Maximize the Styling Quality in a Luxury Fashion E-Commerce

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"O descontentamento é o primeiro passo na evolução de um homem ou de uma nação."

Óscar Wilde

Abstract

With the prosperity of the Internet, the businesses start to see e-commerce as a land with numerous opportunities for exploration, especially for luxury fashion industries. However, the feasibility of buying an item online is a very reticent subject for a large part of the people, mostly because of reliability issues. In order to cover all the risks involved in an online purchase, it is expected that the entrepreneurial entities provide to the customer the best possible service, in this case, a luxury experience combined with a quality service.

Farfetch is an international fashion e-commerce company that contains partnership with independent boutiques distributed all over the world to sell their products online. This digital production company offers to their customers content in the form of information and photography that support the choice of the items to be acquired. In this way, the luxurious experience referred above begins when a client visits the website and the quality of the photographs presented is therefore of utmost importance.

It is in this context that this project arises. With this dissertation it is expected to arrive to a solution that aims at increasing the quality of digital production by making changes to the process.

Initially, it was essential to understand the digital production process, to later identify in which workstations it would be possible to make changes in order to assure the quality. After the identification of the workstation, Live Model (responsible for the materialization of the outfits presented on the website), it was necessary to find out how the quality could be increased. Finally, it was verified that the best configuration would be to apply a better flow of the items that arrive daily from several boutiques and to minimize the use of the basic items bought by the company to conceive the looks. This minimization of the basic items, in addition to promoting more interesting sets with the possibility of enhancing the look, also has the additional benefit of promoting cross selling; allowing greater efficiency of the process and / or a greater dedication to the created looks.

Subsequently, it was realized that the digital production process flows in a way that makes it difficult to cross the items of various boutiques in the same look. After the perception of this problem, it was fundamental to create a project team that met weekly to discuss the requirements needed in each workstation as well as an evaluation of the work done.

To sum up, in order to achieve the objectives of the present project, it is necessary to reorganize the digital production process in such a way that enables to mix a group of items of various brands or boutiques, and then organize them again in accordance with their respective addresses. It is also expected to accomplish an improvement in the efficiency of the digital production process, by optimizing the cycle time in each workstation. In the last chapter of this dissertation it is possible to find the conclusions obtained as well as a feasibility analysis.

Maximização da Qualidade dos Looks Criados num Comércio Eletrônico de Moda de Luxo

Resumo

Com a prosperidade da Internet, as empresas passaram a ver o comércio digital como um terreno com inúmeras oportunidades de exploração, especialmente para industrias de moda de luxo. Contudo, as exequibilidades de comprar um artigo online é um assunto bastante reticente para uma grande parte das pessoas, maioritariamente por questões de fiabilidade. De forma a colmatar todos os riscos que implica uma compra online é esperado que as entidades empreendedoras proporcionem ao cliente o melhor serviço possível, neste caso, uma experiência de luxo aliado a um serviço de qualidade.

A Farfetch é uma empresa de comércio digital de moda internacional que conta com a parceria de boutiques independentes distribuídas por todo o mundo. Esta empresa de produção digital disponibiliza aos seus clientes conteúdo em forma de informação e fotografia que suportam a escolha dos artigos a adquirir. Desta forma, a experiência de luxo referida anteriormente tem inicio aquando da visualização do website e é, portanto, de extrema importância a qualidade das fotografias apresentadas.

É neste enquadramento que surge o presente projeto. Com esta dissertação é expectável a apresentação de uma solução que visa o aumento da qualidade do processo de produção digital.

Inicialmente, foi essencial perceber o processo produtivo para, posteriormente, identificar em que posto de trabalho seria possível proceder a uma alteração em prol da qualidade. Após a identificação do posto, Live Model (responsável pela materialização dos conjuntos de roupa apresentados no site), foi necessário averiguar de que forma se poderia melhorar o processo. Constatou-se que a melhor configuração seria aplicar um aproveitamento dos artigos que diariamente chegam de diversas boutiques e minimizar o uso das peças básicas compradas pela empresa para conceber os looks. Esta minimização das peças básicas, para além de promover conjuntos mais interessantes com a possibilidade de enaltecer o look, tem também o benefício adicional de promover a venda cruzada; possibilitando uma maior eficiência do processo e/ou uma maior dedicação aos looks criados.

Posteriormente apercebeu-se que o processo de produção digital flui de uma forma que impossibilita cruzar os artigos de várias boutiques. Após a perceção deste problema foi fundamental a criação de uma equipa de projeto que se reunia semanalmente para discutir os requisitos necessários em cada posto de trabalho para ultrapassar esta limitação.

Em suma, para que os objetivos do presente projeto sejam atingidos é necessário proceder a uma reorganização do processo de produção digital de forma a que seja possível misturar artigos de várias marcas ou boutiques, e posteriormente, organiza-los de novo de acordo com as respetivas moradas. É também expectável que haja uma melhoria da eficiência do processo de produção digital que passará por otimizar os tempos de ciclo em cada estação de trabalho, em beneficio da qualidade. No ultimo capitulo desta dissertação é possível encontrar as conclusões retiradas assim como uma análise de viabilidade.

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Contents

Acronyms

SLA - Service Level Agreement

SQL - Structured Query Language

BPM - Business Process Management

BPD – Business Process Design

BPR - Business Process Redesign

BPMN - Business Process Modelling Notation

BPI - Business Process Improvement

EVP - Earned Value Professional

PT - Portugal

GM - Global Manager

EU - European Union

VS - Versus

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1 Introduction

Nowadays, the use of the internet is part of the daily lives of the European population. The opportunity to purchase items online is a very reticent subject in the vast majority of people, mainly due to the sites reliability. According to the research made by the Digital Economy Association & International Data Corporation (2017), this issue has been attenuated with over the years, nowadays, the percentage of users who buy online is 60% worlwide and it is expected to increase to 81% in 2025. So, in the near future, more and more online shopping platforms are expected to gain the consumers' trust.

The online sale of luxury products is challenging since it does not provide to the customer some of the luxury basic conditions, such as the touch and the smell (Kapferer & Bastien, 2009). Providing a service highly oriented to the costumer and focusing in different contents with a high level of quality are some of the key factors to overcome this challenge, as it offers to the costumer a more luxurious and exclusive shopping experience.

The contents referred include not only the information of each item (e.g. measures and description), but also their image creating interesting and appealing looks[1] is extremely important as it is directly related to the customer's perception of each item and may have a direct influence on the purchase decision.

The luxury fashion e-commerce retailer wich is in the core of this disertation, Farfetch, has a digital produtive process flow, that takes into account certain quality patterns. The present project aims propose an alternative a scenario for the digital production in order to increase these patterns. This way, it is necessary to understand at which point of the digital production process will be aplied the improvement; afterwards, it is fundamental to identify all the requeriments; and lastly, modelling the new digital production process around the area that will be affected by the improvement.

1.1 Farfetch

Farfetch is an online fashion platform that offers a unique experience in luxury, and counts with a wide selection of products from most exclusive boutiques and brands around the world. Founded in 2008 by the entrepreneur José Neves, Farfetch operates at the moment with more than 700 boutiques in more than 190 countries. Farfetch has grown significantly in 9 years and was recently announced as one of the few companies of the fashion world to become a unicorn[2].

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[1] Look is a clothing composition, which involves in its elaboration, clothes and accessories

[2] Unicorns are technological startups evaluated in more than a thousand million dollars.

Concerning the company's structure, Farfetch owns offices in 11 countries around the world: Los Angeles, New York, Lisbon, Oporto, Guimarães, São Paulo, London, Hong Kong, Moscow, Tokyo and Shanghai as is possible to observe in Figure 1. These structures differ in the areas they work. For instance, the Lisbon office works in the development of the platform; the London office deals with the core business of the company; and the one in Guimarães is focused on the digital production department was where this project took place. One other business unit, that belongs to Farfetch is Browns. Browns is a physical store in London that besides being one of the partners boutiques of Farfetch.com also have it's own e-commerce. Browns's digital production is also based in Guimarães and has a similar flow process to Farfetch. The main difference between these two entities is the fact that Browns has stock.

Figure 1- Farfetch Offices Distribution

The Farfetch business model is different from all competing digital platforms. Farfetch establishes a relationship between Brands/Boutiques and the final customer without the need of having any stock. Figure 2 shows the Farfetch's general process, that starts with the Brands/Boutiques sending to the digital production process all the items they wish to make available for sale in the online platform. After, these items go through the entire digital process and then return to the original addresses, while all the contents are placed online (photography and information). When the item is purchased, it is sent directly from the partners to the final customer, not having the need to go through the company's premises again. However, all the customer service, from the delivery of the item to the service in case of doubt or return, is ensured by Farfetch.
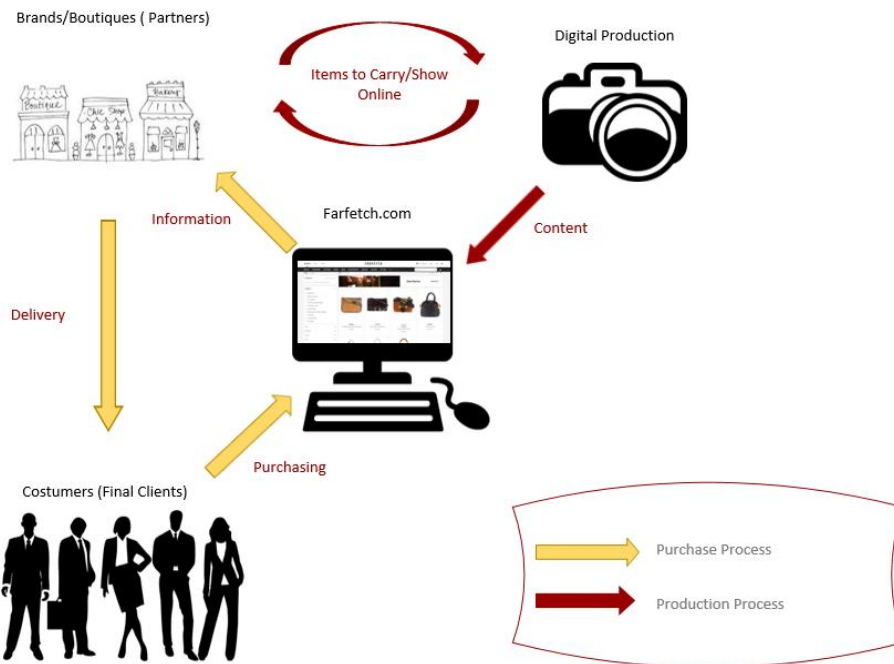
Figure 2 – Farfetch's General Process

As illustrated in the above diagram, the physical items goes through the Farfetch premises only during the digital production process and during that process remains in the building for a maximum period of 3 days (SLA), as defined by the agreement established with the partners.

1.2 Farfetch Styling Quality

Over the years, Farfetch has grown beyond expectation. At the beginning, around 700 items arrived in Farfetch per day, but after a few years this figure started increasing, currently reaching 3000 items a day. The digital production process, as referred above, focuses on the content creation for the platform, such as: the photographs, descriptions and technical information of the products.

Each item may follow different digital production lines, depending on their category (e.g. Clothing category, Jewellery category), as represented in Figure 3. The process is as follows: Items arrive at Farfetch in slots[3] and after their reception, they go to the Scan In area where they are unpacked and organized by digital production line, and where their quality check is also carried out. If the item belongs to clothing category, it will be done the green path as it's shown in Figure 3. That is, the Scan In will sent the items to the Iron area. Here they are ironed, if necessary, and, afterwards, they are taken to Live Model, one of the most important processes of this flow. It is at this stage that the most creative part takes place, the conception of the outfits[4], which will be photographed

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[3] Group of items from the same partner (Brands/Boutiques) that get the same priority in the digital production process. It has a maximum limit of 50 pieces, inside one or more packages/boxes.

[4] Synonym of look

using a model later on. These outfits contain the piece from the slot, which is the main piece, and additional pieces found in a ToolKit[5] provide for Farfetch. If in the slot exist a product which category is jewellery or bags/scarves, follow to Live Model and then respectively, Jewellery and Still area. In addition, if the category of the item is accessories, it follows to Stills directly (e.g. shoes). If in the slot arrives clothing for kids, these clothes will follow the Kidswear path. Lastly, all products come to the end of the process, to perform the Scan Out or Packing and Expedition.
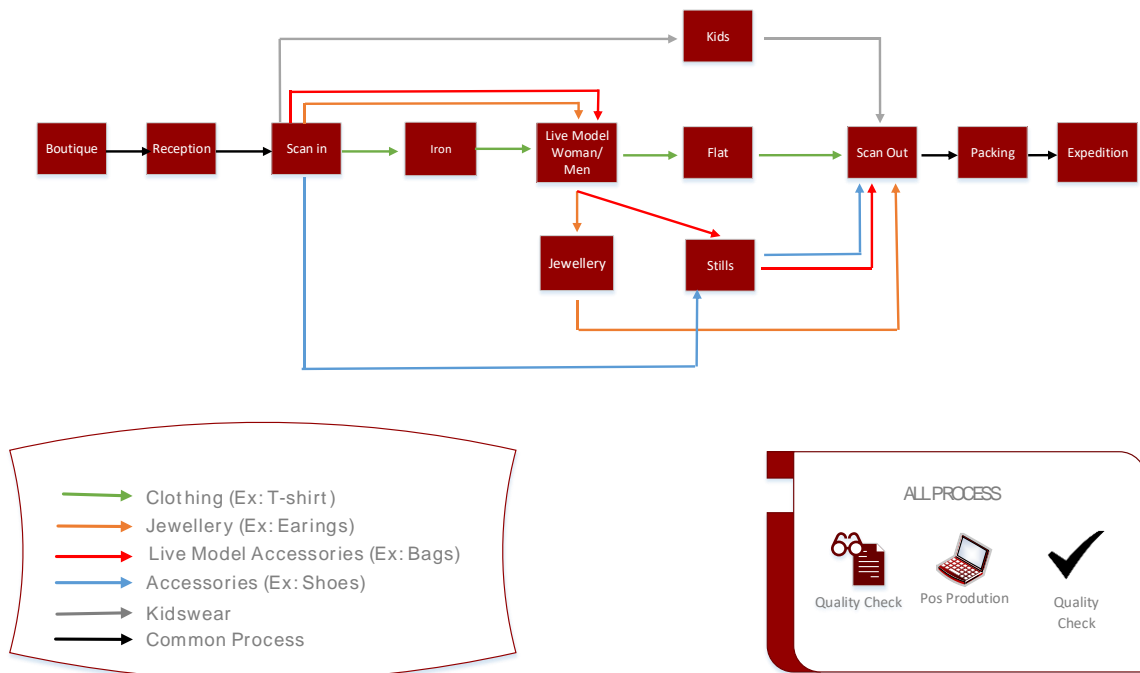
Figure 3 - Digital Production Workflow

So, as seen in the above diagram, a shoe will follow a different flow than a shirt. This is due to different requirements in how they should be photographed. While a shoe needs to be placed on a table under particular light specifications, a shirt requires the existence of a model or a mannequin. Thus, the types of studios required by a product defines the digital production line it must follow.

This project focuses on the items that perform the following digital production process: Reception, Scan In, Iron, Live Model, Flat, Stills, Scan Out, Packing, and Expedition. The items in the Clothing category prevail in this type of flow.

1.3 Project Motivation and Goals

With the present project, it is expected to find a solution that brings the opportunity for styling to use all items available in Live Model area, which can possibly lead to the production of more appealing and interesting outfits. This initiative, which is known as

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[5] The Toolkit is a group of additional pieces, bought by Farfetch for the creation of the outfits.

Mixing Items, has as the main goal making possible to mix items that belong to different Brands/Boutiques, for instance, one pair of trousers from slot X would combine with a shirt from slot Y.

From the customer's perspective, this project will have as main advantage the possibility of finding and purchasing more attractive outfits, and from Farfetch's point of view it is also very beneficial because it can potentiate Shop the Look. In addition, there is also the opportunity to reduce the cycle time in certain workstations, increase the efficiency of the entire production process and the work flow of the items.

1.4 Methodology

The current project was divided into two big groups: (i) Understanding the main problem in Digital Production and (ii) Drawing different alternatives.

To help in the organization of the tasks throughout the development of the dissertation the GanttProject 2.8.5 Pilsen (build 2179) support tool was used. With this tool was possible more specific division of: resources allocation; precedences collocation; assignment of priorities; and a bigger management of all the project, as demonstrated in Table 1.

Table 1 - Gantt chart for the project
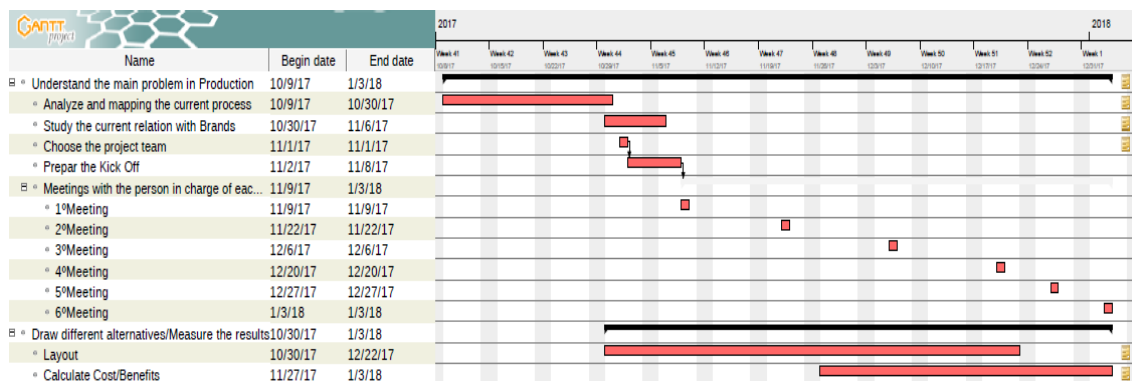
At the initial stage of the project it was necessary to analyse and establish all the steps in the digital production process directly connected to the project. The main purpose of this task was to understand the way each step work and the relationship/connection among them, as current improvement; opportunities.

Afterwards, the relationship between Brands/Boutiques was studied on a more directed approach, to understand how the outfits are actually developed, which brands are related to and which ones are the top 4 Farfetch brands. After this individual work was necessary create a team work. This team contained individuals responsible for each, digital production stage with the aim of providing feedback about the work done.

In a second stage, a layout of the ideas, developed subsequently, was carried out together with F-Tech requirements and the calculation of the cost/benefit.

1.5 Dissertation's Structure

This dissertation is divided in 5 main topics: introduction, literature review, overview of the current process, process improvement and lastly, conclusion and future work.

In section 2, it is possible to find the literature review about the challenges this project will focus on, such us business process and process design. The current situation of the problem is described in section 3, as well as the detailed analysis of the provided data and a deep explanation of each phase of the entire productive process. In addition, the development of the project and the modifications needed to support a quality improvement are describing on section 4. Lastly, in section 5, the main conclusions of the project as well as the upcoming suggestions for new projects are introduced.

2 Literature Review

In this section, an overview of the most relevant literature on the subjects pertinent to the implementation of the project is provided. Firstly, it is given an explanation of a business process, secondly, a clarification of all methodologies used, such as business process management and business process improvement. Finally, a description of some business process techniques used, i.e., Brainstorming, Surveys and SWOT Analysis.

2.1 Business Process

With the growth of globalization, the effect of management in companies has become fundamental. According to Ko *et al* (2009) the reasons for a company to survive and become profitable are:

- The rise in the frequency of ordered goods;
- The need for fast information transfer;
- Quick decision making;
- The need to adapt to changes in demand;
- More international competitors;
- Demands for shorter cycle times.

For this, it is fundamental to have "Business processes largely determine the quality, degree of innovation and productivity of organizations" (Bernardo *et al*, 2017a). So, the main objective of a process is creating a line for any business and helps streamline individual activities. From another perspective more directed to real world, the business approach allows the employees to achieve their commitment and motivate them to improve the daily knowledge (Heisig, 2003a).

A business process is composed of several activities which aims to obtain a desired solution (Aguilar-Savén, 2004), considering this information, we can divide a business process in three main steps: Input; Activities and a common Output, as it is possible to observe in Figure 4.
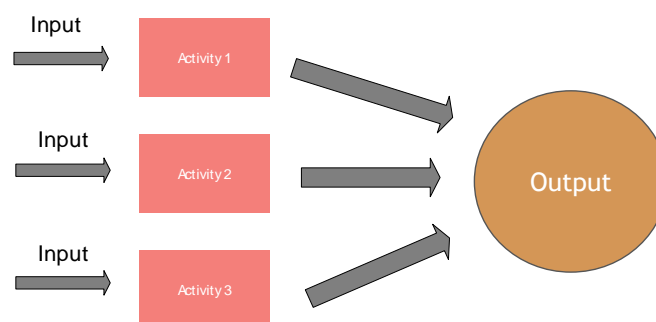
Figure 4 - Geral representation of a Business Process

2.2 Business Process Management

According to van der Aalst (2003), one of the most important researchers of this theme, Business Process Management (BPM) is a support of business processes because it uses methods, techniques and software to design, control and analyze operational processes involving humans, organizations and other sources of information. In other words, in accordance with Doebeli *et al* (2011) "Business process management (BPM) as an organizational management philosophy continues to receive attention as a practice, providing organizations with a means of increasing competitiveness a sustainability in times of market uncertainty, increasing globalization and constantly business conditions".

In accordance with Benedict *et al* (2013) there are six steps that should be followed to succeed in applying BPM, and there are, several techniques and tools that support business processes through all stages (Jan L.G. Dietz *et al*, 2008). This methodology is entitled Six phases of BPM life cycle, shown in Figure 5, this cycle starts with Planning and Strategy and finish with Refining. The live cycle methodology should be made in repeat way. The Table 2 has an explanation about each phase according to Bernardo *et al* (2017b) perspective, i.e., in Planning and Strategy it should be establish a strategy and develop a plan.

Figure 5 - The BPM live cycle

Table 2 - Six Phases of PM live cycle (Bernardo *et al*, 2017)

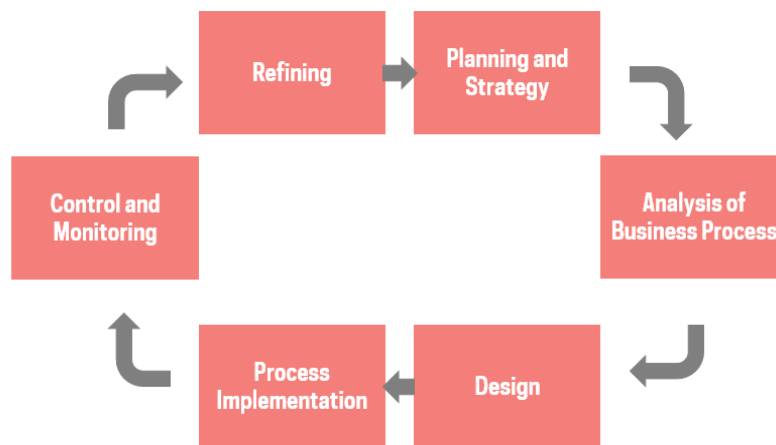| Stage	Description
Planning and strategy	Establish a strategy oriented toward business processes and develop a plan to direct BPM actions
Analysis of business processes	Use different methodologies to understand the current alignment of organizational processes with the stipulated objectives and goals
Design	Design the new process and its specifications; strive to adjust the specifications within a model that best contributes to the objectives established in the plan based on the current status
Process implementation	Implement the adjusted model. This stage includes the challenges of change management and process optimization
Control and monitoring	Contrast the achieved results with the planned goals and offer suggestions for decision making by managers and continuous improvement
Refining	Make adjustments and improvements to contribute more effectively to cycle feedback

Source: Adapted from ABPMP (2013)

To achieve a rich appreciation of the process, it is fundamental to standard the process at a high level. The most important aspect to start a BPM methodology is to have an extensive process knowledge. In this way, citing Heisig (2003b), words the best practices of BPM are:

- "Identify subject matter experts for each area of the business affected by the process. Often there are assumptions made by those in related roles that prove to be incorrect;
- Use complementary techniques to help the stakeholders step outside of the box and see things differently. The techniques suggested are not the only ones available. The BPM team should test different modeling approaches and assess for themselves the ones that work best for their company and culture;
- On complex processes, to ensure that the scope is at the right level, try asking, "Why?" five times. When clear answers are no longer forthcoming, that suggests the appropriate level of scope;
- Ensure that the team is able to succinctly and specifically state the practical problems associated with the business domain;
- Build a roadmap of the short-, medium-, and long-term vision for the application."

2.3 Process Design

Process design is a component of the business process that "can limit the capability of the process to deliver the required performance" (Balasubramanian and Gupta, 2005).

This technique depends on two main factors: stakeholders and activities. The stakeholders provide the information about how the parts of the process work. "Usually business process design should consolidate several process stakeholders' knowledge" (Xiao and Zheng, 2012a). Any model is based on a set of activities and these activities represent the scope of the business process (Xiao and Zheng, 2012b), that is, these activities are defined by the stakeholders and by their knowledge of the process. This way, process design has a huge impact on job definitions, process flow and organization structure.

2.4 Process Redesign

Business Process Redesign (BPR) is an approach "that gets more and more attention, offers a way of thinking and designing to overcome these shortcomings" (Gerrits, 1993). The main difference between process redesign and process design is the fact that process design is focused on creating entirely new processes and process redesign is focused on making major changes in existing processes.

According to Mansar and Reijers (2005a), BPR framework is based on six elements, shown in Figure 6. This framework starts by considering the costumers as part of the business (internal and external costumers), secondly it is important to pay attention to the products generated by the business process. In third place comes the business process, that can be divided in two views: the operational view, more specifically, number of tasks; and the behavior view, i.e., the tasks sequencing. After, the participants in the process, such as the organization process and the population, and finally, the information and the technology used.
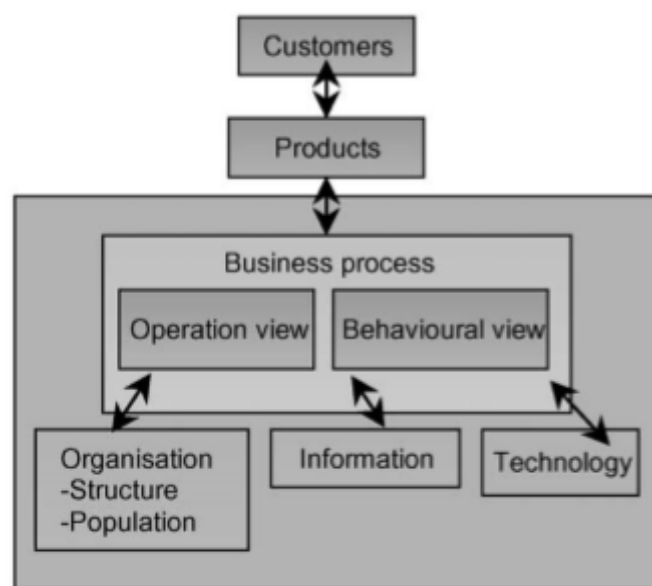
Figure 6 – Framework for BPR implementation (Mansar e Reijers 2005b)

2.5 Business Process Modelling Notation

Business process modelling is an important key in the perception and understanding of business processes. The process modelling technique is used by organizations to model a business process (Respício and Domingos, 2015), in other words, a Business Process Modelling Notation (BPMN) shows graphically the events, the activities, the control flow and the dataflow logic that constitute a business process (Rachdi *et al*, 2016a). To describe a process, it exists a large variety of process languages available today, nevertheless for understanding the objectives of a process, it is necessary to standardize the process semantics. According to Geiger *et al* (2015) "(…) if they skip certain parts of it or implement some features in a limited or differing way, the portability of processes can no longer be taken for granted. In this case, strictly speaking, an engine only supports a dialect of BPMN." In this way. It is essential to have a deeply knowledge of how a flow chart is developed in order to be understanding to all people and be able to handle the complexity inherent to business processes (White, 2004a).

A BPMN model is composed of a set of elements. Figure 7 provides an overview of a set of BPMN elements related to control flow specifications.
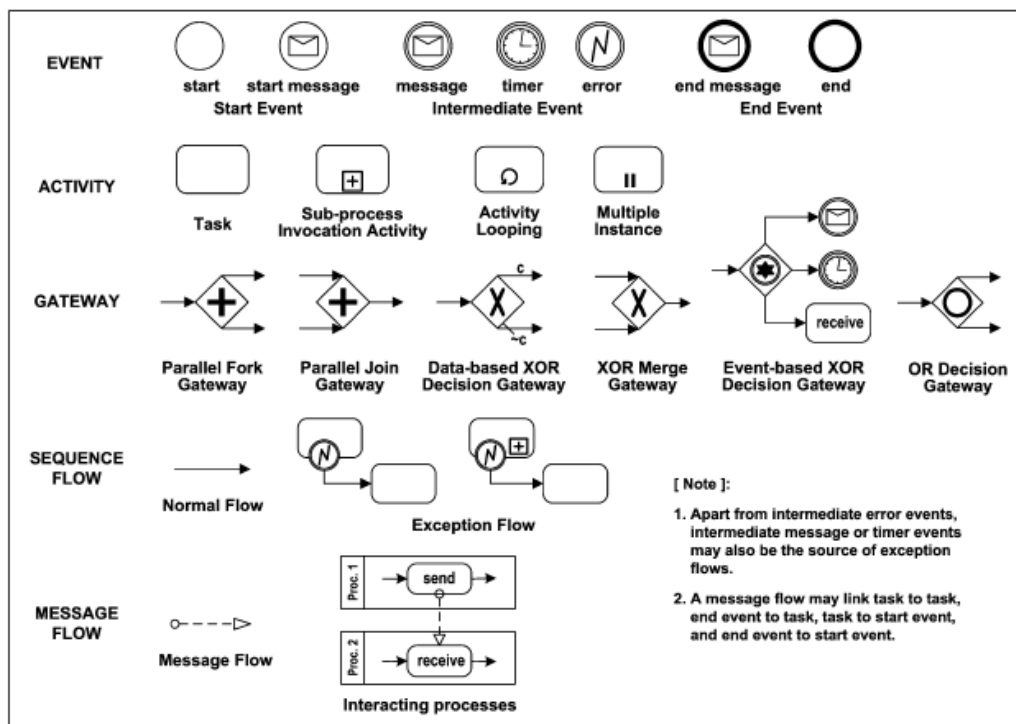
Figure 7 - Overview of BPMN elements (Dijkman *et al*, 2008)

As we can see in the figure above, a BPMN graphic is composed by events, activities, gateways, sequence flows and message flows.

An event may signal the start of a process (start event) the end of a process (end event) and may also occur during the process (intermediate event). The activity is used to define tasks and sub-processes and they are essential for the work to be performed. The gateway is used to determine the divergence and convergence of sequential flows, that is, it is usually used to represent a decision, forking and joining of paths. In addition, the sequence flow is used to show that activities will be performed within a certain sequence in the process and lastly, the message flow is applied to show the flow of the message between two separate processes (White, 2004b).

According to a research made by Rachdi *et al* (2016b) about business rules languages, for a successful BPMN model it is necessary in first instance to draw the model taking into account all the objectives and after verifying if the business rules are all respected based on the obtained process schema.

However, the BPMN technique has some issues that Dijkman *et al* (2008) showed in his research such as:

- Process with multiple start events;

- Process instance completion;

- Exception handling for multi-instance sub processes;

• Or-join gateway.

2.6 Business Process Improvement

Process improvement is an important step of a business process life cycle. In fact, "(…) improving a process is to ensure a monitoring that allows obtaining results positively scalable in terms of constraints, new requirements, identified and analyzed malfunctions and internal suggestions" (Akkiyat and Souissi, 2017).

Although being fundamental, a Business Process Improvement (BPI) methodology has several terminologies. One of the biggest mistakes is confused this concept with Business Process Re-engineering (BPR). According to (Harrington *et al*, 1997a), a business process improvement is a methodology that is designed to bring step-function improvements in administrative and support processes using approaches such as process benchmarking, process redesign and process re-engineering.

A business process improvement should ensure that:

• Makes the process effective - obtaining the desired results.

• Makes the process efficient - uses the minimal resources as possible.

• Makes the process adaptable - flexible designed to change the costumers and business needs (Bhatt, 2000).

The BPI methodology, shown in Figure 8, was designed by Adesola and Baines (2005) and it is based on seven steps that guides the actions and the decisions.
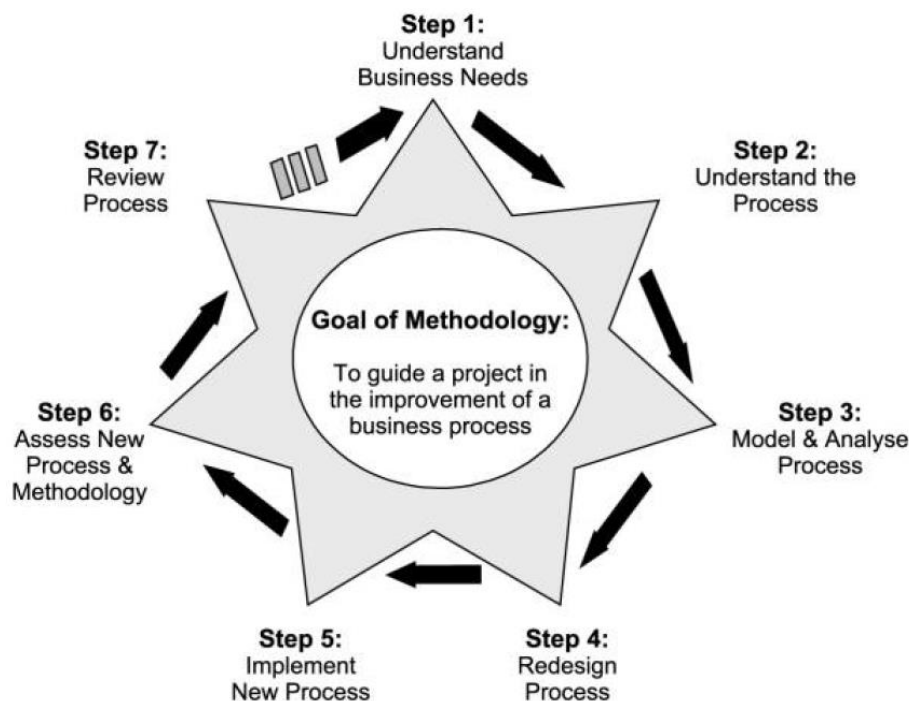

Figure 8 - A generic model for a business process improvement (Adesola and Baines, 2005)

Taking into account the previous figure, the first step aims to develop a vision and a strategic objective, at this phase it is recommended to make a SWOT and stakeholder's

analysis. The second step is expected to model the process, that is, identify the business process architecture using, for instance, process flowcharts and in step 3 the objective is measure the existing process performed. The fourth step is hoped to define the F-Tech requirements and identify the focus of re-design activity with brainstorming. The objective in step 5 is to plan the implementation and develop the technology, in addiction, step 6 aims to conduct process deployments, perform data reflections and putting in practice the action plan and, lastly, the seventh phase is expected to develop a strategic view of the business.

2.7 Business Analysis Techniques

The business analysis techniques are a set of methodologies that help not only to identify business needs and problems, but also create impactful deliverables that facilitate stakeholder decisions.

Some of those techniques are: SWOT Analysis, Brainstorming and surveys, that will be described in the following sections.

2.7.1 SWOT Analysis

With the objective of improving the strategy of a company is necessary to develop an analysis process with different Stakeholders, one of the most popular is SWOT analysis (Hill and Westbrook, 1997). This technique aims to identify the strengths, the weaknesses, the opportunities and the threats of a project/process/company, as seen in Figure 9. After the identification process it is possible to obtain an output based on the strengths, aware of the weaknesses and that exploits the opportunities (Dyson, 2004).

	Helpful to achieving the objective	**Harmful** to achieving the objective
Internal (attributes of the organisation)	Strengths	Weaknesses
External (attributes of the environment)	Opportunities	Threats

Figure 9 - SWOT matrix (Hay and Castilla, 2006)

In addition, it is important to specify the meaning of each quadrant, according to Hay and Castilla (2006):

- Strengths are internal attributes of the organization that are helpful to the achievement of the objective.
- Weaknesses are internal attributes of the organization that are harmful to the achievement of the objective.
- Opportunities are external conditions that are helpful to the achievement of the objective.

- Threats are external conditions that are harmful to the achievement of the objective.

2.7.2 Brainstorming

Brainstorming is one of the most important techniques used to generate creative ideas and solutions through intensive and freewheeling group discussion. According to Furnham and Yazdanpanahi (1995) a brainstorming "was first claimed to be an effective method of group problem solving, who argued that this technique increases the quality and quantity of ideas generated by group members".

This methodology consists in each participant is invited to share their option, think loud and suggests as many ideas as possible. In this way, the quantity of ideas and opinions at a problem facilitates its resolution. However, this technique has some disadvantages mostly because brainstorming groups may have disruptive interpersonal conflicts and unequal participations (Aiken *et al*, 1996).

2.7.3 Survey: Questionnaires

A survey is one of the most important ways to gather information from a population (Brehob and K., 2001a). Although, the possibility to collect significant information is high, it is possible that some percentage of that information end up being skewed. In this way, it is very important the content and the design of the questionnaires, "users' reactions can have a strong impact on the design and development of an interface" (Kuter and Yilmaz, 2001a).

According to (Brehob and K., 2001b) the steps for conducting a survey are:

- Set the goals - What do you want to capture?
- Decide on the target population and sample size - Who will you ask?
- Determine the questions- What will you ask?
- Pre-test the survey - Test the questions
- Conduct the survey - Ask the questions
- Analyze the data collected - Produce the report

The questions have most of the times, three types of questions: multiple choice; numeric open-end, for instance, "how many time do you spend per day on project?" and text open-end questions, for example, "Give you option about …" (Kuter and Yilmaz, 2001b).

3   Overview of Current Productive Process

The digital productive process in Farfetch flows in accordance with the image shown previously, in Figure 3 and it has multiple different flows mainly: Clothing path, Jewellery path, Live Model Accessories path, Accessories path and Kidswear. From an overall perspective of the entire process, the present project will focus on the Clothing path and Live Model Accessories path. As it is shown in Figure 10, the process starts with the boutiques sending the slots for Farfetch's facilities (as explained previously, a slot is a box which can bear at most 50 items inside) and the planning team allocating these slots orders to the working days. When the slots arrive to Farfetch they are received by the reception team that forwards them (in priority order) to Scan In and after to Live Model, where it is taken the first photograph of the items. After the Live Model step, the process is divided in: Flat, for clothing (e.g. Trousers); and Stills, for accessories (e.g. Bags/Scarves). Lastly, all the items from the slots are gathered to carry out the Scan Out, Packing and Expedition process, returning to the Boutiques. It is important to have a brief overview of all these steps, and for that reason the next sub chapters will explain how the digital production process in this company works.
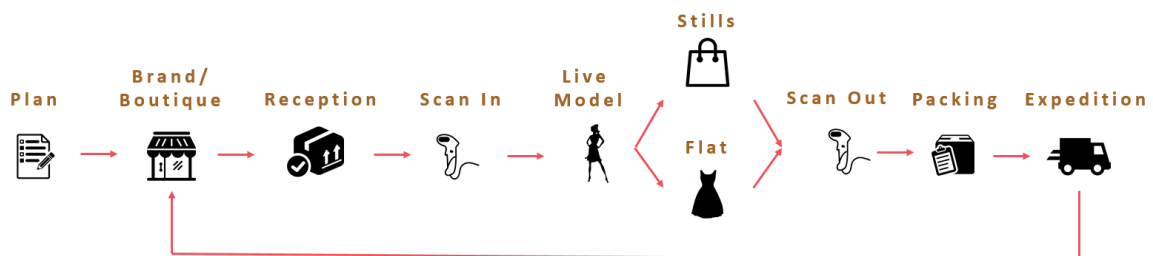
Figure 10 - Clothing Process

3.1   Planning

Planning is responsible for the allocation of Brands/Boutiques that arrive daily, product balancing throughout the day (assignment of priorities), calculation of necessary capabilities/resources and, finally, the realization of forecasts.

This team provides a daily report (using Microsoft Excel) containing the list of slots that will arrive and their priorities. With this tool, the reception is able to forerun the daily organization and prepare the delivering

3.2 Reception

The reception is the second step of the whole digital productive process and consists in verifying if all the slots that arrive to Farfetch match with the forecast, using the report provided by the planning team. The reception team is also responsible for making the work more balanced. Usually, the delivery companies arrive during the morning with material for one day of work, i.e., two shifts. The shift division corresponds to two half days. In other words, the planning team splits the process between the afternoon of the same day and the morning of the next day.

After the confirmation of the slots and their division, a registration number is placed on each slot to facilitate its identification. This way, if a Brand/Boutique wants to send 150 items to Farfetch is becomes necessary to divide the pieces between, at least, three slots. Each slot has a tracking sheet, as seen in Figure 11, with the number of the slot, the name of the store, the priority, the arrived day, the number of the slot the store sent and the color of the day:

Figure 11 - Slot's tracking sheet

Subsequently, the slots are neatly placed in ascending order of priority, for the mizus[6] to take them to the next step.

3.3 Scan In

Scan In is the third step of the digital production cycle. This stage starts with the mizus allocating the slots, previously prepared by the reception team, to the workstations, always by priority order.

Afterwards, the worker unpacks the slot, item by item, and verifies if each item has an ID sheet with a bar code to scan. At this point, the worker can be faced with three situations:

- The item is new;
- The item is duplicate;

---

[6] Mizus- Normally defined as Mizusumashi, logistic train, in the company is defined by a collaborator who does the transport of items between stations.

- The item is either missing or a reshoot.

If the item is new, it must go through the whole digital production, meaning it has to complete the process of photography and description. A duplicate item is a product that has previously attended Farfetch's facilities. This type of product accompanies the slot during the entire process but is not photographed. Conversely, a reshoot item is a product that has been in Farfetch previously but needs to be photographed again. Finally, a missing item has no information in Farfetch´s software.

New items also require that a worker checks for any defects; if the item is considered blocked; and if the item has any accessories attached. Sometimes, the items that arrive at Farfetch come with some stains, scorches or even defects. When this happens, the defective item is catalogued with photographic proof. Whenever an item does not belong to the list of Farfetch´s brands or has alarms attached, it will be considered blocked. Lastly, the worker must verify if the item has an extra piece, like a belt. If so, the piece is stamped so it does not get lost.

While the Scan In is performed, the items are placed on the rails[7]. The division of the products by the rails takes in account the flow path and the gender of the item. For instance, if the item is a women's trousers it will be placed on the rail that goes to Live Model Women. Each rail should hold a maximum of 16 items. After all pieces of the slot are placed on the rails, the worker prints the tracking sheet, Figure 12, for each rail used, in order to identify to which slot it belongs. This identification sheet must contain the slot priority, the arrival day, the number of the slot, the name of the store, the production path, the number of items in the rail, the number of rails the slot has, the number of duplicated items in the rail and the color of the day.
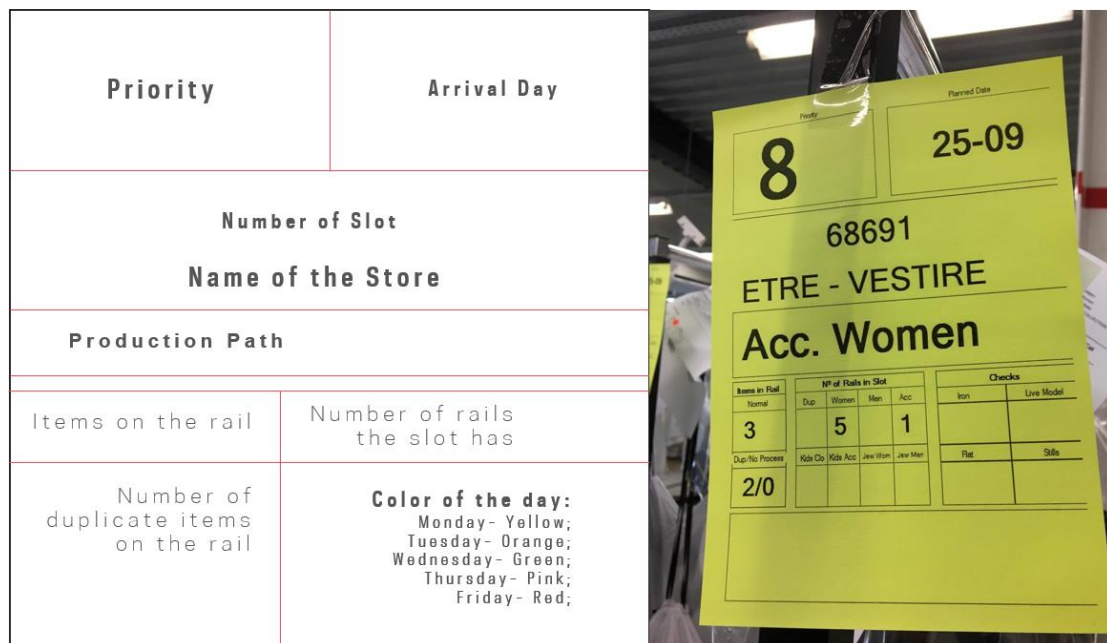

Figure 12 - Rail's tracking sheet

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[7] Rail- It is an iron-mobile structure where the items are placed.

Each workstation has three different zones: the green area, used to store auxiliary material like rails and empty boxes; yellow area, which is a "to-do" zone, meaning that it is a space reserved for mizus to allocate the new slots; and the blue area, a "done" zone where workers place the slots after all items are scanned so that they are ready to be allocated by the mizus to the next station.

3.4 Live Model

Live Model is the most important step in the entire process and, as such, it will be the main focus of the present dissertation. The Live Model process is divided in two sub-processes: preparation of the looks – Styling– and photography of the looks - On Set.

Styling

The work division in Styling is based on the already performed rails from Scan In, which means that, each stylist has a rail assigned to him with items that belong to the same slot. The main objective of Styling is the materialization of the looks and this sub process is divided in several steps. The first step is to elaborate a short description of each item on the tracking sheet, for instance, "black top with flowers". Afterwards, it is essential to research how the brand visualizes the piece and meant it to be used on an outfit. After this research, the stylist is in charge of the composition of the outfit using the Toolkit or items of the same rail. For example, if the rail has a pair of trousers, the stylist can combine it with a simple T-shirt and a pair of boots currently available on the Toolkit. The Toolkit is a set of saleable carryovers items purchased by Farfetch at the Brands/Boutiques partners, which are used to support the Styling sub process. A carryover is a piece that is transversal to the clothing collections launched by the brand, so, it is always possible to find the item in the stores. In this way, same pieces of the Toolkit are saleable and can be purchased online with Shop The Look button. The Figure 13 illustrates the Styling process referred above:

Analyse the Item   Search about the Brand and   Create the looks with the
                          understand the Brands Style   Toolkit available

Figure 13 - Styling process

When the final looks are finished and validated by the styling coordinator, who has to verify if the outfits follow Farfetch's styling guidelines, the rail is sent to the next sub process: photography or On Set.

On Set

The photography process is performed in teams made up of a stylist, that is there to ensure that the look he previously idealized results in the model; a stylist assistant, in

charge of assembling all the items selected from the Toolkit that are needed to complete look; a model, who will wear the selected pieces; and a photographer, who is responsible for photographing the look in a total of 4 views consisting of: front, back, ¾ and a detailed shot, as show in Figure 14.

Figure 14 - Live Model photos

3.5 Flat and Stills

When the items leave the Live Model step they are split into two processes: all pieces belonging to the Clothing path go to Flat step and all the pieces that belong to Live Model Accessories path go to Stills step.

Flat and Stills are a different concept from Live Model photography, where the items are photographed with a model. In these sections, only the items which make part of the scope of the dissertation will be described.

Flat

The fundamental idea behind this step is to photograph the item in such a way that it is perceived as if it is floating when a client looks for the piece online. To achieve this, the photographer uses transparent or opaque mannequins to dress the item. In this way, with the help of the edition department it is possible to get the look that is presented in Figure 15.

Figure 15 - Flat photo

Stills

The Still step is very similar to the Flat step. The Live Model Accessories arrive through the mizu and the rails are allocated to the workstation by priority order. The concept of Still photography is to give the perception that the accessories are floating, just like in Flat photo. Usually, four photos are taken per piece: flat (because the photo shares the same features of the Flat photo), back, inside and detail, as is it shown in Figure 16.

Figure 16 - Stills photos

At this point, all the processes involving the photographer are finished, and the photographies taken throughout the digital production process are sent to the quality control department. This department's main function is to give feedback for all the photos and to ensure that they follow Farfetch's standards. If all the photographs from a slot receive positive feedback, the slot gets permission to follow to the next and last step. Otherwise it will be necessary to redo the process.

3.6 Scan Out/ Packing/ Expedition

Scan Out is a very similar process to Scan In. It is in this workstation that items belonging to the same slot that have followed different paths in the process are reunited. This happens in a stock area just before the Scan Out area where each rail waits for the remaining rails belonging to the same slot.

The Scan Out process starts with the assignment of the slots to the workstation by mizu. Afterwards, an operator scans the file that comes with each item (product sheet) and checks if the description in software matches the real item. Posteriorly, the slot is packed and shipped for the corresponding entities.

With these last activities, the entire digital production process is finished, whilst trying to accomplish the 3 days policy, which means that the slots only stay inside Farfetch's facilities for a maximum of 3 days (SLA).

3.7 Layout

Regarding the productive process presented in the previous sub-chapters, it was noted a considerable necessity of structuring it. In Figure 17 it is possible to visualize the current layout of the building:

Figure 17 - Building Layout

The items' flow is characterized for being a continuous process. This way, the slots enter on Farfetch by the reception station and are forwarded to the Scan In stage (illustrated with the blue squares on the first floor, right side). After the identification stage, the items are sent to the upper floor using hoists. On the second floor, and after going trought the ironing station, the items that belong to the man category are transported to the Live Model Man, and the items that belong to the woman category are transported to the Live Model Woman (right side of this floor). Regarding the jewellery items, these are transfered to the place represented in purple, on the inferior right corner of the second floor, as it can be seen in Figure 17. The items that have to go through Flat and Stills are transported by the mizus to the left side of the second floor, illustrated in Figure 17 by light purple and pink, respectively.

Immediately after the digital production, the items are hoisted back to the ground floor, where Scan Out, Packing and Expedition take place. After this, the products leave the digital production procedures facilities and are shipped for their initial addresses.

3.8 Data collection

For the development of this dissertation it was necessary to resort not only to the company's database, but also to field measurements. After the data collection, the Microsoft Excel tool was used to analyze the data providing support for graphics, calculations and extrapolations.

After data collection, it was necessary to calculate the percentage of items, within the Scope, that follow the paths shown in Figure 10, the Clothing path and Live Model Accessories path. Of all the existing paths (Clothing path, Jewellery path, Live Model Accessories path, Accessories path and Kidswear path) about 52% belongs to scope and goes to Live Model: 34% goes to Woman and 18% goes to Man. As previously mentioned, after Live Model step the items are divided in Stills and Flat. The percentage of items that follows for Stills is about: 23% for Live Model Woman and 10% for Live Model Man. The percentage of items that follows for Flat is 76% for Live Model Woman and 89% for Live Model Man. Table 3 shows the results obtained. The sum of the percentages does not add up 100% because the missing percentage refers to items out of the scope.

Table 3 - Percentage of items that follows Clothing and Live Model Accessories path

	Live Model Woman	Live Model Man	Stills	Flat
Scan In	34%	18%	-	-
Live Model Woman	-	-	23%	76%
Live Model Man	-	-	10%	89%

3.9   Brands Outfit Creation

Currently, the outfits created in Live Model always contain a main item (item coming from a Brand/Boutique) and elements chosen from the Toolkit available or elements from the same rail, used to complete the look. The Toolkit bought by Farfetch consists mostly of saleable basic style pieces or carryovers, that is, items that are accessible in Farfetch.com. In order to profit from the outfit concepts rather than only from the main pieces showcased in them, a utility called Shop The Look is available for the costumer. This utility allows the costumer to easily access and purchase all the items, including the ones from the Toolkit, that were used in a specific outfit.

In order to understand if there is any tendency amongst brands in the creation of looks, the database was used to study the top 4 best-selling Farfetch brands.

The study consisted in analyzing the combinations made between items forming a look and the origin of these items to draw conclusions about the trends and the analysis is present in Figure 18.
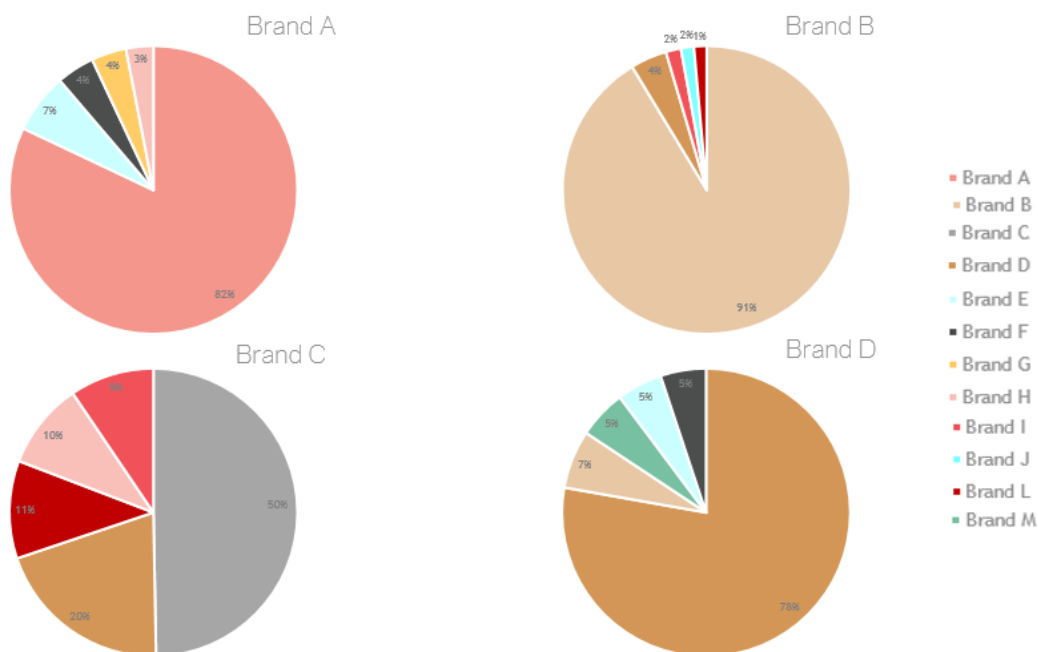
Figure 18 - Brands outfit creation

From Figure 18 it is possible to conclude that the top 4 best-selling Farfetch brands usually conceive the looks mostly with their own pieces (Toolkit items with the same brand). That is, 76.77% of the times a Brand A piece makes up a look together with another Brand A piece. This can be explained by the restrictions imposed by top brands, trough guidelines, regarding how Farfetch can cross their pieces.

In a deeper observation, it is possible to verify that the rest of the brands used to make the looks are mostly the same in the 4 graphs. This occurs because those brands belong to the same cluster, that is, they are brands with similar style. For instance, 3 out of the 4 top Brands (A, B, and C) combine with the Brand F. In conclusion it is important to retain that in the present process there is the attempt to join Brands of the same style/cluster, and this fact can be the starting point for the creation of the Mixing Items.

3.10 Framework of this project in the digital production process

After studying the digital production process, it was identified a great opportunity to increase quality in the Live Model step. As explained in the chapter 3.4, the looks are designed with the help of the available Toolkit or items that belongs to the same rail. With this, the styling process becomes very limited, once the Toolkit items are carryovers, i.e., basic pieces, which make the process of promoting the main items more difficult.

Bearing this issues in mind, the initiative of Mixing Items emerged. The Mixing Items consists on giving to the styling team the opportunity to concretize the looks, that will be placed online, with a bigger choice of items, once it will be possible cross items from others slots. This way, all the items that are in Live Model, within the scope, can be used to design the looks, so the use of basic parts will be minimized and swapped by pieces with more expression and sales capacity.

One of the consequent initiatives of Mixing Items is the shop the look. This application on Farfetch's website, as previously mentioned, is now available. However, it provides only the possibility of purchasing some pieces of the Toolkit. With this project, this application will be potentiated and the users will not only be able to find an item with a superior styling quality online but also have the chance to buy all the pieces that constitute the look (inside the scope). This way, it is expected the sales of the sensation pieces of some collection will increase.

In Figure 19 is shown a schematic of the framework of this project. In first place the goal is to increase the quality of the styling with the Mixing Items initiative that will consequently increase the sales. The Mixing Item, in its turn, will leverage Shop The Look which will also bring benefits in terms of sales.
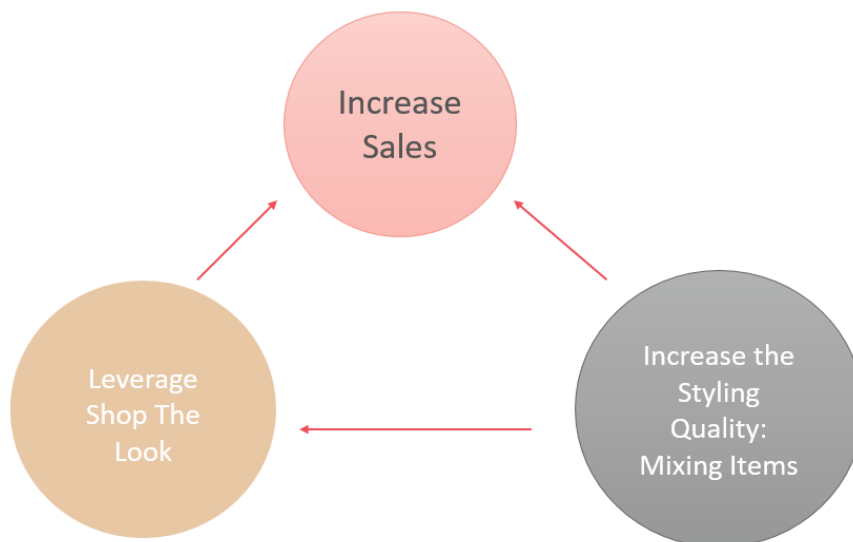
Figure 19 - Overview of the project purpose

There are some basic principles that are essential for the proceeding process, such as:

- The slots have to remain always united;

- The priorities of each day must be accomplished;
- Each slot can only remain in the company's facilities for a maximum 3 days;
- Each item has to be send for the original address
- Respect the Farfetch guidelines;
- Respect the brands guidelines.

The greatest challenge of this project is to assure that the goal is reached, that is, neither improving the quality of the styling, without compromising the partners (Brands/Boutiques). Together with the main objective, there are opportunities for parallel improvements such as the organization of space, change the methodology of work, efficiency improvements, among others.

4 Process Improvement

Process Improvement is the active task of identifying, analyzing and improving upon existing business processes, so, according with Harrington et al, (1997b) this methodology is "designed to bring about step-function improvements in administrative and support processes using approaches" such as Brainstorming. This chapter aims to describe each step of the digital production process improvement, using the model presented in Figure 8 from chapter 2.5. The steps 6 and 7, *Assess new process and methodology* and *Review new process* respectively, are not going to be described in this chapter once they were impossible to implement in the present project. This chapter also contains the *Project Methodology* section to give a brief overview of the methodology used and a *Costs and Benefits* section.

4.1 Project Methodology

In the present chapter the methodology adopted for solving the problem imposed will be shown, as well as the techniques used in the development of the project.

Project Team

Given the dimension and the multifunctional nature of this project, a strong Project Team, counting with people from many areas was needed.

It was fundamental to create a team with key members from each step of the digital production process. In Figure 20, the team members and their respective functions on the process are shown, most of the members are Managers since they are considered to be an added value for the project. The main objective of creating this group is to collect the greatest number of insights about the project and, at the same time, to obtain feedback of the work already developed. Therefore, it was necessary to create weekly brainstorming meetings, in which different scenarios of the project were presented, so that the group members could contribute with their perspectives.
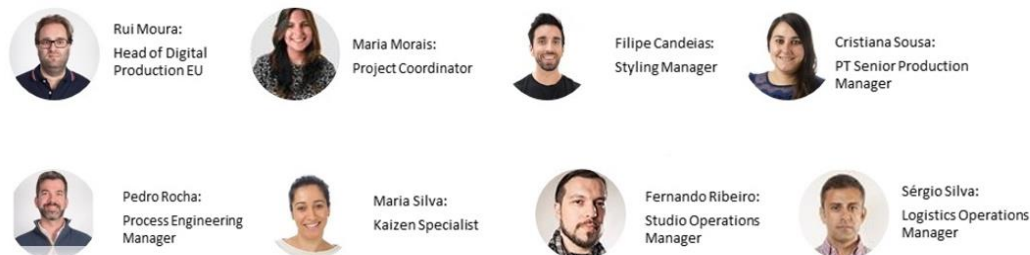
Figure 20 - Elements of Project Team

Brainstorming

The fundamental objective of the Brainstorming meetings was to collect the maximum number of ideas from the members of the project team.

In these Brainstorming sessions, held weekly as shown in Figure 21, a power point document was presented with information on the current state of the project. During these presentations the project team was invited to contribute by suggesting ideas. For that, some discussion points were identified with the intention of guiding the Brainstorming. This way, all the work carried out during the Maximize the Styling Quality project was developed with the contribution and validation of the selected project team. In Figure 22 it is shown an example of one of these sessions.
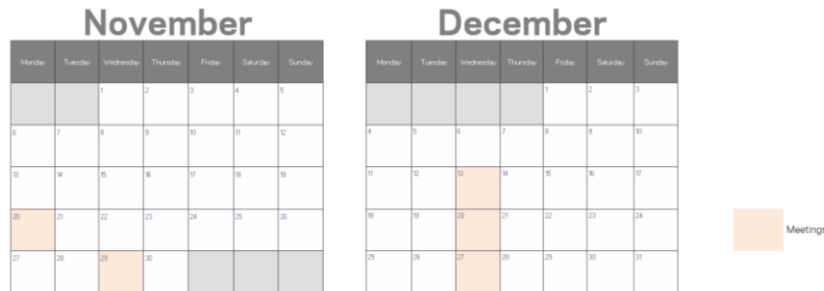
Figure 21 - Schedule of Brainstorming Meetings
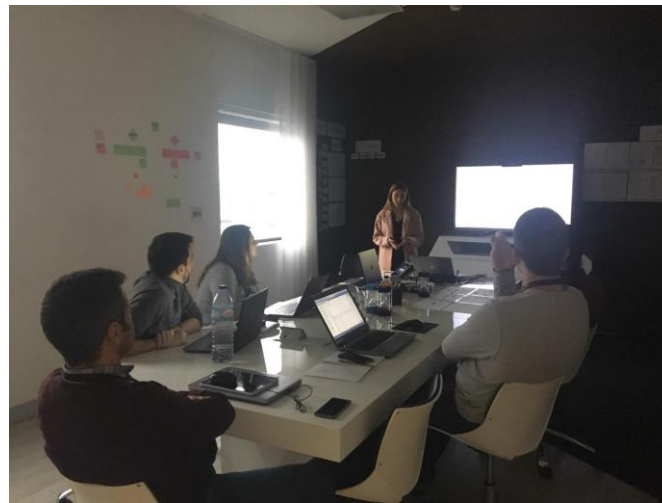
Figure 22 - Brainstorming Meeting

Table 4 shows the agenda of each Brainstorming session.

Table 4 - Brainstorming's Theme Meetings

Sessions	1st Session	2nd Session	3rd Session	4th Session	5th Session
Theme	Current Situation: Kick Off	Styling Requests	Scenarios	Tests Results	Project Presentation

Therefore, in the first session the Kick-Off meeting was held with the purpose of presenting the current situation overview and, at the same time, of exposing the project, with the intention to recall all requirements needed in each step of the process. The second session was dedicated to the Styling step, since this part of the digital production process is focus of the present project. The results of some questionnaires made to the styling professionals were presented and, together with the project team, it was also possible to adapt the process in order to make it correspond to the needed requirements. After all the information was analyzed, it was possible to conceive scenarios and in the third session of the brainstorming meetings, they were presented to the project team which selected the best one. In addition, between the third session and fourth session, tests in different steps of the project were conducted and in the fourth session the results were presented with the intention of validating the chosen scenario. Lastly, on the fifth session the project was presented with all the requirements included.

4.2 Understand the business needs

After an overview of the current digital production process, it is now essential to understand the business needs, especially when it comes to producing content for the final user. As such, this chapter aims to present and describe not only the vision, strategic objectives and the stakeholders analysis, but also the potential impact of successfully implementing this new project.

Business Process

In a business process approach, the business needs are best understood using an activity (strategy) to output (vision) diagram, as show in Figure 23.

Figure 23 - General representation of "Maximize the Styling Quality" project

For this project the activities were defined taking into account what is needed to attain the main objective: maximize the quality of styling - giving to styling department the opportunity to use all items received from the Brands/Boutiques (Mixing Items initiative); improving the efficiency of the process - with by reducing the time spent on some tasks; improving the organization - process redesign approach.

The vision for the "maximize the styling quality" project is to provide the costumers more appealing outfits in order to encourage them to buy the entire look and, in this way, increase the sales.

Stakeholder Analysis

Stakeholders Analysis is a key factor in terms of assessing how the interests of stakeholders should be addressed in a project plan, policy, program or other action. For this study, it was done a graph, Figure 24, which on the vertical axis shows the power level of stakeholders (that must be Keep Satisfied or be monitor, depending on the level) and on the horizontal axis shows the interest level of stakeholders (depending of the level, they must be Informed or managed closely).

Figure 24 - Stakeholders Analysis

The Final Clients are the process stakeholders that have more power in digital production, because they are responsible for purchasing the items, although having no interest in the details of the Maximize the Styling Quality project. EVP Operations and PT GM and Global Production Director come next and are the stakeholders inside the Farfetch's facilities that have more power as well as, interest in the project because it has direct implications in sales and profit. With the same level of power is the Head of Digital Production EU and Global Head of Styling. However, the interest of the second is relatively higher due to the connection with his area of the project. Logistics Manager, Process Engineering Manager and Studio Operations Manager require mostly to be kept informed however and come next in the level of power. On the other hand, Styling Manager demonstrates a higher level of interest since it belongs to the area of Styling. Finally, the Styling Department and the Partners are both in a leverage position

and manage closely because they are the positions most connected with the intervention area of the project. Despite that, the power that these positions have is relatively low compared to the other hierarchical positions represented in the graph.

SWOT Analysis

In the table below (Table 5), the SWOT Analysis performed for the present project is shown where the internal and external factors that affect the company's future performed are identified. The SWOT Analysis was developed by Strengths, Weakness, Opportunities and Threats.

Table 5 - SWOT Analysis

STRENGTHS	WEAKNESS
▶ Stylist's Quality	▶ Limited ToolKit
	▶ Slot Oriented Process
	▶ Manual Process
OPPORTUNITIES	**THREATS**
▶ Willingness of the customers to buy entire looks if they are appealing	▶ Farfetch's openness to big process changes requiring investment

The Strength detected in the digital production process is the quality of Styling team. The confidence in these professionals is evident, and because of this, the whole project revolves around their capacity to provide better looks with items never seen before.

One of the biggest Weaknesses of the current process is the limited Toolkit not only for being basic items, but also in lower quantity. Nowadays, during the materialization of the looks, it often occurs having two stylists choosing the same Toolkit item, while only one of them will be able to use it. The other Weakness detected was the way that the digital production process used to work. In the entire process, all workstations use software designed to work by slot, so, in each step, an item can only move to the next step if all items of the same slot are ready to move. The last weakness is the fact that the whole digital production process is almost totally manual, thus existing the risk of delaying priorities and exchanging product sheets.

Considering both the Weaknesses and Strengths identified, the present project will provide the opportunity for customers to purchase all items viewed in an online outfit with the Shop The Look application. As mentioned previously, the Shop The Look is a concept that is currently put into practice, however, this application gird up the carryovers that are part of the Toolkit. With the Maximize the Styling Quality project

arise the opportunity for this concept to grow, allowing cross-selling of items from several Brands / Boutiques.

In addition, the main Threat identified in the digital production is Farfetch reluctance to the changes required in the entire process due to the changes that this modification entails in the process flow and the investment in the technology software for the quality improvement.

4.3 Understand the process

This chapter aims to give a brief overview of the Business Process Modelling used to comprehend the current digital production process.

Business Process Modelling

During the study of the process, explained in detail in Chapter 3, arose the necessity to use the business process modelling notation (BPMN) technique.

This approach was used in all areas within the scope of this project and it was possible to be found in Appendix A. Figure 25 is an example of BPMN model from the Live Model step - Styling sub process. This process, as referred previously, begins with the stylist observing the priority of the rails and ends when the rail goes to the studio (on set).
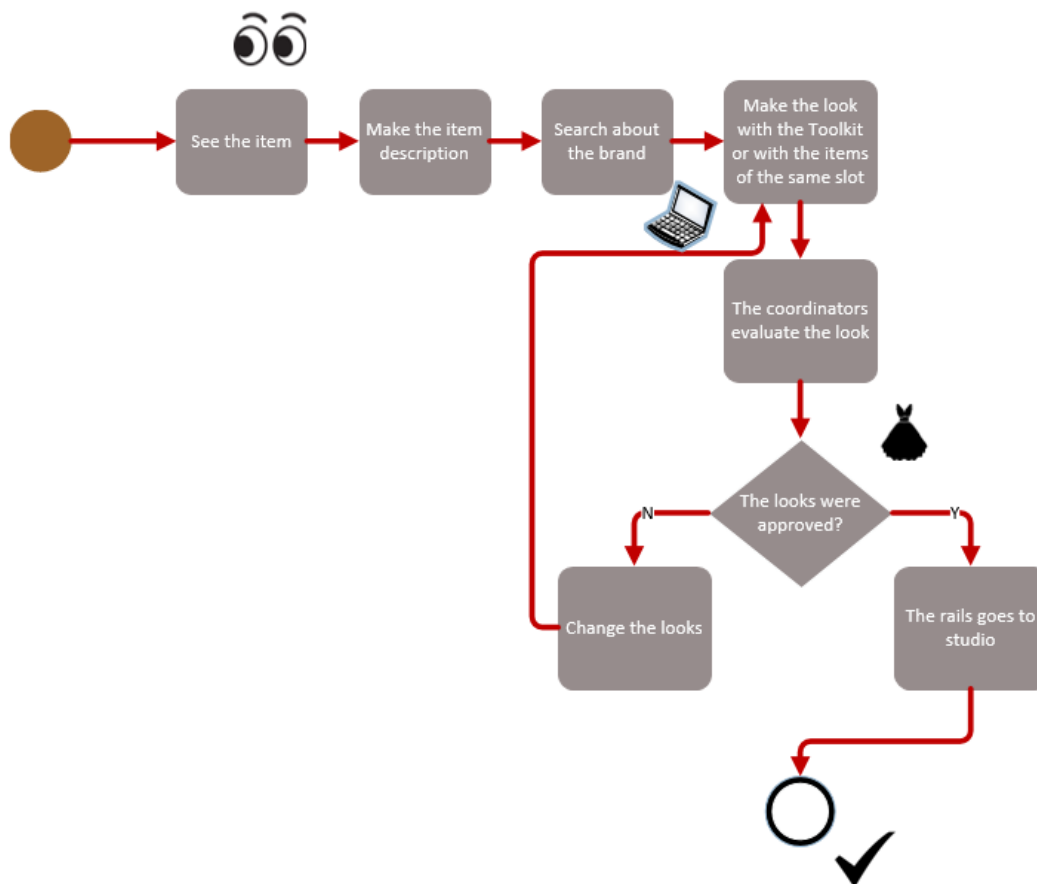

Figure 25 - Styling Process Mapping

4.4 Model and Analyze the Process

An important step when developing the project was identifying the challenges and requirements needed in the styling department to implement the mixing items initiative. At this stage it, was necessary to create a survey with key questions so it could be understood how this team would react to changes in the process and what they would prefer. In this chapter, an analysis to the data obtained within a population of 26 people is performed, and the key conclusions are later presented.

Current Process VS Mixing Items

The main objective of the project is to increase the quality of the styling, for this, it was necessary to realize a study in detail of the working flow of the items for later to be able to adapt to the new modification. In the beginning, it was possible to observe in the whole digital process a strong dependence on the manual work, for instance, in the reception the verification of the arrival of the slots, a report is manually filled by the workers.

Another problem was found in the focus area of the present project, Live Model, namely with the use of the Toolkit. Currently the Toolkit consists of pieces purchased by Farfetch from the partners boutiques (saleable items) however, these pieces are characterized by carryovers (as they are transversal to all collections) and restrict the quality of the styling, since the Toolkit lack the capabilities to emphasize the desired items. In addition, the amount of equal parts in the Toolkit is limited, i.e., only one Stylist can use a particular item in the materialization of the look.

Taking into account these problems, it was suggested the idea of crossing items of several slots (Mixing Items) with the intuit to increase the quality of the styling with more interesting pieces and at the same time to increase the number of options for the creation of the looks. Allied to this objective comes the minimization of studio time, since a look could include two or more different items of slots, and potentializing the Shop The Look application. In Figure 26 left side, it is possible to visualize a look designed with the current process, to which the piece that will be sold is the jeans and are conjugated with a basic top. In the same figure but in the right side there is a look with the Mixing items that, as in the previous example, the piece that will be sold is the jeans but, in this case, it is conjugated with top and a jacket more attractive.
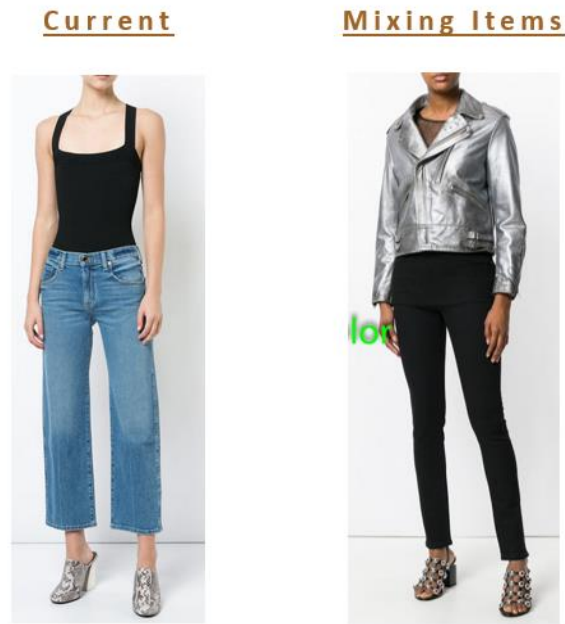
Figure 26 - Difference between outfit look current and Mixing Items process

However, when crossing items from multiple slots, they must be returned to the original slots to be sent back to the Boutiques. In this way, it will be necessary to create a new station in the process that sorts the items.

Questionnaires

At the beginning of the questionnaire two questions were raised about the experience of the stylist, as it is possible to see in the figure below.
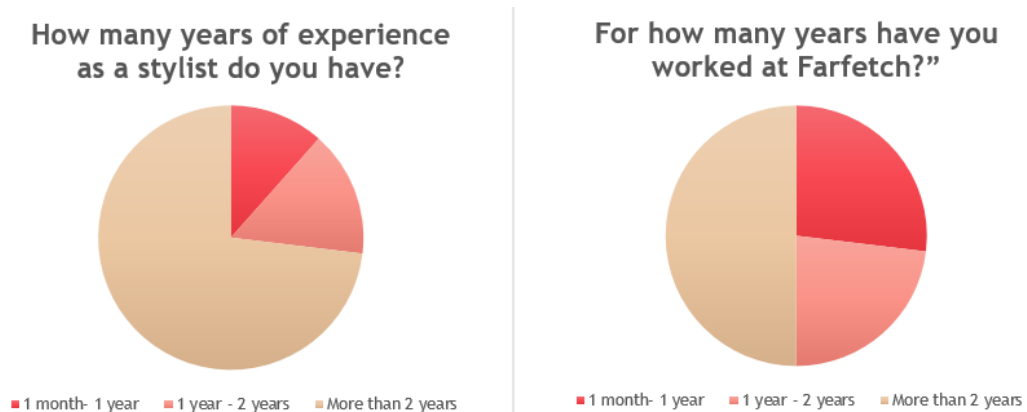
Figure 27 - Survey Questions 1 and 2

As it is shown in Figure 27, left side, most of the professionals working in this department have more than 2 years of experience. Taking this fact into account, it is possible to afirm that the following answers are given by professionals with experience in Styling. The second question aims to understand if the respondants have a deep

knowledge about the process and Farfetch's guidelines, which is true according to Figure 27, right side.

The next two questions aim to identify the reaction of the workers to changes in the process, and the result are shown in Figure 28.
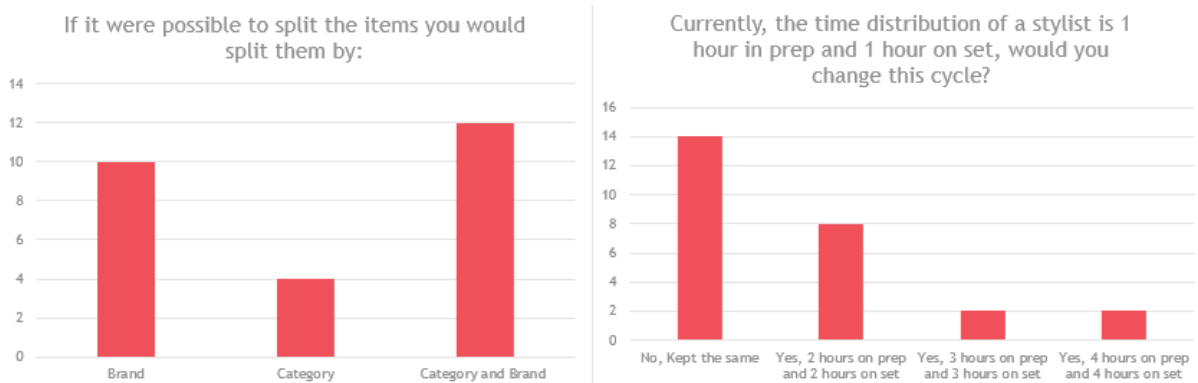
Figure 28 - Survey Questions 2 and 3

At the moment, the items that arrive to Live Model are split by slot and inside of this slot the items are divided according to the brand. Within the Mixing Items initiative, having the products organized by slot and brand not provide the required diversity of items. When asked about how to slip the items, Professionals responded that they would like to receive the product split only by Category and Brand, for example, one rail with all the trousers together split by brand. On Figure 28, right side, a question was posed regarding the cycle time, as currently the distribution of time on the Live Model is one hour to prep 16 items and one hour on set. The main objective of this question was to understand if the current time used is adequate or if more time was necessary. It is possible to afirm that the professinals consider that the current time distribution's sufficient.

The next question was directed to the materialization of the looks. Based the results from Figure 29 it is possible to assert that the workers prefer to work with less items, since they consider that too many items could be confused and by having less items they have more room to study the product.

If you had 1 hour to create 16 different looks, how many articles available do you think you would need in order to create them? (Consider we are talking about articles you've never seen before)
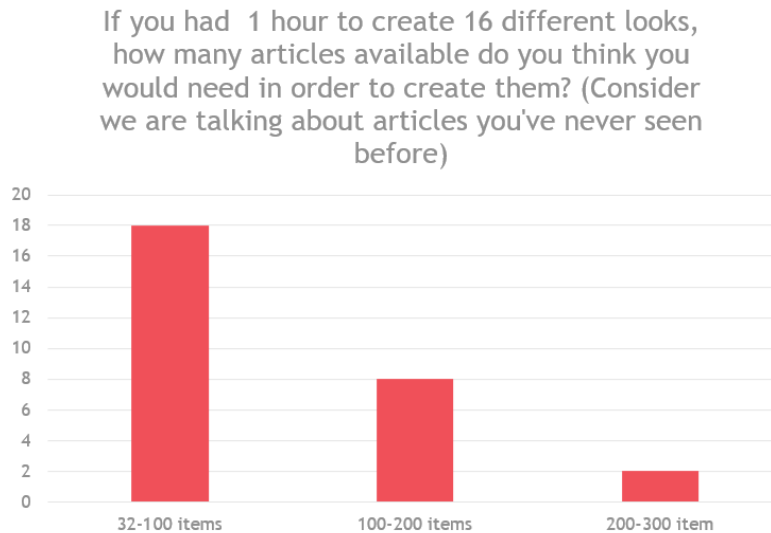
Figure 29 - Survey Question 4

Finally, an open question was posed in order to find out the way the workers imagine the preparation area so a layout could be constructed. In Figure 30 some relevant answers are shown.

"We definitely need a board or something similar to create the looks! Something that I can hang the item that I'm preparing and the toolkit pieces! (…)"

"The current menswear prep area is a good example for the future (…) It's really necessary to have a support table to prepare jewelry or bags. (…), is mandatory to have tools like a board on the wall so we can easily preview the looks before going on set."

"I would make more organized and spacious with an area to test the outfits"

Figure 30 - Survey Question 5

As can be verified by the comments above, it is admissible to create a board for the looks preparation, i.e., a zone in which it is possible to manage the items for validation on whether the created outfit makes sense or not. Another inevitability exhibited is the need to improve the organization of the space in order to be more ample and more appealing to creativity.

4.5 Redesign Process

Scenarios

With the implementation of all the actions above mentioned and by taking into account all the requirements, it was possible to build a first scenario shown in Appendix B. Subsequently, this first version was presented on the third session of Brainstorming and after the feedback received from the project team was sketched the scenario shown on

Figure 31. By visualizing the layout presented and the current digital production process it is possible to see the addition of three new processes named Pre Styling, Sorting step and Photo Quality Control on time. In the development of the scenarios it was used the process redesign approach shown on chapter 2.4.

Figure 31 - Final Scenario

Regarding the layout presented above the new process will carry the following modifications:

Scan In

Currently, the structuring of the materials in the rails is carried out according to the Brand, that is, if a slot coming from a boutique has 3 trousers, 2 t-shirts from a Brand X and 2 trousers and 1 t-shirt from Brand Y the organization on the rail will be performed joining all items of Brand X and then all items of Brand Y. However, with the Mixing Items project and taking into account the survey results, the distribution on the rails will be performed according to the category and within each category, according to the brand, i.e., using the previous example: the 3 trousers of Brand X and the 2 trousers of the Brand Y will be together as well as the 2 t-shirts of the Brand X with the 1 t-shirt of the Brand Y, as shown in Figure 32.
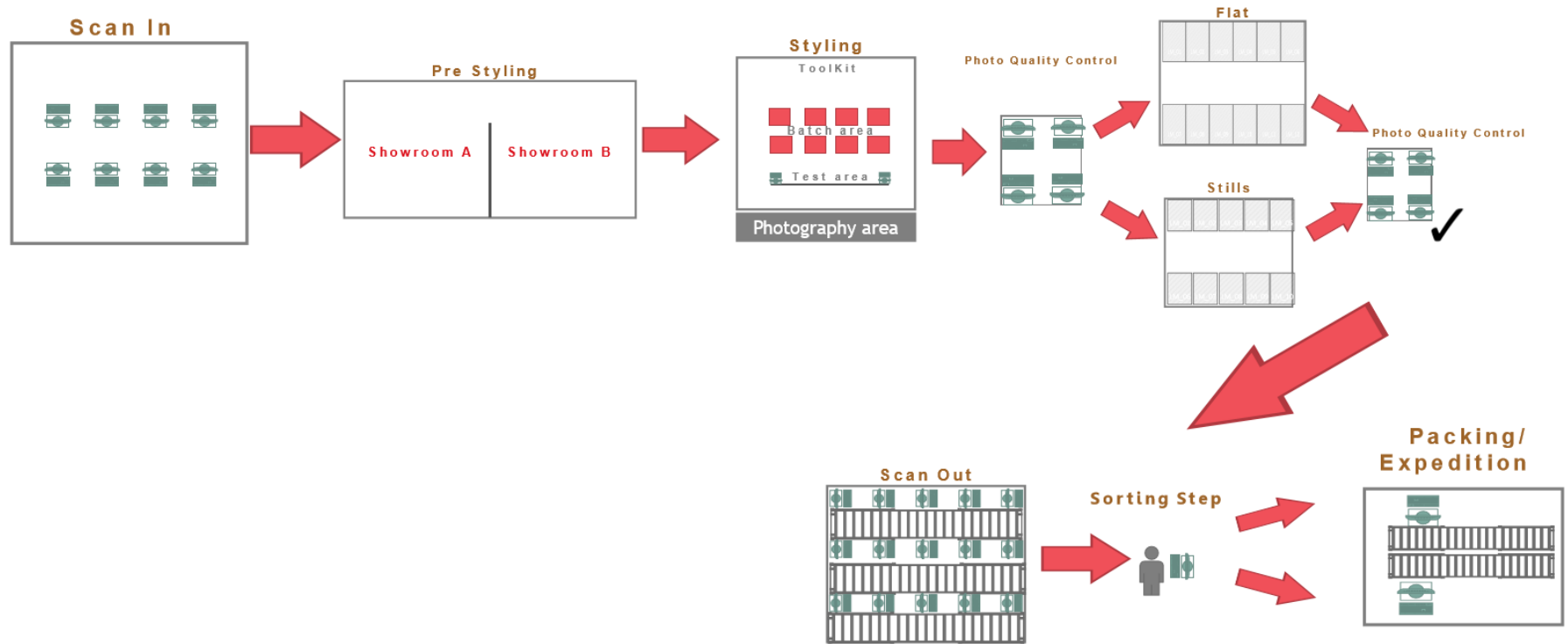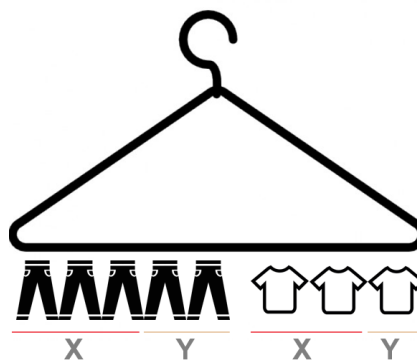
Figure 32 - Rail Structuring

Pre Styling

The Pre Styling is a new step in the process which is composed by Senior Stylists (Buyers) who have the goal of creating batches with items that have the potential to match. It will be like creating clusters according to the item style that will be delivered to a Stylist in the styling area.

The Styling will be organized in two different areas: the Showroom A and the Showroom B. The purpose of this division is to ensure that when the buyers are working on Showroom A the mizu is allocating the next items from Scan In to the Showroom B. In this way, there is no risk of mixing pieces with distant priorities.

Live Model

In the styling zone there will be a batch area where the batches from Pre Styling will be allocated to the respective Stylist. To create the looks, the Stylists can use the items belonging to the batch delivered or the available Toolkit. In this zone, there will also be a board for testing the looks, as recommended on the questionnaires results.

In the studio area there will be no modifications, nevertheless, with the previous modifications it is expected that the time in this sub process will be smaller since there will be more than one main item in each look which currently do not happen.

Photo Quality Control- Live Model

The quality control process is a step that currently exists in digital production. However, this step is dedicated to checking the quality of Live Model, Flat and Stills photography. The disadvantage of this position is that there is the need to a reshoot to a Live Model photo, the

rail that contains the item is already in another step. This implies a movement of the logistic resources so that the piece is back to the Live Model step and, simultaneously, increase the waiting time of the slot for leaving the Farfetch's facilities. The purpose of Photo Quality Control - Live Model is to provide a process of quality control dedicated only to Live Model in order to minimize the movement of resources, waiting time and facilitate the tracking of the item in the event of negative feedback.

<u>Flat & Stills & Photo Quality Control</u>

There will be no changes in this steps.

<u>Scan Out</u>

A slot can only follow for Scan Out when:

- All items have the check of the Quality Control;

- All items, which have previously followed different paths in the process, are gathered in the stock area (before Scan Out step).

In the current process the slot only can enter in Scan Out if all items that belongs to this slot are gathered, otherwise has to wait in stock area before this step. In the propose modification the items go to Scan Out in the same way that they left the previous steps reducing the stock time.

<u>Sorting & Packing & Expedition steps</u>

The Sorting step is a new process that aims to separate the items in their respective slots for later to be sent to the Brands / Boutiques. As a result, the packing area will have two lines, in each line will be allocate some slots, for instance, the first line is responsible for the slot X and the second line is responsible for slot Y. Thus, if the sorting step worker receive an item that belong to the slot X he has to route it for the first line or if the worker received an item that belongs to the slot Y he must send to the second line. The Packing and Expedition process will not have any changes.

F-Tech requirements

For the concretization of the project it will be necessary to modify the software used in the digital production process, since the whole computer system is designed to work by slot. This way, in each step of the process, by:

- <u>Reception</u>

  Development of a tool with the expecting material to arrive, day by day, linked to a mobile scan, in order to be possible to scan the slot and confirm automatically their arrival.

- <u>Pre Styling</u>

  Creation of a software to identify a batch. After gathering all items that will belong to the same batch, it is essential to create a tracking sheet of the rail with the information seen on the Figure 33.

Figure 33 – Rail's Tracking Sheet

- Live Model

  Update the current software in order to memorize product sheet bar code, outfit bar code, rail bar code, the number of Live Model studio and the name of the professionals in this studio, as shown in Figure 34.

Figure 34 - Live Model Software Update

- Scan In / Flat / Stills / Photo Quality Control / Scan Out/ Packing / Expedition

  Update the software so that it can be possible to work by item.

- Sorting Step

Design of a software that enables the worker to guide the items for the Packing line. In this way, when the worker scans the product sheet, the new software indicates to which Packing line the slot should go, i.e., if in the Packing Line 1 is assigned the slot A, B and C, when the worker receives an item that belongs to one of the three slots will forwards him to this line. This application also provides the lead time and the percentage of items needed to achieve this step to complete the slot. In Figure 35 there is an example of this application.

Figure 35 - Sorting Step Tool

4.6 Implement new process

In order to verify if the implementation of the new process was possible it was necessary to carry out tests in the various stages of the process.

Scan In

In this section, the modification made consisted of changing the disposition of the items in the rails. Currently, the items are ordered taking into account the slot primarily and secondly the Brand, as explained above, however, with the Mixing Items project the items will be arranged according to Category and then by the Brand. To verify if this new change would not delay the process flow, it was necessary measure the cycle time of the proposed process and after that, compare it with the current cycle time. Figure 36 shows the difference between the current process cycle time (OLD PROCESS) and the cycle time of the proposed change in the process (NEW PROCESS). For this study, some tests were carried out, to which for the old process were accounted 205 samples and for the new process 227 samples. This discrepancy between sample values is due to the fact that it was impossible to carry out further tests, once this intervention affects the daily productivities of the company. It is also important to mention the uncontrollability of this step of the process, since the items that arrive at Farfetch come from Brands / Boutiques, which have the autonomy to decide what they will send. Thus, it is impossible to abolish duplicated items.
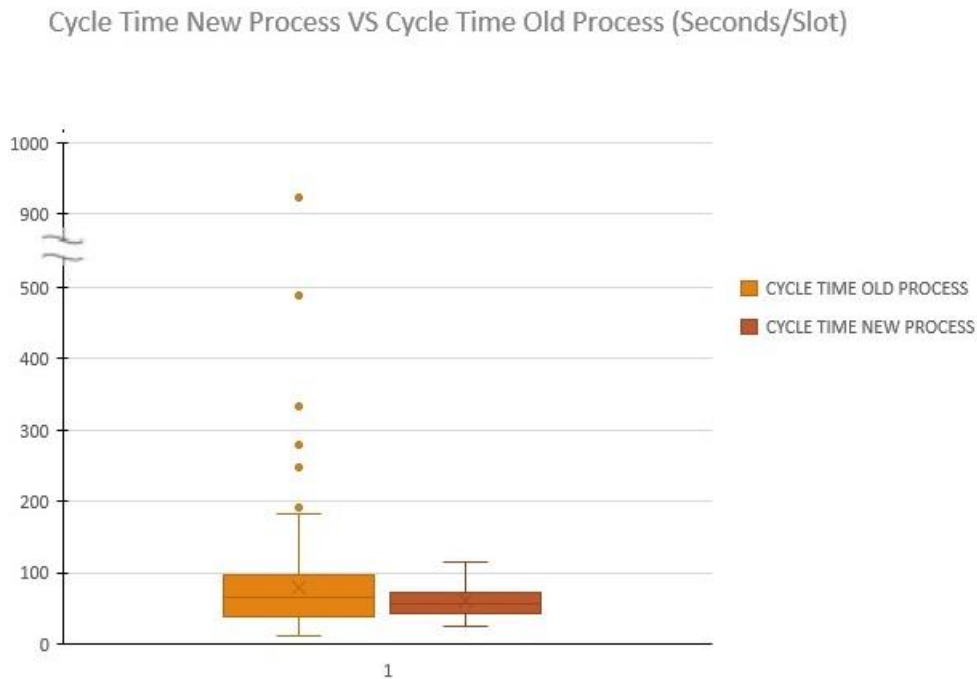
Figure 36 - Boxplot for the Cycle Time between Methods

Looking at the figure, it is possible to verify that the new process takes on average 70 seconds per slot while the old process takes 79 seconds. So, it is possible to conclude that the cycle time of the new process is lower than the current one, due to the fact that the proposed organization is more visual than the current techniques, for example, if a worker has to allocate a T-shirt from Brand X it is simpler to identify where the other T-shirts are than where the Brand is. Moreover, it was also observed a bigger dispersion of the cycle time values of the old process compared to the new process.

It is also possible to observe the existence of some outliers in both processes. These outliers are due to a typical characteristic of the step, the identification of the duplicates. When a possible duplicate is identified, it is necessary to confirm if the software has a photograph, otherwise it is necessary to go through each step of the process looking for the identical item (the current software indicates the priority to which the detected ID belongs).

In order to deepen the study, it was performed a test on the difference of the expected values with a level of significance of 5%, and the hypotheses were:

- H0: $\mu_O - \mu_N = 0$; the difference in expected values of the current and new process cycle times is equal to 0.

- H1: $\mu_O > \mu_N$; The expected value of the cycle time of the old process is bigger than the new process.

After performing the calculations presented in Appendix C, it was determined that the test is inconclusive, since the p-value, 9%, is higher than the significance level considered, 5%. However, the processes cycle time tends to be smaller since the rejection value, 9%, is quite close to that level of significance.

Pre Styling

As previously mentioned, this step does not exist in the current digital production process. However, it was fundamental for the continuity of the study, to understand how much time a Buyer would take to complete the batches.

In the first place, it was essential to determine the number of items that are going to be part of each batch. For this calculation, it was taken into account essentially the breaks of the digital production team and the current target. Currently, the Sytling team takes breaks every 2 hours and 30 minutes and has a work cycle of one hour on preparation and one hour. To avoid stopping over a cycle it was decided that each new work cycle would take 2 hours and 30 minutes. So, it was determined that in each 2 hours and 30 minutes:

- The buyer has to change the showroom, that is, as 2 hours and 30 minutes to perform 8 batches for Live Model Woman and 4 batches for Live Model Man and after going to the other showroom and do the same;
- The buyer has to perform 8 batches of 37 items for Live Model Woman and 4 batches of 48 items for Live Model Men;
- The Stylist has to create the looks;
- A rail goes on set.

Regarding the need to understand how much time one Buyer will need to perform one batch, for Live Model Women, with 37 items, 2 different tests were made, with 2 different Senior Stylists (buyers). In the first test 3 batches were created, and in the second one, 2 batches. In order to perform the tests, it was necessary to simulate an environment as near as possible to a Pre Styling area, so, this test was carried out in the business unit Browns, which has an extended Toolkit and possesses unknown items for a Farfetch worker. In Figure 37, it is shown the results of the tests.

FIRST TEST

First Rail	Second Rail	Third Rail
• 1º Sub Rail – Coats/Jackets-8	• 1º Sub Rail – Coats/Jackets-8	• 1º Sub Rail – Coats/Jackets-19
• 2º Sub Rail – Sweaters/Dresses – 14	• 2º Sub Rail – Sweaters/Dresses – 14	• 2º Sub Rail – Sweaters/Dresses – 7
• 3º Sub Rail – Jeans/Trousers – 12	• 3º Sub Rail – Jeans/Trousers – 10	• 3º Sub Rail – Jeans/Trousers – 6
• 4º Sub Rail – Bags – 3	• 4º Sub Rail – Bags – 5	• 4º Sub Rail – Bags – 5

Time	00:37:23	00:13:11	00:12:04

SECOND TEST

First Rail	Second Rail
• 1º Sub Rail – Coat/Jackets-5	• 1º Sub Rail – Coats/Jackets-6
• 2º Sub Rail – Sweaters/Dresses – 13	• 2º Sub Rail – Sweaters/Dresses – 16
• 3ºSub Rail – Jeans/Trousers– 13	• 3º Sub Rail – Jeans/Trousers – 10
• 4º Sub Rail – Bags – 6	• 4º Sub Rail – Bags – 5

Time	00:35:50	00:15:16

Figure 37 - Pre Styling Test Results

According with the figure above, it is possible to observe that the time to perform the first rail was higher than the time to perform the remaining rails. This is due to the fact that the first rail requires more attention because is the first time that a Buyer sees the items, so, it is essential to perform a Brand research and carefully observe the arrived items.

In addition, the project team deliberated that the target time to perform the first will be 40 minutes and for the remaining rails 15 minutes. Figure 38 shows some of the rails finished during the test.
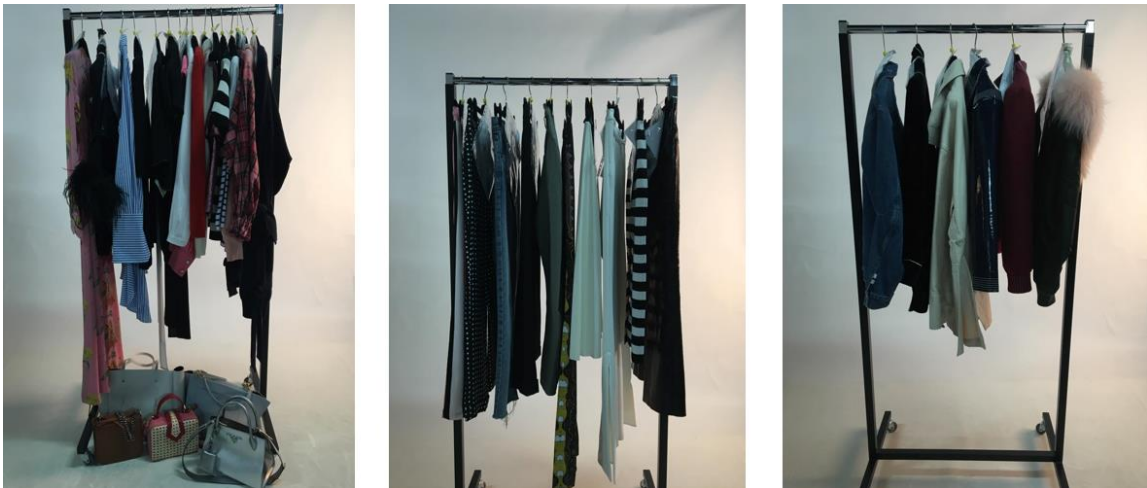
Figure 38 - Rails Performed

Due to the impossibility of accomplishing further tests, it was not possible to perform for Live Model Men the same procedure used for Live Model Women. This way, to estimate the cycle time, was assumed that between women and men the time varies proportionally to the number of items in the batches. Considering that, to perform 48 items it will be necessary 52 minutes for the first rail, and 20 minutes for the remaining rails.

In conclusion, in order to provide 8 batches for Live Model Women and 4 batches for Live Model Men, in 2 hours and 30 minutes, 2 Buyers are required, in Appendix D and Appendix E it is shown the excel sheet used for the calculations.

Scan In and Pre Styling

Subsequently, it is essential to understand the work time difference between the Scan In and Pre Styling.

Firstly, it was takes into account:

- The Scan In target;
- The percentage of items which follow the path under consideration, shown on Chapter 3;
- Number of items needed in Pre Styling area (8 batches *37 items= 296 items, Women, 4 batches*48 items=192 items, Men).

Considering this, the work difference among these two workstations will be 2 hours and 40 minutes to which the project team decided that it would be approximately 3 hours due to the instability of the process.

Styling Test

For the Styling test, it was given to a stylist a rail developed by a Buyer, that is, a set of 37 items with the potential to combine. The main objective of this test was to identify the percentage of looks created with more than one item from of the rail (desired situation) and the percentage of looks using of the Toolkit.

For the test, it was given to a Stylist 2hours and 30 minutes from which he only used only 41 minutes and the looks created contained 35% of Toolkit items and 65% of items from the same rail. In Figure 39 the Styling coordinator is evaluating the work done.

Figure 39 - Rail evaluation process

On Set Test

Following the Styling test, the same rail was delivered to a studio team (Stylist, Stylist Assistant, Photographer and Model) in order to verify if 2 hours 30min would be enough to photograph the designed looks. This way, as it was expected, the time in study was minimized, currently one look (with one main item) takes 4,08 minutes and with mixing items approximately 5 minutes (with two pieces), since, as previously mentioned, a look can contain more than one main items, which means, the time of the model to change clothes and the time of the photographer to take the photographs will be reduced. However, as the main objective of the project is to increase the quality of the created outfits the target time was not reduced to give freedom to a Stylist to change the looks with the intention of increasing the quality. So, to photograph the 37 items were used the 2 hours and 30 minutes provided. In Figure 40 are exposed some of the photos taken in the study.

Figure 40 - On Set test Result Photos

A summary of the proposed changes in each Workstation is given in the Table 6:

Table 6 - Summary of proposed amendments

Workstation	Function	Resources	Work division
Scan In Vs Pre Styling	Time difference between these two Workstation in order to supply the Pre Styling with 296 items for woman and 192 items for man.	8 workstation in Scan In.	3 hours between Scan In and Pre Styling.
Pre Styling	Time to perform 8 batches for woman and 4 batches for man.	2 Buyers in Pre Styling (one for woman and one for man).	2 hours 30 minutes in each showroom.
Styling	Conceive looks for all items in the rail .	8 Stylists for create the outfits.	2 hours and 30 minutes on styling area.
On Set	Shoot all conceived outfits.	1 Stylist, 1 Stylist Assistant, 1 model and 1 photographer.	2 hours and 30 minutes in studio.

Sorting step

Due to the implications that it would have in the flow process, it was impossible to test and obtain results for this step.

4.7 Costs and Benefits

In the aftermath of this project it was felt the need to estimate the cost / benefit for the project implementation. To estimate the benefit it is necessary to carry out an AB test. The AB test is a tool used by the company to measure the public's adherence to a given change, thus, 50% of the population is presented with the new approach and the remaining 50% with the normal process. To carry out this procedure it is required the application of the new approach to 5000 items and the online time of the test be 3 months. Therefore it was not possible to carry out this past and present results until the end of this dissertation.

For the cost calculation it was taken into consideration the areas that the project would influence this most, such as:

- F-Tech - In order to update the software to be more flexible (work by item);
- Give training in all steps of the new digital production process - including how to work with new software;
- Two additional resources for Styling and one additional resource for logistics;
- AB test - although it is the way how the benefit is evaluated, it has a cost that must be considered.

Regarding all fulcral areas, it was necessary within each area to make some important considerations that are shown in the Table 7.

Table 7 - Summary of Costs Considered

Cost of Updating the Software	Training Cost	Cost of hiring: 2 Stylists and a Logistics professional	AB Test Cost
It were considered the areas of software change (e.g. planning tools), the cost of a F-Tech professional (development and test), and the number of days needed to perform the update	It was considered that 1800 items are not produced and the recovery time is 6 days.	It was considered the cost per person in 2017	Cost to do the Mixing Items in 5000 pieces

Taking into account the revenue of 2017, the items produced in this same year and the costs previously estimated, for the project to be feasible it is necessary to increase sales by 0.09%, which is not considered a significant value given the growth in sales that Farfetch has been to registering (the values calculated will not be presented in order to maintain confidentiality).

5   Conclusions and Future Work

The launch of this innovative project was not something built over a week. As the company starts growing, there is the need to improve the material given to the costumers, which require an increase of the quality of the Styling in order to raise the revenue. This is the starting point for this project. During the development of the project, it started being evident that most products that arrive at Farfetch are not being used to their full pottential, so it is possible increase the quality and the potential demand.

Bearing this in mind, this project proposed the Mixing Items initiative, which consists in crossing the material of all Brands/Boutiques that arrive at the facilities, in order to creat more attractive outfits. Allied to this benefit comes the need to separate the slot that, until this moment, goes through all the steps of the process together, jointly at the end. It will also be needed to re-join the items of the same slot in order to be returnes to the partners. However, some problems have emerged related to this change, such as the fact that all process flows work it at the slot level instead of items level.

In order to implement this initiative, two tasks were created: Pre Styling, which creates batches with pieces from various boutiques, to which it assigned a registry, and the sorting step that carries out the process of separating the items taking into account the boutiques to which they belong. Due to a technical defect found in the operating system that influences the company's database, together with the impossibility of performing tests on sorting step, it was not possible to calculate the SLA of the new project. Nevertheless, it was detected that between the section of Scan In and Live Model (place where the PreStyling is going to be positioned) there is a stock time of approximately 0.9 days, thus, it can be said that this time will be converted in productive work, in orderto increase the quality.

To finish this dissertation, it was made a Cost / Benefit Analysis to the present project. To estimate the cost of this project the following changes were considered:

- Cost of updating the software;
- Cost of training the works to use the new software;
- Cost of hiring 2 Senior Stylists (Buyers) and 1 logistics worker;
- Cost of perform a AB Test (Benefit).

After the sum of all these parcels it was possible to conclude that the investment needed is not considered a significant value taking into account the growth forecasts. In addition, to estimate the benefit that the quality will bring, that is, the sales growth with the implementation of a quality improvement, it would be essential to perform an AB Test.

Future Work

The future work for this project is well defined. First, it is necessary to realize how this increasing the quality would influence sales. In an effort to realize this, as previously mentioned, it will be necessary to use the AB Test tool.

In addition, it would be important to carry out tests at the sorting station. This task has an important weight for the process since it deals directly with the task of delivering the slots (Packing and Expedition) and any type of failure could compromise the relationship with the partners. Consequently, it would be important to carry out the calculation of the SLA in order to see if Farfetch's commitment to the partners would be fulfilled. In order to have results more reliable in all workstations it is also important to perform more tests of the working time.

Finally, it would be beneficial to study the possibility of RFID implementation. RFID tags are electromagnetic fields that makes it possible to identify and track them. This way, the problem of exchanging product sheets, the need to track items, for possible repetitions, would be facilitated as well as the resolution of other problems that are currently handled manually.
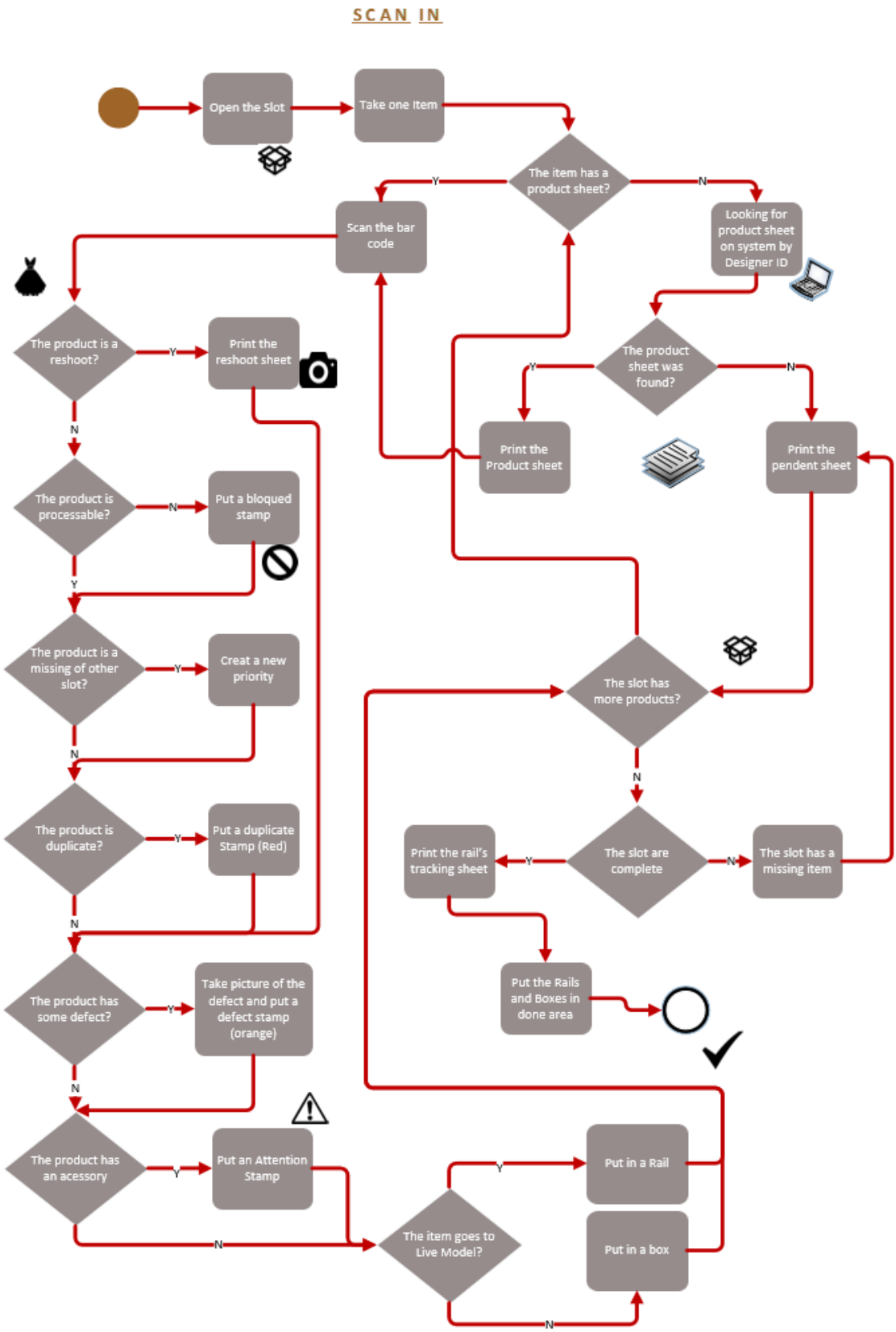
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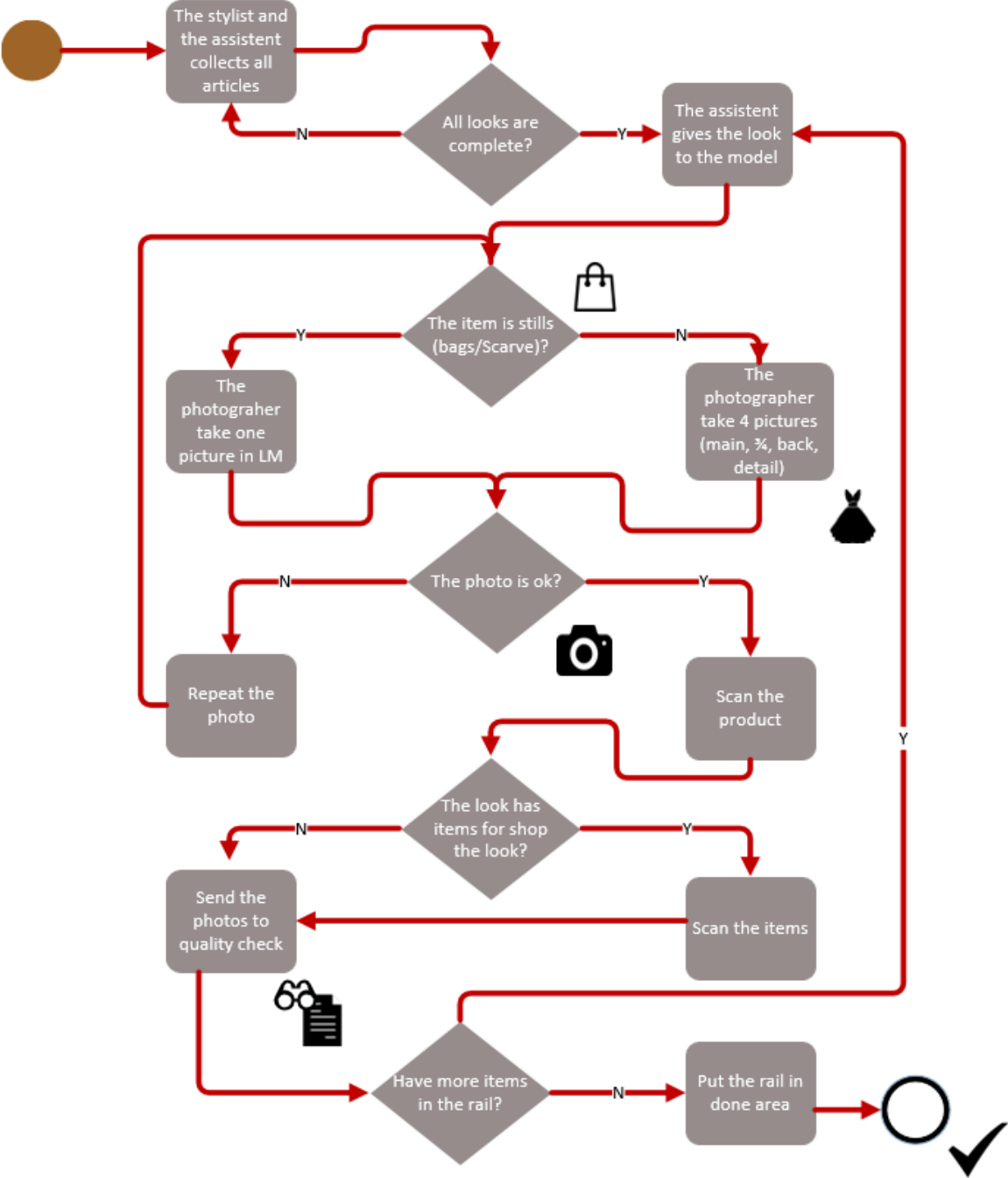
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APPENDIX A: Process Mapping

SCAN IN

Live Model - ON SET

The stylist and the assistent collects all articles

All looks are complete?
N
Y

The assistent gives the look to the model

The item is stills (bags/Scarve)?
Y
N

The photograher take one picture in LM

The photographer take 4 pictures (main, ¾, back, detail)

The photo is ok?
N
Y

Repeat the photo

Scan the product

The look has items for shop the look?
N
Y

Send the photos to quality check

Scan the items

Have more items in the rail?
N

Put the rail in done area

F L AT

STILLS

SCAN OUT

PACKING

EXPEDITION

APPENDIX B: Initial Scenario
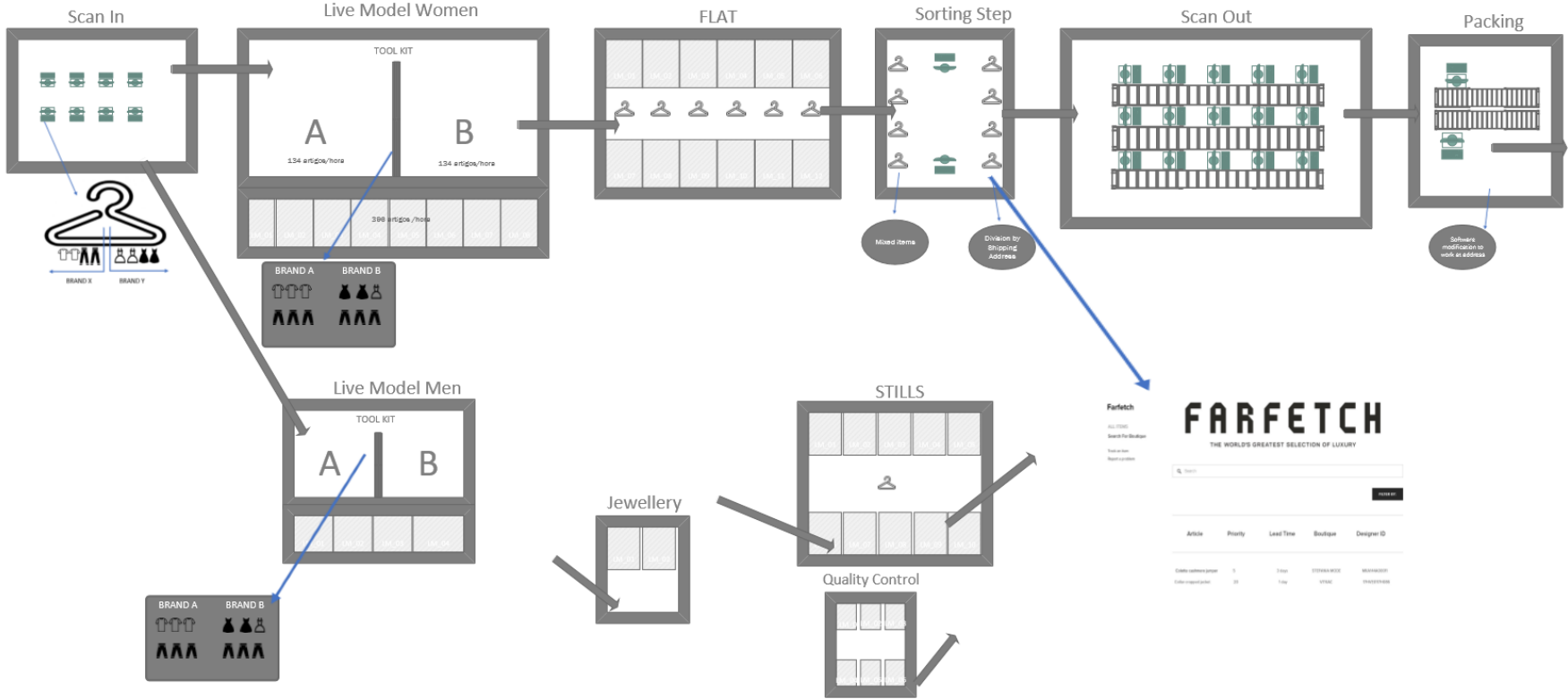
APPENDIX C: Excel Sheet of Scan In Step

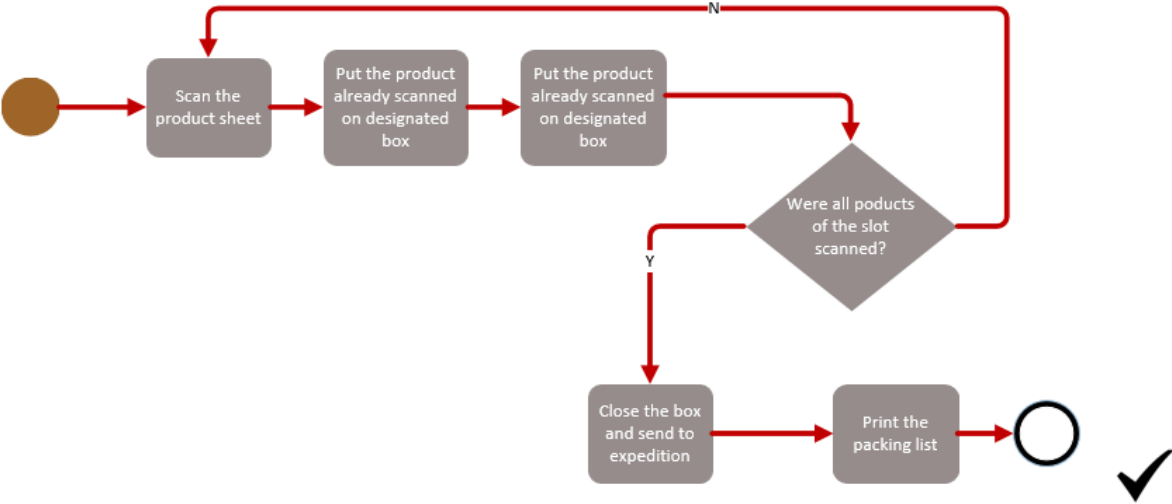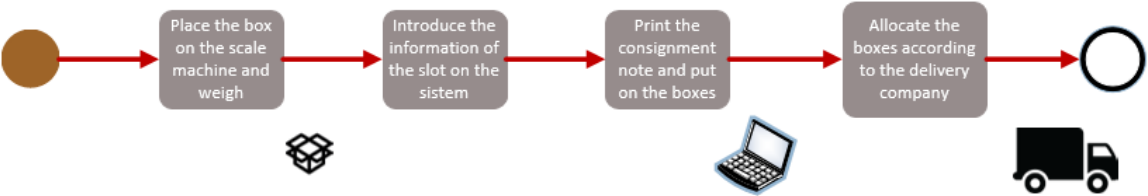| CYCLE TIME OLD PROCESS	CYCLE TIME NEW PROCESS
12	25
15	26
16	26
18	26
20	27
20	27
20	29
21	30
22	30
22	30
23	31
24	32
25	32
25	34
25	34
26	34
27	34
27	35
28	35
28	35
28	35
28	36
28	36

$$H_0: \ \mu_A - \mu_B = \delta_0$$
$$H_1: \ \mu_A - \mu_B \neq \delta_0, \ \mu_A - \mu_B > \delta_0 \ \text{ou} \ \mu_A - \mu_B < \delta_0$$

$$ET = \frac{(\bar{X}_A - \bar{X}_B) - \delta_0}{\sqrt{\dfrac{S_A^2}{N_A} + \dfrac{S_B^2}{N_B}}} \ \curvearrowright \ N(0,1)$$

	New Process	Old Process	Δ	ET
Average	70,92	79,44	8,52	1,35
Standard Deviation	42,69	81,02	6,33	
Number of Samples	227	205	p-value	9% Inconclusive

Cycle Time New Process VS Cycle Time Old Process (Seconds/Slot)
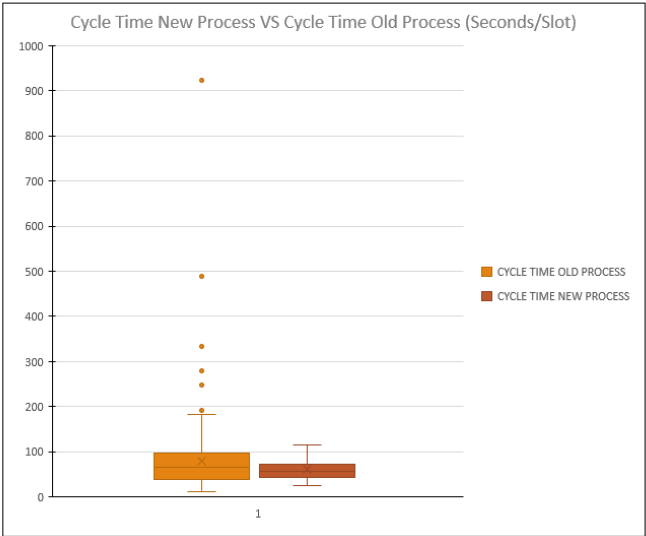
APPENDIX D: Excel Sheet for Pre Styling Women

Target   106 items   ➡   7,2 hours   How long does it take to shoot a Main?
                                                                                           4,08 min/Main

                         14,72 items/hours

Taking into
account that
the ideal
distribution
time is 2h30min
on prep and
2h30min on set

On prep   On set   The perfect batch will be of?
2h30   2h30   min   items
                          ✔   4,08   1
2h30+2h30+2h30=7h30   150 x

                                                 x=   36,8056

Considering we
only have one
main per look(
which will not
happen)   ≈   37 items

The amount of item you will have in the Showroom: 296

- The first time you see it takes 40 min and then 15 min

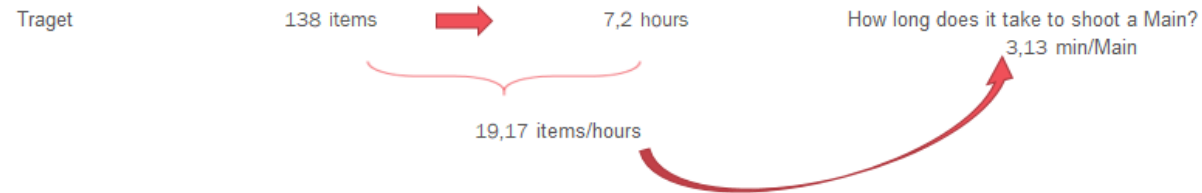- Considering it is 2h30min., we will retire the 40min from the first time - 110 min

x   110

$x=$ $7,3333 \approx$ 7   batch

1 PERSON CAN FEED 8 STYLITS WITH 37 ITEMS EACH, IN 2h30min

APPENDIX E: Excel Sheet for Pre Styling Men

Traget   138 items   ➡   7,2 hours   How long does it take to shoot a Main?
                                                  3,13 min/Main

19,17 items/hours

Taking into account that the ideal distribution time is 2h30min on prep and 2h30min on set

On prep   On set
2h30   2h30

2h30+2h30+2h30=7h30 ✔

The perfect batch will be of?
min   items
3,13   1
150 x

x=   47,9167

≈   48 items

Considering we only have one main per look(which will not happen)

The amount of item you will have in the Showroom: 192

Pre_Styling Tests

The First Batch

MIN   ITEMS
    40   37
X   48

X=   51,8919   ≈   52 min

The Remaining Batches

MIN   ITEMS
    15   37
X   48

X=   19,4595   ≈   20 minutes

It was considered that women and men vary proportionally

- The first time you see it takes 52 min and then 20min

- Considering it is 2h30min , we will retire the 52 min from the first time - 98 min

1 PERSON CAN FEED 4 STYLISTS WITH 37 48 ITEMS EACH IN 2H30MIN