

Bachelors of Fashion Technology
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Graduation Project Overview



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Optimizing the Garment Sampling Process: Challenges and Solutions for Efficient Raw Material Sourcing

Garment Sample: Sample is the prototype or model of the garment, upon which the buyer can decide on how and whether to confirm the order or not. Garment sampling process is one of the principle processes in garment manufacturing and it plays an important role in attracting buyers and confirming export order.

In company XYZ, the sampling and merchandising departments are located separately from the main production unit, where the bulk manufacturing takes place. However, the sampling department is situated in close proximity to the merchandising department. All sampling related processes—including sample garment construction, inspection, cleaning, alteration, finishing, and fit evaluation on the body form—are carried out within the sampling room. However, pattern making is conducted separately in the CAD department, and pattern printing is done in the plotter room, which is located adjacent to the CAD department.

One of the major roles of the merchandising department is to oversee the process of sample making and then sending that sample to the buyer for approval. Throughout the T&A of each and every style of product for all the brands, various samples are made and sent to the buyer. The number of samples and types of sample can vary with different buyers. The company caters to different buyers - H&M, Zara, Bestseller, American Eagle, Kappahl, EL Corte, Benetton, Cecil.

We were part of the merchandising team responsible for handling products for Bestseller and H&M. While our initial focus was on production merchandising tasks for these brands, as interns, our prime responsibilities later expanded to include key roles in the sampling process for H&M products. Our responsibilities included procuring raw materials such as fabric, trims, accessories, hang tags, and barcodes, along with obtaining the reference sample product. We coordinated with the CAD department to create the required pattern and delivered it to the sampling room for sample production. This process involved providing the fabric and pattern to the cutting master for cutting, followed by handing over the cut panels to the sewing machine operator for garment construction. Once the product was sewn, it was sent to the finishing area for pressing, cleaning, inspection, thread trimming, taking the measurements and fit evaluation on the body form. Afterward, the product was packed in the appropriate polybag, as different products required specific packaging. Finally, we collected the necessary documents from the merchandiser, including the invoice, GST letter, PAN card copy, and buyer's office address, before dispatching the package via the designated courier.

Both H&M and bestseller involve multiple sample making processes which differ from each other.

In Bestseller the samples developed are generally as follows :-

Proto Sample - A proto sample, or prototype, is the first garment created to test a design concept. It's an essential part of the early stages of design development. It is made to get a

general idea about the product. Proto samples are made from design sketches or concepts. Proto samples help designers evaluate the functionality and feasibility of a design. They help manufacturers determine what needs to be improved or fixed in a design. They help buyers examine the fabric, fit, and look of a garment. They may be made from substitute fabrics and trims if the actual fabrics aren't available. The proto sample is developed under the PD (product development) merchandising team. They send it to the buyer. After evaluating the proto sample only the buyer confirms the order on its vendor portal.

After getting the order confirmation, the major role of the production merchandising team starts. Keeping the order receiving date as the initial date they develop their T&A calendar.

Fit Sample - Fit sample is made just after getting the order approval. It is made and sent to the buyer to check the fit of the garment, whether the garment has the fit according to the requirement. Two fit samples are developed in the sampling department, and it is under the responsibility of the production merchandising team to get it developed and send it to the buyer. One of the two samples is sent to the buyer, one sample is kept here in the merchandising department as a counter sample. The buyer evaluates the sample and sends the approval. It is often the case that the buyer does not approve the first fit sample and sends the fit related comments. The merchandising team then has to develop another pair of fit samples on the basis of fit related comments that the buyer has sent. The fit related comments are available on the vendor portal or the buyer directly mails it to the concerned person. The second fit sample is then sent to the buyer. In most cases, the first fit sample is not approved due to necessary adjustments, making it common for buyers to grant approval only after reviewing the second fit sample. The raw material for the fit sample has to be the same as that of the final product which includes everything - fabric, trims and accessories. The color of the fabric can vary as a fit sample is developed to check the fit of the garment, but it is always better to find the fabric in the similar color if available. The composition of the fabric has to be the same though as well as the trims characteristics.

PP (Pre Production sample) - After fit sample approval, the pre production sample is developed. The pre production sample is made as a reference sample for the bulk production of garment in the factory. Three PP samples are developed in the sampling department. Two out of three PP samples are sent to the buyer and one is kept in the merchandising department as a counter sample. The buyer evaluates and approves the sample and sends back one out of two samples back to the merchandising department with a seal, which makes it a sealed sample. The sealed sample is sent to the main production unit. They use that sealed sample as a reference sample to be used in the bulk production.

Photoshoot Sample - Another sample, known as the photoshoot sample, is developed and sent to the buyer. Whether this sample is required depends entirely on the buyer's preferences. The primary focus of the photoshoot sample is its aesthetic appeal. While minor fit-related issues may be overlooked, a reasonably good fit is still maintained to ensure the buyer's satisfaction. The garment must look visually appealing, especially on a body form, and closely resemble the final product. Therefore, the fabric and trims should match the final

product's color palette as accurately as possible. Generally for the photoshoot sample the garment piece is collected from the factory's bulk.

Once the sample is ready, it is placed on a body form to assess its fit and overall appearance. Typically, two photoshoot samples are made—one in a base size (usually small or medium) and another in a larger size—before being sent to the buyer. The buyer then evaluates the sample and has their model wear it for the photoshoot. The resulting images are used for advertisements, retail promotions, warehouse catalogs, and other marketing purposes.

GPT (Garment Performance Testing) Sample - This sample is made for the purpose of testing the garment. Two GPT samples are made. One goes to the factory to get tested at the factory's internal lab. Other samples go to buyer nominated laboratories. The buyer nominated laboratories are - Bureau Veritas Lab, UL Testing, SGS Testing, Intertech labs etc. The samples have to get approvals in these laboratories whose reports go to the buyer. The GPT sample can either be picked from the garment bulk which is produced in the main factory or it can be developed in the sampling department separately. The merchandising department prefers to get the GPT samples developed in the sampling department because the sampling department has better skilled operators and make through operation occurs in the sampling department, so the garment made at the sampling department has lower chances of having any minute defect and it will most likely pass the garment testing. Especially for garments with critical and more detailed operations the GPT sample pieces are preferably made at the sampling department.

Shipment Sample - The final sample which is sent to the buyer is the shipment sample. Two shipment samples collected from the bulk stock of garment from the factory. One of those two samples is finished at the sampling department. Finishing involves pressing, inspection, cleaning and thread cutting, taking measurements in accordance with the spec sheet received from the buyer, checking the fit on the body form. After finishing the sample is packed and sent to the buyer. In some cases where the garment is highly detailed and involves lots of critical operations, the merchandising department prefers to develop it in the sampling department only, so that a perfectly made sample is sent to the buyer. This case is similar to that of the GPT sample.

Counter Sample - In the case of a Pre-Production (PP) sample or a Fit sample, one identical sample is retained by the merchandising unit. This serves as a reference to ensure quality control and accountability. For example, if the sealed PP sample is sent to the production unit and the production department makes a major error during bulk manufacturing, the merchandising team can refer to the counter sample. Since the counter sample is an exact replica of the sealed sample approved by the buyer, it allows the merchandising department to verify that they provided the correct sample and that the error originated from the production unit, not their end.

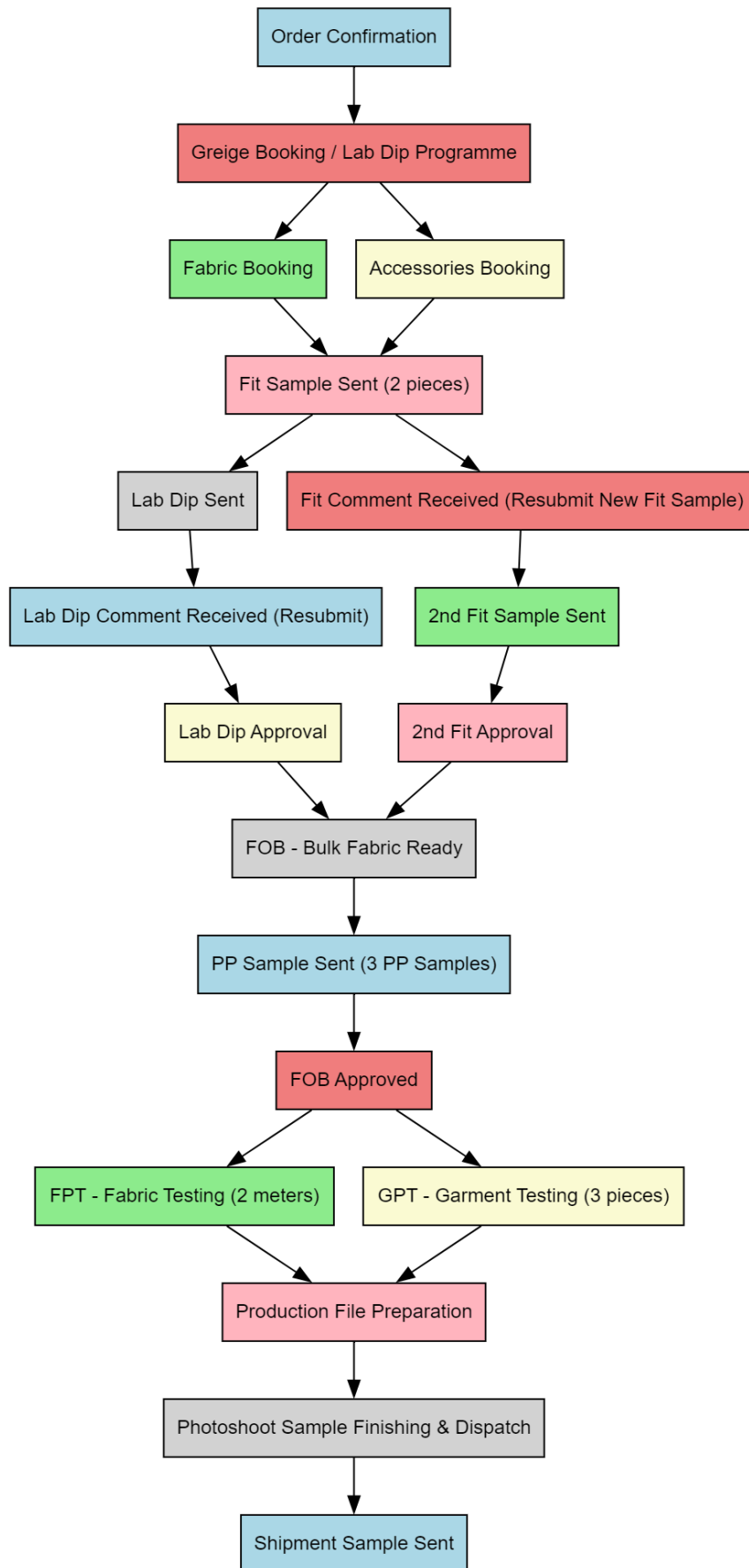
Development Sample (DS) - The development sample is the first physical prototype of a garment, created based on the buyer's instructions. The buyer provides all necessary documents, including the tech pack and pattern details, which are shared with the merchandiser. The merchandiser is responsible for overseeing the development of this sample under the supervision of the head technician. This sample is primarily made to evaluate whether the garment's construction is correct. Since it is only for assessment purposes, substitute materials can be used.

Quotation Sample (QS) - A quotation sample is not required for every garment; it is only produced upon the buyer's request. This sample is typically made for garments that are new to the company. The purpose of this sample is to confirm the overall performance and quality of the garment, even if the buyer is satisfied with its construction.

For example, in the development sample, a substitute hook and eye may have been used. While the buyer approves the garment's design, they may be dissatisfied with the quality of the hook and eye. In such cases, a quotation sample is created using a different hook and eye, either of better quality or the exact specification requested by the buyer, if available.

Counter Sample (PP Sample for H&M) - Once the development sample and quotation sample (if required) are approved, a counter sample—referred to as the Pre-Production (PP) sample for H&M—is produced. This sample is made using actual materials and follows the required quality standards set by the buyer. The factory prepares this sample to assure the buyer of the final quality and appearance of the garment before bulk production.

Time and Action Plan - The merchandiser's role in the Bestseller team for each garment style is structured around a Time and Action (T&A) plan. Orders are received on a style-specific basis, and upon receiving an order, the merchandiser develops or updates the corresponding T&A. Every task is then executed strictly according to this plan, ensuring a streamlined workflow from order placement to shipment dispatch.



Problem Statement

The timely development of garment samples is a critical component of the merchandising department's Time & Action (T&A) schedule. However, frequent delays in the sourcing of raw materials—specifically fabric, trims, and accessories—significantly disrupt the sample-making process. These materials are primarily sourced from the fabric store, accessories store, sampling room, or, in some cases, the merchandising office, all of which maintain a limited stock solely for sampling purposes. When the required materials are unavailable in these locations, procurement becomes a time-intensive process, often leading to delays ranging from one to several days.

Existing sourcing methods include requesting raw materials from the company's textile mill, local vendors, or the garment production factory. However, each of these methods presents its own set of challenges, such as logistical constraints, miscommunication regarding specifications, dependency on external suppliers, and the additional workload imposed on factory personnel. These inefficiencies result in prolonged sample development timelines, impacting merchandising schedules and potentially delaying bulk production approvals.

Repeated instances of material unavailability, mismanagement, and lack of a streamlined tracking system for trim and fabric sourcing create bottlenecks in the sample-making process. These disruptions not only extend the lead time for sample approvals but also increase workload pressure on interns and merchandising teams, ultimately affecting overall operational efficiency. Addressing these challenges requires the implementation of a structured tracking and procurement system to ensure the timely availability of raw materials, reducing unnecessary delays in sample development.

Problem Overview

The sampling process is one of the major parts of the T&A schedule for the merchandising department. As interns it was our task to oversee and assist in the process of sample making in the sampling department. This involves getting the required fabric, trims/accessories, label, pattern, tags and taking it to the sampling department to get the sample developed. Now for the fit sample the fabric has to be sourced from the fabric store (smaller fabric stores at the merchandising and sampling departments are, not the main fabric store of the production house) and the trims has to be sourced from the accessories store which is adjacent to the fabric store. In some cases, the required fabric or trims are sourced directly from the sampling room, which maintains a limited stock of raw materials. Additionally, small quantities of raw materials may also be available in the merchandising department office. If the necessary raw materials are readily available in either of these locations, they are utilized for sample making, eliminating the need for separate procurement as sourcing raw material from the store would require an MR (material requisition). Raw materials in these three locations are used for the sole purpose of sampling only.

The challenge arises when the required raw material is unavailable in all three locations—the fabric store, accessories store, sampling area, and merchandising department—which can delay the sample making process. The unavailability of the required raw material at the time of the sample making is a consistent problem. There are many ways to source the unavailable raw materials—one is to request the store manager to get the required raw material. The store manager procures raw materials and accessories from the company's textile mill or external vendors. Although this may seem like a straightforward process, the time required to source raw materials can vary significantly. If the materials are readily available, easily accessible, and a transport field staff is available as per schedule, the store manager can arrange for immediate transfer, typically within a day. However, if the materials are not in stock, difficult to access, or if logistical constraints arise, the process can take anywhere from 2 to 5 days, depending on availability and transportation challenges. The company's textile mill is 60 km away from the merchandising office so even if the material is available it would take at least 1 more day to be sourced. The other method is to source the material locally from some outside vendor, but this method is rarely used and can also take up to 2-4 days depending on various factors like material accessibility or vendor availability. The third method, commonly used for Pre-Production (PP) samples, involves sourcing raw materials directly from the garment production factory, which is located 13 km away from the merchandising office. This requires coordinating with the factory's raw material (RM) warehouse, which includes both the fabric storage and trim store, to locate and send the necessary materials back to the merchandising office.

While this is a viable option, it presents several challenges. The factory's RM warehouse primarily manages materials for bulk production, and sourcing materials for sample development is technically not their responsibility. Additionally, locating specific raw materials—especially trims—within the factory can be time-consuming and labor-intensive. Even if the warehouse staff agrees to assist, communicating the exact requirements over the phone, identifying the correct materials, and arranging transportation through the designated field staff can lead to confusion and delays. Moreover, the warehouse personnel are already occupied with their daily tasks, making it difficult for them to allocate time for sourcing materials specifically for the sampling and merchandising teams. A more efficient approach is for us to visit the factory ourselves to source the required raw materials, especially when they are lightweight and easy to carry back to the merchandising office. This method is relatively straightforward since we are fully aware of the specific materials needed for sampling and can search for them directly in the factory. Additionally, we can seek assistance from the warehouse staff in locating the materials without entirely depending on them, as sourcing for sampling is primarily our responsibility.

While this approach reduces dependency on factory personnel, it still requires significant time and effort. A round trip to the factory, collecting the material, and returning takes approximately 2.5 hours, assuming the materials are readily available. However, finding specific materials within the factory can be a challenge, as they are often stored in large bulk quantities, making it difficult to locate smaller items. Warehouse staff, already occupied with their primary tasks, may not always be immediately available to assist. Additionally, certain

materials, such as barcoded trims, may be in stock but not easily accessible, further delaying the process. Due to these factors, a single trip to the factory for sourcing materials can take 4-5 hours or more, depending on availability and accessibility, making it a time-intensive task despite being a relatively simple solution.

The unavailability of fabric and trims often leads to delays in the sample-making process. If all the required raw materials are readily available, a sample can be developed within a day or even less, provided that sewing operators and cutting masters are also available. However, when raw materials are not in stock, the process is significantly delayed. The extent of the delay varies depending on the availability and sourcing time of the materials. In some cases, it may cause a 1-2 day delay, while in more complex situations—such as difficulty in procurement, logistics issues, or unavailability of specific trims—it can extend to 3-4 days or even up to a week before the sample is completed.

At first glance, this issue may not seem significant, especially considering that thousands of pieces are manufactured for each style. However, each style requires multiple samples at different stages of development. On average, a single style demands at least 7-8 samples and often more throughout the process. Since sending samples on time is a critical part of merchandising's T&A calendar, any delay in sample development can have a cascading effect on production timelines.

As interns, our responsibility was to source raw materials for the sampling department to ensure timely sample completion. On a typical day, especially during peak months like January—we were responsible for handling sample development for 2-3 different styles, but at times, this number could rise to 4 or even 5 styles per day. Importantly, this workload was assigned to a single intern, not a group or a pair.

Occasional delays in sample making such as 1-3 days in rare cases are generally manageable and do not significantly impact operations. Even buyers may not object to minor delays. However, the real issue arises when trim unavailability becomes a recurring problem, causing frequent disruptions. Given the high volume of samples that need to be completed daily, especially during peak production periods, consistent delays in sourcing raw materials can become a serious bottleneck. While occasional setbacks are acceptable, if raw material shortages and delays become a regular occurrence, they can severely impact sample approval timelines, merchandising schedules, and overall efficiency making it a major problem rather than an isolated inconvenience.

Some of the problems that we experienced which lead to the delays are as follows:-

- 1) For one style's PP sample, a 45 mm knitted waistband in UV white was required. However, it was unavailable. Alternative options such as a 45 mm woven waistband, 42 mm woven waistband, and 50 mm knitted waistband were present, but none matched the UV white specification. Due to this, we were initially instructed to proceed with a 45 mm woven waistband, but the production master rejected the idea for the buyer's sample. To avoid further delays, we made one counter sample using a

45 mm woven waistband while requesting the store to source the correct material. However, the store sourced waistband arrived the next day but was not UV white. It was unclear whether this was due to material unavailability or a misunderstanding by the fielder regarding the UV white specification. As a result, sourcing was delayed by another day. Since it was a Saturday, the correct 45 mm knitted waistband in UV white was only received on Monday, causing a three day delay in sample shipment, all due to a single waistband.

- 2) For a particular style, a specific type of elastic button loop was required. During the development sample stage, substitute loops were used. However, for the counter sample and production sample (which are sent to the factory as a reference for bulk production), the original loops needed to be used. Since the development sample was made with substitute loops, the field team needed to find the original loops for the later samples. Unfortunately, they were unable to locate them. The merchandiser had already booked the bulk order, assuming that trims would be available by the deadline, as was the usual practice. However, due to a lack of communication about the trim status, the expected availability did not materialize. As a result, the sample got stuck at an intermediate stage. Since the bulk order had already been accepted by the merchandiser, the factory now required extra time to complete the sample, or alternatively, the sample had to be sent with substitute loops. In both cases, the responsible personnel faced challenges, all arising from a lack of awareness regarding the trim status. To prevent such issues, a tracking mechanism should be implemented to monitor the availability of trims. Additionally, remarks should be recorded in the system if any difficulties arise during the procurement stage. This would improve visibility and streamline the sample development process for the merchandising team.
- 3) Another case involves a sample that could not be developed for an entire week due to the unavailability of thread in a specific color. No procurement request was made in time, and only a few days before the sample delivery date did the merchant inform the accessories store about the missing thread. Since merchants handle multiple samples for different buyers, they sometimes overlook one or two crucial elements.
- 4) In one instance, the required barcode sticker for a shipment sample, which was to be developed in the sampling department, was unavailable. As a result, we had to go to the production factory just to retrieve that single barcode sticker. Upon reaching the factory, we also sourced other raw materials, including fabric and trims. However, there was a possibility that these materials were already available at the head office, where the merchandising department, fabric store, or accessories store is located. At the factory, the shipment had already been completed, meaning all the pieces had been produced, and barcode stickers were no longer readily accessible. We had to search for the required barcode sticker—specific to the style and size—among leftover stock, which was stored haphazardly in old, torn, and dusty carton boxes without a proper system in place. This required manually searching through each box to locate the sticker. Fortunately, we found the barcode sticker and were also able to source other raw materials quite easily. However, the issue remained that we had to make the trip to the factory just for one missing sticker. By the time we returned, it was already too late to proceed with sample making, and we had to defer the process to the next day.

- 5) In one instance, the required fabric for making the fit sample was unavailable. Fabric shortages are quite rare, as such issues are more commonly faced with trims and accessories. However, on occasion, fabric unavailability does occur. If the fabric is available in RFD (Ready for Dyeing) form, it can be used to manufacture the fit sample, since color accuracy is not critical at this stage. However, this practice is generally avoided. For PP (Pre-Production) samples, fabric unavailability is never an issue, as the required fabric arrives from the factory as FOB (First of Bulk) and is specifically allocated for PP sample development. For shipment samples, if they need to be manufactured in the sampling department, or for proto samples, the fabric must be in the exact required color. In such cases, there are two options:
1. Use RFD fabric from the store and send it to a dyeing vendor, which would take 1–2 days.
 2. Place an order with the store for the correct fabric. However, the lead time for fabric arrival can vary—it may take just one day, or in some cases, extend up to 4–5 days. Another alternative is to visit the factory and search for the fabric ourselves. Upon doing so, we found that the fabric was not available in the factory store. Fortunately, we were able to source 2–3 meters of the required fabric from the cutting department, where it was leftover from cut panels of another style.

These are just a few examples—there are many more cases where sample-making gets delayed simply because a small component such as a label, tag, thread, elastic, barcode, button, or the required fabric in the correct color is missing. Even a minor issue like this can halt the entire sampling process. Additionally, manually retrieving raw materials from the factory is physically challenging and time consuming. Generally, buyers may not mind receiving a sample slightly later than the expected or committed date. If a sample is delayed, some buyers may follow up via email, while others may not be too concerned. However, this largely depends on the buyer's personality. While an occasional delay in sample delivery might be overlooked, frequent delays can lead to frustration, prompting buyers to actively seek updates. Even if a buyer does not immediately follow up on every delayed sample, repeated late shipments create a negative impression of the merchandising team and the company. Over time, this affects the company's reputation in the buyer's eyes. Additionally, within the company, frequent delays in sample making can affect the image of the merchandising team, in front of management.

Proposed Solution -

Trim Status Dashboard: Solution Overview

The Trim Status Dashboard will improve visibility for both merchants and the trim store, ensuring better lead time management for trim procurement. The dashboard will introduce features that enhance usability and streamline communication between departments.

Key Features & Functionalities

1. Trim Data Entry & Intimation to Trim Store
 - When the merchant enters the first style entry, the system will prompt them to upload the tech pack and sample image.
 - A new section will be added for entering trim details (e.g., elastic, buttons, zippers).
 - Once the trim data is entered, the trim store will receive an automatic notification, allowing them to begin procurement planning in advance.
2. Lead Time Allocation for Trim Procurement
 - Since orders are received days before sample submission, the system will provide the trim store with sufficient lead time for procurement.
 - A "New Order" section will display:
 - Style number and other essential details.
 - Lead time for trim procurement, helping the trim store plan procurement schedules accordingly.
3. Procurement Assignment & Status Tracking
 - When the trim store manager raises a procurement request, they must assign a specific fielder (responsible for trim procurement).
 - The system will require the manager to enter the name of the assigned fielder for each trim.
 - Example:
 - Elastic → Assigned to Mohan (Fielder)
 - Button loops → Assigned to Rajesh
 - The dashboard will provide real-time tracking of:
 - Which trim is assigned to whom
 - Procurement status updates
4. Color-Coded Status Updates for Better Visibility
 - The Trim Dashboard will use color indicators to track progress based on:
 - Time left for procurement
 - Procurement status (e.g., pending, in-progress, completed)
 - The merchant will also have access to the dashboard, allowing them to plan the sample development stage accordingly.

Principles Used in the Proposed Solution

The **Trim Status Dashboard** is designed using a combination of two key Lean management principles: **Traffic Light System (TLS)** and **Kanban**. These principles work together to enhance visibility, streamline procurement, and optimize workflow efficiency in the sampling process.

1. Traffic Light System (TLS)

The Traffic Light System is used to provide real-time visibility of trim procurement status through a color-coded tracking mechanism. This system helps prioritize procurement tasks and ensures that critical trims are sourced on time, reducing delays in sample-making.

- **Green:** Trims are readily available, and procurement is on track.
- **Yellow:** Procurement is in progress but requires follow-up to ensure timely availability.
- **Red:** Procurement is delayed or critical trims are missing, requiring immediate action.

This system ensures that merchandising and trim store teams can proactively address sourcing delays, minimizing disruptions to the Time & Action (T&A) schedule.

2. Kanban System

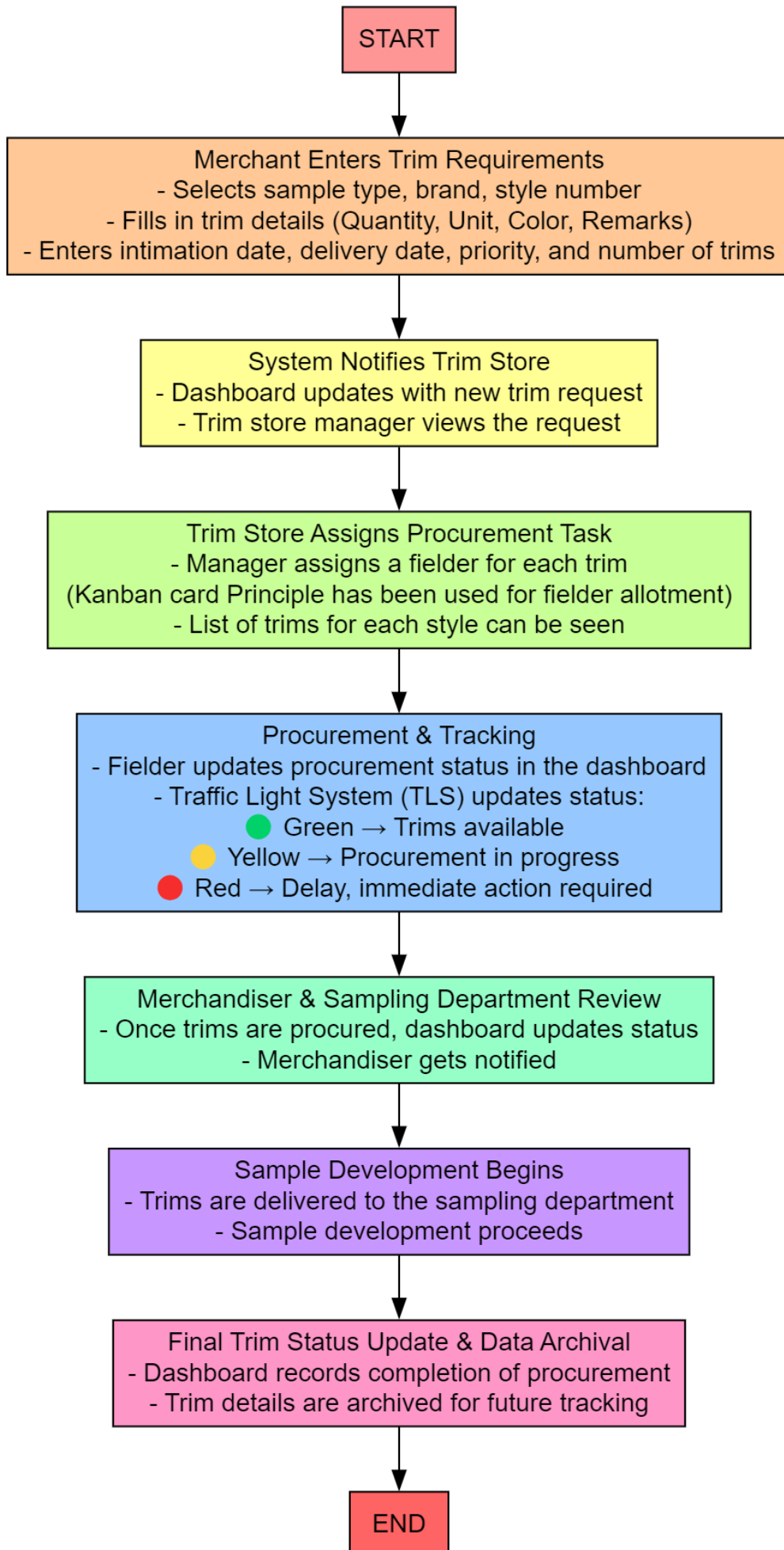
Kanban principles are integrated into the dashboard to manage and track trim procurement stages systematically. This approach visualizes the flow of trim requests, allowing teams to monitor progress and identify bottlenecks.

- **Backlog:** New trim requests that need to be processed.
- **In Progress:** Trims currently being sourced or procured.
- **Completed:** Trims that have been received and are ready for sample development.

By implementing Kanban, the system ensures continuous monitoring and structured workflow, preventing overload and enhancing coordination between the merchandising and sourcing teams.

Impact of TLS + Kanban Integration

By combining **TLS for real-time status updates** and **Kanban for structured workflow management**, the Trim Status Dashboard improves efficiency in raw material sourcing. This dual approach enhances transparency, enables better decision-making, and ultimately reduces delays in the sampling process, ensuring a smoother workflow in production merchandising.



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  <!-- Example Row -->

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    <td class="border border-gray-400 px-4 py-2">Meters</td>

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