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INVENTORY MANAGEMENT OF UNREPEAT PRODUCTION STUDY CASE OF POT MEETS POP DENIM

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Abstract

Pot Meets Pop (PMP) is a fashion company which specialist in jeans product. PMP is one the pioneer of jeans business in Indonesia. Now, PMP have more than 20 articles of product for the latest season. 70% of lineup product is a jeans product like bottoms and jackets. PMP vision is to be a business leader in Indonesia and South East Asia. To reach the goal, PMP have to increase overall performance such as production planning and marketing advertising. The methodology of this research use primary data which came from direct observation and secondary data which got from another source such as text book and internet. Direct observation already done in PMP office, story, and authorized store. All the research data would be gathered find the best solution for PMP problem. This research only use bottoms jeans product as an object to limiting the object research.
Based on root causes analysis, there are four major problems; less market knowledge, advertising promotion, inventory recording, and forecast method. This study aims to solve the problem and find a solution for each problem. After processing data analysis has been done, the solution for every problem has found. The solution for 4 problems; software for inventory record, create advertising and promotion, all staff have to join the forum, and forecasting methods. After giving a solution to PMP, it needs to be implemented in PMP activity for forecasting and marketing. The solution will help PMP to improve overall performance of PMP.
Keywords: Pot Meets Pop, Forecast, Fashion Industry, Business Process, Root Cause Analysis, Inventory Management.

Introduction

Pot Meets Pop (PMP) denim is an Indonesian denim brand which was established in the end of 2008. PMP launch their first product in the middle of 2009 and get a good response from local market. After the first article had already release, PMP periodically release their article every season. In the first and second year, PMP release 8 until 12 articles per 3 months, the line is based on the season at that time. There are summer, fall, winter, and spring. But at third year, PMP release their article every 6 months. So, its means they combine 2 seasons into one article release.

PMP just release every article once with one production in the beginning of the season. So, there are no restock in PMP inventory. The management team always changes the material and added value. So, the lineup product always a totally new product in every season. Although the denim fitting is always the same. There are Thaistick, Superthaistick, Afghani, and Pipes. Because the never made twice for one article, PMP have to made a forecast for next 6 months and release each product every as same as the forecast. They have own store, online store, and flagship store. So, the forecast of product will based on sale in every store.

If the forecast was incorrect, it could be the goods already almost out of stock before the new season or still a lot of inventory in the next season. They wouldn't reproduce the pas article to keep PMP in first main business idea. If there are a lot of inventories in the next season, they will sale their item in PMP store or an event. They cut the price until half price. Usually this strategy success to sell all old product, but of course the revenue will be decreased to.

To decide forecast, PMP use two factors. There are distribution centre and initial delivery. PMP have 1 authorized store, 7 flagship store, and

online store. They already have privation for quantity in every store. PMP will restock the goods if in monthly store reports record that a high number of selling. They also have inventory for the rest of season. PMP will issue from the warehouse if the store needs to restock or there is a customer buy from online store.

PMP very confidence with their quality of product because of the capability and experience factory. Almost all local denim brands in Bandung and Jakarta use the same factory with PMP because another brand believes about the factory capability. But, even though the factory has a good capability, there are still reject product. Even there are customers who receive reject goods. Reject goods percentage was small, around 5%. Almost all reject goods can be repair and then ready to sell. There are many problems in PMP denim. But it can conclude that the entire problem happened because of bad inventory management. If PMP denim can solve the problem, PMP increase their number of selling and customer satisfaction. Inventory management, forecasting, and business process are concern to fix the entire problem. If the problem already solve, PMP denim can reach South East Asia market and be a leader in denim and fashion label.

Considering the background of the problem above, this final assignment has problem solving research about *"**Inventory Management for Unrepeat Product: Case Study of Pot Meets Pop Denim**"*

Literature review

Inventory Management

Base on Heizer and Render (2008) there types and function of inventory.

There are 4 functions of inventory:

1. To separate various parts of the production process
2. To separate the firm from fluctuations in demand and provide a stock of goods that will provide a selection for customers.
3. To take advantage of quantity discounts.
4. To hedge against inflation and upward price changes

There are 4 types of Inventory:

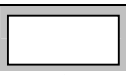
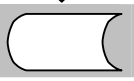
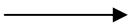
1. Raw material inventory is materials that are usually purchased but have yet to enter the manufacturing process.
2. Work-in-process (WIP) inventory is components that are no longer raw materials but have yet to become finished products.
3. MRO is maintenance, repair, and operating materials.
4. Finished-goods inventory an end item ready to be sold, but still an asset on the company's book.

Business Process

There are three types of business processes:

1. Management processes, the processes that govern the operation of a system. Typical management processes include "Corporate Governance" and "Strategic Management".
2. Operational processes, processes that constitute the core business and create the primary value stream. Typical operational processes are Purchasing, Manufacturing, Advert ising and Marketing, and Sales.
3. Supporting processes, which support the core processes. Examples include Accounting, Recruitment, Call center, Technical support.

Based on Juric and Trkman, (2011) symbols that use to map business process are:

Symbol	Indicates	Example
	Activity	Delivering Raw Materials
	Decision point	Accept / Reject
	Delay/Waiting	Waiting for Finished Goods
	Process Flow	

Forecasting

Forecasting is the art and science of predicting future events. A forecast is usually classified by the future time horizon. Time horizons fall have 3 categories

1. Short range forecast, less than 3 months
2. Medium range forecast, 3 months until 3 years
3. Long range forecast, more than 3 years

Based on Heizer and Render (2008), forecasting needs seven basic steps to do it properly, these steps are:

- **a.** Determine the use of the forecast
- **b.** Select the items to be forecasted
- **c.** Determine the time horizon of the forecast

d. Select the forecasting model(s)
e. Gather the data needed to make the forecast
f. Make the forecast
g. Validate and implement the results

These are the seven basic steps to designing and implementing a forecast system if forecast is to be continued the data must be collected on a regular basis and generate the forecast regular time.

Root Cause Analysis

Root cause analysis is a tool to define a problem. Root cause can identified any cause of the main problem. To finding a root cause, there four steps;

1. Successor of problem definition
2. Answer of why's problem exist
3. Fact based
4. Priority

Why is a common question to find a root cause. Why is use to know problem causes at each level of root. From root cause, it can know how big the problem impact is and also the location of the problem. One core problem can due to many factor. Each factor can be identified to know how big the impact for the main problem.
There are 3 types of root cause;

1. Current Reality Tree (CRT)
CRT creates a branch for one core problem and every branch can have more branches. One core problem possible to have more than two branches. CRT maybe creates undesirable effect which is out of human control.
2. Fish Bone Diagram
As the name of fish bone, there is one fish head and many bones in fish body. Fish head in the main problem and bone is the problem cause. One main problem can have eight problem causes.
3. ANOVA
Analysis of variance, will find the problem based on statistic calculation.

Methodology

Research

Research is the first step that should be taken. The research is doing in factory and store of PMP denim. This step is very important to get all of data from observation and interview for further research methods. It's need to making appointment with PMP management person or team to discover more and more about problem in PMP denim.

Problem Identification

After observation in store and factory of PMP, it has a discussion with owner and management team. It can identify problem in inventory management and production activity from this discussion. Problem that discussed are about all problem and how to solve the problem in inventory management and forecasting activity.

Literature Review

Literature review is the base to understand about the knowledge and information in doing research of Pots Meet Pop Denim. The sources of literature review from text book and from internet. This research uses several operation books such as Operation Management by Heizer and reader, Supply Chain Management by Chopra and Meindl, and Managing quality by Foster. It also uses some journal and article about inventory management.

Data Gathering

This step is gathering of information that is related to this research. Data gathering have 2 types of data, primary data and secondary data.

1. Primary Data
Primary data collected from direct observation and interview. The purpose of this activity is to find information which has relation with inventory management and business process.
2. Secondary Data
Secondary data collected from another source and literature review. This research use source from internet and operation text book to support all the primary data. Also gathered data from company's file.

Data Analysis

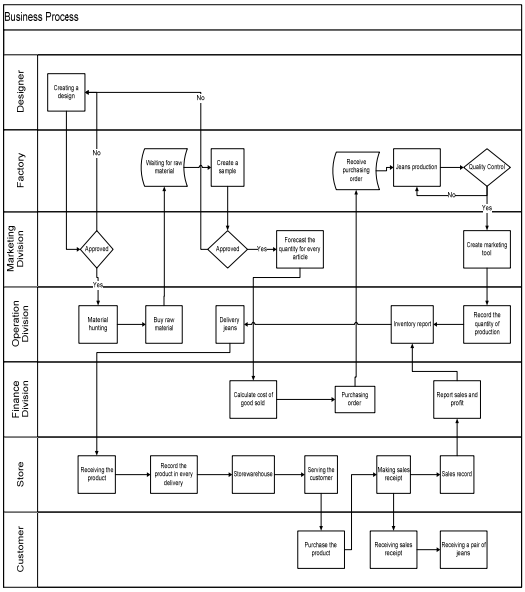
After all the data already gathered, the next step is processing the data. The data processed by determine forecast and inventory management that used by the company. There will be an analyze the data and make a root cause from the entire problem in data.

Conclusion

After data analysis step, the solution of the problem will be finding and generated. The solution is based on the literature review and

made for solving the problem. Its purpose to improve the overall inventory and production performance in PMP management and factory team.

Data Processing and analysis



Planning

In this process, the cycles begin by deciding the product. For deciding a product, PMP research from international brand and fashion trend at that time. After research, designer team will create a model of product with all detail and also with the material. When the sketch was already finisher, all team would hold a meeting to decide which product will be release at net season. Another division also gives an advice and suggestion for designer to modify the model or even to create a new sketch. If the product already gets a approval from all team, the sample production will be start. First of all material hunter will search the best material for the product. He will search from local and international market. If the material can't be find or the minimum order quantity was too big, designer will modified the model or use another material alternative.

Forecasting

Forecast the demand is the most important aspects for managing company's inventory. Operation and marketing division have to full responsible for forecasting number. Correct forecasting means there are no lost sales or over stock for inventory. The number of inventory has to fulfill customer demand in one season and it can be empty size before the new article will release. If forecasting have a lot of miss, company will face a big loss.

To decide the best forecasting number, its need several aspect and criteria to support forecast. First is a last season sale. Last season sales can tell the truth about the demand of market. It can be seen which one were the best selling and the worst selling. It's very important references to decide accurate forecasting. The longer company can analysis the sales, the result will more accurately. This activity also includes calculating lost sales at that period and the remaining of inventory at change of seasons.

Second is trend mode. Trend mode was change very fast in this last 5 years. Designer have to update with the newest trend and the quantity of product have to adjust with the newest trend. For this year, the trend of jeans is skinny cutting with raw material jeans. PMP produce more quantity for this model to fulfill market demand. PMP reduce the other model to fulfill the capacity for skinny jeans.

The last one is historical data. Historical data was collecting all the data from internal and external company to support the forecast. The data can be from the past of company or overall data about selling fashion and jeans.

Production

Production process will start after the factory already receives the raw material and the design from PMP team. This process will start depend from the material hunter which find and provide a raw material in certain quantity. If all raw material and detail material were already complete, the factory will create a scheduling for every process jeans making. There are 4 steps for making a piece of jeans; cutting raw material, drawing patters, sewing and finishing.

Distribution

Distribution product will start after PMP office checks all the quality of finish goods. If there are still reject in that production, PMP will send back to the factory for repairing. Distribution point will spread to 7 stores which located in Bandung, Jakarta, Medan, Surabaya, Jogja, and Bali. Every store get a quantity which represent the area demand. In this table, it explains about distribution for each article in S/S 12.

This distribution was also based on forecast from PMP office and store management. Beside this store list, there are still many stores which became PMP reseller. This store doesn't consignment with PMP, they only buy off the product and sell again in their store.

Retailing

Retailing process start when all products already arrived in store. Every store manager will record every quantity of product and categorized the product to put in the display. Every store has a different concept, so it's very important for all store managers to understand every product knowledge and put in the right display. Every store has a different policy to put the products and record the selling product.

Every store has to record the selling every one week and give the report to PMP office. If the stock needs to restock, PMP will send the product to keep the quantity in safe limit to avoid lost sales. This policy applies in all consignment store. The flagship store has a different policy. PMP flagship store, which located in Bandung, handled by operational manager of PMP. Almost half of selling number in overall product comes from this store. So, store manager have to update the stock every day. PMP store will send the product to the store when the stock of product already reaches less than half. Operational manager will check the stock opname to make sure that the quantity for stock out and stock in was same.

ROOT CAUSE ANALYSIS

After analyzed PMP business process and inventory cycle, some process indicated that there is a problem in that process or activity. The processes which have a problem are in forecasting and inventory report.

Forecasting

PMP use last season sales data as their references to create forecast demand. Unfortunately, PMP doesn't use any method to calculate the number of forecast. They don't use qualitative methods to predict the forecast. PMP already done is calculating the forecast with subjective prediction based on last season sales. So far, their forecast has a miss in a huge number. Even though the entire product can be sell until finish, but there already pass the season. Which there already a new article releases. So PMP have to sale their product to finish all of inventory stock.

Inaccurate forecast can cause too little or too many stock in selling period. Too little stock can cause lost sales because of the products was not complete. For example is Afghani blue. This article release twice, in season S/S 11 and F/W 11. When it release in S/S 11, PMP forecast fewer than the other article at that time. The result said that Afghani blue was the highest selling number at that season. The golden size (28,29,30,31) already sold out in the middle of October which is there are still one and half month of the rest season. The next season, PMP release Afghani blue again because of good response from the market. PMP increase the production of Afghani blue more than 100% to avoid lost sales at past season. Unfortunately, the result was unexpected. The golden size already sold out at 4th month since the product was release. PMP maybe think that this was a good news, but the truth is it was a big loss for PMP. If they can increase more production, they will be earn more profit.

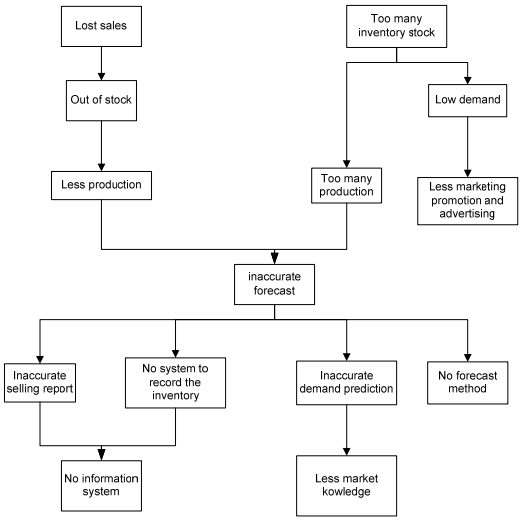
Too many stock means overstock which is PMP can lose capital that can be use to run business because of the capital still in fix asset. Total stock opname in S/S 11 and F/W 11 was around 75 million rupiah. Maybe it's only 10% from all inventory stock at the beginning, but in the future when the business already growing and the percentage still in the same number, it could be reach half billion rupiah for stock opname. Even though in the next season the product can be sale, its reduce overall profit. When new season was coming, the article will be discount up to 50%. This way can sold out the product very fast. But it still better rather than keep the old article and sell it together with the new article.

Inventory

Inventory report was record all data about product which come in and out from the PMP office inventory. To make sure that data already correct, there is an activity call stock opname to check the quantity of the product manually. With this method, the margin error of counting could be huge. For example, in April 2012 there is a mistake counting until 25 pieces in one month. PMP have a loss more than 10 million rupiah at that time because of inaccurate inventory report.

When inventory record was false, all the historical selling data would be false too. So the

forecast will be inaccurate. Accurate forecast can increase profit more than 100%. These theories already prove by Sports Obermayer, they can increase profit from 60% top 122%.



Proposed Solution

Based on root cause analysis, it can be conclude that there are six main problems in PMP. It can give a solution to solve the entire problem.

Marketing Promotion and Advertising

PMP already exist in denim business since 2009. PMP including one of the pioneer in Indonesia to develop jeans as main business. At that time, only Peter Says Denim (PSD) which already sustain. The first target market was denim addicted. For denim addicted Rp 500.000 wasn't a big deal. But for normal people, that was very expensive. PMP haven't enough marketing tools to knowledge the customer about the quality of product. the rival, PSD, use international band as their brand ambassador. The brand image will increase rapidly with this strategy. Even though the product quality worse than PMP.

For now, PMP already endorse local band. But majority are indie label such as The SIGIT and Agrikulture. Beside Indie band, PMP also endorse DJ such as DJ Ko Flow and Fixed bike champion (Ciluy & Diaz). For some people, those public figures are very famous in their own sector. But for public, they are still unknown. To make PMP expand market, it suggest to endorse influence and famous person in Indonesia. And another criteria is have a lot of follower in twitter

Market Knowledge

Market knowledge can use as the reference for marketing team to create a high quality product, forecast and marketing tools. When the marketing team doesn't know about market progress, they can't decide the future demand or market response about the product. In jeans business, there are some customers who care about the detail a lot and the rest of that just but jeans because they need it. Marketing team use to divide the customer into two segments to make a different persuasion and marketing tools.

A denim head (denim addicted) customer can be know in Indonesia Denim Group (INDIGO). In this organization, people will discuss about jeans with very detail. Any bad and good things of a product will talk in this forum. The owner and some of PMP staff already join in this forum since the beginning of PMP. But PMP shop keeper, which is very important to persuade customer, can't have a good knowledge about the product. Only one shop keeper who are the member of INDIGO. This solution suggest to all PMP staff to join with INDIGO. Good product knowledge is a must for PMP staff, especially marketing team and shop keeper. Be a member of INDIGO will give a lot of information about jeans trends. It needs a good information and knowledge to create a good quality product.. So for the next season, the product can develop based on the demand.

Inventory Data Base

The weakness of PMP inventory record is the method. PMP use manual record every day to record the inventory and done by one person who are actually responsible in finance. It's happened because there are no inventory manager to record every product which comes out from inventory and product which returns from the store. There will be many lack of inventory record at the end of the month and season.

There was no code or label for every product and there was no group for each similar product. It's always happen when PMP want to deliver the product and there was another product mix together. Also sometimes the reject product can pass from factory and office which will receive in store. All happened because there were no data base for every product. With manual record, the percentage of mistake will

be very high. So it's possible to get a lack of inventory data.

To solve the problem, it suggested creating data base for all variant products. Data base is a compilation of product data which save in computer software with systematically. So, the inventory data can check with software. With this software, PMP will easily check the daily data and can input all the inventory input or output. At the end of the month or season, software will record the data daily and monthly to see the statistical selling data.

The application or software must a online program. With online program, inventory data will be updated periodically from each consignment store Indonesia. Every store also can check the inventory data in main office and can request for more products to sell. This system will help PMP admin to record the sales data. Stock opname result will be the same between inventory report and real inventory.

Forecast

Faster the product can be sold out, the weight will be bigger. Formulation below will be use to have a weight proportion for each sold out month ;

$$1+\frac{\left(\frac{n}{2}\right)(6-t)}{n}$$

n = Total sold out product
t= Sold out in ... month

6 means total months for one season. The equation use an assumption that the sold out production will be divide into total months for sold out. Monthly demand will assume can apply for one season. Based on the formulation, it has a equation which have available for all production number. The actual demands will times with weight to get a projection demand for whole season. Table below show the result of that equation.

Conclusion

Based on root cause analysis in PMP, there are 4 types of root causes. The root causes are :

1. Inventory data base and inventory record

The recommendation is use to have an accurate inventory data. For now, PMP record the inventory daily data with manual. Admin have to record every day selling and stock out from inventory based on report from shop keeper and inventory manager. At the end of the month admin have to compile the data to know the latest inventory stock and sold item. With manual system, the percentage of lack inventory between report and reality will be huge. Inventory records in April have a lack product more than 20 pieces. It will be a big loss for PMP.

Historical data also important to make a forecast. Right and complete historical data will decrease margin error of forecast. Now condition in PMP, with unrecorded historical data, the forecast number get from subjective prediction based on last season sales. With a good inventory record, PMP will have a forecast with minimum margin error.

2. Promotion and advertising

PMP is one of the oldest and biggest local denim company in Indonesia. Many teenagers in urban city know about PMP brand, especially in Jakarta and Bandung. Bandung as the main base city of PMP, most of sales item sold in this city. In peak season, especially holiday season, PMP sales were very high. In normal season, there are only a few sales per month. If PMP want to sustain in denim business, they have to create a marketing strategy to be known for a lot of people for all the time

For now, PMP promote their product in Darahkubiru.com, free magazine, event, and social media. PMP want to be the denim business leader in Indonesia and South East Asia. For now PMP already be a leader, but a denim leader for community and big city such as Bandung and Jakarta. That's the reason why there are a low sales in some of period. Promotion and advertising will help PMP to increase sales and profit. Also to reach the main goal, to be a leader in denim business.

3. Market knowledge

The recommendation is to increase the knowledge for every person in PMP. The advantages of product knowledge will be impact to production and selling product. If all human resources have a good knowledge about denim product and detail, the quality of product will increase because all human resource will work with passion. This is a simple thing but have big impact for another activity, especially selling activity.

Now PMP team already has a master knowledge about denim product and detail. Especially staff who work in the main office such us owner, designer, and marketing team. But for production and shop keeper, they don't have a good product knowledge. Factory worker have a knowledge based on experience, not a passion. Shop keeper, who very important to sell the product, must have a good knowledge to attract customer. A good knowledge shop keeper can discuss and talk about the product with the customer, so customer will feel interested with the product. If shop keeper and factory have good knowledge, it will increase overall PMP performance. And its closer to be the biggest denim company in Indonesia

4. Forecasting

The recommendation is to use a method to calculate the forecast. Now PMP never calculate the forecast. They only use projection based on subjective and last season sales. The result was bad. Many lost sales and too many inventory stocks in the end of season. This is a big loss for PMP. Forecast is very important. When the forecast was true, there only a few stock and no lost sales in the end of season.

Forecast method can calculate the production number with minimize margin error. Actually there are no the perfect forecast, all the forecast must be incorrect. Our duty was to minimize the error. If PMP already have a forecast method and an expert person to calculate the forecast, they will increase the profit up to 100%.

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