

FACTOR ANALYSIS FOR PERSONAL SKIN CARE PRODUCT'S (PSC) PENDING ORDER ROOT CAUSE at PT. XYZ

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ABSTRACT: This study was conducted to describe product's pending order problem of personal skin care products (PSC) in PT. XYZ, to analyze the factors that caused it and to determine the root cause of the problem. Finally, this research was conducted to produce alternative recommendations or solutions to overcome PSC product's pending order problem in PT. XYZ.

Factors that caused the problem of PSC product's pending order are obtained from exploration result or focus group discussion (FGD) of respondents that are selected by using purposive sampling. FGD was carried out with tools analysis such as fishbone diagrams with "6M" framework of thinking (consist of aspects of human resources, management / financial, equipment / machinery, procedures/ processes, environmental, and aspect of raw material) which are usually used to find the root cause of a problems in manufacturing industry. Moreover, these causative factors of product's pending order are used to create a perception questionnaire. Questionnaires in this conformation stage were filled out by respondents of product's pending order problem in PT. XYZ. Respondents were selected by using snowball sampling technique. The result of this survey of perception was processed by IBM SPSS statistical program version 20, with test of Kendall concordance (W), in order to confirm the result of FGD.

Hence, analytical result concludes that both FGD and questionnaire methods are complementary to each other. Both methods are equally share result that the product's pending order in PT. XYZ is caused by inaccuracy of sales forecasting or demand distributor (DD) forecasting. Relate to inaccuracy of sales forecasting or DD forecasting, research result proposes four recommendations for PT. XYZ as a solution. First recommendation is to improve marketing's key performance indicator (KPI) related with sales target in unit. Second recommendation is the use of combination of quantitative with qualitative sales or DD forecasting technique. Third recommendation is to increase strategic stock for each product for short time period. The last recommendation is DD forecasting should be received by SCM of PT. XYZ from its logistic provider (PT. ZZZ) after having coordination with marketing division of PT. XYZ

KEYWORDS: fish bone, pending order, DD forecasting, sales forecasting, Kendall test.

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1 INTRODUCTION

PT. XYZ is a company that started from healthcare facility such as pharmacy store, which was established in the early 1960s. The founder of this company is an Indonesian physician. The pharmacy then developed into a manufacturing company that started its production since 1962. Initially, the company is located in Jakarta. In 1994, the company acquired a foreign company production facility / factory in Bogor. The acquisition, made in 1994, caused the product-making process to be relocated from Jakarta to Bogor. In 2005, under the leadership of the 3rd generation company founder, the company is experiencing a change of name.

PT. XYZ is located in Bogor, Indonesia. The company has a sales target worth 340 billion dollars in 2014. PT. XYZ has a vision of becoming a world-class healthcare company that has a high competitiveness in its service and product quality, and

safe products for the Asian regional market. To realize this vision, PT. XYZ has 3 company missions: to encourage sustainable growth, providing maximum business results to its stakeholders, and apply the principles of good corporate government. The company has a goal to achieve sales worth 500 billion dollars by 2015 as stated in its statement of purpose. Agreeing with the concept of agribusiness by Edward and Schultz (2005), PT. XYZ is included as a downstream business of agribusiness sector which certified GMP, GMP, OHSAS 18001: 2007, and ISO 9001:2008.

At the beginning of this study, secondary data is acquired that PT. XYZ have 53 PSC item or stock keeping unit (SKU) until this moment. From the existing secondary data, it is known that during 2013 of every month pending orders occur, with the average pending orders per month as many as 7 items. The smallest pending order was in July 2013 as many as 1 items, and the largest pending orders occurred in August 2013 as many as 12 items. Inventory problem in the form of continuing PSC pending orders products in the supply chain management of PT. XYZ became the topic of this thesis study. This study was conducted to describe the problem of PSC products' pending orders at PT. XYZ, analyzing the factors that cause the problems PSC product pending orders that is encountered in the supply chain management of PT. XYZ, and determine the root cause and recommend alternative solutions to overcome the problems of pending order of PSC products which is faced by the supply chain management of PT. XYZ.

The research is conducted at PT. XYZ due to the perceived adverse effects of PT. XYZ as a result of a pending order inventory problem sustained in PT. XYZ. The effect of this pending order is bad for the company, which resulted in loss of sales up to 32% from the sales target (in value) of PT. XYZ.

The research problem is to explore the causing factors of PSC product pending order issue that emerge at PT. XYZ and to generate alternative solutions to overcome the problems of the said pending order of PSC products inventory. This study aims to describe the problem of pending orders PSC products faced by PT. XYZ, analyzing the factors that cause the problems pending orders and determine the root cause and recommend alternative solutions to overcome these problems.

The difference in this research position when compared with related studies that have been inventoried by the researcher, is that in this study a fishbone diagram analysis tools and Kendall's concordance test (W) is combined to find the root cause of the PSC products pending order problem at PT. XYZ.

The benefits derived from combining these two analyzers is if at the FGD stage (fishbone diagram) is intended to explore the causes of the problem, then at the perception questionnaire stage (Kendall's concordance test) is aimed to confirm the results of the FGD stage. Both approaches are expected to be complementary to the shortcomings of each approach are covered, and generate a more validity proven results than if only using one tool analysis only.

2 LITERATURE REVIEW

Perfect Order Concept

Pending orders occurred are due to stock-outs which will affect the decline in customer satisfaction. Mellen and Pujiraharjo (2013) found that drug stock-outs in his study object occurred because of inaccurate floor stock planning in the hospital service unit, and low competence in the related resources. Kanyoma and Khomba (2013) are out of stock at the public health centers in Malawi due to government governance agencies factors that fail to meet the drug orders, delay purchase by the drug procurement staff, and budget cuts by donors.

In order for consumers to be satisfied, Eckert (2007) emphasized the importance of always creating a condition called perfect order. Perfect order condition is a condition that occurs when consumers get the right desired product / product, purpose, condition, quantity, time, documentation, and the cost (Bowersox et al., 2013; Marien (2007) in Eckert (2007)). Consumer dissatisfaction that can be reduced will have an impact on corporate profits. Related research on consumer response to stock-outs when occur in a place somewhere is as much as 62.0% of consumers will shift the purchase to its replacement product, delaying the purchase 15.1%, and 22.9% of them not buying the product when the stock-outs occur (Zinn and Liu 2001).

Supply Chain Management

Gaspersz (2012) suggested that meetings that are too long, conflicts between departments, inability to submit the product on time, customer complaints, finished product stock-outs, inventory imbalances, always abrupt, and frequent production stop are 8 symptoms of a troubled supply chain management, which requires corrective action to eliminate the root cause of the problem.

Of the various definitions that the authors have collected, e.g. from Gaspersz (2013), Siahaya (2013), The Association for Operations Management (APICS) dictionary (2010), Mentzer et al. (2001), the author conclude that according to them, supply

chain is a network used to submit the product (goods or services) from raw materials to end customers through a stream of cash flows, information, and physical distribution. The author agrees with Liu (2011) and Arshinder et al. (2008) that there has been no uniform definition of the term supply chain.

Fishbone Diagram

Fishbone diagram is an analysis tool that is used to identify potential root issues related to both quality and production (Paneru 2011; Jacob 1997). This analysis tool is called fishbone diagrams, because of its fish bone-shape like. This diagram is a diagram illustrating a causal relationship introduced by Dr. Kaoru Ishikawa, a Japanese quality control expert, so this diagram is also called Ishikawa diagrams (Bose 2012; Özdemir 2010). Fishbone diagrams are used when we want to identify possible causes of a problem and especially when a team tends to fail-think in its routine (Tague, 2005).

Kendall's Concordance Test (Kendall W):

Widhiawati (2009), Shaban (2008), Lewis and Johnson (1971) explains that Kendall's concordance test is basically if we want to know if there is an opinions alignment of a subject group (respondents) in assessing a particular object. Sidney (1988) explained that if the Spearman's test and Kendall T describes the degree of relationship / alignment between the two variables that are tested, then the Kendall W describes the degree of relationship / alignment between two or more variables that are tested. Alignments (concordance) are valued as well as correlation, which is from 0 to 1. Generally, the concordance rate above 0.5 can be considered a high enough level alignment Santoso (2003). Santoso (2003) and Widhiawati (2009) state the value of the Kendall concordance (W) can be found with the formula:

$$W = \frac{12\sum R_i^2 - 3n^2k(k+1)^2}{n^2k(k^2 - 1)}$$

k is the number of variables, n is the number of assessors (respondent) and Ri is the number of respondents rating the data.

Conceptual Framework

The conceptual framework of this study is started by confirming the existence of PSC product pending order problems at PT. XYZ. At this stage secondary data obtained from field observations by researchers are collected.

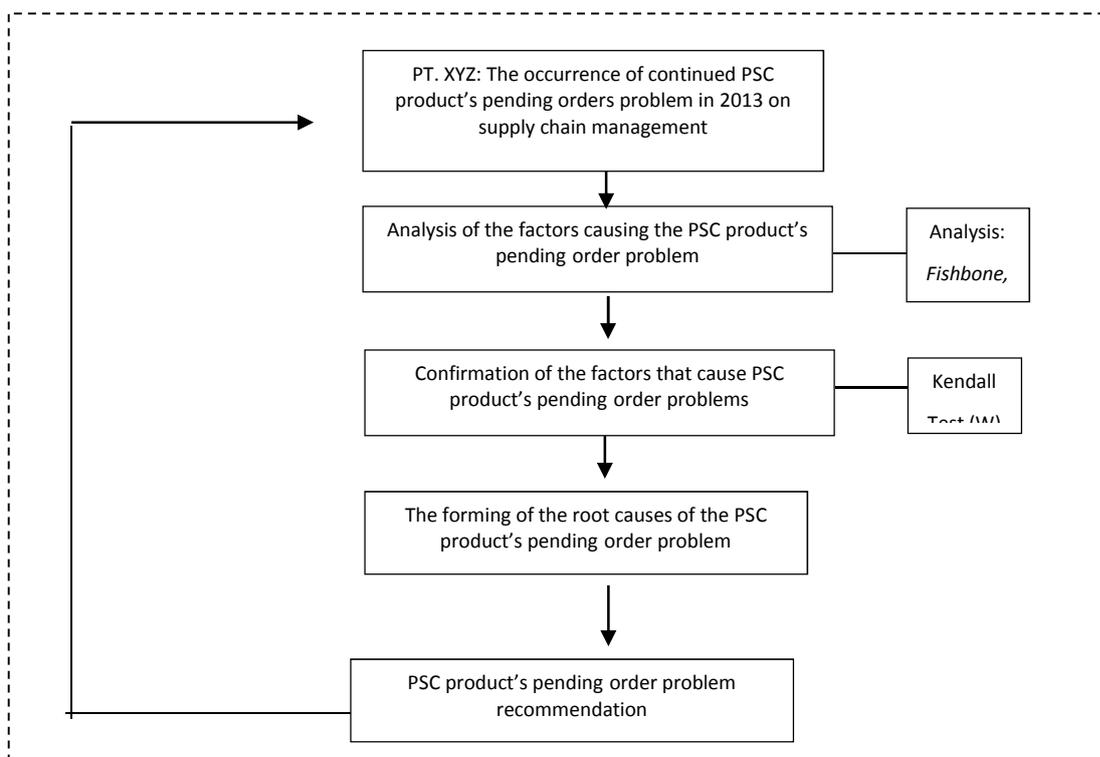


Figure 1 Conceptual Framework. —> Research process, — Analysis process, - - - - - Area of study limitation.

The next stage is analyzing the pending orders' cause of problems factor(s). At this stage, focus group discussions (FGD) by a group of respondents are selected by purposive sampling. FGD will be using fishbone diagram analysis tool based on a 6 M framework (man, machine, money / management, method, milieu, and material).

At this stage, cause of pending order problems factor(s) will be explored. Further causing factor(s) that is found in the exploratory stage will be confirmed by using perception surveys on selected speakers using snowball sampling. The survey results are then processed by Kendall test (W). The results at neither exploration stage nor the confirming factors that cause the PSC products pending order at PT. XYZ is then used to determine the root cause of pending order of PSC products at PT. XYZ. In the final phase of this study, a literature review is conducted related to pending orders issues and research findings to generate pending orders troubleshooting recommendations in PT. XYZ.

3 RESEARCH METHOD

Time of Research and Location

This thesis research is conducted at PT. XYZ which is located in Bogor, Indonesia. This study was conducted from October 2013 to April 2014.

Research Approach

The study was conducted with a descriptive research design through a case study approach at PT. XYZ. PSC product's pending order issues are identified using secondary data processing from the supply chain management of PT. XYZ. Then the factors that cause the problem of pending orders are obtained from the focus group discussion (FGD) of the respondents are selected by purposive sampling. FGD is conducted by the respondents with help of the fishbone diagram analysis tool guide.

The factors that cause the problem of pending orders obtained from FGD stage then is used by the researcher to create the perception questionnaire. This questionnaire will be filled out by the respondents that were selected by snowball sampling. The results of the perception survey will eventually be processed using IBM SPSS statistical program version 20, with nonparametric statistical method which is the Kendall alignment test (W). Once the root cause of pending orders in PT. XYZ is found, by using secondary data from the theories of related literature and scientific opinion of the researchers and experts, the researcher will then recommend alternative solutions to address pending orders issues that emerge.

Data Processing and Analysis Technique

Pending order of PSC products issue at PT. XYZ are identified using secondary data processing which is present at the internal and external supply chain management of PT. XYZ. Then the factors that cause the problem of pending orders are sought by processing the primary data from the FGD, with the guide of fishbone diagram analysis tool. The factors that cause the problem of pending orders that were obtained from FGD stage are then used by the researcher to create the perception questionnaire. This questionnaire will be filled out by the respondents pending order products PSC PT. XYZ, which is obtained by snowball sampling technique. The results of the perception survey will eventually be processed using IBM SPSS statistical program version 20, with nonparametric statistical methods which were the Kendall alignment test (W). Once the root cause of pending orders in PT. XYZ is found from the processed primary data and secondary data of this research, using literature review related research findings and scientific opinion of the researchers and experts, and then the researcher will recommend alternative solutions to address the emerging issues of such pending orders.

4 RESULTS AND DISCUSSION

From the secondary data in Table 1, it is known that during 2013 pending order of PSC products occur in every month. Average pending orders per month is as many as 7 items. The smallest pending orders occurred in July 2013 as many as 1 item, while the largest pending orders occurred in the month of August 2013 as many as 12 items.

There are 10 factors that are suspected to be the cause of PSC product pending order from the fishbone diagram that are generated during the exploration stage or FGD which are: running out of finished goods (FG) inventory; management / financial governance (MK); material delays in production; unstandardized sales and operations planning (SNOP); human resources (HR) regeneration programs or HR knowledge related with market demand forecasting techniques; the function of supply chain (SCM) at PT. XYZ and low function of quality management system (QMS); inaccurate distributor demand (DD) or sales demand; regulatory developments; unstandardized and slow material requirements planning (MRP) system / tool; uncontrolled market developments and the dissolution of a sales operation manager / suboptimal logistics provider function.

Table 1 Profile products PSC pending orders in PT. XYZ

Month	Amount of SKU pending order PSC	Month	Amount of SKU pending order PSC
Dec-12	5	Jul-13	1
Jan-13	7	Aug-13	12
Feb-13	6	Sep-13	4
Mar-13	8	Oct-13	2
Apr-13	9	Nov-13	10
May-13	6	Dec-13	10
Jun-13	9		

To prioritize the root causes, then out of 10 factors only 3 factors are taken that are the most factors that often appear on the diagram. These three factors are as follows:

1. Working capital which leads to unbalanced outstanding payment (accounts payable). Problems that relate to financial management governance at PT. XYZ,
2. Unstandardized sales and operations planning (SNOP), and
3. Unstandardized Material requirements planning (MRP).

The first factor is suspected as the cause of having the highest frequency of occurrence as many as six times, while the second and third factors had the same second-highest frequency that appeared on the generated fishbone diagram, where each equally appear four times. The most frequent causative factor that appeared on a fishbone diagram is usually the root cause of the problem or the effects of the problems that are being discussed. Hence, for a temporary conclusion of this research it is alleged that financial management governance factor at PT. XYZ to be the root cause of the pending orders in PT. XYZ for PSC products.

The results of this fishbone is then attempted to be verified using a perception survey of the respondents that know about the PSC products' pending order matter at PT. XYZ. This will be presented by the researcher in the subsequent discussion.

The results at this stage of the perception questionnaire states that the low accuracy of DD being ranked 1 as an actual cause for PSC products' pending order does not conflict with the results from the fishbone diagram. If noticed again on the said fishbone diagram part, then MK (management / financial governance) causes an imbalance in the working capital, if further asked, they arise because of two things, namely operational expenditure (OPEX) which is also used for capital expenditure (CAPEX) e.g. for a construction project or due to inaccurate DD conditions that ultimately lead to an accumulation / motionless supply of certain products. Therefore, if we do 2 stages of decision making as described above in the fishbone diagram, it can be concluded further that the root cause of the PSC products' pending orders problems at PT. XYZ is because of inaccurate DD conditions or it is because of the muddle between OPEX and CAPEX allocation at PT. XYZ.

Fishbone diagram from this FGD stage could not further identify which of the two factors that is the root cause for the occurrence of MK. To answer that, a result from the questionnaire perception is needed. When we consider the results of the questionnaire related to the perception, the parts that are related to the causes of governance management or financial PSC product is less than optimal that eventually led to a pending order, where the results are listed in Table 2.

Table 2 The results of the perception survey of the causes of financial governance which led to working capital management unbalanced in PSC Product^a

Rank	Factor	Mean Rank
1	Stock FG DD does not move because of the low accuracy	1,16
2	OPEX used for CAPEX	1,84

^a respondent amount =19, Kendall Concordance Coefficient (W) = 0,623, degree of freedom (df) = 1, Asymptotic significance = 0.001, Chi-square SPSS = 11,842, Chi-square count = 11,837, Chi-square table (α = 5%) =3,841, then there is a statistically significant alignment of the opinions of the survey respondents.

From Table 2, it is clear that there is an opinions alignment of respondents in the confirmation stage of the pending order cause. The respondents agreed MK is more caused by inaccurate DD than caused by the CAPEX and OPEX usage jumble. The conclusion is that ultimately inaccurate DD although only appeared 2 times in the fishbone diagram, but if explored further, turned out to be a deeper cause of the factors that appear most often in the fishbone diagram, namely management or financial governance factor which led to imbalanced working capital (MK).

At the end of this discussion we conclude that there are no difference in the root of the PSC products' pending order problem at PT. XYZ that are identified using FGD by fishbone diagram analysis tool with the results of the questionnaire that were processed with Kendall's concordance test (W). Inaccurate DD or low accurate sales plan is a factor which is the root cause of pending order of PSC products at PT. XYZ.

Hence, analytical result concludes that both FGD and questionnaire methods are complementary to each other. Both methods are equally share result that the product's pending order in PT. XYZ is caused by inaccuracy of sales forecasting or demand distributor (DD) forecasting. Relate to inaccuracy of sales forecasting or DD forecasting, research result proposes four recommendations for PT. XYZ as a solution. First recommendation is to improve marketing's key performance indicator (KPI) related with sales target in unit. Second recommendation is the use of combination of quantitative with qualitative sales or DD forecasting technique. Third recommendation is to increase strategic stock for each product for short time period. The last recommendation is DD forecasting should be received by SCM of PT. XYZ from its logistic provider (PT. ZZZ) after having coordination with marketing division of PT. XYZ.

5 CONCLUSIONS AND SUGGESTIONS

Conclusions

1. At the beginning of this study a secondary data is acquired that PT. XYZ until now have 53 sku of personal skin care products (in 2013). From the existing secondary data it is known that during the year 2013 in every month there occurred pending orders, an average pending order per month can be as many as 7 items. The smallest pending order was in July 2013 as many as 1 item, and the largest pending orders occurred in August 2013 as many as 12 items. The effect of this pending order is bad for the company, which resulted in sales loss up to 32% of the sales target (in value) at PT. XYZ.
2. At the end of this discussion we conclude that there are no differences in the root of the pending order of PSC products problem at PT. XYZ by using FGD with fishbone diagram analysis tool and the results of the perception questionnaire that were processed with Kendall's concordance test (W). Inaccurate DD or low accuracy of the sales plan is a factor which is the most significant cause of the pending order of products at PT. XYZ as well as PSC products.
3. Relate to inaccuracy of sales forecasting or DD forecasting, research result proposes four recommendations for PT. XYZ as a solution. First recommendation is to improve marketing's key performance indicator (KPI) related with sales target in unit. Second recommendation is the use of combination of quantitative with qualitative sales or DD forecasting technique. Third recommendation is to increase strategic stock for each product for short time period. The last recommendation is DD forecasting should be received by SCM of PT. XYZ from its logistic provider (PT. ZZZ) after having coordination with marketing division of PT. XYZ.

Suggestions

1. From this research it is known that the root cause of the problem is the DD accuracy or low sales planning. Therefore, it is recommended for further researcher to conduct further research in order to find the root cause of the demand distributor / sales forecasting low accuracy in PT. XYZ by using similar methods in this study or different methods. So far, the cause of the low accuracy of DD for PSC product at PT. XYZ has only been confirmed by the researcher through field observations of its process.
2. It is advisable to do further research to study the problem of the research (pending order of PSC products at PT. XYZ) with other analytical instruments such as current reality tree (CRT), Pareto diagrams or analytical hierarchy process (AHP), to further strengthen the validity of the results of this study.
3. It is advisable for the management of PT. XYZ to immediately execute the proposed alternative solutions that the researcher suggests in order to discover immediately its effectiveness and efficiency in addressing the PSC products' pending order PT. XYZ.

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