HOSPITAL INVENTORY OPTIMIZATION

November 2016

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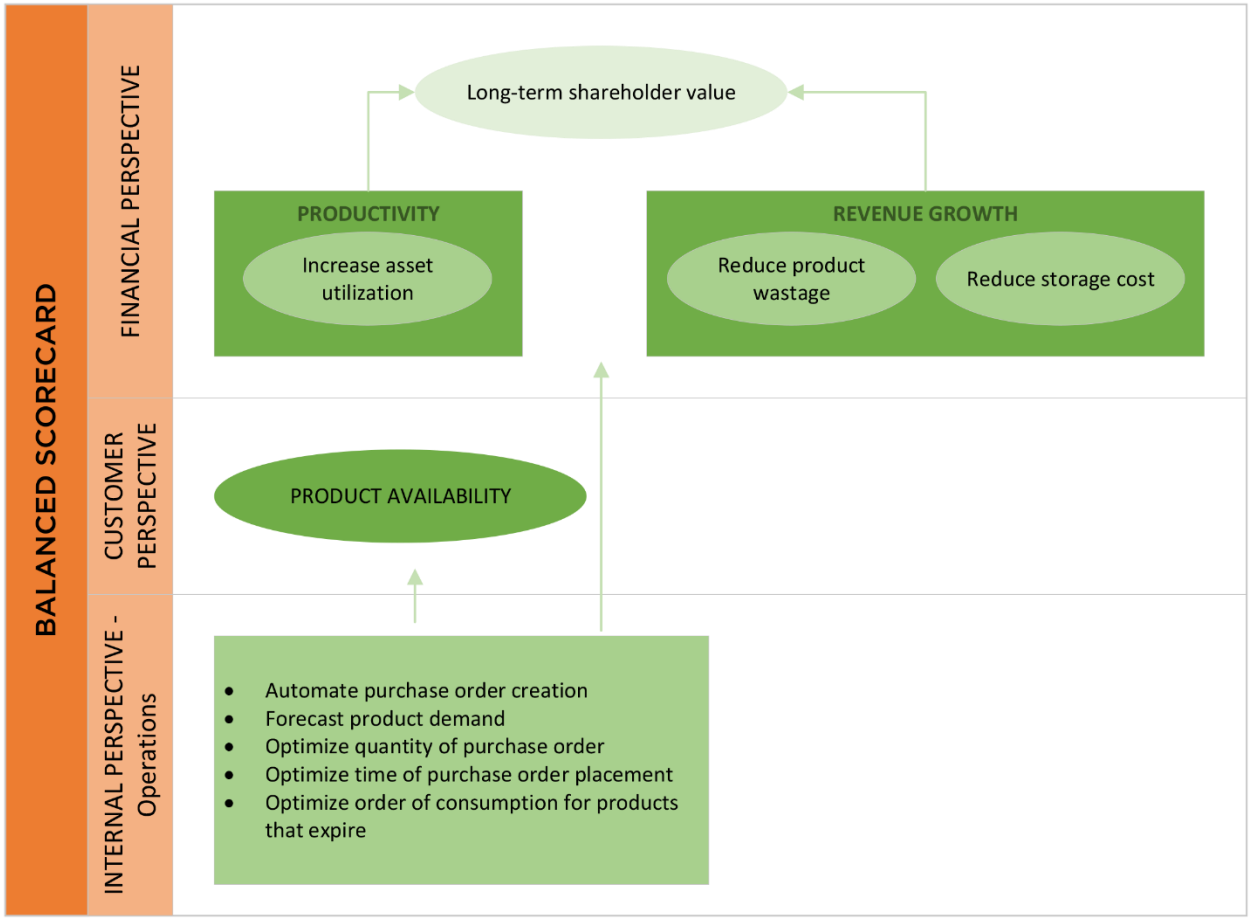
Problem Statement:

Inventory management has been one of the trickiest business capability for any organization, and the case is no different for hospitals. As result of poor technology and processes, hospitals struggle with over-stocking, stock-out, labor costs, inability to use data for decision-making, among other problems. Many manual processes are also involved, for instance, placing purchase orders – right quantity, right time. There is a need to tackle these problems for optimizing the capability.

Proposal:

Only the elements associated with proposal have been included in the balanced scorecard below:



Forecasting demand:

To automate the order system, it is important to understand the demand of products sold/consumed by the hospital. The demand of products at the pharmacy is collected from the Point-of-Sales system at pharmacy. Modified version of weighted-average forecasting is used to predict the demand.

Let,

d_i = demand forecast value for the product in month mi

d_1 = demand for the product in month mi-1

d_2 = demand for the product in month mi-2

d_3 = demand for the product in month mi-3

d_4 = demand for the product in month mi, the previous year

d_5 = demand for the product in month mi-1, the previous year

d_6 = demand for the product in month mi+1, the previous year

Then,

$$\mathrm{di} = \frac{d1 + d2 + d3 + 0.5d4 + 05.d5 + 0.5d6}{6}$$

The model considers demand around the same month, the last year, considering the impact of seasons on health disorders.

Automating Purchase Order Placement:

In order to automate the purchase order placement, the right quantity of order and right time to place the order have to be calculated. Below factors are considered to deduce the same:

1. Product's demand forecast
2. Safety stock value for the product
3. Lead time for the product (supplier to hospital)

A threshold value is calculated using the above factors. Whenever inventory stock falls below this threshold, a purchase order is automatically generated at backend.

Business rules were created using knowledge from prior experience in supply chain, and researching on the internet. The backend structure was designed by creating a logical model in ErWin data modeler.

For implementation, physical model was created for Oracle 11g database using ErWin data modeler. Oracle 11g was integrated with ErWin, and forward engineering was used to create table structures.

Forecasting and automation logic was implemented in the database using Trigger, Procedure, Functions, and Cursors.