

Optimization of Warehouse Cost & Workforce Forecasting



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Introduction

Many of the world's leading Retail and CPG enterprises are facing increasing pressure to improve operational performance, increase productivity and drive innovation in supply chain management by streamlining processes, eliminating errors and reducing costs.

In a survey conducted by Intermec at the end of 2014 it was reported that mid-sized warehouses lose approximately 3k Man hours a year due to workforce inefficiencies.

Following are the two areas where all Operation managers face challenges when they have to look for Cost Optimizations

Picking & Put-away Optimization

At the time of WMS implementation the Storage Location where the Item should be stored to optimize the Picking Process is decided based on the Velocity Classification (Current) of the Item.

As time passes (say 6 month) the Velocity of Item may get changed, thus increases the chance of Dead Pallet presence in the Storage Location, where the fast moving Item should be placed. Especially depending upon the number of Items a warehouse is handling, increase this complexity many folds.

Also the pattern in which the picking requests come and correlation between articles being picked must be an input in the put away strategy. For instance it might be more beneficial to have two storage locations for the same article kept with different sets of article.

The real challenge is to proactively optimize Storage and not wait for 6 months and expect a manual intervention in changing the rules.

Workforce Forecast

Another Bottleneck for Warehouse Operations is to have the right Work force to handle Operations, so that there would not be any delays neither end up paying more to un-utilized labor or procure short term labor. It will help if we eliminate unnecessary effort thus have more efficiency and translate sales forecast into actual granular effort needed.

Thus to optimize warehouse operations cost, above areas becomes very critical.

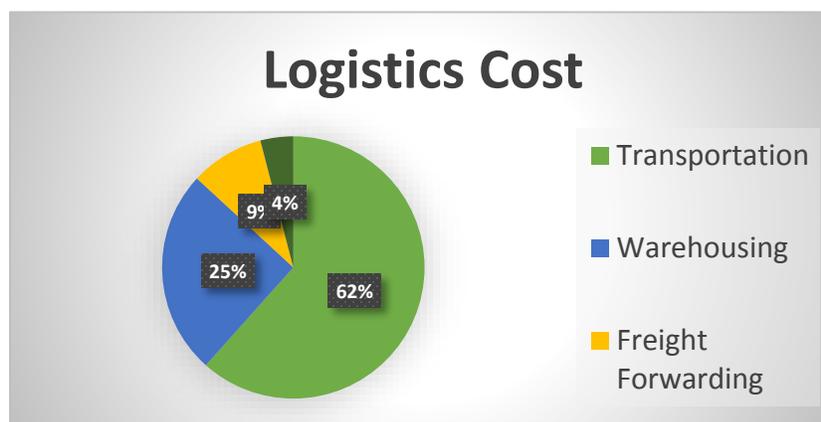
Problem Statement

In the current environment it is vital for businesses to strive for lean operations, continuously optimizing it. Given the competitive market place, demanding customers it is imperative to minimize operation expenses, improve efficiencies of processes and people. Eventually customers get benefits in terms of cost and improved service levels.

It becomes s more challenging to identify these opportunities and act on them before the competition does. The more obvious and low hanging improvements opportunities have mostly been en-cashed by the industry.

In the end to end logistics, transportation has been fairly optimized by advanced planning, network optimization and collaboration within the given constraints of a specific industry and its demand & supply picture.

Out of total logistics spend ~25% is on warehousing activities (second only to transportation). There is potential for optimization of the warehouse operations and in getting the operational costs down.



Warehouses are run as cost centres in a labour intensive manner. It is perceived as essential for the supply chain but not as a value adding step, hence companies seldom invest beyond the basic storage infrastructure in the warehouse. Advanced automation technology has been around for some time, but has not been adapted due to perception of high cost and ROI not being visualized.

The mind-set of adding more workforce can solve all problems & constraints in the warehouse is misnomer.

Labour costs make up for about 54% of the total warehouse costs. IT system used in the warehouses are usually transactional and only keep track of what is in the warehouse and where. These have very minimal optimization capabilities and are driven by rules set by operations without any combinatorial analysis or what if scenario analysis.

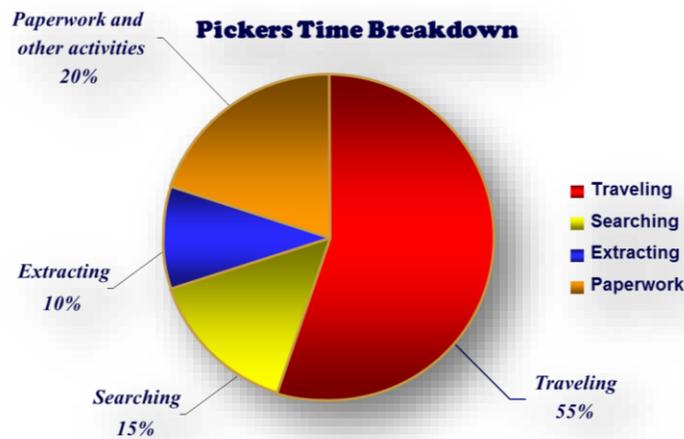
Thus inefficiencies in Putaway & Picking can result in exponential rise in warehouse operation cost and most warehouse managers do not even realize the impact.

Key Industry Facts

Following are the main areas which accounts for inefficiencies in Warehousing Operation:

- **Storage Utilization:** Improper utilization of Location increases the number of Pallet Position/Racks required to store the item. Also articles must be stored based on their correlation and picking patterns.
- **Picking Optimization:** Pick efforts increases many folds if the fast moving Items' inventory lie in the location very far from the shipping Doors. Thus keeping the check on the Classification of Inventory and the location it should be stored in becomes critical.

Picking accounts for nearly 60% of the total Labor Cost, thus to reduce the cost of warehouse operation, optimizing Picking operations becomes essential. If we analyze the Picking tasks in detail, usually for optimized environment, 55% of time spent by Picker is only for travelling.



Source: John J. Bartholdi, III, Steven T. Hackman, 1998

So just by putting Items in the right areas thus reducing travel time of pickers, can lead to reduction of picking effort by about 50%.

How much is incorrectly placed inventory in the warehouse contributing to the operations cost?

Consider a scenario where Picker has to pass a dead (non-moving item's pallet for more than 1 month) every time he has to pick some fast moving item. If the Transactional Volume of the warehouse is:

- 5,000 Orders/Day
- 4 Pallet (ordered)/Order
- 4 Feet of Extra distance to be covered (while passing by one non-moving Pallet)
- 200 Feet/Min (Speed of picker)
- 40 min/Day (Wastage)
- 244 hrs/Year
- Wages- 15\$/Hr

Thus Total Loss= 15*244 ~ 3650 \$

Thus, merely keeping one dead pallet in the wrong place, an Organization may lose 3650\$ per year.

Solution

We developed the Statistical Framework based on Regression Analysis which will help Warehouse Operations Team to define benchmark for the Picking time, and monitor operational efficiencies. This framework will also help Warehouse Operations to Predict/ Forecast the Workforce requirement in warehouse for a period (Weekly, monthly etc.) using the Operational benchmark parameters, historical workforce demand & Future work requirements.

The Historical data will be consumed & churn by Statistical tool like **NEC SAMPO** and provide the statistical equation.

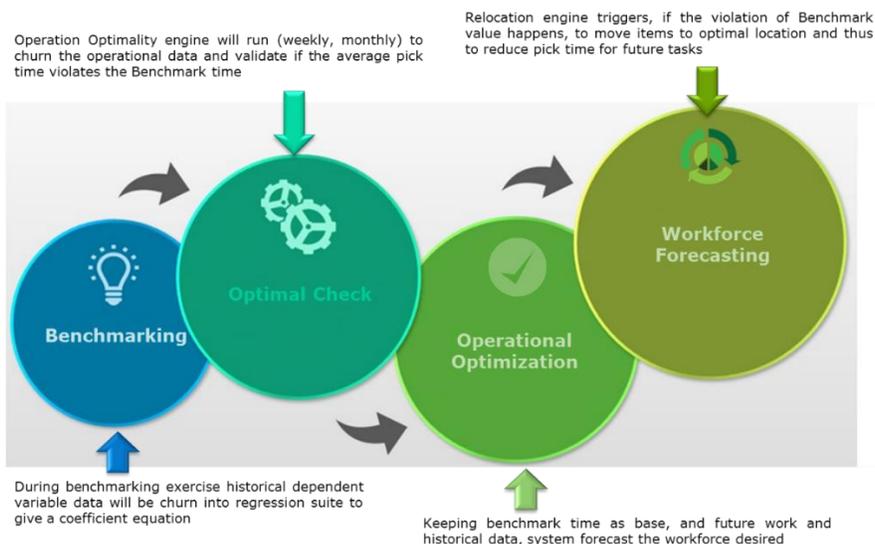
Picking time for each Pick Task is directly proportional to:

- Distance covered to pick the Item
- Weight & Volume of the Item to be picked
- Picking Type: Each, Carton, Pallet
- Item Velocity
- Product Category
- Handling Class
- Repacking Class

Thus to establish any relation on how the Picking time gets determined Regression analysis will be done for building statistical models that characterize relationships among above dependent variable.



Regression equation for the Benchmark Picking Time will be used to evaluate if the Operations are optimal and to forecast the workforce.



Target Industry/ Customers

Fast Fashion Retailers- Fast Fashion Retailers like Zara, Ann Taylor where the Styles & Fashions keeps on changing very rapidly, so it's very essential to align the warehouse operation which will suit the Velocities of Item and thus will bring the Pick Efficiencies and Optimize the Workforce.

E-Commerce- E-Commerce Industries have huge variability in Demand, thus highly unpredictable to foresee how much particular Item will be shipped. This makes the

Unique Business Benefits

- ✓ Increase Operational Efficiency by Improved KPIs:
 - Average Pick Time
 - Workforce Utilization
 - Lead time- Location to Dock
- ✓ Proactive approach to identify bottlenecks
- ✓ Define framework to establish benchmark for Picking Time
- ✓ Workforce forecasting to bring Operational Efficiencies

Conclusion

With continuous pressure on companies to reduce the overall Supply chain cost, organizations are looking towards warehousing Operations to drive the need of cost optimization.

The real opportunities with companies is to devise some framework where they can refine their picking process and also plan their workforce better to drive the cost optimization. Regression Analysis is the proven technology to establish the parameter and their dependencies.

Thus using this tool company can save on their operations cost and also predict the workforce and manage their operations better.

About The Author



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Tushar has about 9 years of extensive industry experience in Business Consulting, Requirement Analysis and Process Designing with leading global organizations in Retail, Logistics and Supply Chain Execution area. He has worked on multiple supply chain product implementations in US & Asia Pacific and shares an extensive interest in the supply chain domain. Tushar holds an Engineering degree in Computer Science and currently pursuing Advance Diploma in Supply Chain from IIM Kolkata