Retail Stores-Design & Operation's Optimization

Abstract

In general, large-scale infrastructure design methods have their preferred CAD tools for 3D modeling and 2D detailing along with defined Product Life Cycle Management IT system for PDM. This method of digitization is an inevitable approach to drive the entire project from initial Architect Design (from ID) concept to final site completion in all aspects covering Civil, Electrical, Mechanical, Plumbing, Security and Safety, etc. This larger analogy of design, its Engineering data, stores operations data and the best practices can be standardized adopting various best practices for Retail Stores.

For Retail Stores, there are other design and engineering application areas to make the Infrastructure to a live Business Centre that demonstrate the values continuously to attract consumers, increase profit and support growth.

Introduction

This document is aimed at listing key Value Engineering and Optimization areas at 1st place for Stores Engineering. Also, some areas are detailed to advent the best practices or the optimization requirements to engineering or operational effectiveness for any Retail Store.

Life cycle activities list for understanding

- Ethos value that could be aimed at having BRANDING, EMOTIONAL CONNECT, HERITAGE, CULTURAL IMPACT, etc.
- One Standard design and display external / internal with the Ethos value
- Design standards / guide
- Stores Equipment Categorization and Modules definition
- Methods on design costing and its optimization
- Design of stores equipment for packaging & handling for stores or warehouses
- Shop equipment's design & its validation methods
- Shop equipment's global sourcing
- PDM & PLM, for new product or product sustenance data management
- Material Compliances
- Retail Stores Data analysis and Planogram for overall utilization of space and maximizing profit
- Stores layout digitization and its optimization

Not limiting to the list above, the importance is related to the criticality of Engineering that goes into any store's design for the values it carries, contributing to companies' business and the methods to keep definite control from initial setup, profitable running till refurbishment or scrapping.

Areas of stores engineering & its operation's effectiveness:

Continued below are few high level insights in the life cycle coverage of Stores Engineering & its Operation's effectiveness.

(i) Design standards / guide

Design guide is a database where tacit knowledge & learnings are converted into explicit form for future references. The design repository that captures the design requirements of a design to meet its intended function under stated conditions and may also elaborate on methods of design, manufacturing, its validation etc.

Benefit of this explicit definition under Design Guide can be easily adopted to the design development of automated CAD 3D models and 2D drawings. This method of automation extending from part level to subsystem modules facilitate to further matured process called Knowledge Based Engineering (KBE).

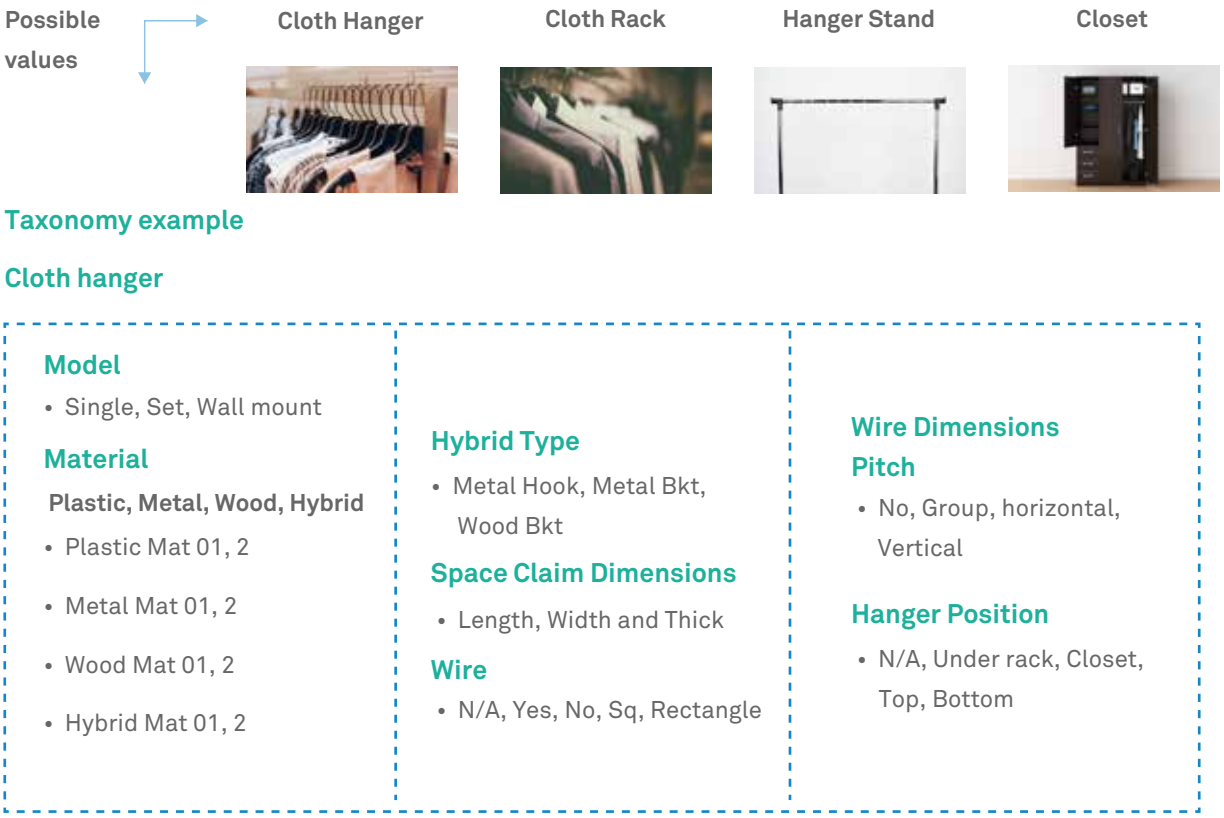
(ii) Stores Equipment Categorization and Modules

To have logical control with PDM or PLM, it's important the owners define their product categories and modules within each product.

Product Taxonomy is the technical term for the classification and definition of the module parameters. With Taxonomy module parameter definition, we can apply KBE methods to automate CAD 3D modeling & 2D drawing.

Below is the simile illustration on planning for Taxonomy.

Product Taxonomy: An illustration



Benefit of structure definition & documentation of Taxonomy with module parameters

Achieve high level of productivity to the order of 70% to 80% in having the parts ready for release compared to traditional methods as the generation of CAD with KBE is made almost instantaneous.

(iii) Methods on design costing and its optimization (Should Costing)

In the design life cycle, as the design matures from initial concept to final sourcing, the engineering aims to add value to money doing needed scrutiny. This is done to achieve the required function of the design while keeping the

cost low. So the value addition and its costing have an impact on overall gain. It's very important to keep constant tabs on the overall cost of the part / product (stores equipment, accessories) whether it's manufactured in-house or brought out. This activity on estimation for increasing the margin is termed commonly as "Should Costing".

Cost Optimization can be aimed in multiple ways

Leveraging the design repositories on hand for communization or standardization or complexity reduction

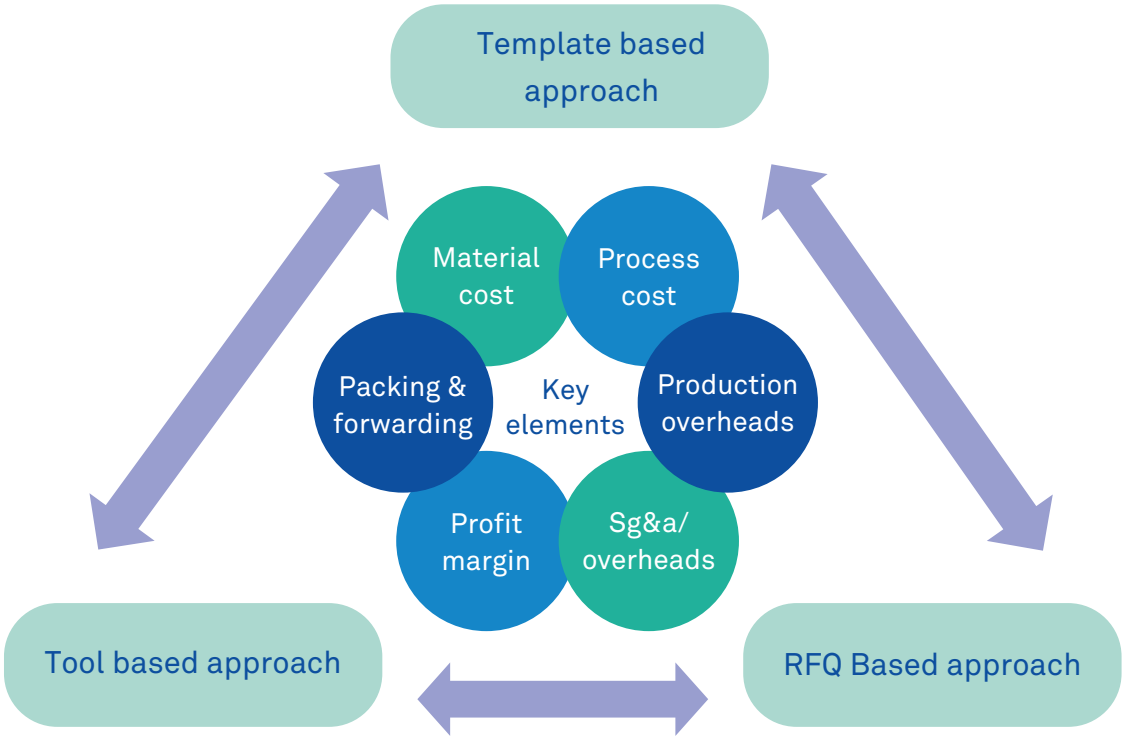
Leveraging vendor sources for manufacturing cost optimization for optimized supply chain.

Leveraging current vendor and cost repositories to build in-house costing tool or creating one such simple flexible tool for internal references.

Leverage current technology tools for adopting cost estimation for prompt tracking and hence taking action to control it.

Leveraging procurement ecosystem for alternative global sourcing that meets cost reduction.

High-level overview on "Should Costing" with its key elements of consideration is illustrated below



This term of costing called as "Should Costing" plays a key role across all three stages of product development as illustrated below.

Should costing

Concept state

- Reliable cost estimates for business case
- Demand driven product design :
- Decisions on/ evaluations of product variants
- Impact assessment of technologies and features

Detailed engineering stage

- Fine-tune designs to achieve targeted costs to reduce costs
- Trade-offs between products/ process technology features and costs
- Decision support on sourcing locations and make versus buy
- Supplier negotiations for new products/ tools
- Alternate design comparison
- Product complexity reduction

Commercial production stage

- Revalidate current costs
- Cost optimization and VA/VE
- Focused supplier development
- Resourcing decisions
- Negotiating for parts/ tools
- Impact assessment of engineering changes
- Impact assessment for commodity price fluctuations
- Product complexity reduction

Sample of equipment "Should Costing" below

Product		Spreadsheet			
	Part Number	Model 2		Location	
	Part Name	Assembly		USA	
		Unit Cost	Qtrly	Monthly	Yearly
		1	250	83	1000
	Setup Cost	$43.01	$0.17	$0.52	$0.04
	MFC Cost	$24.18	$24.18	$24.16	$24.16
	Material Cost	$12.24	$12.24	$12.24	$12.24
	Point Cost	$3.43	$3.43	$3.43	$3.43
	Purchased Cost	$4.00	$4.00	$4.00	$4.00
	Sr No.	Purchased	Part Qty	Cost per price	Total Cost
	1	Concept	4	$1.00	$4.00
					$0.00
					$0.00
					$0.00
					$0.00
					$0.00
					$0.00
				Total Cost	$4.00
	Material rate USA-0.46 $/Lbs, India-0.34 $/LBS, China-0.24 $/Lbs				
Weight of the SQ Tube-6.60Kgs	Material rate USA-0.$0 $/Lbs, India-0.40 $/LBS, China-0.30 $/Lbs				
	0.755/Ft				

Benefit of should costing

Application and adoption of Should Costing helps in making faster and smarter decisions by:

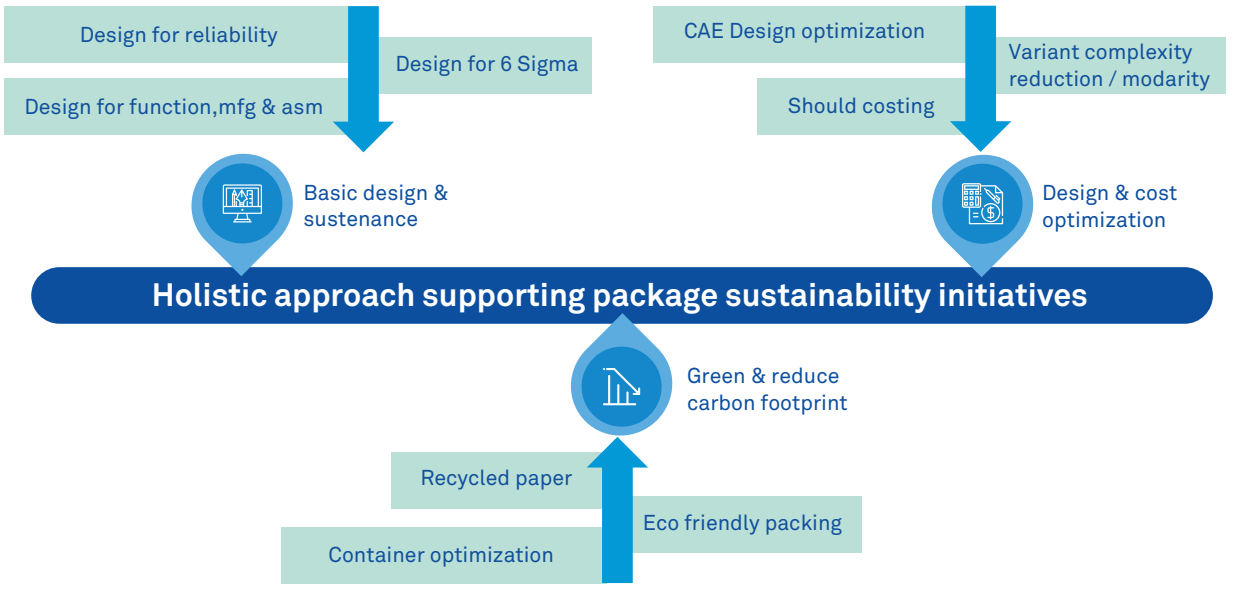
- Control, Structure or Eliminate price negotiation
- Understanding Value vs. Price and choose partner based on value
- Tracking on new product target cost as the design matures and support decision or trigger for cost optimization

(iv) Design for packaging & handling

In any product design and development, packaging design optimization is a critical activity in bringing a cost-effective reliable solution and it's vital because of:

- Direct cost addition to BoM
- No major value addition to the actual end product but to protect it from shipping damages and brand value

These packaging solutions could be of Primary or Secondary or Tertiary package requirement based on the product and end shipping needs. It has to be a holistic approach like the below sample illustration on different aspects to be considered.



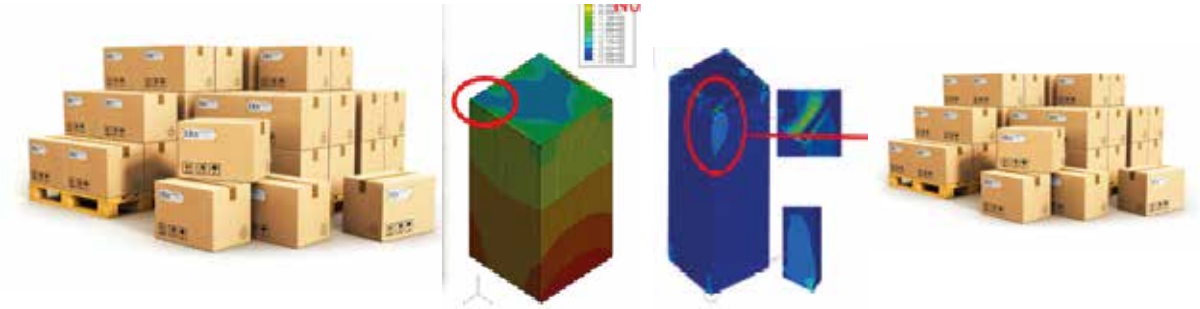
Some of its optimization methods to do get it right the first time or within few iterations are illustrated below. We also need to consider various environmental aspects for reliable and sustainable design.

Design for packing

Warehouse stacking – CAE prediction

Environment could demand to predict warehouse stacking failures.Proactive CAE analysis would have helped to identify such potential risk and build robust design for the application

Non Uniform stress & displacement field with 4 high stack



Stack tilt in warehouse

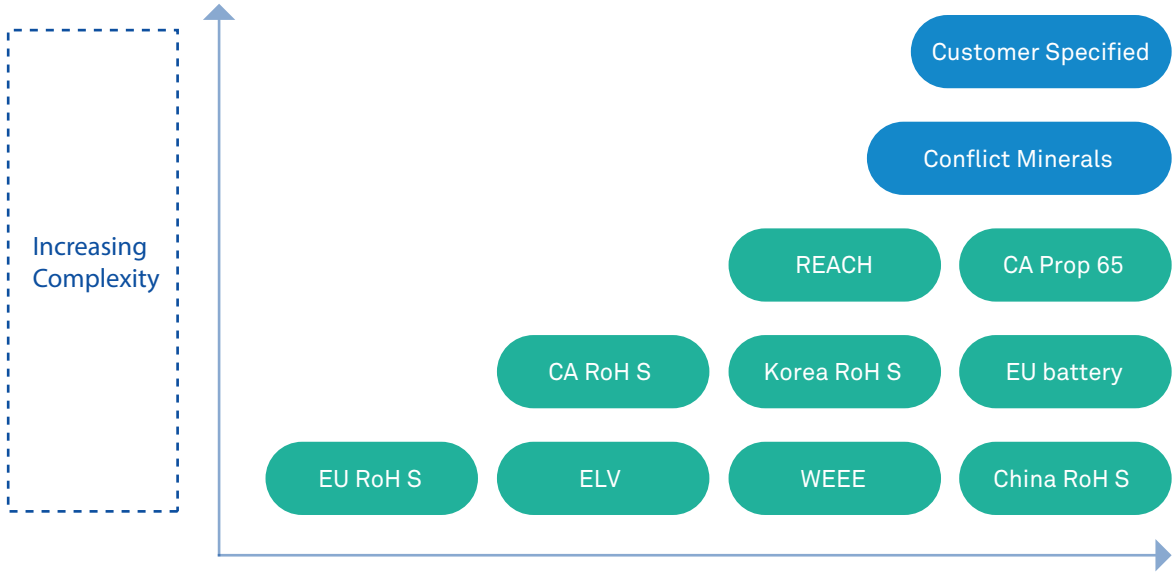
Local failure of washer pack

Benefit of the holistic package design approach is immense in addressing the perceived quality impact affecting the brand and to the extent of taking care of safety requirements during any part of handling.

(v) Product material compliance

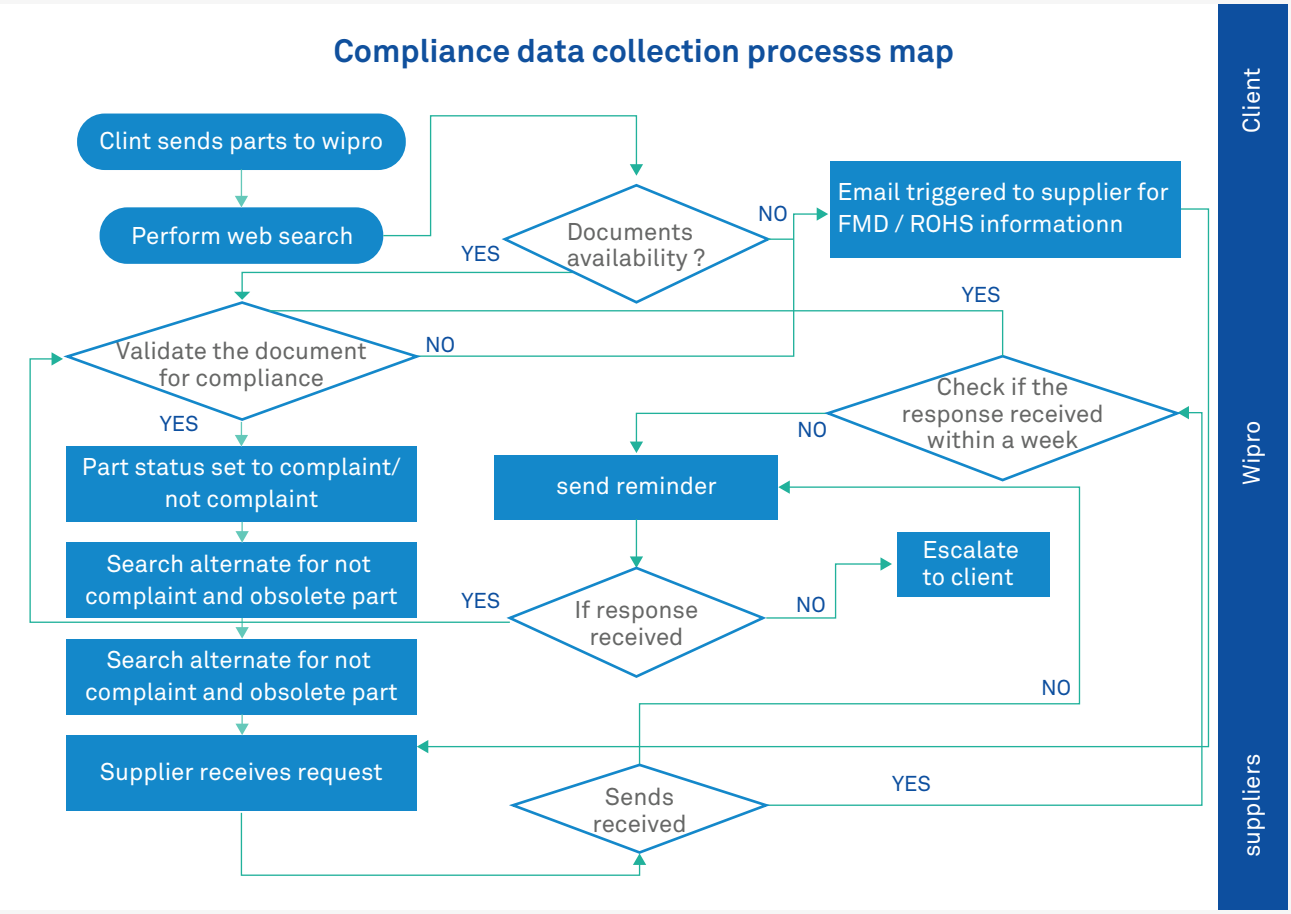
It has increasingly been a challenge with respect to different compliance requirements that various geos' products need to adhere to. Companies' global footprint further add to the complexity in terms of how they need to be more sensitive to make sure their product's material conformance is tracked and monitored at a micro level.

Regulation complexity perspective



- Compliance negligence will have a serious impact on bottom line such as Brand damage, lost sales, blocked shipment and rework, recall, late product introductions, etc.
- A structured process as well as bandwidth are required to track, record and monitor on a continuous basis to overcome the challenges of negligence.
- The optimum ways could be to have the structured PLM or PDM system with SharePoint Team collaboration for management of material conformance requirement.

Below is an illustration on simple workflow as a service to coordinate with supplier to manage conformance requirements.



While there is a lot of sensitivity associated with this requirement, companies have to look at the means to reduce the overall operations overhead by classification of core and non-core activities within the process of tracking, planning, maintaining and monitoring material conformance. They should adopt technology levers like Share Point system tools where non-core and core activities can be cost-effectively handled to execute in a collaborative method with remote teams and vendors well-connected with required internet way of working. Meticulous identification and adoption of automations in the workflow process map is also a means to increase productivity.

Benefit or effect of levers in optimizing the material compliance fulfilment process

- One process tool with core & non-core activity segregation facilitate easy collaboration
- Optimize the operations overhead with cost-effective collaboration for non-core activities

(vi) Retail data analysis and planogram plan for optimization

To maximize overall profit or strategizing support for business growth, there are multiple means of data analysis for Retail Stores as it deals with sale of product and services to the customer.

Company-owned retails can largely leverage the huge amount of information that can be gathered on customer behavior. A retailer who sells goods of companies can also leverage data analysis in terms of planning the right assortment of products in the store in an efficient way, arrange the products in a way that stimulates purchase and minimizes inconvenience for customers.

Factors that need to be considered for Planogram are

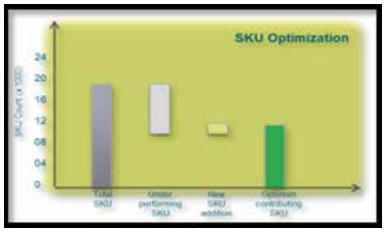
- Layout design
- Space allocated to Merchandize categories
- Promotional area
- Flexibility
- Cost of product and its margin
- Maintenance and overhead cost details
- Inventory
- Season sales trend
- Customer buying behavior
- Signage and Graphics

Some of the insight-driven Retail Data Analysis topics contributing to operational effectiveness are listed below.

- Product Category and Margin contribution.
- Product SKUs and inventory turnaround time or inventory holding cost.
- Product SKUs and shelf volume coverage.
- Retail interior equipment capex contribution per sq. ft.
- Revenue per sq ft. or Revenue per shelf cubic ft.
- Retail stores overhead contribution and optimization.

Planogram often called planos, shelf space plans, schematics or POG's are a simple and effective tool for visual merchandising planning to suit purchasing behavior and more revenue.

Few illustrations on the retail store's data analysis



Option 1
Total No of Shirts placed in shelf= 43

Option 2
Total No of Shirts placed in shelf = 72

Percentage of Inventory in OPTION 1 is 40% less compared to OPTION 2

40 % of best selling products can be added as in OPTION 2 to increase Retail Sales Per Square Foot

Benefit of retail data analytics

- Enhance (large revenue, high margin)
- Grow (low revenue, high margin)
- Fix (high/low revenue, low margin)
- Review (high/low revenue, negative margin)
- Control on overhead cost and operational effectiveness

Stores layout digitization and its optimization

Stores digitization facilitates virtual analysis to optimize the layout. With the required flexibility on in-store reengineering for product variation and optimization, stores digitization could play a critical role.

Further Insights from Video Analytics empowers planning for sales enhancement.

Stores layout digitization and its optimization

Benefit of Stores digitization with video analytics helps to study the customer movement analysis and optimize store layout to enhance sales per customer.

About the authors

H. Saravanan

Holds an MS in Manufacturing Management, and a B.Tech in Mechanical Engineering. He has 22+ years of experience in Product Design and Development for its life cycle functions. Saravanan has handled various roles within the Product Engineering Practice, led Team for its Technical solution and driven Cost, Quality and Operational enhancement or transformation solutions to Global Customers covering various facets of engineering functions. The Global Customer's footprint covers wider industry spectrum viz. Automotive, Heavy Engineering, Industrial Products, Consumer White Goods, Retail, Food & Beverages, Apparel, Foot Wear, etc.

He can be contacted at **Saravanan.Hariraj@Wipro.com.**

Abbreviations

- IT - Information Technology
- PDM - Product Data Management
- ID - Industrial Design
- CAD - Computer Aided Design
- KBE - Knowledge Based Engineering
- VA/VE - Value Analysis / Value Engineering
- BoM - Bill of Material
- CAE - Computer Aided Engineering
- SKU - Stock Keeping Unit

Wipro Limited
Doddakannelli, Sarjapur Road,
Bangalore-560 035,
India

Tel: +91 (80) 2844 0011
Fax: +91 (80) 2844 0256
wipro.com

Wipro Limited (NYSE: WIT, BSE: 507685, NSE: WIPRO) is a leading global information technology, consulting and business process services company. We harness the power of cognitive computing, hyper-automation, robotics, cloud, analytics and emerging technologies to help our clients adapt to the digital world and make them successful. A company recognized globally for its comprehensive portfolio of services, strong commitment to sustainability and good corporate citizenship, we have over 175,000 dedicated employees serving clients across six continents. Together, we discover ideas and connect the dots to build a better and a bold new future.

For more information, please write to us at **info@wipro.com**

IND/BRD/OCT 2019 - SEP 2020