International Journal of Business, Management and Visuals (IJBMV), ISSN: 3006-2705
Volume 7, Issue 1, January-June, 2024, Available online at: https://ijbmv.com

Value Stream Mapping in Retail

John Uysal[1], Amy Blasco[2], Vinu Cherian[3], Aswin Kumar Thanikachalam[4]

ABSTRACT

Value Stream Mapping (VSM) in retail has emerged as a powerful tool for identifying inefficiencies, enhancing productivity, and optimizing processes across the supply chain. This paper explores the application of VSM in the retail sector, focusing on its ability to visualize and streamline the flow of goods and information from suppliers to customers. By mapping each step in the process, retailers can identify bottlenecks, eliminate waste, and improve lead times, ultimately leading to cost reductions and enhanced customer satisfaction. The study highlights key areas where VSM can be particularly impactful, such as inventory management, order fulfillment, and customer service, and provides case studies demonstrating successful implementations. The findings suggest that VSM not only supports lean retailing but also serves as a foundation for continuous improvement and a more agile response to market demands.

Keywords: Value Stream Mapping (VSM), Retail Process Optimization, Lean Management in Retail, Supply Chain Efficiency, Retail Workflow Analysis, Customer Value in Retail

INTRODUCTION

A Value Stream is an organization's sequence of activities to deliver on a customer request. They are highly cross-functional with the transformation of a customer request to a good or service flowing through many departments or teams within an organization, they can flow in both directions, and depending on the scope the fence posts (beginning and end points) are established.

Value Stream Mapping (VSM) systematically measures, evaluates, and integrates all activities/processes within a system to achieve a competitive advantage by

- Eliminating errors
- Reducing losses
- Optimizing lead-time / cycle-times and
- Ensuring value addition through the process

How many Value Streams does an organization have?

The number of value streams will depend on the size of the organization and the scope at hand. Small organizations may have only one or two customer-facing streams and several internal support streams, whereas large organizations could have dozens of customer-facing value streams and hundreds of internal support streams. A Value stream can be established whenever there is a request and a deliverable.

Value Stream Mapping Vs. Process-level Mapping

Value Stream Maps provide an effective means to establish strategic decision for making improvements, the macro perspective, provides leadership the means to define strategic improvements, whereas Process-level Maps enables people to design tactical improvements. VSM provides a highly visual, full-cycle view of how work progresses from a request of sorts to fulfilling that request (ex: order to delivery, quote to cash, etc.,) Also, VSM deepens organizational understanding of systems that deliver value and supports that deliver value to customers. It distills complex systems into simpler and higher-level components whereas process maps capture detailed level plan The quantitative nature of VSM provides the foundation for data-driven strategic decision-making. Also, VSM reflects workflow as a customer experience as compared to the internal focus of typical process-level maps.

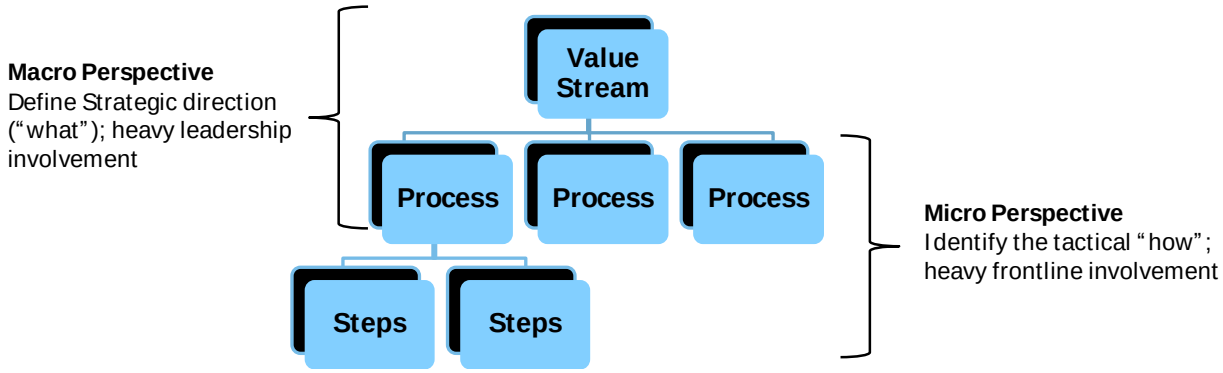

Figure 1 Granularity work in Value Stream Mapping

Organization Structure for a Value Stream Mapping

Many organizations are designed as a series of function-based silos that has little relationship to the customer fulfillment cycle. However, VSM forces an organization to think holistically in terms of cross-functional work systems. While this type of cross-functional view can pose challenges, an organization embraces this view to leverage the benefits and transform its operations.

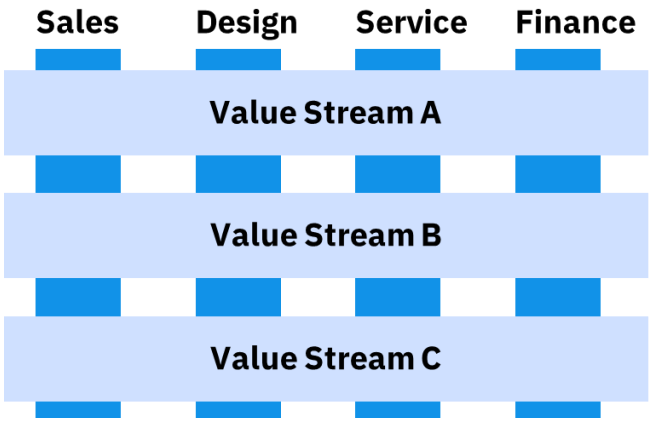

Figure 2 Vertical organization vs horizontal reality

APQC's Process Classification Framework

APQC's Process Classification Framework® (PCF) is a taxonomy of business processes that allows organizations to objectively track and compare their performance internally and externally with organizations from any industry. We utilized the PCF for Retail version 7.3 for reference.

Delivering digitally enabled solutions in today's enterprises can be complex, spanning multiple functional boundaries and spawning countless cross-team dependencies. This can result in a fragmented delivery process with clunky handoffs, breakdowns in communication, and substantial delays. The purpose of VSM is to bring order to this chaos so that value-producing work can flow smoothly and continuously across the organization. The key to succeeding with VSM in SAFe is applying Lean Thinking principles to every value stream.

Value Stream types

VSM or Developmental Value Streams are driven by two types of value streams – Operational Value Streams and Support Value Streams. The Value Streams are important to build, configure, support, and maintain the software and systems. It normally requires cross-functional collaboration. The end-users are company users, stakeholders, and employees. Key team and resource organizing construct into agile release trains (ARTs)

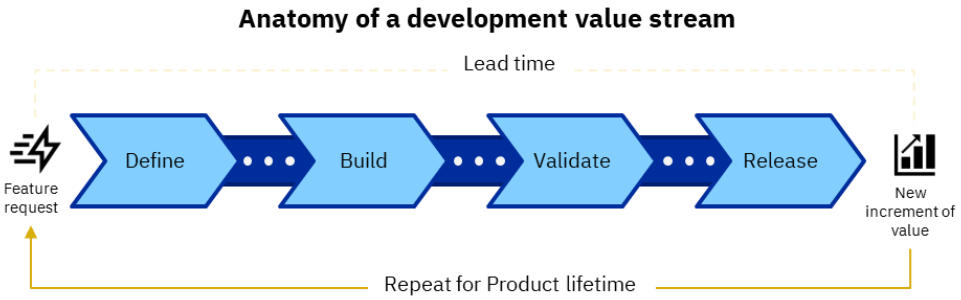

Figure 3 Developmental Value Stream Anatomy

Operational Value Streams

The Operational Value Streams are focused on External customers and driving end customer value. Customer Journey maps and design thinking are key inputs. Key value drivers for retail customers include product selection, convenience, price, merchandising, and experience. Operational value streams include offering a smooth path to purchase and checkout, fulfilling an order, and delivering support.

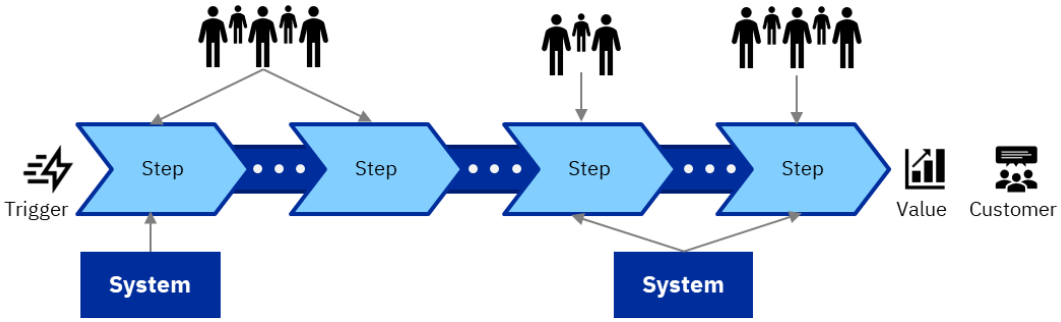

Figure 4 Operational Value Stream Anatomy

Support Value Streams

The Support Value Streams are focused on Internal users and processes. Employee journey maps are key inputs. Support value streams include inventory management, demand planning & forecasting, onboarding, and supporting personnel.

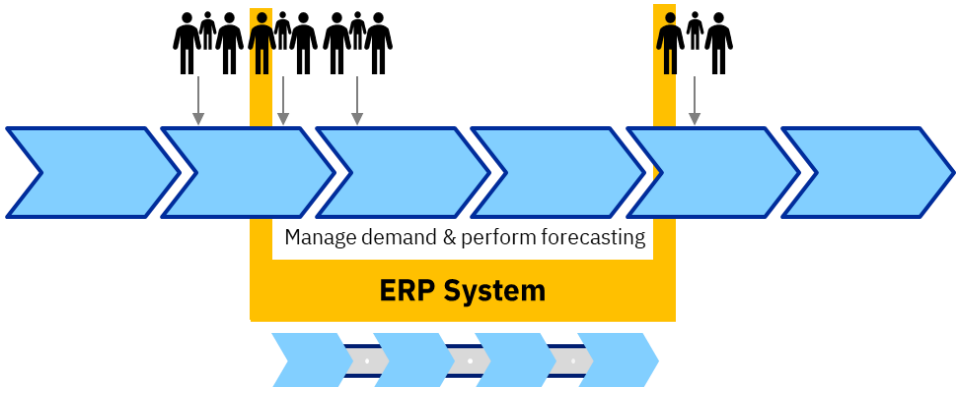

Figure 5 Support Value Stream Anatomy

Identifying the Value Stream to Map

For Value Stream Mapping, we can map a process, a subset of processes, or a process of processes. The following questions can guide the selection process:

- What process is associated with the biggest team impediment?
- What are the processes that we believe to be inefficient and suboptimal?
- What processes are not delivering a high return of customer value per effort?

Value Stream Mapping in Retail Industry

Rapid changes in the market, technological advancements, complex customer requirements, and unfavorable global events have created Intense competition, Demand for omnichannel purchase options, Supply chain chaos, and labor shortage.

To overcome these obstacles and prepare for future disruption, retailers need unprecedented operational precision and adaptability. VSM through its Macro perspective and cross-functional design can enable retailers to overcome these challenges. In retail, the provision of value lies largely within the processes and Retail VSM aims to maximize efficiency in these processes and thereby maximize customer value and eliminate waste. Software's leveraged to automate human tasks, using in-store staff for the fulfillment of online orders and support, and utilizing retail automation to free up employee time and shift it to impactful activities.

As a starting point, VSM in Retail can begin with a focus on

- Procure Good and Manage Logistics (Supply Chain),
- Merchandising Products, and
- Customer and Associate Experience

These Retail Functions have Value Streams that cut across them horizontally such as Procure Goods and Logistics management feeds into Merchandizing Products which in turn supports Channel Management and ensures delivery of exceptional customer experiences. Each Value Stream has its own set of processes and activities. All these processes, activities, and value streams are supported by Management functions such as Human Resources, Information Technology, Finance, Risk Management, Partner Management, etc.,

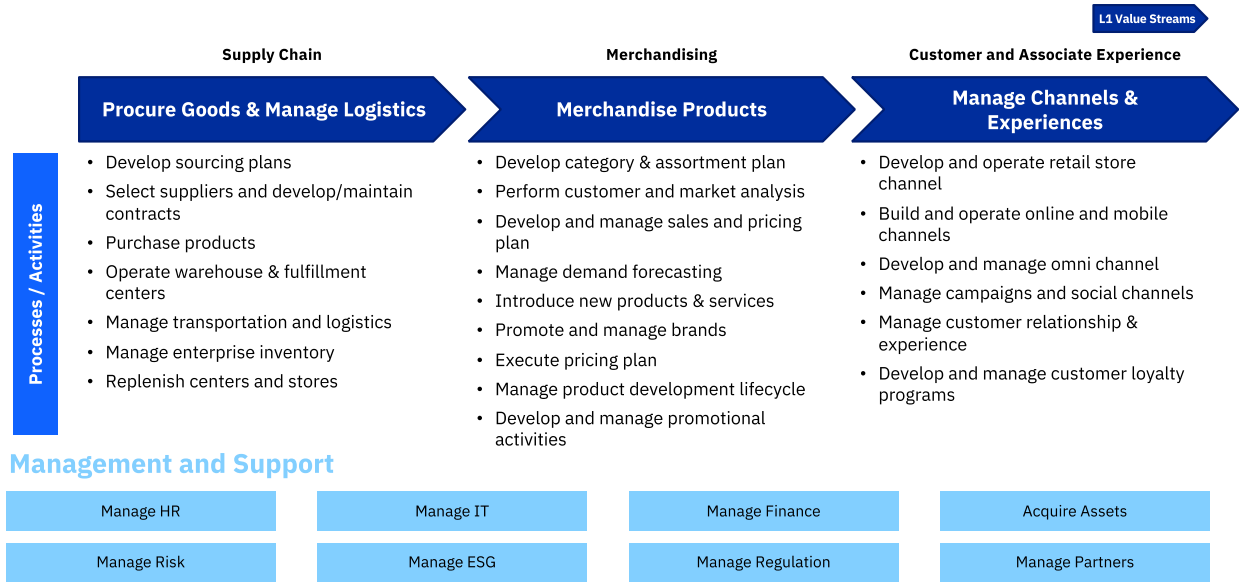

Figure 6 High-Level End-to-End Retail Value Stream

Procure Goods and Manage Logistics

The Value Stream Mapping for Procurement and Logistics shown below depicts the process information flow in the top and middle and the bottom part depicts the goods flow. The target goal of this VSM is to deliver what customer wants through a refined procurement plan and quality reviews, increase plan accuracy and reduce cycle times. It starts focused on the customer with their needs being assessed or surveyed through a Customer Demand Assessment. A Purchase plan is devised based on the assessment and statistics on historical procurements. Once a plan is in place, Quotations are invited and then implemented with select suppliers

The optimization for this VSM involves various sprint teams supporting these functions in varied Management & ERP systems. The list of such squads (not exhaustive) typically organized is

- Finance (ERP) squad
- Supply Chain squad
- Inventory & Warehouse squad
- Supplier Relationship squad
- Customer Relationship squad
- Product Merchandising squad
- Demand Forecasting squad
- Data Analytics squad and
- Process Planning squad

The various squads have to work together to improve the information flow accuracies and arrive at a reduction in their cycle times.

The bottom part of the VSM indicates various functions working together to deliver the goods to the customer in a timely and efficient manner which is the key function of a purported retail organization.

The Increasing trend of Automation of the Inspection, Warehousing, Sorting, and Distribution activities aids in further improving the efficiency of the system and reducing cycle times

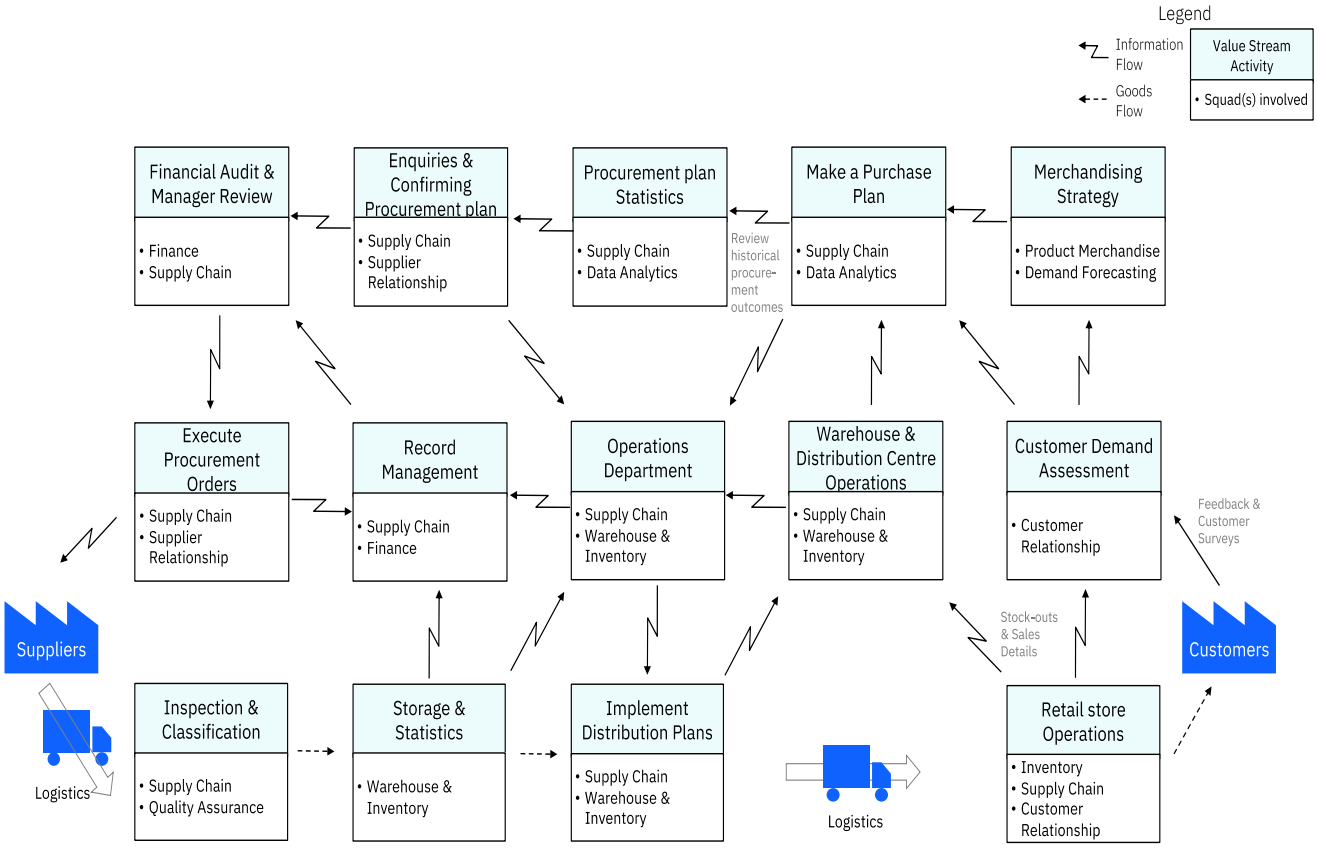

Figure 7 Value Stream Mapping: Procure Goods and Manage Logistics

Merchandise Products

The Value Stream Mapping for Merchandising captures the activities from a request to fulfilling that request within Merchandising function. The top level of the VSM captures alignment to the strategy and feeds the right information and

performance data to enable iteration of the strategy. The middle layer captures the planning element of merchandising, and the execution side of merchandising is captured by the bottom layer.

In VSM, the value flows horizontally between functions. For ex: If sourcing is sub-optimized then the subsequent functions such as Assortment, Layout Management, and Inventory will be impacted leading to failed merchandising strategy implementation. Execution requires the horizontal flow of value while being aligned with the overall strategy. Even though merchandising is a function with large elements of processes to it, we can view it as a Value Stream where the focus is on the macro perspective, providing leadership means to define strategic improvements, instead of focusing on process-level maps to design tactical improvements.

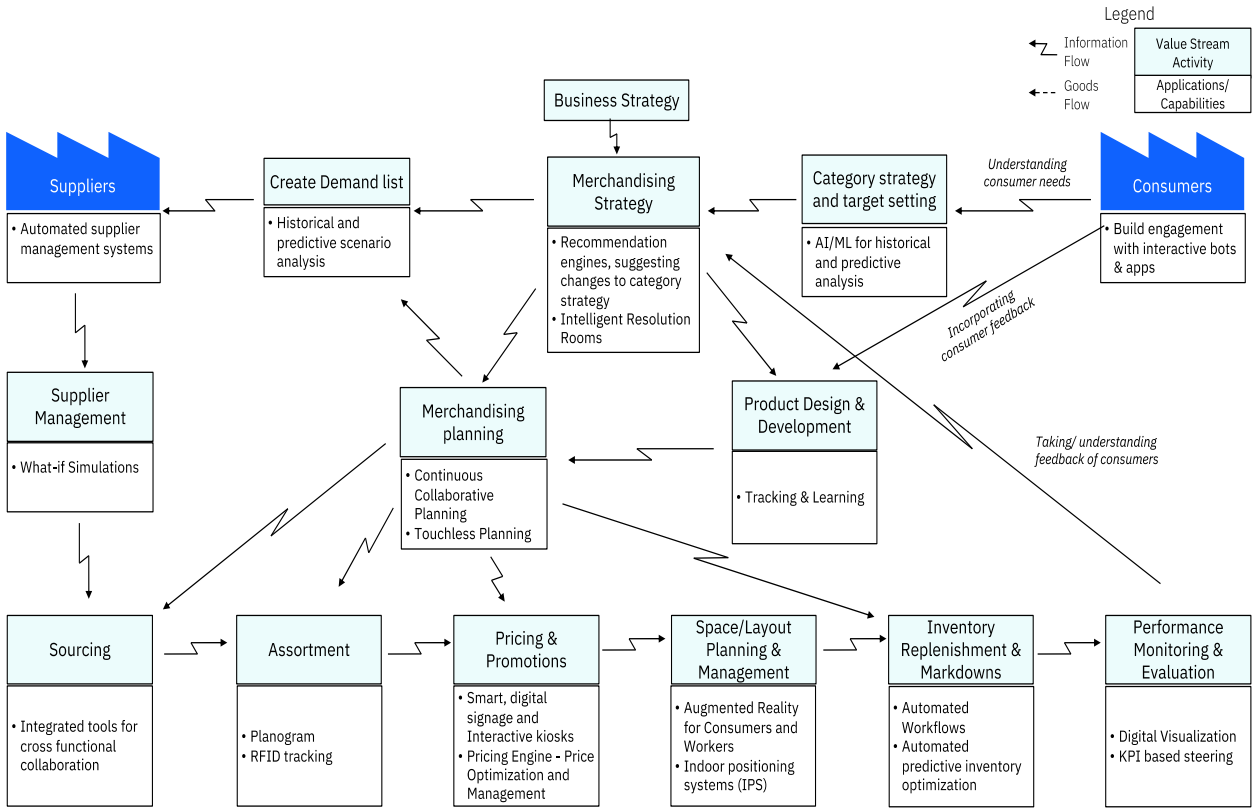

Figure 8 Value Stream Mapping: Merchandise Products

The VSM of the Merchandising system starts by taking inputs from Customers, which is then fed to the Merchandising Strategy unit which also takes inputs from the overall Business strategy. Technologies such as Recommendation engines and Intelligent Resolution Rooms are leveraged to further strengthen the Strategy definition. Information flows from the Strategy unit to the Suppliers via the demand, enablingbles them to plan and supply goods as required. With inputs from the Merchandising Strategy and product development unit, merchandising planning coordinates the flow of information and material for the merchandising function from sourcing the material, Real Estate Management, Pricing, and Promotions to monitoring the performance of the overall function.

There is a growing trend of leveraging automation and mobile tools to reduce errors and wait time. Smart, digital signage and Interactive kiosks are used to improve sales uplift. Pricing Engine - Price Optimization and Management tools are leveraged to enable smart pricing and achieve optimal value offerings.

E-Commerce

The e-commerce market has grown significantly, and the online retail market has become very competitive. Online retailers strive to improve their operations to reduce costs and improve customer satisfaction. Through Value stream mapping (VSM), we can identify and reduce errors, losses, and lead time and improve value-added activities.

Back-end (Movement of goods)
When the customer places an online order on the online store, it is received and processed by the Order Management System which then sends out triggers to the suppliers who can plan their processing and delivery accordingly. Goods received from the suppliers are passed through Quality and Inspection and are managed or stored at the warehouse. Based on the input from the order management and fulfillment the goods are moved through the units from sorting, processing, labeling, packing, and finally shipped out to customers.

Customer Returns are managed separately to handle goods that are sent back by the customers, these goods are introduced back into the system post-quality assurance.

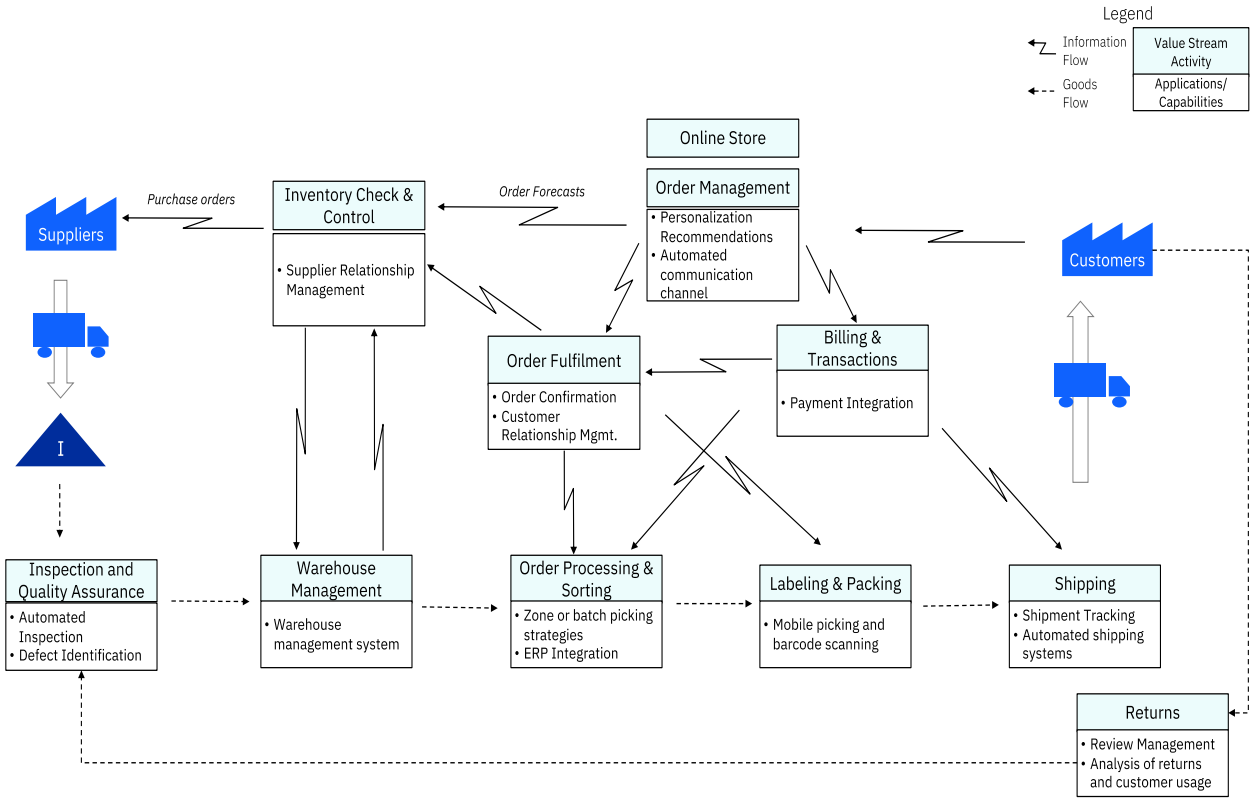

Figure 9 Value Stream Mapping: E-commerce

Front-end (Online experience)
Along with all the back-end processes, the online experience is a critical part of any e-Commerce platform.

The online experience flow starts with the customer's journey when they search for a product, to placing an order, receiving it, and post-purchase support if any. The entire step is encompassed as a Value Stream with each of the sub-functions having its dedicated teams to improve its functionality and usability.

A smooth integration of systems between the front-end and back-end is essential to provide expectational customer service. For example, if the Inventory is not properly integrated, then users of the online store will be ill-informed about the product status.

Some of the capabilities or applications that can be leveraged to reduce lead time and add value are Device Optimization & Integration for providing consistent and reliable user experience, Intent-based Search Engines to help customers find products faster, Data Management for Product Information, Catalog, Master Data, and Taxonomy to help store, retrieve and visualize product data and help customers choose the right product.

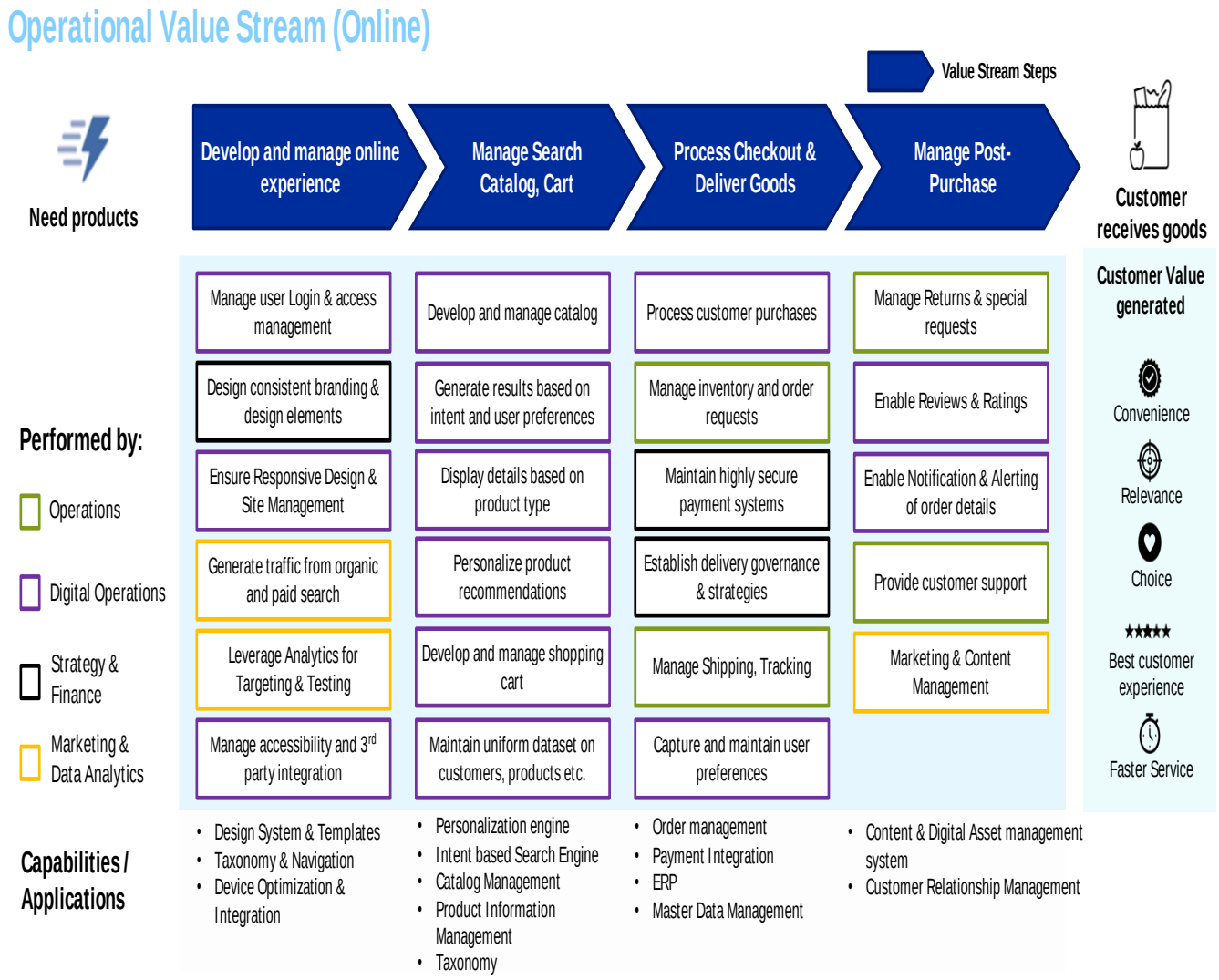

Figure 10 Value Streams and Processes to fulfill an order placed digitally

Demand Planning/Forecasting

The Value Stream Mapping for Demand Planning/Forecasting captures the activities from handling historical Sales Data to Executing Plans are shown below. The top level of the VSM captures the feeding of the right information and performance data for enabling iterations to the strategy and the information flow. The bottom layer captures the execution and material flow.

Historical Sales data is one of the major inputs for Demand Planning. Various strategies/Plans devised for the Product Categories, Channels & Stores, and Inventories by the Management are based on this Sales data as a reference. Any seasonality or anomaly is identified and tagged.

The Demand forecast models are built based on the Plans devised and also based on the feedback on the accuracy of the previous demand forecast models.

Leveraging Technologies such as Big Data, Machine Learning, and Artificial Intelligence in Demand Planning/forecasting further aids in improving the efficiency of the system and accurate Forecasting models

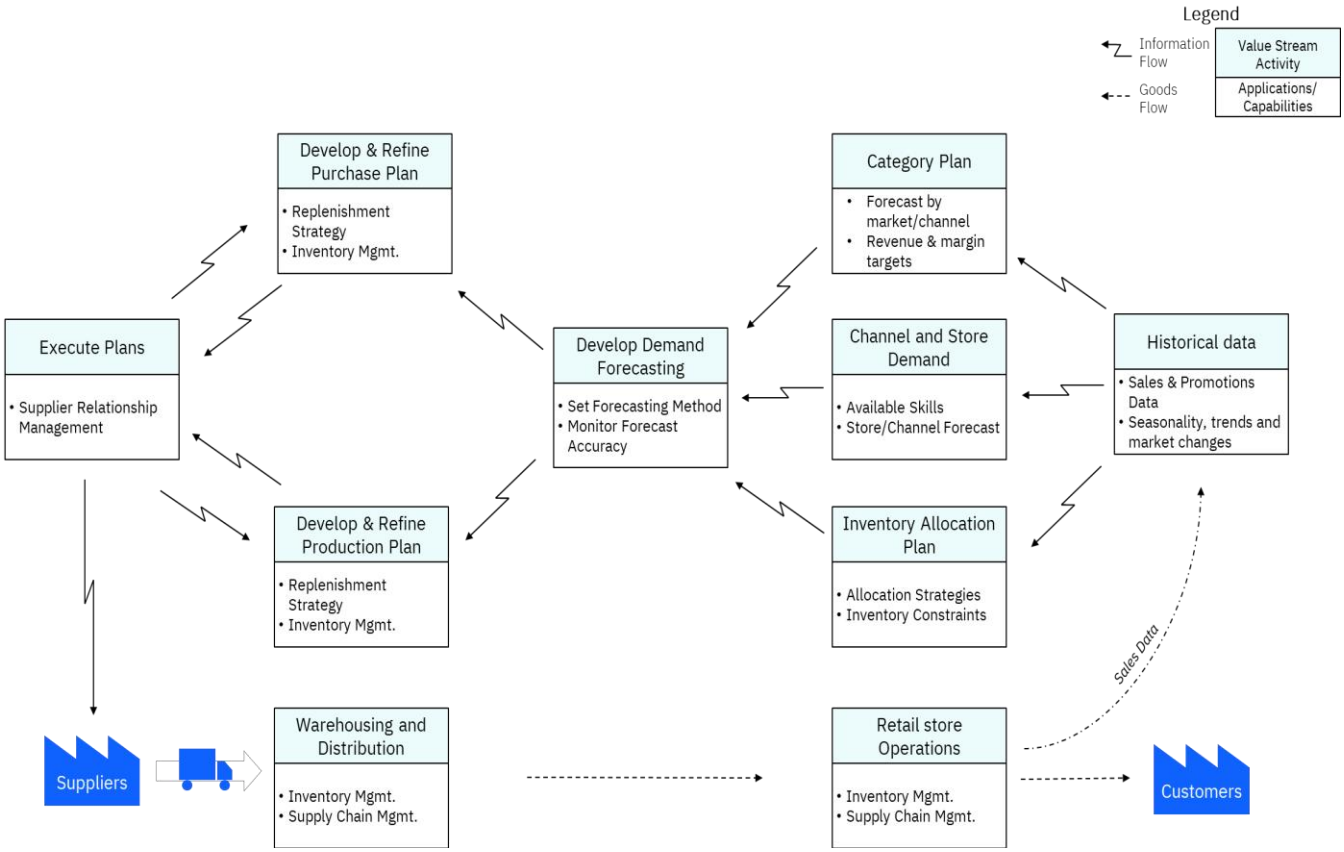

Figure 11 Value Stream Mapping: Demand Planning/Forecasting

CONCLUSION

Value Stream Mapping (VSM) in retail serves as a powerful tool for identifying inefficiencies, reducing waste, and enhancing overall process efficiency. By visualizing the flow of materials and information from the point of origin to the point of sale, retailers can pinpoint bottlenecks, streamline operations, and ultimately deliver greater value to customers. Implementing VSM in retail environments not only leads to cost reductions and faster delivery times but also improves customer satisfaction by ensuring that the right products are available at the right time.

Moreover, as the retail industry increasingly embraces digital transformation and omnichannel strategies, the application of VSM becomes even more critical. By integrating VSM with modern technologies such as data analytics, IoT, and AI, retailers can gain deeper insights into their operations and adapt more quickly to changing market conditions.

In conclusion, Value Stream Mapping offers a structured approach to continuous improvement in retail, enabling businesses to stay competitive in a fast-paced and ever-evolving market. Retailers that effectively leverage VSM will be better positioned to meet customer expectations, optimize their supply chains, and drive sustainable growth in the long term.

REFERENCES

[1]. Abdulmalek, F. A., &Rajgopal, J. (2007). Analyzing the benefits of lean manufacturing and value stream mapping via simulation: A process sector case study. International Journal of Production Economics, 107(1), 223-236. https://doi.org/10.1016/j.ijpe.2006.09.009

[2]. Braglia, M., Carmignani, G., &Zammori, F. (2006). A new value stream mapping approach for complex production systems. International Journal of Production Research, 44(18-19), 3929-3952. https://doi.org/10.1080/00207540600690515

[3]. Cudney, E. A., & Elrod, C. C. (2011). Incorporating lean concepts into supply chain management. International Journal of Six Sigma and Competitive Advantage, 6(1-2), 1-17. https://doi.org/10.1504/IJSSCA.2011.041239
[4]. Hines, P., & Rich, N. (1997). The seven value stream mapping tools. International Journal of Operations & Production Management, 17(1), 46-64. https://doi.org/10.1108/01443579710157989
[5]. Amol Kulkarni. (2023). Image Recognition and Processing in SAP HANA Using Deep Learning. International Journal of Research and Review Techniques, 2(4), 50–58. Retrieved from: https://ijrrt.com/index.php/ijrrt/article/view/176
[6]. KATRAGADDA, VAMSI. "Automating Customer Support: A Study on The Efficacy of Machine Learning-Driven Chatbots and Virtual Assistants." (2023).
[7]. Bharath Kumar. (2022). AI Implementation for Predictive Maintenance in Software Releases. International Journal of Research and Review Techniques, 1(1), 37–42. Retrieved from https://ijrrt.com/index.php/ijrrt/article/view/175
[8]. Goswami, Maloy Jyoti. "Utilizing AI for Automated Vulnerability Assessment and Patch Management." EDUZONE, Volume 8, Issue 2, July-December 2019, Available online at: www.eduzonejournal.com
[9]. Jogesh, Kollol Sarker. Development of Vegetable Oil-Based Nano-Lubricants Using Ag, h-BN and MgO Nanoparticles as Lubricant Additives. MS thesis. The University of Texas Rio Grande Valley, 2022.
[10]. Bharath Kumar. (2022). Integration of AI and Neuroscience for Advancing Brain-Machine Interfaces: A Study. International Journal of New Media Studies: International Peer Reviewed Scholarly Indexed Journal, 9(1), 25–30. Retrieved from https://ijnms.com/index.php/ijnms/article/view/246
[11]. KATRAGADDA, VAMSI. "Time Series Analysis in Customer Support Systems: Forecasting Support Ticket Volume." (2021).
[12]. JOGESH, KOLLOL SARKER. "A Machine Learning Framework for Predicting Friction and Wear Behavior of Nano-Lubricants in High-Temperature." (2023).
[13]. Vivek Singh, Neha Yadav. (2023). Optimizing Resource Allocation in Containerized Environments with AI-driven Performance Engineering. International Journal of Research Radicals in Multidisciplinary Fields, ISSN: 2960-043X, 2(2), 58–69. Retrieved from https://www.researchradicals.com/index.php/rr/article/view/83
[14]. Sravan Kumar Pala. (2016). Credit Risk Modeling with Big Data Analytics: Regulatory Compliance and Data Analytics in Credit Risk Modeling. (2016). International Journal of Transcontinental Discoveries, ISSN: 3006-628X, 3(1), 33-39.
[15]. Kuldeep Sharma. “Computed Tomography (CT) For Non-Destructive Evaluation: Enhancing Inspection Capabilities and 3d Visualization”, European Chemical Bulletin ISSN: 2063-5346, Volume 12, Issue 8, Pages 2676-2691 (2023). Available at: https://www.eurchembull.com/uploads/paper/1b1622f28f8810ed2b073791283fcc1b.pdf
[16]. Lummus, R. R., &Vokurka, R. J. (1999). Defining supply chain management: A historical perspective and practical guidelines. Industrial Management & Data Systems, 99(1), 11-17. https://doi.org/10.1108/02635579910243851
[17]. Liker, J. K. (2004). The Toyota Way: 14 Management Principles from the World’s Greatest Manufacturer. McGraw-Hill Education.
[18]. Rother, M., & Shook, J. (1999). Learning to See: Value Stream Mapping to Create Value and Eliminate Muda. Lean Enterprise Institute.
[19]. Seth, D., & Gupta, V. (2005). Application of value stream mapping for lean operations and cycle time reduction: An Indian case study. Production Planning & Control, 16(1), 44-59. https://doi.org/10.1080/09537280412331283935
[20]. Simons, D., Francis, M., Bourlakis, M., &Fearne, A. (2004). Identifying the determinants of value in the UK red meat industry: A value chain analysis approach. Journal on Chain and Network Science, 4(2), 109-121. https://doi.org/10.3920/JCNS2004.x047
[21]. Bharath Kumar Nagaraj, “Explore LLM Architectures that Produce More Interpretable Outputs on Large Language Model Interpretable Architecture Design”, 2023. Available: https://www.fmdbpub.com/user/journals/article_details/FTSCL/69
[22]. Jatin Vaghela, Security Analysis and Implementation in Distributed Databases: A Review. (2019). International Journal of Transcontinental Discoveries, ISSN: 3006-628X, 6(1), 35-42. https://internationaljournals.org/index.php/ijtd/article/view/54
[23]. Bhowmick, D., T. Islam, and K. S. Jogesh. "Assessment of Reservoir Performance of a Well in South-Eastern Part of Bangladesh Using Type Curve Analysis." Oil Gas Res 4.159 (2019): 2472-0518.
[24]. Anand R. Mehta, Srikarthick Vijayakumar, DevOps in 2020: Navigating the Modern Software Landscape, International Journal of Enhanced Research in Management & Computer Applications ISSN: 2319-7471, Vol. 9 Issue 1, January, 2020. Available at: https://www.erpublications.com/uploaded_files/download/anand-r-mehta-srikarthick-vijayakumar_THosT.pdf
[25]. KATRAGADDA, VAMSI. "Dynamic Customer Segmentation: Using Machine Learning to Identify and Address Diverse Customer Needs in Real-Time." (2022).

[26]. Amol Kulkarni. (2023). “Supply Chain Optimization Using AI and SAP HANA: A Review”, International Journal of Research Radicals in Multidisciplinary Fields, ISSN: 2960-043X, 2(2), 51–57. Retrieved from https://www.researchradicals.com/index.php/rr/article/view/81
[27]. Goswami, Maloy Jyoti. "Study on Implementing AI for Predictive Maintenance in Software Releases." International Journal of Research Radicals in Multidisciplinary Fields, ISSN: 2960-043X 1.2 (2022): 93-99.
[28]. Neha Yadav, Vivek Singh, “Probabilistic Modeling of Workload Patterns for Capacity Planning in Data Center Environments” (2022). International Journal of Business Management and Visuals, ISSN: 3006-2705, 5(1), 42-48. https://ijbmv.com/index.php/home/article/view/73
[29]. Sharma, Kuldeep, Kavita Sharma, Jitender Sharma, and Chandan Gilhotra. "Evaluation and New Innovations in Digital Radiography for NDT Purposes." Ion Exchange and Adsorption, ISSN: 1001-5493 (2023).
[30]. Womack, J. P., & Jones, D. T. (1996). Lean Thinking: Banish Waste and Create Wealth in Your Corporation. Simon & Schuster.
[31]. Basu, R., & Wright, N. (2012). Total Supply Chain Management. Routledge.
[32]. Keyte, B., &Locher, D. (2004). The Complete Lean Enterprise: Value Stream Mapping for Administrative and Office Processes. Productivity Press.