

## **CHAPTER 2 - LITERATURE REVIEW**

### **2.1 Theoretical Perspectives**

#### **2.1.1. Customer Service Level Measured by OTIF**

OTIF's performance is a tangible expression of our commitment to on-time delivery. Achieving high OTIF requires operational proficiency, such as simplifying supply chain processes, leveraging real-time tracking and visibility technology, and collaborating effectively with external partners. Implementing a customer-centric approach is equally important. The journey towards customer satisfaction occurs through an interrelated path between service quality and OTIF performance (Amegbe et al., 2019; Flores et al., 2020). Understanding the theoretical foundations of this relationship, implementing practical strategies to strengthen both aspects and continually measuring and refining an organization's efforts can ensure that customers view them as a service provider and a reliable partner in their success.

#### **2.1.2. DMAIC (Define, Measure, Analysis, Improve, and Control)**

Using Six Sigma in research might offer a distinctive viewpoint for enhancing results and refining procedures. Its fundamental ideas can be modified to improve the quality and efficiency of research projects by streamlining research workflows, decreasing errors, and eventually focusing on business and manufacturing. Thus, the Six Sigma DMAIC (Define, Measure, Analyse, Improve, and Control) technique can be used as a road map for solving issues and improving processes and products. Six Sigma is a tried-and-true methodology for streamlining company processes (Radha et al., 2018).

#### **2.1.3. Pareto Analysis**

Pareto analysis is a good decision-making tool based on the 80%-20% rule introduced by Vilfredo Pareto, a nineteenth-century Italian economist (Bonnici et al., 2015). This concept is about focusing effort on 20% of the root cause of the problem that will impact 80% of the benefit from the project. Pareto analysis implies that making a small effort effectively will create a big impact.

#### 2.1.4. Five Whys Method

To identify the underlying source of a problem, one effective yet primary problem-solving method is the Five Whys Method. It is a root cause analysis (RCA) technique that is most frequently taught. Users can identify an underlying cause that may not have been immediately apparent by asking "why" five times. It might also lead to a single solution to that underlying issue (Alan et al., 2018).

#### 2.1.5. Parts Supply Chain Management and Inventory Control

Chen et al. (2009) mentioned that supply chain management is about demand forecasting in inventory management. Accurate demand forecasting can help improve inventory planning decisions (Yoon et al., 2023). Demand forecasting can decide how much inventory should be sent to each support point, create a list item backup (LIB) to each support point and how many shipments to each (see Figure 2.1).

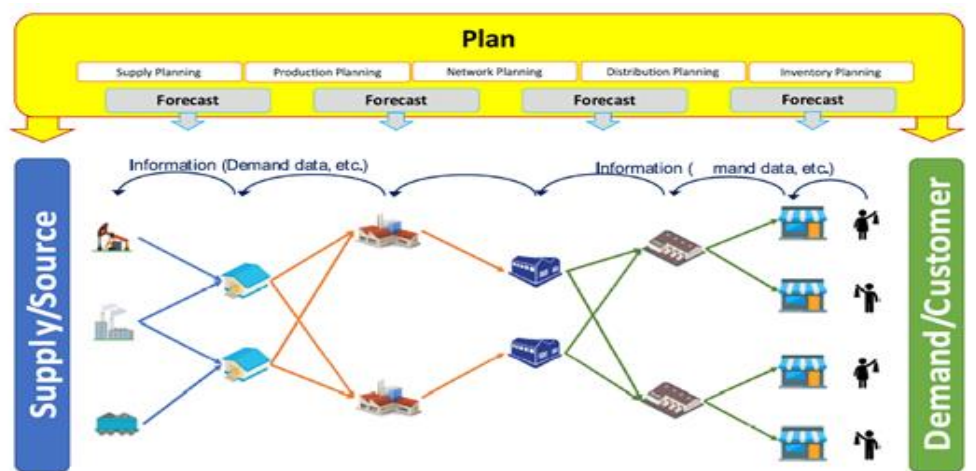


**Figure 2.1** A General Representation of a Storage Chain Network

(source: Yoon et al., 2023).

Accurate demand forecasting ensures effective stock of list item backup (LIB). Thus, ensures proper supply chain management and improves customer service levels by lowering inventory stocks (Abbasimehr et al., 2020). Demand forecasting is dependent on three factors, namely, (a) The availability of historical data, (b) The duration of the forecasting period, and (c) The forecasting model utilized (Lasek et al., 2016). There are two categories for forecasting models. The first is qualitative models, used when there is limited or no historical data, and the second is quantitative models, used when

there is sufficient reliable historical data to use statistics for future forecasts (Klassen & Flores, 2001; Bergman et al., 2017). This type of analysis is considered in the literature as time series analysis. Some of these methods are simple linear regression (SLR), simple moving average (MA), and simple exponential smoothing (SES). The MA formula is.

$$F_d = \frac{(D_1 + D_2 + \dots + D_n)}{n} \quad (2.1)$$

Where:

$F_d$  is the forecast demand for the  $n^{\text{th}}$  period.

$D$  is the demand of period  $n$ .

$n$  is the number of periods.

Inventory control is all about calculating stock level (SL). Safety stock (SS) level determination becomes crucial in calculating stock level to optimize inventory management and enhance customer service levels in any supply system by ensuring product availability (Tadayonrad & Ndiaye, 2023). Then, lead time (LT) delivery and cycle order (CO) must be considered to determine the stock level. Lead time (LT) is the time spent to deliver parts to the warehouse. Cycle order (CO) is a frequency order in one month. A minimal stock level ( $SL_{\min}$ ) and maximal ( $SL_{\max}$ ) exist. The minimal stock level is required to stock in warehouse after considering SS and LT. Stock level maximal is the total stock that can be stock in warehouse after considering SS, LT, and CO.

$$SL_{\min} = F_d (SS + LT) \quad (2.2)$$

$$SL_{\max} = F_d (SS + LT + CO) \quad (2.3)$$

#### **2.1.6. Warehouse Space Estimator**

Warehouses are essential to the supply chain's ability to balance product demand and supply at various stages (Rene et al., 2017). Space warehouse estimator is an important thing to calculate for warehouse design. Space design must consider the growth of demand for the future to allow for additional stock to cover the growth of demand. Space warehouse must calculate all facilities at the new warehouse like a forklift, trolley, hand pallet, and fire extinguishers.

#### **2.1.7. Assessment of Investment Feasibility**

To assess investment feasibility, one can use a Net Present Value (NPV), an Internal Rate of Return (IRR), and a Payback Period (PP) (Milis et al., 2009; Sinaga, 2023; Ji et al., 2023). NPV is the sum of all the cash flow discounted to the present using the time value of money. Internal Rate of Return (IRR) is the index that is massively used as a tool for the decision-making of any business. IRR try to find a single rate of return that summarises the merit of a project, the discount rate value at which the net present value (NPV) is zero. The IRR decision criterion suggests accepting a project if and only if the IRR exceeds the cost of capital. The IRR is often used for investment decisions, but some critical (theoretical and applicative) issues remain unsolved (Huang, 2023; Ji et al., 2023):

1. Complex-valued return rates and complex-valued capital are devoid of economic meaning.
2. Project ranking with the IRR is not compatible with NPV ranking
3. The IRR cannot measure the return on the initial investment
4. The IRR decision rule may be applied if the cost of capital is constant
5. The IRR does not exist if the capital is lost or an arbitrage strategy is undertaken

## **2.2. Previous Studies**

The pursuit of customer satisfaction is at the heart of every successful business. Two critical aspects significantly influence the quality of services provided and the timely fulfilment of promises made. In the context of OTIF, reliable delivery and timely turnaround are essential factors that directly impact customer satisfaction and loyalty. Studies conducted by Modak (2017) and Dünder & Öztürk (2020) stated that reliable delivery and timely completion significantly improve customer satisfaction and loyalty.

Other studies also provide strong evidence of this positive relationship, showing how high OTIF achievements mean reduced customer downtime, increased overall satisfaction, and even potential sales growth and cost savings (Bortolini et al., 2016; Ochonogor et al., 2022). Therefore, implementing practices that promote reliability, responsiveness, and assurance is critical (Yang et al., 2021). It can involve investing in sophisticated inventory management systems, optimizing logistics networks, and cultivating a transparent culture of communication and collaboration within the organization (Gunasekaran & Ngai, 2003; Talib et al., 2015; Ruda & Pukas, 2022).