

## Study of Supply Chain Performance with DIFOT as a Key Performance Indicator

Dr.S.TephillahVasantham,Assistant Professor

*Mepco School of Management Studies*

*MepcoSchlenk Engineering College Sivakasi*

*Mr.A.Ivan Kenny Raj,Assistant Professor,Mepco School of Management studies,MepcoSchlenk Engineering College,Sivakasi*

*Dr.K.Kannan,Assistant Professor,Mepco School of Management studies,MepcoSchlenk Engineering college,Sivakasi*

*Mr.GGeolinRangith Student II MBA*

*Mepco School of Management Studies*

*MepcoSchlenk Engineering College Sivakasi*

### Abstract

The project aims to study the DIFOT (Delivered in Full On Time) as a KPI for supply Chain Management. DIFOT is a Supply Chain KPI which tells about the performance of the supply chain. DIFOT is calculated for every single product of the company. The formulas associated with the calculation are studied and used in the calculation of various indicators that are associated with the calculation of the DIFOT such as DIF (Delivered in Full), DOQ (Delivery On Quality), DOT (Delivered On Time), are calculated and these indicator results are used to calculate the DIFOT value. All indicator values are presented in percentages and DIFOT value is also represented in percentages. This KPI shall be used to represent the performance of the company in the customers point of view. It is helpful in enhancing the customer retention capacity of the organization.

**Keywords:** DIFOT,DIF,DOQ,DOT and Supply Chain Performance

### Introduction

Supply chain is accepted as the most important factor for the success of every industry. Success of supply chain in a company is achieved only by finding the best practices in the industry and incorporating them in the factory premises for attaining it.

Supply Chains cover everything from production to product development to the information systems needed to direct these undertakings. Typically, SCM attempts to centrally control or link the production, shipment, and distribution of a product. By managing the supply chain,

companies can cut excess costs and deliver products to the consumer faster. This is done by keeping tighter control of internal inventories, internal production, distribution, sales, and the inventories of company vendors. SCM is based on the idea that nearly every product that comes to market results from the efforts of various organizations that make up a supply chain. The supply chain manager tries to minimize shortages and keep costs down.

Productivity and efficiency improvements can go straight to the bottom line of a company. Good supply chain management keeps companies out of the headlines and away from expensive recalls and lawsuits. Supply chain management is really important because it can help achieve several business objectives. Overall, supply chain management provides several opportunities for companies to improve their profit margins and is especially important for companies with large and international operations.

Through data analysis, manufacturers may be able to anticipate the shortage before the buyer is disappointed. Improving the allocation of “available to promise” inventory. Analytical software tools help to dynamically allocate resources and schedule work based on the sales forecast, actual orders and promised delivery of raw materials. Manufacturers can confirm a product delivery date when the order is placed — significantly reducing incorrectly-filled orders. Supply chain management has five key elements—planning, sourcing raw materials, manufacturing, delivery, and returns.

While yesterday’s supply chains were focused on the availability, movement and cost of physical assets, today’s supply chains are about the management of data, services and products bundled into solutions. Modern supply chain management systems are about much more than just where and when. Supply chain management affects product and service quality, delivery, costs, customer experience and ultimately, profitability. Modern supply chains take advantage of massive amounts of data generated by the chain process and are curated by analytical experts and data scientists.

The KPI’s must have certain characteristics such as it should be specific, Measurable, Attainable, Realistic and it should be time based (Kerzner, 2015). The companies could make use of KPIs to monitor operations and manage all resources. Key performance indicators (KPIs) are a set of quantitative metrics that can help to gauge the business’ performance over time. Specifically, they help to monitor how effectively the organization is achieving its target goals. Omnichannel supply chains help businesses sell products through all possible sales channels. They require certain factors like order accuracy and on-time, damage-free

delivery for smooth operations. Minor errors can cause major problems. KPIs enable companies to monitor the processes of supply chain so that they are able to identify the ones that need improvement. To define the supply chain KPIs, the companies must first set specific performance parameters required for tracking operations. In supply chain management the key performance index (KPI) such as the DIFOT (Delivered In Full On Time) or OTIF (On Time In Full) is a measure of supply chain performance and measures how often the customer gets what they wanted on time. Though DIFOT or OTIF is primarily focused on logistics performance it could also be used to measure the effectiveness of operation of the company since to achieve a high level of DIFOT all the operations of the company should be aligned and be operating efficiently to achieve it. The project is mainly focused on measurement of the supply chain performance of the company using DIFOT as a KPI and construct the cause-and-effect diagram about the various processes that affect the attainment of the required supply chain performance.

### Review of Literature

Within Business Intelligence (BI) systems, an industrial Key Performance Indicator (KPI) is a measurement of how well the industrial process in the organization performs. A KPI is a specific metric (a quantitative, periodic measurement of one or more processes), chosen from all of the collected or possible industrial metrics within a business in such a manner as to convey the most amount of information in a single measurement – the “key” measurement. All indicators are metrics. Therefore, creating effective leading KPIs is critical to the success of any business organization so that not only it is agile to changes, but also is prepared for changes in advance (Peng, 2008). Measuring supply chain performance says about the gap between planned phase and executed phase and helps companies to know about their problems

and where they could improve. Measuring or monitoring supply chain performance reveals the gap between planning and execution and helps companies to identify potential problems and areas for improvement. However, it is recognized that developing key performance indicators (KPIs), or metrics, is very challenging and a set of practical guidelines is not readily available for companies and supply chain management (SCM) practitioners. Industry standards and best practices in supply chain performance measurements suggest that “less is better” as to developing performance metrics. Companies should focus on only a small list of KPIs which are critical for their operations management, customer service, and financial viability. Every system or organism uses feedback for continuous learning and adaptation. The role of performa

nce metrics or KPIs is the feedback in one's supply chain. Monitoring KPIs reveal the gap between plan and execution and helps to identify and correct potential problems and issues (Chae, 2009).

Without reliable metrics, performance reporting is like rolling the dice. Effective data mining will be necessary to determine the correct set of metrics for each project. Key = a major contributor to success or failure Performance = measurable, quantifiable, adjustable and controllable elements Indicator = reasonable representation of present and future performance. The KPI's Should be predictive measurable, Actionable, Relevant, Automated and Few in number (Kerzner, 2015). A relevant number of authors consider that their use is a key factor in project management. Project delivery and project management required different sets of metrics to monitor their successful progress. This paper has described research conducted to design and develop a comprehensive set of KPIs suitable for implementing any project management and project monitoring management activities (Montero, Onieva, & Palacin, 2015).

Supply chain management (SCM) practices are bridged by the attention to a few measures including both financial and non-financial perspectives. The attention to supply chain management (SCM) has been increasingly paid. Its aim is to create more values for customers and stakeholders. KPIs support obtaining the desired results in customer and financial perspectives. KPIs drive to initiate their related practices enabling to the organizational vision and mission (Boonsothonsatit, 2017). A business unit must prove that its supply chain activities have been performed effectively and efficiently. To find out these criteria, an audit can be done in form of measurement and evaluation of supply chain performance. To be able to determine the effectiveness and efficiency of the supply chain must first be measured the performance of the supply chain (Hendayani & Sarianto, 2017).

The KPI's (Key Performance Indicators) are the warning signs of the company and if the KPI's are used properly they are useful to improve the company performance. In today's world the business intelligence systems use KPI's to evaluate and demonstrate the effectiveness of performance of the company and help in achieving the goals. The relevant indicators are selected for the data that are present. (PIRLOG, 2015). Delivery In Full On Time (DIFOT) is concerned about the customer's satisfaction, they expect the product to be delivered on time. Customer satisfaction could be attained when the product

delivery attains customer expectation. KPI's represent the measurements that are quantifiable and helpful in examining the performance of the business (Ryophatch, 2016).

SCM has become an important part of the industry since it addresses long-term strategic alliance, supplier-buyer partnerships, cross-organizational logistics management, joint planning, control of inventory, and information sharing. Delivery In Full and On Time (DIFOT) says about the performance of the supply chain which reflects the customer service and support. The group average of performance is often similar but when in case of KPI such as Delivery In Full and On Time (DIFOT) is used to denote the correct performance of the supply chain of the company (Ruth & Nucharee, 2011). Organizations with long supply chains need to understand the sustainability aspects of their supply chains. The value that the company provide to their customers is the sum of all the values they add along the supply chain. This satisfaction fulfilment should be the performance of the order management process from the time the order is taken through to the time the product is delivered to the customer. Then, the Delivery In Full and On Time (DIFOT) will be recommended as the supply chain performance measurement. The definitions of 'supply chain', 'demand chain' and 'value chain' are sometimes used interchangeably. Key factors that have influenced successful SCM have been the power of companies over the supply chain and the part of business risk makers in forcing companies to manage risk more effectively into their supply chains (Banomyong, Varadejsatitwong, & Kitcharoen, 2006).

In order to improve supply chain effectiveness in the globalization era, firms should improve the logistics function as well as service and innovation to be more efficient. Information sharing between manager and employee has a positive impact on net profit (Intalar & Jeenanunta, 2015). A cause-effect tree was used to identify the influencing factors and map the possible causes of OTIF hits, process standardization was proposed to bring uniformity, and also because of its ability to improve performance and communication between parties. Some of the recommended measures are relatively simple to implement, while others require more resources and company involvement to make them happen. OTIF is considered a reactive KPI; in other words, a hit is recorded only when the goods are received. It could also be proposed to use another KPI to measure logistics performance before the goods are received.

d, in order to have a more proactive perspective on performance (Morales, 2021).

Key performance indicators (KPIs) measure and strategically intend in order to gain insights into practice elsewhere. Delivered In-Full, On-Time, (DIFOT) for customer services, both of them are considered measurements of delivery performance in a supply chain (Habib, 2015). Logistics service performance measurement (PM) is a fundamental activity pertaining to the achievement of logistics goals and the improvement of services. It concludes that the measurement of SC performance must be context-specific and emphasis needs to be placed on the degree of uncertainty and interdependency related to the SC in question. Logistics performance measurement (PM) is especially challenging in areas where high value goods are at stake, several factors are involved, and uncertainty is high. The efficient flow of goods and services throughout the value chain with a high degree of punctuality is vital in many industries. Customers are mostly interested in the delivery of goods and personnel on time, at the right quantity and in an optimal way. Large capacity ensures the ability to deliver large quantities and achieve scale economies. Relevant KPIs include the delivery in full on time (DIFOT) rate (Panayides, Borch, & Henk, 2018).

Recognizing that market instability directly affects supply chain operations, it is acknowledged that competition is no longer between individual companies, but rather between supply chains. Developing skills to manage organizational resources (tangible and intangible) is fundamental to achieve resilience in the supply chain, thereby achieving a competitive advantage. Managers have used Key Performance Indicators (KPIs) to monitor operations as they provide internal and external visibility, and consequently help decision making. For this purpose, KPIs able to portray the current scenario of an organization and its supply chain should be established, thus helping to monitor and evaluate processes. A lack of attention from the KPIs to monitor certain actions in order to prepare the supply chain or deal with unexpected events by means of resource management. Specific KPIs that can help not only monitor the operations but also assist in the creation of organizational or supply chain resilience (Karl, 2018). Within the context of operations and supply chain management, key performance indicators such as On Time In Full (OTIF) or Delivery In Full On Time (DIFOT) are measurements of logistics or delivery performance within a supply chain. Even though OTIF is primarily a measure of logistics performance, it can also be used (Soroka, Ramjaun, & Coverdale, 2020).

### Research Methodology

Analytical research design is used in the analysis. Various formulas are used in the calculation of the DIFOT. The data used in the calculation is taken of the ERP of the company and nature of data is secondary. The formulas and details regarding the research is taken from referring to various journals and websites regarding Supply Chain Management. The data regarding the calculation of DIFOT and the results are tabulated in the table and represented for the single product of the company.

### Data Analysis and Interpretation

Supply chain management is the governing of flow of goods and services that flow in and out of the organization and it also includes transformation of raw materials into finished goods. It says about the customer value generated and also the competitive advantage in the market. Supply chain management is the processing of the entire production flow of a product or service from raw material to delivery of the final product to the consumer. Companies build a network of suppliers links in the chain that transport products from raw materials supplier to organizations that deal directly with users.

An effective supply chain management system minimizes production cycle costs, waste and time. Industry standards have evolved into a just-in-time supply chain, with retailers automatically sending replenishment orders to manufacturers. Retail store shelves can be filled as quickly as products are sold. One way to further improve this process is to analyze data from supply chain partners to determine where they can be further improved.

A KPI or key performance indicator is a measurable value used to assess how successful an individual or organization is in achieving a goal. High-level KPIs that handle company performance, or KPIs that also handle individual or department-level processes.

A KPI or Key Performance Indicator should always compile with the SMART framework which represents that the KPI should be Specific, Measurable, Attainable, Relevant and should be within separate Timeframe.

Supply chain KPI'S are essential in maintaining the supply chain effectiveness and increasing the performance of the supply chain of the company. The various parts in which KPI'S are used in supply chain are order capture, inventory management, purchase manage

ment, supplier management, Production management, warehousing, transportation and logistics.

**DIFOT**

DIFOT (Delivery in Full On Time) or OTIF (On Time and In Full) is used as a delivery based KPI which is used to represent the supply chain performance by measuring the product quantity, quality and delivery performance. The KPI is expressed in percentage.

The DIFOT values are dependent on quality of the product, in time delivery to the customers and quantity supplied to the customer. It measures the success of the supply chain in fulfilling the orders on time. It looks at the delivery performance from the view point of the customers hence DIFOT is considered as a superior delivery performance indicator when compared to other indicators such as Shipped-on-Time (SOT) and On-Time Performance (OTP). DIFOT metric could be used to measure the supply chain performance and the results can be used to improve the service provided by the logistics department of the company. It is also used to identify the issues associated to poor delivery performance to rectify the problems associated with it. The important use of calculating DIFOT is it is helpful in increasing the customer retention capacity of the company. The various factors which could affect the DIFOT values are Human error, carrier failures and running the inefficient warehouse.

**DIF = Delivered in Full = Qty supplied / Qty Ordered**

**DOQ = Delivered on Quality = 1 – Quantity with quality issues / Quantity Ordered**

**DOT = Delivery on Time = Quantity delivered on Time / Quantity supplied**

**DIFOT = Delivery In Full On Time = DIF x DOQ x DOT**

Sl No	Product Name	Ordered Quantity	Supplied Quantity	Quality Issues	Quantity Supplied on time	DIF %	DOQ %	DOT %	DIFOT %
1	Water Pump	30	30	3	30	100	90	100	90
2	Water Pump	50	50	0	50	100	100	100	100
3	Water Pump	250	250	0	200	100	100	80	80
4	Water Pump	100	50	0	50	50	100	100	50



### **Combined Table for Water Pump DIFOT Calculation**

The Table represents the DIFOT calculation of the product of the company. The company exports and supplies products to much of the bigger automotive companies. The table shows that the DIFOT values are dependent on values of DIF, DOQ and DOT. These three factors are the influential factors of the DIFOT. If any one of the factors are affected then the targeted DIFOT value could not be attained hence the companies must give the complete effort in maintaining the DIFOT values since it is highly influential in attaining the customer value.

### **Result and Discussion**

DIFOT is considered a very important KPI in measuring the supply chain performance.

It is dependent on factors such as quantity, quality and timely delivery. DIFOT values can be influenced by shipping delays, manufacturing delays, human error and data collection errors. DIFOT can help in improving the supply chain performance by showing the direction in research that should be made in order to find the problem that affects the supply chain. While increasing the DIFOT value of the organization it may increase the customer retention capacity of the organization. The various formulas associated with the study of DIFOT are found out and they are represented in the research. Two different products are selected for study of which one is an open sales order product while the other is a closed sales order product. Analysis with the formulas associated with the DIFOT calculation is done. The DIF, DOQ and DOT are calculated and these indicators are used to calculate the DIFOT value. These values are tabulated.

### **Suggestions and Conclusion**

KPIs are really important for accessing the current performance of the company. Supply Chain Management is the part of the company which takes care or is responsible for every part of the company and it directly affects the profitability of the company hence it becomes really necessary to maintain the performance of the supply chain at an optimal level to increase the profit-making capacity of the company. DIFOT is considered as an important KPI in Supply Chain Management. The current study is mainly focused on calculation of DIFOT in the manufacturing company. It represents the customer way of thinking about the delivery performance. The main problem while incorporating the various KPIs are the availability of

data, the data should not be dispersed throughout the organization but it should be available at the single place for easy maintenance of the KPI's and it should also be available at the perfect timing for understanding the performance accurately.

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