

IMPORTANCE OF DEMAND PLANNING PROCESS ON DIFFERENT SUPPLY CHAIN PERFORMANCE INDICATORS

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Abstract: *The main purpose of this paper is to present and explain how specific demand data can influence on the performance of the company in certain business areas. Every company depends on how required information is received from the market (customers) and how this information is being interpreted internally before alignment within the company is done. Situation on the market changed significantly in the last few years, availability of goods has been and still is disrupted. Supply chains had to change dramatically in order to provide requested service levels, which in some industries was very difficult or even not achievable. Timely information sharing between companies has become of increasing importance not only for regular business but also for bare survival in very competitive environment. For managing effectively there has to be a clear process of gathering, evaluating and distributing information to all relevant stakeholders. Communication of decisions made in this process has crucial importance on the company's business performance in the short and mid-term. This paper will present an impact analysis on the specific supply chain performance indicators over a certain time period where the process of data gathering has been evaluated and improved.*

Key words: Demand planning, Supply chain, Performance, Logistics

1. INTRODUCTION

The term supply chain was first encountered in the literature in 1982, in the controversy whether there is a difference in the impact of logistics management and supply chain management on the creation of value for the end user and their impact on the company's profitability. What supply chains are? Turban and King in 2003 said that a supply chain is a combination of different organizations and flows of materials, money and information that support the execution of different activities. However, there are several definitions for supply chain and we will list some of them:

Council of Supply Chain Management Professionals (CSCMP): "A supply chain is a global network used to deliver products and services from raw materials to end customers through an engineered flow of information, physical distribution, and cash"(Council of Supply Chain Management Professionals (CSCMP), 2023).

The Global Supply Chain Forum (GSCF): "A supply chain is a sequence of processes and flows that take place within and between different stages and combine to fill a customer need for a product" (Global Supply Chain Leaders Group (GSCLG), 2023).

The Chartered Institute of Procurement & Supply (CIPS): "A supply chain is a network of entities, directly or indirectly interlinked and interdependent in serving the same consumer or customer. It comprises organizations, people, activities, information, and resources involved in moving products and services from suppliers to end-users" (The Chartered Institute of Procurement & Supply (CIPS), 2022).

The aforementioned definitions highlight the common characteristics and key aspects of the supply chain, emphasizing more its mutual nature, involving multiple stakeholders, and the flow of products, information and resources through the various stages.

A supply chain connects many companies, it implies the exchange of materials and information in logistics processes that extend from the collection of raw materials to the delivery of finished products and services to the end user. We would distinguish two definitions that the supply chain consists of a series of companies that are involved in satisfying the needs of consumers (directly or indirectly).

Based on the definitions, we can see the importance of the supply chain in today's economy. It was especially emphasized during the Covid virus pandemic when the supply chains assumed the obligation to ensure that all customers are supplied with the necessary product. The most important participants in the

supply chain are: buyers, manufacturers, suppliers, retailers, wholesalers and distributors. In addition to the participants, each supply chain has its own activities. Supply chain activities begin with customer orders and end when a satisfied customer pays for the purchased good or service (Balfaqih, Hasan, et al, 2016). Supply chain management requires planning and monitoring of a high number of activities. Demand planning on which supply chain operations are based is providing a signal or warning about the status of a particular product or service. Planning managers need to have access to the most relevant information that drives the supply and demand system available at any given moment. The data obtained by the management should be based on real time and by planning the demand for certain products, it allows the decision maker to act in a timely manner and with a true or approximate forecast of demand trends. To maximize profitability, supply chains must be as efficient as possible. Accurate demand planning is critical to ensuring supply chain efficiency for inventory and, ultimately, revenue.

2. IMPORTANCE OF DEMAND PLANNING ON SUPPLY CHAIN KPI'S

In today's fast-paced and highly competitive business landscape, an efficient and well-organized supply chain is vital for a company's success. One of the key pillars that underpin an effective supply chain is the demand planning process. Demand planning involves forecasting customer demand for products or services and aligning it with the necessary resources and production capabilities to meet that demand in a timely and cost-effective manner. This process is crucial for optimizing supply chain performance and ensuring business sustainability. Here are some reasons why demand planning holds such importance:

Anticipating Customer Needs: Demand planning involves analyzing historical data, market trends and customer behavior to anticipate future demand accurately. By gaining insights into consumer preferences and buying patterns, companies can proactively align production, procurement, and distribution efforts to ensure the right products are available at the right time and in the right quantity. This proactive approach minimizes the risk of stockouts and excess inventory, allowing businesses to meet customer demands efficiently.

Enhancing Supply Chain Efficiency: Demand planning facilitates the smooth flow of goods along the supply chain. When demand projections are accurate, procurement, production, and distribution activities can be coordinated seamlessly, reducing lead times and improving order fulfillment. Moreover, streamlined processes minimize operational disruptions, enabling businesses to respond swiftly to market fluctuations and capitalize on new opportunities.

Cost Reduction and Resource Allocation: Accurate demand forecasting allows companies to allocate resources more efficiently. By knowing what and when to produce or purchase, businesses can negotiate better contracts with suppliers, take advantage of volume discounts, and optimize production schedules. Consequently, cost savings can be channeled into product development, customer service, or innovation, further boosting supply chain performance.

Optimizing Inventory Management: A robust demand planning process enables organizations to strike a balance between stock levels and customer demand. Excess inventory ties up capital and incurs storage costs, while inadequate inventory leads to missed sales opportunities and dissatisfied customers. By accurately forecasting demand, companies can optimize inventory management, reducing carrying costs and minimizing the risk of obsolescence.

Strengthening Customer Relationships: Meeting customer demands promptly and consistently is vital for building strong customer relationships and loyalty. A reliable demand planning process ensures that companies can fulfill orders accurately and on time, leading to increased customer satisfaction and positive word-of-mouth. Satisfied customers are more likely to become repeat buyers and brand advocates, which can significantly impact a company's bottom line.

Demand management process is all about predicting customer demand and balancing with supply chain capabilities, so demand is fulfilled. There are six main sub-processes or activities which have a goal to make efficient operational system for balancing demand and supply:

- Determine demand management goals and strategy
- Determine forecasting procedures
- Plan information flow
- Determine synchronization procedures
- Develop contingency management system
- Develop framework of matrices

With a clearer understanding of demand patterns and customer behavior, companies can make informed choices about product development, market expansion, and investment in new technologies.

3. RESULTS

Based on the research goal, data was gathered and analysed. Example is from a domestic company and their experience with one foreign company, which is their strategic customer. Company name will not be revealed due to data protection purposes. After observed problems, forecast accuracy has been addressed and its impact on transportation cost and inventory levels, as some of the most important performance parameters.

Company has quite sophisticated system of receiving forecasted quantities from this customer. They are ordering multiple products for different production lines. There were both internal and external factors that influenced on their actual performance. However, our focus was more on the performance and activities done in the domestic company. Internal analysis of this forecast in the local company was not done and no quite clear rules in cooperation with customer have been communicated. After implementing changes from september 2022., some KPIs (key performance indicators) have been established and monitored on a regular base. Actual forecast accuracy (FA) results were calculated and are shown in table below:

Table 1: Forecast accuracy development for 2022.and 2023

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2022	45.3%	42.7%	51.4%	56.1%	52.3%	64.3%	52.4%	41.0%	42.3%	47.8%	62.1%	71.3%
2023	48.2%	68.7%	75.4%	84.6%	86.4%	88.2%						

After implementing more detailed analysis, some facts became obvious:

- Very low forecast accuracy among two companies (B2B), where it should be much higher
- Very unstable FA (demand), variations per month are significant and trend is very unpredictable
- No clear rules communicated internally how to work with the customer on this topic
- Forecast received is much shorter vs lead times (LT) for some important and expensive materials

Inaccuracy of shared forecast and longer period of lower actual results vs plan led to a further process deterioration, which impacted on transportation costs and inventory levels.

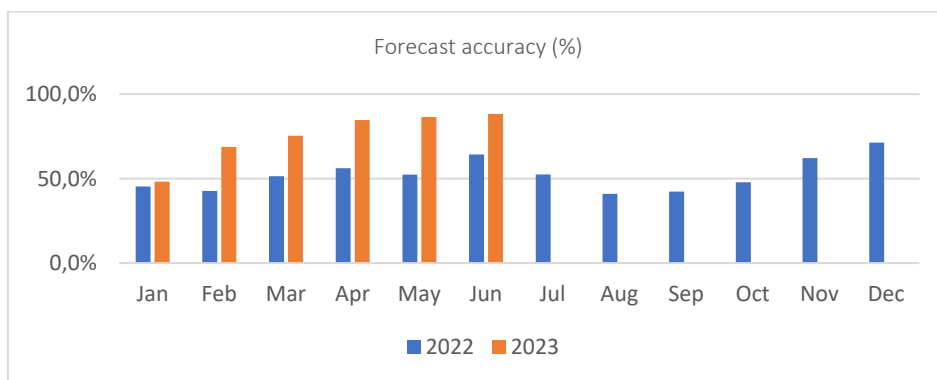


Figure 1. Forecast accuracy development

In period May – July 2022. forecast accuracy was still on a low level. Expectation was that quantities will not be taken as in previous period, but opposite happened. This influenced from one side on higher transport cost due to more deliveries which had to be done. On the other side, production was not able to keep up with the demand due to lack of resources, which was also one factor which was not planned correctly. First, there were not enough people engaged in the production process. This is an activity that has to be done much sooner, so people can be trained and be utilised in the process once expected. Second, there was not enough materials since planned output was much lower and suppliers were not informed about additional needs.

Table 2: Overview of transport costs per month in 2022. and 2023 (kEUR)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2022	37	51	29	31	109	109	163	26	42	37	42	18
2023	124	42	38	22	45	60						
YTD 2022	37	88	117	148	257	366						
YTD 2023	124	166	204	226	271	331						

In period from september 2022. there was a stable growth of forecast accuracy due to better data analysis. However, in the begining of the 2023., due to previous year low results in Q1-Q2 period, significalntly higher inputs were not expected and validated, which led to a lower accuracy result. And this was real example where you have to consult and align with the customer in order to avoid potential issues in operations. After observing what happened, taking all negative consequences on the performance, process was revised and better alignment with the customer was established. Better internal communication and alignment of all sectors on what should be done caused FA result to continously rise. This led to a much better results in a different business areas. Transport cost and inventory levels will be observed with more details.

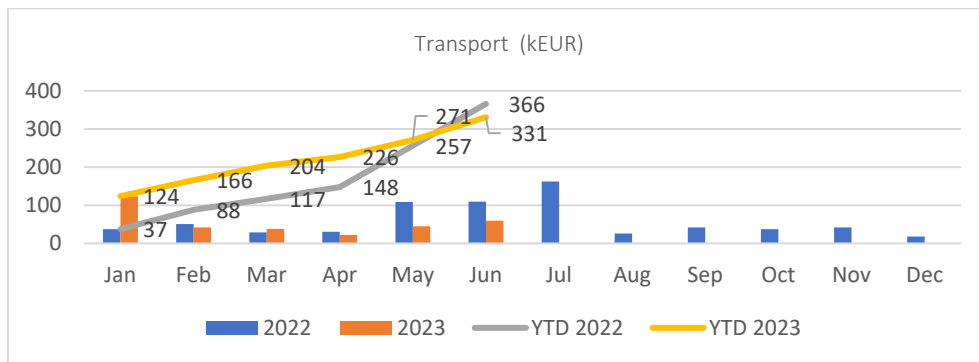


Figure 2. Transport cost development per month

Transport cost from Aug till Dec 2022. was significantly lower. Increase of transport cost in jan 2023. was a direct consequence of wrong internal decision that customer will not take forecasted quantities and all internal operations were set on a lower output. In period May – June 2023. there was an increase of transport cost but this had different, produciton related causes. There are different factors that influence on inventory levels and demand inputs are one of the main. Demand data and analysis of actual performance in the past are crucial for future planning of all activities, including stock management. In this case stocks in Q1 2022. were very high due to much higher forecasted inputs vs what was actual realisation. Due to very long times some materials were ordered and delivered based on the original demand and kept on stock for much longer time than what was initially planned. If demand / sales happened as planned, stock would be lower.

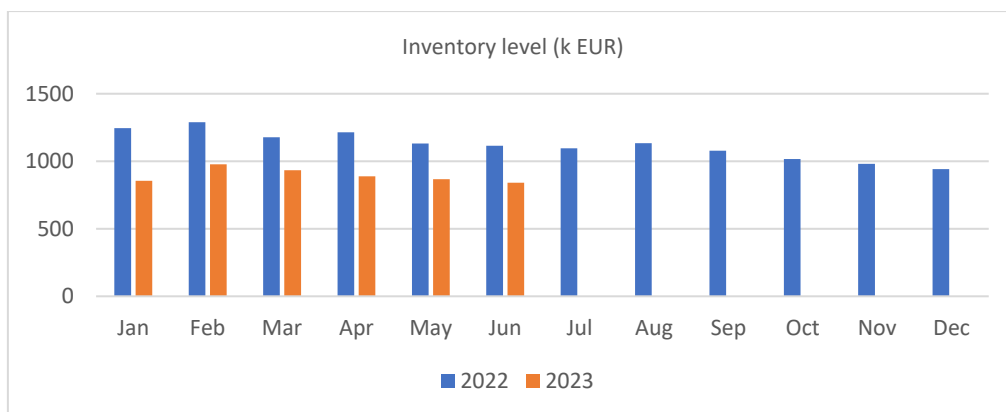


Figure 3. Inventory level per month

Having this in mind corrective activities have been introduced. Some alternative materials with shorter lead times were implemented. Better stock monitoring has been in place and faster decision making regarding all references on stock that are potentially not usable. Claim process with suppliers has been revised and structured, which resulted with improvement in supplier management.

Better structure of stock has been defined in order to prioritize some products which are essential for sales and revenue point of view. This provided more stable production process with less stoppage due to lack of materials.

4. DISCUSSION

Demand planning process was not considered as important part of the activities which seriously contribute to the performance of majority of sectors in the company. Consequently it had effect not only on the logistics business acumen (inventories, transport cost,..), but on the total supply chain (procurement, production,...). Not to mention negative financial effect on the company as a whole.

One of the most important improvement actions was to establish demand planning process in order to define steps how to improve input data coming from the customer. Awareness of the problem is the first step in starting resolving it. Understanding what influence on the input data, how to interpret them, and what decisions are made based on them, together with communication with internal stakeholders is considerably impacting companies performance.

Some decisions made in the past, based on previous negative experience when customer was not performing as expected, without informing customer, had huge negative impact on company financial result. As we could see, there was a repeated unclear behaviour in the beginning of 2023. when a similar situation happened. Doubt was present and the situation with high stocks and low turnover was something to be avoided (Ka, Jagan Mohan Reddy, 2019) .

Regular communication with customers has been introduced in order to foresee what are they planning in the short / mid term, so all relevant operations can be organized accordingly. Additional step was better internal alignment based on the decisions made regarding demand inputs. Once everybody starts communicate one plan and align priorities per sector in line with this plan, things become clearer and more transparent. It is not easy but eventually improvements are visible in different areas. There are still some other processes to be corrected and improved, but this is topic for some other study.

5. CONCLUSION

The demand planning process serves as a crucial foundation for supply chain performance and overall business success. Accurate demand forecasting empowers companies to optimize inventory, streamline operations, reduce costs, and enhance customer satisfaction. By anticipating customer needs and aligning resources accordingly, organizations can remain agile and responsive in a dynamic market, gaining a competitive advantage over their peers. Embracing a robust demand planning process is not just an option; it is a necessity for any business looking to thrive in the ever-evolving landscape of modern commerce.

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