
The Impact of Raw Material Shortage and Increasing Freight Cost to Dell's Supply Chain Implementation

Nathasya Fernanda¹, Lena Ellitan²

^{1,2}Universitas Katolik Widya Mandala

E-mail: ibm.nathasya.f.20@ukwms.ac.id¹, lena@ukwms.ac.id²

Article History:

Received: 12 Februari 2023

Revised: 25 Februari 2023

Accepted: 26 Februari 2023

Keywords: *SCM Strategy, SCM Implementation, Sustainability*

***Abstract:** Dell is the huge technology company that is well known with its strength in supply chain strategy. The capability to respond to the environment change can make them sustain for the long time. At first, direct sale and customization were the remarkable strategies of Dell. However, it led to the low level of product availability. As time passed, consumers require the higher availability products that cause Dell also starts to establish the standard products and sell them in stores. Regardless from the success of Dell's supply chain, this company also faces the challenges such as the shortage of network controller and micro controller which are used for making personal computer. More than that, the increasing the freight cost is also faced by Dell as the result of the COVID-19 pandemic era. Fortunately, the supply chain that has been designed to achieve the goal to present a unique positioning, high innovative products with affordable prices can save this company. Dell's strategic fit, the supply chain's driver, the distribution network, the presence of e-business contributes to solve these supply chain's problem. In addition, the writer suggests to digitize supply chain and establish the long term relationship to prevent the similar case happen in the future.*

INTRODUCTION

The supply chain activity is the core process of a company. The raw materials are obtained, then it passes through a set of manufacturing processes to be the finished products that are ready to be distributed to the customers. Since the supply chain is a complex process, the problem is something unavoidable. Every company will face the challenges and problems that should be responded to properly. Taking a fast evaluation and corrective action are required to prevent the problem becoming more unmanageable. Responding to the environment change also assists a company to detect the potential problem.

Dell as a technology company also faces a problem that obstructs the supply chain process and causes many bad impacts for the company comprehensively. Even though Dell has already obtained the annual sales for \$101.2 billion, it still faces the challenges in its supply chain process.

Dell faces the shortage of several crucial components in making personal computers (PC) such as the network controller and microcontrollers. The shortage caused Dell to experience the backlog in its Infrastructure Solution Group (ISG). More than that, the shortage also results in the higher cost spent to purchase raw material. Despite the raw material shortage, Dell also experienced the effect of increasing freight cost. The COVID-19 Pandemic gives the direct effect to the global supply chain including the transportation cost. More than, the ocean network congestion that occurs in mainly US West Coast Terminal contributes to the higher freight cost.

Facing these problems, Dell is adjusting the price strategy of products. Dell also increases the product's price as a response to the increasing raw material and freight cost. It also believes that in the upcoming time, there will be the raw material price deflation. However, the freight cost is still expected to increase so that the product price will not decrease as well. The other bad impact is the increasing lead time of personal computer production. It obstructs the implementation of Dell's strategy that focuses in providing the high quality products and services for the customers. According to Jeff Clarke, as the Dell Technologies' Vice chairman and co-chief operating officer, the biggest challenge that Dell faces nowadays is to chase the cost regarding the uncertainty and volatility. This bad situation got the unfavorable response from the market in which Dell's stock declined to 5.34% since Dell's earnings are below Wall Street expectations. However, according to Crn.com, by the end of the fiscal year 200, the revenue will be \$101.20 billion which is 17% higher than the fiscal year 2021 revenue which was only \$86.7 billion (Kovar, 2022)

This paper is arranged to analyze the factors of Dell's supply chain implementation. We are willing to identify the strengths and weaknesses of Dell's strategies that can be the evaluation of the current supply chain performance. More than that, we also expect that this paper also provides the solutions for Dell's Supply chain problem. The detailed explanation will be delivered below. The purposes of this paper arrangement are.

1. To understand the decision phase of Dell's supply chain.
2. To analyze the process view of Dell's supply chain.
3. To describe how Dell achieves the strategic fit.
4. To analyze the way of Dell in expanding the strategic scope.
5. To know the drivers of Dell's supply chain.
6. To understand how Dell implements the distribution network.
7. To analyze the performance level of Dell's supply chain.
8. To analyze Dell's supply chain problem solution.

LITERATURE REVIEW

Supply Chain Concept

Supply chain is a set of activities that consists of all parties that are involved in this process both directly and indirectly with the main goal to fulfill the customer's request and satisfaction (Chopra & Meindl, 2016). The supply chain process includes the procurement of raw material, manufacturing process, distribution system, and the consumption of products and services. Therefore, the parties involved in the supply chain are producers, vendors, warehouses, transportation companies, distribution centers, and retailers. The main objective of the supply chain is to maximize the overall value generated. The overall value refers to the profit that is the difference between the customer value with cost spent to supply the chain.

In supply chain management, it handles the flow of products, finance, documents and information. The flow of products represents the movement of the physical products from the supplier to the end consumers. A set of processes starts from the raw material which will be

processed to be the final product in manufacturing then it will be moved to the warehouse, channel distribution and ended in final customers. As the products move, the information attached to the products also flow. It could be a two ways information since it will be both received by seller and buyer. That information includes the invoice, delivery status, purchase order and so on. The supply chain process also involves the finance movement. As we know, in conducting the process, the seller requires to pay the supplier regarding the raw material. More than that, the transportation cost also pops up from the distribution channel. All of these costs need to be considered in determining the price of final products to make sure that the supply chain value can be generated. Lastly, in improving the easiness of tracking the good movement, the flow of documents also has influences. Many documents such as Freight Bill, Bill of Lading, Terms of Sale, Packing List, Insurance Certificate, Certificate of Origin, and Export license are published to make the movement of goods clear and easy to manage. (Simons, 2022)

Strategic Fit

Strategic fit in supply chain refers to the condition in which the competitive strategy as the holistic object of a company aligns with the supply chain strategy. The company should maintain the consistency between the competitive strategy and the supply chain capability. Over time, the competitive advantage and the supply chain strategy can be changed and adjusted to the customer's needs and the external environment. However, both of them should still be aligned even though it is not the same as the previous strategy. In addition, Strategic fit is highly required in every company. The lack of it can cause a big failure to the company. The most common problem that occurs in many companies is the narrow scope of the goal. Each activity or department has their own goal rather than the holistic goal. As a result, there is an interest conflict among each party.

In achieving the strategic fit, there are three main steps which should be passed by a company. Firstly, companies should understand the customer and supply chain. In order to give the high satisfaction level, a company must know what the customers want and need. It will be a waste if a company provides advanced products but it does not match with the customer's needs. More than that, the implied demand uncertainty must be faced by the company through determining the number of inventories which should be available with the proper amount (it is not too much or too less). Not only understanding the customers, the company should be aware of the supply chain uncertainty like the material shortage, the poor quality of raw material, and so on. If a problem occurs in the supply chain, the customers will not receive the goods properly.

The second step is understanding the supply chain capability. Each party in a supply chain system has been assigned to a different task. Therefore, companies need to understand what suitable action should be conducted by each party. Talking about supply chain capability is highly connected with the efficiency and responsiveness concept. If a company has more abilities then it will be more responsive. Responsiveness concept includes several elements such as meeting the short lead time, high service level, handling a large variety of products, building highly innovative products, and so on. The opposite of responsiveness concept is the efficiency that emphasizes the lower cost. There is a tradeoff between efficiency and responsiveness. A more responsive company will be less efficient in the business process.

Lastly, achieving strategic fit. A company should ensure that the desired consumer need matches with what the supply chain parties have done. If not, the company requires to alter the competitive strategy or supply chain strategy. In achieving strategic fit, the company should assign roles to the different supply chain stages that ensure the appropriate level of responsiveness. Each

stage should not focus on achieving its own goal but the competitive strategy.

Driver Of Supply Chain Problem

There are several drivers of supply chain that influences the success of supply chain process.

1. Facilities

Facilities include the location in which the products are manufactured, assembled and stored. Looking at the function, this element includes the plant, merge center, and the warehouse of the company. The machinery, location and capacity can influence the supply chain performance level. For example: if you want to save more transportation cost, then the company can build a warehouse which is near to the location of targeted customers. The decision regarding the number of plants and warehouses also needs enough consideration toward the production target and capacity. The company should not spend too much money for the useless facilities.

2. Inventory

Inventory is the raw material, work in progress and finished goods owned by a company that becomes the very important assets of the company (Kenton, 2022). Related to the efficiency and responsiveness, the company should determine how many inventories that should be kept at the warehouse. Storing too many inventories can raise the high inventory and handling cost. If the company applies the efficiency concept, then the company should minimize the amount of inventory. In contrast, if responsiveness is the priority, then the company should make sure that the existing inventory can give a fast response once the order is submitted.

3. Transportation

Transportation is movement of products from a location to another place. This process is started by moving the raw material from suppliers to the warehouse to be processed. After it is finished, then the products will be distributed to distributors until it reaches the end consumers (Anderson, 2022). The design of transportation methods also includes the route and transportation modes. It really influences the efficiency and responsiveness of the company. If a company needs fast shipment which is for high responsiveness, the company should pay the higher cost. Meanwhile, if company wants to only pay the lower cost, the shipment will take the longer time.

4. Information

It is an important supply chain element that is required to take a decision because it contains a wide view of the supply chain process. Information is like a glue that can make all parties inside a supply chain system able to work together. If there is no information inside the supply chain, a manager will not know what the customer needs, the amount of existing inventory, the profitable target market, and so on (H., 2017)It becomes the biggest driver that give the direct impact to the facility, inventory, transportation, sourcing, and pricing.

5. Sourcing

Sourcing is a process to select and find the proper party suppliers to procure products and services and do certain day-to-day business activities like production, storing, transportation, and so on. The decision of sourcing strategy is very crucial because the company should determine the proper parties which can professionally handle those activities and assist the company in achieving the cost effectiveness. More than that, through sourcing, it can help the

company to focus on their core value to give the maximal impacts (Kushner, 2022).

6. Pricing

Pricing is a process to set the certain price that should be paid by customers based on the value of product and service which will be received. There are several methods which can be applied by companies. There are many pricing methods which can be chosen. It could be cost oriented which evaluates the cost of finished goods. The other is market-oriented pricing that does the market research regarding how much price that the customers are willing to pay. The efficiency prioritizes the lower price so that the company should minimize the cost. Meanwhile, for company that implement responsiveness, the price is usually higher to provide the high quality of products.

Distribution Network

Distribution network is the interconnected party that contains the transportation and storage system (Hayes, 2021). This system is very crucial in determining the satisfaction level of customers because without the distribution network, the product can not be delivered. In designing the proper distribution network, the company should be able to match its choice and the main objective of the company. The flaw in choosing the distribution network can cause a bad impact for the company.

In designing the transportation method, the company should choose whether it wants to prioritize efficiency or responsiveness. If the efficiency concept is applied, the cheaper transportation method should be chosen. On the other hand, if the company wants the products to be delivered fast to maintain their responsiveness level, they should spend more cost to choose advanced transportation methods like air freight. Not only need to match with the goal, the characteristics of products should be considered properly also. There are several materials and components that require special treatment such as fruit, vegetable, meat, charcoal, and so on. That should be placed in a certain temperature, Meanwhile, for the technology products should be handled properly to avoid damage.

Not only the transportation, the existence of wholesalers and retailers should be adjusted to the company's necessity. In some companies, they can directly collaborate with retailers in selling the products, the other also involves the distributors. The company should establish the standard price to make sure that the wholesaler and the retailer charge higher margin that can destroy the market price of products itself.

During the digital era, many companies have already implemented e-business. According to Chaffley, e-business is an application of digital technology, especially internet, to improve the organization's competitiveness through continuous optimization. (Sudrajat, 2017). In conducting the business activities, the e-business also uses several platforms such as e-commerce, e-marketing, e-communication, and so on. During this digitalization era, the existence of e-business is very beneficial. It enables the company to exist whenever and wherever. More than that, e-business is also able to eliminate the geographical boundaries. The firm can connect with the customers that live in other countries so that the market is also expanded.

Supply Chain Performance

A company should be able to analyze whether the supply chain process that has been conducted has already aligned with the expectations or not. A supply chain measurement is expected to get the holistic view of the current supply chain process. In order to do the measurement, there are several simple steps that should be conducted. First, the company should

identify the core value of the whole supply chain process. After it is identified, the company looks at this core process in more detail to find out the problem and what things that actually happen. Then, the company should calculate the resources involved in this process (Putri, Huda, & Sinulingga, 2011).

In measuring the supply chain performance, there are several components that can be assessed such as inventory investment, inventory efficiency, on-time supplier delivery, forecasting accuracy, lead time, unplanned orders, schedule changes, overdue backlog, material availability, excess and obsolete inventory, customer service order, perfect order. Gross profit margin, asset efficiency, return on assets, and gross margin. However, the selected elements can be adjusted to the company's needs (Operational Excellence Consulting, 2022)

RESULT AND DISCUSSION

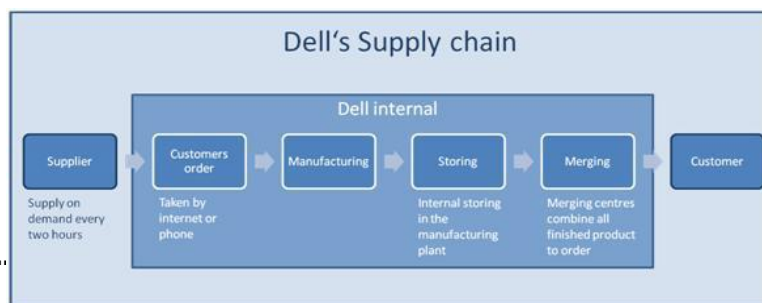
Company Profile

Dell. Inc is a huge technology company that has spread its wings in the global market. This multinational company was initially established by Michael Dell in 1984. Focusing on the sales of personal computers, data storage solution, network sales, and software, this company has a headquarter located in Round Rock, Texas, USA. As a technology company that has grown for more than 35 years, Dell operates in 180 countries and employs more than 165,000 workers around the world.

Even though there are many players in the technology field, Dell is still able to compete fiercely with other brands such as HP, Lenovo, Asus, and so on. Maximizing its strength in the supply chain process, Dell. Inc can generate revenue for \$106,995 million in the first quarter of 2022. Surviving and competing for 28 years is not an easy journey for Dell. It faces a lot of changes that force Dell to keep improving its performance. It is proven that in 2022, according to Fortune.com, Dell sits in rank 86 for the 500 top global companies since the aggregate sales successfully achieved \$37.8 trillion last year—an increase of 19%, the highest annual growth rate in history. More than that, in supporting the employees in improving the performance, Dell built a large and convenient workplace that will get Dell the 31st rank of the best large workplace in technology 2022. These achievements show Dell's intention to establish the sustainability technology company for the long term.

Overview Of Dell's Supply Chain

Dell Inc. Is well known as one of the multinational companies that has an excellent supply chain system. The main purpose of Dell's supply chain is to maximize the comprehensive value of the supply chain through the remarkable strategy called **direct sale**. Initially, Dell eliminated all of the middleman and all of the customer's orders were directly submitted through Dell's official website. Dell chose this strategy since it also gives the opportunity for its customers to do the customization (Shrum, 2018). The direct sale which connects the customers and Dell directly can minimize some misunderstanding regarding the customer's requests. More than that, it also can reduce the additional cost of the distribution.



Picture 1. Dell's Supply Chain Flowchart

From the flow chart above, we can see that Dell initiated its supply chain process by obtaining the raw material from the suppliers. The supply of raw material was requested every two hours to fulfill the customer's demand. Meanwhile, Dell accepted the customer's order from the internet which is the official website together with the customer's special request about the specification and additional features. After that, Dell manufactured the raw material for the required components to build the order. Then, those components are temporarily stored in the manufacturing plant before moving to the merging center. All of the components are assembled in the merging center to be the complete finished products. Those products will be directly sent to the customer's address.

As the time passes, some customers also request the high availability personal computers in a shorter time. The customization takes a long time that does not match with people that want to buy the products in a short time. Only emphasizing the customization will lead Dell to lose a certain portion of the market. Therefore, in 2008, Dell started selling the personal computers and laptop in more than 1000 retail stores worldwide without eliminating the customization and direct sale system (Menchaca, 2008).

Decision Phase Of Dell's Supply Chain

Supply chain is one of the dynamic processes in every company. Even though a company has already designed the whole supply chain process, there are several unpredictable situations that force them to adjust and change the design. External environment and customers are two components that contribute most in how a company makes the proper decision in the supply chain. Dell is also a company that should readjust its Supply chain design, planning, and operation because of the customer's preference shifting. The more detailed explanation will be delivered in these three stages.

1. Supply chain Strategy or Design

The decision taken in this stage is applied for the long-term period. At first, Dell fully designed its supply chain for the customization process. It could successfully offer the low cost of customization products that becomes Dell's unique competitive advantage compared to the other competitors. At that time, Dell still produced all of its components and products by its own facilities to ensure the quality of the customized products. However, because of the shifting customer's preferences that leads to the lower level of customized products, Dell shifts its own production process by collaborating with several partners to outsource the production process. More than that, the initial Dell's strategy of using the fully direct selling, then it is also combined by collaborating with several intermediaries without fully eliminating the direct sale process. In establishing the strong relationship with the customers, Dell also shared the integrated information regarding forecasted sales dollar, sales quantities. As the return, Dell will get the information from the suppliers whether the supplier's capacity is able to support the forecast or not so that Dell can determine the plan properly

2. Supply Chain Planning

The second stage of taking the decision is establishing supply chain planning. In this part, the decision will be implemented on a quarter to year basis. The planning decision will be considered by the forecasted data for the upcoming year. Basically, Dell has determined the

targeted market which is the middle to large business and also the end consumers which are mostly the students and workers in the age bracket of 18-35 years of that are in middle class individuals. Referring to the complex targeted market, the price of products that are set is also different. Most of the customized products are produced for the business customers that the features are adjusted to the business' required capacity. Meanwhile, the end customers prefer to purchase the standard products. The price for customization products will be different from the standard products because it possesses the additional component and features that cost more.

Not only determining the targeted market, Dell also has a plan to manage the inventory. Dell tries to minimize the inventory level by letting the suppliers hold the component inventory. As a result, Dell will get an additional charge for this, but it is considered cheaper than storing all of the inventory in Dell's warehouse. The other plan decision which is made by Dell is doing subcontracting for producing Dell's components and products. Dell also establishes several backup locations which are mainly utilized for assembly processes that are located in Malaysia, Brazil, USA, etc. The purpose of establishing the backup location is to prevent the sudden stopped production process if there is an obstruction in a plant. Therefore, Dell can remain satisfied by maintaining the normal lead time.

3. Supply Chain Operation

Operation stage has the shortest time horizon which is on a daily basis. In doing the supply chain operation, Dell initially implemented a Just-in-time process to support the customization production process. This process helps Dell to reduce the waste by manufacturing products based on the submitted order (Banton, 2022). More than that, it also caused Dell to easily forecast the demand more accurately so that Dell can save more cost to provide the affordable customized products for the customers. According to Sunil Chopra, at that time, it successfully led Dell to obtain more than USD 3.5 billion in revenue more than USD 56 Billion.

Meanwhile, when the customers' desire regarding the customization product has declined, Dell must change several supply chain operation's decisions. It should work together with many kinds of retailers spread in many countries to push the sales. Dell collaborates with Walmart in the US and GOME in China to market the products. Looking at the current strategies that involve the retailer, Dell should need more efforts to forecast the demand because it has not only depended on the submitted order only but Dell should be able to ensure the availability of its products in the market so that the customers do not move to the other competitors. (Chopra & Meindl, 2016)

Process View Of Dell's Supply Chain

In running the business, Dell should determine what kind of process should be implemented. There are two kinds of basic processes usually chosen by many companies. The first one is the push system that relies on the anticipation of the customer's orders. Meanwhile, the pull system emphasizes responding to the customer's order or in other word, the production process will be conducted once the customer's order is submitted. The selected process of view should be aligned with the company's objective.

Looking at the overview of Dell's supply chain, we can infer that Dell combines both the push-pull system (Paul Trudgian Ltd, 2022) This system enables the company to manufacture a product by combining the fix material list and flexible material list instead of producing the same products from the fix material list. Basically, this system allows the customization process. Dell will provide some options of PCs which can be purchased by customers. After that, the demand

was pulled through the submitted order that contains certain features that should be added. In this case, Dell still controls the given option for the companies. This thing is conducted to decrease the total lead time if every piece of PC components are customized. Even both of these systems seems to reflect the extremely distinct marketing strategies, but Dell successfully collaborate these two strategies by using both the customization and pushing the orders through retailer stores spread in more 180 countries.

Strategic Fit Of Dell

Every company requires to achieve the strategic fit in which the competitive strategy and the supply chain strategy is achieved. Dell is also required to apply the same concept, if Dell lacks the strategic fit it will cause a big failure for the company's goal. Basically, there are three kinds of steps that should be passed by Dell.

1. Step 1: Understanding Customers And Supply Chain Uncertainty

Customers are the parties that have really contributed to Dell's sustainability. Without the existence of customers, there will not be sales that generate profit for the company. In order to maintain and increase the number of customers, Dell should understand what its customers want and need. Before 2006, The customers preferred to purchase the customized personal computer that can be adjusted to their necessity. Therefore, Dell produces the customization products to fulfill their preferences. However, after that, the interest toward customized products declined. People prefer to purchase the available personal computers in technology retailers so that they do not spend too much time waiting for the products to arrive.

In fulfilling the customer's demand, there are several factors that influence the customer's demand. Firstly, the response time that customers are willing to tolerate. Dell should be able to give the shortest response time especially when the most of the customer's orders are customized. The other component is the variety of products needed. People are demanding a lot of variety so that they have many choices. Customization which is implemented by Dell can provide a wider variety of products. Until this day, there are several series of Dell laptops such as Dell Inspiron, Dell Vostro, Dell Latitude, Dell XPS, Dell Alienware, Dell Precision. Dell also brings out the most updated features of PC and laptop for the customers (catatanteknisi.com, 2022). Not only present with wide variation, Dell also offers many innovative features such as AI-based laptops, consistent and simple cloud experience, proactive storage solutions, and so on. The innovative products are designed to follow the trends since technology is fast changing. Without innovation, the products will be obsolete and not interesting for the customers (Dell, 2022).

Uncertain demand is the biggest challenge which is usually faced by every company including Dell. This problem becomes more challenging when Dell decides to shift the customization process to make it available in retailers. When the products are customized, Dell can still forecast it more accurately based on the submitted order. However, when it has been changed by making it available in retailers, the demand was harder to predict because unpredictable situations like the pandemic influence the purchasing power of customers. More than that, it also causes several unfavorable situations such as the chip and other component shortages that obstruct the production and the whole supply chain process.

2. Step 2 : Understanding Supply Chain Capabilities

In facing the uncertainty in the external environment, Dell should be completed with the proper supply chain capabilities. The inability to fulfill the customer demand will give bad

impacts to the business process. Therefore, Dell should ensure that the capability is properly implemented. Firstly, Dell can bring the availability of customized technology products for the customers. It can show Dell's response to wide ranges of quantities demanded because the customization will automatically increase the variants that are desired by the customers. Dell also has the cost advantage here, even though the product is customized, but the price is still affordable. Secondly, Dell also tries to meet the short lead times. In facing the shortage challenge, Dell faces a difficulty to overcome it. The shortage of components causes the production process to be postponed so that the overall required time also becomes longer. However, Dell still does the best effort in cutting down the lead time. Dell India successfully cut the lead time during the shortage from 12-14 weeks to 6-8 weeks (NewsDeum Desk, 2022).

In leveraging the overall supply chain capability, Dell also challenges the suppliers to refine their activities in security, efficiency, quality, logistic, and excellence. This condition can strengthen the relationship between Dell and the suppliers. More than that, in providing the best quality products, Dell also sets a certain standard and does the regular audit to the supplier's factory and performance. The criteria that is set by Dell includes the cost, delivery, innovation, security, and adherence to Dell's strict principle.

The supply chain capability is also strongly related to the concept of efficiency and responsiveness. A company should tradeoff between efficiency and responsiveness. In order to be efficient in providing its products in many retailers around the world, Dell does the outsourcing to some factories in helping Dell to produce the orders. The advantage of this system is that Dell can save more money because it does not need to increase its machinery and facility to produce a lot of products. However, the tradeoff that Dell obtained is it could not fully control the standardized quality of products. It becomes a risky challenge if the factory partner does not follow Dell's standard. As a result, it can sell the less quality products that affect the customer's satisfaction. (Dell Technologies, 2021)

3. Step 3: Achieving Strategy Fit

After assessing the uncertainty and capability of Supply Chain, Dell should ensure that it is aligned with Dell's goal to achieve the strategic fit. The strategy that Dell set is not a static goal, the change in environment enables Dell to revise its strategy as long both the competitive strategy and supply chain strategy are aligned.

Previously, Dell's competitive strategy focused on differentiation. Dell sells the customized personal computer that makes this company different and unique among the competitors. More than that, it also leads Dell in more understanding the customer's wants and needs. This competitive strategy is aligned with Dell's supply chain strategy that is willing to give the fast response toward the customers by providing a large variety of customizable products at reasonable prices. More than that, Dell also establishes a strong relationship with customers. Through the direct selling, the customers submit its customization order directly to Dell that assists the company to understand more the customer's needs.

However, Dell also tries to adjust its strategy to the current condition in which people are less preferable to technology customization. Therefore, the competitive strategy of Dell is shifted to focus on cost leadership. Dell has a goal to sell the valuable products with the most affordable price among the other competitors. The supply chain strategy's focus also changed to efficiency. Since Dell's products are already available in many retailers which means the retailer will charge the certain margin. Dell tries to make its supply chain process to be more efficient to ensure that the customers still obtain the affordable price. A thing that Dell does is through the outsourcing process to make Dell focus more on the core value and cut more costs

regarding the production cost, facility cost, maintenance cost, and inventory cost.

From these points, we can infer that Dell has already achieved the strategy fit, and it successfully makes Dell well-known as a company with the best supply chain process that is able to adapt and adjust to the unpredictable environment. As the result, Dell can survive and contribute to the society until this time.

Expanding Strategic Scope of Dell

According to Sunil Copra, the scope of strategic fit refers to the function within a firm and stages in the supply chain that arrange an integrated strategy to achieve the company's objective. The scope of strategy should not be limited in the operational level but it should integrate the intercompany level to maximize the overall supply chain surplus.

Intraoperation Scope

In intraoperation scope, each group under the same operation tries to achieve the independent goal to minimize the local cost. For example: in order to minimize the cost especially for the transportation cost. To respond to this objective, the transportation department decides to ship the products as much as they can in a full-load container. Sometimes, the container is also overloaded because they coerce too many products to be loaded. As a result, this action destroys several product's package that can reduce the quality of Dell's products. Even though the cutting cost objective is fulfilled, the quality aspect is still questionable so that the main goal of Dell in providing affordable technology in high quality could not be achieved comprehensively.

Intrafunctional Scope

In order to give the fast response and most updated technology products, the production department will manufacture the products when there is a customer's order (JIT). More than that, the inventory group does not stock too much of the raw materials inventory to avoid obsolete components so that the innovative products can be established well. The minimum inventory can improve Dell's control to the quality of raw material. More than that, it can cut costs so that a good quality product can be sold at an affordable price.

Interfunctional View

Some functional departments have different goals such as the operational department wanting to cut the cost. Meanwhile, the sales department wants to increase revenue. In order to make them aligned, the overall company's goal should be determined which is increasing the profit. Both sales department and operation department should conduct activities that support company goal such as reducing the lead time (operation department), boosting the direct sell method (sales department)

Intercompany View

In distributing the products, the distributor center does not make an independent decision anymore. They decide to work together by establishing a long term relationship with the third party of shipping service so that it can give the fast response, even though it is slightly more expensive compared to their own sea shipment. However, everything will be handled by the third parties and it can reduce the total lead time.

Agile Intercompany View

To avoid some unpredictable situations, Dell tries to build strong relationships with the suppliers. More than that, they also establish the long term contract to ensure that the suppliers follow the standard. Not only that, it also prevents the supplier to supply the products for the other competitors so that it minimizes the possibility of raw material's shortage and the leak of the company's secrets.

Driver of Dell's Supply Chain

In implementing a favorable supply chain system, there are many drivers which should be considered properly to ensure that every process is conducted fit with the company's purpose (Shahzadi, Amin, & Chaudhary, 2013).

1. Facilities

The facilities possessed by Dell will influence the performance and capacity of Dell. The presence of facilities should be adjusted to the company requirements in fulfilling the customer's needs. Therefore, every company usually has a distinct kind and size of facilities. In assessing Dell's facilities, we can take a look at several kinds of facilities such as the plant, warehouse, and merge center.

Even though Dell's headquarter is located in Texas, USA, the products are manufactured in many different countries around the world. Dell utilizes the help of third-party ODM (Original Design Manufacturers) in producing the components which will be assembled for the finished products. ODM company is a company that designs and products marketed under the labeling of purchasing entities (Technopedia, 2022). In a shorter way, ODM is similar to the sourcing method. In the past, Dell even implemented OEM (Original Equipment Manufacturer) that allows it to produce the products solely. However, in increasing the cost efficiency to prevent too high product price, then the production system is shifted for sourcing. Most of Dell's products are sourced from the plants located in China and Taiwan since both of these countries set the lower wage rate.

After the components have been manufactured, then the components will be delivered to the assembly plants or merge center. Mostly, the assembly plants are located near the headquarters to make the distribution system easier. The most well-known assembly plant of Dell is located in Limerick, Ireland that applies the Just-In-Time manufacturing process. The other assembly plants are located in China, Malaysia, Brazil, and the US. More than that, the shifting OEM to ODM system also leads several factories to be converted to be the merge center or assembly plant. In 2002, Nashville manufacturing plant was changed to be the logistic and merge center so that the job in Nashville was transferred to the Lebanon Facility. The shift was done since the facility in Nashville is nearly located to the Nashville International Airport that becomes the strategic location to the logistic process (Nashville Business Journal, 2002)

The other facility that can be a concern for Dell's supply chain is the absence of the warehouse. It happens since Dell implements the JIT system. Just-in-Time is a system that allows the company to receive the raw material or components from the supplier once the order is accepted. This system enables Dell to reduce the inventory management cost because it does not require storage cost. However, it does not mean that Dell does not need the function of storage at all. In storing the components and raw material, Dell asks the suppliers to keep inventory in Revolvers or supplier logistic centers (SLCs) that are located near Dell's merge center. One of Dell's revolvers is located in Austin and is most frequently used by the suppliers.

2. Inventory

Inventory is the part of the company which sensitively impacts the amount of comprehensive cost. It becomes the main challenge of many companies including Dell to manage the inventory properly so that the spending can be minimized as much as possible. Every company will have its own way in handling inventory including Dell.

In handling the inventory, Dell asks the suppliers to contribute in managing the inventories. The suppliers should pay the rent to use the resolvers in share and the products are still owned by the suppliers, not Dell. Later, this cost will be imposed indirectly on the component's cost. This way is really helpful for Dell to cut the cost because the cost of handling the inventory solely is much greater compared to allowing the suppliers to keep the inventory in revolver. Dell itself withdraws the inventory from revolvers on average every two hours. According to macrotrends.net, It leads for the three months ending July 31,2022, the inventory turnover ratio is 3.57

Minimizing the inventory brings out many advantages for Dell. First, it will eliminate the unrequired cost. Keeping the inventory for a long period of time can raise the cost. It is something that should be avoided by the company because this activity is not considered as non-value added activity. Secondly, it can keep the product's price lower. By allowing the supplier to handle the inventory, Dell will not impose the additional cost that can lead to the higher price. The higher cost can make the customers consider shifting to the other competitors that have similar quality with Dell's products. Thirdly, it eases Dell to detect the inventory's problem. When a company has a lot of inventories, the condition will cause the company to face difficulties to control the quality of inventories. There will be a big possibility that the company will lose the quality control toward certain portions of inventories. Last but not least, it prevents the products from becoming obsolete. Dell's as the technology company faces the challenge of quick life cycle technology products. If Dell possesses too much inventory, once the products are not on the trends, the value of components automatically declines. This implemented strategy assists Dell to overcome this challenge.

3. Transportation

Transportation is a crucial last stage of the supply chain. The success of delivering the products to the customers depends on the transportation system. Without transportation, the flow of goods can not run well. As a result, the flow of documents, finance, and information will slow down. For Dell. The transportation system assists this company in shipping 179,000 orders daily that bring million products. It is predicted that those products can fill 34,000 sea containers in a year or 2.1 cargo jets every day (Dell Technologies, 2021). Dell has its own reason in selecting the modes of transportation.

In selecting the transportation mode, Dell has the strong reason to shift the priority method from air transportation to sea transportation. It wants to increase the efficiency by optimizing the route selection. As we know, even though the air transportation can deliver the products in a shorter time, the cost is much higher than the others. It will have an impact on the product's price. In determining the logistic partner, Dell makes sure that these partners have fulfilled TAPA freight security requirements or similar region guidelines.

Dell also has big concerns to reduce the carbon emission. It can be achieved by reducing the frequency of shipment. Therefore, Dell adjusted the packaging size so that in a shipment, it can load more products in a container. Dell also utilized land transportation to ship the products. It has established a partnership with SmartWay since 2004. Smartway is a collaborative program that involves US Environment Agency (EPA), carriers, freight shippers, logistic

entities that helps the company to choose the carriers that commit to reduce the fuel consumption (Dell, 2022). Therefore, through this program, it does not benefit for Dell but also allows Dell to contribute in environmental impact which is reducing the possibility of global warming.

4. Information

Information system is truly crucial for every party in the supply chain process. During the digitalization era, the information system has been highly developed and gives feasibility for the integrated information. It enables Dell to share the access regarding the certain information to the suppliers or certain parties. More than that, the information is helpful in making decisions at a strategic level. The different matter in every level requires the company to apply the distinct tool as well. (MBA Knowledge Base, 2022)

The operational level as the management that handles the daily operation directly uses maps. Through the map, operational management can determine the place and country in which the information will be collected. More than that, it can be used to get the demographic level of consumers. This kind of information can assist them in deciding how Dell's organization will be operated.

According to Johnston, the tactic strategy level is determining how companies deploy the resource in a short-term period. The suitable information tool which can be used at this level is the **database**. It is an electronic collection of data that enables certain parties to access it whenever and wherever they are. Database can be the source of information in identifying Dell's strengths and weaknesses to create the tactic for Dell itself.

Meanwhile, at the strategic level, Dell uses the world **wide web (www)** which uses the internet. Through this tool, Dell can obtain information regarding the other competitors such as their latest products, trends, and so on. Therefore, the information can be the base in creating the strategy of Dell to win the competition.

Dell has the official website in dell.com that becomes the platform for the customer to submit their orders including the special requests for the feature and specifications. More than that, the customers also can track their product's shipment process. This platform also provides information about the new products and updates of Dell companies. Not only the customers, Dell itself can collect the data regarding the consumer's pattern when they visit the official website. Later, this information can be used in developing proper strategy to increase the sale.

5. Sourcing

At this time, many companies including Dell do the sourcing strategy. Dell sourced many operation activities like the production process, sales, and the distribution process. The main field which is outsourced by Dell is the technical support since it is not categorized as the core competence of Dell. The core competence term in this case refers to the company's competitive advantage that successfully makes the company unique and creates value for the customers. One of Dell's core competences is innovation. The organization will focus on how they create the innovative technology products while the other activities will be accomplished by the third-parties.

Dell has several reasons that cause them to decide to outsource the other processes. Firstly, it enables Dell to gain access to the world capability. The development of technology in every country is different. When Dell is working with other parties worldwide, it will ease Dell in getting the latest technology update so that the company can launch the most innovative products compared to the other competitors. Secondly, sourcing can assist Dell in cost saving. There are several parts that become more expensive when Dell decides to do it solely. It

happens because of the unaffordable machines or facilities. Therefore, sourcing these parts will be more beneficial for Dell to spend less cost. Thirdly, Dell can share the risk through sourcing. It happens since Dell becomes more flexible and adaptable in meeting the changing opportunity. Technology faces fast change, many components and machines can become obsolete fast. Sourcing can reduce this risk both financially and strategically in the long term. Lastly, the benefit of sourcing in which Dell can redirect the existing source for more strategic activities. Since the source is limited, Dell should be able to use the source effectively with the most minimum waste. The source should be maximally used for the core competence which is for the product's innovation. Therefore, the goal of Dell can be achieved.

6. Pricing

Dell requires an appropriate pricing strategy because it is strongly related with the profit or loss which will be obtained by the company. The kind of product and the target market influences the company's decision in selecting the pricing strategy.

In Dell, the pricing strategy usually changes as the product passes through its life cycle. The main reason is the products will face different constraints every entering the new stage (Bhasin, 2019). However, generally, Dell wants to charge the affordable price of a PC that is still profitable for the company. More than that, since the products are ordered through customization, the price of each product depends on the feature and service added on the products.

Dell's Distribution Network

The feature of Dell's direct selling process in the Supply Chain system leads Dell to implement the Manufacturer storage with direct shipping process. In other ways, it is called the drop shipping process. In conducting this system, Dell only involves the manufacturer, retailer and the customers. Even though in the usual system, the order is submitted through the retailer, but here, the customers can submit the order both to the Dell directly and retailers. However, the customers prefer to submit the order directly through Dell website since they avoid the bigger possibility of misunderstanding in delivering their customization order. Looking at the problem, we actually can say that the retailer is not the integrated party of Dell company.

Implementing this concept brings out many advantages for Dell. Firstly, Dell can handle lower inventory costs. It occurs since Dell can postpone the customization and the production process until the customer's orders are submitted. Therefore, Dell does not need to stock too much inventory that can increase the inventory cost since we need the fund for storing and controlling the inventory. Secondly, it can minimize the lower handling cost as the consequence of the lower level of handling cost like the controlling quality, so that the whole cost can be reduced dramatically. Thirdly, it can create a good customer experience. Doing the customization and shipping directly to the customers can create a different level of satisfaction since the customers can have different products from the other.

Even though the dropshipping system brings many benefits for Dell, there are many weaknesses that should be faced properly by Dell. First, direct shipping can result in high transportation costs. The customization makes Dell have to deal with many different distances of people since the products will be directly shipped. Sometimes, the amount of product shipped in the same location is uncertain so that when the amount of products are fewer, the transportation cost per product will surge. Secondly, the shipping time is also increased. The increased distance and direct shipment to customer's houses takes a longer time. Therefore, Dell's customized

personal computers are not suitable for people that need the PC currently. Thirdly, the drop shipping system affects the complicated system for the return process. The cost for return will be expensive enough and the products should be returned to Dell through the official website. Later, customers can track the return process but the longer period time is required because the products will be shipped twice-from the customer to the Dell, and Dell that sends back the fixed products. The longer distance between the Dell and customers also contribute for the complexity return process because the shipping time also depends on the how far you are.

E-Business of Dell

Growing up as a huge technology company, Dell has already established its first website in 1994. Then, this website is used to sell its products online. Dell's direct sell strategy benefits Dells in entering the e-business field. The absence of a middleman does not raise a conflict that can obstruct the operational and sale process. At that time, the consumers can submit the order through the phone. It enables Dell to conduct its Just-in-time process easily.

The use of the E-commerce system continues and develops rapidly from year to year. In 2020, Dell successfully gained US\$50 million computer sales through its official website (Kraemer, 2001) This condition stimulates Dell to do continuous improvement so that it establishes the Premier Page which is well-known as Premier Dell.com nowadays. This discovery facilitates Dell to have a stronger relationship with the customers because the customers can submit their personalized products, track their orders, even get the information and ask the question regarding their problems. Not only integrated with customers, this facility also connects Dell with other partners such as the logistics, suppliers, and service providers that allows them to get the update from Dell.

Dell not only sells its products to the end customers, but it also serves several customer groups such as the small business with up to 200 employees, medium, and big business, also the education, health, and social organization (Turban, et al., 2008). Therefore, Dell combines Dell PowerEdge servers e and web Methods B2B integration software. Later, it can be directly linked to the ERP (Enterprise Resource Planning) to assist the procurement process. This invention is very helpful and most purchased by B2B consumers at that time.

In implementing the E-business, Dell realized that the customer relationship can be built better through the technology. Therefore, Dell arranges the online customer service that allows them to serve the customers every time. The virtual desk is provided for self-diagnosis and service for asking the technical support data such as the FAQs, order status, user guides, and so on. Meanwhile, if the customers can contact Dell, they can do the live chat or phone the online customer services.

The features of the Dell website that enables the customers to purchase the products directly brings a lot of impacts for the customers. Firstly, Dell provides a faster response for customers. All of the submitted orders can be automatically accepted and can be processed as soon as possible. More than that, the existence of online customer service also assists the customers to get the answer of their questions once they submit the question. Secondly, Dell uses the internet to offer a wide variety of PC's configuration, later the customers can select their choice regarding the kind of feature and components for their customization products easily so that it can increase the satisfaction level of customers. Thirdly, the official website facilitates many easy payment method choices for customers. They can pay for the products through the credit card, debit card and other online payment methods so that they do not need to go out for accomplish the payment process.

The official website not only benefits the customers but also Dell itself. Firstly, Dell can bring

out the new products to the market quickly and widely. Once you upload an article or content on the internet, it only requires a second that these contents will be received by many people. Dell can introduce and market their new products fast through the internet. More than that, the internet also does not give a certain border regarding the location. What Dell has uploaded regarding its products, it can be accessed by people that come from other countries so that Dell will have a wider reach to potential customers. More than that, it also helps Dell to reduce inventory cost. As mentioned before, the use of e-commerce supports the implementation of Just-in-Time so that inventory levels will be drastically reduced and Dell is able to aggregate the finished products in several locations. The other impact is the elimination of intermediaries that can charge high margins. Many products from other companies become more expensive than the original price because of the intermediaries that charge additional margin. As a result, the price can not compete with the other competitors. However, through the official website, Dell can avoid this unfavorable condition.

Dell's Supply Chain Performance

In assessing whether the supply chain strategy which has been conducted by Dell, it is important to assess Dell's performance. The performance will give us insight about the customer level satisfaction which become the main goal of Dell. In order to assess it, we will use two main measurements, the lead time and profit.

Lead time can refer to the amount of required time from the beginning until the end of the process (Kenton, 2022). A company usually measures the lead time in manufacturing, supply chain, and also project management. According to the data uploaded by Dell official website, the total lead time of products is generally 2-3 weeks in the condition of the available inventory and customized products order. However, Dell stated that there is no standard lead time that can be guaranteed because it depends on the type of product ordered, the availability of product's components and custom's holding time that will be different in every country. Basically, it is difficult enough to compare Dell's lead time with other competitors since the others have already available products without customization so the existing data is only regarding the shipment time. Asus products will be delivered in 3-5 days after the order is submitted. Meanwhile, all back-orders will be fulfilled between 10 - 14 days. However, the peak season and availability of products can cause the delay of shipment.

The other component which can be used to measure Dell's performance is from net income. In 2021, according to Dell's official website, the total net income obtained was USD4.9 Billion. Meanwhile, compared to Asus, as the main competitor of Dell, Statista.com stated that the operating income in 2021 was 44.55 billion New Taiwanese dollars that was equal to USD1.45 Billion. It shows that Dell is more beneficial compared to Asus.

From these two components, we can say that Dell has a good enough supply chain process. It can be inferred from the total net profit last year that was bigger compared to Asus. Net profit or the value of the supply chain can be the main measurement of the success of the supply chain. Bigger profit a company obtains, the bigger supply chain value that can be maximized. Regardless from the profit, Dell still has the long lead time but the customization process becomes the main cause for the longer lead time. Perhaps, it will not be suitable for people that can not wait too long. Therefore, it should be a concern for Dell to reduce the lead time properly.

CONCLUSION

As a huge technology company, Dell wants to present a unique positioning, high innovative products with affordable prices. In achieving this goal, an advanced and organized supply chain has been conducted. In the implementation, Dell's supply chain is recognized as the best company supply chain. It has the ability to change and adjust with the customer's needs. It is able to make the supply chain strategy that is focusing on efficiency to be aligned with the cost advantage as the competitive strategy. All of the supply chain stages are designed to support this goal. Manufacturing through ODM, no inventory, prioritizing the sea transportation, maximizing the information flow are the steps to provide affordable prices for customers. Using the JIT and direct selling are also the strength of Dell's supply chain, even though Dell has already begun to collaborate with retailers to market its products, but it shows that Dell has the agility in adapting to the current change. This adaption capability is also proven from the implementation of E-business that becomes a must for the company in entering the digitalization era. Dell launches many platforms that help them to be connected to its customers. From the whole supply chain practice, Dell successfully gains the high profit which shows that Dell successfully manages the supply chain properly.

Like what has been stated before, Dell faces the supply chain problem regarding the material shortage and the increasing freight cost. There are several points suggested by the writer.

1. Digitize the whole supply chain stages. This solution can ensure that all parties in the supply chain system are fully connected so that the environment change can be detected earlier and Dell can take preventive action. Through this strategy, Dell is allowed to quickly adjust its operation system not only in manufacturing but also in the distribution process. More than that, it also enables Dell to create simulation and prepare several scenarios for supply and demand to prevent unpredictable situations.
2. Establishing long term relationships with supply chain parties. It could be done through a long-term contract that ties the supply chain parties. For example: Dell can ensure that the certain supplier does not supply the raw material to the other companies so that the possibility of shortage can be minimized. Same with long term contract with the transportation parties, when Dell decides to use the help of third parties to distribute the products, through the long term contract, Dell can secure several aspects including the freight cost term.

Through these suggestions, the writer expects that Dell can solve these problems so that the goal of Dell to provide affordable price can be achieved without neglecting the quality of products itself.

REFERENCES

- Ajay Kumar Pagare, r. K. (2021). Supply Chain Management and its Tools used by McDonald's in India. *Industrial Engineering & Management*, X(6), 1-3. Retrieved November 15, 2022
- Ashton, E. (2022, April 11). *all things supply chain*. Retrieved November 14, 2022, from <https://www.allthingsupplychain.com/the-amazing-supply-chain-of-mcdonalds/>
- Basodan, H. (2016). Process View of a Supply Chain. *International Journal of Scientific & Engineering Research*, VII(4), 663-668. Retrieved November 16, 2022
- Benaroya, G. (2021). *Leading Global Supply Chain at McDonald's*. LinkedIn. Retrieved November 16, 2022
- Bhatnagar, A. (2009). *Textbook of Supply Chain Management*. India: Word Press. Retrieved November 14, 2022, from <https://books.google.co.id/books?id=faaV4159a68C&pg=PA21&lpg=PA21&dq=respons+e+time+customer+will+tolerate+in+fast+food+restaurants&source=bl&ots=f1DSQcjI5t&>

- sig=ACfU3U2LpzFeSV1_i5JVv3uoGfdEUAhZMA&hl=en&sa=X&ved=2ahUKEwim147tga37AhVFTnwKHdN2DX8Q6AF6BAgweAM#
- Britannica, T. E. (2022, August 23). *Britannica*. Retrieved November 12, 2022
- Catarina Delgado, B. M. (2013). *Supply Chain Management*. Retrieved November 16, 2022
- corporation, e. o. (2021). *Packaging, Toys, and waste*.
- Curz, A. (2015). *McDonald India Cold Chain*. Retrieved November 2015, 2022
- Dorall, A. (2022, March 15). *TRP*. Retrieved from <https://www.therakyatpost.com/living/2022/03/15/this-is-why-you-cant-get-large-fries-at-mcd-its-not-just-a-potato-shortage/>
- Dzananovic, S. (n.d.). *How Does McDoanlds Manage Their Inventory?* Academia. Retrieved November 13, 2022
- edu, e. o. (2019, November 15). *osu edu*.
- Flinders, K. (2010). *McDonald's commits to outsourcing for 11 years*. *compter weekly*. Retrieved November 15, 2022
- Gregory, L. (2022). *McDonald's Generic Strategy & Intensive Growth Strategies*. *panmore institute*. Retrieved November 16, 2022, from <https://panmore.com/mcdonalds-generic-strategy-intensive-growth-strategies>
- Hayes, A. (2022). *The Supply Chain: From Raw Materials to Order Fulfillment*. Retrieved November 16, 2022, from <https://www.investopedia.com/terms/s/supplychain.asp>
- Hidayat, D. (2013). *Competitive Advantage McDonald*.
- Howard, E. E. (2015). *Marketing at McDonalds*. Retrieved November 13, 2022
- Insights, S. W. (2019, December 5). *thomasnet.com*. Retrieved November 14, 2022, from <https://www.thomasnet.com/insights/the-recipe-to-mcdonald-s-supply-chain-success/>
- Irum Shahzadi, S. A. (2013). Drivers of Supply Chain Performance Enhancing Organizational Output : An Exploratory Study for Manufacturing Sector. *European Journal of Business and Management*, V(14), 2222-2839. Retrieved December 12, 2022
- Jacobs, K. (2018). *Efficient, bold and sustainable: McDonald's supply chain secrets*. Retrieved November 14, 2022, from <https://www.cips.org/supply-management/analysis/2018/march/mcdonalds-supply-chain-secrets/>
- Jain, A. (2019). *Supply Chain Management of McDonalds India*. Retrieved November 15, 2022, from <https://medium.com/@jainaditya017/supply-chain-management-of-mcdonalds-india-58e1064274b5>