# Effects Analysis of Postponement strategy implementation on manufacturing enterprise—— Take L manufacturing company as an example

Li Dan

College of mobile telecommunications. Chongqing university of posts and telecommunication, Chongqing, China

e-mail: elfindan@tom.com

**Keywords:** component; postponement strategy; supply chain; CODP point

**Abstract.** The "Postponement" concept was originally introduced by Alderson (1950) in the article "Marketing efficiency and delay principle". Postponement strategy which allows company quickly respond to customer needs as well as maintain the advantage of low-cost production. However, most of the current research focuses on the practices in western company, but are Chinese companies fit to use this strategy to solve their problems. The paper will take Chinese company into practice, reveal the effect and applicability of postponement strategy in Chinese enterprise.

## 1. INTRODUCTION

As a national economy motive force, manufacturing plays an indispensable role, its development reveals the competitive advantage of the country. In recent years, Chinese manufacturing enterprises get into the global economy at the same time also faces the problem of globalization. One of the most prominent problems is the traditional supply chain system can not quickly adapt to different customer requirements. The supply chain of traditional Chinese manufacturing enterprises is either a push supply chain or a pull supply chain, and its operation is unable to respond to the rapidly changing customer needs [1]. How to maintain the advantages of low-cost production at the same time to respond quickly to the individual needs of customers is an urgent problem to be solved for Chinese manufacturing enterprises. As many abroad studies have shown that postpone strategy can effectively solve the problem. In this paper, take Chinese L manufacturing company as an example, analysis and find the problems of its supply chain. Then, using ATP simulation calculation way to explore the effect of postponement strategy in A company. Wish the research can provide reference and application value for other manufacturing enterprises in China and the world.

## 2. RELATIVE THEORY FOUNDATIONS

### *A. Postponement strategy*

The concept of a delay strategy was first proposed by Wroe Anderson, who referred to the delay as a marketing strategy that could effectively reduce risk, eliminate time and demand uncertainty, and eliminate waste from different markets. The postponement strategy has a great impact on the competitiveness and organizational capacity of the enterprise. This strategy can effectively reduce the storage period of the finished product, and the product forecast is simpler and more accurate, and can also control the production risk effectively [2].

### *B. "Push and pull" mixed supply chain*

The manufacturing enterprises are facing increasingly harsh and rapid changes in customer demand, facing competition and challenges from the same industry, at the same time, enterprises also face rising costs, the risk of crisis. Therefore, there are new requirements for supply chain, which will push and pull each other together the "push pull" combined supply chain system [3]. The implementation of the supply chain process, promote the order in front with prediction, is behind the production of customized according to the needs of individual customers. The delay in manufacturing is the key, it is the integration of push-pull supply chain, mass production and organic customer demand combined to ensure that the enterprise can survive and develop eventually dominate the market in the fierce competition in the market [4]. With the competition model of supply chain from the original price priority mode When the model is turned into time first, the advantage of postponement strategy is more advanced, which is the key to the cost control and efficiency improvement of the supply chain[5].

## 3. THE ANALYSIS OF L COMPANY ON ITS SUPPLY CHAIN CURRENT SITUATION AND PROBLEMS

### *C. The introduction of L company*

L company was established at 1997. The operation and manufacturing center is locate at Huizhou, a major world manufacturing center in China. After almost 20years' hard work, the company has about 40 modern automatic assembly lines for the domestic appliance manufacturing. Accompany with mechanical arms and the ERP system, the company mainly has diesel engine, heat engine, power system integration strategy business unit. The company have got the ISO9001:2000, ISO14001:2004, OHSAS18001 etc. management approval. Besides the CCC approval, the products of the company have got GS, UL, EMC CE, SAA etc. international certifications. The company also determines to perfection their sale network for the Chinese market. As far as the marketing concerned, the company optimizes the traditional sales network and also extends the internet online transaction. Under the national one belt one road policy, it sells its products all over the world. The new production and assembly of the A series, B series diesel generator sets, using a mature modular design method, compact structure, high power volume ratio, high power quality ratio, low fuel consumption, with automatic control system, meet the standards of environmental protection. Flexible installation, the overall test proved they are excellent performance, reliable operation, outstanding products, suitable for all types of locomotives for power generation. The annual revenue of L company in 2016 is 20.5 billion. With the rapid changes in customer demand, more stringent requirements from customer, sustain increasing on production cost, L company are facing a huge challenge.

### *D. Analysis on the supply chain situation of L company*

L company's production system is MTO system, all production, sales and management rely on the order. Its supply chain model is a typical pull-type supply chain model, all production began in the customer, the customer needs in the supply chain information flow, logistics and capital flow drive source. How many machines are produced, how many machines are produced and how many corresponding raw materials are purchased. And the full use of information systems based on the set of the corresponding parameters, by the system to calculate when to start production, when to issue a purchase order. The supplier does not make any production preparation and will not carry out any purchase behavior when it does not receive the customer demand order.

This supply chain mode of operation, although it can greatly reduce the supply chain inventory, reduce the node's product promotion costs and out of stock costs, but with the changes in customer demand in recent years, making the number of product design changes. The direct impact of the L company is the

design changes caused by the entire supply chain ecosystem changes, and even the entire plan of the supplier also need to be adjusted, the result is the company to complete the adjustment plan may not guarantee delivery on time, which caused the company Great pressure.

*1) Analysis of product forecast*

The company's supply chain model is linked to the production model, sales orders as a starting point, reflecting the needs of customers, and the next production and procurement for its matching supply. In the company's current sales module, only the customer signed the contract in order to enter the sales order in the information system, the establishment of the product number project number, as well as production BOM and process planning. However, under this system, the sales model is too single and no relevant forecasting and analysis, for the customer's potential data mining and follow-up of potential orders do not have any role in promoting. The current sales forecast method is based on the personal judgment of the salesperson. Although the order forecast is based on the objective and fair basis, but the company's people-oriented forecasting method more or less subjective judgments, seriously affected the accuracy of sales forecast.

*2) Analysis of product delivery*

Since the company was established in 2007, has successfully delivered more than 4,000 products, in ensuring the quality of the premise, on time delivery rate of 95%, but in recent years the market for quality and new environmental requirements continue to improve, as well as the delivery time harsh, resulting in L company production of great pressure, according to the company's effective data show that nearly 6 months on average delivery rate of only 86%.

*3) Production costs improperly control, production allocation is unreasonable*

Because of the delivery time affected by the supplier, there are a lot of downtime，and once the material arrived and need to work overtime, resulting in uneven distribution of production capacity, overtime hours rise, followed by the high cost of production. No less than the corresponding increase in manufacturing costs, resulting in L part of the model cost increases, profits decline.

In summary, L company supply chain problem surface is the supplier or outsourcing business capacity is insufficient, can not meet the production needs of L company. The actual is the L company can not make a quick response to customer needs，facing the market dynamic changes in the lack of preparation, resulting in L's supply chain system entire delivery delay. The essence of L company is the current pull-type supply chain management model, can not adapt to the market's rapidly changing, unable to make accurate and rapid response to customer needs. Therefore, the core contradiction of L supply chain is the supply chain "pull" management model. On the one hand, the production needs to change with the customer needs at any time to adjust, on the other hand is the downstream supply chain communication consultation is more difficult. L company is currently in this passive situation: on the one hand can not guarantee on time delivery to customers, on the other hand the downstream supply chain is not good control, while their own need to work overtime, resulting in increased production costs. Such as the past, do not consider the operation of the enterprise supply chain reform, L will gradually lose its advantage, the market competition out.

## 4. EFFECT ANALYSIS OF POSTPONEMENT STRATEGY FOR L COMPANY

The paper discusses the current situation of L's supply chain and analyzes the core contradictions in this model. The use of postponement strategy is to provide customers with customized services, but also to achieve the best economies of scale program. So how can it prove that postponement strategy is more cost-effective and improve market responsiveness? The following will be through the actual research, in the ERP system simulation set of books based on the calculation of delay after the implementation of the

manufacturing strategy to optimize the effectiveness of its supply chain analysis. Mainly from three aspects to elaborate: the analysis of product forecast to enhance the effect, supply chain risk control, production cost effect.

### *E. Analysis on the effect of product forecast*

We change the past sales forecasting style which is subjective man-made speculation. It is also not just data mining and speculation based on historical sales data. We can build a new sales forecasting that according to the customer's comments and needs and its summary to the L company's ERP system and the use of ATP simulation method to circulate the data. All of this can get the real needs of customers and the goal of system integration automation. Through the business process of the sales department of the survey, we can be roughly the sales forecast is divided into the following steps: customer consultation, technical agreement, sales quotes, IOS, IOS confirmation, sales orders. From the customer consultation stage to the customer to the specific technical requirements of the generating unit, the sales department in accordance with technical requirements and configuration quotations, and then to the customer signed an order agreement, L company to confirm the agreement, and finally signed a formal sales order. Really belong to the sales forecast order category only related to IOS to IOS Confirmation. At this point the input system, not just a sales forecast document, but to give it a real life to predict: According to the sales funnel model, each stage of each information in the system are recorded in the system, so that sales staff more accurate and comprehensive grasp of customer dynamics and information and the entire sales module policy as an ecosystem, open up the other modules of the information sharing channels, to avoid the existence of information islands.

In the system need to create a new forecast number, according to the information in the technical agreement to build the standard BOM, simulation ATP operation. ATP simulation system simulates the number of deliverable products before sales, analyzes the impact of sales on the overall business. Resulting in a corresponding forecast production order and forecast purchase order. For L companies, the ATP function not only improves the accuracy of the sales order forecast for L Company, but also demonstrates the superiority of the postponement strategy to supply chain optimization.

ATP function system configuration diagram is as follows:

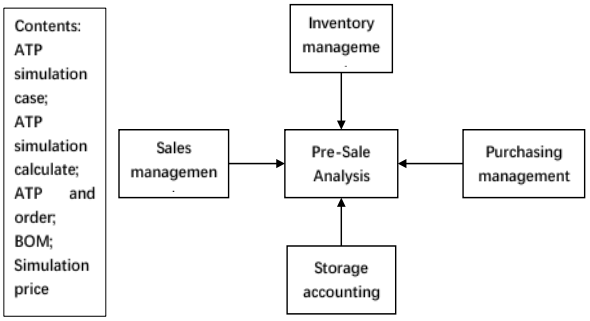
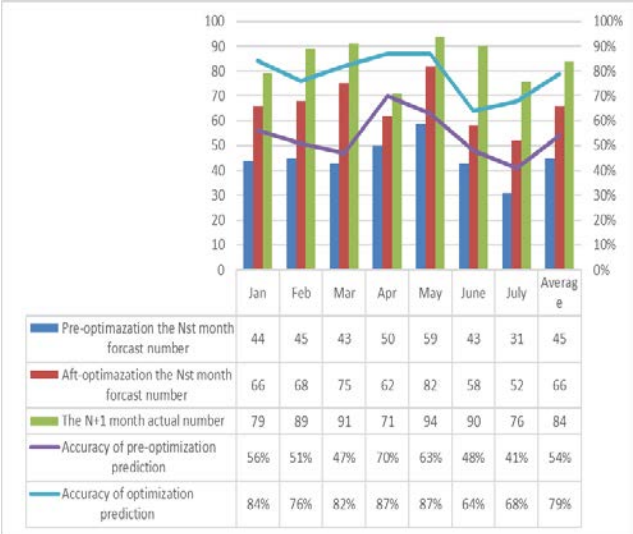



Figure 1. ATP function system configuration diagram.

Through systematic order forecasting and ATP simulation, we analyzed data for forecasted orders and actual orders for seven months of last year:




| | Jan | Feb | Mar | Apr | May | June | July | Average |
|---|---|---|---|---|---|---|---|---|
| Pre-optimazation the Nst month forcast number | 44 | 45 | 43 | 50 | 59 | 43 | 31 | 45 |
| Aft-optimazation the Nst month forcast number | 66 | 68 | 75 | 62 | 82 | 58 | 52 | 66 |
| The N+1 month actual number | 79 | 89 | 91 | 71 | 94 | 90 | 76 | 84 |
| Accuracy of pre-optimization prediction | 56% | 51% | 47% | 70% | 63% | 48% | 41% | 54% |
| Accuracy of optimization prediction | 84% | 76% | 82% | 87% | 87% | 64% | 68% | 79% |

Figure 2. Effect analysis chart of product forecast comparison.

As you can see from the above chart, the accuracy of the implementation of the postponement strategy is clear for the sales order forecast. The seven-month average sales order forecast accuracy is improved from 54% to 79%, up by 25 percentage points. Which in March the forecast rate increased by 35 percentage points, the effect is most significant. Through the sales department to understand that the two-regional sales manager of the month to the company's sales forecast to bring a significant impact, and once the implementation of delayed manufacturing strategy and entered into the information system will not have such a problem, in line with the company's actual business.

### *F. Analysis of Risk Control Effect*

After implementing the postponement strategy, we expect to significantly reduce the delayed delivery rate of the company's Auxpac20 model and increase the timely delivery rate of suppliers, especially the on-etime rate of delivery time for the supplier. Which can effectively reduce the uncertainty of supply chain operation, shorten the lead time of product delivery, reduce supply chain inventory costs, greatly reducing the risk of supply chain management, which in the fierce competition in the market to maintain a strong advantage. First of all, we comparatively analyze the delay delivery number and rates through the implementation of postponement strategy for Auxpac20.

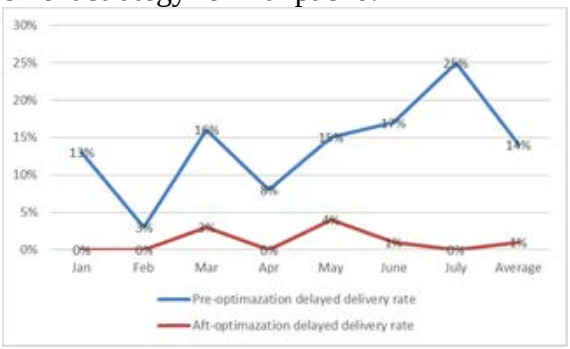



Figure 3. Effect analysis chart of product delayed delivery comparison

From the above chart, after the implementation of postponement strategy, from the simulation of seven months of data analysis L company's flagship product Auxpac20 series of products delayed delivery significantly reduced from the implementation of an average of 14% to only 1%, the decline is much

larger than expected. Which in January, February, April and July have maintained a hundred percent on time delivery rate.

The overall idea of the optimizing supply chain for L company and supplier is that the supplier should integrate the information which based on L company's order history and supply chain information. L company's ERP system and supplier's ERP system should set up the interface, The L company's forecast sales orders into the production plan and procurement plan shared to the suppliers. Through using the use of "push-pull" combination of supply chain approach, the L company's forecast orders for bulk, large-scale production of standard parts and batch parts, until the company's forecast orders into a formal order, and then do the subsequent customization, personalized production. In this way, it not only increases the insurance factor for the normal production of L Company, but also generates the material waiting time for the normal order due to the need for rework.

The entire production lead time, from the "order" to "delivery to customers" at least need 87 days. In the use of postponement strategy, reset the push point, the "push" and "pull" together, join the CODP point, as bellowed:

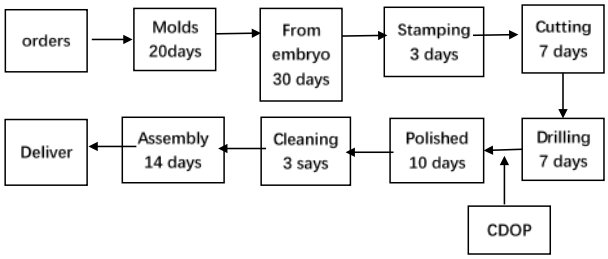



Figure 4. Production flow chart of crankshaft supplier with postponement strategy

As you can be seen from the above chart, based on the principle of postponement, make the forecast order before production, module standard product as scale until the customer orders issued, and then according to customer demand for individual production processing. The entire production cycle only takes 27 days, a full reduction of 60 days of production cycle than the original supply chain model, greatly accelerating suppliers' response speed to L company orders, and because of pre-production to form scale, it is easy to arrange production, but also can reduce its production cycle, reduce production difficulties, thus saving the cost of upstream nodes in the supply chain.

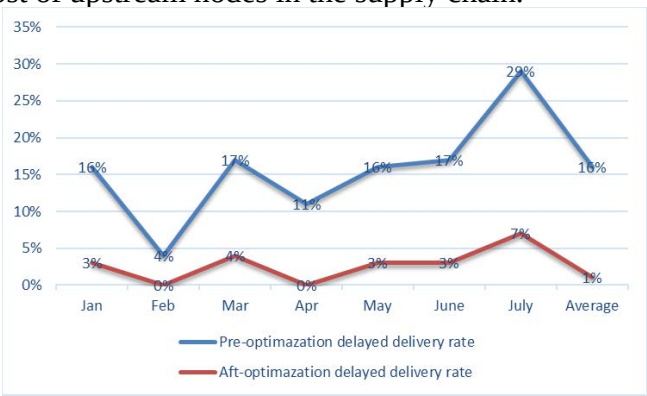



Figure 5. Effect analysis chart of crankshaft supplier delayed delivery comparison

From the above chart, after the implementation of postponement strategy, the supplier's delayed delivery situation greatly improved, from the implementation of an average of 16% to only 1%, it can be seen from the implementation of delayed manufacturing strategy for not only for L companies but also

the company's downstream supply chain is a significant effect.

### G. *Analysis of cost control effect*

The implementation of postponement strategy has not only improved the product forecasting effect and the risk control management, but also has the remarkable improvement to the L company's cost control. The concrete manifestation is in two aspects:

- The improvement of the delayed delivery rate of the product, the significant reduction in the delay in compensation;
- The improvement of quality of delivery and delivery time of supplier which can reduce production costs.

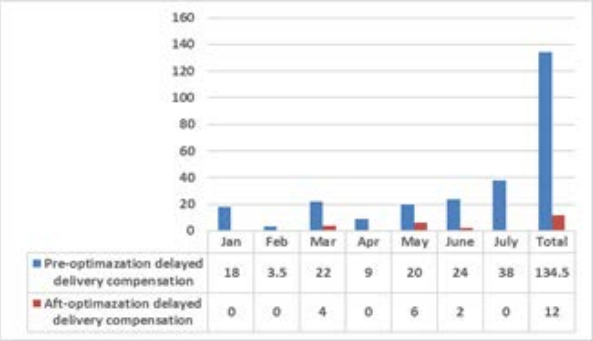



Figure 6. Effect analysis chart of Compensation of delayed delivery comparison

From the above figure, L's delayed delivery of compensation within 7 months effectively reduced by 1.225 million yuan, an average of 175 thousand yuan per month can be saved. At the same time, if calculated in December each year, you can save a total of 0.175x12 = 2.1 million yuan. The reduction in the amount of compensation not only reduces the cost of production, but also reflects the superiority of L's postponement strategy from on-time delivery, quality and quantity, and enhance customer satisfaction.

After the implementation of postponement strategy, the production costs of enterprises significantly reduced, less work overtime, complaining less, more rational allocation of production capacity.

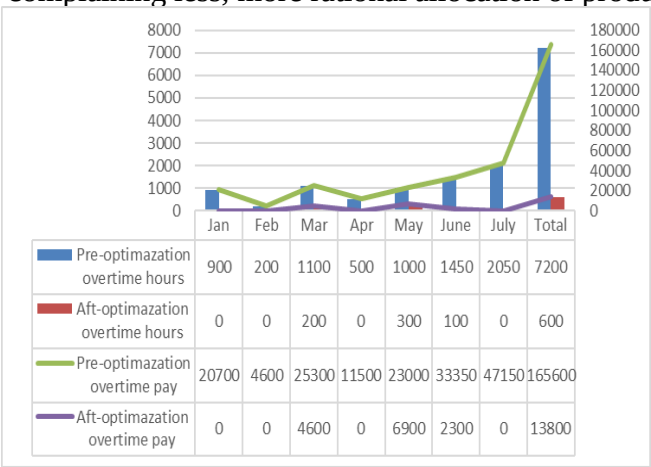



Figure 7. Effect analysis chart of OT work situation comparison

The figure for the last seven months through the ERP system attendance module data analysis model, the quantitative results from the simulation (according to L normal monthly output of 66 units, 8 hours of working time) for the L company to save the number of hours of work for the 6600 hours, save overtime costs RMB 151,800.00. It can be seen that the implementation of the postponement strategy can not

completely solve the contradiction between production overtime and on-time delivery, but it can reduce production costs and reduce overtime costs to a certain extent. What's more, it can improve the supplier's delivery speed and quality.

### *H. Analysis by synthesis*

In summary, the postponement strategy has a significant effect on L company's supply chain operating system which performance in the following three aspects:

- Postponement strategy to improve the accuracy of sales orders forecast, and the actual operation to avoid the impact of man-made uncontrollable factors. The establishment of a complete forecast of the ecological system, from the sales forecast, production planning forecast to the procurement plan forecast, more financial sector data analysis, which greatly improved the L company supply chain management level and efficiency.
- Postponement strategy to reduce the L supply chain management risk factor. Improve the company's products to customers on-time delivery rate, improve customer satisfaction at the same time with the downstream suppliers and the market to face the risks and challenges for the changing market and customer demand for changing, agile experience, lean production, which greatly improved the response speed of the supply chain.
- Postponement strategy to reduce costs significantly. Directly reduce the production sector overtime, a reasonable allocation of production capacity is also effective to reduce compensation because of delays in delivery and improve customer satisfaction [6].

## 5. CONCLUSIONS

The starting point of this study is the problem that L company's product delivery time on the decline. We do the analysis to find the essential reason is that L company's supply chain system can not make a quick and effective response to customers order change. Through the transformation of its supply chain system, using the ERP simulation test system to deduce and then find that postponement strategy can optimize program not only effectively improve the sales order forecast accuracy, reduce production management in the operational risk, but also effective cost control, really be agile operations, lean production, rapid response.

## References


[1] Alderson W. Marketing efficency and the principle of postponement[J].Cost and Profit Outlook, 1950,3:15-18.

[2] Van Hoek RI. The rediscovery of postponement: a literature review and directions for research[J].Journal of Operations Management, 2001,19: 161-184.

[3] Bueklin L P, postponement, sepeculation and structure of distribution channels[J]. Journal of Marketing Research,1965,2(2),26-31.

[4] Suhong Li, S.Subba Rao, T S Ragu-Nathan.Development and validation of a measurement instrument for studying supply chain manament practices[J].Journal of Operations Management, 2005,23:618-641.

[5] Jian Li, Shouyang Wang, T.C. Edwin Cheng. Analysis of postponement strategy by EPQ-based models with planned backorders[J]. Omega, 2008,36(2):777-788.

[6] Gergory A, Micheal J. A numerical analysis of capacitated postponment[J]. Production and operation management, 2002,11(3):340-356