



Linköping University

Master of Science in Business Administration - SMIO

## **Seminar 3: Beer Game**

### **- Analysis -**

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Group:	1 (Morning Section)
Course:	Contemporary Business Processes
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# Table of Contents

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<b>1. Introduction .....</b>	<b>3</b>
1.1 Definition of the Bullwhip Effect in Supply Chains? .....	3
1.2 Description of the “Beer Game” .....	3
1.3 Description of group process.....	3
<b>2. SWOT Analysis of the “Beer Game” .....</b>	<b>4</b>
<b>3. Group outcomes according to the “Beer game” .....</b>	<b>5</b>
<b>4. Lessons learnt .....</b>	<b>5</b>
<b>Appendix .....</b>	<b>7</b>
<b>Bibliography .....</b>	<b>9</b>

# **1. Introduction**

## **1.1 Definition of the Bullwhip Effect in Supply Chains?**

According to the article (1997) of Lee, Padmanabhan & Wang the Bullwhip Effect describes the occurrence of a steady consumer demand of one product, “the demand orders variabilities in the supply chain were amplified as they moved up the supply chain”. One reason for this variability is the self-orientation of companies in solving their problems. The Bullwhip Effect is occurring in many industries and includes consequences like for example high stock levels, lower customer service, poor capacity utilisation, aggravated problems with demand forecasting as thus high costs and low levels of inter-firm trust. ([www.quickmba.com](http://www.quickmba.com)).

## **1.2 Description of the “Beer Game”**

The so called “Beer Game” is used as an illustration for the “Bullwhip Effect”. It is a “laboratory replica”(Senge, 1990) of real supply chain process including a four stage supply chain (retailer, wholesaler, distributor and factory). The task hereby is to produce and deliver beer according to the customers demand. To emphasize the importance of time one structural aspect is delay which is due to logistics and production time. Necessary rules are that the participants are not allowed to communicate with each other and order decisions are made on former orders from the downstream site. The aim of the “Beer Game” is to visualize the challenges within the supply chain (Lee, Padmanabhan, Whang, 1997).

## **1.3 Description of group process**

We were supposed to play the “Beer Game” for 70 days but due to time consuming confusions and miscalculations we finished the game on the 23 day. To sort out this disarrangement problem we decided to chose on person who was in charge of coordination each single step and day. However, it was hard to stick to the rules as some group members were confused and thus led to wrong calculations which infected the orders and thus the delivers of all parties.

Nevertheless, after some start-up problems, the group was establishing a well-structured process. In addition there was a good group dynamic development which included the support by the observers.

## 2. SWOT Analysis of the “Beer Game”

### Strengths:

The game gave us the change to face the bullwhip effect ourselves. A practical experience is lasting longer than just theoretical approaches.

### Weaknesses:

During the game, the players were not allowed to communicate, which lead to unpredictability of the following stages. Every order was not foreseeable in its amount and mainly a short term reaction, without strategic or long term planning. Peak effects followed, resulting in either storage or shortage. Therefore, the customer service was neglected. Additionally, we were not aware of the cost caused by storage and shortage. In comparison, a stock is preferable to a shortage, but we were lacking in strategies.

### Opportunities:

The biggest opportunities to change the outcomes can be find in a strategic planning and coordination, based on communication or trust. About day 20 we started a stabilization process to reduce shortages.

### Threats:

On other hand, the bullwhip and panic effects are likely to increase as fast term reaction. The poor customer service might lead to lose customers in reality. An interruption of the whole supply chain was a possible outcome for the following days after day 23.

Strengths	Weaknesses
<ul style="list-style-type: none"><li>• Experience of bullwhip effect</li></ul>	<ul style="list-style-type: none"><li>• Missing communication</li><li>• Unpredictability</li><li>• Poor customer service</li><li>• Sales company tried to increase a fixed demand of customers</li><li>• No cost observation</li></ul>
Opportunities	Threats
<ul style="list-style-type: none"><li>• Planning and coordination</li></ul>	<ul style="list-style-type: none"><li>• Panic effects/ bullwhip</li><li>• Lose customers</li><li>• Interrupt supply chain processes</li></ul>

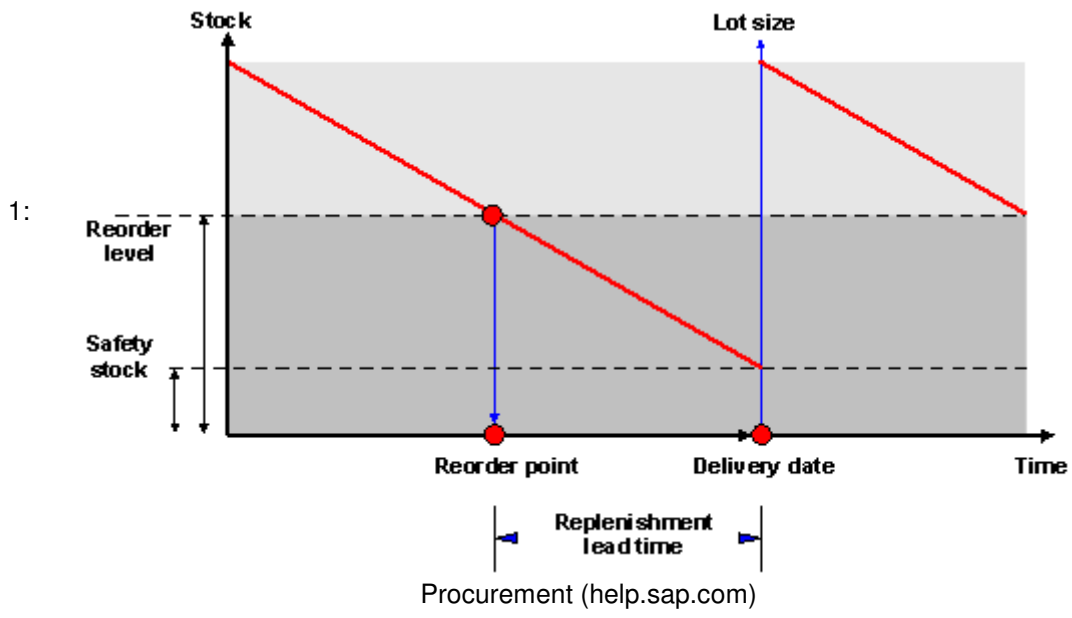
### **3. Group outcomes according to the “Beer game”**

It was difficult to predict the customers demand: one day it was 0, the next day it was 18. This circumstance caused appearance of excess stocks of beer or shortage. However, it was possible to influence the behavior of the following member of the supply chain by forming own orders. Nevertheless, to get response for an order took approximately 5 days to deliver the ordered amount. After noticing the tendency, the team tried to take it into consideration for further orders. The mistake, most done at the beginning was to overestimate the situation of customer’s demand, to analyze the situation by random case which mislead. To focus more on the general situation than on random cases in the supply chain is one main outcome. Furthermore, we realized the communication and coordination would have lead to more success.

### **4. Lessons learnt**

- Communication/coordination
- Stock and stable orders
- Organization inventory

Communication is the key factor for interacting between companies. As the stages in the beer game are interlinked and interdependent, communication and coordination of orders and strategies can avoid the bullwhip effect partly and lead to less extreme fluctuation within the supply chain. One outcome might be holding stock and stable ordering processes. This means more frequent orders, based on long- term expectancies and strategies, instead of risky short-term reactions and fluctuations. Holding a small stock is advisable, as it is less costly than shortage. This safety stock is the minimum level of stock providing capacity in the period between reordering and delivery of orders, also called replenishment time. Replenishment is a term, referring to organization inventory.

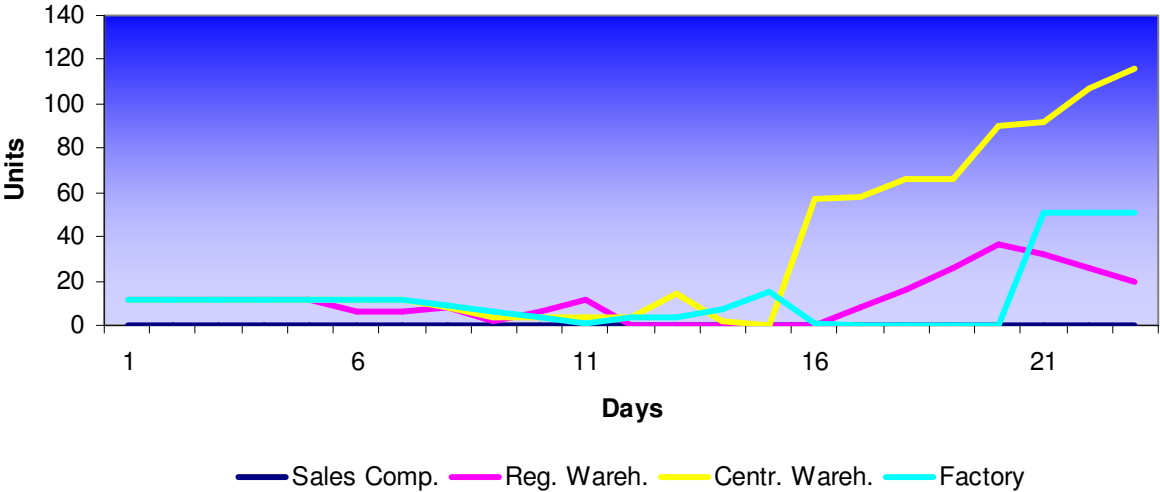


Figure

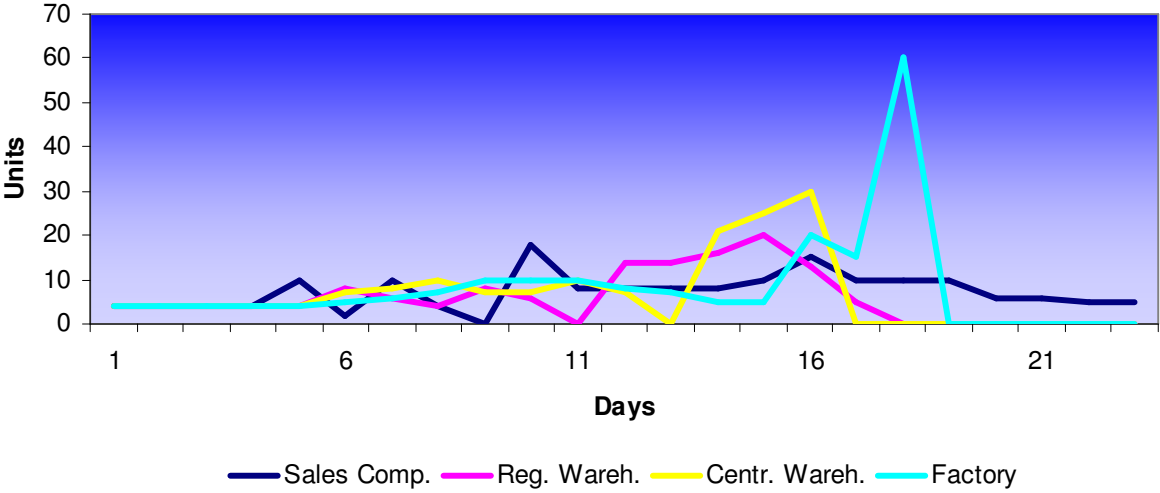
To sum up, as the supply chain is a chain, every element is interlinked and connected with each other in a direct or indirect way. To gain efficiency and appropriated supply, communication and coordination are the key figures for good customer service and low costs.

**Appendix**

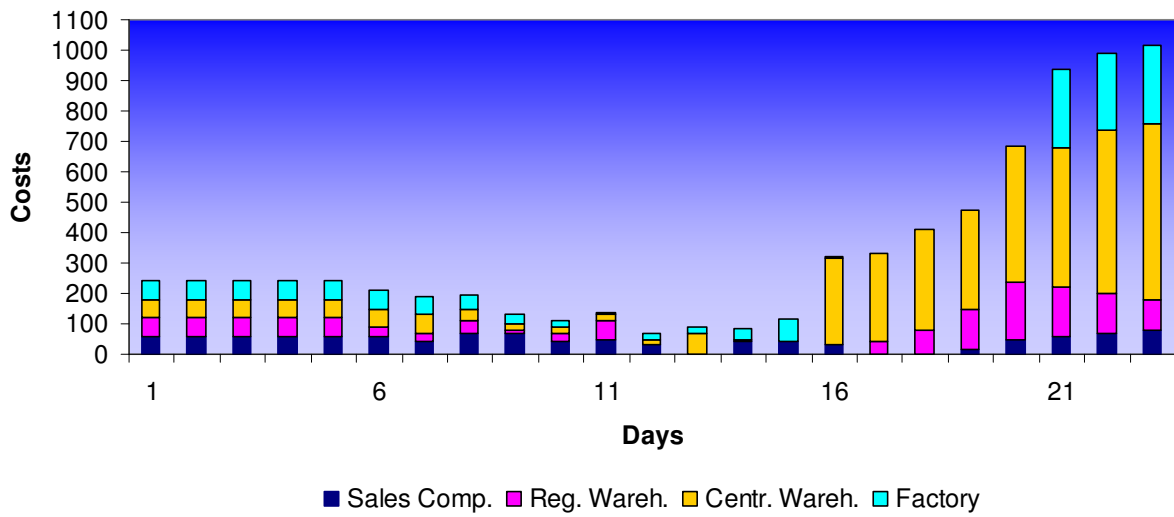
**Outgoing Stock**



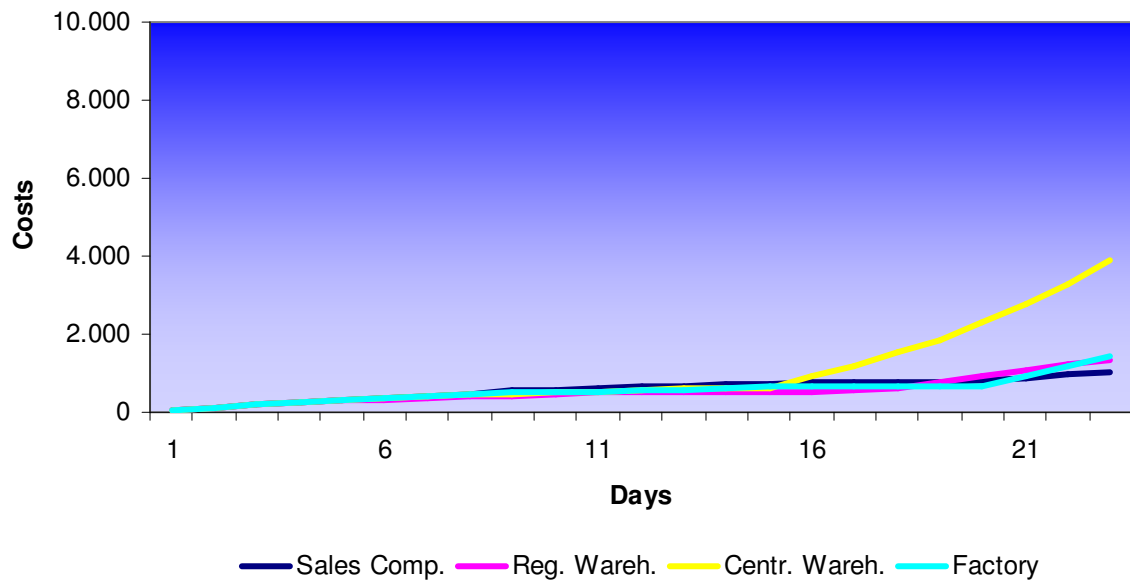
**Orders Placed**



### Daily Costs



### Beer Game - Cumulated Costs





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