IMPLEMENTING THE PRINCIPLES OF LOGISTICS IN CLOTHING TECHNOLOGY

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Abstract
Defined as the process of planning, implementing, and controlling the efficient, effective flow and storage of goods, services, and related information, from the point of origin to the point of consumption, in order to comply with customer requirements, logistics shows its crucial role in scientifically performance improvement of the manufacturing activity in the clothing industry.
The objective of this paper is to present the implications of implementing logistics principles in organizing textile production, in order to better understand, identify and eliminate the possible sources of perturbation.

Key words: LOGISTICS, PRINCIPLES, BULLWHIP EFFECT, $\sqrt{n}$, COOPERATION SUPPLIER – CUSTOMER, "COST EXPLOSION"

1. Introduction

We are tempted to say that „to produce" is the key to success in industrial and commercial business. But, being a „good manufacturer" and satisfying the consumer's demands is not enough: any company has suppliers, some of them being „the key" to successfully fulfilling the production goals. A factory is „successful" if its suppliers are „successful". The reality of production, especially that of the textile industry, shows that the most of the problems are not related to how everyday processes are carried on, but are related to the logistics, internal and external to the production process.
Defined as „the part of the process of product supplying which is planning, implementing and controlling the production flow and the effective and efficient storage of goods, services and information, from the origin point to the consumption point, in order to meet the customer requirements" [1], logistic is part of any textile company, through the ongoing interactions with suppliers, producers and consumers. Companies, as well as their customers, want a prompt answer to their request, in the most favorable terms of quality, price and compliance of expectations.
Unfortunately, we tend to say that logistics' costs. A necessary budget for this activity, in any business, easily shows that logistics "spends", largely affecting the benefits, without being able to distinguish a profit for each product. What would be the production or the quality in a company without logistics?
We are tempted to say that only production ensures the creation of „Added Value" in company, by processing raw materials in order to obtain the products. But we can say, based on our managerial experience, that the production success depends 90%, without exaggeration, of good logistic support, internal and external to company!
Therefore, the objective of this paper is to present the implications of implementing logistics principles in the manner of organizing textile production, in order to better understand, identify and eliminate the possible sources of perturbation.

2. Application of logistics in textile confection industry

We can consider that logistics is a science like any other, therefore we need principles. Seemingly banal, they demonstrate their importance in organizing the daily logistics, in some

cases, without the awareness of the managers. Once broken, however, can lead to serious abnormalities in the company. We will try to present them, as they are found in the textiles industry.

1.5.1 The Forrester Effect („Bullwhip effect")

In any supply chain, we meet a succession of technological stages, which starts with the raw material and ends with the finished product. For example, we can consider the technologic and logistic steps that go from cotton production and ends with customer purchasing a quantity of long-sleeved shirts, as a results of their desire to accomplish some of their needs. As we suspect, the demand of shirts will be influenced by seasonal effect, which will make any market disturbance to propagate upstream. As we go up, the disturbance will be more significant (Bullwhip Effect) [2],[3], as it can be seen in the figure below (Figure 1).

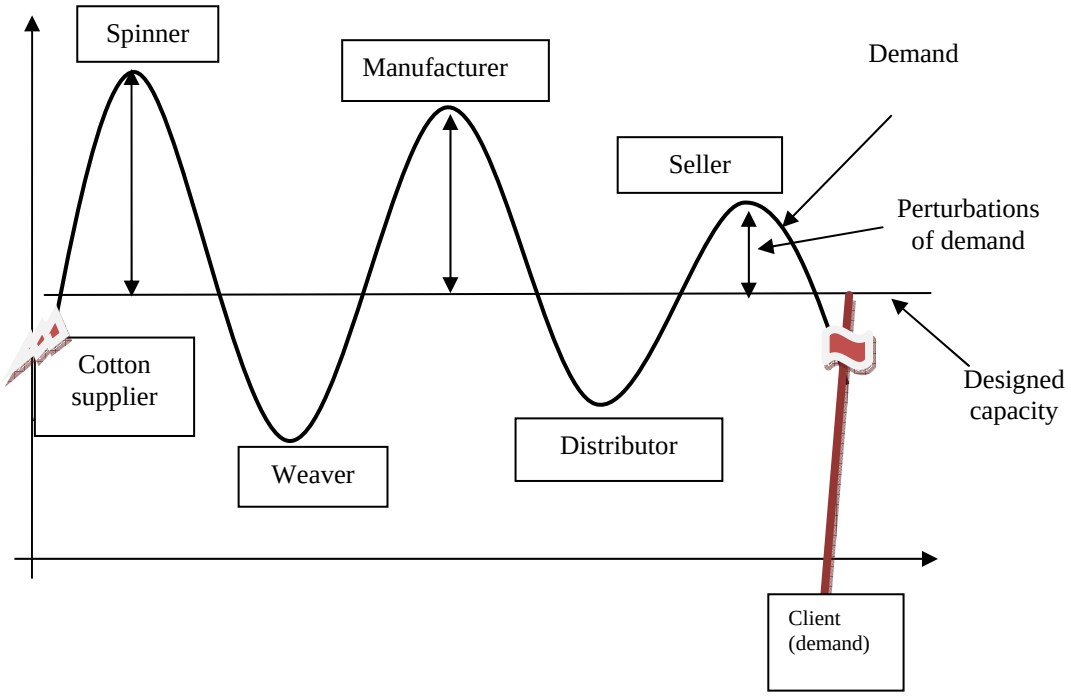

Figure 1. Forrester Effect („Bullwhip effect")

Upstream links are most likely exposed to the force of „whip", which is fully felt by the upstream links of the Romanian textile industry! We can note that the clothing industry is located approximately in the middle of Forrester effect influence.
We can customize the Forrester effect at internal logistic level, as shown next (Figure 2):

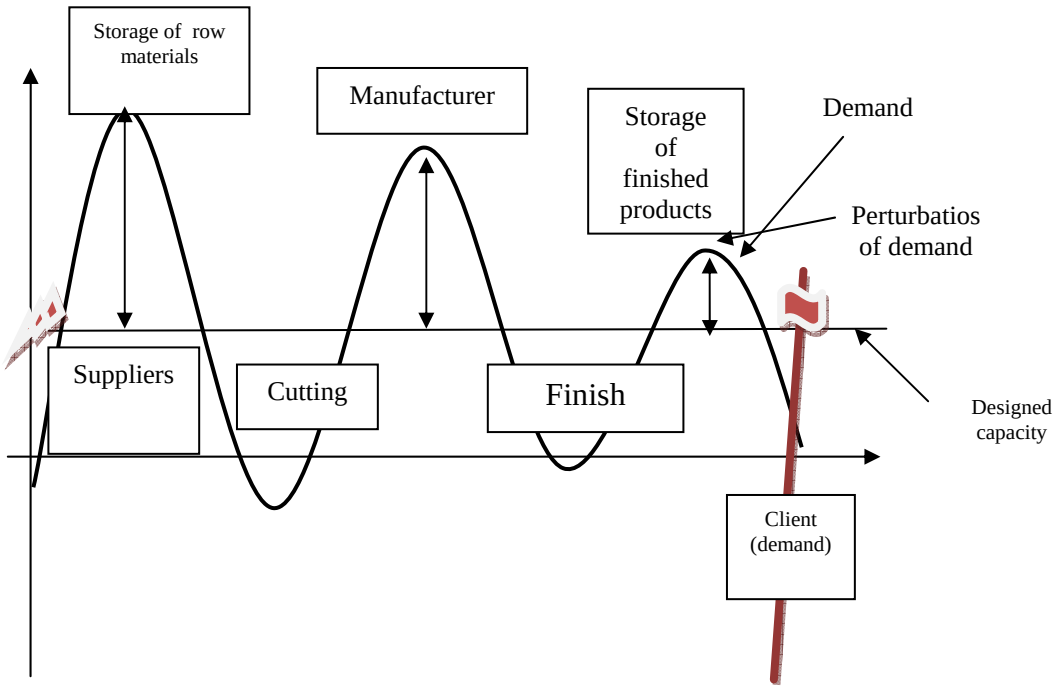

Figure 2 : Forrester Effect in confection processes

As shown in Figure 2, a disturbance in the demand of products (such as higher demand than the planned one / smaller than planned) spreads increasingly stronger toward the raw material supply, putting both warehouses and suppliers in the position to face problems as supplementing or reduction, in a short time, of the amount of needed row materials.

1.5.2 The principle of grouping goods/ products/ semi-finished products in the transport activity

Found in the literature under the terminology "transport massification" [4], [5] we are considering that this principle has its origins in "The principles of movement saving" of Ralph M. Barnes. In his paper, "Motion and Time Study: Design and Measurement of Work" from 1937, it is presented the "grouping" principle, referring to the movements economy of the production operator which is moving several objects from the place A instead of place B. If he succeeds grouping and transporting them in this manner, he would save energy and time (and the company money...)!

In the transport activity, we admit that we need to do transport the goods from point A to point B. It is logical to consider the transportation costs, the expenses being determinate by the means of transport (truck, train, plane, ship, etc..) and by the distance between A - B and the transport capacity. We can find situations where transportation cost is not directly proportional to distance or volume of materials.

For example, if it is not uses the full capacity of the vehicle, it consumes the same energy amount, which, distributed to each unit of transported product, will increase the unit cost! Similarly, the unit cost is higher on shorter distances than on longer distances (situation caused, for example, by the cost of loading / unloading)!

Therefore, this principle demonstrates the lack of direct proportionality between the unit cost of transportation, the material volume and the distance.
For this reason, in the textile confection industry we can find this principle in all technological stages:
- In materials supplying / warehouse;
- In cutting department (Cutting the batch of products, not on the unit);
- In confection (flows of packets with semi- finished products, not individual products);
- Etc..

1.5.3 Principle $\sqrt{n}$

We are considering **n** similar warehouses, each of them having a security stock s. If we group these deposits, then the security stock will not be **s x n**, but $s\sqrt{n}$!
Similarly, if we consider the variability of an demand as **σ**, which requires a safety stock **s**, the variability for **n** time periods will not be $\sigma \times n$, but $\sigma\sqrt{n}$ and the safety stock will not be $s \times n$, but $s\sqrt{n}$. [6]
In practice, this principle justifies the central warehouses/ central storages/ high volume supply centre for commerce, production or transportation. Regrouping goods for different entities into a single storage, the volume and variability of safety stock will go lower. These centralized storage structures will also facilitate the implementing of goods grouping principle, which can outline a corollary: large deposits are more profitable than small ones!
For this reason, textile companies are making efforts to have unique storage of raw materials and finished products, regardless if the physical space can allow more storage locations.

1.5.4. The principle of „cost explosion" at the base of logistics tree

When it comes to distribute a quantity of products to many destinations, we can approach the problem as arborescence. Imagine an example, a textiles factory:

- A tailor takes a pack of fabric. We can assign a specific cost for this action (time spent x hourly labour);
- The same amount of fabric, cut into parts this time, is taken in 8 packages, in 8 different transportations by a feeder. The cost will be eight times bigger;
- The 8 packages are divided into 64 groups of items that will be manipulated by 4 different feeders on 4 technological lines, in 4 job places;
- The transportation costs had already "exploded"!

And the analyzed situation may continue:

- A distributor takes from the warehouse 1,000 textile products, with a truck. Will be registered a specific cost for the transportation from the manufacturer to its central warehouse;
- Suppose that in the central warehouse, goods will be grouped in lots of 100 pieces, which will be distributed (among other products, according to the grouping principle ...) to 10 different stores. Unit costs of transportation for our product will already "explode";
- The "explosion" grows ample if we consider how much each customer spends on transportation, after purchasing these products, from shop at home!

As shown in this presentation of logistic for production and distribution of textiles, it is used an arborescence logistic, from a primary source (the top of the arborescence) to the consumers. As we get closer to the final point of consumption (the base of the arborescence), the total costs of transportation are multiplying, getting the size of an "explosion"[7].

1.5.5. Principle of cooperation supplier – customer

In the market economy, any company is seeking profit and can say that this desire is not reprehensible! Therefore, negotiation, competition and fighting for market share are on a daily basis in any economic field. We can note that issues such as cooperation or mutual assistance do not fit in this fight.
Considering that in a business relation supplier – producer there is a P profit margin, we expect each part to win P / 2. Reality shows us that profits are rarely shared equally, one of the parts usually gaining more than the other. Each part is engaging in "fighting" a whole arsenal of negotiating strategies, noting that being a good producer is not everything nowadays.
When a provider unduly increase its products price (in order to increase profit), the manufacturer is recording a higher production cost, therefore its production is likely to become uncompetitive on the market. If this situation continues, it is possible that the manufacturer goes bankrupt, which will affect its suppliers from at least two viewpoints:

- Being bankrupt, the manufacturer will not make payments to suppliers;
- Being bankrupt, suppliers are losing a customer.

Everyday reality shows us that companies have in time reliable suppliers and customers, establishing with them preferential trade relations, based more on cooperation than on maximizing profits. The on-line contact and preferential relations between parts are ordinary, cooperation getting stronger in time, based on criterions as:

- The physical distance between supplier - manufacturer - client;
- Regularity of deliveries;
- The profit achieved by cooperation between parts;
- The quality of the work;
- Trust and reliability proved over the contracts;
- Etc..

In the specific case of the textiles industry in Romania, are involved particular issues, such as:

- Most of textile engineers / managers of textile companies are former graduates of the most representative higher education institution in the textile field from Romania - Faculty of Textiles - Leather of UT Iasi;
- Principles, techniques and procedures applied in the current work are largely common, result of the same program of training and specialization;
- Managers know each other, although formally are competitors on the same market. They are actually friends and cooperate at every link, thus diminishing the perturbations;

3. Conclusions

Analysis of the application of logistic principles in textiles industry leads to the following conclusions:

- The Forrester effect is felt fully due to multiple consumer market turbulence;
- Application of the principle of goods grouping becomes increasingly difficult in terms of reducing the volume of products and impossible to apply to unique products;
- The principle leads to rationalization of warehouses location in companies;
- The "explosion" of logistic costs at the base of technological arborescence leads to rationalization of the production flow, eliminating links that brings additional costs;
- Cooperation between supplier and producer is one of the keys to success of the whole technological chain upstream - downstream.

Often empirically applied, these logistic principles represents a source of productivity and profits for managers, but insufficiently used in many cases.

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