Order management empowering entrepreneurial partnerships in the context of new technologies

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Abstract. The expansiveness of latest generation technologies triggers manufacturers from different industry sectors more complex situations in order management with various loyal customers and occasional customers. More specifically, orders variations in logistics chain make it difficult to achieve entrepreneurial partnerships in the context of new technologies integrated into automotive and wind industry processes, which hinders getting major investments. Within this framework, the research team investigates the bottlenecks in the supply chain and indicates some rules and methods to solve the desynchronizations and fluctuations caused by the constraints of cutting-edge technologies. The paper aims to solve order management problems based on both an algorithm and an implementation in SAP. Also, in the paper, a conceptual model is created for the user whose basic task is the management of the entrepreneurial orders. Solutions identified based on the algorithm offers an order management plan by optimally adjusting inventories to deal with any kind of orders, thus achieving a profitable entrepreneurial approach between the two partners.

1. Introduction

Lately, a wide range of industries have focused their competitive strategies on mobilizing the skills and innovative capabilities that are found in the groups of customers and suppliers that make up their business supply chain. Considerable efforts have also been invested in quality management models, application of information technologies and procedural and organizational reengineering. Most of businesses have searched with confidence in supply chain management to provide new insights into new sources of competitive advantage [1]. A company that is in partnership with the supply chain can influence its performance in terms of the superiority of the new product through its entrepreneurial orientation. According to a complex study from the current literature, entrepreneurial thinking contributes positively to the superiority of the new product. Businesses can learn from their partners in the downstream supply chain, as they can directly increase performance and further strengthen the positive influence of entrepreneurial leadership on the superiority of the new product. It is worth noting that the merits of entrepreneurial guidance on the top-down of products diminish under three conditions: greater technological uncertainty, growing company age and reduced learning by supply chain partners [2]. The entrepreneurial orientation of a distributor positively mitigates the relationships between the co-operative factors and the acquisition of knowledge of a producer, implying that the strengthening of the entrepreneurial orientation of the distributor can improve the efficiency of the cooperation [3]. In academic research, within this complex field an extensive literature on partner selection criteria have been revised to show that adequate research from entrepreneurial firms is
lacking. There are also various recommendations for business firms in choosing companies established as alliance partners [4]. It can be argued that firms with specialized resources, entrepreneurial orientation and local collaborations of partners gain competitive post-privatization advantage [5].

Taking into account all aspects of the extensive research study, the research team has sought to find feasible solutions for preventing variations in logistics chain orders so that it can achieve entrepreneurial partnerships.

The expansiveness of cutting-edge technologies of composite materials used in manufacturing parts with special technical characteristics both in the automotive and wind sectors has generated major changes in quality standards and parameters in delivering entrepreneurial contracts between main suppliers, intermediary suppliers and customers. Countering divergences between logistics chain links has influenced a new approach by which any chain link optimizes investment to ensure product quality and profit maximization, being challenged to make decisions by which the stocks held are properly dimensioned. The impulse offered by new technologies has enabled product variants to be diversified, offering consumers a much wider choice of products, also influencing unexpected transit of loyal customers [6]. This situation causes chain links to face increasingly sophisticated supply issues, such that making entrepreneurial partnerships creates an optimal flow of orders in the context of new technologies and offers new solutions for synchronizing variations between chain links. Cutting-edge technologies, current market requirements, and sudden changes in consumer preferences have prompted the development of ever-more complex collaborative relationships between logistics chain links for entrepreneurial order management [7].

Regardless of the challenges imposed by market changes, consumer buying behaviour and the emergence of state-of-the-art technologies, chain links in any logistics chain need to deliver a continuous flow of supply to manage a much larger order run. In this respect, the realization of the entrepreneurial partnerships in the logistic chain implies certain rules and methods, which control the variations imposed by challenges mentioned above.

2. Solving entrepreneurial orders issues

Speeding strategies of the new global economic environment have increasingly integrated more scientific concepts to solve the problems of managing entrepreneurial orders. Industrial organizations provide their competitive advantage through low costs and a high level of customer service. Basically, the necessary materials are planned to ensure the availability of the material, which is used to purchase or produce the necessary quantities in time, both for internal purposes and for sales and distribution. This process involves stocks monitoring and in particular, the creation of automatic procurement proposals for production. The realization of this process presupposes the support of the complete computerized link between production and distribution [8].

The study conceived in this paper shows how order management based on an algorithm using DBR (Drum-Buffer-Rope) philosophy and an implementation in the SAP system (Systems, Applications and Products for data processing) can manage production and processing logic to produce and assemble composite material parts needed both in the automotive and wind domain. More specifically, ERP systems are designed to connect integrally the departments of a business organization, namely to automate the flow of information from the purchasing, production, warehouse, delivery departments. ERP systems allow the procurement of raw materials to be planned in connection with production orders and deliveries available in warehouses, so that customer deliveries are made on a regular basis. Thus, the process of purchasing, storing and redistribution of raw materials or finished products is simplified. For example, in order to complete the manufacturing process, the SAP system, through Bill of Material (BOM), ensures that raw materials from the last level are purchased for the purpose of manufacturing the necessary subassemblies, then the other necessary procurement assures the final assembly of the finished product (Figure 1).
The acquisition process in SAP ERP is more efficient than traditional due to traceability and improved step automation. This facilitates purchase within the required plans, complete inventory management and reporting of all activities. In addition to facilitating access to vendor management tools, the system allows the selection and evaluation of suppliers and contracts negotiation [8].

3. Leveling entrepreneurial orders
DBR leveled entrepreneurial order along the logistics chain through safety stocks that are placed and dimensioned to protect the rhythm of each individual link in the supply chain. The purpose of using the DBR solution for dimensioning the intermediary stock is to protect the chain links against orders variations within the supply chain, provided the same rhythm is maintained at every link in the logistics chain. To illustrate this, the research team proposes a calculation model based on the DBR philosophy described by Goldratt (2003) and Cox et al (2003) through safety stock target (Tb) and safety stock status (Sb) [9-11].

The research team based on the study conducted between May and October 2016, data on the number of pieces produced by Link X for Client A, Client B, Client C and Client D were collected, these being current customers within a company that produces pieces from latest generation of composite materials (Figure 2).

For balancing the continuous flow of composite materials required for the production of the parts, for Current Customers and to ensure a logistic flow of composite materials in the production of the parts, for Occasional Customers, it is applied a sizing formalism by placing a safety stock at each supplier, respectively Supplier Y, Supplier Z, Supplier W.

**Figure 1. BOM for 10 pieces A RS4 B7**

**Figure 2. Orders fluctuation for Current Customers**
For Current Customers placement of composite material orders is processed once a week. The replenishment of composite material stocks is performed at the same time from the three suppliers because the pieces manufactured by the Chain Link X requires combinations of composite material to obtain necessary piece technical configuration (Table 1- Table 6). The tables presented in this paper have been adapted [12].

**Table 1. Glass Fiber order from Supplier Y for Current Customers**

| Time phases for placing glass fiber order |       |       |       |       |       |       |       |       |       |       |       |       |
|-----------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Min.                                    | Max.  |       |       |       |       |       |       |       |       |       |       |       |
| 5 rolls                                 | 20 rolls |       |       |       |       |       |       |       |       |       |       |       |
| Delivery time 1 week                    |       |       |       |       |       |       |       |       |       |       |       |       |
| Week                                    | 0     | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | 11    | 12    |
| Consumption                             | 0     | 0     | 0     | 3     | 4     | 2     | 1     | 0     | 3     | 3     | 4     | 3     | 5     |
| Stock held                              | 10    | 10    | 10    | 7     | 3     | 1     | 20    | 20    | 17    | 14    | 10    | 17    | 12    |
| Receive order                           | 0     | 0     | 0     | 0     | 20    | 0     | 0     | 0     | 0     | 10    | 0     | 0     |       |
| Placing new order                       | 0     | 0     | 0     | 0     | 20    | 0     | 0     | 0     | 0     | 10    | 0     | 0     |       |

In week 3 for Client B, Customer C and Client D, 3 glass fiber rolls and 3 carbon fiber rolls were consumed to produce 10 pieces of A RS4 B7. Glass fiber requires a 100m² surface veil roll of 35g / m² and the carbon fiber weighs 200g / m², width 100cm / 100ml, thickness 0.32mm, and twill fabric 2/2 (Table 1, Table 2).

**Table 2. Carbon Fiber order from Supplier Z for Current Customers**

| Time phases for placing carbon fiber order |       |       |       |       |       |       |       |       |       |       |       |       |
|-------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Min.                                      | Max.  |       |       |       |       |       |       |       |       |       |       |       |
| 10 rolls                                  | 35 rolls |       |       |       |       |       |       |       |       |       |       |       |
| Delivery time 1 week                      |       |       |       |       |       |       |       |       |       |       |       |       |
| Week                                     | 0     | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | 11    | 12    |
| Consumption                              | 0     | 0     | 0     | 3     | 9     | 6     | 3     | 2     | 5     | 7     | 4     | 3     | 2     |
| Stock held                               | 15    | 15    | 15    | 12    | 3     | 17    | 14    | 12    | 7     | 25    | 21    | 18    | 16    |
| Receive order                            | 0     | 0     | 0     | 0     | 20    | 0     | 0     | 0     | 25    | 0     | 0     | 0     | 0     |
| Placing new order                        | 0     | 0     | 0     | 0     | 20    | 0     | 0     | 0     | 25    | 0     | 0     | 0     | 0     |

**Table 3. Glass Fiber order from Supplier Z for Current Customers**

| Time phases for placing glass fiber order |       |       |       |       |       |       |       |       |       |       |       |       |
|-----------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Min.                                    | Max.  |       |       |       |       |       |       |       |       |       |       |       |
| 15 rolls                                 | 25 rolls |       |       |       |       |       |       |       |       |       |       |       |
| Delivery time 1 week                     |       |       |       |       |       |       |       |       |       |       |       |       |
| Week                                    | 0     | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | 11    | 12    |
| Consumption                             | 0     | 0     | 0     | 3     | 4     | 0     | 3     | 5     | 3     | 4     | 0     | 0     |       |
| Stock held                              | 10    | 10    | 10    | 7     | 3     | 3     | 0     | 15    | 12    | 9     | 5     | 15    | 15    |
| Receive order                           | 0     | 0     | 0     | 0     | 0     | 20    | 0     | 0     | 0     | 10    | 0     | 0     |       |
| Placing new order                       | 0     | 0     | 0     | 0     | 20    | 0     | 0     | 0     | 10    | 0     | 0     | 0     |       |
| Week | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|------|---|---|---|---|---|---|---|---|---|---|----|----|----|
| **Consumption** | 0 | 3 | 4 | 5 | 6 | 3 | 9 | 2 | 3 | 2 | 2 | 4 |
| **Stock held** | 25 | 22 | 18 | 15 | 10 | 4 | 1 | 17 | 15 | 12 | 10 | 8 | 24 |
| **Receive order** | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 20 | 0 |
| **Placing new order** | 0 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 20 | 0 | 0 |

| Week | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|------|---|---|---|---|---|---|---|---|---|---|----|----|----|
| **Consumption** | 0 | 0 | 0 | 3 | 2 | 0 | 8 | 0 | 5 | 0 | 4 | 3 | 3 |
| **Stock held** | 18 | 18 | 18 | 15 | 13 | 13 | 5 | 25 | 20 | 20 | 16 | 13 | 25 |
| **Receive order** | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Placing new order** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 |

| Week | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|------|---|---|---|---|---|---|---|---|---|---|----|----|----|
| **Consumption** | 0 | 3 | 4 | 5 | 5 | 3 | 0 | 5 | 3 | 2 | 0 | 1 |
| **Stock held** | 20 | 17 | 13 | 10 | 5 | 0 | 12 | 12 | 6 | 3 | 11 | 11 | 10 |
| **Receive order** | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 10 | 0 | 0 | 10 |
| **Placing new order** | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 10 | 0 | 0 | 10 |

**Table 4.** Carbon Fiber order from Supplier W for Current Customers

**Table 5.** Glass Fiber order from Supplier W for Current Customers

**Table 6.** Kevlar order from Supplier W for Current Customers

**Chain Link X** decide on the replenishment time for safety stock and takes into account following the three notifications:

- The **green signal** does not create another order.
- The **yellow signal** creates the order and sends it to the suppliers.
- At the **red signal** the safety stock has already been replenished.

The replenishment time for the safety stock is calculated through Safety Stock Target (Tb) and Safety Stock Status (Sb) [9], [10]. The algorithm for dimensioning the safety stock is based on the formula:

\[
Tb = DLT \times \frac{MO}{UoLT} \times SP
\]

Safety Stock Target Supplier Y (Tb_Y) for Glass fiber (G)

\[
Tb_Y^G = 1 \text{ week} \times \frac{25}{1 \text{ week}} \times 150\% = 37,5
\]
Safety Stock Target Supplier Z (Tbz) for Carbon fiber (C) and Glass fiber (G).

\[
Tb^{ZC} = 1 \text{ week} \times \frac{30}{1 \text{ week}} \times 150\% = 45
\]

\[
Tb^{ZG} = 1 \text{ week} \times \frac{20}{1 \text{ week}} \times 150\% = 30
\]

Safety Stock Target Supplier W (Tbw) for Carbon fiber (C), Glass fiber (G) and Kevlar (K).

\[
Tb^{WC} = 1 \text{ week} \times \frac{15}{1 \text{ week}} \times 150\% = 22,5
\]

\[
Tb^{WG} = 1 \text{ week} \times \frac{30}{1 \text{ week}} \times 150\% = 45
\]

\[
Tb^{WK} = 1 \text{ week} \times \frac{25}{1 \text{ week}} \times 150\% = 37,5
\]

Safety Stock Status (Sb) it is refers to the level of security stock at one time and is based on the formulas:

\[
\text{Percentage } \% \times Sb^{yellow} = \frac{MO}{Tb} \times 100
\]

(2)

\[
MO^{daily} = \frac{MO}{7}
\]

(3)

\[
\text{Percentage } \% \times Sb^{red} = \frac{MO^{daily}}{Tb} \times 100
\]

(4)

It is calculated
• the Stock Status for yellow color (Sbyellow) (formula 2),
• the Stock Status for red color (Sbred) (formula 4) which is calculated according to the average daily order according to formula 3.

| Table 7. Sizing the safety stock for Supplier Y for Current Customers |
|-----------------|-----|---|-----|---|------|-----------------|---|
| Supplier Y     | MO  | DLT| SP  | Tb | Sbyellow | Consumption rhythm | Sbred |
| Glass fiber    | 25  | 1 week | 150\% | 37,5 | 66,66\% | 3,57/zi | 9,52\% |

| Table 8. Sizing the safety stock for Supplier Z for Current Customers |
|-----------------|-----|---|-----|---|------|-----------------|---|
| Supplier Z     | MO  | DLT| SP  | Tb | Sbyellow | Consumption rhythm | Sbred |
| Carbon fiber   | 30  | 1 week | 150\% | 45 | 66,66\% | 4,28/zi | 9,51\% |
| Glass fiber    | 20  | 1 week | 150\% | 30 | 66,66\% | 2,85/zi | 9,5\% |

| Table 9. Sizing the safety stock for Supplier W for Current Customers |
|-----------------|-----|---|-----|---|------|-----------------|---|
| Supplier W     | MO  | DLT| SP  | Tb | Sbyellow | Consumption rhythm | Sbred |
| Carbon fiber   | 15  | 1 week | 150\% | 22,5 | 66,66\% | 2,14/zi | 9,51\% |
| Glass fiber    | 30  | 1 week | 150\% | 45 | 66,66\% | 4,28/zi | 9,51\% |
| Kevlar         | 25  | 1 week | 150\% | 37,5 | 66,66\% | 3,57/zi | 9,52\% |

For Occasional Customers, placement of composite material orders is processed every 2 weeks. As with Current Customers orders, the replenishment of composite materials is made at the same time from the three suppliers because the parts manufactured by Chain Link X requires combinations of composite material to obtain the required technical configuration. Placement of orders
every two weeks does not increase the investment and the materials are not kept in stock for too long. (Table 10 – Table 15)

**Table 10.** Glass Fiber order from Supplier Y for Occasional Customers

| Time phases for placing glass fiber order |      |      |      |      |      |      |      |      |      |      |      |
|-----------------------------------------|------|------|------|------|------|------|------|------|------|------|------|
| Min. Max.                               | 5 rolls | 20 rolls |
| Delivery time 2 weeks                   |      |      |      |      |      |      |      |      |      |      |      |
| Week                                    | 0    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
| Consumption                             | 0    | 0    | 0    | 3    | 4    | 2    | 1    | 0    | 3    | 3    | 4    |
| Consumption for Occasional Customers    | 5    |      |      |      |      |      |      |      |      |      |      |
| Stock held                              | 10   | 10   | 10   | 7    | 3    | 1    | 20   | 30   | 22   | 19   | 25   |
| Receive order                           | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 10   | 0    | 0    |
| Placing new order                       | 0    | 0    | 0    | 0    | 20   | 0    | 0    | 0    | 0    | 10   | 0    |
| Placing occasional order                | 10   |      |      |      |      |      |      |      |      |      |      |

**Table 11.** Carbon Fiber order from Supplier Z for Occasional Customers

| Time phases for placing carbon fiber order |      |      |      |      |      |      |      |      |      |      |      |
|------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|
| Min. Max.                                | 10 rolls | 35 rolls |
| Delivery time 2 weeks                    |      |      |      |      |      |      |      |      |      |      |      |
| Week                                     | 0    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
| Consumption                             | 0    | 0    | 0    | 3    | 9    | 6    | 3    | 2    | 5    | 7    | 4    |
| Consumption for Occasional Customers     | 3    | 5    |      |      |      |      |      |      |      |      |      |
| Stock held                               | 15   | 15   | 15   | 12   | 10   | 24   | 18   | 16   | 11   | 24   | 25   |
| Receive order                            | 0    | 0    | 0    | 0    | 20   | 0    | 0    | 0    | 25   | 0    | 0    |
| Placing new order                        | 0    | 0    | 0    | 0    | 0    | 25   | 0    | 0    | 0    | 0    | 5    |
| Placing occasional order                 | 7    |      |      |      |      |      |      |      |      |      |      |

**Table 12.** Glass Fiber order from Supplier Z for Occasional Customers

| Time phases for placing glass fiber order |      |      |      |      |      |      |      |      |      |      |      |
|------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|
| Min. Max.                                | 15 rolls | 25 rolls |
| Delivery time 2 weeks                    |      |      |      |      |      |      |      |      |      |      |      |
| Week                                     | 0    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
| Consumption                             | 0    | 0    | 0    | 3    | 4    | 0    | 3    | 5    | 3    | 3    | 4    |
| Consumption for Occasional Customers     | 5    | 3    |      |      |      |      |      |      |      |      |      |
| Stock held                               | 10   | 10   | 10   | 7    | 3    | 3    | 0    | 15   | 12   | 9    | 5    |
| Receive order                            | 0    | 0    | 0    | 0    | 0    | 20   | 0    | 0    | 0    | 10   | 0    |
**Table 13. Carbon Fiber order from Supplier W for Occasional Customers**

| Time phases for placing carbon fiber order | 15 | 5 |
|------------------------------------------|----|---|
| Placing new order                        | 0 0 0 0 0 0 20 0 0 0 0 10 0 0 0 |
| Placing occasional order                 | 15 | 5 |

| Delivery time 2 weeks                     | |
|------------------------------------------|---|
| Week                                     | 0 1 2 3 4 5 6 7 8 9 10 11 12 |
| Consumption                              | 0 3 4 3 5 6 3 9 2 3 2 2 4 |
| Consumption for Occasional Customers     | 7 15 |
| Stock held                               | 25 22 18 15 10 4 1 17 15 12 23 6 22 |
| Receive order                            | 0 0 0 0 0 0 0 25 0 0 0 0 20 0 |
| Placing new order                        | 0 0 0 0 0 25 0 0 0 0 20 0 0 |
| Placing occasional order                 | 20 |

**Table 14. Glass Fiber order from Supplier W for Occasional Customers**

| Time phases for placing glass fiber order | |
|------------------------------------------|---|
| Min.                                     | |
| Max.                                     | |
| 10 rolls                                 | 25 rolls |
| Delivery time 2 weeks                    | |
| Week                                     | 0 1 2 3 4 5 6 7 8 9 10 11 12 |
| Consumption                              | 0 0 0 3 2 0 8 0 5 0 4 3 3 |
| Consumption for Occasional Customers     | 12 |
| Stock held                               | 18 18 18 15 13 13 5 25 20 20 16 13 25 |
| Receive order                            | 0 0 0 0 0 0 0 20 0 0 0 0 0 0 0 |
| Placing new order                        | 0 0 0 0 0 0 0 0 0 0 0 0 0 15 0 |
| Placing occasional order                 | 12 |

**Table 15. Kevlar order from Supplier W for Occasional Customers**

| Time phases for placing kevlar order     | |
|------------------------------------------|---|
| Min.                                     | |
| Max.                                     | |
| 10 rolls                                 | 20 rolls |
| Delivery time 2 weeks                    | |
| Week                                     | 0 1 2 3 4 5 6 7 8 9 10 11 12 |
| Consumption                              | 0 3 4 3 5 5 3 0 5 3 2 0 1 |
| Consumption                              | 5 5 |
Placement of composite material orders is processed every 2 weeks because this is the way material is optimally rolled out and Chain Link X has no excess inventory for a long time. The replenishment time for the safety stock for occasional order is calculated through Safety Stock Target (Tb) and Safety Stock Status (Sb) [9], [10]. For this case are used the formulas for replenishment time of safety stock also applied for Current Customers (Formulas 1, 2, 3, 4).

| Supplier Y | MO | DLT | SP | Tb | $S_{b\text{yellow}}$ | Consumption rhythm | $S_{b\text{red}}$ |
|------------|----|-----|----|----|---------------------|-------------------|---------------|
| Glass fiber | 25 | 2 weeks | 150% | 37,5 | 66.66% | 1,78/zi | 14.26% |

| Supplier Z | MO | DLT | SP | Tb | $S_{b\text{yellow}}$ | Consumption rhythm | $S_{b\text{red}}$ |
|------------|----|-----|----|----|---------------------|-------------------|---------------|
| Carbon fiber | 30 | 2 weeks | 150% | 45 | 66.66% | 2,14/zi | 14.26% |
| Glass fiber | 20 | 2 weeks | 150% | 30 | 66.66% | 1,42/zi | 14.23% |

| Supplier W | MO | DLT | SP | Tb | $S_{b\text{yellow}}$ | Consumption rhythm | $S_{b\text{red}}$ |
|------------|----|-----|----|----|---------------------|-------------------|---------------|
| Carbon fiber | 15 | 2 weeks | 150% | 22,5 | 66.66% | 1,07/zi | 14.26% |
| Glass fiber | 30 | 2 weeks | 150% | 45 | 66.66% | 2,14/zi | 14.26% |
| Kevlar | 25 | 2 weeks | 150% | 37,5 | 66.66% | 1,78/zi | 14.26% |

For Supplier W dimensioning the safety stock for Kevlar, with a Tb of 25 orders, notify that yellow stock is 66.66%. The signal recorded for red stock at 14.26% requires emergency to refill the stock. Specifically, reaching 14.26% is the moment when the rope valve is pulled and acceleration plans for the material reception needs to be executed immediately. (Table 18) Orders for suppliers are sized with an average value, taking into account the average consumption and frequency set, for placing the order. In this way, through this control mechanism, the material is available at the right time for Occasional Customers, while offering material availability for Current Customers.

The dimensioning the safety stock minimizes "Customer Risk" by providing the right mix of composite material at the right time for both Current Customers and Occasional Customers.

4. Conclusions and future work
The algorithm provides a synchronized process regarding the frequency of composite materials used, through which the intermediary supplier Chain Link X can offer at any moment the most appropriate technical combination. The applicability of the proposed solution offers a customized model of collaboration between the three selected suppliers and the intermediary supplier Chain Link X for Current Customers and Occasional Customers.
The algorithm solved the dimensioning of certain safety stocks of the necessary materials for the production of the parts, ensuring a continuous flow of special raw materials for **Current customers and Occasional Customers** and contributed to the choice of the optimal combination of composite material in making a specific piece for automotive industry (Figure 3). The result of using the algorithm ensures material rolling, reduces storage costs and minimizes product risk.

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