RUNNING A BUSINESS THROUGH A SHARING RESPONSIBILITIES (AND PROFITS) STRATEGY

Leonard Călin ABRUDAN [a*], ***Mirabela Constanța MATEI*** [b], ***Maria Madela ABRUDAN*** [c]

[a] *University of Oradea, Faculty of Economics, Oradea, Romania*
[b] *University of Oradea, Faculty of Economics, Oradea, Romania*
[c] *University of Oradea, Faculty of Economics, Oradea, Romania*

ABSTRACT
The paper aims to identify and evaluate methods, processes, and activities through which a business may evolve, in terms of selling, market share and, eventually, profit. There are many types of economic activities and not all of them perform at the same level at specific moments. The paper will try to find out if sharing the activities and responsibilities comprised by an economic process may end in a higher level of profit for all participants. It will be about considering a way of sharing these responsibilities, which had gained significantly in the late years, in terms of reputation, know-how and theoretical consideration. This type of business conduct is drop shipping and for it is unusual to hold inventory. In terms of being responsible to her clients, sometimes a drop shipper has to give up the routine, to get out from the comfort zone and to try to find new ways in which she can provide superior utility for the customers and profits both for her and her suppliers. The problem here is that the inventory bears costs, many of them, and the paper will try to model an optimum sizing for the quantity that must be purchased in this respect. The newsvendor model will be applied to a real company in an empirical approach and hopefully, some useful outcomes will result. The scientific literature is not concerning much about this usage of this particular model and this paper will try to help entrepreneurs to find and use another instrument, which may prove useful. In a globalized economy, every useful item could make the difference between a company and its competitors.

KEYWORDS: *drop shipping, inventory, newsvendor model, profit.*

1. INTRODUCTION

0.48 seconds were enough to reveal more than 101,000,000 results of a simple Google search by the keyword *drop shipping*. AliExpress, Shopify, Oberlo, Wyseshop, dhgate, bigbuy, to present only a few names, most of them very well known already on the market. There are, also, Romanian names such as gomag.ro or smartbill.ro.
All these are signs that the term presented above is nowadays a significant category in the markets. There are, also, some theoretical approaches, many of them simple advertorials, which are trying to explain the type, the instruments, the methods through this manner of conducting business really works.
Despite the large interest shown by the market players, regarding this kind of economic activity, there are few scientific approaches in this field of research.
Kenny (2006), Hawk (2016) are just two authors who tried to take drop shipping to an easier to understand level, as popular science. Many other researchers, with a more scientific manner, tried to set some benchmarks in order to create a framework for the drop shipping activity.

* Corresponding author. E-mail address: labrudao@gmail.com

Webb & Zhang (1997) formulated the concept of information drop shipping. Khouja (2001) formulates a single-period model in order to identify the optimal mix of inventory issues and drop shipping for the e-tailers (e-commerce retailers). Ayanso, Diaby and Nair (2004) tried to set a threshold level for the inventory in order to keep its rationing policy. Hovelaque, Soler and Hafsa (2006) used a „newsboy" order policy model to analyze stock-picking, warehouse-picking and dropshipping. Yao, Kurata and Mukhopadhyay (2007), on the other hand, treated the reliability of order fulfillment and its importance to the whole supply chain. Rabinovich, Rungtusanatham and Laseter (2008) investigated the e-tailers margins in the drop shipping context. Khouja and Stylianou (2008) developed two inventory models that allow e-tailers to use drop shipping when it is about a shortage during lead-time. Chen and Zhang (2008) put the question about the right time when a member of a supply-chain can adopt the drop shipping channel. Xiao, Chen and Chen (2009) have taken into account the optimal inventory and dynamic admission policies for retailers with a seasonal approach related to the products that the retailers are dealing with. Gan, Sethi and Zhou (2009) in their paper wrote about the contract related issues, in terms of commitment-penalty clauses. Chiang and Feng (2010) discussed the dichotomy between retailers and e-tailers in terms of a competitive supply-chain with drop shipping. Yu, Cheong and Sun (2016) tried to identify the optimal distribution channel strategy considering drop shipping as an important factor. Ma et al. (2017) considered the possibility of reselling the returned products and the impact on the inventory. Chen et al. (2018) presented an integrated model for online product placement and for inventory control.

2. WHAT IS DROP SHIPPING?

This manner of conducting business it`s an innovation in the supply chain management and it can provide superior competitiveness if it`s well used. In fact, drop shipping comprises an order fulfillment technique, which is based on the existence of many intermediaries in the process through the goods are delivered to the final consumer. It can be used in both online and traditional commerce and the recent decades` technological improvements took it to subsequent "next levels".
Every manufacturer wants to sell its products to as many as possible consumers. In the globalization era, this process is significantly impeded by the cultural peculiarities, long distances which have to be covered by the products that are being sold (trough the logistic activities) and by the lack of direct relationships between the producer and the consumers. The awareness of every product tends to decrease proportionally with the strength of the direct relationship and inversely with the distance.
The logistic forces are summoned to help the supply chain to cope with the distances, but the direct relationships between the manufacturer and its customers can be replaced neither by advertising nor by publicity or some forms of interaction, other than the face-to-face.
In fact, drop shipping is about a producer, or distributor, a retailer (also called e-tailer) and customers. The retailer forwards an order to the manufacturer, or distributor, who fills the order directly to the customer. The initial order is received by the retailer from its customer and contains all the needed specifications, technical or of other nature, which are necessary for the product identification. The payment is made to the retailer, which withdraws its money out of the specified amount and pays the rest to the producer or distributor. Every part of this process is happy, the manufacturer sells its products (and makes a profit from its sales), the customer receives what he or she needs (which means utility) and the retailer makes some profits from the difference between the two prices.

3. HOW DROP SHIPPING REALLY WORKS?

From the point of view of a transaction, there are four possible scenarios:

(a) There is only one producer, one retailer and one customer. This scenario is being depicted in the figure below.

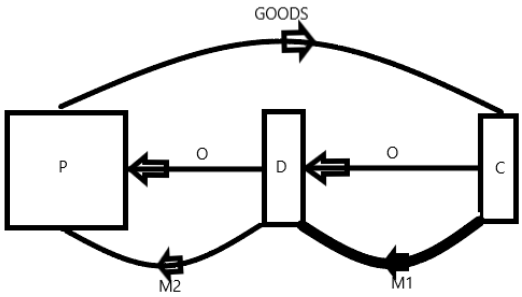

Figure 1. Drop shipping – the basic approach. PDC model
Source: made by the authors

Explanations for the picture above are as follows:

- P is for the producer, D for the retailer (in this case, drop shipper) and C for the customer;
- GOODS are the products that are being sold (so they are being delivered from the manufacturer`s warehouse directly to the customer);
- M1 and M2 are the money that is being paid, such that M2 < M1 (as one can see, the line that illustrates the cash-flow between the customer and the drop shipper is thicker than the one which was used for the other cash-flow, from drop shipper to producer);
- O is for the order the customer submitted to the retailer, who backs it to the manufacturer.

The name of this model could be PDC (as producer - drop shipper - customer). This is a simple framework in which the retailer doesn`t need to hassle much. It is just about connecting demand with the offer. Costs are, in this first model, at a significantly low level.

(b) The other scenario is that in which one producer, one retailer, and multiple customers are involved. There is no need for another illustration, because one can easily imagine the process with the added protagonists.

In this case, PRC+ means that there are many customers (e.g. 5), so there is a + sign at the C end of the letter string. M1 comprises all the amounts (m1, m2, m3, m4, and m5) that are correspondent to the orders that customers, from 1 to 5, submitted to the retailer. M1 > M2 as in the first scenario, otherwise the commercial activity wouldn`t have sense. Producer and retailer are sharing the profits presumed by all these transactions and customers are gaining in terms of utility.

In the PDC+ model, the drop shipper has to cope with many orders coming from more than one customer, a case in which some significant infrastructure is needed. Assuming that in the simplest model, PDC, the drop shipper already has a computer, or, at least, a performant smartphone and the embedded technical knowledge, along with connectivity premises, which allows the drop shipper to surpass the communication-related issues, in this second case there is a need for more. Some customer management skills, practice, and resources are needed. This entails an increase in costs, which leads to lower profits.

(c) A third possibility is that in which there is one customer, a drop shipper and multiple suppliers. In this case, which could be named the +PDC model, the customer has many needs to be fulfilled and places more than one order to the retailer and the latter forwards all these orders to be filled by the corresponding producers.

The resources that are needed in this case are related more to the information about the offer. To know who-is-producing-what is not so complicated, as a result, the infrastructure and the costs could be maintained at a lower level.

(d) The fourth possible scenario is the most complicated one. Multiple suppliers/producers, multiple customers with various needs to be satisfied and only one drop shipper to manage all the system. The necessary infrastructure will need to be properly sized, in this case. It may be necessary, from a certain point on, to have increased data processing capabilities and customer relations management skills. The costs will also be situated on a superior level in comparison with the other models, so greater sales volume will be needed in order to keep profits at the desired level. +PDC+ model may need some inventory, at the drop shipper level, to fill certain orders and this could press significantly against the profits, so greater sales volume comes again into discussion.

Even if this model has various facets, this is the main form in which this activity is organized, with large volumes of sales, narrow margins and strong competition. Competition is fierce both at the level of manufacturers and drop shippers. They are all struggle for profits, often they are sharing these profits, so the customers are the only category which gain in terms of utility.

Of course, in real life, the market as a whole comprises many situations in which there are multiple retailers also, but this paper is not designed to deal with those conjunctures.

4. INTEGRATION OR SPECIALIZATION?

Companies can choose between integrating all operations or being specialized into one of the operational stages of the economic process. Manufacturers know how to find raw materials (or parts for their final products) at a fair price and to use all these in obtaining quality products, with high technical specifications, capable to provide utility to many customers across the market. Distributors, retailers and, in this case, drop shippers know how to optimize the delivering process in order to "leverage the fulfillment capabilities of the suppliers to fulfill orders" (Changkyu Park, 2017).

When the manufacturer chooses to integrate all the stages, from raw materials acquisition to final products delivery, she has to cope with many types of costs and even so, she cannot be sure she is able to reach all the potential customers in the market. Aside from this discussion, there is another one which designs its shadow over the whole situation. This is about identifying the optimal size of the inventory, going through all the steps, from the establishment of the type of demand up to using the most appropriate model to find out the right number which suits the best in the integrated option.

As one can easily imagine, there will be many marginal demand exponents which won`t be reached to by the "hand" of the manufacturer. This is a feasible possibility for a drop shipper to take some actions in order to fill those gaps, and to use the opportunity left open by the manufacturer. For the latter, is costly to try to reach all the persons who are living in a specific region. Especially if the region is remotely situated from the manufacturer`s production facility.

Drop shipper advantages include lower inventory, delivery, and shortage costs. The disadvantages are expressed by increased per-unit cost (considering as an acquisition cost the manufacturer`s price, who also operates on the same market, probably), fragmented order delivery, if it is about a customer which places an order with multiple products, produced by multiple suppliers, incurring possible longer delivery times.

The drop shipper, considering her financial advantages, cost related, could reach those marginal customers more easily than the manufacturer, even if the latter is adept of the integration option. Another problem the drop shipper is facing consists in the technical and computer-related skills of those marginal customers. If they are able to identify on-line the products they need, they won`t use the drop shipper to get those products. They will, simply, use their computers or smartphones to

order the desired products from the manufacturer`s website; of course, at a lower price. This is another limitation that the drop shipper has to deal with.
The following part will be about stating the model which will be used, with all its parameters and necessary assumptions that are to be made. The model will be used in the fourth above depicted scenario, the most complicated one, in which the drop shipper, even if she has to deal with only one of the other parties, has to hold inventory.

5. PRESENTATION OF THE MODEL

In terms of specialization, one can see that the drop shipper could have her well established place in the picture as a whole. It`s enough one customer to make a landing on the drop shipper`s website, to place an order and the drop shipper is in business. To be in business, in this case, means that the drop shipper sends the received order to the vendor, collects the money from the customer and subsequently pays the price to the vendor. To avoid uncomfortable price differences between the value posted by the drop shipper on her website and the value from the manufacturer`s, the drop shipper has to negotiate the price previously. In order to get the best price for specific products, the drop shipper will probably have to buy those products in larger quantities and, thus, to handle inventory. Another problem with inventory management is that the stocked products tend to increase the break-even point level. The paper will aim to find the optimal quantity, which has to be kept in stock, in order to fill the customers` orders.
First of all, the drop shipper has at hand two ways in which she can establish the optimal inventory quantity, qualitative methods and quantitative ones. Qualitative methods are usually referred to as subjective because of their personal touch. They rely more on opinions manifested by researchers and less on using mathematics in the process of applying the methods. The paper won`t take into account any of the many qualitative methods, focusing instead on refining the research in terms of quantitative approach. In this respect, there are, at least, three time considering manners: short, medium and long-term analysis. The drop shipping activity, especially when it comes to hold inventory, does not rely on long time horizons, because of the desired higher liquidity level of stocks. This is the reason why the paper will study only the short-time approach.
Also, it won`t be about the decision making process at the level of customer. The customers already established their opinions regarding the desired products, the functional and aspirational benefits are already understood by the buyers, so it is all about the acquisition`s moment in a specific time horizon.
The problem here is related to the newsvendor model. If the demand is less than the inventory level, the drop shipper will have a fill-rate of 100% (Adelman, Barnes-Schuster and Eisenstein, 1999). Otherwise, it will have a fraction of the demand satisfied. But, if the drop shipper is facing a shortage in the inventory, another interesting cost appears – the loss of good-will cost. The issues are not the same like in the newsstands business because the drop shipper does not have to throw away the items she did not sell (as in the newspapers case, at the end of the day the daily newspapers are worthless).
The question remains the same – should the drop shipper focus on a higher service level and be ready to face a loss in the good-will, which can be translated in future unsold products, or she should concentrate primarily on meeting the demand, under the specter of holding inventory (with all the cost related to this)?
In order to find the optimal quantity a drop shipper should hold as inventory, it needs to figure out a set of premises and a model in which those premises may work. In this respect, it is necessary to assume some elements to build up a framework in which the model should be circumscribed.
The assumptions are as follows:

(a) A predetermined time horizon;
(b) A random continuous-time process (the process happens in a closed time interval, at a continuous rate). E.g., customers that are landing on the drop shipper website and are submitting orders. These customers are already identified, through the market segmentation, or based upon some empirical data (of the type of time-series), thus their number is already known.

The model that the paper will consider, in this respect, is the newsvendor model. In the following part, the premises of the model will be presented, and after that, one will be able to see if the model suits significantly well.

6. THE STRUCTURE OF THE USED MODEL

Inventory is the backbone for every company. If it`s maintained at an optimal level, it can bring organizations success. As one could learn before, the drop shipping activity, per-se, does not comprise inventory, but, sometimes, the drop shipper has to become retailer and to stock some particular products in order to obtain better prices from her suppliers, to have better delivery lead-time management and to have a higher level of service.

A drop shipper is not keen to hold inventory, so she has to optimize the inventory level and cannot afford to keep it over a long time period. Thus, she chooses to share not only the profit with her supplier but also the responsibilities assumed by the inventory, even over a short time horizon. The responsibilities are partially linked to the utility felt by the customers and partially to the drop shipper shareholders.

In the following, a real company with a made-up name will be considered. Mrs. Right owns a family company, which is still a small neighborhood start-up business, providing various types of products to its customers. The company does not own a store or a warehouse, being a home-based business. It uses Mrs. Right`s laptop and an Internet connection to collect orders from the customers and to submit those orders to the suppliers. Simply, a drop ship company.

In September, Mrs. Right`s company is facing the opportunity to buy some winter jackets which are likely to be sold before the winter season. Usually, that kind of jackets are sold, in high season, for $60 each, but the supplier requires $30 apiece, one-time offer, without any possibility to replenish the inventory if it`s wrong-sized from the start.

Mrs. Right knows that she could sell a winter jacket for $55 during the next period, earning $25 for every one of them. She also knows that it will be hard holding an inventory like this in her home and she fears that if the order she will place will be undersized, then she will suffer a loss of good-will cost, and if it will be oversized, will have to cope with inventory costs at the level of $30 apiece. She knows that the time horizon is not too long and the jackets will have to be sold until the end of winter season, otherwise she will be forced to put them in clearance sale at winter`s end at a significantly lower price. She has data from the previous ten years regarding the demand for such jackets, but she needs help to figure out how many of them should she order.

The model parameters are, as follows:

- Acquisition cost - $30;
- Mrs. Right`s price - $55;
- Demand is unknown, but some data are available regarding the past evolution of the phenomenon; Mrs. Right is confident that she will be able to sell 150 winter jackets, anyway;
- The salvage value of the unsold jackets can be around $20/piece;

The past referring data, Mrs. Right could provide are presented in the next table:

Table 1. Demand for winter jackets on last ten years

Year	1	2	3	4	5	6	7	8	9	10
Number of winter jackets sold by Mrs. Right`company	135	146	123	151	160	153	158	147	139	166

Source: data provided by the company

The newsvendor model used in the paper is adapted from Shenoy and Rosas, 2018. The exactly demand for winter jackets is not known, but in this case (of fashion, clothing and related) the demand distribution tends to be a normal one. In the following table, the demand distribution is presented along with the foreseen demanded quantities that Mrs. Right thinks she will have to deal with and the cumulative probability of the occurrence for every quantity.

Table 2. Foreseen demand for this year.
Probability and cumulative probability for every value

D	132	134	136	138	140	142	144	146	148	150
Probability	0.01	0.03	0.05	0.11	0.3	0.3	0.11	0.05	0.03	0.01
F(D)	0.01	0.04	0.09	0.2	0.5	0.8	0.91	0.96	0.99	1

Source: data provided by the company

Where:
D is the possible demand, in presumed values;
Probability is the likelihood of one value to become real;
F(D) is the cumulative probability.

The newsvendor model in the normal distribution case is based upon establishing the optimal quantity to be held as inventory using the sample mean and the standard deviation of the values. In addition to these instruments, the paper proposes an MS Excel function which is able to help entrepreneurs to cope with the difficult mathematical and statistical calculus.
In the mentioned authors` vision (Shenoy and Rosas, 2018), in order to use this model, the following assumptions are to be made:

- The model is designed for a single-period and a single product with a finite lifetime;
- The product, usually, cannot be sold after the time expiration. There are circumstances in which some salvage value is possible;
- Zero inventory is basic;
- Demand is a stochastic variable, but its probability distribution is known;
- There is no possibility to re-order if the initial quantity it`s not sufficient;
- The orders bear no cost.

The relevant cost for this model is the cost of underage and cost of overage. The first is referring to the case in which the demand is underestimated, while the latter is about the other alternative, in which the demand is more than the entrepreneur is expecting. The cost of underage is the expression of the lost selling opportunity, meaning the difference between the expected revenue and the acquisition cost for every unit. The cost of overage represents the burden the inventory carries with it, the purchasing cost of the unsold products.
The mathematical expressions and the explanations for the two mentioned costs (Shenoy and Rosas, 2018) are, as follows:

- The aggregate cost of underage is $C_u \max\{(D-Q),0\}$;
- The aggregate cost of overage is $C_o \max\{(Q-D),0\}$.

In the above expressions, Q represents the ordered quantity. The discussion is about only two possibilities, to sell Q units or not. Thus, p could be the probability of selling Q units and (1-p) then is the opposite alternative.
In terms of probabilistic calculus, the total expected loss (in case of underestimated demand) is

$$C_u \times p_{(D>Q)} \quad (1)$$

while the total left stock value equals

$$C_o \times p_{(D\leq Q)} \quad (2)$$

Being only two possibilities, the sum of their probabilities is equal to 1.

$$p_{(D>Q)} = 1 - p_{(D\leq Q)} \quad (3)$$

Letting the equations (1) and (2) be, the inventory is usually (Adelman, Barnes-Schuster and Eisenstein, 1999) increased when

$$C_o \times p_{(D\leq Q)} < C_u \times p_{(D>Q)} \quad (4)$$

The optimal value of inventory, Q, will be when the two equations will be equal. Introducing equation (3) in (4) will result

$$C_o \times p_{(D\leq Q)} = C_u \times \left(1 - p_{(D\leq Q)}\right) \quad (5)$$

And finally,

$$p_{(D\leq Q)} = \frac{C_u}{C_u + C_o} \quad (6)$$

This expression is usually known as the critical ratio (Shenoy and Rosas, 2018) and it has the following form:

$$C_r = \frac{C_u}{C_u + C_o} \quad (7)$$

7. NUMERICAL ANALYSIS

After presenting the model, it`s time to use the above data and formula (equation (7)) and the already defined parameters in order to find the optimal quantity which has to be purchased by Mrs. Right so that she may be able to limit the occurrence of the unwanted costs.
Let us go back to the previously presented three categories: the price (at which the winter jackets will be sold by Mrs. Right), the acquisition cost (which is supposedly to be paid by her) and the salvage value (at which the unsold jackets will be sold in the clearance selling period). There were $55, $30 and $20, respectively.
These values will be entered in the equation (7) in order to obtain the critical ratio.
Doing that, the result will be:

$$C_r = \frac{C_u}{C_u + C_o} = \frac{p-c}{p-c+c} = \frac{55-30}{55} = \frac{25}{55} = 0.45 \qquad (8)$$

where
p is the price;
c is the acquisition cost.
Cost of underage, being the profit the entrepreneur did not realize, can be expressed by the difference between the price p and the cost c. The result of the above calculus represents the probability of the optimal quantity to be purchased.
This is the right time to mention that the mentioned equation is related to the no salvage value alternative. In Mrs. Right`s case, the possibility of recovering a part of the initial cost slightly modifies the critical ratio:

$$C_r = \frac{C_u}{C_u + C_o} = \frac{p-c}{p-c+c-s} = \frac{55-30}{55-20} = \frac{25}{35} = 0.71 \qquad (9)$$

where
s is the salvage value.
The new value means the same as the old one, but in the upgraded conditions.
Going back to the normal distributed demand assumption, the parameters for a normal distribution will be necessary to be found. These parameters are the mean and the standard deviation and both of them can be calculated using the data presented in the Table 1. The sample mean is:

$$\mu = \frac{\sum V_n}{n} = \frac{1478}{10} = 147.8 \qquad (10)$$

where
μ is the mean;
V_n is the value of the demand for every considered year;
n is the number of years.
The result represents the average quantity sold by Mrs. Right`s company over the past ten years.
For a better visual experience, a graph will be inserted:

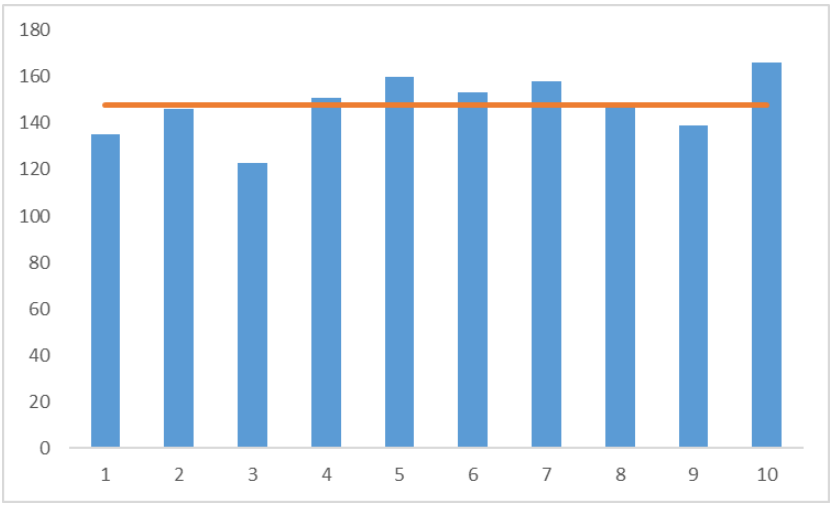

Figure 2. Average value of the demand for the past ten years
Source: made by authors

The standard deviation is easy to find using the following formula:

$$\sigma = \sqrt{\frac{\sum (V_n - \mu)}{n}} = 12.83 \quad (11)$$

where
σ is the standard deviation.
In this point, the optimal quantity, Q, can be calculated using the following formula:

$$Q = \mu + z\sigma \quad (12)$$

Where:
z is the standard normal variate (SNV).
This parameter can be found using a MS Excel function (NORM.S.INV) applied to the critical ratio. Doing this the value of z will be

$$z = NORM.S.INV(0.71) = 0.55 \quad (13)$$

Using this value along with those for mean and standard deviation in equation (8), the result will be:

$$Q = 147.8 + 0.55 \times 12.83 = 154.85 \approx 155 \quad (14)$$

Thus, the optimal quantity Mrs. Right has to buy in order to prevent the occurrence of the unwanted costs is 155 winter jackets.

7. CONCLUSIONS

In the past years, the using of the Internet in the economic activity led to significant mutations in the entire process (as a whole), and in some certain parts and aspects of it, also. E-commerce, e-marketing, e-tailing and many else are all related to the usage of world-wide-web. In their article, back in 1997, Webb & Zhang already put in discussion the information drop shipping. Nowadays, in the social media era, regardless of its kind (Facebook, Instagram and so on) it`s all about spreading information across all environments.
The drop shippers learned that using the Internet on a large (or even larger) scale could help them to reach their customers, the first of all, and then to their suppliers as well. Managing the connections and the business-related skills has led to next steps like the fine-tuning of the process. One of those soft-touch methods is inventory control.
After obtaining the desired result, Mrs. Right can optimize her activity, regarding not only the winter jackets but almost all kind of goods she desires to sell. She just has to establish the nature of the demand for her products and in the future, she can manage the quantities easier. The model can be extended as well to other types of demand: uniformly distributed, to the Poisson distribution processes, to the log-normal and the discrete distribution.
This model may work not only in the distribution`s matter issues, but also other parameters can be added: beginning inventory, demand in tranches and so on. Even though it is not a good-for-all instrument, it can provide help for those who are able to use it properly.
In the literature review part of the paper, one could easily see we found only one scientific article related to the use of the newsvendor model in the drop shipping activity. As it was repeatedly stated, the drop shippers are seldom using inventory, but holding an inventory may not reduce the entrepreneurs` capacity of making a profit. Of course, it depends on the profit margins and the inventory costs.

One of this paper`s aims was to bring the usage of the newsvendor model to the level of all, to make it easier to understand.

The responsibilities, which the drop shipper shared with her suppliers, are not all related to the customers` utility providing process. There is more, there is about their shareholders too. The profits presumed by the economic activity are shared not only between the economic actors, but between the investors as well. In this respect, it has to be one of the economic actors` main concerns to learn about and to make use of all the instruments they are aware of.

REFERENCES

Adelman, D., Barnes-Schuster, D., Eisenstein, D. (1999). *The Newsvendor Model. The Operations Quadrangle: Business Process Fundamentals.* The University of Chicago Graduate School of Business.

Ayanso, A., Diaby, M., Nair, S., K. (2004). Inventory rationing via drop-shipping in Internet retailing: A sensitivity analysis. *European Journal of Operational Research 171.* 135-152.

Changyu, P. (2017). A Partial Backordering Inventory Model with a Drop-Shipping Option under Purchase Dependence. *Asia-Pacific Journal of Operational Research Vol. 34, No. 4*.

Chen, Y-K., Chiu, F-R., Lin, W-H., Huang, Y-C. (2018). An integrated model for online product placement and inventory control problem in a drop-shipping optional environment, *Computers & Industrial Engineering 117*. 71-80.

Chiang, W., K., Feng, Y. (2010). Retailer or e-tailer? Strategic pricing and economic-lot-size decisions in a competitive supply chain with drop-shipping. *Journal of the Operational Research Society 61,* 1645-1653.

Gan, X., Sethi, S., Zhou, J. (2010). Commitment-penalty contracts in drop-shipping supply chains with asymmetric demand information. *European Journal of Operational Research 204.* 449-462.

Hovelaque, V., Soler, L., G., Hafsa, S. (2006). Supply chain organization and e-commerce: a model to analyze store-picking, warehouse-picking and drop-shipping. *4OR, 5 (2), Springer Verlag*, 143-155.

Khouja, M. (2001). The evaluation of drop shipping option for e-commerce retailers. *Computers & Industrial Engineering, 41.* 109-126.

Khouja, M., Stylianou, A., C. (2009). A (*Q, R*) inventory model with a drop-shipping option for e-business. *Omega 37,* 896-908.

Ma, S., Jemai, Z., Sahin, E., Dallery, Y. (2017). The news-vendor problem with drop-shipping and resalable returns. *Int. J. Production Economics 55 (22).* 6547-6571.

Rabinovich, E., Rungtusanatham, M., Laseter, T., M. (2008). Physical distribution service performance and Internet retailer margins: The drop-shipping context. *Journal of Operations Management 26.* 767-780.

Shenoy, D., Rosas, R. (2018). *Problems and solutions in inventory management*, Charn, Switzerland, Springer International Publishing.

Xiao, Y., Chen, F., Y., Chen, J. (2009). Optimal Inventory and Dynamic Admission Policies for a Retailer of Seasonal Products with Affiliate Programs and Drop-Shipping. *Naval Research Logistics 56, Wiley Periodicals.* 300-317.

Yao, D., Kurata, H., Mukhopadhyay, S., K. (2008). Incentives to reliable order fulfillment for an Internet dropshipping supply chain. *Int. J. Production Economics 113.* 324-334.

Yu, D., Z., Cheong, T., Sun, D. (2016). Impact of Supply Chain Power and Drop-Shipping on a Manufacturer`s Optimal Distribution Channel Strategy, *European Journal of Operational Research 252 (2).* 554-563.

Webb, T.D., Zhang, B. (1997), Information Dropshipping, Library Hi tech, 57-58, 145-149