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Cost-volume-profit analysis: practical aspects in e-commerce

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Abstract. As a result of the COVID-19 pandemic, e-commerce has experienced a significant increase. For Russian companies it's quite hard to compete with international organizations, mainly due to companies' size and constant investments. The article addresses the issues that e-commerce companies face in terms of business models, costs, pricing and reaching a break-even point. We have studied the financial metrics of Ozon (leader company in Russian e-commerce market and have predicted net income for Ozon in 2023-2028. We outlined the limitations of break-even analysis in real-world scenarios for digital platforms.

Keywords: cost volume profit analysis, breakeven point, digital platform, decision making.

1. INTRODUCTION

Management accounting has a whole arsenal of techniques and methods that allow company, its director, and managers to process and summarize the initial information [1]. The cost-volume-profit analysis is a powerful analytical tool for planning and decision-making that is used by managerial accountants to help managers make better decision. A company uses CVP analysis to reach important benchmark like break-even point. The CVP analysis helps in budgeting by determining: the number of units that must be sold to break even; the impact of a given reduction in fixed costs on the break-even point; the impact of an increase in price on profit.

E-commerce development has come a long way from being a simple, one-sided ecommerce companies to appearing a massive ecosystem. The good example is Amazon. Today it has incorporated various units within its business model, including a one-sided platform, two-sided marketplace, web services, kindle marketplace, an app store, prime video, game studio, and even retail stores. Moreover, COVID-19 related restrictions accelerated e-commerce adoption by consumers. As a result of the COVID-19 pandemic, online platforms such as Ozon experienced a significant increase in the number of new active buyers, higher demand for products on their platforms and an inflow of third-party merchants.

The aim of the work is to provide particularities of CVP analysis in e-commerce.

2. LITERATURE REVIEW

The point of opening and running any business is to make a profit. Entrepreneurs and companies need to assess the prospects of the industry before starting a business, investing in a startup, as well as when developing and introducing new products or services to the market. Knowing a profitability of different types of products, a company can competently redistribute its resources to more promising areas and remove unprofitable positions.

In literature it has been developed a theoretical understanding of the reasons why a company should calculate the BEP. There are several reasons which can be formulated as these:

- determination of the profitability of a new product, considering what equipment and technologies are used by a company, how much products can be produced and sold. This metric calls for riskiness (including force majeure events) and the prospects of the chosen direction [2]. The calculation of the break-even point is one of the key indicators in any feasibility study of a business project [3];
- planning sales volumes that cover all the company's expenses and allow a company to earn a given amount of profit [4;5];
- formation of an effective pricing policy. Even though prices in highly competitive industries are formed by the market, a company need to understand whether the average market value of the product covers the costs of it. Knowledge of the critical point of the product makes it possible to form optimal price lists for different categories of customers (retail, wholesale, dealer price, etc.), as well as promotional conditions. The calculation of the break-even point shows how much a company should produce when the price decreases or how a growth in productivity can affect profitability [6;7];
- nomenclature optimization. Calculating the profitability of each product in nominal and monetary terms, a company can choose the optimal structure of the assortment with a focus on the demand and capabilities of the company. The calculation of zero profitability for each individual product allows to identify products that are unprofitable as well as the most profitable positions. It is necessary to try to minimize low-profit products in the product line [8].

The general formulas for BEP are presented in formula 1 and 2.

$$\text{Break even point (in units)} = \frac{\text{Fixed costs}}{\text{Selling price per unit} - \text{Variable costs per unit}} \quad (1)$$

$$\text{Break even point (in monetary form)} = \text{Break even point (in units)} * \text{Selling price per unit} \quad (2)$$

3. DATA AND METHODOLOGY

In this research we will use a case study method to “contribute to our knowledge of organizational phenomena” [9].

The e-commerce market in Russia consists of four categories of business with different characteristics and business models. The first category includes multi-profile businesses that operate only online. This group could include Ozon, Wildberries and Beru. The second category is the narrowly focused online-only business (Lamoda, Citilink, Apteka.ru). The third category includes multi-channel businesses using not only online but also physical shops. These include MVideo, Eldorado, DNS, Detsky Mir and IKEA. The fourth category includes cross-border businesses that deliver to Russia.

OZON.RU is an e-commerce platform in Russia (5th in the top of the most expensive Russian Internet companies according to Forbes.) OZON was one of the first companies to start developing the e-commerce sector in the Russian market, representing the direction of industries’ digitalization [10;11]. Originally started as an

online bookstore, OZON has now evolved into an innovative platform or ecosystem that is driving the e-commerce market.

In early 2019, the company was the first in Russia to launch consumer credits for multi-category purchases, as well as a bank card with a cashback for customers, and launched a deferred programme for multi-category purchases, became the largest network of its own parcel machines in Russia, launched express delivery of goods in Moscow and a referral programme for customers. The fee for using the site depends on the scheme chosen for working with the warehouse.

The company's main product is an online e-commerce website with delivery capabilities. The company works with suppliers (B2B) and sells to customers (C2C). The revenue stream received by the company is made up of two parts: the independent sale of goods through its store and the commission from the sales of partners who place their goods on the marketplace. In table 1 we present the business model of Ozon. It uses a platform business model with multiple business units and distribution models.

Table 1. Business model of Ozon

Key partners	The main activity	Value proposition	Customer relations and channels	Customer segment
Sellers Logistic companies; Individual entrepreneurs; Owners of pickup points; Banks;	It is an online e-commerce platform with the possibility of delivery. Working with suppliers (B2B) Selling to customers (B2C)	<i>To sellers:</i> Ozon takes care of all issues in logistics and marketing, reducing costs for small businesses <i>To buyers:</i> - Fast delivery to pick-up points within walking distance from home - Delivery in 1 hour (Ozon Express)	Mobile application Website Social media pages Technical support Contextual advertising on the Internet	<i>Sellers:</i> Russian small, medium and large businesses; International companies <i>Buyers:</i> Russians, for personal use

Gross merchandise value (GMV) is the total value of goods sold on the marketplace, excluding returns, exchanges, and discounts. Leaders of the rating in Russia: Wildberries has almost doubled the sales, to 805.7 billion rubles, the Ozon this figure has increased 2.3 times - 446.7 billion rubles. Sales Citilink, which was the third leader, in 2021 grew by a quarter - to 163.4 billion rubles.

Table 2. The biggest e-commerce companies in Russia

Nº	Company	GMV, mln, rub	Increase %	Orders, thousands	Increase %	Average order, rub	Increase %
1	Wildberries.ru	805700	95	771900	153	1040	-23
2	Ozon.ru	446700	126	221200	199	2020	-24
3	Dns-shop.ru	185300	41	16200	14	11400	24
4	Citilink.ru	163400	24	13200	7	12400	16
5	Mvideo.ru	132600	15	13000	20	10200	-4
6	Market.yandex.ru	122200	180	29700	151	4110	12
7	Aliexpress.ru Russia	106100	116	48000	152	2210	-14
8	Lamoda.ru	71200	34	14100	15	5050	17
9	Petrovich.ru	62200	41	3990	4	15600	36
10	Vseinstrumenti.ru	61900	52	9700	40	6380	9

Source: April 2022 data from Data Insight

The dynamic of some financial indicators of Ozon we present in table 3. The company has achieved significant scale (revenue and number of active buyers) and continues to grow the business rapidly, while focusing on achieving future profitability.

Ozon is an online retailer and web service provider. The company provides products such as apparel, auto and industrial items, beauty and health products, electronics, grocery, books, games, jewellery, kids and baby products, movies, music, sports goods, toys, tools and other related products. It also provides related support services, including home delivery and shipping, cloud web hosting and other web related services. The company merchandises these products through company-owned online and physical platforms. These platforms are also used by various third parties for selling their goods.

Table 3. Financial indicators of Ozon

Year	2022	2021	2020	2019
Loss for the period, bln RUB	(58,187)	(56,8)	(22,3)	(19,4)
Number of active buyers, million	35,2	25,6	13,8	7,9
Adjusted EBITDA, bln RUB	(3,215)	(41,2)	(11,7)	(15,8)
Total revenue, bln RUB	277,1	178,2	104,4	60,1

Ozon reached cash flow from operations break-even point in 2020 and reached operational break-even point. This company is a great example of size effect and long-term effect of capital investment directed to cover fixed costs and increase contribution margin per unit by developing new technologies, expanding network of delivery points and assortment on the market. Ozon introduced variety of most modern trends on the retail/marketplace markets which made him one of three greatest marketplaces in Russia. However, Ozon is still unprofitable by net income.

The Ozon Company's accounting policy is based on the principles of fair value, materiality, and consistency. Fair value is used to measure the value of assets and liabilities, while materiality and consistency are used to ensure that all accounting decisions are made in the best interests of the company and its shareholders. The company also adheres to the Generally Accepted Accounting Principles (GAAP), International Financial Reporting Standards (IFRS) and Russian Accounting Standards (RAS). In addition, Ozon Company has adopted the Financial Accounting Standards Board's (FASB) Accounting Standards Codification (ASC) as its primary source of authoritative guidance. This policy also requires the company to assess the impact of new accounting pronouncements on the company's financial statements.

Concerning the sales scheme of Ozon company, sales can be conducted in three different ways. They are closely connected with the models of logistics.

The first model is FBO or fulfillment by operator (in our case it is Ozon). The seller transfers and keeps its products in one of Ozon warehouses, then the company acts in the role of the intermediary and sends the products to other cities or transfers goods directly to clients.

The other model is FBS or fulfillment by the seller. In this case the seller of products again uses Ozon like the intermediary to connect with the clients and send them the products, however it is a more "independent" way of providing sales comparing with FBO. It means that the seller stores its products in an owned or rented warehouse. The seller collects, packs, and marks all the goods according to Ozon requirements by himself. Then, he just transfers products to the sorting center or to the points of issue.

The sale of goods and services of Ozon works according to the FBS (Fulfillment by Seller) scheme in which the seller is responsible for the storage and delivery of the products (Fig. 1).

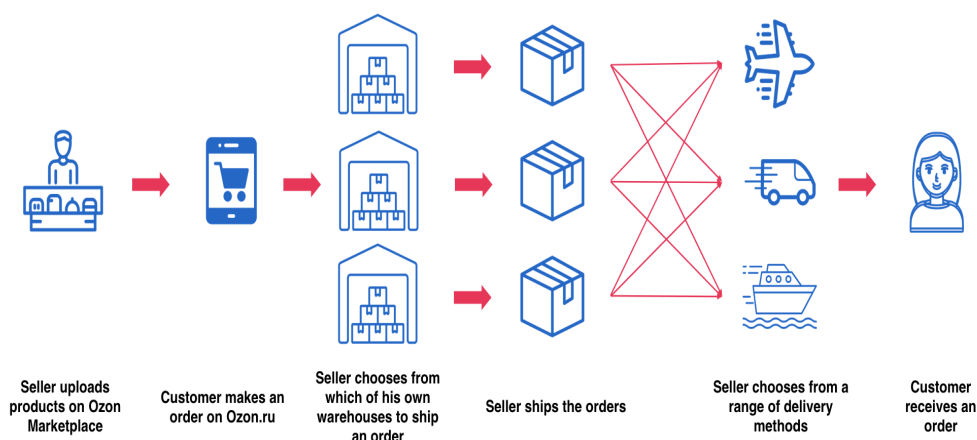


Fig.1. Model "Fulfillment by Seller"

The last one to be mentioned is FBS+ model. The seller works independently and provides direct sales to the clients. Ozon does not have a part in this kind of operation, it only places goods on its website. The seller stores, packs and delivers its products by himself. This model serves good to big stores with their own delivery structure by saving money on Ozon delivery fees.

Within all 3 models, the payment scheme is as follows: the buyer pays for the goods on Ozon - Ozon retains the commission and other payments - transfers the remaining amount to the seller. There is always a commission for the goods, but other payments depend on the model and may include fees for storage, delivery, etc. Ozon pays sellers 2 times a month, but recently, the daily payments function appeared.

Another scheme presents the franchising. Individual entrepreneur opens Ozon's order pick-up point as a franchise. Ozon earns money as a fraction from the total value of orders going through a particular pick-up point.



Fig. 2. Model "Franchising"

Each seller sets their own pricing strategy on the Ozone website.

For marketplaces you can specify the coefficient by which the price is multiplied. You can change the price both upwards and downwards. For example, with a price of 900 rubles on the market and a multiplier of 1.1 the product will be priced at $900 \times 1.1 = 990$ rubles.

In myAlpari the system will automatically create a «Follow-the-market-price strategy», which includes online shops with multiplier 1. All products with auto-application of prices enabled in advance will be automatically added to this strategy.

If the pricing strategy and auto-application of promotions are enabled at the same time, the product price is affected first by the strategy, then by the promotions.

Ozon operates on the marketplace model, where each seller can place their goods on the site for a fixed percentage - a commission.

The commission is calculated on the seller's set price, including VAT, plus any discounts or promotions specified by the seller. There is no need to pay for the commission and other expenses separately - all expenses for the calculation period are considered when calculating the payment amount.

If there is no category for an item or the category has been temporarily removed for technical reasons, our commission for sale will be 9%.

The commission depends on the category and in some cases on the subcategory. If you want to determine which category your product belongs to, you can check it or compare it with an existing product.

4. RESULTS

The overall implementation of the CVP analysis can be conducted by several steps that simplified can be called as the following:

- to determine the fixed costs required for the operation of the company;
- to calculate variable costs;
- to determine the amount of revenue;
- to calculate BEP.

Cost classification of Ozon:

1) Advertising & promotion costs (online marketing, offline media, personnel costs, which are also included in the "marketing and sales").

2) Logistics costs (storage and transportation of goods)

3) Technology costs (automation of internal processes, improvement of the payment system through Ozon card, launch of new high-tech products).

So, cost structure of Ozon is rather simple: there are fixed costs depending on the total number of open points of distribution, salaries and rents, and there are also some variable costs which depend on GMV of Ozon.

To conclude, Ozon may experience significant fluctuations in results of operations and growth rate:

- Ozon has incurred significant losses in the past and is going to continue being unprofitable till it reaches its break-even point, which can only be reached through size effect as in the past in 2020 and 2022 he achieved cash flow from operations break-even and operating profit break-even.

- Ozon has significant risks connected with usual business risks such as risks of brand – which means that company name will suffer from some cases which cannot be fully controlled, risks of industry – means that company will lack speed and adaptability to new reality while its rivals continue to follow the trend.

Ozon have certain problems connected with its business model and cost structure. The most significant cost factor is the lack of couriers or work force and the price of labor, which means that Ozon can face huge problems in the future.

Theoretical aspects of the BEP that we have studied are understood, and it may be seemed like an easy thing to do because we don't need a lot of specific data. However, some aspects of calculating and its difficulties for digital platform can be highlighted:

- the calculation formula is simple and clear if there is an understanding of all fixed and variable costs, but these indicators are not always constants. Namely,

expenses tied to the volume of output - the amount of wages of employees who are involved in the manufacture of the product, the cost of raw materials and other costs associated with the production and sale of finished products. If raw materials or components rise in price, the total costs increase, the contribution margin of the goods will decrease and, accordingly, the break-even point will change;

- in common calculation ideal conditions are taken - the volume of output is equal to the volume of revenue. But in fact, there is work in progress, may be failures in the production cycle, reducing the number of products. In addition, not all manufactured products can find their buyer;

- the most difficult this is a revenue calculation. In case of a digital platform, it will be calculated based on GMV. So, we think that GMV will be the main metric.

Based on the summary table of Ozon's key operating and financial metrics (Table 4), we have calculated the planned net income (Table 5).

Table 4. Summary table: key operating and financial metrics

Rub in millions, unless indicated other wise	For the three months ended December, 31			For the year ended December, 31		
	2022	2021	% of change	2022	2021	% of change
GMV	296,019	176,805	67	832,240	448,260	86
Number of orders	174,6	92,1	90	465,4	223,3	108
Annual order frequency	13,2	8,7	52	13,2	8,7	52
Total revenue	93,626	66,298	41	277,115	178,215	55
Adjusted EBITDA	3,933	(15,886)	-	(3,215)	(41,156)	(92%)
Loss for the period	(11,212)	(20,794)	(46%)	(58,187)	(56,779)	2%
Net cash generated from (used in) operating activities	8,534	15,266	(44%)	(18,753)	(13,626)	38%

We can say that the main feature of Ozon is working at a loss. The company is widely known in the marketplace market and occupies a leading position but often irrationally uses packaging materials and logistics. We can assume that Ozon needs to improve its expenses management because it had operating losses from 2021 to 2022. In table 5 we have presented the budget for net income for 2023-2028 using assumptions of CVP analysis.

Table 5. Net income budgeting for Ozon

Ozon, bln rub	2021 2q	2022 2 q	2023	2024	2025	2026	2027	2028
GMV	89	170,6	236,1965	277,9206	301,4702	313,9831	320,4329	323,7074
Price	2,405405	2,916239	3,211002	3,369375	3,451467	3,49326	3,514345	3,524936
Revenue(p rice* GMV)	37	58,5	73,55851	82,48433	87,34554	89,88255	91,17855	91,83355
COGS (VC=VCU* GMV)	11,89	33,24	52,18979	63,37097	69,17441	72,12113	73,61367	74,36731
SG&A (FC)	22,764	16,269	17,37772	18,12237	18,17113	18,75242	19,56488	21,46624
EBITDA	-9,1	0,2	9,5	18,8	28,1	37,4	46,7	56
Net income	-15,233	-7,202	-6,171	-5,171	-4,771	-2,171	-0,171	0,829

From our calculations in Table 5 (based on the tendencies of previous years), we

can see that break-even point can be reached between 2027 and 2028. According to the long-term forecast, Ozon plans to show a positive operating profit in 2024.

It is very important to provide possible variants and solutions for continuing positive tendency of Ozon in becoming closer to its break-even point.

First, to continue horizontal expansion by attracting new customers and work force to operate with greater GMV on the marketplace. Next possible growth catalysator is continue of providence of new technological solutions for clients, which must make their experience better as in long-term as in short-term. Moreover, loyalty programs must be competitive with Yandex.Plus because Yandex is going on unprofitability of Plus just to attract and retain clients.

At the same time, the key direction is work with businesses. B2B segment, letters of credit, analysis of sales and key metrics must be provided to such type of users too. Ozon has very strong competitors in B2B segment such as MTS, Wildberries.

5. CONCLUSION

To conclude, let's summarize the limitations of break-even analysis in real-world scenarios for digital platforms.

First, the most obvious and significant problem of break-even analysis for digital platform is that such analyses do not consider changes in sales volumes: the break-even point is calculated based on the current sales volume (GMV). However, when the sales volume changes, the break-even point will also change. Moreover, the "price" or commission that digital platform receives (depending on the type of the products). It forces an analyst to make dynamic models with different scenarios, where it will be possible to predict movement of the break-even level depending on the case in industry or in the economy, including all long-term effects and possible solutions of occurring problems.

Second, CVP analysis for digital platform does not consider factors affecting demand: competition, fashion changes, etc. Such structural and qualitative industry peculiarities are not included in break-even point analysis, however company's capex and M&A deals can be directed on break-even point improvement, such as decreasing of this level. So break-even point calculation cannot consider qualitative industry trends, but in predictions and forecasts of break-even point industry unique qualities can be included.

Third, CVP analysis for digital platform does not consider the impact of changes in exchange rates: if the company deals with foreign suppliers or buyers, changes in exchange rates may affect the break-even point. Such factors must be calculated in different non-classical break-even point ways of calculation, but in scenario-analysis they can be considered. These different factors considered as positive, neutral, and negative in scenario analysis and can be included in calculation if analyst is calculation some break-even point which depends on some variables, which can be changes through time.

In conclusion, it is worth saying that calculation of break-even point can be different. It can depend on scenario analyses based on micro- and macroeconomics, margin efficiency, operating efficiency, supply-chain improvements, and fluctuations of prices and other variables.

One of the main applications of break-even analysis is making decisions about changes in prices for goods or services in e-commerce. If a company plans to decrease the commission, it must make sure that it will allow it to reach the break-even point and make a profit. To do this, it is necessary to conduct a break-even analysis and determine what changes need to be made to prices to achieve the desired result taking into consideration GMV.

Break-even analysis can also help companies manage and optimize costs. It shows which costs need to be reduced or optimized to reach a lower break-even point. This helps companies improve their efficiency and reduce their costs. In addition, break-even analysis allows companies to take into account seasonal fluctuations and other factors that may affect demand and costs.

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Aims and Objectives

Published online by Institute of Cited Scientists, Cyprus, two times a year, Journal of Digital Science (JDS) is an international peer-reviewed journal which aims at the latest ideas, innovations, trends, experiences and concerns in the field of digital science covering all areas of the scholarly literature of the sciences, social sciences and arts & humanities. The main topics currently covered include: Digital Economics, Education, Engineering, Finance, Health Care.

The main goal of this journal is the effective dissemination of original incites/results generated by the human brain and presented/reflected in articles using modern information/digital technology.

This current Issue mainly consists of selected paper presented on the International Conference on Digital Science (DSIC 2023) that was hold on October 20-22, 2023 in Agia Napa, Cyprus and divided on two equal parts: 1. Engineering scientific view (the first three articles) and 2. Economics scientific view (the last three articles) with multidisciplinary approach on adoption of Digital technology/knowledge in modern reality.

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