



JOINT APPLICATION OF BCG (GROWTH-SHARE) AND SV (STRENGTH-VARIETY) MATRICES FOR THE PRODUCT STRATEGY DEVELOPMENT

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Abstract: More than half a century has passed since the appearance of the BCG matrix, and therefore it requires adaptation to current conditions. This article, considering several methodological and practical limitations of the BCG matrix, proposes a refinement and expansion of this tool. To develop effective strategic solutions, it is not always enough to understand the company's position in the market, as suggested by the BCG matrix, it is also very important to understand the competitive situation in the market, as well as the "balance of power" between the main players who will determine the (im)possibility of implementing certain strategic decisions. In order to analyse the competitive situation, it is proposed to use the SV matrix, developed to analyse the competition level in markets where there are dominant groups of companies determine the rules for all market participants. This article proposes an algorithm for the joint application of BCG and SV matrices and refines strategies for BCG matrix products (question marks, stars, cash-cows, dogs), depending on the competition level in the market under consideration, according to the SV matrix.

Keywords: economic dominance, BCG matrix, SV matrix (strength – variety)

1. INTRODUCTION

The BCG matrix was proposed more than 50 years ago and is perhaps the most popular product portfolio analysis tool. This is both caused by the apparent simplicity of the matrix use and by ready-made strategy options depending on whether the product falls into one or another quadrant. Not all the business hypotheses, laid down by the authors in the methodology of its application, correspond in the XXI century to the state of the market to which the matrices are applied. Therefore, the conclusions obtained do not always look adequate from the modern researcher's point of view, which will be discussed in detail later.

Also, in modern conditions, the calculation of points for the BCG matrix construction does not always look like an easy task. For example, for an average-sized audit company in Russia, which exists in a market where the first four companies controlled 83% of the market by the end of 2021, although there are more than 3,600 players in total (Vertogradov & Shchelokova, 2022), it will be a very difficult task to build a position on the BCG matrix relative to the leader of this market horizontally. In terms of market share, such a company will be closer to zero, and the strategies recommended by the matrix do not leave a chance for success.

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The purpose of this article is to consider what are the additional opportunities that the joint use of BCG and SV matrices provides for solving strategic tasks in modern organizations.

2. WHAT IS THE BCG (GROWTH–SHARE) MATRIX?

This matrix was proposed in 1970 (Henderson, 1970) by the Boston Consulting Group (BCG), and it is one of the most well-known tools used to analyse the product portfolio and the life cycle of products for marketing and strategic management tasks. In the author's version on the BCG website (www.bcg.com):

- the market share of the product/company relative to the leader is on a horizontal scale;
- the growth rate of sales of the analysed product in the market relative to the average market growth rate of the market is on a vertical scale.

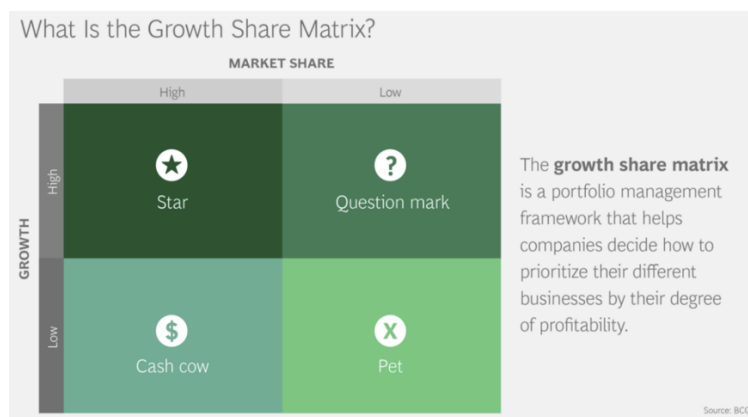


Figure 1. Description of the BCG matrix (www.bcg.com)

Accordingly, the resulting visualization divides the graph into 4 quadrants:

- “Star” – high market share and high growth rates. This segment brings a lot of money but requires a high volume of investments to support growth. When the market stops growing and requires money to maintain market share, products will move into the “cash cows” quadrant.
- “Cash cows” have a large market share, do not require investments and are a “cache source” for other products.
- “Pets” (or sometimes “dogs”) – low market share and low growth rates. The product does not require investment but also does not bring significant income.
- “Question Marks” – low market share, but high growth rates. By default, “question marks” require more financial investments than they bring. If investments are stopped, they will most likely die. But with additional resources and with the growth of the market share they will become “Stars” or “Pets” (if the market share cannot be increased).

2.1. Disadvantages and limitations of the BCG matrix

Easy decision-making based on the BCG matrix have always attracted practitioners, but it is very important to understand the scope of the matrix and its limitations:

1. Perhaps in 1970, the market share of the product and the growth rate of its market, according to the authors of the BCG matrix, were key factors for investment choosing,

now it may not be so. For example, a company may refuse to increase market share in favor of increasing recurring revenue. For example, this is typical for the software market, when companies refused (by setting a discriminatory price) to sell software licenses, motivating the client to buy software using a subscription model with regular payments. For companies, abandoning current revenue (and, accordingly, market share) in favor of the possibility of obtaining long-term income was more profitable, since it significantly increased the valuation of companies by investors (Duò, 2022).

2. The BCG matrix authors' assumption that the market leader has a lower production cost and a higher profit margin also requires verification in modern conditions for a specific market (Whitehead, 2014). Now not all companies seek to cripple market share, especially in times of crisis, since it is quite possible that it is more profitable to work with a small part of the most marginal customers. For example, in the express delivery market, some of the leading companies do not occupy leading positions in niche market segments, as they do not see the economic sense to fight for them (Vertogradov, 2022). In some markets, the situation of copying the leader's products is significant, sometimes up to counterfeit production. It may be rather cheaper to repeat a successful product than to develop a new one, so the costs of such companies may be significantly lower, and the profit margin is at least comparable (Galazova, 2009). For example, in Russia, by the end of 2018, the volume of the counterfeit market of luxury fashion brands in retail amounted to 280 billion rubles and exceeded the volume of the legal market by 13% (Kostyrev & Shchurenkov, 2019).
3. The BCG matrix logic assumes that markets with a low growth rate are not interesting for investment, which has many counterexamples, especially for high-margin markets, where entry barriers for new players are possible. As an example, we can cite the markets of church candles or coffee shops in business centers: stable demand volume, high marginality, and high barriers to entry.
4. The model recommends the rejection of "Pets", but this group of products can serve as the basis for sales of high-margin additional products of the company. For example, if we consider separately such products as "Yandex. Navigator" and its free competitors, then they are unprofitable for the creators, but based on such unprofitable products, companies have access to a wide customer base and sell advertising and other services.
5. The matrix is very sensitive to the quality of data, even in modern conditions of the spread of accounting systems in enterprises, which can be a source of information about the growth rates of products' sales needed to determine the position of the product along the vertical axis.
6. One of the features of BCG-matrix is its retrospectivity: strategic decisions about the future are proposed to be made based on past data, which means that the proposed strategies do not consider even very obvious potential industry events.

2.2. BCG matrix modification tools

In Khismatullina & Egorova (2020), the BCG matrix is used in conjunction with Spearman's rank correlation coefficient, ABC analysis, and Dibb-Simkin analysis methods to form an optimal assortment policy for the enterprise. First, the corresponding ranks for each product are identified by the method of rank analysis through the share of output in total volume and profitability. The authors assume that greater product profitability provides a higher product share in the total output. ABC analysis, as well as BCG and Dibba-Simkin matrices, are used in classical versions, and their complex application allows you to look at the tasks of assortment planning from different managerial angles.

The joint application method of ABC analysis and BCG matrix for the meat processing plant products analysis is proposed in (Baranova, 2018). The author suggests combining the three categories of ABC analysis and the four quadrants of the BCG matrix, obtaining a 3×4 matrix, indicating recommendations for solutions for each assortment item at the intersection of the corresponding rows and columns.

In Volkov (2018), it is proposed to use the so-called “public sector portfolio matrix” to assess the effectiveness of Russia’s budget policy. It is a combination of two strategic planning tools – the BCG matrix and the Ashridge matrix (the relationship between the company’s management potential and the key competitive advantages of the business unit (Alexander et al., 1994).

According to Verhoef et al. (2019) the current trend of economics digitalization requires the refinement of classical management concepts, and it seems possible to expand the BCG matrix boundaries application for modern companies through its integration with one of the youngest tools in management – the SV matrix.

3. WHAT IS THE SV MATRIX (STRENGTH-VARIETY)?

The SV matrix (Strength-Variety matrix, market power/leaders differentiation) was initially developed as a solution to the problem of separating “alpha companies” by numerical methods within the theory of economic dominance framework, but gradually became an independent tool for analyzing the competition level in markets where there are dominant groups of companies determine the rules for all market participants.

Within the theory of economic dominance framework (hereinafter – TED) all companies in a certain market are divided into alphas, betas, and gammas (Blokhin et al., 2019). Alphas are usually the largest companies on the market, having access to the least expensive resources and administrative levers, but also bearing the highest costs for the development of products and the market as a whole, building the game rules, investing in innovation, etc. Unlike the prerequisites of the BCG matrix, TED does not assume that alpha companies receive a large profit margin. Alfa companies can have lower production costs, but at the same time, they invest in the development of the market in the interests of all its participants. TED is actively used to analyze modern industry and product markets (Manchenko, 2020; Blokhin & Likhachev, 2021; Govorova, 2023).

The SV matrix is used for the market, where it is possible to single out the dominant group of companies based on the Linda index (Linda, 1976) (it is also called the “core of the market”), and further evaluates two indicators that are numerically postponed on the horizontal and vertical axes:

- CRSV – total market share of the dominant group of companies in the market,
- HTSV – the level of differentiation of companies by market share within the dominant group.

Due to several methodological limitations of calculating the Linda index, it is also recommended to additionally use the Herfindahl-Hirschman index (HHI) as an important tool for verifying the level of market concentration (HHI less than 1000 shows a weak market concentration, and more than 2000-2500 – a high concentration (Bukvić et al., 2014). This methodology is presented in more detail in Shchelokova & Vertogradov (2021) and at www.svmatrix.online.

Further, depending on the CRSV and HTSV values obtained, each market will fall into one of the four quadrants, see the following table.

Table 1. Description of the quadrants of the SV matrix (Vertogradov et al., 2022)

	30% <CRSV <65% Low market share of the dominant group	CRSV>65% High market share of the dominant group
HTSV>0,1 high level of differentiation within the dominant group	Quadrant I – “low or natural barriers” There is one clear leader within the dominant group, but new players are constantly coming to the market, since it is impossible to establish barriers to their entry	Quadrant G – “Dominant superalpha” There is one clear leader within the dominant group that determines the rules of the game in this market
HTSV<0,1 low level of differentiation within the dominant group	Quadrant RO – “Red Ocean” Companies from the dominant group actively compete both with each other and with all other companies in the market.	Quadrant B4 – “Natural oligopoly” The dominant group includes several companies of comparable capabilities that are interested in preventing new players from entering their circle

There is an example of the graphical construction of the matrix below (Figure 2), that also allows visual representation of additional information about the market: for example, the size of the ball, depending on the objectives of the study, can mean both the dominant group size and the relative volume of the corresponding segment. And in the case when they study the change in the state of the market at time intervals, the arrows sequentially connect the values so that the dynamics of changes are visible.

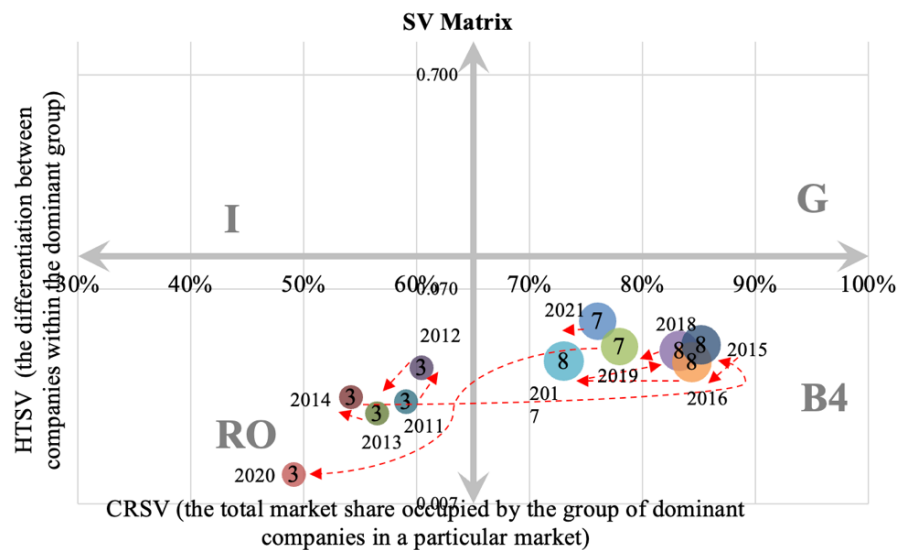


Figure 2. Example of the SV Matrix (Spektor, 2022)

3.1. Features and recommendations for the SV matrix construction

A significant advantage of using the SV matrix is that there is no need for a researcher to have access to the information about the market shares of all its participants. The Linda index can be used to calculate both absolute and relative market shares to identify dominant groups, so it is enough to have information, for example, about the revenue of the first 20 companies.

The second advantage that not only revenue can be the criteria for the dominant group. For example, if the economic feasibility of the task allows, the volume of production in money, pieces, tons, or others can be taken as analogs of revenue.

Another SV matrix advantage is its dynamism and the ability to demonstrate values for different periods on the same matrix.

3.2. Disadvantages and limitations of the SV matrix

Like any tool, the SV matrix has application limitations:

1. The SV matrix does not apply to markets where it is impossible to single out a dominant group. According to the recent studies results, in most of the studied Russian and international markets, the dominant group exists.
2. Cases, where there is only one dominant company in the market, are not identified by the Linda index. Therefore, it is recommended to additionally use the Herfindahl-Hirschman index, which always identifies such situations. But its correct application requires information about the size of the entire market and the shares of each company.
3. Currently, there is a discussion about the methodological correctness of considering a group of 10 or more companies as the dominant group (in most cases, such a large group will fall into the B4 quadrant (natural oligopoly)). Due to the peculiarities of the calculation of indices, such groups may include, for example, five large companies and seven with shares of 2-3%. Probably, such cases should be analyzed expertly, making decisions based on knowledge about a particular market, and to what extent this large group of companies has a consolidated influence on other companies in the market.

Like any analytical tool, the SV matrix is sensitive to data quality, but for many markets data is available for free, however for niche markets, it is usually available for a fee.

The SV matrix has already been widely used in the articles of its authors and by other researchers to analyze various national and international markets (insurance, automotive market, online education, international higher education market, business process outsourcing, audit services, fertilizer market, etc.) A detailed and constantly updated list of studies is provided on the website <https://svmatrix.online/ru/Publications/>.

4. IN WHAT CASES IS IT POSSIBLE TO USE THE SV AND BCG MATRICES TOGETHER?

The SV matrix can assess the presence of the dominant group, its composition, and the degree of companies' differentiation within the group. The BCG matrix is designed to analyze the company's product portfolio. Let's consider how the joint use of these tools can help companies to improve the adequacy and effectiveness of their strategic decisions.

4.1. The SV matrix will allow you to select a market for the BCG matrix analysis.

For companies in the dominant group in a particular market, it makes sense to apply the BCG matrix, comparing their product with the leader. For companies outside the market core, it is worth looking at a narrower market segment. For example, the same company may be an inconspicuous player in the home appliance market, not be part of the dominant group in the washing machine market, but be one of the leaders in the market of professional machines for kindergartens. In this case, the company should analyze the product position with the BCG matrix and make further investment decisions and monitor their effectiveness in the market of professional machines for kindergartens.

The combined use of the SV and BCG matrices allows numerical methods to select those markets where the company should compete and develop the most effective strategies in the selected segments. For this, it is necessary to:

- 1) Analyze the market using the SV matrix and determine the nature of the competition. If the company is not within the dominant group, it should consider the possibility of identifying narrower markets (for example, by product, geographical or other criteria) to determine the competitive environment and the level of competition within the dominant group more accurately.
- 2) For market segments where the company is in the dominant group, it makes sense to build a BCG matrix for the relevant products, and it is crucial to consider the company's position within the dominant group to make strategic decisions.

5. DIRECTIONS FOR CLARIFYING STRATEGIC DECISIONS BASED ON THE JOINT APPLICATION OF BCG AND SV MATRICES

Depending on the results of using the BCG matrix for the market segments selected using the SV matrix, various options for determining the company's development strategy are possible (see Table 2).

Table 2. SV/BCG matrix

	Stars (market leader + high growth rates)	Cash cows (market leader + low growth rates)	Question marks (not a market leader + high growth rates)	Pets (not a market leader + low growth rates)
G "Dominant superalpha"	<ul style="list-style-type: none"> • Holding the breakaway • Maintaining positions in the dominant group and the market 	<ul style="list-style-type: none"> • Market retention by substitute goods 	<ul style="list-style-type: none"> • Increasing market share through new niches 	<ul style="list-style-type: none"> • Diversification of resources into other markets • Leaving the market (including the sale of the company to interested players of the dominant group)
I "Low or natural barriers"	<ul style="list-style-type: none"> • Fight for new customers 	<ul style="list-style-type: none"> • Barriers for new players, including through their inclusion in the company's own logistics chains 	<ul style="list-style-type: none"> • Increasing market share through new niches 	
RO "Red Ocean"	<ul style="list-style-type: none"> • Significant investments to maintain the position (by increasing sales and market share) 	<ul style="list-style-type: none"> • Cooperation and moving to the quadrant B4 • Product development in other markets 	<ul style="list-style-type: none"> • Race for the leader and market transfer to quadrant B4 • Significant investments 	
B4 "Natural oligopoly"	<ul style="list-style-type: none"> • The opportunity to go to quadrant G due to high growth rates • Creating barriers for non-dominant companies 	<ul style="list-style-type: none"> • Strengthening the barriers of the dominant group (cooperation with other group players) 	<ul style="list-style-type: none"> • Cooperation with the leader or other players of the dominant group • Niche strategies 	

5.1. "Star" strategies in the SV matrix quadrants

If a company has a "star" product, it's likely to be a market/segment leader (since these products are not within this quadrant of the BCG matrix in another situation), and the company's sales are growing faster than the average market. Let's consider four options for the location of the "star" in the SV matrix:

- 1) G – the company is the dominant player in this market and the leader of the dominant group. The task of such a company is to keep the existing gap from other players. An additional task is to invest in maintaining and strengthening institutional advantages that guarantee leadership and to prevent the situation of strengthening competitors who can win new consumers in a growing market or win market share from existing players. In 2018, SOGAZ Insurance Group broke away from its competitors by acquiring the second-largest player in the personal insurance market – all VTB Insurance Group companies. As a result, the leader's share increased from 23.4% to 42.2% (Shchelokova & Vertogradov, 2023).
- 2) B4 is a leading company with an insignificant gap from its main competitors (there is a “natural oligopoly” in the market). If a company grows faster than others in the dominant group, then it can move the market to the G quadrant, at least by increasing the gap from other players. If there is no such possibility because all players in the dominant group are growing faster than the market (probably due to acquisitions of shares of companies outside the dominant group), then, at least, it is necessary to protect this “natural oligopoly” by creating barriers for other players who are not part of the dominant group.
- 3) RO – despite its not very significant position in the market, formally the company is the leader of a poorly differentiated dominant group. To maintain its leading position, it will need a large amount of investment, which corresponds to the canonical recommendations of the BCG matrix for “stars”: to invest in sales growth and market share. Investments in this case allow you to maintain a leading position even in times of crisis. In 2020 the economic activity in Brazil significantly decreased due to the coronavirus: the reasons were both a drop in household incomes and many deaths from COVID-19. Three foreign brands managed to maintain their positions in the automotive market: Volkswagen, Chevrolet, and Fiat, which had enough resources (both financial and production) to retain their market shares (Spektor, 2022).
- 4) It is a leading company (with a large margin from other companies of the dominant group), but there is a large number of potential competitors that can weaken the company's position since the barriers to entry into the market are relatively low. In this case, the main recommendations for this type of product are the struggle for new customers, and the search for new segments in a growing market to maintain and strengthen their positions (ideally, move to segment G). For example, according to (Korostyleva, Suslova, & Spektor, 2022), segment I is characteristic of the international education market, with the USA being the leader in most cases. Traditional strategies for a competitor are the development through leadership in educational innovations and the creation of the most attractive employment conditions for scientists and applicants from all over the world largely comply with the recommendations above.

5.2. “Cash cow” strategic options

Cash cow companies occupy a leading position, but their sales growth rates are below the market average. This situation is different from the previous one (“star”), since the growth rate is much slower, it is more difficult for the company to maintain a dominant position. Depending on the nature of dominance in the market under consideration, the following strategic options can be considered for “cash cow” products:

1. G – keeping the market from disintegration and competition with substitute goods (alternative products that can cover the needs of current customers). During the crisis caused by the 2020 pandemic, Danone's share was declining in many segments of the Russian food market. It was possible to maintain a leading position due to the expansion of the business into vegan or vegetarian dairy products (Yakimova, 2023).

2. B4 – put efforts with other companies strengthening barriers around the dominant group to increase the distance from other players. In most of the Russian markets analysed by various authors using the SV matrix, the dominant group in the B4 quadrant consisted mainly of foreign companies. After the withdrawal of most foreign companies from the Russian market in 2022, a significant change in its structure is expected. In this regard, it will be important to analyze the behavior of the former “cash cows” of these markets – Russian companies whose growth rates were relatively low due to institutional barriers built by the dominant group.
3. RO is a high-margin “cow”, so it is important to assess whether it makes sense to invest additional efforts to protect the company’s position in a situation where competition is quite tough (demand is limited, players do not have strong advantages), it may be worth trying to unite with other players and move the market to the B4 quadrant, or focus on the development of new products in more promising markets.
4. I – in such a situation, it is important for a company to “defend” its “pasture” from new competitors, since the barriers to entry into the market are low. The classic representative of the I quadrant is Ikea. Having shown low growth rates by the end of 2020 (IKEA sales in Russia show positive dynamics, 2020) against the background of the overall growth rate of furniture production in Russia, but with a well-established system of sales, procurement, and quality control of products, Ikea dominated the sale of furniture and most of its direct competitors in the industry supply their products to it. It is impossible for large furniture market manufacturers not to work with such a powerful company as Ikea. But starting to work with it, companies also lose opportunities for their own development, as Ikea dictates its conditions, becoming a key customer (Laguntsov, 2022).

5.3. “Question mark” strategic options

The “question mark” companies do not occupy a leading position in terms of market share, but their product sales growth rate are higher than the market average. On the one hand, there are larger players by market share, whose position cannot be ignored, on the other hand, such firms have growth potential.

1. G and I – the market leaders are likely to have significant institutional advantages, so it will be difficult to fight him. A possible strategy, in this case, would be to increase market share by winning consumers in niche segments (which are often not interesting to the dominant player). For example, before the pandemic in Russia, the Aeroflot group controlled 46.8% of the total passenger turnover in Russia. Its closest competitors S7 (14% of passenger turnover) and AzurAir (10%) have chosen to compete through niches. With the dominance of Aeroflot on international scheduled flights: S7 strengthened its position in the domestic market, and AzurAir specializes in charter flights (Volohov, 2020).
2. B4 – one of the strategic options can be to unite with the leader and other members of the market core to separate and differentiate from other players. Such companies need to become leaders in market niches where they have institutional or market advantages. In this case, it is very important to make efforts to prevent an increase in separation from larger players, as this may lead to falling out of the dominant group and depriving all the institutional advantages associated with this group. For example, according to the experience of allocating state subsidies to support the Russian automotive industry, leading companies in the mass automotive market always receive them, because they meet the current requirements for localization of production. The loss of one of the producers from such a group of “subsidized leaders” will greatly weaken the price competitiveness of its products.

3. RO – on the one hand, it may make sense to catch up with the leader and move the market to B4, but a high level of competition determines a high need for investment to maintain and increase market share. In this case, it is important to evaluate the advantages of the company relative to competitors to determine the prospects of the applied efforts. For example, in 2004, Microsoft Explorer dominated desktop browsers with a market share of 94.5%. In 2014, it was overtaken by Google's Chrome browser, which took 68.76% by the end of 2021, and the share of Microsoft's browser fell to 1.6% (Web browser market share in 2021, 2021). Google had enough resources and perseverance to defeat the leader, which cannot be said about other market participants – Opera, Firefox, and the rest.

5.4. “Question mark” strategic options

A product with a low market share and sales rates is unlikely to be in the dominant group. And the BCG matrix suggests giving up such products, although in real life such a refusal is not always a good decision.

Indeed, due to the final stage of the product life cycle in this quadrant, it makes no sense to invest significant resources in the development of the product (an exception may be the case when it is potentially possible to resume the development of this market).

The classic strategies of the BCG matrix offer in this quadrant cardinal reduction strategies such as closing or selling a business. Is it always worth giving up the “pet” product? The answer to this question will depend on the financial attractiveness of this product (yes, it may not be high-margin, but, for example, due to a high share in the company's portfolio, it will bear most of the fixed costs, thereby “increasing” the marginality of other products), as well as on the role of this product in the business model (for example, when this product provides access to the customer base or other sources of income of the company).

The possibility of selling this business will differ by the segments of the SV matrix. In several situations discussed above, participants in markets I and B4 are invited to increase the gap from other players in order to transfer the market segment in question to the G quadrant: the presence of players interested in such a transition will affect the attractiveness and the possibility of selling this business.

6. KEY CONCLUSIONS AND RECOMMENDATIONS ON THE USE OF STRENGTH-VARIETY AND GROWTH-SHARE MATRICES

1. The BCG matrix is very limited in use nowadays, since there is rarely a situation when the prerequisites laid down in the matrix are fulfilled. This causes a large amount of criticism, as well as many authors' interpretations to improve the results of using the tool. If the tool is used carelessly, the conclusions obtained will not reflect reality, and the recommended strategies will be incorrect. The joint application of the BCG matrix with the SV matrix will help to select the market more accurately for the application of the BCG matrix, as well as adjust the recommended strategies considering the nature of competition in the market under consideration.
2. This study proposes an algorithm for the joint application of the SV and BCG matrices for current markets: before applying the BCG matrix, it is necessary to assess the level of competition in the market under consideration, as well as the strength of the dominant players (using the SV matrix). It is also important to pay attention to the correct definition of the “market” for a company's product. Understanding which quadrant of the SV matrix your product falls into (according to the BCG matrix) will help develop more informed strategies.

3. In different competitive markets for the same types of products (pet, star, etc.) effective strategies for the development of these products will differ. For example, for “question mark” products in the RO, G, and B4 quadrants will differ significantly, as for other types of products.

We recommend using these tools together, because when analyzing modern markets, following the basic strategies of the BCG matrix does not always lead to the desired result, and using it together with the SV matrix will significantly enhance the quality of conclusions based on the analysis results.

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