BUDWEIS VALUE ADDED PROCESS MATRIX AS A NEW TOOL FOR STRATEGIC PLANNING IN ENTERPRISES

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Abstract: The objective of the paper is to introduce a new strategic planning tool, the Budweis Value Added Process (BVAP) matrix, an authorial instrument meticulously designed to transcend traditional portfolio planning methodologies. In today's dynamic business landscape, the BVAP matrix provides a comprehensive framework for evaluating the performance and efficiency of enterprise components. The article's findings demonstrate how the matrix can identify positions based on production and sales productivity, leading businesses towards the "Full Wallet" quadrant, representing peak productivity with increased operational profit margins, improved value addition, and reduced manufacturing durations. The BVAP matrix is unique because it includes a temporal component to account for product lifecycles, providing a more detailed view of portfolio stability and optimization. This new element, along with the matrix's compatibility with current strategic needs, represents a major advancement in strategic planning tools. The results highlight the matrix's effectiveness in promoting strategy alignment to improve company performance. The empirical validation in an industrial setting confirms the matrix's significance and its ability to influence future strategic planning approaches, providing a new perspective for organizations to manage today's challenging market environments. The research methods used to achieve the assumed goal are, in the theoretical part, a critical analysis of literature, and in the research part, an original method, the Budweis Value Added Process (BVAP) matrix, supporting strategic planning processes in enterprises.

Keywords: BVAP matrix; product portfolio, strategic tool, performance of production, performance of sales productivity

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Introduction

As indicated in the literature review, several business evaluation and strategic planning studies have evaluated the BCG (Boston Consulting Group) matrix. The BCG matrix recommends prioritizing the firm's competitiveness and growth rate when budgeting product costs (Chiu and Lin, 2019). These factors affect how much money the product will make or cost you (Ilin et al., 2020). Few studies have evaluated whether strategic planning can boost customer satisfaction by adding value to corporate operations (Shahrbabaki et al., 2020; Andrejovska & Helcmanovska, 2021; Abu Salma et al., 2021). Thus, production and sales productivity must be addressed to build a new method for enterprises to manage their product portfolios and stay competitive. The contemporary strategic planning, management, and decision-making period is characterized by searching, trial and error, and strong influence from the changing corporate environment (Straková and Talíř, 2020). Meanwhile, the business sector increasingly demands innovative corporate strategy methods from the scholarly community (Gomes et al., 2019; Straková et al., 2020). This paper considers the presentation of the new strategic planning tool an opportunity to start a necessary broad scientific conversation. When developing the new strategic enterprise planning tool, the BVAP matrix, the theoretical starting point was adding value to corporate operations to satisfy customers with products or services (Hsu et al., 2022). According to this concept, products and services in a company's portfolio generate varying added value, which affects the company's margin, or profitability. Given this, the company's product portfolio can be categorized by added value (or margin). For portfolio categorization, a mean value of the attained margin will be computed to aggregate firm products and services by contribution to company operation. It can be suggested that products or services below the mean value of the portfolio margin (limit proceeds value) should be reinvented or replaced with new ones.

RQ1: A relevant question arises about the time of product portfolio stability and optimization of its proceeds?

For this reason, a third dimension has been applied in the newly devised product matrix - the time - to determine, in addition to the financial and product planning, the time parameter of the portfolio structure. The time dimension will use specified lifetimes of the individual products or services which will be combined with the product parameters to devise the proposed BVAP matrix for the entire company portfolio of the individual products or services.

Literature Review

In the area of company performance and systems for strategic measurement of performance many studies have been conducted which identified key factors affecting performance of an enterprise (Lombardi et al., 2020). The business environment in modern economies has dramatically changed methods used in entrepreneurial activities and currently it strongly depends on creation and utilization of new knowledge, information systems, innovations, management techniques and tools to achieve high performance (Hajek et al., 2017). Measurement of a company's performance and utilization of appropriate value generators is essential for spreading of knowledge about how various strategies and behaviors influence results of the organization (Vochozka and Machová, 2017). Some studies suggest that systems for measurement of company performance should be designed in combination with business strategies so that a higher performance can be really achieved (Yuliansyah et al., 2017). Therefore, a company strategy shall be realistic, and it shall mobilize necessary resources for its development which will ultimately ensure success and high profitability of the company (Skowron-Grabowska et al., 2017).

Many companies seek to transform the company strategy into solutions with added value for customers through integration of products and services (Dadashnejad and Valmohammadi, 2018; Carvalho et al., 2019; Lodding and Koch, 2020). Key elements of not only a global business model include proposals to increase value for customers and to get a share on that value, management methods, deployment and use of critical sources and integrated processes which bring value to target customers (Tallman et al., 2018; Sahi et al., 2018). The value of goods for the customer affects not only the decision to buy but it also poses a major challenge for managements of enterprises (Luo et al., 2018; Wang et al., 2020). The value offered to the customer plays a key role in communication of how the company is going to provide value to the customer. Although managers and scientists ever more frequently focus on the value for customers, the concept is not yet sufficiently understood and applied; due to the broad range of research of the value concept relatively few studies have been published on the topic (Payne et al., 2017). It is obvious that the value for the customer (which is a sum of the product / services) differs from what the customer perceives as a value, which is a subset of functions of the product/services, and from what the customer is actually willing to pay, e.g. the customer may not be willing to pay for the value, even though he perceives it as a value (Thürer et al., 2017; Shou et al., 2020). Also, the effect of the value perceived by the customer on loyalty of customers is both direct and indirect because marketing communication reflects the relation only partly (Hänninen and Karjaluoto, 2017). In recent years there has been a principal change in understanding of the structure of value and communication of value offered to customers, while it is possible to identify two complementary views of the value for the customer: value in exchange and value in use (Roy et al., 2018). Where interactions with customers were limited in the past in terms of diversity, quantity, and complexity, nowadays, thanks to development of information technologies, customers are more involved, their experience has improved and their

motivation for co(creation) of value has increased (Ghosh and Lever, 2020). In order to provide services with added value an ever-increasing number of companies view consumers as an effective instrument to determine performance of the company through dialogue, participation and involvement (Omar et al., 2020) since services with added value include activities improving design of the products and highlighting the brands, such as better packaging, brand stories, pre-sale and aftersales services for customers, advertising and product placement (Liu et al., 2021).

An analysis of the product portfolio is used to analyze strategic position of company's products on the market to decide in which products the company should invest more or less. The best-known approach to the product portfolio analysis is a Boston Consulting Group (BCG) growth-share matrix. It is a strategic tool to identify strategic positions of products on the market and to formulate strategies for allocation of sources (Chiu and Lin, 2019). The BCG matrix model developed by the consulting firm Boston Consulting Group (BCG) in mid 1970s, known also as the growth-share matrix or growth-participation matrix, has been widely used as a strategic tool thanks to its ability to identify the ideal product in the portfolio (and/or service) of the organization (Hersen et al., 2018; Krupskyi and Kuzmytska, 2020). Fifty years after the introduction of the BCG matrix certain versions of company portfolio management are being used by many big companies with several enterprises (Wayubood et al., 2017). Some scientists, however, insist that the traditional BCG matrix is a static historical analysis, and it does not consider different timeframes (Chiu and Lin, 2019). Regarding the fast changes and growing complexity, the today's competitive environment, the matrix needs to be improved in many aspects (Zhou and Zuo, 2010).

Based on the completed survey and focus of the research activities, the following hypotheses were formulated:

- (H1): The Budweis Value Added Process (BVAP) matrix is a strategic planning and decision-making tool for optimization of product portfolios of enterprises that provide products and services.
- (H2): Performance of production and sales efficiency ranks among decisive parameters for definition of a company portfolio of products and services.

Research Methodology

The BVAP (Budweis Value Added Process) matrix was tested on a medium-sized engineering company in the Czech Republic. The selected enterprise will remain anonymous to ensure its data protection, but it represents engineering companies of this size category in the Czech Republic. The company (hereinafter the enterprise A) operates in the engineering industry and manufactures forestry and agricultural machinery with a focus on custom manufacturing. The analysis of the product portfolio of the selected company is based on the accounting environment during the economic crisis (COVID-19).

The BVAP matrix presented in this paper has not yet been published or verified in practice. The theoretical basis of the newly proposed method consists in the fact that contributions of the individual parts of the company portfolio to generation of added value are used as a tool to optimize the portfolio to make it more profitable. The outputs will make it possible to determine which of the products (services) in the product portfolio are profitable and which should be replaced. The BVAP matrix should also provide the enterprise with information about how to innovate the portfolio so that the enterprise remains profitable and competitive (Bojnec and Tomsic, 2021; Gallino and Rooderkerk, 2020; ALHumeisat, 2023). The research data was evaluated using production and sales productivity calculations. Performance of production is measured by production time and operational profit. For the first BVAP matrix graph, the following computations are done:

$$Performance of Production = \frac{\left(\frac{\sum Production time}{\sum Product Type}\right)}{\left(\frac{\sum Operating Profit Margins}{\sum Product Type}\right)}$$

where:

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 \sum Production Time... is the time of production from the moment when the means of production enter the enterprise until the final product/service is completed. \sum Operating Profit Margins... is the profit of the enterprise after variable production costs, such as wages and raw materials, have been paid but before payment of interest or tax. \sum Product Type... is the number of items in the product portfolio.

Performance of Sales Productivity also uses two variables: the quantity of the manufactured products and the operating profit (margin). The following calculations are performed to obtain the second graphical result of the BVAP matrix.

$$Perfromance of Sales Productivity = \frac{\left(\frac{\sum Quantity}{\sum Product Type}\right)}{\left(\frac{\sum Operating Profit Margins}{\sum Product Type}\right)}$$

where:

 \sum Quantity ... is a quantity of manufactured products or provided services. \sum Operating Profit Margins... is a profit of the enterprise after variable production costs, such as wages and raw materials, have been paid but before payment of interest or tax. \sum Product Type... number of items in the product portfolio

The two computations above will be used to create a two-dimensional BVAP matrix with an x-axis for sales productivity and a y-axis for production. The average will be used to represent the BVAP matrix in two dimensions after the following calculations.

$$BAPV = \frac{\left(\frac{Operating\ Profit\ Margins}{Production\ Time}\right)_{Performance\ of\ Production}}{\left(\frac{Operating\ Profit\ Margins}{Quantity}\right)_{Performance\ of\ Sales\ Productivity}}$$

where:

 \sum Operating Profit Margins... is a profit of the enterprise after variable production costs, such as wages and raw materials, have been paid but before payment of interest or tax. \sum Production Time... is the time of production from the moment when the means of production enter the enterprise until the final product/service is completed. \sum Quantity... is a quantity of the manufactured products or provided services. The BVAP matrix will be broken into four segments based on corporate data to show product positions. The average values will define the perspective division point. Table

product positions. The average values will define the parameter division point. Table 1 shows the division. Companies can optimize their product or service portfolio using the data and parameters in the two-dimensional BVAP matrix diagram.

Table 1. Analysis of the BVAP matrix										
	Half Empty Wallet	Full Wallet								
Performance of	Low performance of sales	High performance of sales								
	productivity and increasing	productivity and high								
	performance of production	performance of production								
Production	A Leaky Wallet	Filling Wallet								
Froduction	Low performance of sales	Increasing performance of sales								
	productivity and low performance of	productivity and low								
	production	performance of production								
Performance of Sales Productivity										

Source: Own elaboration

Research Results

Table 2 contains imported data of the enterprise "A" analyzed by the MATLAB software which performed the individual computations and generated the diagrams. The table provides important data about the product portfolio of the enterprise which have been used for analysis of the BVAP matrix.

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			Promon		P-00	uci por tione		e enter p	I ISC A
Name of the Company	Product Type	Operating Costs (CZK)	Invoiced Price excluding VAT	Operating Profit Margins (CZK)	Quantity	Process Value Added per Piece	Productio n Time	Productio n Time of One	Norm Hour
Company "A"	'A'	1 395 400	1 425 000	29 600	100	296	100	1	296
Company "A"	'B'	9 520 500	9 875 000	354 500	50	7090	200	4	1.7725e+03
Company "A"	'C'	3 257 850	3 540 000	282 150	10	28215	240	24	1.1756e+03
Company "A"	'D'	21 785 550	22 150 000	364 450	10	36445	120	12	3.0371e+03
Company "A"	Έ'	1 608 700	1 700 250	91 550	200	457.7500	50	0.250	1831
Company "A"	'F'	3 795 500	4 575 000	779 500	15	5.1967e+04	300	20	2.5983e+03
Company "A"	'G'	6 490 550	6 950 320	459 770	17	2.7045e+04	153	9	3.0050e+03
Company "A"	'H'	16 550 500	16 750 750	200 250	13	1.5404e+04	182	14	1.1003e+03
Company "A"	'I'	11 750 690	12 540 620	789 930	22	3.5906e+04	242	11	3.2642e+03
Company "A"	'J'	12 958 042	13 690 450	732 408	13	5.6339e+04	234	18	3.1299e+03
Company "A"	'K'	9 875 012	10 254 069	379 057	10	3.7906e+04	300	30	1.2635e+03
Company "A"	'L'	7 900 562	8 745 015	844 453	10	8.4445e+04	320	32	2.6389e+03
Company "A"	'M'	16 950 360	17 854 050	903 690	8	1.1296e+05	280	35	3.2275e+03
Company "A"	'N'	6 012 505	6 875 400	862 895	16	5.3931e+04	240	15	3.5954e+03
Company "A"	'O'	18 856 050	19 840540	984 490	13	75730	143	11	6.8845e+03
Company "A"	'P'	1 463 000	1 795000	332 000	100	3320	100	1	3320
Company "A"	'Q'	9 750 690	10 251030	500 340	220	2.2743e+03	96	0.4364	5.2119e+03
Company "A"	'R'	3 350 690	3 874050	523 360	10	52336	340	34	1.5393e+03
Company "A"	'S'	3 786 000	4 250120	464 120	8	58015	160	20	2.9008e+03
Company "A"	'T'	12 950 960	13 188360	237 400	5	47480	200	40	1187

Table 2: Costs and profitability of the product portfolio of the enterprise "A"

Source: Own elaboration

Testing of dependence of the products (services) on the performance of production and performance of sales productivity

The BVAP matrix devised for the enterprise "A" was analyzed and described below; the results were used for a graphical analysis of the product portfolio of the enterprise "A" with determination of the BVAP matrix. The Performance of Production was calculated form the analyzed product portfolio in a calendar year as follows, using the average which divided the axis x and axis y.

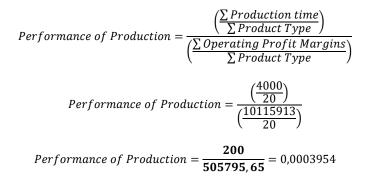
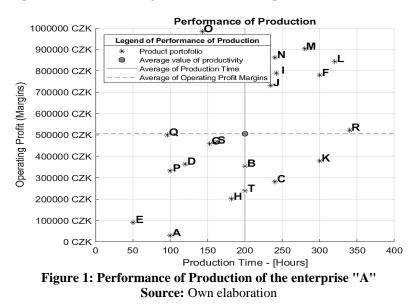


Figure 1 shows how enterprise "A"'s average production performance splits the product portfolio into four segments. According to the formula above, production time averages 200 hours on axis x. According to the computation above, the operating profit average on axis y is 505 795.65 CZK (19 978,93 EUR). Enterprise "A" divides its products by profit and production time. The indicator illustrates the impact of product manufacturing time on firm "A"'s profit.



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Table 2 shows Figure 1 results in the "Norm Hour" column. Performance of Sales Productivity was calculated for the analyzed product portfolio in a calendar year using the average value dividing axes x and y.

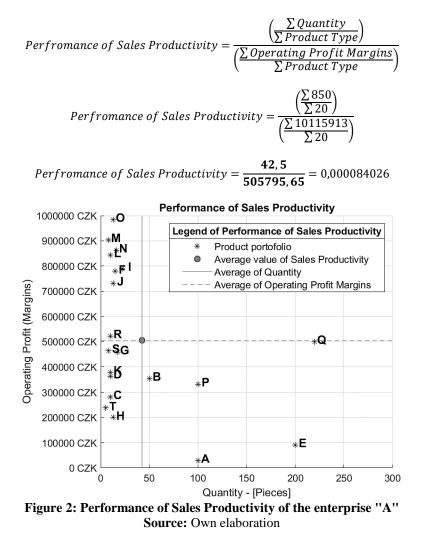


Figure 2 indicates the distribution of sales productivity for enterprise "A," and its average value separates the product portfolio into four segments. According to the calculation, axis x (quantity) averages 42.5 pieces. According to the computation, the average operating profit on axis y is 505 795.65 CZK (19 978,93 EUR). Profit and quantity determine how "A" divides its products. The indicator represents the percentage of manufactured items in enterprise "A" s profit. Table 3's "Profit per piece" column shows Figure 2 results. Figure 2 further shows that the analyzed company makes the most money from custom (piece) manufacturing.

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The indicators above determined the BVAP matrix and two-dimensional diagram: The performance of sales productivity (x) and production (y) formed the BVAP matrix. The average value of the BVAP matrix for the analyzed product portfolio in the calendar year was divided by the axes x (sales productivity) and y (production). The diagram below is based on Table 2, using data from the columns "Profit per piece" and "Norm Hour" on the axes x and y.

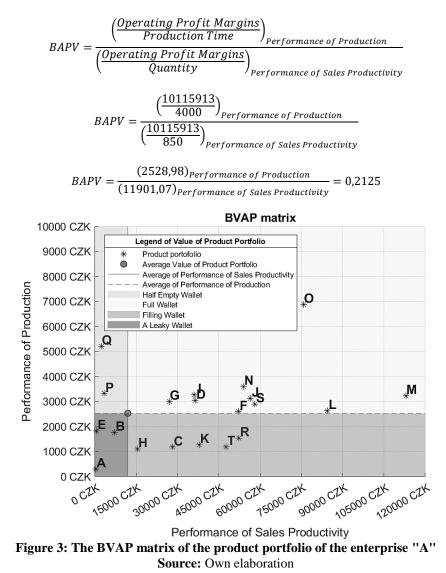


Figure 3 illustrates the two-dimensional BVAP matrix of enterprise "A"s product portfolio. The calculated average on axis x (Performance of Sales Productivity) is 11

901.07 CZK (470,09 EUR). According to the calculation above, the average value on axis y (production performance) is 2 528.98 CZK (99,89 EUR). The company might prepare the graphic monthly to respond to sales and optimize its product portfolio. The BVAP matrix product ratios are shown in Figure 3. The twodimensional BVAP matrix diagram illustrates that enterprise "A"s least attractive products are "A", "B", and "E", which should be addressed and optimized because they are in the position "A Leaky Wallet". This suggests they don't bring enough sales productivity based on output. After the outcome was submitted to enterprise "A", the three components were analyzed. However, the most attractive products in the product portfolio are "L", "M", and "O", which are crucial products for the organization because they are in the "Full Wallet" of the BVAP matrix. They give the company excellent sales productivity based on production.

Discussion

The paper introduced and tested a corporate portfolio planning BVAP matrix. The BVAP matrix helps manufacturing and service organizations optimize product portfolios through strategic planning and decision-making (Carvalho et al., 2019; Corevnen et al., 2020). The initial study hypothesis addressed this. Product portfolio optimization in a real firm may inform the BVAP matrix's strategic planning. The indications were assessed in enterprise "A" and its product portfolio, including "A Leaky Wallet" products with low potential. The authors removed products from the analyzed enterprise's product portfolio and added one using the BVAP matrix. In the latest BVAP matrix research, which included the optimized product, no products were "A Leaky Wallet"-the enterprises least advantageous. Production and sales are maximized in the optimized portfolio. The matrix works well and lets each company construct a unique portfolio to stay competitive (Villamil et al., 2022). Anyone can optimize its product portfolio using its own data with the new BVAP matrix for business. Unlike the BCG matrix, the BVAP matrix does not use enterprise market share. Solution outputs support hypothesis 1. The BVAP matrix is a promising strategic, planning, and decision-making tool for manufacturing and service enterprises' product portfolio optimization. Thus, the initial hypothesis is confirmed. Chiu and Lin (2019) evaluated the BCG matrix, a strategic tool for product strategic positions on the market and source allocation strategy. They found similar results. The new BVAP matrix indicators focus more on the enterprise than market position and share. Production and sales efficiency affect a company's product and service portfolio, as the second hypothesis demonstrated. The solution and results demonstrated their mutual importance for portfolio definition. Ghosh and Lever (2020) argue that these two indicators are key business factors that determine enterprise growth. The BVAP matrix's strongest production sector, "Full Wallet," ensures sales productivity through output. Completed calculations demonstrate that production and sales productivity affect BVAP matrix positions. The BVAP matrix tends towards the "full wallet" when operating profit (margin/added value) increases and production time decreases. As sales of a low-operating-profit product climb, the

BVAP matrix approaches "A Leaky Wallet". The company should monitor and optimize relevant indicators based on each product or service's margin when analyzing a product portfolio's BVAP matrix. Management must realize that huge sales numbers do not always guarantee prosperity and profitability, the firm's total margin measures profitability. These findings are supported by several authors. Debicki et al. (2009) found that assessing enterprise performance helps explain how strategies and behaviors affect firm results. Based on early research, Yuliansyah, Gurd, and Mohamed (2017) recommend integrating indicators into performance neasurement. The BVAP matrix indicators enable corporate performance optimization. Additionally, the second hypothesis was confirmed. Coreynena et al. (2020) integrated products and services to improve corporate strategy and customer value.

Conclusion

To adapt to changes in strategic management and planning, methodological and decision-making tools must be updated (Straková et al., 2021). This study introduces a new tool based on the main goal of any transformation project, whether industrial or service. This maximizes corporation margin or manufacturing value added (Ghosh and Lever, 2020). The internal corporate environment, including product and support processes and the enterprise's transformation efficiency, and the product or service portfolio must complement this (Straková et al., 2021). Customer happiness is directly related to business profitability. The literature review showed that since the second half of the past century, the market share of each product portfolio in the context of its growth rate has been the main measure of an ideally set firm portfolio (Birafane et al., 2020) like the iconic BCG Matrix. Numerous corporations have utilized it for product portfolio research (Özemre and Kabadurmus, 2020). Four product classes were created based on corporate profitability. Without scientific humility towards this procedure, the authors would not have designed a new matrix (Hensmans, 2019). The authors cited a large-scale survey of corporate managers' strategic tool use to motivate enterprise portfolio analysis modification. Over 600 Czech businesses were surveyed between 2016 and 2021. More than 75% of companies do not use Situation Analysis methods, including the BCG matrix, because strategic management tools no longer represent the competitive situation. Given the fundamental changes in company competitive environments, managers are wary of this matrix.

Before building the new matrix, the writers respected company managers' demand for a procedure, a model that explains genuine business processes. The writers present a complete value-creation analysis of business processes. This paper's major goal was to provide a new business strategic planning tool. The BVAP matrix, tested on a medium-sized Czech engineering company, achieved the goal. Two hypotheses were tested to evaluate if the new BVAP matrix with a temporal dimension is adequate for strategic planning based on profitability, production, and sales productivity. The solution's outputs substantially support the first hypothesis. The

BVAP matrix can help manufacturers and service providers optimize their product portfolios through strategic planning and decision-making. The second hypothesis showed that manufacturing and sales efficiency affects a company's products and services. The solution and results proved their mutual conditionality and portfolio definition importance. Results from the research were highly applicable to corporate practice. Management actively validated it, and trade, customs, and employee compensation norms were demanded. As expected, economic cycles shift, the new matrix will likely gain importance. The authors discussed the new matrix, its structure, and expected results with managers from other companies and received excellent comments. Their feedback will be considered during product testing. Validation is underway against a test set of companies the authors have access to. The new planning, analytical, and management tool for firm operations may help

build scientific methodologies for corporate or commercial strategy projection (Madronero, 2018). Corporate model development, policy, and consumer relations regulation are also possible. The matrix is often employed in business or service production plans and in the economic-financial sector, where value added, or margin, is the major efficiency parameter. It can be employed in the company's investment policy, HR, and control systems. This paper's research goal was achieved, but the results need to be analyzed, validated, and specified using other enterprises and industries. Answers may reveal new information. First, apply the BVAP matrix to all-size enterprises in diverse industries and services. The authors of this study realize they are developing a novel strategic planning instrument and do not overrate the first approximation of their findings. The authors feel the outputs are valid and useful in corporate practice. The writers welcome feedback and will evaluate it. The authors posit that the findings of this study will contribute to the resolution of

the pressing issue surrounding business portfolio planning in the face of dynamic economic conditions. Therefore, the subsequent phase of the study is to examine the temporal dimension of the three-dimensional matrix.

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MATRYCA PROCESÓW WARTOŚCI DODANEJ BUDWEIS JAKO NOWE NARZĘDZIE PLANOWANIA STRATEGICZNEGO W PRZEDSIĘBIORSTWACH

Streszczenie: Artykuł prezentuje nowe narzędzie do planowania strategicznego, tj. matrycę Procesu Wartości Dodanej Budweis (BVAP), autorski instrument zaprojektowany w sposób szczegółowy, aby wykraczał poza tradycyjne metody planowania portfela. W dzisiejszym dynamicznym środowisku biznesowym matryca BVAP dostarcza kompleksowych ram



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Wyniki artykułu oceny wydajności i efektywności komponentów przedsiębiorstwa. pokazują, w jaki sposób macierz może identyfikować stanowiska na podstawie produktywności produkcji i sprzedaży, prowadząc przedsiębiorstwa w stronę kwadrantu "pełnego portfela", reprezentującego szczytową produktywność przy zwiększonych marżach zysku operacyjnego, lepszej wartości dodanej i skróconym czasie trwania produkcji. Macierz BVAP jest wyjątkowa, ponieważ zawiera komponent czasowy uwzględniający cykle życia produktu, zapewniając bardziej szczegółowy obraz stabilności i optymalizacji portfela. Ten nowatorski element, wraz ze dostosowaniem matrycy do bieżących potrzeb strategicznych, stanowi istotny krok naprzód w opracowywaniu narzędzi planowania strategicznego. Wyniki podkreślają skuteczność matrycy w promowaniu dostosowania strategii w celu poprawy wyników firmy. Walidacja empiryczna w warunkach przemysłowych potwierdza znaczenie matrycy oraz jej zdolność do kształtowania przyszłych podejść do planowania strategicznego, co dostarcza organizacjom nowej perspektywy w zarządzaniu obecnym wymagającym otoczeniem rynkowym. Metody badawcze zastosowane w celu osiągnięcia założonego celu obejmują krytyczną analizę literatury w części teoretycznej oraz autorską metodę, czyli matrycę Budweis Value Added Process (BVAP), wspierającą procesy planowania strategicznego w przedsiębiorstwach.

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Slowa kluczowe: macierz BVAP; portfel produktów, narzędzie strategiczne, wydajność produkcji, wydajność sprzedaży