p-ISSN : 2301-7775
e-ISSN : 2579-8014
NIAGAWAN Vol 13 No 1 Maret 2024

APPLICATION OF LINEAR PROGRAMMING IN OPTIMIZING PRODUCTION COMBINATIONS TO MAXIMIZE PROFITS: A STUDY ON MEATBALL SHOP IN WEST BANDUNG REGENCY

Ade Ismail [1)*], Ela Laela [1)]
[1)] Faculty of Economics and Business, Universitas Siliwangi
Penulis Korespondensi: 213402066@student.unsil.ac.id, 213402074@student.unsil.ac.id

Abstract

The optimization of the amount of production needed to maximize profits is still an obstacle to the growth of MSMEs in Indonesia. This research aims to determine the combination of production quantities and income optimization. The object of this study is the Bakso Barokah Shop (Baso Mang Udung Ciranji). A linear program of simplex methods with POM-QM software is then used to obtain accurate research results. The simplex method is a reference in managerial decision-making. Based on the results of the analysis, the maximum profit per week of Barokah Meatball Shop is IDR 2,700,000, which is six times the production of Mercon meatballs. The calculation results show that the optimal meatball production is to focus on Mercon meatball production rather than other meatballs. The results of this study can be used as a decision-making consideration related to production problems to get optimal profits.

Keywords: *Linear Programming, Simplex Method, Product Optimization, POM-QM*

Article Information:
Received Date: 1 Januari 2024
Revised Date: 5 Maret 2024
Accepted Date: 11 Maret 2024

INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) are the most strategic sectors of the national economy and concern many people's lives (Singgih, 2007). MSMEs are the largest economic actors in Indonesia's economy and have proven to be the key to economic security and the denominator of economic growth (Laela et al., 2023). The Ministry of Cooperatives and Small and Medium Enterprises noted 65 million MSME units in Indonesia as of May 2022. This number increased compared to the previous year, which was 64 million businesses. The increase in the number of businesses is directly proportional to solid national economic growth. The Central Bureau of Statistics noted that Indonesia's economy in 2022 managed to grow 5.31% compared to the previous year. Thus, the number of micro small industry business units has a positive effect on economic growth in Indonesia.

Based on data from the Central Bureau of Statistics in 2023, the food and beverage industry is still the main source of economic growth among other processing industry subsectors. The contribution of the food and beverage industry reached 6.39% of the total GDP. However, the growth of this subsector in the second quarter of 2023 is only 4.97% (YoY), below the national GDP growth (Bappenas, 2023). The slow growth may reflect suboptimal food industry production (Utami & Damayanti, 2022). Thus, there is a gap in research related to optimizing the combination of the amount of production of each type of product and optimizing the income obtained by the business.

If you look at it from the potential aspect, West Bandung Regency is one of the districts that can develop food and beverage industry subsectors in West Java (Arifudin et al., 2020; Ginting et al., 2019). The development of food MSMEs in West Bandung Regency more or less occurred from around 2000. This is due to the economic development in Bandung, which continues to show yearly development (BPS, 2023). This is why the West Bandung Regency food industry is worth developing.

One of the food industries in West Bandung Regency is meatball noodles. This product is very popular in Indonesia because the price and variety of meatballs vary to meet the tastes and purchasing power of various levels of society. Meatballs are made from mashed meat, mixed with tapioca flour, shaped round, and cooked in hot water. Meatball noodles are cooked in broth and served with mustard greens (Helilusiatiningsih et al., 2023). Meatball noodles generally have a basic ingredient of beef (Hermanianto & Andayani, 2002). However, until now, many meatball noodles have sprung up with other basic ingredients such as chicken, fish, shrimp, and others (Rijal, 2017).

The meatball noodle business is a fast food business that is part of MSMEs which can contribute to the Indonesian economy (Kusumaningrum et al., 2021). However, the meatball noodle business Bakso Barokah Shop (Baso Mang Udung Ciranji) faces various obstacles in making managerial decisions. Barokah Bakso Shop has various types of meatball products, but does not consider the combination of production quantities for each type of product. As a result, this meatball shop does not optimize revenue. Whereas, this meatball has the vision to become the leader of the meatball market in West Bandung Regency. Thus, this study aims to determine the combination of the amount of production of each type of product for revenue optimization. The right product combination can increase profits and maintain business sustainability.

LITERATURE REVIEW

Entrepreneurship is applying creativity and innovation to solve problems and find opportunities to improve business life. Entrepreneurship in Indonesia itself is stated in the Decree of the Minister of Cooperatives and Small Entrepreneur Development Number

961/KEP/M/XI/1995 as a person's spirit, attitude and ability in handling business which aims to create the latest products or technology for better service or gain greater profits (Khamimah, 2021). Entrepreneurship can drive economic activity that influences national economic progress and growth. Entrepreneurs often create innovations, products, or services that can fill gaps in the market or even create new markets. This provides impetus for the development of the industry as a whole.

An industry is a collection of firms producing goods and services with positive and high cross-elasticity (Maemonah, 2015). In addition, a company is an organization that combines and organizes resources to produce goods and sales services (Schoubben & Hulle, 2004). Every company has clear goals, including the meatball noodle business. The company aims to maximize profits (Bekmezci, 2015; Jensen, 2002). Thus, the company needs to decide to achieve maximum profit (Haessler, 2020). A sales maximization theory emerged in its development, assuming companies maximize revenue from their sales with or without minimum profit constraints (Levinthal & Wu, 2010; Opper et al., 2012). High profits can be obtained by firms with the market power to control price and output, cost advantages, and innovation success (Hosseini et al., 2018). The level of profitability will determine the company's decision to exit or remain in the market (Chesbrough, 2007; De Toni et al., 2017; Shipley & Jobber, 2001).

In the production process, constraints are generally limited resources that can be used (Hakim et al., 2018). Due to limited resources, companies must ensure the allocation of resources to produce a certain amount of output (Andrews & Serres, 2012; Cardon & Stevens, 2004; Eichler et al., 2004). The meatball noodle business needs to determine the proportion of production of each meatball noodle product to generate maximum profit (Handoyo et al., 2023). Thus, the resources used can be distributed precisely on each product.

Along with the development of knowledge, modern optimization methods emerged to overcome the weaknesses of conventional optimization methods. Modern optimization methods, i.e., mathematical programming, include techniques for evaluating optimization problems under constraints (Amaran et al., 2019; Mandal, 2023). If the equation of goals and constraints is expressed in linear form, the type of mathematical programming is linear programming. Linear programming can overcome problems with multiple constraints and inequality (Luedtke et al., 2010; Nuryana & Rosyana, 2019). This method can be used to calculate the proportion of production of each type of product in the meatball noodle business because meatball noodle businesses usually have more than one type of meatball noodle product.

RESEARCH METHODS

This research makes Bakso Barokah Shop (Baso Mang Udung Ciranji) the object of this study. The meatball noodle business is studied as part of the downstream industry or the final product produced directly to the end consumer (Laela & Azhari, 2023). Bakso Barokah Shop was chosen as the research object because of its many enthusiasts. Most consumers are millennials and members of the Z generation. Bakso Barokah Shop is in Kp. Ciranji, Saguling Village, Saguling District, West Bandung Regency, West Java.

This research uses primary data. Primary data is data collected directly from primary sources. The data used in this study are the results of observations and interviews with the owner of the applied research. These observations and interviews produce data on raw materials, production, amount of production, and profits of each type of product. Then, the Linear Program model of maximization problems with the simplex method is used to find the optimization of production and income (Lina et al., 2022). The simplex method is a reference in managerial

decision-making in MSMEs such as Bakso Barokah Shop. POM-QM software was used in this study for accurate data processing (Ardila & Maimunah, 2023). POM-QM is an alternative program that can help make decisions. The results of data processing will then be analyzed again to determine the number of product combinations that produce the highest profit. In addition, the optimal combination of the number of inputs can be analyzed by looking at slack and dual value variables to find the number of specific inputs. The results of the analysis can then be used as recommendations for obtaining maximum income. The following is the research flow to ensure that the research results are in line with the specified results:

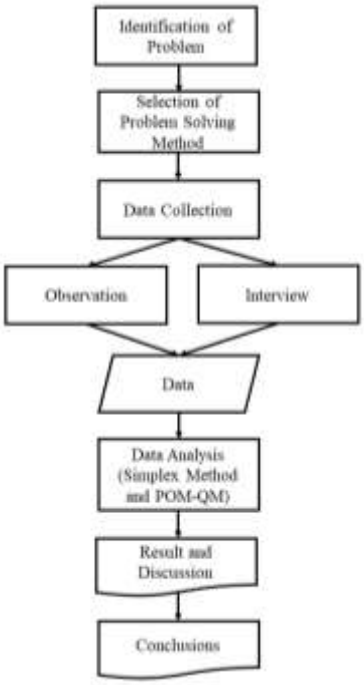

Figure 1. Research Flow
Source: Author Processed Data, 2024

RESULTS AND DISCUSSION

Based on the observations and interviews, Bakso Barokah Shop has three variants of meatballs: original, tendon, and mercon. Within one week, Bakso Barokah Shop provides 30 kg of ground chicken meat, 10 kg of ground beef, and 10 kg of tapioca flour. Producing Original and Tendon meatballs requires 10 kg of chicken meat, 2 kg of beef, and 2 kg of tapioca flour, producing 200 and 100 meatballs, respectively. Meanwhile, each Mercon meatball production requires 5 kg of chicken meat, 1 kg of beef, and 1 kg of tapioca flour, producing 30 meatballs. Every week, the profit of original meatball products is IDR 600,000, Tendon meatballs is IDR 500,000, and Mercon meatballs is IDR 450,000. Data on raw materials is presented in Table 1 below.

Table 1. Meatball Production Raw Material Data

Material	Original Meatballs	Tendon Meatballs	Mercon Meatballs	Supplies
Chicken meat	10 kg	10 kg	5 kg	30 kg
Beef	2 kg	2 kg	1 kg	10 kg
Tapioca flour	2 kg	2 kg	1 kg	10 kg
Profit	IDR 600,000	IDR 500,000	IDR 450,000	

Source: Author Processed Data, 2024

To find maximum profit from the production of all three types of products, a linear program is carried out using the simplex method consisting of decision variables, goal functions, and constraint functions. Determination of the mathematical formulation of the data in this study using symbols X_1, X_2, and X_3, where the description of each symbol is as follows:

x_1 = Total production of Original meatballs

x_2 = Total production of Tendon meatballs

x_3 = Total Production of Mercon meatballs

The mathematical model formulation of linear programming is to maximize:

$$Z_{max} = 600x_1 + 500x_2 + 450x_3$$

$$Z_{max} - 600x_1 - 500x_2 - 450x_3 = 0$$

The function constraints owned by Bakso Barokah Shop can be formulated as limitations, including the following:

Chicken meat: $10x_1 + 10x_2 + 5x_3 \leq 30$

$$10x_1 + 10x_2 + 5x_3 + S_1 \leq 30$$

Beef: $2x_1 + 2x_2 + x_3 \leq 10$

$$2x_1 + 2x_2 + x_3 + S_2 \leq 10$$

Tapioca flour: $2x_1 + 2x_2 + x_3 \leq 10$

$$2x_1 + 2x_2 + x_3 + S_3 \leq 10$$

The limitations of the signs used are:

$$x_1 \geq 0, x_2 \geq 0, x_3 \geq 0$$

The above functions are then inserted into the simplex table (Table 2) as follows:

Table 2. Data Formulation on Simplex Table

Var	X1	X2	X3	S1	S2	S3	NK
Z	-600	-500	-450	0	0	0	0
S1	10	10	5	1	0	0	30
S2	2	2	1	0	1	0	10
S3	2	2	1	0	0	1	10

Source: Author Processed Data, 2024

Furthermore, in Table 3, the key column is determined from the coefficient of the destination function, which is the column with the most significant negative coefficient.

Table 3. Key Column Determination

Var	X1	X2	X3	S1	S2	S3	NK
Z	-600	-500	-450	0	0	0	0
S1	10	10	5	1	0	0	30
S2	2	2	1	0	1	0	10
S3	2	2	1	0	0	1	10

Source: Author Processed Data, 2024

Furthermore, in Table 4, the key row is determined from the row with the smallest index, which is obtained from the right value (NK) divided by the key column value.

Table 4. Key Row Determination

Var	X1	X2	X3	S1	S2	S3	NK	Index
Z	-600	-500	-450	0	0	0	0	
S1	10	10	5	1	0	0	30	3
S2	2	2	1	0	1	0	10	5
S3	2	2	1	0	0	1	10	5

Source: Author Processed Data, 2024

The new key row is obtained from the key row divided by the key number. The number that is at the intersection between the key column and the key row is the key number.

Table 5. New Key Row Assignment

Var	X1	X2	X3	S1	S2	S3	NK	Index
Z								
S2								
S3								

X2	1	1	0,5	0,1	0	0	3

Source: Author Processed Data, 2024

Next, the creation of values other than the key row is made. This value change aims to optimize the data so that it will get the maximum amount of production and sales results.

Z	-600	-500	-450	0	0	0	0
-600	1	1	0,5	0,1	0	0	3
	0	100	-150	60	0	0	1800
S2	2	2	1	0	1	0	10
2	1	1	0,5	0,1	0	0	3
	0	0	0	-0,2	1	0	4
S3	2	2	1	0	0	1	10
2	1	1	0,5	0,1	0	0	3
	0	0	0	-0,2	0	1	4

After obtaining the new optimized values, they are entered in the simplex table shown in Table 6 as follows:

Table 6. Simplex Table of Optimization Results

Var	X1	X2	X3	S1	S2	S3	NK
Z	0	100	-150	60	0	0	1800
X2	1	1	0,5	0,1	0	0	3
S2	0	0	0	-0,2	1	0	4
S3	0	0	0	-0.2	0	1	4

Source: Author Processed Data, 2024

After entering the key value in the simplex table, there is a Z row that is still negative. Thus, a recalculation is carried out, determining the key columns and rows in Table 7 as follows:

Table 7. Recalculation, Determination of Key Columns and Rows

Var	Z	X1	X2	X3	S1	S2	S3	NK	Index
Z	1	0	100	-150	60	0	0	1800	
X2	0	1	1	0,5	0,1	0	0	3	6
S2	0	0	0	0	-0,2	1	0	4	-
S3	0	0	0	0	-0.2	0	1	4	-

Source: Author Processed Data, 2024

A new key row is specified as follows:

Table 8. New Key Row Assignment

Var	X1	X2	X3	S1	S2	S3	NK	Index
Z								
X3	0,5	0,5	1	0,2	0	0	6	
S2								
S3								

Source: Author Processed Data, 2024

After determining the new key row, then changing the key row as follows:

Z	0	100	-150	60	0	0	1800
-150	0,5	0,5	1	0,2	0	0	6
	75	175	0	90	0	0	2700
S2	0	0	0	0,2	1	0	4
0	0,5	0,5	1	0,2	0	0	6

		0	0	0	0,2	1	0	4
S3		0	0	0	0,2	0	1	4
	0	0,5	0,5	1	0,2	0	0	6
		0	0	0	0,2	0	1	4

After obtaining the key row values, they are entered in the simplex table shown in Table 9 as follows:

Table 9. New Simplex Table

Var	X1	X2	X3	S1	S2	S3	NK
Z	75	175	0	90	0	0	2700
X3	0,5	0,5	1	0,1	0	0	6
S2	0	0	0	-0,2	1	0	4
S3	0	0	0	-0.2	0	1	4

$X_3 = 6 \; and \; Z_{max} = 2700$

Source: Author Processed Data, 2024

After analysis and calculation, optimal results are obtained in the form of variable values and goal function values. The variables x_1, x_2, and x_3, which respectively state the optimal production amount of Original meatballs, Tendon meatballs, and Mercon meatballs, which can occur if the meatball shop only produces Mercon meatballs, namely six times the production. In addition, the optimal results are also obtained from the objective function value $Z_{max} = 2700 \; or \; IDR \; 2.700.000$, which indicates the maximum profit that can be obtained from producing meatballs with this optimal quantity. In addition, the objective function coefficients do not have negative numbers. Thus, the optimal results obtained are appropriate and valid.

In addition to using manual calculations with the simplex method, POM-QM for Windows v5 is used to prove the accuracy of the results. This software is also used to compare manual calculations of simplex methods. The steps taken in solving cases using POM-QM are then documented in Figure 2 below:

Table 10. Input Formulation Data

	X1	X2	X3		RHS	Equation form
Maximize	600	500	450			Max 600X1 + 500X2 + 450X3
Constraint 1	10	10	5	<=	30	10X1 + 10X2 + 5X3 <= 30
Constraint 2	2	2	1	<=	10	2X1 + 2X2 + X3 <= 10
Constraint 3	2	2	1	<=	10	2X1 + 2X2 + X3 <= 10

Source: Author Processed Data, 2024

After inputting the formulation data as in Figure 2, the results of the iteration obtained are presented in Figure 3 below:

Table 11. Iterations

Cj	Basic Variables	600 X1	500 X2	450 X3	0 Slack 1	0 Slack 2	0 Slack 3	Quantity
Iteration 1								
0	Slack 1	10	10	5	1	0	0	30
0	Slack 2	2	2	1	0	1	0	10
0	Slack 3	2	2	1	0	0	1	10
	zj	0	0	0	0	0	0	0

	cj-zj	600	500	450	0	0	0	
Iteration 2								
600	X1	1	1	0.5	0.1	0	0	3
0	Slack 2	0	0	0	-0.2	1	0	4
0	Slack 3	0	0	0	-0.2	0	1	4
	zj	600	600	300	60	0	0	1,800
	cj-zj	0	-100	150	-60	0	0	
Iteration 3								
450	X3	2	2	1	0.2	0	0	6
0	Slack 2	0	0	0	-0.2	1	0	4
0	Slack 3	0	0	0	-0.2	0	1	4
	zj	900	900	450	90	0	0	2,700
	cj-zj	-300	-400	0	-90	0	0	

Source: Author Processed Data, 2024

In addition, the final result or solutions list is presented in Figure 4 below:

Table 12. Solution List

Variable	Status	Value
X1	NONBasic	0
X2	NONBasic	0
X3	Basic	6
Slack 1	NONBasic	0
Slack 2	Basic	4
Slack 3	Basic	4
Optimal Value (Z)		2700

Source: Author Processed Data, 2024

The results of linear program testing show that Bakso Barokah Shop has a maximum profit of IDR 2,700,000 per meatball production weekly. Calculations using the POM-QM program give the same results as previous manual calculations to prove the accuracy of the calculation results and determine the greatest profit that can be generated from limited resources (Agnia et al., 2021; Koltai & Tatay, 2011). With this research, problem-solving skills and simplex method solutions can help make a decision (Basadur, Pringle, et al., 2000; Basadur, Runco, et al., 2000; Jdid et al., 2022). Thus, the results of this study can be a reference and guideline in decision-making related to meatball production in the Bakso Barokah Shop.

CONCLUSION AND RECOMMENDATION

Based on the simplex analysis, the maximum weekly profit of Bakso Barokah Shop is IDR 2,700,000, six times the Mercon meatballs production. The calculation results using the simplex method show that the optimal production for meatballs is to focus on producing Mercon meatballs rather than other meatballs. By optimizing production and profits, businesses can develop better and more sustainably in the future. This research proves that the optimal calculation results are appropriate and reliable. Therefore, the results of this study can be used as a decision-making consideration related to the production problems of Bakso Barokah Shop to get optimal profits. Further research can use different applications to encourage the sustainability of MSMEs in Indonesia.

REFERENCES

Agnia, G., Herwanto, D., Hoerunisa, I., Nugraha, B., & Sari, R. P. (2021). Optimize the Time and Network on the Distribution of Tempe Industry by Using the Approach of the Assignment and Networking. *Jurnal Serambi Engineering*, *6*(2). https://doi.org/10.32672/jse.v6i2.2863

Amaran, S., Sahinidis, N. V, Sharda, B., & Bury, S. J. (2019). Simulation Optimization: A Review of Algorithms and Applications. *Annals of Operations Research*, *240*(1), 351–380. https://doi.org/10.1007/s10479-015-2019-x

Andrews, D., & Serres, A. de. (2012). *Intangible*

Asset, Resource Allocation and Growth: A Framework for Analysis (OECD Economics Department Working Papers, Issue 989).

Ardila, R., & Maimunah, E. (2023). Optimalisasi Pendapatan Berkendala Pada Usaha Mi Bakso Di Kota Metro. *BULLET: Jurnal Multidisiplin Ilmu*, *2*(2), 415–425.

Arifudin, O., Wahrudin, U., Rusmana, F. D., & Tanjung, R. (2020). Pendampingan UMKM Dalam Meningkatkan Hasil Produksi Dan Hasil Penjualan Opak Makanan Khas Jawa Barat. *Jurnal Karya Abdi Masyarakat*, *4*(2), 313–322. https://doi.org/10.22437/jkam.v4i2.10560

Bappenas. (2023). Laporan Perkembangan Ekonomi Indonesia dan Dunia Triwulan II Tahun 2023. In *Perkembangan Ekonomi Indonesia dan Dunia* (Vol. 7, Issue 1).

Basadur, M., Pringle, P., Speranzini, G., & Bacot, M. (2000). Collaborative Problem Solving Through Creativity in Problem Definition: Expanding the Pie. *Creativity and Innovation Management*, *9*(1), 54–76. https://doi.org/10.1111/1467-8691.00157

Basadur, M., Runco, M. A., & Vegaxy, L. A. (2000). Understanding How Creative Thinking Skills, Attitudes and Behaviors Work Together: A Causal Process Model. *Journal of Creative Behavior*, *34*(2), 77–100. https://doi.org/10.1002/j.2162-6057.2000.tb01203.x

Bekmezci, M. (2015). Companies' Profitable Way of Fulfilling Duties towards Humanity and Environment by Sustainable Innovation. *Procedia - Social and Behavioral Sciences*, *181*, 228–240. https://doi.org/10.1016/j.sbspro.2015.04.884

BPS. (2023). *Pertumbuhan Ekonomi Kota Bandung Tahun 2022* (Vol. 3, Issue 03).

Cardon, M. S., & Stevens, C. E. (2004). Managing Human Resources in Small Organizations: What Do We Know? *Human Resource Management Review*, *14*, 295–323. https://doi.org/10.1016/j.hrmr.2004.06.001

Chesbrough, H. (2007). Business Model Innovation: It's Not Just about Technology Anymore. *Strategy and Leadership*, *35*(6), 12–17. https://doi.org/10.1108/10878570710833714

De Toni, D., Milan, G. S., Saciloto, E. B., & Larentis, F. (2017). Pricing Strategies and Levels and Their Impact on Corporate Profitability. *Revista de Administração*, *52*(2), 120–133. https://doi.org/10.1016/j.rausp.2016.12.004

Eichler, H. G., Kong, S. X., Gerth, W. C., Mavros, P., & Jönsson, B. (2004). Use of Cost-Effectiveness Analysis in Health-Care Resource Allocation Decision-Making: How Are Cost-Effectiveness Thresholds Expected to Emerge? *Value in Health*, *7*(5), 518–528. https://doi.org/10.1111/j.1524-4733.2004.75003.x

Ginting, A. P., Hubeis, M., & Fahma, F. (2019). Strategi Pengembangan UMKM Pangan Berdaya Saing di Kota Bandung. *MANAJEMEN IKM: Jurnal Manajemen Pengembangan Industri Kecil Menengah*, *14*(1), 1–7. https://doi.org/10.29244/mikm.14.1.1-7

Haessler, P. (2020). Strategic Decisions between Short-Term Profit and Sustainability. *Administrative Sciences*, *10*(3), 63. https://doi.org/10.3390/admsci10030063

Hakim, L., Paramu, H., & Gusminto, E. B. (2018). Penerapan Linear Programming Dalam Penentuan Kombinasi Produk Guna Memaksimalkan Laba Pada Ud Putera Sroedji Jember. *Bisma: Jurnal Bisnis Dan Manajemen*, *12*(3), 300. https://doi.org/10.19184/bisma.v12i3.9000

Handoyo, S., Suharman, H., Ghani, E. K., & Soedarsono, S. (2023). A Business Strategy, Operational Efficiency, Ownership Structure, and Manufacturing Performance: The Moderating Role of Market Uncertainty and Competition Intensity and its Implication on Open Innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, *9*(2), 100039. https://doi.org/10.1016/j.joitmc.2023.100039

Helilusiatiningsih, N., Soenyoto, E., Irawati, T., & Fitriyah, N. (2023). Pelatihan Mahasiswa dalam Pembuatan Mie Ayam Spesial di Laboratorium Agroteknologi UNISKA. *CENDEKIA: Jurnal Pengabdian Masyarakat*, *5*(2), 88–94. https://doi.org/10.32503/cendekia.v5i2.4052

Hermanianto, J., & Andayani, R. Y. (2002). Studi Perilaku Konsumen dan Identifikasi

Parameter Bakso Sapi Berdasarkan Preferensi Konsumen di Wilayah DKI Jakarta. *Jurnal Teknologi Dan Industri Pangan*, *8*(1), 1–10.

Hosseini, A. S., Soltani, S., & Mehdizadeh, M. (2018). Competitive Advantage and Its Impact on New Product Development Strategy (Case Study: Toos Nirro Technical Firm). *Journal of Open Innovation: Technology, Market, and Complexity*, *4*(2), 1–12. https://doi.org/10.3390/joitmc4020017

Jdid, M., Salama, A. A., & Khalid, H. E. (2022). Neutrosophic Handling of the Simplex Direct Algorithm to Define the Optimal Solution in Linear Programming. *International Journal of Neutrosophic Science*, *18*(1), 30–41. https://doi.org/10.54216/IJNS.180104

Jensen, M. C. (2002). Value Maximization, Stakeholder Theory, and The Corporate Objective Function. *Business Ethics Quarterly*, *12*(2), 235–256. https://doi.org/10.2307/3857812

Khamimah, W. (2021). Peran Kewirausahaan Dalam Memajukan Perekonomian Indonesia. *Jurnal Disrupsi Bisnis*, *4*(3), 228–240. https://doi.org/10.32493/drb.v4i3.9676

Koltai, T., & Tatay, V. (2011). A Practical Approach to Sensitivity Analysis in Linear Programming under Degeneracy for Management Decision Making. *International Journal of Production Economics*, *131*(1), 392–398. https://doi.org/10.1016/j.ijpe.2010.04.037

Kusumaningrum, D. A., Pangestu, N. D., Yolanda, D., & Putra, R. H. O. (2021). Strategi Usaha Mikro Kecil (UMK) Kuliner Menghadapi Pandemi Covid-19 di Jakarta. *Jurnal Disrupsi Bisnis*, *4*(6), 551. https://doi.org/10.32493/drb.v4i6.14536

Laela, E., & Azhari, S. C. (2023). Bibliometric Analysis: Patterns of Significance and Correlation in Consumer Satisfaction Research. *Jurnal Bisnis & Kewirausahaan*, *19*(01), 81–94. https://doi.org/10.31940/jbk.v19i1.81-94

Laela, E., Putri, M. A., Ningrat, S. R., Hakiki, R., Awalludin, R. A., & Muiz, A. N. (2023). Store Atmosphere terhadap Consumer Satisfaction melalui Experiential Marketing dan Perceived Quality Baso Japri Tasikmalaya. *Sosio E-Kons*, *15*(1), 12–23. https://doi.org/10.30998/sosioekons.v15i1.15560

Levinthal, D. A., & Wu, B. (2010). Opportunity Cost and Non-scale Free Capabilities: Profit Maximization, Corporate Scope, and Profit Margins. *Strategic Management Journal*, *31*, 780–801. https://doi.org/10.1002/smj.845

Lina, T. N., Rumetna, M. S., Pormes, F. S., Ferdinandus, W., & Matahelumual, F. (2022). Pelatihan Optimalisasi Sumber Daya pada Usaha Kecil dan Menengah Menggunakan Metode Simplek Serta POM-QM. *Jurnal Pengabdian Masyarakat Bidang Sains Dan Teknologi*, *1*(4), 453–461. https://doi.org/10.55123/abdikan.v1i4.976

Luedtke, J., Ahmed, S., & Nemhauser, G. L. (2010). An Integer Programming Approach for Linear Programs with Probabilistic Constraints. *Mathematical Programming*, *122*, 247–272. https://doi.org/10.1007/s10107-008-0247-4

Maemonah, S. (2015). Strategi Pengembangan Industri Kecil Gula Aren di Kecamatan Limbangan Kabupaten Kendal. *Economics Development Analysis Journal*, *4*(4), 414–426. http://journal.unnes.ac.id/sju/index.php/edaj

Mandal, P. K. (2023). A Review of Classical Methods and Nature-Inspired Algorithms (NIAs) for Optimization Problems. *Results in Control and Optimization*, *13*, 100315. https://doi.org/10.1016/j.rico.2023.100315

Nuryana, D., & Rosyana, T. (2019). Analisis Kesalahan Siswa SMK dalam Menyelesaikan Soal Pemecahan Masalah Matematik pada Materi Program Linear. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, *3*(1), 11–20.

Opper, S., Wong, S., & Yang, Y. (2012). Sales Maximization or Profit Maximization? How State Shareholders Discipline their CEOs in China. *Asia-Pacific Journal of Financial Studies*, *41*(3), 347–375. https://doi.org/10.1111/j.2041-6156.2012.01076.x

Rijal, M. (2017). Diversifikasi Produk Olahan Ikan Bagi Ibu-Ibu Nelayan Di Dusun Mamua Kabupaten Maluku Tengah. *Jurnal Biology Science and Education*, *6*(2), 159. https://doi.org/10.33477/bs.v6i2.383

Schoubben, F., & Hulle, C. Van. (2004). The Determinants of Leverage; Differences between Quoted and Non Quoted Firms. *Economic and Management*, *XLIX*(4), 589–621.

Shipley, D., & Jobber, D. (2001). Integrative Pricing via the Pricing Wheel. *Industrial Marketing Management*, *30*(3), 301–314. https://doi.org/10.1016/S0019-8501(99)00098-X

Singgih, M. N. (2007). Strategi Penguatan Usaha Mikro Kecil Menengah (UMKM) sebagai Refleksi Pembelajaran Krisis Ekonomi Indonesia. *Jurnal Ekonomi Modernisasi*, *3*(3), 218–227. http://e-journal.ukanjuruhan.ac.id

Utami, T. W., & Damayanti, A. (2022). Dekomposisi Pertumbuhan Produktivitas Industri Manufaktur Indonesia: Pendekatan Stochastic Frontier. *Jurnal Ekonomi Dan Kebijakan Publik Indonesia*, *9*(2), 1–17.