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DISTRIBUTOR SELECTION ON THE IMPACT OF DEMAND FOR COFFEE PRODUCTS: AHP – SINGLE EXPONENTIAL SMOOTHING

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ABSTRACT

The purpose of this study is to assess the performance of suppliers based on the AHP method at the highest weight level, the consistency level of supplier performance based on the smallest consistency value and predict demand with the selected value in the conversion in the kilogram model. The research methodology is quantitative integration of AHP- Single Exponential Smoothing. The data of this study is primary data covering the AHP of the questionnaire, secondary data covering the data of actual requests. This study states that the performance of suppliers includes Quality, Cost and Delivery with consistency with the smallest criteria, namely Delivery, Quality and Flexybility. Meanwhile, the demand prediction with a capacity of 1336 cups of arabica coffee was converted to a capacity of arabica coffee beans of 27 kg in April 2022. The implications of this study are expected to be carried out in determining the dumping factor is experiment with a dumping factor decision-making model that is adjusted to the needs of the TKP Coffee Shop. The suggestion of this study for researchers can then determine the estimated capacity of safety supplies and an economical ordering model.

Keywords: Analytical Hierarchy Process, Exponential, Distributor Selection, Coffee Shop Business.

1. Introduction

Coffee production from 2017 to 2019 was fairly rapid in Indonesia. Export activity reached 8.65 thousand tons or reached 1.17% of the total production. Dominant export activity in the arabica type where the Asian, Australian, American and European continents are the main export commodity continents (BPSStatistik, 2017). Connoisseurs of brewed coffee derived from arabica types almost all predominantly consume from adolescence to adulthood (Edelmann et al., 2022). One of the Coffee Shops, namely the TKP Coffee Shop, is a briefing place for customers who want to just enjoy Arabica coffee and do formal agenting. The demand level for arabica coffee over a period of 36 months is predominantly more than 8000 cups daily. Therefore, the level of importance of this research is to

optimize the quality of arabica coffee, suppliers with certain criteria are needed and inventory capacity is needed every month. The role of the supplier is very important in order to provide arabica coffee bean products that are in demand by customers and the role of the right inventory to meet customers who visit the TKP Coffee Shop. The role of suppliers and coffee shops has a communication role that must be maintained to provide the right inventory capacity so that customers always visit (Alfian Pradana et al., 2020).

The issue of this study is how important the criteria must be met by suppliers and how much capacity the Coffee Shop provides to meet the supply of arabica coffee for customers. This research has never been done by anyone because the research that will be carried out tries to integrate the AHP and Single Exponential Smoothing methods. Every month arabica coffee suppliers are not optimal in carrying out performance. This happens with several cases, namely defects in arabica coffee bean products, high costs of transportation activities on weekends, estimated delivery times hampered due to weather and there are delays in information services, the expectations of the owner of the TKP Coffee Shop have not been able to be met and the information conveyed still has inappropriate communication. From these factors, the supply of arabica coffee beans is automatically late and customers who come will complain because the coffee ordered is not fulfilled. This incident occurred within this 6-month period. To suppress the occurrence of current cases, it is important to set supplier criteria to reduce delays, improve supplier performance and predict customer requesting needs for arabica coffee consumption at the TKP Coffee Shop to suppress the occurrence of current cases.

Findings of (Desha Aguslian Bermano & Gustian, 2021; Jawak & Sinaga, 2020; Saputra & Novita, 2021), states that quality, delivery, service and price as criteria with the highest vector eigenvalues are shipments. It means that delivery is the most important performance benchmark. While the statement (Ahmad et al., 2022), the most important criterion is quality because quality as a weighing of product inventory. In contrast to the statement (Baroto & Utama, 2020), the level of price importance as a support in the classification of getting high profits from the sale of coffee products. In contrast to the expression (Mario et al., 2018), The selected classification of suppliers who are at the average level is delivery. Where the role of delivery is closely related to the estimation of inventory time which will be the fulfillment of customer needs.

AHP is more complex to discuss suppliers with criteria and sub criteria. Therefore, the subcriteria used in this study is an advantage role from the previous findings (Desha Aguslian Bermano & Gustian, 2021)**.** From the level of importance of the supplier criteria, it is used to achieve a large number of predictions resulting from the Single Exponential Smoothing method to meet the needs of arabica coffee in the future. After the criteria are met, there will be a target of meeting the needs of arabica coffee to achieve the target according to the calculation of the Single Exponential Smoothing method. Findings (Endra & Laurina, 2021), states that the estimated prediction is 53,262 cups daily. This became the benchmark for the least inventory. While the findings (Amelia et al., 2019), states that the Mean Absolute Percentage (MAPE) level has a significant impact that the smaller the MAPE the predicted value is worth using. Research (Deina et al., 2021), estimated predictions over time will decrease if the data history decreases. This means that the predicted estimates will be less than the actual data.

Based on the issues and findings of the predecessor, the discussion of supplier selection and prediction of dominant demand is not one finding. Rather, it is split from each article. Therefore, this is a research gap that is the development of AHP-Single Exponential Smoothing integration. The scope of this study is 1 kg arabica coffee beans capable of producing 50 cups of arabica coffee, research observation data for 36 months, AHP criteria model using respondents, namely Owner, Barista and Manager at TKP

coffee shop. The integration of these two methods as a plan answers the research objectives, namely (1) the performance of suppliers based on the AHP method at the highest weight level (2) The level of consistency of supplier performance is based on the smallest consistency value. (3) predicted demand in April 2022 with the selected value in the conversion in the kilogram model.

2. Literature Review

Analytical Hierarchy Process (AHP)

AHP is a method that serves for decision-making on the condition that the respondent is more than 1 person (Siregar et al., 2019; Tirkolaee et al., 2021). In addition, the AHP method does not require the level of validation and reliability of the criteria used (Jawak & Sinaga, 2020; Nguyen et al., 2021; Onainor, 2019). The role of AHP has a hierarchical design with the connection of paired comparison matrices. Where this role can be made a correlation between the criteria and sub-criteria used (Duong et al., 2018).

Single Exponential Smoothing

Single Exponential Smoothing has a function as a prediction of time series data in the future (Fauzi et al., 2020). The use of Single Exponential Smoothing as a prediction with the condition of the use of dumping factor. The dumping factor used ranges from 0.1 to 0.9(Deina et al., 2021). However, some of the findings are different. This is in terms of the aspect of research assumptions (Duong et al., 2018; Novanda et al., 2018; Rincón et al., 2020). Thus, the specified dumping factor is expected to suppress the occurrence of excess coffee bean products. If there is an excess of arabica coffee bean products, the estimated budget every month can increase (Harijanto et al., 2020; Zhu et al., 2022)

3. Method

The research design uses quantitative integration of AHP- Exponential Smoothing. AHP function is to determine the supplier of coffee beans according to criteria and sub-criteria. Meanwhile, Exponential Smoothing to predict the demand for coffee beans uses dumping factors 0.8, 0.5 and 0.2. There is a research population, namely for AHP parties involved in CoffeeShop TKP. The selected samples were Baristas with 6 years of experience (weight 0.5) as respondent 1, Owner with 6 years of experience (weight 0.3) as respondent 2, Manager with 4 years of experience (weight 0.2) as respondent 3. As for Exponential Smoothing, it uses historical data on the demand for coffee beans for 36 months with saturated sample types. Primary data research instruments for AHP questionnaires with criteria of Quality (X1), Cost (X2), Flexibility (X3), Delivery (X4), Responsiveness (X5), and Reliability (X6). While the secondary data for Exponential Smoothing is reputable demand history and scientific literacy data on the topics of demand management and decision-making.

Table 1.
Operational Constructs

Constructs	Definition	Items and sub-Items	Measurement	Scale
Supplier	The party in charge of providing product supply for users	1. Quality (broken coffee beans, reddish-brown coffee bean color, and smell like medicine) (Ahmad et al., 2022), 2. Cost (negotiation, wholesale and include expedition) (Barolo & Utama, 2020)	AHP Method	Nominal

		3. Flexibility (timing suitability, purposefulness, and quality adaptation) 4. Delivery (inventory, information, time) (Desha Aguslian Bermano & Gustian, 2021), 5. Responsiveness (policy, transparency, and terms of service) (Mario et al., 2018), 6. Reliability (fulfilled expectations, trusted and guaranteed service)		
Forecasting	Product management function of user demand and guaranteeing reliable delivery estimates	Exponential smoothing (Fauzi et al., 2020)	Dumping factor 0.8; 0.5 and 0.2	Nominal

The research data analysis technique uses AHP within the following stages:
AHP uses a decision model with the following stages (Handayani et al., 2018):

1. Defining problems and goals
2. Drawing up a hierarchy of problems taken from criteria and subcriteria.
3. Creating a comparison matrix in pairs with weighting so that the level of importance of alternatives to the criteria is clearly stated.

Table 2.
AHP Scale

Importance level	Information
9	Absolutely more influential
7	Very more influential
5	More influential
3	A little more influential
1	Equally influential
2, 4, 6, 8	Values in between

Source: (de Felice et al., 2015)
Decision makers by assessing the degree of importance of the elements in the following matrix model:

$$A = [a_{11} \ldots a_{1n} \ldots \ldots \ldots a_{n1}\ a_{n2}\ a_m\ ] \quad \ldots 1)$$

4. Calculate the geometric average to get the stump results from several respondents. The geometric mean formula is:

$$f(x_1, x_2, \ldots x_n) = x_1^{q1}\ x_2^{q2} \ldots x_n^{qn} \quad \ldots 2)$$

Information:
$f(x)$ = geometric mean
x_n= the value that each respondent gives in the comparison
q_n = respondent weights

5. Determining priorities by arranging problem elements at the hierarchy level to determine the normalized value:

$$Z_j = \sum_{i=1}^{n} \quad a_{ij}, \text{ for } j=1,2, \ldots n \qquad \ldots 3)$$

Information:
Z_j= the number of elements in the j-th column
Elements – elements on the matrix divided by Z_j, to obtain normalization. Then search for vector weights with average using the formula:

$$w_i = \frac{\sum_{j=1}^{n} \frac{a_{ij}}{z_j}}{n} \text{ for i = 1,2, …n} \qquad \ldots 4)$$

If the correlational comparison is complete, then the eigen vector is searched by the formula:

$$A \,.\, w = \lambda_{maks} \,.\, w \qquad \ldots 5)$$

Information
A = pairwise comparison matrix
λ_{maks}= the largest eigen vector of A

6. Calculate the consistency ratio by providing a numeric value with a consistency index using the formula:

$$CI = \frac{\lambda_{maks} - n}{n-1} \qquad \ldots 6)$$

Information:
N = matrix size or the number of items compared

7. If CI is worth 0, it is declared a consistent matrix. Inconsistent limits use the consistency ratio (CR) or the comparison of the consistency index to the random index (RI) with the formula:

$$CR = \frac{CI}{RI} \qquad \ldots 7)$$

8. Ranking with the highest weight.

Exponential Smoothing

The steps of exponential smoothing is done as follows

a. Determine the alpha value used for forecasting with the following formula:

$$a = \frac{2}{n+1} \qquad \ldots 8)$$

Information:
α = Information
n = data on the multiplicity of periods

b. Calculating errors in forecasting using (MAD) Mean Absolute Deviation, as a measurement of the average error in guessing using the formula (Indrasari, 2020) :

$$MAD = \frac{\sum_{t=1}^{n} (T_t - Y'_t)}{n} \qquad \ldots 9)$$

Information:
T_t = data requests in the period *t*
Y'_t = forecast value in the period *t*
n = data on the multiplicity of periods

c. Calculating the error squarely (Mean Square Error) using the following formula:

$$MSE = \frac{\sum (T_t - Y'_t)^2}{n} \qquad \ldots 10)$$

$\sum (T_t - Y'_t)^2$ = (demand data on period *t* – forecast value of period *t*)^2
N = data on the multiplicity of periods

d. Calculate relative forecasting errors, using MAPE (Mean Absolute Percentage Error) assuming a percentage of the error value according to actual data that is too high or too low using the formula (Sungkawa & Megasari, 2011) :

$$MAPE = \frac{1}{n}\sum_{t=1}^{n} \frac{|Y_t - \hat{Y}_t|}{Y_t} \quad \ldots 11)$$

Information:

Y_t = actual value in the period *t*

$\widehat{Y_T}$ = forecast value in the period *t*

n = data on the multiplicity of periods

e. Perform forecasting calculations using SES (Single Exponential Smoothing), due to unstable data patterns using formulas (Indrasari, 2020) :

$$F_{t+1} = aX_1 + (1 - a)F_t \quad \ldots 12)$$

Information :

X_t = data requests in the period *t*

α = smoothing contanta (0,1 < *x*< 0,9)

F_{t+1} = forecasting for the period *t*+1

4. Result and Discussion

Based on the processing of research data for the AHP – Exponential Smoothing method, the following discussion results were obtained.:

Table 3.
Normalized Eigen Vektor Criteria AHP

	Quality	Cost	Flexibility	Delivery	Responsiveness	Reliability	Total	Eigen vector
Quality	0.240	0.306	0.251	0.161	0.220	0.252	1.429	0.238
Cost	0.148	0.188	0.325	0.198	0.205	0.126	1.191	0.198
Flexibility	0.138	0.083	0.144	0.284	0.155	0.181	0.985	0.164
Delivery	0.240	0.153	0.082	0.161	0.222	0.157	1.015	0.169
Responsiveness	0.138	0.116	0.117	0.091	0.126	0.181	0.769	0.128
Reliability	0.098	0.153	0.082	0.105	0.072	0.103	0.612	0.102

Source: Data Process Result (2022)

Weighting of the criteria with the highest score on the criteria of Quality rank 1, Cost rank 2 and Delivery rank 3. Each with a vector eigenvalue of 0.238; 0,198; and 0.169. The inconsistency used was 0.005 with an estimated accuracy of 0.01.

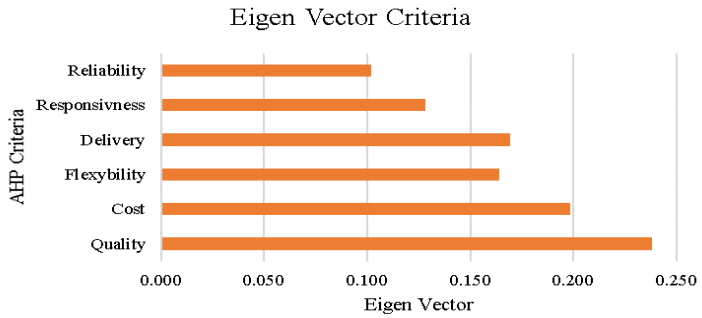


Figure 1. Normalized Eigen Vector Criteria

Eigen vector weighting as a normalization with the highest role on Quality, Cost and Delivery criteria.

Table 4.
Weighting of AHP Criteria and Sub-Criteria

Criteria	Weight	Rank	Sub Criteria	Partial Weights	Global Weights
Quality	0.2381	1	Cracked coffee beans	0.4233	0.1008
			The color of the coffee beans is reddish brown	0.3055	0.0727
			Smells like medicine	0.2712	0.0646
Cost	0.1984	2	Negotiated pricing	0.3484	0.0691
			Wholesale prices	0.4181	0.0830
			Price includes expedition costs	0.2334	0.0463
Flexybility	0.1641	4	Bookings are delivered on time	0.3524	0.0578
			Bookings are delivered as intended	0.3953	0.0649
			Quality adaptation	0.2523	0.0414
Delivery	0.1692	3	Ordering supplies	0.4632	0.0784
			clear booking information	0.2880	0.0487
			Estimated delivery time	0.2488	0.0421
Responsivness	0.1282	5	Thoughtful clarity	0.3551	0.0455
			Transparent and accountable information	0.3701	0.0474
			Terms of service are met	0.2748	0.0352
Reliability	0.1020	6	Fulfilled expectations	0.6432	0.0656
			Trusted	0.5543	0.0565
			Guarantee the best service	0.4484	0.0457

Source: Data Process Result (2022)

The determination of Quality with rank 1 has a weight value of 0.2381 with the dominant sub-criterion being broken coffee beans. The dominant role of broken coffee beans is stated as the failure of suppliers who are declared unfit to be expeditioned to the TKP coffee shop. Therefore, the importance of the condition of coffee beans is a strict consideration. Cost determination with rank 2 has a rank of 2 with a weight of 0.1984 with the dominant sub-criterion being wholesale prices. The role of wholesale prices is very influential for resale at TKP coffee shop. Therefore, suppliers provide wholesale prices as an opportunity for TKP coffee shops to increase the role of high profits from time to time. Delivery

determination with rank 3 has a weight value of 0.1692 with the dominant sub-criterion being order inventory. Ordering inventory is the spearhead which plays an important role in meeting the supply of coffee beans with quality except for broken coffee beans. Therefore, TKP coffee shops that have customers every day an average of 100 visitors need to consider the estimated capacity of coffee bean supplies.

Flexybility determination that dominates the sub-criteria is order sent according to the destination. Orders sent according to the purpose are one of the missions carried out by suppliers to provide hope when needed related to the supply of coffee beans at TKP coffee shop. Furthermore, the dominating Responsiveness is the sub-criteria of transparent and accountable information and the dominating Realibility is the sub-criteria of Meeting expectations.

Table 5.
AHP Consistency Test

	Sigma VB	Lambda max	CI	CR<0,1	Decision	Rank
Quality	9.030	3.010	0.005	0.010	Consistent	5
Cost	9.103	3.034	0.017	0.033	Consistent	3
Flexybility	9.040	3.013	0.007	0.013	Consistent	4
Delivery	9.040	3.005	0.003	0.005	Consistent	6
Responsivness	9.207	3.069	0.035	0.066	Consistent	1
Reliability	9.161	3.054	0.027	0.052	Consistent	2

Source: Data Process Result (2022)

Determination of the consistency test value as the most important parameter. Where the criteria that are declared consistent are worthy of use as parameters for determining the criteria for suppliers who are able to provide the best performance for TKP coffee shops. Based on the consistency test of the Criteria of Quality, Cost, Flexybility, Delivery, Responsivness, Reliability, each has a Consistensy Ratio ≤ 0.1. The assessment of the highest consistency ratio criteria was Responsivness of 0.066, the second order was Reliability of 0.052 and the third order was Cost of 0.033

Table 6.
Single Exponential Smoothing Kriteria Dumping Factor

Periods	Demand	alpa=0,2				alpha=0,5				alpha=0,8			
		Forecast	MAD	MSE	MAPE	Forecast	MAD	MSE	MAPE	Forecast	MAD	MSE	MAPE
April 2019	8568	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
May	8904	8,904	-	-	-	8,904	-	-	-	8,904	-	-	-
June	9296	8,982	314	98,345	0.034	9,100	196	38,416	0.021	9,218	78	6,147	0.008
July	8162	8,818	656	430,756	0.080	8,631	469	219,961	0.057	8,373	211	44,572	0.026
August	7840	8,623	783	612,550	0.100	8,236	396	156,420	0.050	7,947	107	11,369	0.014
September	7836	8,465	629	396,050	0.080	8,036	200	39,900	0.025	7,858	22	490	0.003
October	8321	8,436	115	13,331	0.014	8,178	143	20,342	0.017	8,228	93	8,570	0.011
November	8135	8,376	241	58,162	0.030	8,157	22	470	0.003	8,154	19	349	0.002
December	7963	8,294	331	109,253	0.042	8,060	97	9,379	0.012	8,001	38	1,454	0.005

January	8142	8,263	121	14,696	0.015	8,101	41	1,687	0.005	8,114	28	794	0.003
February	8019	8,214	195	38,174	0.024	8,060	41	1,678	0.005	8,038	19	360	0.002
March	8034	8,178	144	20,824	0.018	8,047	13	168	0.002	8,035	1	1	0.000
April 2020	8108	8,164	56	3,163	0.007	8,077	31	931	0.004	8,093	15	214	0.002
May	8082	8,148	66	4,329	0.008	8,080	2	5	0.000	8,084	2	5	0.000
June	8036	8,125	89	7,999	0.011	8,058	22	478	0.003	8,046	10	93	0.001
July	8180	8,136	44	1,905	0.005	8,119	61	3,729	0.007	8,153	27	722	0.003
August	7790	8,067	277	76,773	0.036	7,954	164	27,050	0.021	7,863	73	5,275	0.009
September	8125	8,079	46	2,147	0.006	8,040	85	7,270	0.010	8,073	52	2,754	0.006
October	8062	8,075	13	178	0.002	8,051	11	124	0.001	8,064	2	4	0.000
November	7920	8,044	124	15,442	0.016	7,985	65	4,282	0.008	7,949	29	831	0.004
December	8323	8,100	223	49,724	0.027	8,154	169	28,488	0.020	8,248	75	5,600	0.009
January	7869	8,054	185	34,154	0.023	8,012	143	20,337	0.018	7,945	76	5,751	0.010
February	8378	8,119	259	67,264	0.031	8,195	183	33,561	0.022	8,291	87	7,505	0.010
March	7795	8,054	259	67,039	0.033	7,995	200	39,961	0.026	7,894	99	9,855	0.013
April 2021	7638	7,971	333	110,712	0.044	7,816	178	31,845	0.023	7,689	51	2,627	0.007
May	8149	8,006	143	20,338	0.018	7,983	166	27,647	0.020	8,057	92	8,455	0.011
June	8137	8,033	104	10,918	0.013	8,060	77	5,950	0.009	8,121	16	256	0.002
July	8260	8,078	182	33,121	0.022	8,160	100	10,014	0.012	8,232	28	773	0.003
August	7756	8,014	258	66,361	0.033	7,958	202	40,790	0.026	7,851	95	9,071	0.012
September	6916	7,794	878	771,033	0.127	7,437	521	271,423	0.075	7,103	187	34,987	0.027
October	8652	7,966	686	471,051	0.079	8,044	608	369,067	0.070	8,342	310	95,970	0.036
November	9576	8,288	1,288	1,659,628	0.135	8,810	766	586,380	0.080	9,329	247	60,890	0.026
December	6832	7,997	1,165	1,356,264	0.170	7,821	989	978,364	0.145	7,331	499	249,449	0.073
January	6720	7,741	1,021	1,042,993	0.152	7,271	551	303,118	0.082	6,842	122	14,955	0.018
February	7560	7,705	145	21,030	0.019	7,415	145	20,944	0.019	7,416	144	20,604	0.019
March	6496	7,463	967	935,501	0.149	6,956	460	211,269	0.071	6,680	184	33,890	0.028
April 2022		5,970.57				3,477.82				1,336.02			
Average			352.64	246,320	0.05		214.72	100,327	0.03		89.62	18,418	0.01
					4.58				2.78				1.16

Source: Data Process Result (2022)

Single exponential smoothing uses 3 types of dumping factor, namely 0.8; 0.5 and 0.2. The value of this dumping factor with α of 0.2 each; 0.5 and 0.8. Single exponential smoothing uses a total of 36 months of data from April 2019 to March 2022. Thus, the predicted demand forecasting is April 2022. The april 2022 prediction results have differences from each different dumping factor. The predicted

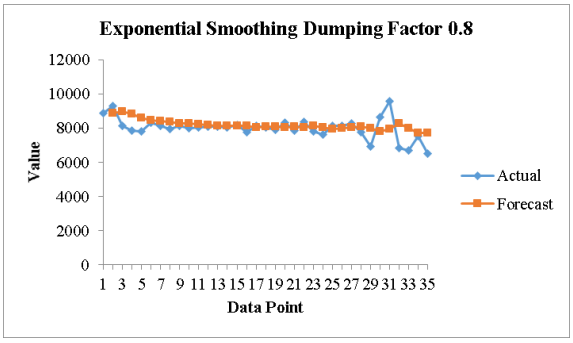
value of the request is used with the smallest MAPE value proof of the three MAPE values used. The smallest MAPE value at the dumping factor is 0.2 with a predicted demand of 1336 cups of arabica coffee. The conversion of 1336 cups into kilograms using the assumption that every 1 kg can be used for 50 cups of arabica coffee. Thus, the predicted demand for 1336 cups of arabica coffee with an estimated need for coffee bean capacity of 26.7 ~ rounded to 27 kg of arabica coffee.

Table 7.
Error Rate Comparison

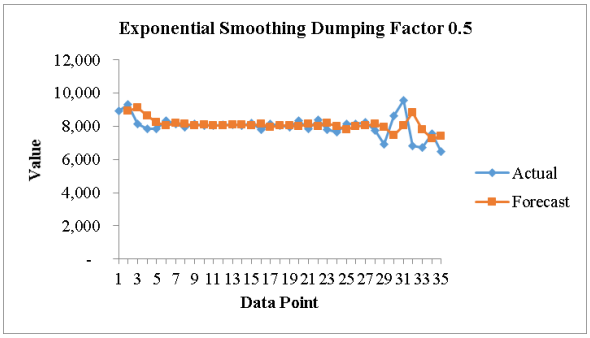
	Forecasting	alpa=0,2	alpha=0,5	alpha=0,8
Month	April 2022	5970.6	3477.8	1336.0
MAD		352.6	214.7	89.6
MSE		352.6	100327.1	18418.2
MAPE		4.6	2.8	1.2

Source: Data Process Result (2022)

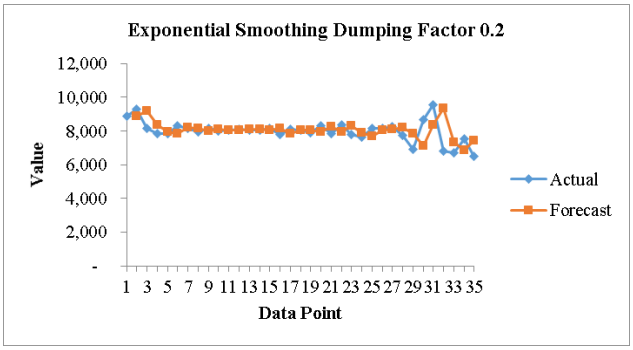
The comparison of the smallest error rate is at the dumping factor of 0.2 with a α accuracy rate of 0.8. MAD value of 89.6; and an MSE value of 18418.2. Thus, it can be expressed that the smaller the value of the α will decrease the MAD and MAPE values, while the MSE value will increase.



(a) Dumping Factor 0,8



(b) Dumping Factor 0,5



(c) Dumping Factor 0,2

Figure 2.
Comparison of Single Exponential Smoothing Criteria Dumping Factor

Source: Data Process Result (2021)

Comparison of single exponential smoothing values based on dumping factor 0.8; 0.5 and 02 have an increased predicted value at dumping factor 0.5 and dumping factor 0.2. Meanwhile, the

dumping factor of 0.8 is predominantly declining. Thus, dumping factor has an influence on forecasting using the single exponential smoothing method.

Research Discussion

Based on the results of the study, it is stated that the supplier criteria that must be met by the supplier need to have the highest weight on quality, cost, and delivery. Meanwhile, the expected consistency with the smallest consistency value close to the value of 0 is delivery, quality, and felxybility with an inventory of arabica coffee beans of 27 kg every month with an estimated amount per cup provided 1336 cups of arabica coffee for customers at the TKP Coffee Shop. AHP context findings answer (Ahmad et al., 2022), where the importance level of the Quality criteria is equal, that is, the value obtained is 0.37. This means that the quality criteria are the main benchmark of the various findings and results of this study. Therefore, we provide an assessment of subcriteria as an advantage over the preliminary findings. It is stated that from the Quality criteria have sub-covers no broken coffee beans, the color of the coffee beans is reddish brown and smells like medicine. These three sub-criteria are the responsibility of the supplier to have a consistent commitment to the sustainability of the TKP Coffee Shop. In addition, the Cost criterion with the sub-criteria of negotiated price, wholesale price, price including expedition costs is of further weight interest with the dominant value of wholesale price. This finding is in the same direction as (Baroto & Utama, 2020) with the same price role – equally having importance. This means that the price has an impact on the sustainability of the TKP Coffee Shop. Therefore, the higher the compensation given regarding prices by suppliers, it will be a high opportunity to increase profits and increase the supply of arabica coffee for visitors. This is why the role of demand prediction needs to be calculated with the Single Exponential Smoothing method.

The calculation selected with the smallest MAPE is 1.2 with a predicted demand of 1336 cups or 27 kg of arabica kopo seeds in April 2022. This prediction becomes a dominating answer and in the same direction as the findingswith the same price role – equally having importance. This means that the price has an impact on the sustainability of the TKP Coffee Shop. Therefore, the higher the compensation given regarding prices by suppliers, it will be a high opportunity to increase profits and increase the supply of arabica coffee for visitors. This is why the role of demand prediction needs to be calculated with the Single Exponential Smoothing method. The calculation selected with the smallest MAPE is 1.2 with a predicted demand of 1336 cups or 27 kg of arabica kopo seeds in April 2022. This prediction becomes a dominating answer and in the same direction as the findings (Fauzi et al., 2020), where the MAPE value becomes the selected parameter at the smallest MAPE value. In addition to MAPE's interests, the use of dumping factors has a high chance of estimating the best amount of inventory.

The dumping factor used was 0.8; 0.5 and 0.2. So, dumping factor experiments answer the findings (Rincón et al., 2020), that the dumping factor used was 0.4; 0.2 and 0.3 do not necessarily contribute to the prediction of high demand, however, this plays more of a role in predicting security in purchasing products so as not to exceed the costs in the TKP Coffee Shop. The use of dumping factors is a critical agenda that needs to be deepened in the inventory management model. Where the role of dumping factor plays a full role in the estimation of demand predictions. Therefore, in further research after determining the criteria for suppliers, it can be carried out the implementation of dumping factors with more diverse exponential forecasting models. Thus, it can be found the most fully contributing pattern to the already estimated demand.

5. Conclusion

This study produces conclusions according to the goals that have been formulated. The conclusion of this study is (1) the performance of suppliers selected by TKP Coffee Shop with the highest criteria includes Quality, Cost, and Delivery based on the highest weight. (2) The level of consistency of supplier performance selected by TKP coffee shop with the smallest criteria, namely Delivery, Quality and Flexybility. (3) the prediction of demand for using the smallest MAPE with a capacity of 1336 cups of arabica coffee converted to a capacity of 27 kg arabica coffee beans in April 2022. The implications of this study are expected to be carried out in determining the dumping factor is experiment with a dumping factor decision-making model that is adjusted to the needs of the TKP Coffee Shop. In addition, it can be carried out the determination of demand strategies for a sustainable increase in demand. The suggestion of this study for researchers can then determine the estimated capacity of safety supplies and an economical ordering model. On the other hand, it can consider a business model to increase demand capacity and assess how important the criteria that have been determined by the AHP method are in this finding.

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