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THE FACTORS AFFECTING BUYING DECISIONS OF ENGINEERED WOOD IN EAST JAVA

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Abstract

The gap between wood supply and demand in East Java will only widen due to population growth in the area. This gap has urged furniture industries to start utilizing waste as raw material for engineered wood to replace natural wood. Therefore, it is highly important to conduct in-depth market studies from the market perspective of the consumers (a combination of business consumers and end consumers) to understand the business prospect of engineered wood. Thus, observing which factors affecting the decisions of buyers (including cultural, social, personal, psychological, and marketing mix) to purchase products and the decisions of producers (including economic climate, political environment, corporate culture, physical climate, technology, personal climate, personal factors, interpersonal factors, and location) to produce products will enable the study to find empirical patterns to develop strategies. This study discovers that: 1) fourteen variables have an effect on buying decisions; 2) the factors of the consumers resulting from the simultaneous reduction of several variables significantly affect buying decisions; and 3) the factors of the consumers resulting from partial (individual) reduction of several variables significantly affect buying decision

Keywords: Processed timber, buying decision, East Java.

INTRODUCTION

Demand for wood, one of the limited natural resources that can be used to meet primary and secondary needs, largely originates from the demand for housing and household furniture (Thonemann & Schumann, 2018). The wood in demand is generally categorized as solid and engineered wood. The latter type appears as an effort to conserve the depleted forest as the main resource (Irland, 2008). The demand for natural wood continues to increase, while the supply is relatively stable or stagnant, causing shortages in the market. As an illustration, the demand for natural wood in Java and Bali, originally projected at approximately 22,400,000 m^3 in 2000, has reached 26,069,496 m^3 in fiscal year 1992/1993 (The Ministry of Forestry, 1994). This phenomenon shows an imbalance between supply and demand in East Java. Another example is the high demand for natural wood in 2001 that exceeds 5,000,000 m^3 while the supply is merely 1,800,000 m^3, leading to importing 2,300,000 m^3 of supply from other regions. This gap will definitely increase along with the increasing population in East Java (Perhutani, 2002).

This gap in production has urged the furniture industries to start using waste as raw material for engineered wood to reduce the dependence on natural wood. To address this dependency, engineered wood must meet several criteria: density, thickness swelling, static bending, modulus of rupture, and modulus of elasticity, all of which are the essential qualities of natural wood (Pribadiyono, 1999, p. 262).This trend is developing; engineered wood increasingly shows indications to be considered as an alternative. There are several reasons for this trend:

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(1) more attractive and extensive in terms of design, (2) easy to shape, (3) inexpensive, (4) relatively durable, (5) lightweight, and (6) strong. Household consumers generally use engineered wood for their furniture, such as study and computer desks, kitchen utensils, and cupboards.

Scientifically, end users as the buyers of end products are categorized as consumer market (Steriotis, Tsaousoglou, Efthymiopoulos, Makris, & Varvarigos, 2018). Kotler (1997, p. 168)defines consumer market as all individuals and organizations purchasing goods and services from other parties for consumption. Meanwhile, the companies processing wood are categorized as business market. Business market is organizations or groups purchasing goods from other parties to be processed into finished goods (Thornton, Henneberg, & Naudé, 2015). The activities in business market will create added value (Kotler, 1997, p. 183). Kotler also defines business market as all organizations purchasing goods and services to be used in the production of other goods or services later sold, leased, or supplied to other parties (Kotler, 2000, p. 196).

To explore the prospect of developing engineered wood, in-depth market studies need to be carried out from the market perspective of the consumers (a combination of business consumers and end consumers) (Hetemäki & Hurmekoski, 2016). To observe consumer behavior, it is necessary to pay attention to important factors that affect the decisions of the end consumers(including cultural, social, personal, psychological, and marketing mix(Kotler, 1997, p. 163))and business consumers (including economic climate, political environment, corporate culture, physical climate, technology, personal climate, personal factors, interpersonal factors, and location (Bovée, Houston, & Thill, 1995, p. 155)) to buy engineered wood. East Java is selected as the object of this study because in addition to accommodating a large number of wood industries, particularly engineered wood, this province is a strategic area for the engineered wood market.

THE FRAMEWORK AND HYPOTHESIS OF THE STUDY

The framework of this study refers to the findings of a dissertation by Pribadiyono (1999)entitled "Balance Sheet and Inventory Level as well as Innovation on the Utilization of Wood Waste in Indonesia". This study discovers that the price of natural wood is not determined by the strength of supply and demand, but rather by market trend despite the fact that market demand for wood cannot be fulfilled with natural wood supply.

The study also argues that engineered wood can replace the demand for natural wood. It is evident from the results of testing engineered wood, stating that engineered wood processed from wood waste has the qualities that meet the requirements of the substitute for raw materials for furniture. Processing wood waste from wood products is a transfer from engineered wood producers in the business market to wood producers in the consumer market (Chakravarty, Puri, Pala, & Shukla, 2015). Since this transaction involves two markets, this study is later directed to analyze the behavior of the business market and the consumer market collectively. This study will separately analyze each variable of the buying behavior of each market. Thus, the effect of each variable both partially and simultaneously on the decisions of the consumers

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to buy a product can be observed. In addition to data processing, the conceptual framework is also an important part of a study. In this study, the conceptual framework is designed as the description of the study. The conceptual framework is adopted from the theories of consumer behavior and marketing mix by Kotler (1997, p. 163) and theories about the factors affecting the decision of business markets to buy a product by Bovee, Houston, and Thill (1995, p. 155). Referring to these theories, this study proposes the following conceptual framework:

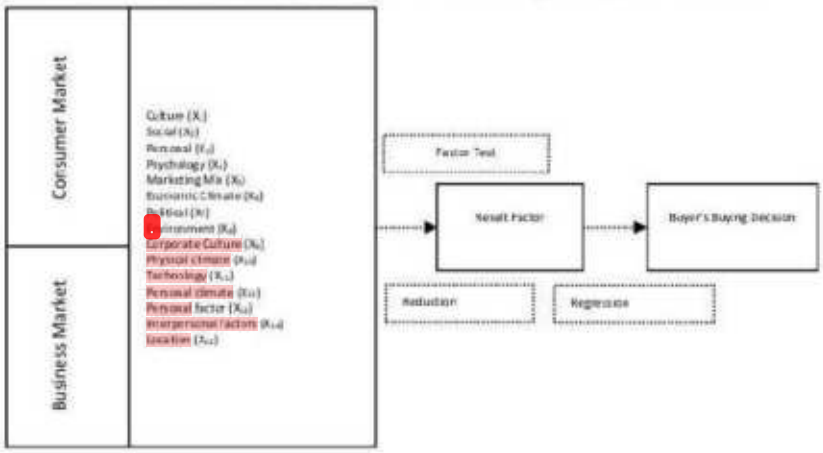

Chart 1: Conceptual Framework

Thus, the hypotheses proposed in this study are as follows:

First, the factors resulting from the reduction of several variables (cultural, social, personal, psychological, marketing mix, economic climate, political environment, corporate culture, physical climate, technology, personal climate, personal factors, interpersonal factors, and location) affect buying decision of engineered wood in East Java.

Second, the factors of the consumers resulting from simultaneous reduction of several variables significantly affect buying decision of engineered wood in East Java.

Third, the factors of the consumers resulting from partial (individual) reduction of several variables significantly affect buying decision of engineered wood in East Java.

METHOD

The Design of the Study

The design of this study applies the main method of survey study, namely a study applied by taking samples from the population and using questionnaires as an instrument for collecting primary data (Singarimbun & Effendi, 1995, p. 3). This study is also called an explanatory study due to its aim to explain the causal relationship among variables through hypothesis testing, by examining the factors affecting buying decision of engineered wood in East Java

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(Cornelissen, 2017). The consumers studied are a combination of business consumers and end consumers in East Java, with the scope of study covering issues related to the theories of marketing, customer satisfaction, consumer market, and business market as well as theories of buying decision.

Population and Sample

The population of the study includes all consumers of engineered wood in East Java, both the business consumers and end consumers, namely 134 companies consisting of three large companies engaged in plywood, 125 medium companies (59 IPKH companies and66 IPKL companies) and six small companies registered with Perhutani Public Corporation (Perum Perhutani unit II East Java, 2002), real estate sector such as PT Sono Jati in Driyo Rejo Gresik Housing and PT Ready Indah, and consumers distributed in Pacitan, Nganjuk, Madiun, Gresik, Lamongan and Surabaya. Random samples taken amount to 100 samples.

Variables and Indicators

Based on the conceptual framework and hypotheses of the study, the variables and indicators in this study are as follows:

First, there are 14 (fourteen) independent variables of the factors affecting Buying Decision of the consumer market (X) as follows: 1) **Cultural (X1)**, the culture or values adopted by consumers affecting their decision to buy engineered wood. The indicators include culture and social class; 2) **Social(X2),** an existing social condition in the consumer market affecting the consumers' decision to buy engineered wood. The indicators include family, role, and status; 3) **Personal(X3),** every existing aspects of the consumers that affects their buying decision of engineered wood. The indicators include employment, economic conditions, and lifestyle; 4) **Psychological(X4),** psychological aspects of the consumers in making decisions to buy engineered wood. The indicators include perception, knowledge, and belief; 5) **Marketing mix**(X5), a group of marketing tips utilized by companies to achieve their marketing goals, affecting buying decision of engineered wood. The indicators include: product, price, distribution, and promotion; 6) **Economic climate**(**X6**),a condition surrounding the consumers, leading to the decision to buy engineered wood. The indicators include economic conditions, inflation, exchange rates, and competition; 7) **Political environment (X7**),the political condition surrounding the consumers, leading to the decision to buy engineered wood. The indicators include state political conditions and existing (legal/formal) regulations; 8) **Corporate culture (X8),** the existing values (norms) in an organization or company affecting buying decision of engineered wood. The indicators include policies and systems;9) **Physical climate(X9),**the physical condition or environment of the market affecting buying decision of engineered wood. The indicators include geographical and demographic conditions; 10) **Technology (X10),**a set of equipment that becomes a tool or means for producing products (engineered wood)affecting buying decision of engineered wood. The indicators include: the level of technology, raw materials that meet technology standards, and the quality of results; 11) **Personal climate (X11),**the individual (personal) condition of consumers affecting buying decision of engineered wood. The indicators include values, personality, tendency to take risks,

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and possible deviations; 12) **Personal factors (X12),** all existing (personal) aspects of consumers affecting buying decision of engineered wood. The indicators include income and job position; 13) **Interpersonal factors (X13)**, interpersonal conditions of consumers affecting buying decision of engineered wood. The indicators include status, empathy, and persuasion power; and 14) **Location (X14)**, the location or place where consumers can buy engineered wood from suppliers. The indicators include transportation, distance, and shipping speed.

In this study, the answers to each indicator of variable X are given a level of assessment using Likert Scale (1 to 7), a method that measures agreement or disagreement with a particular subject, object, or event described in the statements in the questionnaire.

Second, the dependent variable is buying decision of engineered wood in East Java (Y), implying the consumer preference in the consumer market resulting in an attitude or decision to buy engineered wood. The indicators to measure buying decision are the effect of purchasing factors, buying decision according to the cubic required and the number of purchases of engineered wood every month (M3). To test the hypotheses, the analysis of the study applies statistical techniques, factor analysis and linear regression.

Factor Analysis Model. This model aims to discover dominant factors significantly affecting buying decision of engineered wood in East Java.

Multiple Linear Regression with variables resulting from thereduction aims to determine the effect of each variable both simultaneously and partially. In this analysis, the factors that have been reduced from factor analysis become variables of multiple linear regression.

The Objects of the Study

The objects of the study include all consumers, both the business consumers and the end consumers, namely: large wood companies such as PT Sumber Mas and PT Nusantara Plywood; medium companies such as PT Inhutani and PT Indomapan; real estate sector such as PT Sono Jati in Driyo Rejo Gresik Housing and PT Ready Indah, and end consumers distributed in Pacitan, Nganjuk, Madiun, Gresik, Lamongan and Surabaya.

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Table1: the Description of the Respondents

Consumer Characteristics	Total	Percentage (%)
Age:		
• 20 - 30 years old	12	12
• 31 - 40 years old	40	40
• 41 - 50 years old ≥ 50 years old	28 20	28 20
Gender:		
• Male	68	68
• Female	32	32
Last Education		
• High school	51	51
• Bachelor	32	32
• Master	15	15
• No description	2	2
Profession:		
• Civil Servants (PNS)	32	32
• TNI/POLRI	4	4
• Private	64	64
• Others	-	-
The Frequency of Buying:		
• Each month	42	42
• Each year	31	31
• Uncertain	27	27
Origin:		
• Gresik	10	10
• Lamongan	20	20
• Surabaya	34	34
• Sidoarjo	8	8
• Nganjuk	20	20
• Malang	4	4
• Madiun	2	2
• Bojonegoro	2	2

Engineered wood is generally utilized by households, companies, or industries for furniture. In general, the respondents of this study are aged between 20 and 50 years, male, and working as private employees and government employees.

The Description of the Data

The illustration of the object of this study is obtained from the answers collected from the respondents. The processed data can be used to test data normality, as follows:

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Table 2: Data Normality Test

Variable	n(cases)	Mean	Standard Deviation	Chi-quarter	Df	Asymp. Sig.
X1	100	3.5300	1.7564	39.880	12	0.000
X2	100	4.4550	1.4126	54.080	11	0.000
X3	100	3.8467	1.5759	56.760	16	0.000
X4	100	4.1800	1.3210	57.120	15	0.000
X5	100	4.5700	1.6002	76.400	20	0.000
X6	100	4.0250	1.4331	57.920	20	0.000
X7	100	4.0900	1.8941	12.320	12	0.267
X8	100	3.8950	1.8095	55.480	12	0.001
X9	100	3.3650	1.6141	53.340	10	0.000
X10	100	4.9733	1.7939	63.800	14	0.000
X11	100	4.1025	0.9893	58.400	11	0.000
X12	100	3.7050	1.7668	51.800	10	0.000
X13	100	3.9867	1.4409	67.620	16	0.000
X14	100	4.6567	1.6947	46.560	15	0.000
Y	100	4.0400	1.4543	32.240	18	0.021

Significant Level (α) = 0.05.

Based on the table, it is evident that: 1) the highest mean of 4.9733 is obtained by Technology (X10), while the lowest mean of 3.3650 is obtained by physical climate (X9). It suggests that the assessment of the respondents of technology (X10) is above average, while that of physical climate (X9) is below average. Meanwhile, the value of Y is 4.0400. Generally, it can be said that the data are normally distributed; 2) the standard deviation of the variables in this study is between the maximum value of 1.8941 obtained by political environmental (X7) and the minimum value of 0.9893 obtained by personal climate (X11). The higher the standard deviation, the more volatile or varied the data obtained. It reflects the increasingly varied assessments of the respondents, meaning that the data are normally distributed; 3) chi square test aims to discover whether the variables in this study are normally distributed or not. Observing the description in Asymp. Sig., it can be said that the overall data are quite normally distributed. Since the number of samples obtained (n = 100) is greater than the minimum samples required (n = 30), it can be said that the overall data are normally distributed; and 4) it appears that the data obtained by all variables are normally distributed and nearly perfect. In

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the non-parametric test, it is obvious that the values of Asymp. Sig. are good and perfect (0.00 < 0.05). Thus, the data can be considered normally distributed.

To easily calculate the percentage of the frequency distribution of respondents' answers, the answers are categorized into seven groups using the following statistical formula:

$$\text{Interval} = \frac{\text{Highest score} - \text{Lower score}}{\text{Number of categories}}$$

Where

Highest score = 7

Lowest score = 1

Number of categories (types of assessment) = 7(1, 2, 3, 4, 5, 6, and 7)

Following the data normality test, several steps are carried out sequentially to obtain valid and reliable data. The first step is to test the validity and reliability of the instruments of each variable used in the study. The second step is to conduct a factor analysis, from which we will discover the reduction factor or its free component. The third step is to conduct data analysis to obtain the regression equation and estimation only with the independent variables resulting from the reduction of factor analysis. The fourth step is to strengthen this finding with a diagnostic test (Second order test) including a multicollinearity test, an autocorrelation test, and a normality test. Meanwhile, the fifth step is to test the hypotheses of the study.

The Description of the Engineered Wood Industry in East Java

In East Java, there are three large Plywood companies, 125 medium companies (59 IPKHs, 66 IPKLs) and six (6) small companies, while others are not registered.

Table 3: Data on Plywood Companies in East Java

Companies	Location	Capacity/Year		
		Plywood (logs)	Saw logs	Woodworking (sawn wood)
PT. Kutai Timber	Probolinggo	100,000	36,000	6,000
PT. Nusantara Plywood	Gresik	235,700	50,400	144,310
PT. Sumber Mas Indah Plywood	Gresik	100,000	60,000	14,400
Plywood Industry	Total	435,700	146,400	164,710
IPKH		-	830,200	219,600
IPKL		-		479,476
Small Industries (6 Registered): Furniture				1,500

Source: Processed from various sources

There are three large plywood companies that process engineered wood for export and local production. There are also large companies selling bark for the upholstery of local furniture

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products. Since export prices are higher than local wood prices, the sale is focused more on export. The aforementioned companies currently suffer from shortages of raw materials since the raw materials of engineered wood generally come from outside East Java. The increasingly stringent changes in regulations from countries of origin such as Africa as well as the tendency for regions in Indonesia to directly export the raw materials to foreign countries leads to the lack of raw materials of engineered wood. Moreover, regional autonomy that allows numerous regions to obtain permits to export wood as well as rampant illegal logging cause scarcity of wood. As a result, there is a possibility that two of the three large companies will be closed in the near future.

In the category of medium industries, there are 59 companies engaged in upstream wood processing and 66 companies engaged in advanced wood processing, many of which has gone bankrupt due to a prolonged monetary crisis, the scarcity of raw materials, stringent regulations, and rampant illegal logging. According to the Head of the Department of Industry and Trade (Deperindag) of East Java, there are approximately 68 medium companies that will close in the future. There are merely 6 registered CVs engaged in engineered wood furniture, while others are small unregistered CVs that have gone bankrupt. Wood crisis in East Java threatens to end wood industry in East Java. To address this crisis, the Government of East Java has attempted a collaboration with the Provincial Government of South Kalimantan to supply wood from South Kalimantan.

Engineered wood companies that utilize wood waste are rare. It is in accordance with a study by Pribadiyono (1999, p. 81) of innovations in the utilization of wood waste that technically and economically support wood industry. Observed from field data, medium engineered wood company requires quite expensive machine. Therefore, support from the government is needed, particularly in terms of loan capital. In general, engineered wood industry produces plywood, hardboard or particleboard, frames, and furniture such as chairs, shelves, beds, tables, wardrobes and doors.

THE FINDINGS OF THE STUDY

Instrument Validity and Reliability Test

The construct validity of the instruments of each variable are tested with correlation matrix with a level of significance (α) < 0.05. The instruments are valid or reliable if the value of α (alpha) of each variable is greater than 0.05.Based on commonly used statistical assumptions; a variable is more reliable or has higher reliability if the value of the alpha is closer to 1.00. The results of validity and reliability test show that all variables are valid and reliable.

Factor Analysis

Factor analysis can also test validity, reliability, and normality of data. Validity test on 39 items obtains an alpha of 0.9547. This value is greater than the recommended value (0.7 to 0.8), thus it can be categorized as very good validity. The reliability test obtains an alpha value of 0.9547, greater than the minimum requirement of 0.7, thus indicating good reliability since a value closer to one means a better result. The test on data normality obtains a value of 0.005,

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indicating that the data are normally distributed. Similarly, Kolmogorov Smimov test on partial data and Shapiro Wilk Test obtain a significance of > 0.005, meaning that the entire data are normally distributed.

Table0: KMO and Barlet Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		**.748**
Bartlett's Test of Sphericity	Approx. Chi-Square	4834.504
	df	741
	Sig.	.000

Observing the table, it is evident that the correlation value is greater than 0.3 at a significance level of less than 0.01. The results of the Barlet Test of Sphericity is 4834.037 with a significance of 0.00, below 5% or below α 0.05. It means the correlation matrix is accepted. Thus, the correlation matrix is not an identity or unit matrix, allowing the measurement to be continued on factor analysis. Kaiser Mayer Olkin Index (KMO) shows the suitability of sampling in each indicator of the overall sampling. The result shows a KMO value of 0.748, greater than 0.5, suggesting that each construct is interconnected or each variable in the model is suitable for factor analysis.

To determine whether the factors can be used as a model, the Eigen Value, percent of variance, and cumulative of variance are applied. A factor can be used as a model if the Eigen value is greater or equal to one, the percent of variance is greater than 5%, and the cumulative of variance is 50 % at minimum (Malhotra, 1996). Based on the results of Principle Component Analysis (PCA), there are nine factors affecting buying decision of engineered wood in East Java, all of which are able to explain all variants in the data, evident from the Cumulative of Variance of 81.99%, the Eigen value of greater than one and the Percent of variance of greater than 5% as shown in the following table:

Table5: The Factors Affecting Buying Decision of Engineered Wood in East Java

Component	**Initial Eigen values**			**Rotation Sums of Squared Loadings**		
	Total	%of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	14.775	37.884	37.884	7.960	20.410	20.410
2	4.841	12.414	50.298	5.107	13.096	33.505
3	3.296	8.452	58.751	4.914	12.601	46.106
4	2.266	5.810	64.561	3.444	8.832	54.938
5	1.779	4.562	69.123	2.755	7.064	62.002
6	1.536	3.939	73.062	2.262	5.800	67.802
7	1.311	3.361	76.423	2.162	5.543	73.345
8	1.123	2.880	79.304	1.912	4.903	78.249
9	1.048	2.687	81.991	1.459	3.742	81.991

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Afterwards, a factor rotation is conducted using the Varimax procedure, aiming to minimize variables with highest values. This rotation results in a simpler factor structure to more easily explain all the factors analyzed in the Varimax Rotated Component Matrix Factor model. Referring to previous studies and the theory of Kotler & Bovee for reducing factors to be used as the variables in multiple linear regression, the authors remain using the original terms by choosing instruments with greatest effect on the components. However, different terms are used for several new factors as follows: corporate culture, marketing mix, political environment, economic climate, culture, personal climate, psychological factor, and knowledge of engineered wood and natural wood.

Factor reduction can also be conducted by multiple linear regression analysis. In this study, multiple linear regression is only used as a comparison for confirmatory purpose. The consumers surveyed are a combination of business consumers and end consumers. Exploratory factor analysis is employed to discover the most significant factors. The comparison of the results of the reduction with the linear regression equation of the 14 variables is as follows: 1) regression analysis results in eight variables, namely: cultural, personal, marketing mix, economic climate, corporate culture, personal climate, personal factors and interpersonal factors: 2) factor analysis results in nine factors: cultural, personal, location, economic climate, corporate culture, political environment, personal climate, psychological, and knowledge of engineered wood and natural wood. In regression analysis, the instruments remain unchanged when the variables are reduced. Meanwhile, the instruments in factor analysis change into new factors. In this study, the results of the reduction of factor analysis are used in accordance with the analytical method used, with new factors and instruments.

At this stage, the number of variables with a loading factor of at least 0.55 for n = 100 are categorized (Hair, Anderson, Tatham, & Black, 1998). Based on the table above, it can be seen that the variables are distributed in nine factors with a total variance of 81.991%. The accuracy of the model is the final stage of factor analysis. Using the Principle Component Analysis (PCA) technique, it is found that the model has 154 or 20% residuals calculated from observations and reproduced correlations. It implies that the model still has an accuracy of 80% of the deviation of 5%. Thus, the model of this factor analysis is reliable or acceptable.

Regression Analysis of the Results of Reduction of Factor Analysis

Following the reduction of the factors with factor analysis, a multiple linear regression analysis is performed with the SPSS computer program to obtain the independent variables resulting from the reduction of consumer factors, both from business factors and end consumer factors. The results of reducing factors in this regression are the results of factor analysis in accordance with the steps of the analysis. The formulation of model of the multiple linear regression analysis in this study is as follows:

$$Y = b_0 + b_1x_1 + b_2x_2 + \cdots + b_nx_n + e_1 \ldots$$

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Where:

Y= Buying decision of engineered wood in East Java

x_1= Cultural

x_2= Political environment

x_3= Personal

x_4= Psychological

x_5= Knowledge of engineered wood and natural wood

x_6= Economic climate

x_7= Corporate culture

x_8= Location

x_9= Physical climate

e_1= Other variables not included in the study

b_0= Constant

$b_1 \ldots b_n$= Regression Parameter Coefficient

Using the aforementioned regression model, the following equation is obtained through the nine variables:

$$Y = 2.057 - 1.21x_1 - 0.455x_2 + 0.614x_3 - 0.175x_4 + 0.538x_5 - 0.339x_6 + 0.421x_7 + 0.038x_8 + 0.062x_9$$

Table6: Results of Regression Analysis of the Nine Variables

Independent Variable	Regression Coefficient	t Count	Sig
(Constant)	2.057	3.526	.001
Cultural	-.121	-1.002	.319
Political environment	-.455	-2.670	.009
Personal	.614	3.794	.000
Psychological	-.175	-1.133	.260
Knowledge of engineered wood and natural wood	.538	3.525	.001
Economic climate	-.339	-2.129	.036
Corporate culture	.421	2.232	.028
Location	.038	.328	.743
Physical climate	.062	.492	.624
Multiple R = 0, 702 R square = 0, 492 Durbin Watson = 1,892 F-Count = 9,698 Significance F = 0,000			

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Consequent to obtaining the results of regression with nine variables, a significance test with a significance level of 5% is conducted. The result of t test shows that Cultural, Psychological, Location and Physical climate are insignificant. It is indicated by Cultural with a significance of 0.319 or 31.9%, Psychological of 26.0%, Location of 74.3%, and physical climate of 62.4%, all of which is greater than 5%, indicating insignificance. Based on step wise regression analysis conducted afterwards, the remaining 5 variables are significant. Therefore, the four insignificant variables are not included in the next multiple linear regression equation. The five significant variables are Political environment (0.009), Personal (0.00), Knowledge of engineered wood and natural wood (0.001), Economic climate (0.036), and Corporate culture (0.028), all of which has a significance of below 5%.
Meanwhile, the Overall Significance Test (F Test) is employed to test whether x1, x2, x3, x4, x5, x6, x7, x8, and x9 simultaneously affect Y (buying decision of engineered wood in East Java). By using the SPSS 10.1 program, the estimation equation of the study is obtained with a value of F = 6.989 and a value of Sig.-F = 0.000 < 0.05, showing that thenine variables simultaneously have a significant positive effect on buying decision of engineered wood.

Furthermore, to detect the possibility of heteroskedacity, the Spearman Rank correlation test is applied (Algifari, 2000, pp. 85-86) using t test. T count< t table means no heteroscedastic symptoms while t count >t table indicating heteroscedastic symptoms. Heteroskedacity can also be detected by observing certain patterns in scatter plots or diagrams. The X-axis is the predicted Y, and the X-axis is the residual (real Y-predicted Y) that has been student zed. The results of data analysis in this study show no heteroskedacity since the points spread above and below 0 on the Y-axis, in accordance with the conditions mentioned at point 2 (two). Similarly, t total sig (t count) = 0.000 <t table = 1.990, revealing no heteroskedacity.

Autocorrelation testing aims to determine a correlation between members of a series of observational data sorted by time (time series) or space (cross sectional). It means that the data obtained from the study is affected by the data from the previous period. It causes inaccuracy in F test and t test. To discover any correlation, the Durbin Watson (DW) test is applied. With a sample size of η = 10.0, k = 9, the DW values can be categorized as follows:

First: The DW value < 1.404: a positive autocorrelation

Second: The DW value between 1.404 and 1.874: without conclusion

Third: The DW value between 1.874 and 2.126: no autocorrelation

Fourth: The DW value between 2.126 and 2.596: without conclusion

Fifth: The DW value > 2.596: a negative autocorrelation.

Referring to the results of the Durbin Watson test, a DW value of 1.892 is obtained. The value falls into the third category (1.55 to 2.46), indicating that there are no autocorrelation symptoms or correlations between the variables in this study.

Multicollinearity between independent variables can be determined by observing the value of Variance Inflation Factor (VIF). The VIF value that is greater than four or close to the value of one indicates multicollinearity. This test generally obtains a value smaller than four, meaning

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no multicollinearity (Algifari, 2000, p. 84). Meanwhile, the results of the Kolmogorov Smirmov, Shapiro Wilk, and Liliefors tests show that the data are normally distributed.

Regression Analysis with Five Significant Variables

The significance test of regression coefficient (t test) concludes that five variables are significant while the remaining four variables are insignificant. Therefore, the next regression is carried out only on the five significant variables to discover which variables partially affect buying decision of engineered wood.

Table7: The Results of Regression Analysis of 5 Variables

Independent Variables	Regression Coefficient	t count	Sig
(Constant)	2.063	4.450	.000
Economic climate	-.355	-2.267	.026
Corporate culture	.362	2.307	.023
Knowledge of engineered wood and natural wood	.509	4.515	.000
Personal	.583	3.889	.000
Political environment	-.503	-3.356	.001
Multiple R = 0.687 R square = 0.472 Durbin Watson = 1.877 F-Count = 16.773 Significance F = 0.000			

The table shows that:

$$Y = 2.063 - 0.355x_1 + 0.362x_2 + 0.509x_3 + 0.538x_4 - 0.503x_5$$

Where:

Y= Buying decision of engineered wood in East Java

x_1= Economic climate

x_2= Corporate culture

x_3= Knowledge of engineered wood and natural wood

x_4= Personal

x_5= Political environment

In the Regression Coefficient Test (t test),all regression coefficients are significant since the level of significance is less than 0.05 or 5%. It indicates that the five variables partially affect buying decision of engineered wood in East Java. Meanwhile, in the overall significance test (F test), the value of F is significant since the significance F = 0.000. Thus, the five variables simultaneously affect buying decision of engineered wood in East Java. Observing the regression coefficient, it is evident that the factor with the greatest effect on buying decision is Personal (0.583), followed by Knowledge of engineered wood and natural wood (0.509), and

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Corporate culture (0.362). Meanwhile, factors with negative effect are Economic climate (-0.355) and Political environment (-0.503). Furthermore, the values of VIF of all variables in the multicollinearity test are below four, indicating no multicollinearity. In addition, the results of the normality test with the Kolmogorov Smirmov, Shapiro Wilk and Liliefors testreveal that the data are normally distributed.

Hypothesis Testing

First Hypothesis (H-1): Factor analysis of the first hypothesis discovers nine new factors, namely: Cultural, Personal, Location, Economic climate, Corporate culture, Political environment, Personal climate, Psychological, Knowledge of engineered wood and natural wood. Thus, the first hypothesis is accepted.

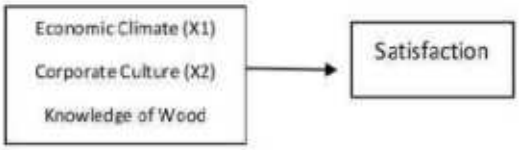
Second Hypothesis (H-2): The factors of the consumers (a combination of business consumers and end consumers), namely Cultural, Personal, Location, Economic climate, Corporate culture, Political environment, Personal climate, Psychological,and Knowledge of engineered wood and natural wood simultaneously have a significant effect onbuying decision of engineered wood in East Java (Y). Thus, the second hypothesis is accepted.

Third Hypothesis (H-3): The factors of the consumers resulting from the partial (individual) reduction of several variables significantly affect buying decision of engineered wood in East Java. Thus, the third hypothesis is accepted.

Table8: The Results of Hypothesis Testing

No	Hypothesis	Result
1	First Hypothesis (H1)	Accepted
2	Second Hypothesis (H2)	Accepted
3	Third Hypothesis (H3)	Accepted

Chart 2: Final model of the results of the study



DISCUSSION

Factors Resulting from the Reduction of Several Variables with a Significant Effect on Buying Decision of Engineered Wood in East Java

The factor analysis of fourteen independent variables (culture (x1), social (x2), personal (x3), psychological (x4), marketing mix (x5), economic climate (x6), political environment (x7), corporate culture (x8), physical climate (x9), technology (x10), personal climate (x11),

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personal factors (x12), interpersonal factors (x13) and location (x14)) and one dependent variable (buying decision of engineered wood in East Java (Y)) obtains nine new factors, namely: cultural, personal, location, economic climate, corporate culture, political environment, personal climate, psychological, and knowledge of engineered wood and natural wood. These new factorsare used in multiple linear regression in the second hypothesis testing. According to the results, these variables support the second hypothesis.

The nine factors are able to explain all variants in the data, evident fromCumulative of Variance of 81.99%, the value of Eigen that is greater than one and the percent of variance that is greater than 5% as presented in Table 5.35. By grouping the number of variables that have a minimum loading factor 0.55 for n = 100 (Hair et al., 1998), the nine aforementioned factors are obtained. A total variance of 81.991% indicates a close relationship between the variables and the factors. Table 5.36 shows that there are 27 variables with a loading factor of more than 5% with a very good percentage of Cumulative of Variance,namely 81.89%.

The factors of consumers (a combination of business consumers and end consumers) simultaneously have a significant effect on buying decision of engineered wood in East Java

The estimation equation of the study has a value of F = 26.844 and a value of Sig.-F = 0.000 < 0.05, showing the probability of Ho is rejected or support Ha at the level of significance (α) = 0.05. It means that all fourteen independent variables of the study simultaneously affect the dependent variable, namely buying decision of engineered wood in East Java (Y).

The Factors of the Consumers Partially AffectBuying Decision of Engineered Wood in East Java

This study discovers five independent variables that simultaneously affect the dependent variable, or the buying decision of engineered wood in East Java (Y). The five variables are economic climate, corporate culture, and knowledge of engineered wood and natural wood, **personal, and political environment.** It supports the third hypothesis (H-3), namely: The factors of the consumers partially have a significant effect on buying decision of engineered wood in East Java (Y). H3 is accepted with following description:

Personal (P): The estimation equation produces Sig.-t P = 0.019 < 0.05, meaning that Ha is accepted or does not support Ho at the level of significance (à) = 0.05. Thus, this variable is **accepted.**

Marketing mix: The estimation equation produces Sig.-t P = 0.000 < 0.05, meaning that Ha is accepted or does not support Ho at the level of significance (à) = 0.05. Thus, this variable is **accepted.**

Corporate culture: The estimation equation produces Sig.-t P = 0.013 < 0.05, meaning that Ha is accepted or does not support Ho at the level of significance (à) = 0.05. Thus, this variable is **accepted.**

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Personal factors: The estimation equation produces Sig.-t P = 0.009 < 0.05, meaning that Ha is accepted or does not support Ho at the level of significance (à) = 0.05. Thus, the third hypothesis (H-3) for this variable is **accepted.**

Interpersonal factors: The estimation equation produces Sig.-t P = 0.010 < 0.05, meaning that Ha is accepted or does not support Ho at the level of significance (à) = 0.05. Thus, the third hypothesis (H-3) for this variable is **accepted.**

Scientific Findings

This study discovers new scientific findings, namely nine factors of consumers (a combination of business consumers and end consumers) comprising 27 instruments. The factors use original terms with minor differences in the instruments. One factor with a different term is the ninth factor, namely knowledge of engineered wood and natural wood. In general, cultural, psychological, and personal factors support the theory of consumer behavior in deciding to buy a product in accordance with the theory of Kotler of the consumer market. Meanwhile, political environment, economic climate, corporate culture, physical climate, and location support the theory of consumer behavior in deciding to buy a product in accordance with the opinion of Bovee et al in the business market. Knowledge of engineered wood and natural wood is an independent factor originating from psychological of the theory of consumer market by Kotler. It is one of the factors of consumers (a combination of business consumers and end consumers), thus supporting the combination of the theory of consumer market by Kotler and the theory of business market by Bovee. Other supporting theories are the theory of Assael regarding the decision affected by internal factors, namely personal and the theory of Stephen P. Robbin regarding buying decision affected by psychological and personal.

The next interesting finding involves two variables, namely economic climate and political environment, part of the five variables partially and simultaneously affecting buying decision of engineered wood in East Java. These independent variables significantly affect the dependent variable, yet with a negative effect. It is contrary to the positive effect obtained by Bovee. In terms of economic climate, the consumers decide not to buy engineered wood even when the economic condition is favorable. They prefer to buy natural wood due to the assumption that natural wood has better qualities. In terms of political environment, good implementation of laws, regulations, order, etc. leads to the obligation to pay taxes, leading to more expensive engineered wood, causing the price nearly similar to that of natural wood. As a result, consumers decide not to buy engineered wood. Engineered wood is generally supplied from illegal logging.

This study is a further study of previous studies of the level of balance, inventory and innovation in waste utilization (Pribadiyono, 1999), examining the factors affecting buying decision of engineered wood in East Java, namely cultural (X1), personal (X3), psychological (X4), location (X14), economic climate (X6), corporate culture (X8), political environment (X7), physical climate (X9), knowledge of engineered wood and natural wood (Xb).

This study also compares with previous studies by Lauwhatta (1999),Dyah Eko (1997), Jusni (1998)and Niraj Dawar & Philip Parker (1994). The first study examines the factors affecting

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the interests of business consumers in making decisions to rent shops while the four other authors examine consumer behavior in making a decision to buy a product. By conducting reliability test, validity test, normality test, factor analysis and multiple linear regression analysis both for regression of the results of the reduction of factor analysis and subsequent multiple linear regression analysis for partial and simultaneous tests, the results of this study support the findings of the previous studies.

The Limitations of the Study

There are a great number of engineered wood industry as business consumers and producers in Indonesia. Similarly, the number of end consumers is significantly enormous in accordance with the total population in Indonesia. Considering the limited time and cost, this study only examines the consumers (a combination of business consumers and end consumers) in East Java. Nevertheless, the findings of this study are expected to be insights for consumers and engineering wood industries in developing their business. Another limitation is the distribution of questionnaires to business consumers in small, medium, and large industries as well as general public. The answers to the questionnaire greatly depend on the opinions of each consumer, both business consumers and end consumers.

CONCLUSION

The wood consumer market in East Java is huge and has the potential to develop. Observed from the available data, there is a shortage of nearly one million cubic meters per year to fulfil the need for natural wood for furniture in East Java. Thus, products made from engineered wood are already widely used by households in Indonesia. It shows that engineered wood can replace or compete with natural wood. In general, East Java remains experiencing shortages in supplying engineered wood in the past two years since the capability of the forests in East Java only support the industries of furniture and other household appliances made from natural wood.

The huge demand of the consumers, a combination of end consumers including all personnel and organizations that buy goods and services from other parties for consumption and business consumers including companies that produce goods using wood as the raw materials, has not been followed by the sufficient supply. In the last two years, approximately 68 factories have gone bankrupt, and more will follow in the future. It will reduce employment opportunities and increase the number of unemployment in East Java. Even though the government and private sector have taken steps to overcome the shortage of wood, they are not yet optimal.

The hypothesis testing proves that the hypotheses of the study are all acceptable. Based on First Hypothesis (H-1), factors resulting from the reduction of several variables, namely cultural, social, personal, psychological, marketing mix, economic climate, political environment, corporate culture, physical climate, technology, personal climate, personal factors, interpersonal factors, and location affect buying decision of engineered wood in East Java. According to the Second Hypotheses, the factors of the consumers resulting from the simultaneous reduction of several variables significantly affect buying decision of engineered

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wood in East Java. Meanwhile, referring to the Third Hypothesis, the factors of the consumers resulting from partial (individual) reduction of several variables significantly affect buying decision.

Thus, companies engaged in engineered wood industry need to consider economic climate, corporate culture, knowledge of engineered wood and natural wood, personal, and political environment, particularly for people of East Java. It is recommended for them to perform socialization through exhibitions or expos to promote their products. The companies also need to aware of the role of personal and corporate culture in their environment while performing their daily tasks. In addition, it is necessary to increase the knowledge of engineered wood and natural wood by attending courses, seminars and trainings in order to increase the motivation of the employees to increase company performance.

To increase the income of East Java and save the wood industry from bankruptcy, the government of East Java needs to collaborate with other regions supplying wood, such as East Kalimantan, West Kalimantan, Central Kalimantan, Maluku and Papua. It is important to consider utilizing community forests or industrial forest plantations to be used for producing engineered wood in East Java. Furthermore, the government needs to provide financial assistance in the form of soft loans to increase the capacity of engineered wood producers and increase employment opportunities to overcome the existing unemployment.

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