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Application of Principal Component Analysis (PCA) in Determining the Dominant Factors Affecting Women's Interest in Entrepreneurship in the Lower Market of Bukittinggi

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Abstract
The success of women in traditional markets is often constrained by various interrelated factors that directly affect the local economy. This study aims to identify the dominant factors influencing women's interest in entrepreneurship at Pasar Bawah, Bukittinggi, using the Principal Component Analysis (PCA) method. Primary data were collected through questionnaires distributed to women entrepreneurs, covering variables such as job choice, entrepreneurial interest, self-empowerment, social environment, and risk tolerance. PCA was applied to reduce correlated variables into fewer uncorrelated principal components. The analysis resulted in three principal components, with the first component selected as the dominant factor due to its highest explained variance. This component, with an eigenvalue of 4.73, explains 47.35% of the total variance and includes variables such as interest in entrepreneurship, willingness to take risks, feeling empowered and useful, and high self-confidence. These findings highlight the importance of psychological and personal factors in women's entrepreneurial interest. The study suggests that government policies should focus on inclusive support such as access to microcredit, digital entrepreneurship training, and promotion of local products to improve the competitiveness of traditional markets and empower women entrepreneurs.

1. INTRODUCTION

The more developed a country is, the more educated people are, and the higher the unemployment rate, the more advisable it is for entrepreneurship. Unemployment rates and entrepreneurship are interconnected. Entrepreneurship plays a crucial role in reducing unemployment by creating new jobs, both for the entrepreneurs themselves and for the surrounding communities. The more individuals who become entrepreneurs, the greater the opportunity for employment, thereby reducing unemployment. Development will be more successful if supported by entrepreneurs capable of creating and opening new jobs. Meanwhile, employment is often affected by the government's limited ability to provide employment opportunities for the community. The government cannot handle all sides of development because it requires considerable funds, manpower, and supervision. Therefore, entrepreneurship is an important factor in development, both in terms of quantity and quality of entrepreneurs. [1]

Entrepreneurship is not the exclusive domain of men, but nowadays women are also increasingly motivated to start a business. Indonesia has great potential to increase the number of entrepreneurs, especially women entrepreneurs. Empowering women in the field of entrepreneurship is one way that can be done to strengthen the country's economy. Therefore, this effort needs to be managed optimally so that the number of women entrepreneurs continues to increase every year [2].

There are now many women traders in the market sector, whether it is a modern market or a traditional market. Usually women with weak economic conditions and limited capital to trade, choose traditional markets as an alternative business to fulfill their needs. Traditional markets are "places established by the government, private sector, cooperatives, or communities independently with business spaces such as kiosks, shops, los, and tents, which are managed by small, medium, and cooperative traders with limited business scale and capital, and the transaction process is carried out through negotiations"[3].

Business success in traditional markets is not an easy thing to achieve. Many women who want to start a business in this sector are faced with a number of obstacles, which have an impact on their low interest in entrepreneurship. The difficulty of women's business success in traditional markets is caused by several interrelated factors that have a direct influence on the local economy such as intense price competition, the influence of local economic fluctuations, lack of infrastructure support, and unsupportive policies.

Pasar Bawah is one of the iconic Traditional Markets located in Bukittinggi City, with an area of about 2.2 hectares. The existence of this market seems inseparable from the development experienced by the people of Bukittinggi over time. From an economic perspective, Pasar Bawah reflects the stages of human life that are always related to daily needs in economic activities. Most of the trades in Pasar Bawah are related to cooking needs, such as vegetables, fish, meat, and fruits. Therefore, the Lower Market is open earlier, from morning until evening. [4].

Based on the results of interviews with several entrepreneurs in Pasar Bawah, there are various reasons that influence their entrepreneurship. One of them is an entrepreneur who sells culinary kacimuih food. the factors that influence her to run this business because it is in accordance with passion, easy to do, flexible time adapted to her position as a married woman and encouragement to help the family economy or help her husband.

Various previous studies have been conducted to look at phenomena related to women's entrepreneurship. Research conducted on the title "Entrepreneurial Interest in Women in Bengkulu City" which shows that there are factors that encourage women's interest in opening a business, namely the existence of opportunities, improving abilities, wanting to open jobs, and having flexible time, and the background until they open their own business, namely increasing family income, independent factors, and developing hobbies [5]. Education, experience, and attitude towards risk-taking are very important for the entrepreneurial activities of women entrepreneurs [6].

The various aspects of research on women entrepreneurs encourage researchers to focus this research on specific things. The difference between this study and previous studies is that it is not yet known exactly what encourages women to choose entrepreneurship, especially in Pasar Bawah, Bukittinggi City. Therefore, this research is formulated by emphasizing the identification of dominant factors that influence women's interest in entrepreneurship in that location.

Based on this, a systematic study was conducted to analyze the dominant factors that influence women's interest in entrepreneurship in the Lower Market of Bukittinggi City. One statistical analysis that can be used is Principal Component Analysis (PCA). The calculation of PCA is based on the calculation of eigenvalues and eigenvectors that express the distribution of data from a dataset. With the PCA approach, it is expected to be able to simplify and eliminate factors that are less dominant or relevant [7].

2. THEORETICAL FRAMEWORK

2.1. Entrepreneurial Interest

Entrepreneurial interest is an interest in becoming an entrepreneur who is ready to manage time, skills and finances for business progress. Interest is not innate from birth, but develops along with various influencing factors [8]. Entrepreneurial interest is a person's determination to start a business that is influenced by entrepreneurial intention. Therefore, it is very important to increase entrepreneurial intention in order to strengthen entrepreneurial interest [9].

2.2. Women Entrepreneurs

Female entrepreneurs refer to women who are actively involved in the field of entrepreneurship, and have the ability to handle risks and recognize opportunities around them. They try to optimize various resources with a creative approach. In addition, women entrepreneurs are women who are involved in all aspects of entrepreneurship and have a great passion to achieve success. They have the ability to take risks and find opportunities to combine resources in innovative ways while capitalizing on the opportunities that exist in their businesses [10].

2.3. Factors Affecting Women's Interest in Entrepreneurship

1. Interests

   Interest is a driver that encourages a person to pursue their dreams, especially things that provide benefits and satisfaction [11]. To measure entrepreneurial interest, several aspects that need to be considered [12].

a. Making a career choice
b. Feeling interested in entrepreneurship
c. Feeling happy about entrepreneurship
d. Desire to be an entrepreneur
e. Dare to take risks to achieve success

2. Self-Empowerment
   Empowerment can be defined as the power to do something that can come from new knowledge, skills possessed, and experience gained [13]. indicators of self-empowerment [14]
   a. Awareness of self-actualization
   b. Self-improvement
   c. Feelings of empowerment and usefulness
3. Social Environment
   The social environment includes various forms of role models formed from an individual's view of the activities of parents, siblings and other family members such as grandparents, uncles, aunts and children. In addition, friends, spouses, or admired entrepreneurial figures also play an important role [15]. social environment variables consist of several indicators including family, group networks, and parents [16].
4. Risk Tolerance the ability to take risks is determined by [17]:
   a. Self-confidence
   b. Willingness to use skills to seek opportunities and possibilities for profit.
   c. Ability to realistically assess risk situations.

2.4. Principal Component Analysis

PCA is a linear combination of the initial variables which geometrically this linear combination is a new coordinate system obtained from the rotation of the original system. The PCA method is very useful if the data has a large number of variables and has a correlation between the variables. The calculation of principal component analysis is based on the calculation of eigenvalues and eigenvectors that express the distribution of data from a data set [18]. By using PCA, variables that were previously as many as p variables will be selected into k new variables called principal components, with the number k less than p . Using only k principal components will produce the same value as using p variables. The variable resulting from the selection is called the principal component [19].

Suppose the random variable $X = (X_1, X_2 \dots , X_p)$ has a multiple variable distribution with mean vector $\mu = (\mu_1, \mu_2, \dots , \mu_p)$ and covariance matrix Σ with eigenvalues $\lambda_1 \geq \lambda_2 \geq \cdots \geq \lambda_p \geq 0$ and eigenvector a_p . Principal Components (PC) are linear combinations of the p original variables, or can be written:

$$KU = AX$$

$$\begin{pmatrix} KU_1 \\ KU_2 \\ \vdots \\ KU_p \end{pmatrix} = \begin{pmatrix} a_{11} & a_{12} & \dots & a_{1p} \\ a_{21} & a_{22} & \dots & a_{2p} \\ \vdots & \vdots & \ddots & \vdots \\ a_{p1} & a_{p2} & \cdots & a_{pp} \end{pmatrix}^T \begin{pmatrix} X_1 \\ X_2 \\ \vdots \\ X_p \end{pmatrix} \quad (1)$$

Thus, the form of principal component analysis assumes that there are p variables, namely $X_1, X_2 \dots , X_p$, which will be formed into p linear combinations as follows:

$$KU_1 = a_{11}X_1 + a_{12}X_2 + \cdots + a_{1p}X_k = a_1^T X \quad (2)$$

$$KU_2 = a_{21}X_1 + a_{22}X_2 + \cdots + a_{2p}X_k = a_2^T X \quad (3)$$

$$\vdots$$

$$KU_p = a_{p1}X_1 + a_{p2}X_2 + \cdots + a_{pp}X_k = a_p^T X \quad (4)$$

1. Data Standardization

   Data standardization is one of the tests calculated where the data has different units so that units are equalized on all variables used. Variables that have large values have a greater influence than variables with

small values. To overcome this problem, the data standardization method can be applied so that each variable is in a uniform range. Therefore, before calculating the correlation or covariance matrix, variables need to be standardized when possible to prevent problems that can occur.

The standardization process will make data with wide unit differences automatically narrowed. [20] The data standardization formula is as follows:

$$Z_{ji} = \frac{X_{JI} - \mu_i}{\sigma_i}, j = 1,2, \dots, n;\ i = 1,2, \dots, p \tag{5}$$

with:

Z_{ji} = standardization of the jth observation variable from the i-th variable
x_{ji} = the jth observation variable from the i-th variable
μ_i = average of the i-th variable
σ_i = standard deviation of the i-th variable

2. Variance, covariance and correlation

Variance is a measure of dispersion that measures how much the data spreads from its center value. The smaller the spread of the data, the better. It also indicates that there is more homogeneity and the differences between the data are not too high. The variance of an odds distribution$X$ is expressed by $Var(X)$ or σ_x^2 or $.\sigma^2$

The variance-covariance matrix is a symmetric matrix that contains the variance on the main diagonal and the covariance off the diagonal [21]. The covariance coefficient indicates the index of linear relationship between two variables. Meanwhile, the correlation matrix contains the correlation coefficient, worth one on the main diagonal, and is also symmetric. In principal component analysis, the variance-covariance matrix is used if the variables have the same units and the variances are not very different. However, if the variances are very different or the units of measurement are not the same, a correlation matrix should be used for a more balanced representation [22].

The eigenvalues of the variance-covariance matrix $\mathbf{\Sigma}$ are the variances of the principal components, so the variance-covariance matrix of KU is:

$$\mathbf{\Sigma} = \begin{bmatrix} \lambda_1 & 0 & \cdots & 0 \\ 0 & \lambda_2 & \cdots & 0 \\ \vdots & \cdots & \ddots & \vdots \\ 0 & 0 & \cdots & \lambda_P \end{bmatrix} \tag{6}$$

The total diversity of the origin variable will be equal to the entire diversity explained by the principal component, i.e., the total variance of the origin variable:

$$\sum_{i=1}^{p} var(X_i) = tr(\Sigma) = \lambda_1 + \lambda_2 + \cdots + \lambda_p = \sum_{i=1}^{p} var(KU_i) \tag{7}$$

p is a principal component that explains all the total variance. Dimensionality shrinkage of the original variable is done by taking a small number of components that can explain the largest part of the variance of the data. If KU (y) is taken as k components, with $k < p$, then the proportion of the total variance explained by the *i-th* component is:

$$\frac{\lambda_i}{\lambda_1 + \lambda_2 + \cdots + \lambda_p}, i = 1,2, \dots, p \tag{8}$$

3. Eigenvalues and Eigenvectors

Eigen vectors are a combination of German and English words. In German the word eigen means actual or characteristic, therefore the eigenvalue can be said to be the true value or characteristic value. The *eigenvalue* is a value that shows how much influence a variable has on the formation of characteristics, which is denoted byλ [23]

If **Σ** is an *n x n* matrix*,* then a nonzero vector *x* is called an eigenvector of *A* if **Σ**x is a scalar multiple of x, i.e., a scalar multiple of:

$$\Sigma x = \lambda \mathrm{x} \tag{9}$$

The scalar λ is called the eigenvalue of **Σ** and x is said to be the eigenvector corresponding to λ. The eigenvalues are obtained by solving the characteristic equation of the correlation matrix, viz:

$$|\Sigma - \lambda I| = 0 \tag{10}$$

Σ is the matrix $n \times n$ and *I* is the identity matrix.

In the algebraic approach, eigenvalues (λ) and eigenvectors (v) can be determined using the following definitions:

$$|\Sigma - \lambda I| v = 0 \tag{11}$$

with:

Σ = covariance matrix of the data

λ = eigenvalue

I = identity matrix

v = eigenvector [24]

The elements in the eigenvector matrix indicate the loading value or coefficient on the main component formed. This coefficient illustrates how much variance a variable can be explained by a main component. If the variance value of a variable is large enough, this indicates that the variable has a significant correlation or relationship with the main component that represents the data from the variables that affect women's interest in entrepreneurship [25].

4. Determination of the Number of Principal Components

There are three general methods for determining the number of principal components. The first method is based on the cumulative proportion of total variance that can be explained. This is the most frequently used method and can be applied to both correlation matrices and variance-covariance matrices. A minimum percentage of explained variance is first determined, and then the number of principal components is set as the smallest number of components that can meet this limit [18].

The second method only applies to the correlation matrix. In this matrix, the original variables are transformed into variables with the same variance, which is one. The selection of the principal component is based on the variance of the principal component, i.e. the eigenvalue. If the origin variables are independent of each other, then the principal components are the same as the origin variables, and each principal component has a variance of one. Therefore, the main component with a variance of less than one is considered to contribute less, so the component whose eigenvalue is less than one is not used.

The third method is the use of a graph called a scree plot, which is a visual aid to determine the appropriate number of principal components. This method can be used on both the correlation matrix and the variance-covariance matrix. The scree plot is a graph between the eigenvalues λ_k and k, with the eigenvalues ordered from largest to smallest. It relates the number of eigenvalues to that number. The idea of this method is to select the number of principal components such that the difference between successive eigenvalues is no longer large [20].

3. RESEARCH METHODS

The object of research used is women who are entrepreneurs in the Lower Market of Bukittinggi City. In this study, the type of data used is primary data where the primary data of this study were obtained through distributing questionnaires to respondents, namely women who are entrepreneurs in Pasar Bawah Bukittingi which contains statements related to the characteristics of interest, self-empowerment, social environment, and risk tolerance. Data collection in this study was carried out using a Likert scale. Likert scale is used if you want data about respondents' opinions about the problem under study, examples of Likert scale answers such as strongly agree, agree, quite agree, and disagree, as well as Likert scale in the form of categorization.

The sampling technique in this study is *Non Probability Sampling*, namely all sample members so that the chances of selecting each sample member cannot be determined. the population is not known with certainty, therefore in order for the sample taken to be representative and represent the population, the number of samples must be known, to determine the sample, namely using the unknown population formula [26].

$$n = \frac{Z_{\frac{\alpha}{2}}^2 \cdot \sigma^2}{e^2}$$

Description:

n = sample

$Z_{\frac{\alpha}{2}}$ = normal distribution

e = magnitude of acceptable error

In this study$Z_{\frac{\alpha}{2}}$ obtained from the normal distribution table is 1.96 with a value of $\alpha = 0{,}05$, the magnitude of the accepted error (e) of 10%

So that the calculation to be taken is at least 96 respondents, and in this study the sample obtained was 100 respondents.

In this study using 14 variables, namely (1) Making work choices; (2) Feeling interested in entrepreneurship; (3) Feeling excited about entrepreneurship; (4) Desire for entrepreneurship; (5) Dare to take risks; (6) Awareness for self-actualization; (7) Self-progress; (8) Feeling empowered and useful; (9) Family influence; (10) Influence of the surrounding environment; (11) Influence of parents; (12) High confidence; (13) Opportunities; (14) Tolerance of risk.

The validity test in this study was carried out by reviewing and revising statement items based on the *professional* opinion (*professional judgment*) of the reviewers. The validator in this study was Mr. Ali Amran, S.T. who is the head of the lower market field at the Bukittinggi City Market Management Office. In this study the question items submitted to the validator were 14 items. After validating by the validator there are several questions that must be discarded and some questions added. The reliability test in this study used the *Alpha* technique (α), An instrument [27] is said to be reliable if the instrument is tried on the same subject repeatedly but the results remain the same or relatively the same.

Based on the research problem, the data will be analyzed using SPSS (*Statistical Package for the Social Sciences*) 22 and RStudio *software*. The work steps that will be carried out in analyzing the data are as follows:

a. Determine data standardization with *Z-Score* calculation.
b. Next, *principal component analysis* is performed with the following steps:
    1. Determine the covariance matrix of the variables used in the study.
    2. Determine the eigenvalues and eigenvectors of the covariance matrix results that have been obtained.
    3. Determine the number of principal components/PCs, i.e:
        a) Using eigenvalue > 1.
        b) Using the proportion of cumulative variance to the total
        c) Using a *scree plot*, the number of components is taken. It is at the point before the curve sharply decreases or starts to slope from the results of the cumulative proportion value.
    4. Determining factor *loading*
    5. Determine the factor/ PC by multiplying the original variable by the factor value through the equation.
    6. Determining the dominant factor of the formed factor that has the largest proportion of diversity value

7. Interpret the results of solving the formulated problem.

4. RESULT AND DISCUSSION

4.1. Data Description

The research data from distributing questionnaires to 100 female entrepreneurs consisted of self-identity and research questions. The recap of the data obtained from the results of this study is described as follows:

a. Description of Respondent Data Based on Type of Business

The data obtained from the results of the study based on the type of business of the respondents can be seen in table 1.

Table 1. Description of Respondent Data Based on Type of Business

Business Type	Number (people)	Percentage (%)
Accessories	6	6
Atk	2	2
Fruits	3	3
Saka	1	1
Herbs	1	1
Bumbu	1	1
Salted Fish	1	1
Services	3	3
Jengkol	1	1
CD cassette	1	1
Grocery	3	3
Crackers	1	1
Cosmetics	12	12
Culinary	13	13
Clothing	26	26
Splintering	2	2
Rattan	1	1
Sembako	20	20
Blinds	1	1
Cake	1	1
Total	100	100

Based on Table 1, it can be seen that there are 20 types of businesses of respondents who are women entrepreneurs in Pasar Bawah Bukittinggi. Of the 100 respondents studied, respondents who are entrepreneurs of Saka, Herbs, Spices, Salted Fish, Jengkol, CD Tapes, Crackers, Rattan, Curtains, and Cakes each as many as 1 person with a percentage of 1% is the least type of business and Clothing as many as 26 people or with a percentage of 26% is the most type of business.

4.2. Data Analysis Results

The data obtained from distributing questionnaires were collected so that an initial data tabulation could be formed. Because there is a diversity of units and differences in the number of question items for each variable in this research questionnaire, it is necessary to standardize the data and the results of data standardization. then the data is used to be processed using principal component analysis with the following steps:

a. Determine the covariance matrix with data that has been transformed into standard form as shown in table 2.

Table 2. Covariance Matrix

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}
X_1	1.0000	0.5447	0.6277	0.2897	0.2897	0.2227	0.2415	0.3383	0.1608	0.1081	0.2560	0.4343	0.2877	0.2121
X_2	0.5447	1.0000	0.4654	0.3474	0.3198	0.2965	0.2724	0.2639	0.1841	0.1020	0.2560	0.4858	0.4220	0.3037
X_3	0.5595	0.4654	1.0000	0.4817	0.2128	0.1090	0.2117	0.2648	0.0550	0.1220	0.2849	0.3055	0.1813	0.1834
X_4	0.6277	0.3474	0.4817	1.0000	0.2858	0.1300	0.2508	0.3883	0.2020	0.1777	0.2264	0.3134	0.2391	0.2181
X_5	0.2897	0.3198	0.2128	0.2858	1.0000	0.1425	0.2627	0.3607	0.0924	0.0408	0.2915	0.2346	0.3539	0.3954
X_6	0.2227	0.2965	0.1090	0.1300	0.1425	1.0000	0.2418	0.1816	0.2120	0.2348	0.2909	0.2970	0.2277	0.2197
X_7	0.2415	0.2724	0.2117	0.2508	0.2627	0.2418	1.0000	0.3768	0.1319	0.1569	0.1214	0.3438	0.4176	0.4973
X_8	0.3383	0.2639	0.2648	0.3883	0.3607	0.1816	0.3768	1.0000	0.3124	0.0958	0.3384	0.3280	0.4305	0.3289
X_9	0.1608	0.1841	0.0550	0.2020	0.0924	0.2120	0.1319	0.3124	1.0000	0.2895	0.4559	0.2205	0.3462	0.1321
X_{10}	0.1081	0.1020	0.1220	0.1777	0.0408	0.2348	0.1569	0.0958	0.2895	1.0000	0.3966	-0.0006	0.1168	0.0922
X_{11}	0.2560	0.2570	0.2849	0.2264	0.2915	0.2909	0.1214	0.3384	0.4559	0.3966	1.0000	0.2338	0.2760	0.1306
X_{12}	0.4343	0.4858	0.3055	0.3134	0.2346	0.2970	0.3438	0.3280	0.2205	-0.0006	0.2338	1.0000	0.5630	0.5325
X_{13}	0.2877	0.4220	0.1813	0.2391	0.3539	0.2277	0.4176	0.4305	0.3462	0.1168	0.2760	0.5630	1.0000	0.5840
X_{14}	0.2121	0.3037	0.1834	0.2181	0.3954	0.2197	0.4973	0.3289	0.1321	0.0922	0.1306	0.5325	0.5840	1.0000

Based on Table 2, X_2 is greater than 0, namely 0.5447. this includes positive covariance. Then, the variable from the covariance result with itself will definitely produce a positive covariance value.

b. Determine the eigenvalues and eigenvectors of the applied covariance matrix. An eigenvalue is a scalar that describes the covariance matrix. Through the calculation process with the help of R studio software, the results are obtained as shown in the tables 3 and 4.

Table 3. Eigenvalue Results

1	4.7348	1.5226	1.4864	0.9786	0.8784	0.8055	0.7054	0.5789
9	0.5240	0.4573	0.3937	0.3396	0.3031	0.2910		

Table 4. Eigen Vector Result

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	-0.3136	-0.1175	-0.4246	0.0749	-0.0481	0.0667	0.0969	-0.2179	0.0532	0.0017	0.2733	0.1072	0.6562	0.3442
2	-0.3122	-0.1232	-0.1717	0.3193	-0.1716	-0.1915	-0.1884	0.1010	0.5903	0.2664	0.0144	-0.0249	-0.3595	0.1811
3	-0.2593	-0.1040	-0.4681	0.0377	0.1064	0.0244	-0.2097	0.4912	-0.1587	-0.1861	-0.5119	0.0805	0.0978	-0.2570
4	-0.2845	-0.4560	-0.3895	-0.2057	0.1187	0.2627	0.1706	-0.4886	-0.1479	-0.1022	-0.0008	0.1162	-0.5702	-0.0270
5	-0.2476	-0.1186	0.0783	-0.4156	0.1358	-0.7009	-0.0498	-0.2581	0.1451	-0.1486	-0.0032	-0.0741	0.1302	-0.3180
6	-0.2015	0.2236	0.1245	0.5852	0.1414	-0.2970	0.5888	-0.0854	-0.1141	-0.0258	-0.2386	0.1291	-0.0087	-0.0397
7	-0.2604	-0.1401	0.2717	-0.0131	0.5018	0.3001	0.1606	0.3065	0.3544	-0.3695	0.3244	0.0594	-0.0219	-0.0734
8	-0.2905	0.0320	0.0781	-0.4588	-0.0525	0.1146	0.4694	0.3017	-0.0757	0.5472	-0.0878	-0.2330	0.0512	0.0252
9	-0.1976	0.4786	0.1335	-0.1229	-0.4439	0.2752	0.0369	-0.1491	0.3122	-0.4006	-0.2829	-0.1966	0.1414	-0.0753
10	-0.1314	0.5457	-0.0211	0.0971	0.5117	0.1353	-0.3795	0.1924	-0.0006	0.3752	0.0261	-0.1410	0.1344	-0.1851
11	-0.2416	0.4916	-0.0476	-0.1206	-0.1218	-0.2952	-0.1306	0.3468	-0.2969	-0.1928	0.3881	0.1427	-0.2156	0.3173
12	-0.3192	-0.2042	0.1374	0.2881	-0.3132	0.1223	-0.0993	-0.0261	-0.3922	-0.0065	0.3716	-0.3298	0.0197	-0.4791
13	-0.3217	-0.0776	0.3487	-0.0210	-0.2178	0.0961	-0.2259	-0.0577	0.0653	0.2678	-0.0950	0.7504	0.0097	-0.0951
14	-0.2854	-0.2385	0.3956	0.0095	0.1742	0.0311	-0.2512	-0.1401	-0.3037	-0.1217	-0.3383	-0.2747	0.0025	0.5419

The results obtained from this eigenvalue show how much impact a variable has on the formation of the characteristics represented by λ , and the ranking of this eigenvalue always starts from the highest. Meanwhile, the eigen vector is the coefficient of each variable used in the formation of the main component or Loadings. This *Loadings* value or *Loadings* factor will be used to compile the main component equation.

c. After the eigenvalue is determined, the next step is to determine the main component (PC) by finding the variance and cumulative value of the eigenvalue first.

The proportion of variance is obtained from:

$$\frac{\tilde{\lambda}_i}{p} \times 100\% \tag{12}$$

$\tilde{\lambda}_i =$ nth eigenvalue
$p =$ number of variables
$i = 1,2,\ldots,$ p

The calculation of the cumulative proportion value is obtained through the addition of the previous proportion values:

$$x_1 = \frac{4{,}7348675}{14} \times 100\% = 0{,}3382$$

$$x_2 = \frac{4{,}7348675 + 1{,}5226885}{14} \times 100\% = 0{,}4470$$

Table 5. Cumulative proportion

No.	Eigenvalue	Variance Proportion	Cumulative Proportion
PC1	4.7348675	0.33820482	0.33820482
PC2	1.5226885	0.10876346	0.446968286
PC3	1.4864093	0.10617209	0.553140379
PC4	0..9786603	0.06990431	0.623044686
PC5	0.8784174	0.0627441	0.685788786
PC6	0.8055947	0.05754248	0.743331264
PC7	0.7054776	0.05039126	0.793722521

PC8	0.5789375	0.04135268	0.8350752
PC9	0.5240873	0.03743481	0.872510007
PC10	0.4573181	0.03266558	0.905175586
PC11	0.3937912	0.02812794	0.933303529
PC12	0.3395258	0.02425184	0.957555371
PC13	0.3031873	0.02165624	0.979211607
PC14	0.2910374	0.02078839	1

Table 5 shows each variable that has been analyzed. In this study, there were 14 variables, which means there were 14 factors studied. To be determined as a factor, the eigenvalue must be ≥ 1, so according to table 5, there are 3 factors identified as *Principal Component*. These three components are sufficient to describe the whole with a cumulative proportion reaching 55.3%. In addition to referring to the table, the *principal components* formed can also be seen in Figure 1.

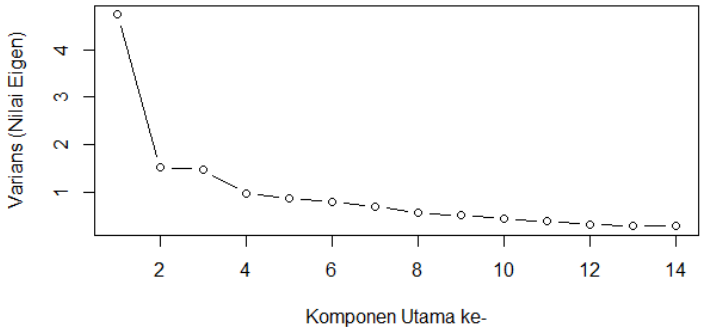

Figure 1. Scree Plot

Figure 1 above shows the main elements and variations. For a PC to be formed, an eigenvalue of at least one is required. In the figure, we can clearly see that there are three components with values equal to or greater than one. This also corresponds to the calculations done on the cumulative proportions.

d. Assigning factor loadings. The loading value is taken from the eigenvector generated by the estimated covariance matrix. In addition, the function of the loading value also functions as the principal component value. Factor loading reflects the level of association between each variable and factor one, factor two, or factor three. The process of determining which variables to include in a particular factor is done by comparing the correlation values in each row in all tables. Here, information from the eigenvectors will be used to generate table 6.

Table 6. Loading Value

	PC1	**PC2**	**PC3**
x_1	-0.314	-0.118	**-0.425**
x_2	**-0.312**	-0.123	-0.171
x_3	-0.259	-0.104	**-0.468**
x_4	-0.285	-	**-0.390**
x_5	**-0.248**	-0.119	-
x_6	-0.202	**0.224**	0.125
x_7	-0.260	-0.140	**0.272**
x_8	**-0.291**	-	-
x_9	-0.198	**0.479**	0.134
x_{10}	-0.131	**0.546**	-
x_{11}	-0.242	**0.492**	-
x_{12}	**-0.319**	-0.204	0.137
x_{13}	-0.322	-	**0.348**
x_{14}	-0.285	-0.239	**0.395**

The Loading values listed in table 6 illustrate the contribution of each variable to a factor, which is seen through the magnitude of the Loading value. To understand the variables included in the factor, we can look at the factor loading and choose the highest value among them. The variable with the maximum Loading value (in absolute terms) indicates that it has an important role in the factor. Thus, the principal components formed can be seen in table 7.

Table 7. Principal Component Groups

PC1		PC2		PC3	
x_2	Feeling attracted	x_6	Aware of self-actualization	x_1	Making work choices
x_5	Dare to take risks	x_9	Family influence	x_3	Feel good
x_8	Feelings of empowerment and usefulness	x_{10}	Influence of the surrounding environment	x_4	Desire
x_{12}	High confidence	x_{11}	Parental influence	x_7	Self-improvement
				x_{13}	Opportunities
				x_{14}	Risk tolerance

f. Based on the three methods of determining the main factors or components, the results taken are based on eigenvalues that exceed one, so three main components were selected with a total value of 53.3%. Below is the data of the three components that have been selected, as shown in table 8.

Table 8. Main components produced

Factor	Variables	Description	Eigenvalue	Loading Value
PC1	x_2	Feeling attracted	4.7348675	-0.312
PC1	x_5	Dare to take risks	4.7348675	-0.248
PC1	x_8	Feelings of empowerment and usefulness	4.7348675	-0.291
PC1	x_{12}	High confidence	4.7348675	-0.319
PC2	x_6	Aware of self-actualization	1.5226885	0.224
PC2	x_9	Family influence	1.5226885	0.479
PC2	x_{10}	Influence of the surrounding environment	1.5226885	0.546
PC2	x_{11}	Parental influence	1.5226885	0.492
PC3	x_1	Making work choices	1.4864093	-0.425
PC3	x_3	Feel good	1.4864093	-0.468
PC3	x_4	Desire	1.4864093	-0.390
PC3	x_7	Self-improvement	1.4864093	0.272
PC3	x_{13}	Opportunities	1.4864093	0.348
PC3	x_{14}	Risk tolerance	1.4864093	0.395

Of the three main components formed, the main component with the value of the largest proportion of variation was selected to become the main factor, namely the first main component, so that the dominant factor obtained consisted of feeling interested, daring to take risks, feeling empowered and useful, high confidence with an eigenvalue of 4.7348675 and was able to explain the total diversity of 47.35%.

5. CONCLUSION

Based on data analysis regarding the application of Principal Component Analysis in determining the dominant factors that influence women's interest in entrepreneurship in Pasar Bawah Bukittinggi City, fourteen variables of influencing factors are extracted so that three principal components are formed based on eigenvalue ≥1, where the

first principal component based on the highest eigen value is 4.7348675 and is able to explain the total diversity of 47.35%, the second principal component has an eigen value of 1.5226885 and is able to explain the total diversity of 15.23%, the third principal component has an eigen value of 1.4864093 and is able to explain the total diversity of 14.86%. So that the three principal components with eigenvalues ≥1 have a total diversity that can explain 53.3% of the total factors that influence women's interest in entrepreneurship in Pasar Bawah Bukittinggi City.

The dominant factor is determined based on the correlated variable with the largest Loading value on the first principal component, because it has the largest total diversity value. Variables that are correlated with the Loading value on each selected principal component show the dominant factors in each principal component. The highest principal component is the first principal component so that the most dominant factors of influencing factors are feeling interested, taking risks, feeling empowered and useful, high confidence.

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