J-CEKI : Jurnal Cendekia Ilmiah
Vol.4, No.3, April 2025

Analysis of Risk Management Model Simplification for Food and Beverage Industry through Small Business and Ventures

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Article History:
Received: 01 April 2025
Revised: 26 April 2025
Accepted: 30 April 2025

Keywords: MSMEs, Risk Management, Risk Assessment, Financial Risk, Market & Reputational Risk, Operational Risk, Legal & Compliance Risk.

Abstract: *Micro, Small, and Medium-Sized Enterprises (MSMEs) are firms with assets and annual sales of up to Rp500 million that are held by individuals, families, or commercial groups. However, the failure rate is significant, and some MSMEs fail to survive. The concept of risk management detailed a collection of activities by recognizing issues, mapping prospective risks to determine the hazards that presently exist in the business, and forecasting possible risks that may develop in the future. Based on these principles, the majority of research respondents in Bandung, Jawa Barat are micro, small, and medium-sized food and beverages business owners. Using a questionnaire, the brand name and owner's age, educational background, expected gross profit, and understanding of the risk management concept are gathered. validity and reability ab are utilized to accomplish the data analysis. The analysis based on 0.729 performed by KMO-Bartlett. 33.849%, 15.600 % for Factor 2 among 5 variables because the value is bigger than 1. As those factor could be described as 37,276% for F1 and 65,817% for F2. The factor loadings resulting from the communalities are used as scoring to generate a recommended solution in the approach of a risk mitigation plan, while the risk action and monitoring plan is utilized for the implementation plan. The goal of the research is to develop a proposed solution for business improvement in MSMEs by handling the business issue with a risk management approach, which entails identifying the business issue, conducting an assessment to know the severity of the issue, determining the treatment, initiatives and strategies to overcome the issue, and determining a monitoring plan as a step of evaluation and improvement continuously because risk management is a continuous process to create sustainable businesses. As the research is conduct in the manufacture and trade, food & industry sector there are 7 industries that left and the research could also implemented in another region, cities and country.*

INTRODUCTION

MSMEs (Micro, Small, and Medium Enterprise) are businesses owned by individuals, households, or business entities with assets and yearly turnover of not more than Rp500 million. In other words, the income generated from such business is relatively small. MSMEs play a role as a driving force for the national economy in Indonesia. These businesses contribute to the high velocity of money in the market. In addition, MSMEs also participate in helping the government open more jobs. With the development of technology, many MSMEs have upgraded. As a customer, you can transact easily. Most MSMEs already have a business website and social media account to make it easier for people to see their products.

However the failure rate is high and some of MSMEs are not sustain due to the sector of the business are mostly on the informal business, There also major changes of the business sector because the business is following the trend and driven base on the demand. the owner of MSMEs are usually lack of business literation and knowledge resulting no value proposition and product value provided for the customers and market segments furthermore the use of technologies and digital tools are not well utilized by the reason of accessibility of knowledge. On the other hands the MSMEs are not capital intensive business type, the owners are struggling to get funding and debts from bank and venture capital because these type of business are incapable to manage the money and asset and most of the time the assurance given by MSMEs are not solid according to the creditors, but most of the time this type of problems are neglected and do not consider as potential issue or risk that could possibly happen in the future.

The concept of risk management defined a set of initiatives by drawing the problem identification, potential risk mapping to determine the risk that currently happens in the business and anticipating the potential risk that possibly happen in the future as for the next movement is by analyzing the impact, finding a proper method to treat the risk as well the risk monitoring and evaluating.

The successful business is aware of their business risk and giving the proper treatments of risk management by conducting annual assessment resulting awareness of risk management in every department therefore the implementation of risk management should be implemented in every type of business

MSMEs (Micro, Small, Medium Enterprises) is one of economic activities that give contribution towards national GDP by 61% moreover it’s help to reduce national rate of unemployment, almost 97% of Indonesian employee are hired by the MSMEs, as per 2022 there are 63.955.369 micro enterprises equal to 99.62% and 193.959 (0.3%) of the total of Indonesian enterprises furthermore on economic crisis MSMEs are resilience and early to recover, it's also very agile to towards economic and global condition hence the government through ministry of economic put a serious effort prior to MSMEs development.

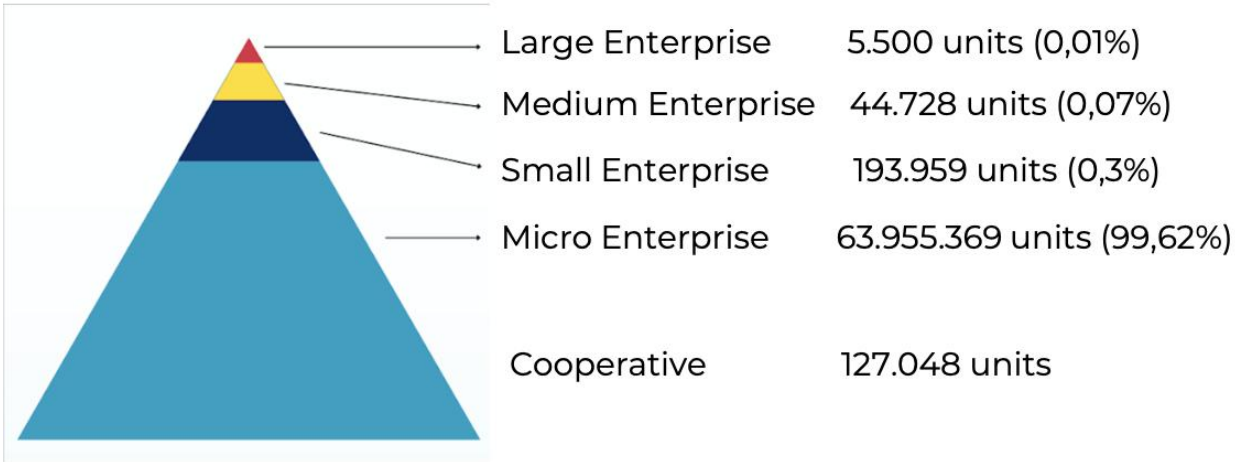


Figure 1. Proportion of MSMEs in Indonesia

The Ratio of bank lending distributed by Bank Indonesia, the ratio of bank lending for MSMEs are 7.1% for the first quarter of 2022 comparing to the 2021 quarter of 7.04%, the nominal would probably increase even though there a slightly decrease on the quarterly basis.

As of June 2022, the amount of digitalized MSMEs is 19.6 Million as equal as 1.3 million since pandemic of COVID-19 started in total of 30.15 % of total MSMEs population furthermore its already fulfilled 65.3% of the target for 30 million digitalized MSMEs in Indonesia.

RESEACH METHOD

Research Design

Research Design is a blueprint or framework for performing a study. It lays out the procedures that will be followed to respond to a research query or test a hypothesis. Research design plays a role in ensuring the validity of the study's findings as well as the relevance and dependability of the data that will be gathered.

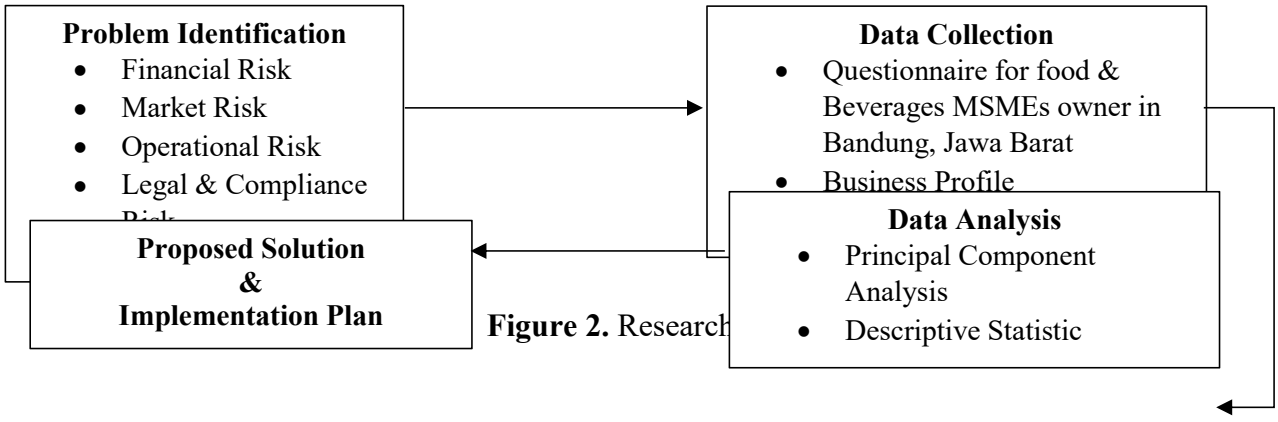


Figure 2. Research

Data Collection

The data of the research is primary data. According to Sugiyono (2012) “the primary data is the data that directly collected by the writer”. The data will be collected using questionnaire that contains the business profile and the question regarding each type of financial risk management.

The business profile defined the research respondents by the business age, the educational

backgrounds, the estimated gross profit and the awareness of risk management concept on the other hands the questions correlated with the risk management are based on the current business obstacles as explained in previous chapter.

Research Methodology

Principal Component Analysis (PCA) is used to find patterns in data and to project the data onto a lower-dimensional space in order to reduce its dimensionality. It is a widespread approach in machine learning and data analysis and is frequently used to preprocess data for use in other statistical or machine learning models, as well as to display and study data. The usage of PCA can be beneficial for reducing the dimensionality of the data since it enables you to recognize and keep just the most crucial variables while eliminating the less crucial ones. Additionally, it may be used to project high-dimensional data onto a lower-dimensional environment, which can make it simpler to comprehend and analyze.

1. Standardize the data by subtracting the mean from each feature's standard deviation and dividing by that value.
2. Determine the data's covariance matrix.
3. Calculate the covariance matrix's eigenvalues and eigenvectors.
4. Where k is the required number of dimensions for the new dataset, sort the eigenvalues in decreasing order and choose the top k eigenvectors.
5. Apply the chosen eigenvectors to the original data.

Due to the fact that PCA is a linear approach, it functions best when the connections between the features are linear. It is crucial to normalize the data before applying PCA since it is sensitive to the scale of the data.

Descriptive statistic is the features of a data set and a summary of the data are frequently provided through descriptive statistics. As they make it simple to rapidly and succinctly describe the key aspects of the data, they are especially helpful when working with huge data sets.

RESULT AND DISCUSSION

Data Analysis

The data analysis describes the findings result of the data, furthermore the analysist consist of the process by finding the output with statistical approach. The data analysis conducted using the descriptive statistic and principal component analysis.

Descriptive Statistic

Descriptive statistics are statistical techniques that are used to summarize, describe, and represent a set of data. These techniques are used to provide a summary of the main characteristics of the data, such as the mean, median, mode, and standard deviation. Descriptive statistics are often used to describe large datasets and to provide a summary of the key features of the data.

Table 1. Mean and Standard Deviation

Descriptive Statistics

	N	Mean	Std. Deviation
Financial Risk 01	149	4.3020	.89068

Financial Risk 02	149	4.4631	.57567
Financial Risk 03	149	3.0940	1.44420
Financial Risk 04	149	3.5839	1.07867
Financial Risk 05	149	3.4899	1.18332
Market Risk 01	149	4.3020	.76851
Market Risk 02	149	4.1611	1.01387
Market Risk 03	149	3.6443	1.13348
Market Risk 04	149	4.2282	.93809
Operational Risk 01	149	4.7248	.53092
Operational Risk 02	149	3.5705	1.19828
Operational Risk 03	149	3.8121	1.07407
Operational Risk 04	149	3.7450	1.07272
Legal and Compliance Risk 01	149	3.5369	.89687
Legal and Compliance Risk 02	149	4.2416	.94190
Legal and Compliance Risk 03	149	3.3624	1.04115
Legal and Compliance Risk 04	149	3.6980	.99800
Valid N (listwise)	149		

Mean

A set of data's mean is its arithmetic average. It is calculated by summing up all of the dataset's values and dividing the result by the overall number of values. Every value in the dataset has an impact on the mean, which measures the data's central. The 149 data is calculated and presented in the table above.

Standard Deviation

The standard deviation is a measure of the spread of a set of data. The average of the squared deviations between the data and the mean, or variance, is used to compute it. When describing how much the values in a dataset deviate from the mean, the standard deviation, a measure of data dispersion, is utilized. The 149 data is calculated and presented in the table above.

Coeficient correlation

The Pearson's correlation coefficient, commonly known as the coefficient of correlation, is a metric used to describe the direction and intensity of a link between two variables. This statistic has a range of -1 to 1, with -1 denoting a strong negative correlation, 0 denoting no connection, and 1 denoting a significant positive correlation. The detailed of Coeficient correlation between the variables are presented in **Appendix 2 Coeficient correlation.**

Principal Component Analysis

Principal component analysis (PCA) is used to find patterns in data and reduce the dimensionality of huge datasets. In order to do this, the data is projected onto a lower-dimensional space in the directions that show the most variation**.**

KMO and Bartlett's Test

Table 2. KMO and Bartlett's Test

KMO and Bartlett's Test	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.688

Bartlett's Test of Sphericity	Approx. Chi-Square	1300.695
	df	136
	Sig.	<.001

Kaisser-Meyer-Olkin as a measure of sample adequacy. A factor analysis may not be suitable for the data set if the KMO value is less than 0.6, according to popular consensus. Statistical analysis is performed to assess if the observed correlation matrix is an identity matrix using Bartlett's test. If the observed correlation matrix is an identity matrix, then component analysis is not applicable since there is no correlation between the variables. When deciding whether or not factor analysis is acceptable for a specific data set, KMO and Bartlett's test are both utilized. They are frequently combined in the factor analysis.

Eigen Value

Table 3. Eigen Value

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.381	31.650	31.650	5.381	31.650	31.650
2	2.368	13.929	45.579	2.368	13.929	45.579
3	1.677	9.864	55.443	1.677	9.864	55.443
4	1.362	8.014	63.457	1.362	8.014	63.457
5	.993	5.840	69.297			
6	.936	5.508	74.805			
7	.835	4.909	79.714			
8	.706	4.154	83.868			
9	.566	3.331	87.199			
10	.488	2.870	90.069			
11	.396	2.329	92.398			
12	.366	2.152	94.550			
13	.283	1.664	96.213			
14	.216	1.271	97.484			
15	.195	1.149	98.633			
16	.128	.751	99.383			
17	.105	.617	100.000			

Extraction Method: Principal Component Analysis.

Eigen Value eigenvalues and eigenvectors in many disciplines, including physics, engineering, and economics. They are frequently used to diagonalize matrices, identify a dynamical system's stationary states, and assess the stability of equilibrium points. Consider the scenario where we need to identify the eigenvalues and eigenvectors of matrix A. We must first solve the following equation to do this:

$$(A - \lambda I)x = 0$$

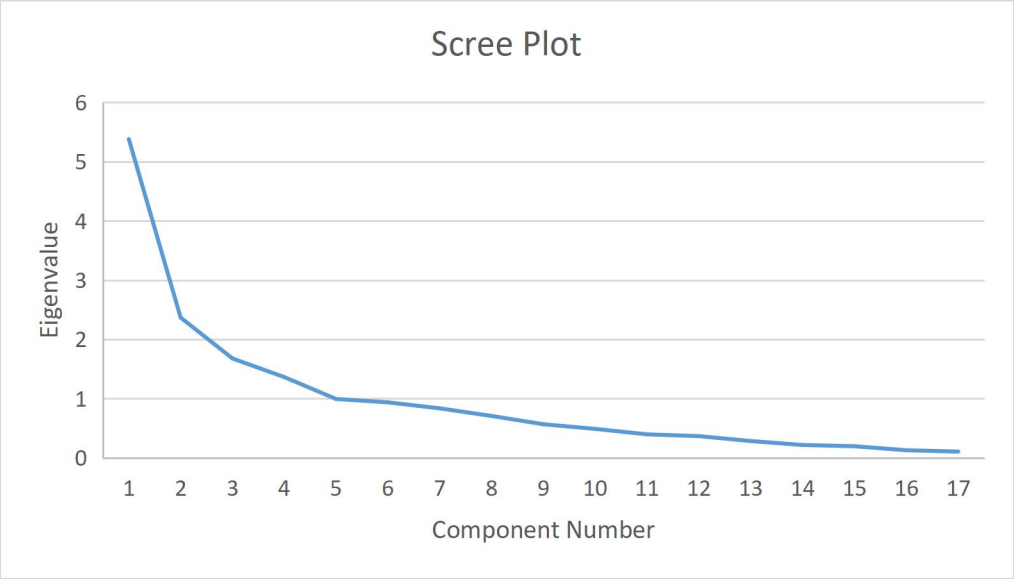


Figure 2. Scree Plot of Eigen Value

I is the identity matrix, etc. The characteristic equation of A is the name given to this equation. We may get the eigenvalues of A by determining the values of that allow the equation to hold. Then, for each eigenvalue, the associated eigenvectors x may be determined by resolving the equation Ax = x

Depicts of the eigen value of component 1 and 2 there are some factor loading constructed which is component 1 and component 2 due to the total of 31.650 for component 1 or and 15.600 % for Factor 2 among 5 variables because the value is bigger than 1. As those factor could described37,276% for F1 and 65,817% for F2. To visualize the compound variables there scree plot graph to display the constructed variables as well as described component distribution graph.

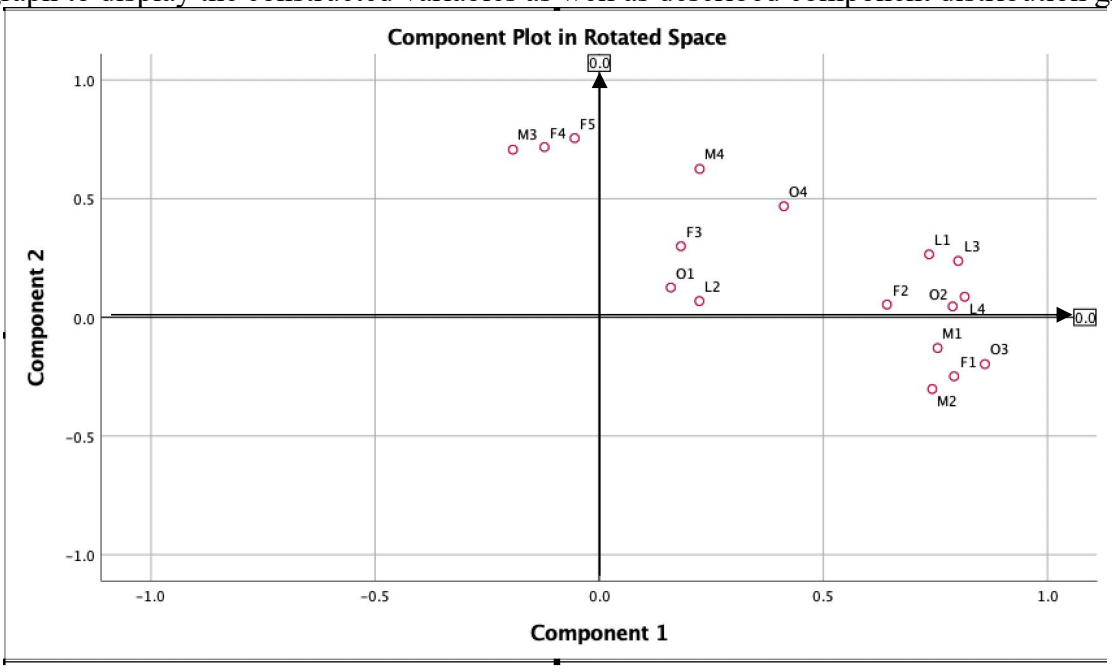


Figure 2. Component Distribution Graph

Factor Loading Analysis

Factor loadings, or the correlations between a given variable and the elements in the model, are commonly used to estimate communities. A strong association between the variable and the factor is shown by a high factor loading, whereas a lesser relationship is indicated by a low factor loading. The sum of the squared factor loadings for a variable can be used to determine its communalities.

Table 4. Communalities in Factor Loading Analysis

Communalities

	Initial	Extraction
Financial Risk 01	1.000	.778
Financial Risk 02	1.000	.609
Financial Risk 03	1.000	.516
Financial Risk 04	1.000	.544
Financial Risk 05	1.000	.642
Market Risk 01	1.000	.651
Market Risk 02	1.000	.655
Market Risk 03	1.000	.602
Market Risk 04	1.000	.829
Operational Risk 01	1.000	.589
Operational Risk 02	1.000	.567
Operational Risk 03	1.000	.825
Operational Risk 04	1.000	.466
Legal and Compliance Risk 01	1.000	.688
Legal and Compliance Risk 02	1.000	.486
Legal and Compliance Risk 03	1.000	.611
Legal and Compliance Risk 04	1.000	.731

Extraction Method: Principal Component Analysis.

Proposed Solution (Mitigation Plan)

The Propose solution is proposed using the method of risk mitigation plan, risk mitigation plan is a strategy or activity intended to lessen or completely eliminate the possible negative effects of recognized risks on a project, company, or organization. A risk mitigation plan's objectives are to identify and prioritize risks, evaluate the possibility and effect of those risks, and then put policies in place to reduce or completely eliminate those risks.

According to the research's conceptual framework this step is the part of treating the risk. Base on the communalities on PCA analysis if the score is greater than 0.5 so that the variables is relevant to the research. The impact categorized as relevant if it's larger than 0.5 and irrelevant if the result less than 0.5, the Risk mitigation plan would be decribed further in APPENDIX 3 Risk Mitigation

Implementation Plan & Justification (Action & Monitoring Plan)

Research implementation plan. It is a thorough plan that specifies the objectives of the study, the research questions that will be answered, the research design and technique that will be applied, and the materials and personnel that will be required to complete the study.

The research implementation plan is a crucial instrument for making sure that the research

study is carried out successfully and that the aims and objectives of the study are met. Additionally, it assists in ensuring that all required personnel and resources are available to support the study and that any possible risks or difficulties are recognized and address in timely manner.

In this research, the implementation plan is creating based on the risk action and monitoring plan as in the step 4 treating the risk and 5 monitoring and reviewing the risk in risk management process as the research conceptual framework. The step of treating the risk define an initiatives and strategies taking to overcome the issue furthermore the monitoring plan is an evaluation of the initiatives that explain in the action plan. The Implementation Plan would be described further in APPENDIX 4 Risk Action Plan and Risk Monitoring Plan.

CONCLUSION

As the purpose of the research is to create a proposed solution for business improvement in food & beverage MSMEs by handling the business issue with risk management approach which is to identify the business issue, conduct assessment to know the degree of severeness, determine the treatment, initiatives and strategies to overcome the issue and monitoring plan as step of evaluation and improvement continuously because risk management is a continuous process to create sustainable business.

REFERENCES

ISO.org. (2018). *ISO 31000 Risk Management.* Vernier, Geneva, Switzerland: ISO Central Secretariat.

Bank Indonesia. (2016). *Profil Usaha Mikro,Kecil dan Menengah Indonesia.* Jakarta : Lembaga Pengembangan Perbankan Indonesia.

Dinas Koperasi dan UMKM Jawa Barat. (2021). *Manajemen Risiko UMKM.* Bandung: Dinas Koperasi dan UMKM Jawa Barat.

Henschel, T. (2008). *Risk Management Practices on SMEs; Evaluating and Implementing Effective Risk Management.* Berlin: Erich Schmidt GmbH & Co.

Kenton, W. (2021 , March 01). *What is Risk Management in Finance and why is it importance?* Retrieved from Investopedia : https://www.investopedia.com/terms/r/riskmanagement.asp

Dilys Parkinson, J. N. (2005). *Oxford Business English Dictionary.* Oxford: Oxford University Press.

Leo J.Susilo, V. R. (2018). *Manajemen Risiko Berbasis ISO 31000:2018.* Jakarta: PT. Gramedia Widiasarana Indonesia.

Brace, I. (2004). *Questionnaire Design; Second Edition.* London & Philadelphia: Kogan Pages.

Mun, J. (2004). *Applied Risk Analysis; Moving Beyond Uncertainty in Business.* Canada: John Willey & Sons.

Michel Crouchy, G. R. (2006). *The Essentials of Risk Management.* New York: Mc Graw Hill Education.

Scott W. Vanderstoep, D. D. (2009). *Research Methods for Everyday life* . San Frasisco : Jossey Bass.

Sage Publications, Inc. (2014). *Research Design; Qualitative & Quantitaive research.* Los Angeles, London, New Delhi, Singapore, Washington DC: Sage Publications, Inc.

Mark Saunders, P. L. (1997). *Research Methods for Business Students; Fifth Edition.* Essex, England: Pearson Education Limited.