

# **FRAMEWORK OF VENDOR PERFORMANCE ASSESSMENT IN HOSPITALITY INDUSTRY**

(Case Study: Sofyan Inn Unisi Hotel Yogyakarta)

## **Undergraduate Thesis**

Submitted to International Program  
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Universitas Islam Indonesia



**Arranged by:**

Sofyan Ali (14522427)

**Supervisor:**

Dr. Ir. Elisa Kusrini, M.T., CIPM, CSCP.

**INTERNATIONAL PROGRAM  
DEPARTMENT OF INDUSTRIAL ENGINEERING  
FACULTY OF INDUSTRIAL TECHNOLOGY  
UNIVERSITAS ISLAM INDONESIA  
YOGYAKARTA**

**2019**

## AUTHENTICITY STATEMENT

### AUTHENTICITY STATEMENT

In the name of Allah, I hereby certify that this research is based on my own work expect for citations and summaries in which of those is explicitly knowledge. If in the future this statement is proved not right and violates the legal regulation of papers and intellectual property rights, I agree Universitas Islam Indonesia to revoke my bachelor certificate.

Yogyakarta, January 2019



Sofyan Ali

# THESIS APPROVAL OF SUPERVISOR

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### FRAMEWORK OF VENDOR PERFORMANCE ASSESSMENT IN HOSPITALITY INDUSTRY

(Case Study: Sofyan Inn Unisi Hotel Yogyakarta)

#### THESIS



(Dr. Ir. Elisa Kusriani, M.T., CIPM, CSCP)

# THESIS APPROVAL OF EXAMINATION COMMITTEE

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### FRAMEWORK OF VENDOR PERFORMANCE ASSESSMENT IN HOSPITALITY INDUSTRY

(Case Study: Sofyan Inn Unisi Hotel Yogyakarta)

By  
Name : Sofyan Ali  
Student No. : 14522427

Was defended before Examination Committee in Partial Fulfillment of the requirements for  
the degree of Industrial Engineering Department

Universitas Islam Indonesia

Examination Committee

Agus Mansur, S.T., M.Eng.Sc.

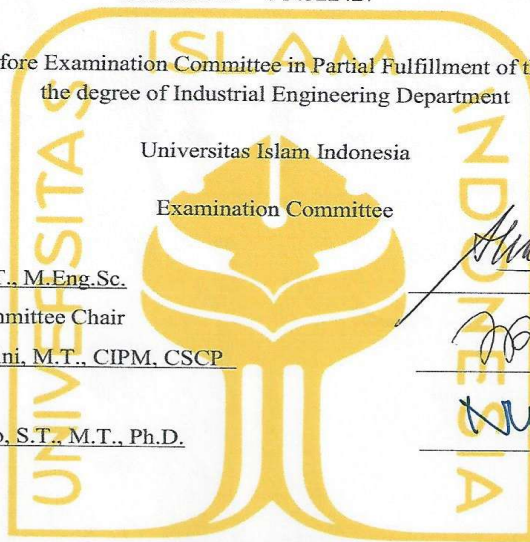
Examination Committee Chair

Dr. Ir. Elisa Kusriani, M.T., CIPM, CSCP

Member I

Winda Nur Cahyo, S.T., M.T., Ph.D.

Member II



*[Handwritten signatures of Agus Mansur, Elisa Kusriani, and Winda Nur Cahyo]*

Acknowledged by,  
Head of Undergraduate Program Department Industrial Engineering  
Faculty of Industrial Technology

Universitas Islam Indonesia



*[Handwritten signature of Dr. Taufiq Immanuel]*  
(Dr. Taufiq Immanuel S.T., M.M.)

## **DEDICATION**

*I am grateful for the love and encouragement from Ayah, Ibu, Fauziah, and Adian, have always provided during every endeavour in my life*

*My Best friends Syahla and Nurman*

*Sofyan Inn Unisi Hotel Yogyakarta*

*My Thesis Supervisor, Dr. Ir. Elisa Kusrini, M.T., CIPM, CSCP.*

*International Program, Department of Industrial Engineering, Faculty of Industrial Technology, Universitas Islam Indonesia*

## **MOTTO**

“And for those who fear Allah, He will make their path easy”

- Q.S At-Talak: 4

“The best of people is those that bring most benefit to the rest of mankind.”

- HR. Bukhari Muslim

“Goals Should Never Be Easy.”

- Sofyan Ali

## PREFACE



*Assalamu'alaikum Warahmatullaahi Wabarakatuh*

Praise is merely to Allah SWT for the gracious mercy and tremendous blessing that enables me to complete thesis entitled “Framework of Vendor Performance Assessments in Hospitality Industry (Case Study: Sofyan Inn Unisi Hotel Yogyakarta) timely as the report that the writer already finished the thesis project that is one of the main subjects in International Program Department of Industrial Engineering Universitas Islam Indonesia.

During the thesis project and the process of writing this report the writer can't finish all of the work if there is no help from Allah SWT and also all the people that support the writer. The writer wants to say thank you to all the people that always giving their support, i.e.:

1. Allah SWT. for His grace and mercy and His last Messenger, Prophet Muhammad SAW
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The author realized that this report are full of imperfection and employ many shortcomings. Therefore, the author is looking forward to the reader's constructive criticism and suggestions for the sake of improving this report. Lastly, the author hopes that this thesis may be beneficial for all parties who read this.

*Wassalamualaikum Wr. Wb.*

Yogyakarta, January 2019

Sofyan Ali



## ABSTRACT

The aims of this research are to design a framework of vendor performance assessment for the hospitality industry. Vendors performance assessment is important to improve vendor performance and manage long-term relationships between the company and their vendor. This vendor assessment framework was developed based on the literature review and interview with procurement experts, and staff at the hospitality. Performance assessment criteria are identified and carried out testing for validity by distributing questionnaires to the procurement department at several hotels. To get the weight of each criterion, then the questionnaire is distributed to the expert procurement and analysis of answers using the Analytical Hierarchy Process (AHP) method, where after obtaining a consistent CR of Analytical Hierarchy Process (AHP), Fuzzy Analytical Hierarchy Process (FAHP) is then used to eliminate subjective of the data so that the data is seen as more objective. The final performance score is calculated based on the standard value of each criterion multiplied by the weight. Based on the application of this model in the hotel, it is known that the proposed model is suitable to assess supplier performance and greatly help the hotel in managing their supplier performance.

Keywords: Framework vendor performance assessments, performance assessments, AHP, Fuzzy AHP

## TABLE OF CONTENTS

<b>COVER</b> .....	i
<b>AUTHENTICITY STATEMENT</b> .....	ii
<b>THESIS APPROVAL OF SUPERVISOR</b> .....	iii
<b>THESIS APPROVAL OF EXAMINATION COMMITTEE</b> .....	iv
<b>DEDICATION</b> .....	v
<b>MOTTO</b> .....	vi
<b>PREFACE</b> .....	vii
<b>ABSTRACT</b> .....	ix
<b>LIST OF TABLES</b> .....	xiii
<b>LIST OF FIGURES</b> .....	xiv
<b>CHAPTER I</b> .....	1
<b>1.1. Background</b> .....	1
<b>1.2. Problem Formulation</b> .....	3
<b>1.3. Research Objective</b> .....	3
<b>1.4. Scopes of Research</b> .....	3
<b>1.5. Research Benefits</b> .....	4
<b>1.6. Systematical Writing</b> .....	4
<b>CHAPTER II</b> .....	6
<b>2.1. Inductive Study</b> .....	6
<b>2.2. Deductive Study</b> .....	13
<b>2.2.1. Supply Chain Management</b> .....	13
<b>2.2.2. Vendor Performance Assessment (VPA)</b> .....	14
<b>2.2.3. Multi Criteria Decisions Making (MCDM)</b> .....	14
<b>2.2.4. Analytical Hierarchy Process (AHP)</b> .....	15
<b>2.2.5. Step of Analytical Hierarchy Process (AHP)</b> .....	16
<b>2.2.6. Basic Principle of Analytical Hierarchy Process (AHP)</b> .....	20
<b>2.2.7. Fuzzy Logic</b> .....	21
<b>2.2.8. Fuzzy Analytical Hierarchy Process (F-AHP)</b> .....	22
<b>2.2.9. Likert Scale</b> .....	26
<b>2.2.10. Vendor Performance Score</b> .....	27

2.2.11. Rating Scale and Level .....	27
<b>CHAPTER III .....</b>	<b>29</b>
3.1. Research Object and Location .....	29
3.2. Problem Identification .....	29
3.3. Problem Formulation.....	29
3.4. Literature Review.....	30
3.5. Data Collection .....	30
3.6. Data Collection Method .....	30
3.7. Data Processing .....	31
3.8. Research Flowchart .....	32
3.9. Results and Discussion .....	34
3.10. Conclusion and Recommendation.....	34
<b>CHAPTER IV .....</b>	<b>35</b>
4.1. Data Collection .....	35
4.1.1 Criteria Selection .....	36
4.1.2 Important Criteria Determination .....	39
4.1.3 Criteria Weighting Using Fuzzy AHP .....	40
4.2. Data Processing .....	41
4.2.1. Analytical Hierarchy Process Weighting.....	41
4.2.2. Criteria Weighting Using Fuzzy Analytical Hierarchy Process .....	47
4.2.3. Framework of Vendor Performance Assessment .....	55
4.2.4. Framework Validation .....	63
<b>CHAPTER V .....</b>	<b>70</b>
5.1. Criteria Weighting .....	70
5.1.1. Criteria Weighting Using Analytical Hierarchy Process .....	70
5.1.2. Criteria Weighting Using Fuzzy Analytical Hierarchy Process .....	71
5.2. Proposed Framework of Vendor Performance Assessments .....	74
5.3. Framework Validation.....	76
5.3.1. Framework Implementation Procedure .....	77
5.3.2. Vendor Final Score Based on Framework .....	79
5.4. Limitation and Future Research.....	81
<b>CHAPTER VI .....</b>	<b>82</b>

<b>6.1. Conclusions</b> .....	82
<b>6.2. Recommendations</b> .....	84
<b>REFERENCES</b> .....	84
<b>APPENDIX A</b> .....	89
<b>APPENDIX B</b> .....	93
<b>APPENDIX C</b> .....	102

## LIST OF TABLES

Table 2.1 Summary Table of Previous Research .....	10
Table 2.2 Pair-wise Rating Scale.....	17
Table 2.3 Random Index (RI) Value.....	19
Table 2.4 Triangular Fuzzy Number for Pairwise Comparisons.....	23
Table 4. 1 Criteria for Vendor Performance assessments.....	36
Table 4. 2 Important Criteria Determination Questionnaire Recapitulation .....	38
Table 4. 3 Important Criteria .....	39
Table 4. 4 Pairwise Comparison Questionnaire.....	41
Table 4. 5 Pairwise Comparison Matrix .....	42
Table 4. 6 Normalize Pairwise Comparison Matrix .....	43
Table 4. 7 Normalization Matrix .....	44
Table 4. 8 Calculation for $\lambda_{max}$ .....	45
Table 4. 9 Criteria Weight .....	46
Table 4. 10 Triangular Fuzzy Number for Pairwise Comparison.....	48
Table 4. 11 TFN Pairwise Matrix .....	49
Table 4. 12 Geometric Mean from Criteria .....	50
Table 4. 13 Defuzzification Results.....	51
Table 4. 14 Normalization Result.....	52
Table 4. 15 Fuzzy AHP Weight's for Each Criterion.....	53
Table 4. 16 Comparison Between Initial AHP weights and Fuzzy AHP weights.....	54
Table 4. 20. Vendor Performance Assessments Framework .....	55
Table 4. 18 Assessed Vendors Using Model of VPA.....	63
Table 4. 19 Performance Score of UD. Siaga.....	64
Table 4. 20 Performance Score of CV. Mulia .....	65
Table 4. 21 Performance Score of CV. Putra Mandiri.....	66
Table 4. 22 Performance Score of CV. Puspa Jaya .....	67
Table 4. 23 Performance Score of CV. Embun Pagi .....	68
Table 4. 24 Vendor Performance Rank .....	69
Table 5. 1 Summary Table of Previous Research.....	75

## LIST OF FIGURES

Figure 2.1 AHP Hierarchy.....	16
Figure 2.2 Triangular Fuzzy Number.....	23
Figure 4.1 Hierarchy Structure of VPA Criteria.....	40
Figure 4.2 TFN Scale.....	47
Figure 5.1 AHP Weighting Result.....	70
Figure 5.2 Fuzzy AHP Weighting Results.....	71
Figure 5.3 Weighting Results Differences Between AHP and Fuzzy AHP.....	72
Figure 5.4 Vendor Implementation Process.....	76
Figure 5.5 Vendor Performance Final Score.....	77

## CHAPTER I

### INTRODUCTIONS

#### 1.1. Background

Nowadays companies are forced to improve their performances and optimize their business process both of manufactures company or services company (Ghorabae et al., 2014). The increase of competitive market make competition among companies is getting tougher. Every company ultimate aim is satisfied their customers, customer satisfaction is a vital corporate objective that demanded to every company. Customer satisfaction includes producing consistently high qualities products and provide high quality customer service (Rajesh & Malliga, 2013).

Many factors influence the company in producing optimum output such as human resources, guarantee product quality, production process and selecting the raw material or right supplier to supply raw material. The main factor that needs to be considered in the performance of the company is the role of a company supply chain (Suliantoro & Nugrahani, 2015).

A supply chain is a network that aims to carry out both the raw material and the intermediate goods which aim to fulfill the production process of a company, the need for designing the right relationship between supplier and companies that make procurement is very important (Pujawan & Erawan, 2010). According to Dursun & Karsak (2013) companies allocate more than 60% of its total sales on purchased items, such as raw material, parts, and components. This company dependence not followed by a supplier performance assessment system. Until now many companies have not routinely evaluated and monitored their supplier performance.

Krause & Ellram (1997), in a survey against 350-500 companies concluded that performance evaluation is important to the program supplier development. Although the company does not have a program formal development, supplier evaluation is important. Vendor performance assessments have purposed to ensure that performance of the vendor is quite adequate, an evaluation program the vendor has also been developed. Some programs ensure that vendors meet expectations in the short run, while the long-term focus is doing vendor development related to performance.

Sofyan Inn Unisi Hotel is one of the hospitality industries in Yogyakarta that running business based on shariah law, as hospitality Sofyan Inn Unisi Hotel offers services as a product that they sell. Services ~~is~~are judged by the quality of services provided because the products that were sold are performance. This performance is purchased and taken into consideration by consumers. Superior performance will give to high trust as well, for companies to engaged in services, quality services are measured by the ability to satisfy customer needs. To maximize the service product, a supplier that supports and cooperates well between the hotel and supplier is needed.

There are many vendors that need by the hospitality to fulfill their needs and running the business, one of them is foods vendor. Hospitality spend 60% of its budget for purchasing food ingredients such as meats, eggs, chickens, vegetables, fruits and etc. that's make the food vendor is critically vendor to hospital because if they offer bad performance to company it will be impacted to the company as well, and unfortunately Sofyan Inn Unisi hotel not routinely assess the performance of their vendor and have not system that used to assess the vendor performance.

Based on the description above this research had purposed to develop a framework that used to assess the vendor performance in hospitality company as a service company. Data that will be used in this research gathered by submitting questionnaires and conducting interviews with the expert at the procurement department. The data from the questionnaire and the interview will be processed with the Fuzzy Analytical Hierarchy Process to weight each of criterion, then next develop the model for vendor performance assessment using



Likert scale, this model will implement to assess the vendor performance in Sofyan Inn Unisi Hotel.

### **1.2. Problem Formulation**

Based on the description above, the problem that comes up in the research would be:

How is the design of a framework for vendor performance assessment in hospitality industry?

### **1.3. Research Objective**

This research is proposed to answer several objectives as mentioned as below:

Understand the process of design framework for vendor performance assessment in hospitality industry.

### **1.4. Scopes of Research**

The researcher determines the scope of research in order to be more focus on the problem.

[Here-Below](#) are several factors should be in the scope of this research:

1. This research was conducted in Sofyan Inn Unisi Hotel Yogyakarta
2. Food vendor are the vendor that evaluated and assessed using this framework
3. Data collection is done by filling questionnaires and interview with procurements manager from hotel around Yogyakarta and Sofyan Inn Unisi Hotel Yogyakarta
4. Data processing done with Fuzzy Analytical Hierarchy Process and Likert scale

### **1.5. Research Benefits**

This research hopefully could give several benefits. The benefits derived from this research are as follows:

1. Sofyan Inn Unisi Hotel Yogyakarta can implemented this framework to evaluate the performances of their vendor.
2. Provide information to the company about alternative methods that can be used in evaluate the vendor objectively and provide input on the performance of vendor.
3. For reader can applicate this knowledge for further research related to vendor performance assessment in hospitality

### **1.6. Systematical Writing**

Writing this study was based on the rules of scientific writing in accordance with the systematics as follows:

## **CHAPTER I INTRODUCTION**

This chapter contains an introductory description of the research process, the background of research, problem formulation, research objectives, and the benefits of research and systematic writing.

## **CHAPTER II LITERATURE REVIEW**

In this chapter, there will be an elaboration on the theories of reference such as journals, proceeding, books, websites as well as the results of previous researches regarding the research problem which is used as a reference for problem-solving with appropriate methods.

### **CHAPTER III RESEARCH METHODOLOGY**

This chapter consists of the description of the framework or concept, research object, and methods that used in this study with systematic way of conducting the research.

### **CHAPTER IV DATA COLLECTION AND PROCESSING**

This chapter contains data collection of research during the research and how to analyze the data. Data processing result that displayed in the form of tables and graphs. Analysis of the processed data to gain the result. In this section is a reference to the discussion of the result to be written in Chapter V.

### **CHAPTER V RESULTS AND DISCUSSIONS**

Contains discussion of the results of data processing that has been done in research. Compatibility research objectives to give recommendations.

### **CHAPTER VI CONCLUSIONS AND RECOMMENDATIONS**

Contains the conclusion of the analysis and any recommendations or suggestions on the results attained in the problems identified during research, so it needs to be done an assessment in future research.

### **REFERENCES**

### **APPENDICES**

## CHAPTER II

### LITERATURE REVIEW

#### 2.1. Inductive Study

The inductive study known as inductive reasoning is a literature study using previous research that has been documented in journals, books and or proceeds. The literature review is very helpful for the researcher to get appropriate theory and methods as guidance to conduct research. The previous research explained as follows:

Karsak & Dursun (2015) researched about QFD based Fuzzy MCMD for supplier evaluation and selection, decision making by identifying features that be purchased in order to satisfy the company needs and, then establishing the relevant supplier assessment criteria, this method produces less imprecise and more realistic overall desirability levels, and this can fix the problem of loss information, the research framework of this research are considered quality function deployments (QFD) planning as a fuzzy multi-criteria group decision-making tool and utilize interrelated house of quality (HOQ) matrices to evaluate alternative supplier.

Ghorabae et al. (2014) studied about new integrated model proposed for supplier evaluation and order allocation which considers both environmental and economic factors. They use the EDAS (Evaluation based on Distance from Average Solution) method and interval type-2 fuzzy sets for evaluation of suppliers with respect to environmental criteria. The object of this research are pulp supplier in a tissue manufacturing company. Criteria that used in this research are environmental pollution, resource consumption, ecological innovation, management system, the commitment of manager, green technologies, and use

green material the result of this research is defined two evaluation parameters for each supplier: positive score and negative score. This research using the numerical example the result shows that the proposed model is efficient and applicable for real word problems.

Singh (2014) researched about a hybrid algorithm that prioritize the suppliers and then allocates the demand among the suppliers, the objective of this research was to maximize the total purchase value of the items taking into consideration budget constraints, demand condition, delivery lead time and supplier capacity, they solved the problem by integrating the supplier rating with mixed linear integer programming method. The customer demand was allocated by using a hybrid algorithm based on the technique for order preference by similarity to ideal solution (TOPSIS) and the mixed linear integer programming (MILP) approaches. The result of this research was the best supplier based on under constrained scenario.

Sivakumar et al. (2014), conducted a research about green vendor evaluation in mining industry. This paper proposed a model framework with case study through the combined approach of analytical hierarchy process (AHP) and Taguchi loss function. The proposed method used to measure loss due to the outsourcing vendor performance for pertinent benefit and risk factors and identify the best vendor to perform an outsourcing function in the mining industry production.

Roshandel et al. (2013) conducted research about evaluating and selecting the supplier in the detergent production industry, this research was done in Tehran. the purposed of this research is to make decision making about the supplier. Many qualitative and quantitative performance indicators such as quality, price, flexibility and due date should be considered in this research. There are four suppliers that that will be evaluated, it was evaluated based on 25 effective criteria using hierarchical fuzzy TOPSIS (HFTOPSIS).

Onder & Kabadayi, (2015) performed research about supplier selection in hospitality industry using ANP method, this study have purpose to make best strategy to choose food supplier to supply food in five stars hotel in Istanbul, the criteria that involved in this research

are reliability, quality, price, communication and relation, sustainability, service quality, management, honest and keep secret, also technology.

Dobos & Vörösmarty (2014) examined the extension of the vendor evaluation methods with environmental, green issues. The goals of this research were to choose such weights which affect the result of the selection process, in this method they divided the criteria in two manners: the traditional and the green factors, criteria that involve in this research were lead time, quality, price in managerial, documentation accuracy, reusability, and CO2 emission in green factors. They applied composite indicators to weight the criteria, to choose the mentioned weight system that used data envelopment analysis (DEA) with common weight analysis (CWA) method.

Lau et al. (2018) studied about business process decision for fresh food supplier evaluations, this study developed a business process decision model to assess the non-compensating food safety sub-criteria in order to disqualify fresh food suppliers that cannot reach the minimum threshold for low probable food safety failure. The methods that used in this research are AHP, TOPSIS and ELECTRE II. This evaluation was done in supermarket chain by using several evaluation criteria which, product, quality, food safety, price, delivery, serviceability, commercial position, supplier relationship, risk factor, and CSR.

Rodrigues et al. (2016) researched about supplier evaluation and management by combining SCOR model and fuzzy TOPSIS, this study adopted criteria similar to ones used in supplier selection, which can lead to a mismatch between supplier and SC performance evaluations. They presented a new approach that used the performance metrics of the SCOR® (supply chain operations reference) model to evaluate the suppliers in the dimension of cost and delivery performance. To categorize the supplier, they used two fuzzy TOPSIS models and the final result indicated four categorizes of the supplier. The object of this research was the second-tier manufacturer in an automobile supply chain that involves 17 suppliers.

Min et al. (2018) carried out the research about evaluation of supplier performance in high-speed train manufacture industry in China to evaluate the supplier with special

characteristic. The method that used in this research was multi-stage MCDM method; there are six criteria that involve in this research they are physical quality, delivery performance, service, price, management system, and environmental safety.

Chen et al. (2011) carried out a research about strategic decisions for information system outsourcing using fuzzy PROMETHEE. The object of this research was four suppliers by using seven criteria for assessment. The goal of this research was to evaluate potential supplier to decision maker or organizations for seeking the efficient IS/IT outsourcing, the criteria that involved were experience, reputation, flexibility, technical capability, quality, management, and price this study done in bank at Taiwan.

Guo et al. (2014) studied about developing new method for supplier selection using integrated semi-fuzzy SVDD and CC-Rule, the purpose of this research was to improve supplier selection process in accuracy and comprehensibility, this research used five criteria to assess the supplier, which were, quality, cost, delivery, service, and corporate social responsibility. This research was done in household manufacturing companies in China.

Chang et al. (2011) initiated the study using fuzzy DEMATEL to find influential factors in selecting SCM supplier, the purposes of this research were to evaluate supplier performance to find key factor criteria to improve performance and provide a novel approach of decision making in supplier selection, criteria that involved in this research are ten which is product quality, product price, technical ability, service, delivery performance, stable delivery of goods, lead time, reaction to demand change, production capability, and financial situation. This research was performed in seventeen electronic manufacturing company in Taiwan.

Polat & Eray (2015) conducted research about supplier selection in railway projects using integrated AHP-ER in the case to finish construction on time the contractor needs to make the right decision in choosing the supplier, the purpose of this research was to evaluate the supplier for supply material for the railway project. The object of this research was five different suppliers and eight evaluation criteria which are quality, delivery time, relationship with the supplier, unit price product, flexibility in payment, communication, production capacity, and technical competence of supplier. This research was done in Saudi Arabia.

Dargi et al. (2014) conducted research about supplier selection using Fuzzy ANP as the approach method. The purposes of this research were to develop framework to support the supplier selection process in Iranian automotive industry, the criteria that used in this research were seven that covered quality, price, production capacity, technical capability, service and delivery, reputation, and location.

Based on the previous research above, there are close relationship between supplier selection and supplier evaluation due to the criteria that used to assess the supplier performance, this research conducts research about framework of vendor performance assessment in hospitality industry, this has objective to develop framework that can be used by hospitality industry to evaluate the performance of their vendor. This research similar with research that conducted by Chen et. al (2011), to find the IS/IT outsourcing for bank in Taiwan.

This research applies 13 important criteria that already obtained from several literatures and already validated, method that used in this research are fuzzy analytical hierarchy process for weighting the criteria, fuzzy used to eliminate subjective of AHP (Deng, 1999) and Likert scale to initialize weight of each criterion and rate each criterion as in previous research that conducted by Usman (2018). It will later be used to find the vendor performance of each vendor. The object of this research is food vendor in Sofyan Inn Unisi Hotel Yogyakarta. The summary table of previous research will be shown in table 2.1.

Table 2. 1. Summary Table of Previous Research

Researchers (year)	Methodologies/Techniques	Research Object	Criteria
Karsak & Dursun (2015)	QFD method in combination of a fuzzy multi-criteria group decision making tool	Private Hospital in Turkey evaluate medical supply	Cost, quality, product conformity, availability, trust, and efficacy of corrective action
Ghorabae et al. (2014)	Interval type-2 fuzzy sets and EDAS	Tissue paper manufacturing in Iran evaluate pulp supplier	Environmental pollution, resource consumption, ecological innovation, management system, commitment of manager, green technologies, and use green material



Researchers (year)	Methodologies/Techniques	Research Object	Criteria
Singh (2014)	TOPSIS and mixed linear integer programming method (MILP)	Literature study in XYZ manufacturing firm and evaluate supplier of intermediate part	Quality, price, on time delivery, responsiveness, and consistency
Sivakumar et al. (2014)	AHP and Taguchi Loss Function	Vendor of outsourcing function in mining industry in India	High level of flexibility, green technology, R&D capability, reputation, and cost.
Roshandel et al. (2013)	Hierarchical Fuzzy TOPSIS (HFTOPSIS)	Primary material of detergent powder supplier in Iran	Quality, delivery time, price, technology, flexibility, responsibility, responsiveness, and services
Onder & Kabadayi, (2015)	Analytical Network Process	Food supplier of five stars hotel in Turkey	Reliability, quality, price, communication and relation, sustainability, service quality, managements, honest and keep secret, also technology
Dobos & Vörösmarty (2014)	Combination of data envelopment analysis (DEA) and common weight analysis (CWA)		Price, quality, documentation, lead time, reusability and CO <sub>2</sub> emission.
Lau et al. (2018)	AHP, TOPSIS, and ELECTRE II	Suppliers of fresh food in supermarket chain	Product, quality, food safety, price, delivery, serviceability, commercial position, supplier relationship, risk factor and CSR
Rodrigues et al. (2016)	Combination SCOR® model and fuzzy TOPSIS	Second tier manufacturer in automobile produce clutch for heavy vehicle	Sourcing cost, return cost, material landed cost, ordered delivery, source cycle time, upside source adaptability, perfect

Researchers (year)	Methodologies/Techniques	Research Object	Criteria
			condition, delivery performance, documentation accuracy, source cycle time, and supplier risk rating
Min et al. (2018)	Multi stage MCDM method	Supplier that produce key parts of highspeed train in China Highs speed train manufacture	Quality, delivery performance, belong to quantitative criteria and service, price, management system, and environmental safety
Chen et al. (2011)	Fuzzy PROMETHEE	Vendors of efficient IS/IT outsourcing in bank of Taiwan	Experience, reputation, flexibility, technical capability, quality, management, and price
Guo et al. (2014)	Integrated semi-fuzzy SVDD and CC-Rule	Household manufacturing company in China	Quality, cost, delivery, service, and corporate social responsibility
Chang et al. (2011)	Fuzzy DEMATEL	Seventeen electronic manufactures company in Taiwan.	Product quality, product price, technology ability, service, delivery performance, stable delivery of goods, lead time, reaction to demand change, production capability, location, and financial situation
Polat & Eray (2015)	AHP-ER	Railway supplier selection in railway project in Saudi Arabia	Quality, delivery time, relationship with the supplier, unit price product, flexibility in payment, communication, production capacity, and technical competence of supplier

Researchers (year)	Methodologies/Techniques	Research Object	Criteria
Dargi et al. (2014)	Fuzzy ANP	Autopart supplier in Iranian automotive company	Quality, price, production capacity, technical capability, service and delivery, reputation and location

## 2.2. Deductive Study

Deductive study or deductive reasoning is testing the existing theory to develop hypothesis in this research. The basis theory of Analytical hierarchy process, fuzzy analytical hierarchy process and Likert scale as follows:

### 2.2.1. Supply Chain Management

According to Stevens (1989) Supply chain management is a system whose constituent parts include material suppliers, production facilities distribution services and customers linked together via the feed forward flow of materials and the feedback flow of information. Pujawan & Erawan (2010) Supply Chain Management is a systematic and strategic coordination of traditional business functions within and across companies in a supply chain to develop the company's long-term performance and overall supply chain.

According to Borade & Bansod (2007) Supply Chain Management as an approach used to achieve efficient integration of suppliers, manufacturers, distributors, retailers, and customers, which means that goods are produced in the right amount, at the right time, and in the right place for the purpose achieve a minimum cost of the overall system and also reach the desired service level.

Based on sources regarding the understanding of SCM, SCM is an integrated and coordinated system used to achieve efficient integration of suppliers, manufacturers, distributors, retailers, and customers to develop the company's long-term performance and overall supply chain with the aim of achieving a minimum cost of the overall system, and reaches the desired service level.

### **2.2.2. Vendor Performance Assessment (VPA)**

According to Amil (2009) vendor performance assessment is a technique to measure vendor performance against a set of agreed criteria where vendor valuation is an important process in an organization, but most organizations assume that their ability to assess, choose and managing the performance of vendors still cannot be done well. This is due to the absence of a theoretical approach that can be used to measure and manage relationships between companies and vendors.

According to Rodrigues et al. (2016) when an organization decides to use a vendor to provide its needs, it can be interpreted that the performance of the organization will depend on the vendor, so that if the organization is wrong in choosing a vendor, there will be problems that are difficult to overcome.

### **2.2.3. Multi Criteria Decisions Making (MCDM)**

MCDM is a sub-discipline of operations research that explicitly evaluates multiple conflicting criteria in decision making both in daily life and in settings such as business, government and medicine (Wikipedia, 2018). According to Mukherjee (2017) MCDM concerned with structuring and solving decision and planning problems involving multiple criteria. The purpose is to support decision-makers facing such problems. Typically, there does not exist a unique optimal solution for such problems and it is necessary to use decision-maker's preferences to differentiate between solutions this such problem can solve with multi criteria decision analysis (MCDA). Mukherjee (2017) proposed following steps of MCDM

1. Define the suitable criteria to achieve goal
2. Identify the alternatives for achieving desired goals
3. Evaluate each alternative
4. Use suitable multi criteria analysis tool or techniques
5. Accept the suitable alternative to achieve goal
6. If final solution is not feasible or not acceptable, then opt for next iteration until feasible solutions are not achieved.

Based on Mukherjee (2017) there are several MCDA tools and technique that can applied to solve such problem, such as: AHP, VIKOR, ANP, TOPSIS, ELECTRE, and etc.

#### **2.2.4. Analytical Hierarchy Process (AHP)**

Analytical Hierarchy process (AHP) first introduced by DR. Thomas L. Saaty from Wharton School of Business in 1970 to group information and determine in choosing the most preferred alternative (Basak & Saaty, 1993). This decision support technique will describe complex multi factor or multi criteria problems into hierarchy. Based Basak & Saaty (1993) hierarchy defined as representation of a complex problem in a multi-level structure where the first level is the goal, followed by the factor level, criteria, sub criteria, and so on down to the last level of the alternative, from complex problem can be interpreted as a criterion of so many problems (multicriteria), unclear problem structure, uncertainly of opinion from decision makers, decision makers more than one person and inaccuracies of available data. With hierarchy a complex problem can be breakdown into groups then organized into a hierarchical from so that the problem will seem more structured and systematic. Analytical Hierarchy Process (AHP) often used for problem solving method compared to other method for following reasons:

1. Hierarchical structure, as a consequence of the selected criteria, to the deepest sub-criteria
2. Considered validate until the inconsistency tolerance limit of the various criteria and alternatives chosen by decision maker

3. Considered endurance of output sensitivity analysis of decision making

### 2.2.5. Step of Analytical Hierarchy Process (AHP)

AHP is one of the most popular MCDM tools for formulating and analyzing decisions specially problem in operation management. According to Subramanian & Ramanatan (2012) the application of AHP to a decisions problem involves four steps, which are:

1. Structuring of the decision problem into hierarchical model

It includes decomposition of the decision problem into elements according to their common characteristic and the formation of a hierarchical model having different levels. A simple AHP has three levels (goal, criteria, and alternatives) though more complex models with more levels could be formulated. The hierarchy model will be shown in figure 2.1.

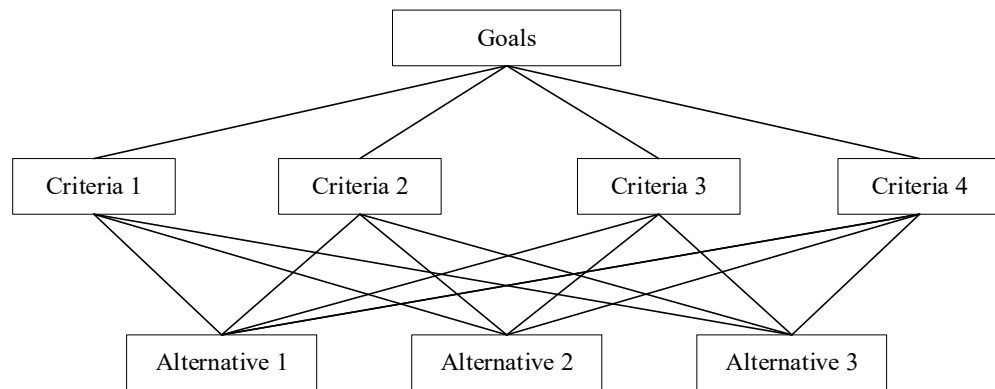


Figure 2. 1 AHP Hierarchy

2. Making pair-wise comparisons and obtaining the judgmental matrix

In this step, the elements of a particular level are compared with respect to a specific element in the immediate upper level. The resulting weights of the element may be called the local weights. Elements are compared pair-wise and judgments on comparative attractiveness of element are captured using a rating scale (1-9). Pairwise scale will be shown in table 2.2.

Table 2. 2. Pair-wise Rating Scale

Level of Importance	Definition	Information
1	Equally important	Both elements have the same effect
3	slightly more important	Decisions are siding with one important element that is compared to their pair
5	Much more important	decisions show a joy over one activity over another
7	Far more important	decisions show a strong passion for one activity over another
9	Extremely more important	An absolute element is preferred when compared to its important partner, at the highest confidence level
2,4,6,8	Middle value between 2 level of decision	When compromise is required

An element that receives higher rating is viewed as superior or more attractive compared to another one that receives a lower rating. Result of weighting criteria above is a matrix  $M \times M$ , where  $M$  is the number of criteria.

### 3. Normalize the data

Normalize the data by dividing the value from each element in the pair-wise matrix with the total value of each column. Normalization done by dividing the element matrix with the number of all elements that existed, the result matrix as follows:

$$N = \begin{bmatrix} n1 = \frac{s1}{\sum_{t=1}^n Si} \\ n2 = \frac{s2}{\sum_{t=1}^n Si} \\ n3 = \frac{s3}{\sum_{t=1}^n Si} \end{bmatrix} \quad (2.1)$$

### 4. Calculate eigen vector and test of consistency value

Maximum eigen vector can be obtained by using Software or manual, calculated the eigen vector from each pair-wise comparison matrix. Eigen vector is the weight of each element, this step is to synthesize the options in the priority assignment of elements at the lowest hierarchy level to achieve the goal.

### 5. Test consistency of the hierarchy

Consistency ratio can be seen with consistency index. Consistency is expected to be near perfect to produce a decision that is close to valid (Saputra, 2018). AHP model can be used for the decision maker's perception as input inconsistency may occur because humans have limitations in expressing their perceptions consistently especially when it must compare many criteria, Consistency ratio is a parameter used to check pairwise comparisons that have been carried out consequently or not. The consistency measurement of a matrix is based on the maximum eigen value, where the value of the consistency index can be calculated by using the formula:



$$CI = \frac{\lambda_{\max} - n}{n-1} \quad (2.2)$$

Where:

CI = Consistency index

n = number of alternatives

$\lambda_{\max}$  = the largest eigenvalues from the matrix order

If CI is zero, then the pairwise comparison matrix is consistent. The predetermined inconsistency limit is determined using a Consistent Ratio (CR), that is, the index ratio is consistent with the value of the Random Index (RI) obtained from an experiment by the Oak Ridge National Laboratory developed by the Wharton School (Saputra, 2018). This value depends on the matrix order. Formula for Consistency Ratio are show in formula 2.3:

$$CR = \frac{CI}{RI} \quad (2.3)$$

Where:

CR = Consistency Ratio

CI = Consistency Index

RI = Random Index

Table 2. 3. Random Index (RI) Value

N	1	2	3	4	5	6	7	8	9	10	11	12	13
RI	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49	1.51	1.48	1.56

Where: N = No of criteria

RI = Random Index

If the pairwise comparison matrix with CR value is less than 0.100 then the inconsistency of opinion from the decision maker is still acceptable otherwise the assessment needs to be repeated.

### 2.2.6. Basic Principle of Analytical Hierarchy Process (AHP)

#### 1. Decomposition

With this principle the complex problem structure is divided into parts hierarchically. Objectives are defined from the general to the special. In the simplest form the structure will consist of alternative goals, criteria and levels. Each alternative set might be divided further into more detailed levels, covering more other criteria. The uppermost level of the hierarchy is the goal which consists of one element. The next level may contain several elements, where these elements can be compared, have almost the same interests and have no differences too flashy. If the difference is too large, a level must be made new (Saaty & Basak, 1993).

First level: Goal

Second level: criteria

Third level: Alternatives

The hierarchy is structured to assist the decision-making process with pay attention to all decision elements involved in the system. Most problems become difficult to solve because of the process the solution is done regardless of the problem as a system with a certain structure.

#### 2. Comparative Judgments

With this principle, pairwise comparisons will be built from all elements that exist with the aim of producing a scale of relative importance from element. This comparative assessment is the core of AHP because will affect the priority order of the elements. Results from this assessment is more easily presented in the form of a pairwise matrix comparisons are pairwise comparison matrices that load levels the interests of several alternatives for each criterion. Interest scale used in the form of numbers. scale 1 which shows the level the lowest (equal importance) to the 9 scale that shows highest level (extreme importance) (Basak & Saaty, 1993).

### 3. Synthesis Priority

Synthesis of priorities is done by multiplying local priorities with priority of the relevant criteria at the top level and add it to each element in the level affected by the criteria. The result is combined or known as global priorities which are then used to weight local priorities of elements at the lowest level according to the criteria (Basak & Saaty, 1993).

#### **2.2.7. Fuzzy Logic**

Fuzzy logic is a form of many-valued logic in which the truth values of variables may be any real number between 0 and 1. It is employed to handle the concept of partial truth, where the truth value may range between completely true and completely false (Novák et al., 1999). It is contrast with the crisp which the output always be 0 or 1.

The processes of fuzzy logic are fuzzification, If-then rules, and defuzzification. Fuzzification is the process in which fuzzify all input values into fuzzy membership functions. After that, all applicable rules will be applied in the rulebase to compute the fuzzy output functions. Lastly, de-fuzzify the fuzzy output functions to get "crisp" output values. According to Kusumadewi (2000), the advantages of using centroid method: The value of defuzzyfication will move smoothly so that a change of the fuzzy set will also run smoothly. Besides, it is easier to calculate.

### 2.2.8. Fuzzy Analytical Hierarchy Process (F-AHP)

Fuzzy AHP is an extension of AHP with a combination of fuzzy logic theory. Fuzzy AHP is developed to solve AHP shortcomings. According to Mohammady (2011) AHP method is mainly used in nearly crisp-information decision applications, AHP method creates and deals with a very unbalanced scale of judgment, AHP method does not take into account the uncertainty associated with the mapping of human judgment to a number by natural language, the ranking of the AHP method is rather imprecise; and the subjective judgment by perception, evaluation, improvement and selection based on preference of decision-makers have great influence on the AHP results.

The main advantage of fuzzy AHP is hidden in this note that pairwise comparisons led to more convenient, realistic and logical appraisal of alternatives rather than other methods and techniques. This advantage of fuzzy AHP can led to more usability of them as core of model's evaluation.

Fuzzy AHP is a concept that calculates based on arithmetic operations and fuzzy triangular number. Pairwise comparison matrix operation is done using Triangular Fuzzy Number, which is a special class of fuzzy numbers whose membership is defined by three real numbers expressed as  $(l, m, u)$ . to make the pairwise matrix a comparison of alternatives carried out based on criteria according to the AHP theory, based on Gungor et al. (2009) the following are the steps to complete the Fuzzy Analytical Hierarchy Process:

- a. Pairwise comparison matrix using Triangular Fuzzy Number (TFN)

$$A = (a_{ij})_{mxn} = \begin{bmatrix} (1,1,1) & (L_{12}, m_{12}, u_{12}) & \cdots & L_{1n}, m_{1n}, u_{1n} \\ L_{21}, m_{21}, u_{21} & (1,1,1) & \vdots & L_{2n}, m_{2n}, u_{2n} \\ \vdots & \vdots & (1,1,1) & \vdots \\ L_{n1}, m_{n1}, u_{n1} & L_{n2}, m_{n2}, u_{n2} & \dots & (1,1,1) \end{bmatrix} \quad (2.4)$$

Where  $a_{ij} = (L_{ij}, m_{ij}, u_{ij}) = a_{ij}^{-1} = \left(\frac{1}{u_{ij}}, \frac{1}{m_{ij}}, \frac{1}{l_{ij}}\right)$  for  $i, j = 1, \dots, n$ ; and  $i \neq j$

In order to obtain a useful scale when comparing the two elements, a comprehensive understanding of the elements being compared is needed and their relevance to the variables or objectives being studied. In the preparation of the interest scale, the current scale is transformed to the triangular fuzzy number, the fuzzy set representation in fuzzy AHP is illustrated by a triangle curve that can be seen below in figure 2.2.

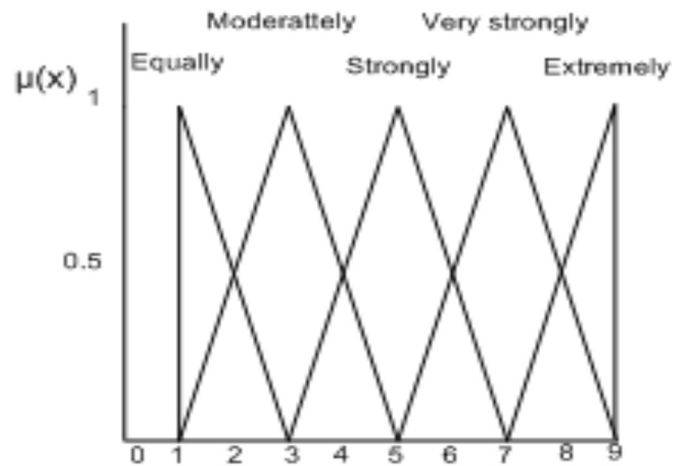


Figure 2. 2 Triangular Fuzzy Number Scale

Degree of judgment of decision maker was introduced into the conventional AHP in order to enhance the degree of judgments of decision maker. Triangular fuzzy numbers listed in the following table 2.4.

Table 2. 4. Triangular Fuzzy Number for Pairwise Comparison

Priority Rating	Fuzzy Scale
1	(1,1,1) for diagonal, (1,1,3)
2	(1,2,4)
3	(1,3,5)
4	(2,4,6)
5	(3,5,7)
6	(4,6,8)
7	(5,7,9)
8	(6,8,9)
9	(7,9,9)

2,4,6, and 8 is intermediate value between each main scale.

b. Geometric Mean Calculation

After all elements of the pairwise comparison matrix converted to TFN (Triangulated Fuzzy Number), the geometric mean method is applied to calculate the priority criteria using following formula:

$$G_1 = (l_i, m_i, u_i);$$

$$l_i = (l_{i1} \times l_{12} \times \dots \times l_{ik})^{\frac{1}{k}} \text{ for } 1 = 1, 2, \dots, k; \quad (2.5)$$

$$m_i = (m_{i1} \times m_{12} \times \dots \times m_{ik})^{\frac{1}{k}} \text{ for } 1 = 1, 2, \dots, k; \quad (2.6)$$

$$u_i = (u_{i1} \times u_{12} \times \dots \times u_{ik})^{\frac{1}{k}} \text{ for } 1 = 1, 2, \dots, k. \quad (2.7)$$

c. Defuzzification

After calculated the geomean value, next step is defuzzification for each result from each criterion. Defuzzification calculation using Center of Gravity (COG) method using following formula 2.8:

$$F_{ij} = \left( \frac{[(u_{ij}+l_{ij})+(m_{ij}-l_{ij})]}{3} \right) + l_{ij} \quad (2.8)$$

d. Normalization Calculation

After calculated the defuzzification, next step is normalization. Normalization is done to organize the data into a group of data that is the same and determines the relationship between each group. This stage performed by using this formula 2.9:

$$N_{ij} = \frac{F_{ij}}{\sum_{j=1}^n F_{ij}} \quad (2.9)$$

After getting the final result in the form of the weighted value, next step is to do sorting based on the normalizing weight result of each criterion.

### 2.2.9. Likert Scale

Likert scale is a psychometric scale that is commonly used in questionnaires and is the scale most widely used in research in the form of surveys (Likert, 1932). When responding to questions on a Likert scale, respondents determine their level of agreement with a statement by choosing one of the available options.

Usually five scale options are provided with a format such: strongly disagree, disagree, disagree, agree, and strongly agree in addition to choices with five scales like the example, sometimes a scale with seven or nine levels is used. An empirical study found that some statistical characteristics of the questionnaire results with various numbers of choices turned out to be very similar (Dawes, 2008).

In this research, the Likert scale was used for two purposes, first used in importance criteria determination questionnaire, second for making scoring rating scale questionnaires of VPA framework. This scale is the most often used in behavioral measurement consisting of statements and accompanied agree-disagree, often-never, fast, good, etc. depending on the purpose of the measurement.

In using the Likert scale for the first questionnaire the answer is 'important-not important' because it aims to measure the level of importance from a criterion, where for very unimportant given value 1, not important given value 2, quite important given value 3, important answer given value 4 and very important given value 5. This scale is chosen because it can be used for comparing the level of importance between one criterion and another.

The results of the first questionnaire determine whether these criteria are important or not. Determination of the importance or not of these criteria is seen from the average level criteria interests, where if the average criteria is  $<3$  then the criteria are not important According to the rating scale; if the criteria are important enough then value of 3 is given, not important is given with value of 2. Value 2 is a value that is  $<3$  so that if the average generated  $<3$  then the criteria are not important.



In the use of a Likert scale for the use of rating scales, different answers depend on each criterion assessed.

#### **2.2.10. Vendor Performance Score**

To get the final score of the vendors, first should be done the assessment to get score from each criterion. The formula that can be used to get the score for each criterion are shown in formula 2.10:

$$\textit{Score} = \textit{rating} \times \textit{weight} \quad (2.10)$$

Where assessment is the value given by the hotel for each criterion with a range of values between 1 to 5. Weight is the value that set for each criterion obtained using the Fuzzy AHP method. Score is the acquisition rate obtained from the multiplication between the rating given with the weight of each predetermined criterion. The resulting score shows performance vendor for each criterion. The scores for each criterion are then added to get the vendor's final performance score. The final score of vendor performance is the total obtained value from the total score for each criterion where the final score is shows how the performance of the vendor that assessed the score is from 1 to 5.

#### **2.2.11. Rating Scale and Level**

In this study, the rating scale used is the Likert scale 1-5. After that, an interview was conducted involving resource persons from the Sofyan Inn for the verification process. The results of making a rating scale can be seen in the proposed model.

In addition to the rating scale, there are also scale levels that will be used to facilitate the hotel in making decisions related to the final value of vendor performance. Table 2.5 is the scale form of the proposed level.

Table 2. 5 VPA Scale Level

No	Scale	Performance	Notes
1	>4-5	Very Good	Maintained
2	>3-4	Good	Enhanced
3	>2-3	Adequate	Monitored
4	1-2	Not Good	Disconnect/Blacklist

Notes given to each vendor are adjusted to the final score of the performance obtained. The details of each note are as follows:

1. Maintained: this is given to vendors who have a value scale > 4 - 5 which can be ascertained as the highest value for vendors who have the best performance and are in accordance with each criterion assessed. Vendors with a maintained record are eligible vendors to be prioritized in procurement at hospitality. And it is expected to be able to maintain its performance.
2. Enhanced: this is given to vendors that have a scale of > 3 - 4 where the vendor with the final results on that scale is the second highest level with good performance. Vendors with increased records become reliable vendors, but only need improvements and improvements in their performance to be better.
3. Monitored: this is given to vendors who have a scale > 2 - 3 where the vendor is said to have adequate performance so that it needs to be monitored for future performance. Vendors with notes are monitored as vendors that are in the middle between good and not good so it needs to be monitored to ensure performance.
4. Disconnected or blacklisted: this record is given to vendors who have a scale of 1-2 which can be ascertained as the lowest value for the vendor who has the worst performance. Vendors with notes that are disconnected or this blacklist is a vendor that will no longer be used as a provider in the procurement of hospitality because it has very less performance.

## **CHAPTER III**

### **RESEARCH METHODOLOGY**

#### **3.1. Research Object and Location**

The Research was conducted in Sofyan Inn Unisi Hotel located in the heart of Yogyakarta in Pasar Kembang street, this hospitality business is run based on sharia.

#### **3.2. Problem Identification**

Problem identification is the initial step of this research. problem identification was obtained from literature review of several articles related, and form the observation, interview with several procurement experts in the hospitality industry.

#### **3.3. Problem Formulation**

Problem formulation is being used to construct the solution of the problem and as the basis to make a conclusion and recommendation. The focus of this research is making a framework that used for vendor performance assessment in the hospitality industry using weighted criteria and scale that based on Likert scale.

### **3.4. Literature Review**

The purpose of the literature reviews in this study is to find out previous studies related to research topics, while also aiming to obtain important criteria in assessing the performance of vendors, both vendors in general or hospitality vendors. The literature study also aims to get a definition of each criterion and an explanation of the rating scale.

### **3.5. Data Collection**

This research uses two types of data, namely:

#### **1. Primary Data**

Primary data is the data that directly obtained from the sources. Primary data of this research were obtained from the procurement manager that already experienced at least one year in the hospitality industry. The data that used were derived from a questionnaire about the rate importance of the criteria, pairwise comparison, and vendor scoring.

#### **2. Secondary Data**

Secondary data is the data obtained from an appropriate literature review, such as journals, proceedings, books. In this research, the secondary data were used to support the research hypothesis and statement in this research. This research performed both deductive and inductive study as a literature review. The deductive study was carried out to gain relevant basis theory and to test theory whether suitable or not. Then it followed by conducting the inductive study to gain related information in previous research in order to position this research to show the uniqueness of this research.

### **3.6. Data Collection Method**

The method of data collection in this research is interview and questionnaire. Thus, the data collection in this research are categorized for both qualitative and quantitative approach.

Qualitative indicated by interview that concerns with the quality of information gathered; while quantitative concerns on the numerical analysis by giving the questionnaire to the expert as the respondent to fulfill required data in Likert scale and AHP. Data collection method was conducted in order to validate the criteria that commonly used in vendor performance assessment, determine rate importance of criteria, pairwise comparison of the important criteria to weight each criterion based on the preference rank, and vendor scoring to know the final results of the vendor performance. The methods are as follows:

#### 1. Interview

The interview was carried out in order to identify and validate proposed criteria already given, whether it is often be used or not, in conducting vendor performance assessment, also for identify most critically vendor in hospitality-based industry based.

#### 2. Questionnaire

To fulfill the framework of vendor performance assessment, the researcher needs to collect the data for identifying important criteria, criteria weight, and vendor final score. Important criteria determination applies Likert scale from 1 to 5. This questionnaire was filled by procurement expert from several hospitality industries around Yogyakarta. To weight the important criteria, pairwise comparison questionnaire was employed that later will be calculated by using AHP and Fuzzy AHP, last distributing appraisal form to assess the vendor performance.

### **3.7. Data Processing**

In this research, there are five data processing that performed to get the framework of vendor performance assessment, namely, criteria selection, important criteria determination, criteria weighting using AHP, Criteria weight, using fuzzy AHP, and last to develop the framework that consists of criteria, weight, criteria explanation, scoring scale and explanation.

Criteria selection was carried out to determine the often used criteria for vendor performance assessment, the next step is to validate and determine the rate of importance of

each criterion from several procurement experts from hotel around Yogyakarta, the respondents were asked to fill rate of importance of the criteria through Likert Scale based questionnaires if the mean is  $>3$  it's concludes important and otherwise, if rate  $>3$  the criteria is used for the next step.

After getting the important criteria, further hierarchy for AHP is made, pairwise comparisons from each criterion, and calculate the pairwise using AHP if the consistency ration  $< 0.1$  the data is considered consistent and will be used for next step. If not  $> 0.1$  the data is considered as not consistent and the pairwise cannot be used in further step. The further step is to transform the initial pairwise to fuzzy pairwise and calculate the geometric means of the pairwise next defuzzification with the center of gravity method and the last is normalization step to get the final weight, the more objective weight next will be used for vendor performance assessments.

After the weighting of each criterion is determined, then the assessments scale and level are then carried out. The scale of assessment using a Likert scale and for an explanation of the scale of assessment is obtained by examining several related references. After getting an explanation of the rating scale for each criterion, the next step is to verify the rating scale by interviewing experts from Sofyan Inn. Scale levels are carried out to make decision making easier.

### **3.8. Research Flowchart**

This research flowchart is used to show the steps of the design model of vendor performance assessment in the hospitality industry. Research flowchart explains the steps of conducting research from the beginning until the end of the research. The research flowchart is shown in Figure 3.1 below:

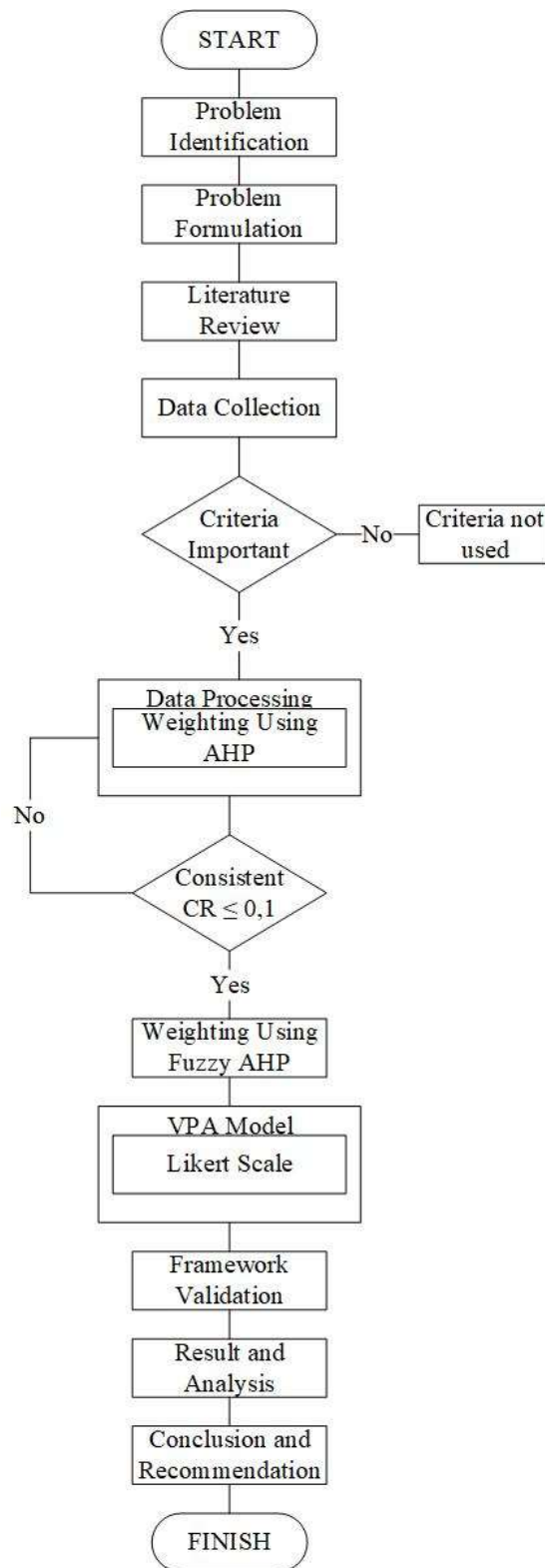


Figure 3. 1. Research Flowchart

### **3.9. Results and Discussion**

After data processing finished, the next step is analysis and discussion from the result of the calculation that performed by using AHP, Fuzzy AHP, and Likert Scale. In this section, it is explained in detail how the result of the theory that applied in the selected object. Besides, this section is the basis suggestion in the conclusion and recommendation section.

### **3.10. Conclusion and Recommendation**

This section would provide the answers to all the problem formulations that have been formulated at the beginning of the research, Moreover, there are several suggestions from the researcher to the company and future research.



## CHAPTER IV

### DATA COLLECTING AND PROCESSING

#### 4.1. Data Collection

Sofyan Inn Unisi Hotel is a sharia hotel located in the city of Yogyakarta under the management of Sofyan Corporation. This hotel has been established and started its operational since 16 September 2016. Sofyan is a brand that is often known by consumers as hotels with sharia concepts and management, as well as pioneers that carries the concept of sharia for hotel management in Indonesia and has been recognized by the Indonesian Ulama Council (MUI).

This research studies about design of model vendor performance assessments in hospitality. First data were obtained by spreading questionnaires to several hotels, these data used to find importance criteria for vendor performance assessments through expert judgements. The second data is the assessments of pairwise comparison to get weight's comparison of initial AHP and weight's comparison of fuzzy AHP. The third data are the assessment data of the vendor with the proposed model that already made. This research is defined as the expert judgments research, where the research was conducted by involving the purchasing manager of the Sofyan Inn Unisi Hotel Yogyakarta. The detailed data for this research will be shown below.

#### 4.1.1 Criteria Selection

Based on a literature review that already reviewed by researcher about several related articles to the vendor performance assessment in general, it was obtained some important criteria that often used, in previous research for assessing and choosing the vendors. These criteria are shown in table 4.1.

Table 4. 1 Criteria for Vendor Performance assessments

No	Code	Criteria	Source
1	PC1	Quality	A, C, E, F, G, H, J, K, L, M, N, O
2	PC2	On time delivery	C, E, G, I, J, L, M, N, O
3	PC3	Price	A, C, D, E, F, G, H, I, J, K, L, M, N, O
4	PC4	Communication with vendors	F, H, N
5	PC5	Flexibility in payments and delivery time	D, E, K, N, M
6	PC6	Responsibilities	A, B, E, L
7	PC7	Responsiveness	C, H, M
8	PC8	Reliability	A, C, F, I
9	PC9	Documents Completeness	I, G
10	PC10	Reputation of Vendor	D, O
11	PC11	Cooperation and Negotiation	B, F, J, K
12	PC12	Vendor location	M, O
13	PC13	Transparency	A, F

Where:

<b>A:</b> Karsak & Dursun (2015)	<b>K:</b> Chen et al. (2011)
<b>B:</b> Ghorabae et al. (2014)	<b>L:</b> Guo et al. (2014)
<b>C:</b> Singh (2014)	<b>M:</b> Chang et al. (2011)
<b>D:</b> Sivakumar et al. (2014)	<b>N:</b> Polat & Eray (2015)
<b>E:</b> Roshandel et al. (2013)	<b>O:</b> Dargi et al. (2014)
<b>F:</b> Onder & Kabadayi, (2015)	
<b>G:</b> Dobos & Vörösmarty (2014)	
<b>H:</b> Lau et al. (2018)	
<b>I:</b> Rodrigues et al. (2016)	
<b>J:</b> Min et al. (2018)	

Total of the criteria are 13. Based on the table above, each of criterion has code from PC1 until PC13. Above are the criteria that often used in vendor performance assessments, further step prioritized the criteria to get the important criteria through questionnaire, the questionnaire here employed Likert scale. Table 4.2 is the result of first questionnaire for each of criterion. 5: extremely important, 4: very important, 3: important, 2: slightly important, 1: not at all important. The first questionnaire result will show in table 4.2.

Table 4. 2 Important Criteria Determination Questionnaire Recapitulation

No	Criteria	Hotel Name					Mean
		Popi Hotel	Sofyan INN Hotel	Dom Hotel	Lido Hotel	Best City Hotel	
Rate of Importance							
1	Quality (PC1)	5	5	4	5	5	4.8
2	On time delivery (PC2)	4	4	3	4	4	3.8
3	Price (PC3)	5	4	4	5	5	4.6
4	Communication with vendors (PC4)	4	3	4	5	5	4.2
5	Flexibility in payments and delivery time (PC5)	4	4	4	4	4	4
6	Responsibilities (PC6)	5	3	3	4	4	3.8
7	Responsiveness (PC7)	5	4	3	4	4	4
8	Reliability (PC8)	5	5	3	4	4	4.2
9	Documents Completeness (PC9)	4	3	3	3	5	3.6
10	Reputation of Vendor (PC10)	4	3	4	3	3	3.4
11	Cooperation and negotiation (PC11)	5	3	3	4	3	3.6
12	Vendor location (PC12)	4	3	3	3	3	3.2
13	Transparency (PC13)	5	5	4	5	4	4.6

#### 4.1.2 Important Criteria Determination

After getting the results from the first questionnaire then the next is to determine the important criteria. Determination of important criteria is done by looking at the average level of importance of each criterion based on the opinions of purchasing experts through the first questionnaire. If the average criteria less than 3 then the criteria are declared not important and cannot be used. And if the average criteria equal to 3 or more than 3 then these criteria are important (Aramyan et.al, 2007). The average level of importance is done with the help of Microsoft Excel programs. Below in table 4.3 are the result of the average level of importance of the criteria.

Table 4. 3 Important Criteria

Code	Average	Result
PC1	4.8	Important
PC2	3.8	Important
PC3	4.6	Important
PC4	4.2	Important
PC5	4	Important
PC6	3.8	Important
PC7	4	Important
PC8	4.2	Important
PC9	3.6	Important
PC10	3.4	Important
PC11	3.6	Important
PC12	3.2	Important
PC13	4.6	Important

Based on table above, it can be seen that all of the criteria that suggested by researcher are important and all of them will be weighted using Fuzzy AHP.

### 4.1.3 Criteria Weighting Using Fuzzy AHP

The use of the Fuzzy AHP method in this research is to assist in the process of weighting the important criteria and remove the vagueness of the data. Before weighting, the pairwise comparison questionnaire should be filled first by the expert. The process of filling out the questionnaire was carried out by expert respondent from Sofyan Inn Unisi Hotel. In this stage AHP should be initially done before fuzzy AHP. For processing, this stage is done with the help of Microsoft Excel programs. The following figure 4.1 is the hierarchy of criteria for vendor performance assessments.

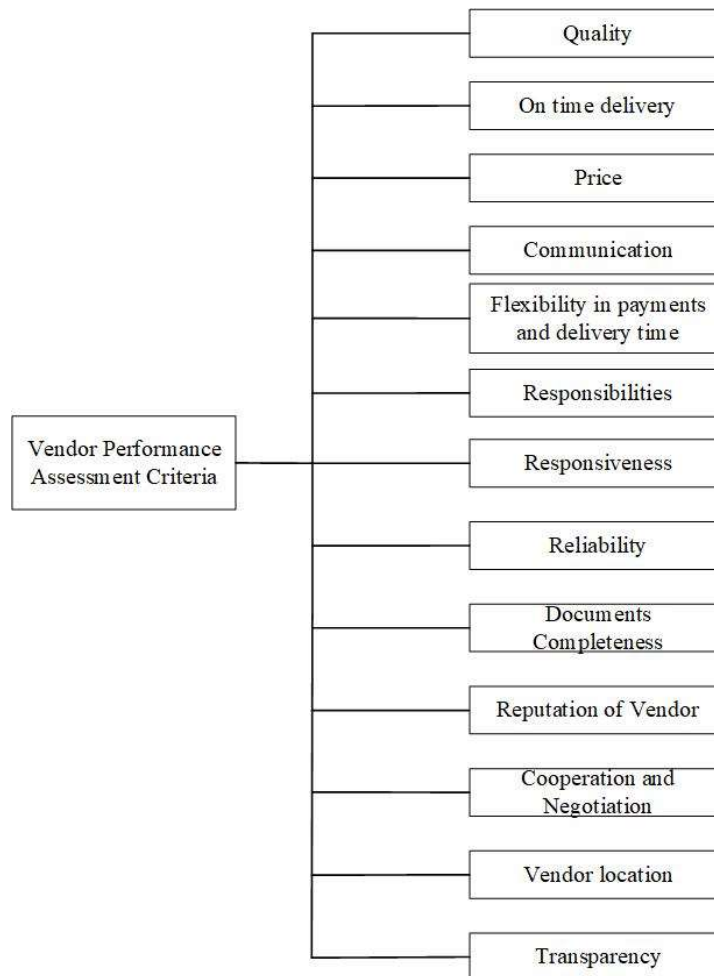


Figure 4. 1. Hierarchy Structure of VPA Criteria

## 4.2. Data Processing

On data processing, the researcher will weight each criterion using Fuzzy AHP and design proposed model that will be used in vendor performance assessments. The step will be described in detail below.

### 4.2.1. Analytical Hierarchy Process Weighting

Below will show the process to get weight by using AHP

1. First stage (recapitulation pairwise comparison become matrix)

Before being presented in matrix form, researchers first show the results of the questionnaire. Table 4.4 is the result of the questionnaires from the respondents for comparison of quality criteria with other criteria. For comparison, all criteria can be seen on the appendix page.

Table 4. 4 Pairwise Comparison Questionnaire

No	Criteria A	Scale A										Scale B									Criteria B
		9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9			
1	Quality							✓											Delivery		
2	Quality								✓										Price		
3	Quality							✓											Communication with vendors		
4	Quality							✓											Flexibility (payments and delivery time)		
5	Quality							✓											Responsibilities		
6	Quality							✓											Responsiveness		
7	Quality							✓											Reliability		
8	Quality					✓													Documents Completeness		
9	Quality					✓													Reputation of Vendor		
10	Quality							✓											Managements		
11	Quality					✓													Vendor location		
12	Quality								✓										Honest and able to keep secrets		

Results of this questionnaire will be transformed into pairwise comparison matrix that will be shown in table 4.5

Table 4. 5 Pairwise Comparison Matrix

VPA Criteria	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8	PC9	PC10	PC11	PC12	PC13
PC1	1	3	1	3	3	3	3	3	5	5	3	5	1
PC2	0.333	1	0.333	3	0.2	0.333	1	1	1	0.333	1	3	0.143
PC3	1	3	1	3	1	3	3	1	5	1	1	3	0.333
PC4	0.333	0.333	0.333	1	0.2	0.333	1	0.333	1	3	1	3	0.333
PC5	0.333	5	1	5	1	0.333	1	3	1	3	3	5	0.333
PC6	0.333	3	0.333	3	3	1	3	1	3	5	3	3	0.2
PC7	0.333	1	0.333	1	1	0.333	1	1	3	3	1	5	0.333
PC8	0.333	1	1	3	0.333	1	1	1	3	3	1	3	0.333
PC9	0.2	1	0.2	1	1	0.333	0.333	0.333	1	1	1	1	0.2
PC10	0.2	3	1	0.333	0.333	0.2	0.333	0.333	1	1	1	3	0.143
PC11	0.333	1	1	1	0.333	0.333	1	1	1	1	1	1	0.333
PC12	0.2	0.333	0.333	0.333	0.2	0.333	0.2	0.333	1	0.333	1	1	0.143
PC13	1	7	3	3	3	5	3	3	5	7	3	7	1
Total	5.931	29.666	10.865	27.666	14.599	15.531	18.866	16.332	31	33.666	21	43	4.827



2. Second Stage (Normalization of each column)

Next step is normalization of each column. Normalization of each column is performed by dividing each of column components with each column total sum. For instance  $\frac{0.333}{5.931}$  this is used to normalize column PC2 and PC1 row, further result is presented below in table 4.6

Table 4. 6 Normalize Pairwise Comparison Matrix

Criteria	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8	PC9	PC10	PC11	PC12	PC13
PC1	0.169	0.1011	0.092	0.108	0.205	0.193	0.159	0.184	0.161	0.149	0.143	0.116	0.207
PC2	0.056	0.0337	0.031	0.108	0.014	0.021	0.053	0.061	0.032	0.01	0.048	0.07	0.03
PC3	0.169	0.1011	0.092	0.108	0.068	0.193	0.159	0.061	0.161	0.03	0.048	0.07	0.069
PC4	0.056	0.0112	0.031	0.036	0.014	0.021	0.053	0.02	0.032	0.089	0.048	0.07	0.069
PC5	0.056	0.1685	0.092	0.181	0.068	0.021	0.053	0.184	0.032	0.089	0.143	0.116	0.069
PC6	0.056	0.1011	0.031	0.108	0.205	0.064	0.159	0.061	0.097	0.149	0.143	0.07	0.041
PC7	0.056	0.0337	0.031	0.036	0.068	0.021	0.053	0.061	0.097	0.089	0.048	0.116	0.069
PC8	0.056	0.0337	0.092	0.108	0.023	0.064	0.053	0.061	0.097	0.089	0.048	0.07	0.069
PC9	0.034	0.0337	0.018	0.036	0.068	0.021	0.018	0.02	0.032	0.03	0.048	0.023	0.041
PC10	0.034	0.1011	0.092	0.012	0.023	0.013	0.018	0.02	0.032	0.03	0.048	0.07	0.03
PC11	0.056	0.0337	0.092	0.036	0.023	0.021	0.053	0.061	0.032	0.03	0.048	0.023	0.069
PC12	0.034	0.0112	0.031	0.012	0.014	0.021	0.011	0.02	0.032	0.01	0.048	0.023	0.03
PC13	0.169	0.236	0.276	0.108	0.205	0.322	0.159	0.184	0.161	0.208	0.143	0.163	0.207

### 3. Third Stage (Priority Weight Determination)

After normalizing each column and getting a total of 1.00 for each column, the third stage is determining the weight or priority value of each criterion. Before determining the weight, the total is determined by summing the row matrix of each criterion. After getting the total, next is determining the weight obtained from the total of each criterion divided by the number of criteria where the number of criteria used is 13. Table 4.7 shows the total results and weights for each criterion.

Table 4. 7 Normalization Matrix

Criteria	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8	PC9	PC10	PC11	PC12	PC13	Weights
PC1	0.169	0.1011	0.092	0.108	0.205	0.193	0.159	0.184	0.161	0.149	0.143	0.116	0.207	0.1529
PC2	0.056	0.0337	0.031	0.108	0.014	0.021	0.053	0.061	0.032	0.01	0.048	0.07	0.03	0.04365
PC3	0.169	0.1011	0.092	0.108	0.068	0.193	0.159	0.061	0.161	0.03	0.048	0.07	0.069	0.10227
PC4	0.056	0.0112	0.031	0.036	0.014	0.021	0.053	0.02	0.032	0.089	0.048	0.07	0.069	0.04234
PC5	0.056	0.1685	0.092	0.181	0.068	0.021	0.053	0.184	0.032	0.089	0.143	0.116	0.069	0.09797
PC6	0.056	0.1011	0.031	0.108	0.205	0.064	0.159	0.061	0.097	0.149	0.143	0.07	0.041	0.09891
PC7	0.056	0.0337	0.031	0.036	0.068	0.021	0.053	0.061	0.097	0.089	0.048	0.116	0.069	0.05997
PC8	0.056	0.0337	0.092	0.108	0.023	0.064	0.053	0.061	0.097	0.089	0.048	0.07	0.069	0.06646
PC9	0.034	0.0337	0.018	0.036	0.068	0.021	0.018	0.02	0.032	0.03	0.048	0.023	0.041	0.03263
PC10	0.034	0.1011	0.092	0.012	0.023	0.013	0.018	0.02	0.032	0.03	0.048	0.07	0.03	0.04012
PC11	0.056	0.0337	0.092	0.036	0.023	0.021	0.053	0.061	0.032	0.03	0.048	0.023	0.069	0.04449
PC12	0.034	0.0112	0.031	0.012	0.014	0.021	0.011	0.02	0.032	0.01	0.048	0.023	0.03	0.0228
PC13	0.169	0.236	0.276	0.108	0.205	0.322	0.159	0.184	0.161	0.208	0.143	0.163	0.207	0.19548

#### 4. Fourth stage (Consistency Test)

in the consistency test, the first thing to do is to multiply the pairwise matrix with the acquired weights. The results are matrix multiplication, Later, the acquired results then divided by the priority weights. Below table 4.8 indicated the result

Table 4. 8 Calculation for  $\lambda_{max}$

MMult	Weights	Result
2.289819	0.1529	14.976
0.62145	0.04365	14.236
1.535493	0.10227	15.014
0.607474	0.04234	14.346
1.438987	0.09797	14.688
1.521622	0.09891	15.383
0.870163	0.05997	14.51
0.978086	0.06646	14.716
0.489177	0.03263	14.99
0.586013	0.04012	14.604
0.636312	0.04449	14.302
0.321165	0.0228	14.085
2.992634	0.19548	15.308

After getting the result from the division, next is to find the  $\lambda_{max}$  of the data,  $\lambda_{max}$  (average from above result) = 14.705, later the consistency index is found by using following formula

$$CI = \frac{\lambda_{max} - n}{n - 1}$$

$$CI = \frac{14.705 - 13}{13 - 1} = 0.142$$

Next to obtain the CI value, the process is by determining the value of CR (Consistency Ratio). The formula used is:

$$CR = \frac{CI}{RI}$$

$$CR = \frac{0.142}{1.56} = 0.091 \text{ (*Consistent*)}$$

The results show that the CR value produced  $\leq 0.1$  then the consistency ratio of the calculation can be accepted (consistent). The weigh results from AHP are shown in table 4.

9

Table 4. 9 Criteria Weight

No	Criteria	Weight	Rank
1	Transparency (PC13)	0.195	1
2	Quality (PC1)	0.153	2
3	Price (PC3)	0.102	3
4	Responsibilities (PC6)	0.099	4
5	Flexibility in payments and delivery time (PC5)	0.098	5
6	Reliability (PC8)	0.066	6
7	Responsiveness (PC7)	0.060	7
8	Delivery (PC2)	0.044	8
9	Managements (PC11)	0.044	9
10	Communication with vendors (PC4)	0.042	10
11	Reputation of Vendor (PC10)	0.040	11
12	Documents Completeness (PC9)	0.033	12
13	Vendor location (PC12)	0.023	13

From the results of the weighting, it can be seen that the criteria of honest and able to keep secrets are the most important criteria with a weight of 0.1955 and the criteria with the lowest weight are criteria for vendor location with weight 0.022 but this data still vague, to make this data more credible and trusted in the further process, Fuzzy AHP will be used.

#### 4.2.2. Criteria Weighting Using Fuzzy Analytical Hierarchy Process

The AHP method is widely used for tackling multicriteria decision problems in real situations. Despite its simplicity in concept and efficiency in computation, it suffers from a few shortcomings one of it was less able to handle uncertainty (Deng, 1999). To improve the AHP method, many researchers use fuzzy AHP for effectively solving the general multicriteria decision problem involving qualitative data. Fuzzy approaches, especially approaches Triangular fuzzy number on AHP scale is expected to be able to minimize uncertainty so that the expected results are more accurate.

##### 1. First Stage (Fuzzy Pairwise)

Fuzzy pairwise done to transform pairwise comparison matrix into to triangular fuzzy number, with rule as shown below in figure 4.2:

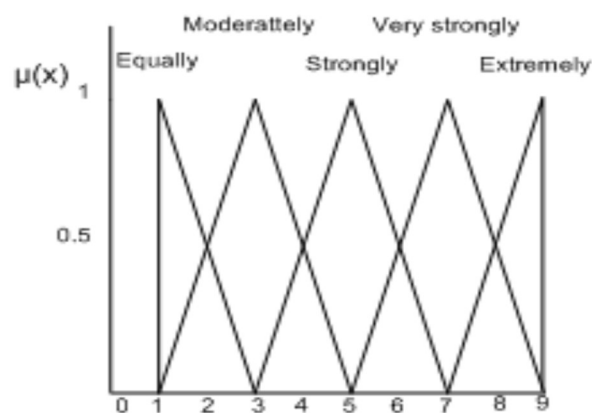


Figure 4. 2 TFN Scale

The TFN for pairwise will be shown in the table 4.10 below

Table 4. 10 Triangular Fuzzy Number for Pairwise Comparison

Priority Rating	Fuzzy Scale
1	(1,1,1) for diagonal, (1,1,3)
2	(1,2,4)
3	(1,3,5)
4	(2,4,6)
5	(3,5,7)
6	(4,6,8)
7	(5,7,9)
8	(6,8,9)
9	(7,9,9)

2,4,6,8, are intermediate values among main scale of AHP

Fuzzy pairwise result will be shown in table 4.11 below.

Table 4. 11 TFN Pairwise Matrix

VPA Criteria	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8	PC9	PC10	PC11	PC12	PC13
PC1	(1,1,1)	(1,3,5)	(1,1,3)	(1,3,5)	(1,3,5)	(1,3,5)	(1,3,5)	(1,3,5)	(3,5,7)	(3,5,7)	(1,3,5)	(3,5,7)	(1,1,3)
PC2	(1/5,1/3,1)	(1,1,1)	(1/5,1/3,1)	(1,3,5)	(1/7,1/5,1/3)	(1/5,1/3,1)	(1,1,3)	(1,1,3)	(1,1,3)	(1/5,1/3,1)	(1,1,3)	(1,3,5)	(1/9,1/7,1/5)
PC3	(1,1,3)	(1,3,5)	(1,1,1)	(1,3,5)	(1,1,3)	(1,3,5)	(1,3,5)	(1,1,3)	(3,5,7)	(1,1,3)	(1,1,3)	(1,3,5)	(1/5,1/3,1)
PC4	(1/5,1/3,1)	(1/5,1/3,1)	(1/5,1/3,1)	(1,1,1)	(1/7,1/5,1/3)	(1/5,1/3,1)	(1,1,3)	(1/5,1/3,1)	(1,1,3)	(1,3,5)	(1,1,3)	(1,3,5)	(1/5,1/3,1)
PC5	(1/5,1/3,1)	(3,5,7)	(1,1,3)	(3,5,7)	(1,1,1)	(1/5,1/3,1)	(1,1,3)	(1,3,5)	(1,1,3)	(1,3,5)	(1,3,5)	(1,3,5)	(1/5,1/3,1)
PC6	(1/5,1/3,1)	(1,3,5)	(1/5,1/3,1)	(1,3,5)	(1,3,5)	(1,1,1)	(1,3,5)	(1,1,3)	(1,3,5)	(3,5,7)	(1,3,5)	(1,3,5)	(1/7,1/5,1/3)
PC7	(1/5,1/3,1)	(1,1,3)	(1/5,1/3,1)	(1,1,3)	(1,1,3)	(1/5,1/3,1)	(1,1,1)	(1,1,3)	(1,3,5)	(1,3,5)	(1,1,3)	(3,5,7)	(1/5,1/3,1)
PC8	(1/5,1/3,1)	(1,1,3)	(1,1,3)	(1,3,5)	(1/5,1/3,1)	(1,1,3)	(1,1,3)	(1,1,1)	(1,3,5)	(1,3,5)	(1,1,3)	(1,3,5)	(1/5,1/3,1)
PC9	(1/7,1/5,1/3)	(1,1,3)	(1/7,1/5,1/3)	(1,1,3)	(1,1,3)	(1/5,1/3,1)	(1/5,1/3,1)	(1/5,1/3,1)	(1,1,1)	(1,1,3)	(1,1,3)	(1,1,3)	(1/7,1/5,1/3)
PC10	(1/7,1/5,1/3)	(1,3,5)	(1,1,3)	(1/5,1/3,1)	(1/5,1/3,1)	(1/7,1/5,1/3)	(1/5,1/3,1)	(1/5,1/3,1)	(1,1,3)	(1,1,1)	(1,1,3)	(1,3,5)	(1/9,1/7,1/5)
PC11	(1/5,1/3,1)	(1,1,3)	(1,1,3)	(1,1,3)	(1/5,1/3,1)	(1/5,1/3,1)	(1,1,3)	(1,1,3)	(1,1,3)	(1,1,3)	(1,1,1)	(1,1,3)	(1/5,1/3,1)
PC12	(1/7,1/5,1/3)	(1/5,1/3,1)	(1/5,1/3,1)	(1/5,1/3,1)	(1/7,1/5,1/3)	(1/5,1/3,1)	(1/7,1/5,1/3)	(1/5,1/3,1)	(1,1,3)	(1/5,1/3,1)	(1,1,3)	(1,1,1)	(1/9,1/7,1/5)
PC13	(1,1,3)	(5,7,9)	(1,3,5)	(1,3,5)	(1,3,5)	(3,5,7)	(1,3,5)	(1,3,5)	(3,5,7)	(5,7,9)	(1,3,5)	(5,7,9)	(1,1,1)

## 2. Second Stage (Geometric Means)

After obtaining the fuzzy pairwise matrix, later geometric means is calculated by using this formula, the results of geomean will be shown in table 4.12.

$$l_i = (l_{i1} \times l_{12} \times \dots \times l_{ik})^{\frac{1}{k}} \text{ for } 1 = 1, 2, \dots, k;$$

$$m_i = (m_{i1} \times m_{12} \times \dots \times m_{ik})^{\frac{1}{k}} \text{ for } 1 = 1, 2, \dots, k;$$

$$u_i = (u_{i1} \times u_{12} \times \dots \times u_{ik})^{\frac{1}{k}} \text{ for } 1 = 1, 2, \dots, k.$$

Table 4. 12 Geometric Mean from Criteria

No	Criteria	Geometric Mean		
		Lower	Medium	Upper
1	PC1	1.289	2.619	4.414
2	PC2	0.443	0.642	1.458
3	PC3	0.961	1.587	3.291
4	PC4	0.440	0.630	1.517
5	PC5	0.889	1.449	2.927
6	PC6	0.731	1.526	2.763
7	PC7	0.663	0.955	2.270
8	PC8	0.690	1.088	2.504
9	PC9	0.440	0.535	1.288
10	PC10	0.382	0.567	1.231
11	PC11	0.609	0.713	1.966
12	PC12	0.256	0.358	0.812
13	PC13	1.717	3.332	5.123
Total Sum		9.510	16.003	31.564



### 3. Third Stage (Defuzzification)

The next step is defuzzification for each criterion using center of gravity method (COG), to calculate the defuzzification value, following formula could be applied:

$$F_{ij} = \left( \frac{[(u_{ij} + l_{ij}) + (m_{ij} - l_{ij})]}{3} \right) + l_{ij}$$

The process of calculation and the results will be shown in table 4.13 below.

$$F_{ij} = \left( \frac{[(4.414 + 1.289) + (2.616 - 1.289)]}{3} \right) + 1.289 = 4.857$$

Table 4. 13 Defuzzification Results

No	Criteria	Defuzzification Result
1	PC1	4.857
2	PC2	1.525
3	PC3	3.500
4	PC4	1.580
5	PC5	3.114
6	PC6	3.027
7	PC7	2.368
8	PC8	2.636
9	PC9	1.320
10	PC10	1.293
11	PC11	2.001
12	PC12	0.845
13	PC13	5.662

#### 4. Fourth Stage (Normalization)

At this stage, conversion of fuzzy numbers into real values (crisp) is done. Total integral value:

$$N_{ij} = \frac{F_{ij}}{\sum_{j=1}^n F_{ij}}$$

the result will be shown below in table 4.14

Table 4. 14 Normalization Result

No	Criteria	Normalization
1	PC1	0.144
2	PC2	0.045
3	PC3	0.104
4	PC4	0.047
5	PC5	0.092
6	PC6	0.090
7	PC7	0.070
8	PC8	0.078
9	PC9	0.039
10	PC10	0.038
11	PC11	0.059
12	PC12	0.025
13	PC13	0.168

The result of criteria weighting after calculating using fuzzy AHP will be shown in table 4.15

Table 4. 15 Fuzzy AHP Weight's for Each Criterion

No	Criteria	Weight	Rank
1	Transparency (PC13)	0.168	1
2	Quality (PC1)	0.144	2
3	Price (PC3)	0.104	3
4	Flexibility in payments and delivery time (PC5)	0.092	4
5	Responsibilities (PC6)	0.090	5
6	Reliability (PC8)	0.078	6
7	Responsiveness (PC7)	0.070	7
8	Managements (PC11)	0.059	8
9	Communication with vendors (PC4)	0.047	9
10	On time delivery (PC2)	0.045	10
11	Documents Completeness (PC9)	0.039	11
12	Reputation of Vendor (PC10)	0.038	12
13	Vendor location (PC12)	0.025	13

After determining weight's comparison of initial AHP and also weight's comparison, the results will be shown in table 4.16

Table 4. 16 Comparison Between Initial AHP weights and Fuzzy AHP weights

No	Criteria	Initial AHP Weight's	Fuzzy AHP Weight's
1	Transparency (PC13)	0.195	0.168
2	Quality (PC1)	0.153	0.144
3	Price (PC3)	0.102	0.104
4	Responsibilities (PC6)	0.099	0.090
5	Flexibility in payments and delivery (PC5)	0.098	0.092
6	Reliability (PC8)	0.066	0.078
7	Responsiveness (PC7)	0.060	0.070
8	On time delivery (PC2)	0.044	0.045
9	Cooperation and negotiation (PC11)	0.044	0.059
10	Communication with vendors (PC4)	0.042	0.038
11	Documents Completeness (PC9)	0.033	0.039
12	Reputation of Vendor (PC10)	0.040	0.038
13	Vendor location (PC12)	0.023	0.025

From the table above, it shows that there is difference on weight's comparison of initial AHP weight's and Fuzzy AHP weight's, each of criterion undergo of increasing value for example quality weight's decreases from 0.153 to 0.144, this result explains that fuzzy AHP decreases human's unclarity or vagueness of the data, minimize uncertainty so that the expected results are more accurate.

Then the results of Fuzzy are used as a weight for the VPA framework that next will be employed to assess the vendor performance in Sofyan Inn hotel.

### 4.2.3. Framework of Vendor Performance Assessment

Weight that already acquired from the previous step will be used to calculate vendor performance through proposed framework that already make by researcher, below in table 4.20 will show the model that will be used to assess vendor in hospitality industry.

Table 4. 17. Vendor Performance Assessments Framework

No	Criteria	Weight	Criteria Explanation	Scoring Rate	Scoring Explanation
1	Transparency	0.168	Assessed by how honest and transparent the vendor is in any matter related to the work and vendor's commitment to the agreement that has been agreed related to everything that happens in a business transaction and contained in the document	5	Vendors are very honest and very transparent in providing any related information
				4	Vendors are honest and transparent in providing any related information
				3	Vendors are less honest and less transparent in providing any related information
				2	Vendors are dishonest and not transparent in providing any related information
				1	Vendors are very dishonest and not very transparent in providing any information
2	Quality	0.144	Assessed from the suitability of specifications with the wishes of the users, and the defects of the items sent	5	The items are in accordance with the wishes of the customer and there is no record of repairs at all and there are no complaints regarding defective items. Defect = 0.
				4	The Items are quite in accordance with the

No	Criteria	Weight	Criteria Explanation	Scoring Rate	Scoring Explanation
					user's wishes and there is a defect in the item but is not issued an inappropriate record. Defect $\leq 5\%$ .
				3	The items are not in accordance with the user's wishes but can still be used and 1 record is not appropriate for the vendor because there is a defect in the item. Defect = 5%
				2	The items are not in accordance with the wishes but the vendor is willing to make repairs and More than 1 note is issued and the vendor is willing to answer. Defect $\geq 5\%$ .
				1	The items are not in accordance with the wishes of the user and more than 1 note is issued and the vendor is not responsible. Defect $\geq 10\%$ .
3	Price	0.104	Assessed from how low the price that offer by suppliers for good from own prediction price	5	Low price with high quality, 15%-20% lower than own estimation price.
				4	Low price with standard quality, quality stable from time overtime, 10%-15% lower than own estimation price.

No	Criteria	Weight	Criteria Explanation	Scoring Rate	Scoring Explanation
				3	Standard price and standard quality product, 5%-10% lower than own estimation price.
				2	Quite expensive with unstable quality and below the standard 0%-5% lower than own estimation price
				1	Expensive price and bad quality of product. Above own estimation price.
4	Flexibility in payments and delivery time	0.092	Assessed from whether or not a payment system change request and delivery time are met	5	All change requests are met in accordance with the policies of the company
				4	Requests for change are met by the policies and conditions of both parties
				3	Change requests are met but must be adjusted to vendor policies and requirements
				2	Vendors fulfill changes requests related to payment systems and not for delivery times (or vice versa)
				1	Vendors do not meet payment system change requests and delivery times
5	Responsibilities	0.090	Assessed from the vendor's responsibility or not to the	5	Responsible for resolving complaints on the same day and

No	Criteria	Weight	Criteria Explanation	Scoring Rate	Scoring Explanation
			complaint, and how long the complaint can be resolved		complaints can be resolved
				4	Responsible for resolving complaints within 1-3 days and complaints can be resolved
				3	Responsible for resolving complaints within more than 3 days and complaints can be resolved
				2	Responsible for resolving complaints within more than 3 days but complaints are difficult to resolve
				1	Not responsible for resolving complaints
6	Reliability	0.078	Assessed from the ability to ensure the right requirements in delivery as agreed in the contract by supplier	5	Vendors have excellent performance to fulfill the demand according to customer requirements
				4	Vendors have good performance to fulfill the demand according to customer requirements
				3	Vendors have average performance to fulfill the demand according to customer requirements
				2	Vendors have below-average performance to fulfill the demand according to customer requirements



No	Criteria	Weight	Criteria Explanation	Scoring Rate	Scoring Explanation
				1	Vendors have poor performance to fulfill the demand according to customer requirements
7	Responsiveness	0.070	Assessed from the response time and effectiveness of the supplier, how fast and sufficient the supplier responds to company X's for questions, requests and problems	5	Vendor have excellent response time, effectiveness and receptivity
				4	Vendor have good response time, effectiveness and receptivity
				3	Vendor have average response time, effectiveness and receptivity
				2	Vendor have below-average response time, effectiveness and receptivity
				1	Vendor have poor response time, effectiveness and receptivity
8	Cooperation and negotiation	0.059	This indicator takes into consideration the cooperation, flexibility and policies from supplier to the company. How the supplier considered "win-win" perspective for seller-buyer relationship	5	Vendor policies are flexible
				4	Vendor policies are quite flexible
				3	Vendor policies are sometimes flexible
				2	Vendor policies are strict there is no negotiation
				1	Vendor policies are fixed there is no any change
9	Communication with vendors	0.047	Assessed from how easy to communicate with vendors	5	Proactive in communicating
				4	Very easy to contact via telephone, email or fax and responded well

No	Criteria	Weight	Criteria Explanation	Scoring Rate	Scoring Explanation
				3	Easy to contact but takes a long time to respond
				2	Difficult to contact either by telephone, fax, e-mail, etc.
				1	Could not be contacted
<b>10</b>	On time delivery	0.045	Assessed from the accuracy of the delivery time with the agreed time	5	All items shipped are in accordance with the time agreement
				4	Some can be sent on time and others experience a delay of less than 3 days
				3	Delays for 3-5 days
				2	Delays for more than 6-8 days
				1	A delay of more than 8 days
<b>11</b>	Documents Completeness	0.039	Assessed from completeness of documents submitted by the vendor to the company and the clarity of the contents of the document for example invoice, delivery documents, and etc.	5	Before shipping and the document is clear and detailed
				4	All documents have been completed before shipment but the contents of the document are not so clear and detailed
				3	The document is submitted after the shipment is made and the contents of the document are clear and detailed
				2	The document is submitted after the shipment is made and the contents of the document

No	Criteria	Weight	Criteria Explanation	Scoring Rate	Scoring Explanation
					are not so clear and detailed
				1	A warning letter is issued because the document is not equipped
<b>12</b>	Reputation of Vendor	0.038	Assessed from previous vendor's performance and services provided during work	5	Vendors have no problems with previous clients and have a history of good performance and provide excellent service during work
				4	Vendors have no problems with previous clients and provide good service during work
				3	Vendors have no problems with previous clients and are good enough to provide services
				2	Vendors have problems with previous clients but while working can provide good service
				1	Vendors have problems with previous clients and are not good at providing services during work
<b>13</b>	Vendor location	0.025	Assessed from a nearest location the vendor with the company	5	Located in an area with a distance of less or equal to 20km
				4	Located in an area with a distance of more than 20km
				3	Vendor companies are in different cities

No	Criteria	Weight	Criteria Explanation	Scoring Rate	Scoring Explanation
				2	Vendor companies are in different countries but are quite easy to communicate
				1	Vendor companies are in different countries and take longer to communicate

#### 4.2.4. Framework Validation

In the process of validation on the VPA framework, this research involves five food vendors. Food vendors are chosen because this process is critical to hotel as almost 60% of its budget every month is used to purchase food ingredients. The process of collecting data in assessing vendor performance is carried out through vendor performance assessment form distributed to the purchasing manager. Data from all of vendors can be seen in Table 4.18.

Table 4. 18 Assessed Vendors Using Model of VPA

No	Vendor Name	Address	Category	Type of goods
1	UD. Siaga	Jl. Kelomponcapir, Soragan, Ngetisharjo	Food ingredients	Fruits
2	CV. Mulia	Jl. Dongkelan, Panggunharjo, Sewon, Bantul	Food ingredients	Chickens and eggs
3	CV. Putra Mandiri	Jl. Pakem, Taman Martani, Kalasan, Sleman	Food ingredients	Fishes
4	CV. Puspa Jaya	Jl. Kenayan, Wedomartani, Ngemplak, Sleman	Food ingredients	Vegetables
5	CV. Embun Pagi	Jl. Jagalan, Kota Yogyakarta	Food ingredients	Meats

Full assessments form can be seen in appendix, after getting the value of each vendor, the next is the result of calculating the score of each criterion with the formula:

$$\text{Score} = \text{rating} \times \text{weight}$$

Total score of each criterion is all summed to get the final score of the vendor performance, the final score of each vendor will be shown below in table 4.19 – 4.24

Table 4. 19 Performance Score of UD. Siaga

Vendor Name	Type of goods	Criteria	Weight	Rating	Score
UD. Siaga	Fruits	Transparency	0.168	4	0.671
		Quality	0.144	4	0.576
		Price	0.104	3	0.311
		Flexibility in payments and delivery time	0.092	5	0.462
		Responsibilities	0.090	5	0.449
		Reliability	0.078	4	0.313
		Responsiveness	0.070	4	0.281
		Cooperation and negotiation	0.059	3	0.178
		Communication with vendors	0.047	5	0.234
		On time delivery	0.045	3	0.136
		Documents Completeness	0.039	4	0.157
		Reputation of Vendor	0.038	4	0.153
		Vendor location	0.025	3	0.075
		Final Score			

Table 4. 20 Performance Score of CV. Mulia

Vendor Name	Type of goods	Criteria	Weight	Rating	Score
CV. Mulia	Chicken and Eggs	Transparency	0.168	5	0.839
		Quality	0.144	4	0.576
		Price	0.104	5	0.519
		Flexibility in payments and delivery time	0.092	5	0.462
		Responsibilities	0.090	5	0.449
		Reliability	0.078	5	0.391
		Responsiveness	0.070	5	0.351
		Cooperation and negotiation	0.059	4	0.237
		Communication with vendors	0.047	5	0.234
		On time delivery	0.045	4	0.181
		Documents Completeness	0.039	4	0.157
		Reputation of Vendor	0.038	4	0.153
		Vendor location	0.025	4	0.1
		Final Score			

Table 4. 21 Performance Score of CV. Putra Mandiri

Vendor Name	Type of goods	Criteria	Weight	Rating	Score
CV. Putra Mandiri	Fishes	Transparency	0.168	4	0.671
		Quality	0.144	5	0.72
		Price	0.104	3	0.311
		Flexibility in payments and delivery time	0.092	4	0.369
		Responsibilities	0.090	5	0.449
		Reliability	0.078	5	0.391
		Responsiveness	0.070	5	0.351
		Cooperation and negotiation	0.059	4	0.237
		Communication with vendors	0.047	5	0.234
		On time delivery	0.045	5	0.226
		Documents Completeness	0.039	4	0.157
		Reputation of Vendor	0.038	5	0.192
		Vendor location	0.025	3	0.075
		Final Score			



Table 4. 22 Performance Score of CV. Puspa Jaya

Vendor Name	Type of goods	Criteria	Weight	Rating	Score
CV. Puspa Jaya	Vegetables	Transparency	0.168	5	0.839
		Quality	0.144	5	0.72
		Price	0.104	3	0.311
		Flexibility in payments and delivery time	0.092	5	0.462
		Responsibilities	0.090	5	0.449
		Reliability	0.078	4	0.424
		Responsiveness	0.070	5	0.351
		Cooperation and negotiation	0.059	4	0.237
		Communication with vendors	0.047	5	0.234
		On time delivery	0.045	4	0.181
		Documents Completeness	0.039	4	0.157
		Reputation of Vendor	0.038	4	0.153
		Vendor location	0.025	4	0.1
		Final Score			

Table 4. 23 Performance Score of CV. Embun Pagi

Vendor Name	Type of goods	Criteria	Weight	Rating	Score
CV. Embun Pagi	Meats	Transparency	0.168	5	0.839
		Quality	0.144	5	0.72
		Price	0.104	4	0.415
		Flexibility in payments and delivery time	0.092	4	0.369
		Responsibilities	0.090	5	0.449
		Reliability	0.078	5	0.391
		Responsiveness	0.070	5	0.351
		Cooperation and negotiation	0.059	4	0.237
		Communication with vendors	0.047	5	0.234
		On time delivery	0.045	5	0.125
		Documents Completeness	0.039	4	0.157
		Reputation of Vendor	0.038	5	0.192
		Vendor location	0.025	5	0.125
		Final Score			

Table 4. 24 Vendor Performance Rank

No	Vendor Name	Category	Final Score	Rank
1	CV. Embun Pagi	Food Ingredients	4.705	1
2	CV. Mulia	Food Ingredients	4.649	2
3	CV. Puspa Jaya	Food Ingredients	4.507	3
4	CV. Putra Mandiri	Food Ingredients	4.384	4
5	UD. Siaga	Food Ingredients	3.996	5

Based on the calculation of the final score on the food vendor's performance from Sofyan Inn Hotel as shown in table 4.24, where have the same criteria and weights for assessment, resulted in CV. Embun Pagi with the best score which is 4.705. It considered as very good performance, in which Sofyan Inn just need to keep maintaining this good collaboration with CV. Embun Pagi, CV. Mulia, CV Puspa Jaya, and CV Putra Mandiri since all of this vendor got a very good performance from the framework. While, UD. Siaga is resulted with score of 3.996, which means this vendor in further need to improve performance since its performance still considered as adequate unlike the others.

## **CHAPTER V**

### **DISCUSSION**

#### **5.1. Criteria Weighting**

After getting the criteria from the first questionnaire, there are 13 important criteria obtained to be employed for assessing the vendor performances, next step is to weight each criterion through the second questionnaire that directly will be filled by the expert of purchasing in Sofyan Inn.

##### **5.1.1. Criteria Weighting Using Analytical Hierarchy Process**

Below in figure 5.1 is the graphic chart that indicates the weighting result of each criterion from questionnaire by using Analytical Hierarchy Process (AHP).

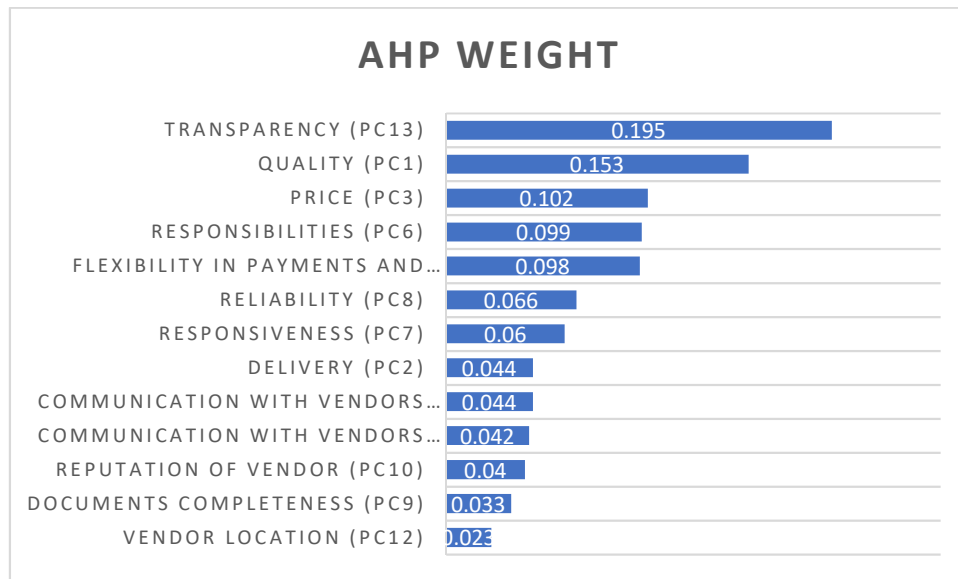


Figure 5. 1 AHP Weighting Results

From the picture above, it can be seen that transparency is the first important criteria to assess vendor performance which have weight of 0.195, quality is the second important criteria with weight of 0.153, third position is price with weight of 0.102, fourth is responsibilities which have weight of 0.099 and so on, this rank is obtained from the AHP pairwise that already filled by the procurement experts of Sofyan Inn Unisi Hotel.

### 5.1.2. Criteria Weighting Using Fuzzy Analytical Hierarchy Process

AHP method is widely used for tackling multicriteria decision problems in real situations. Despite its simplicity in concept and efficiency in computation, one of the weakness in AHP method is the problem with criteria that have more subjective characteristics, therefore, by using fuzzy AHP, the problem with the criteria can be seen more objectively and accurately. Below figure will show the result of weighting using fuzzy AHP.

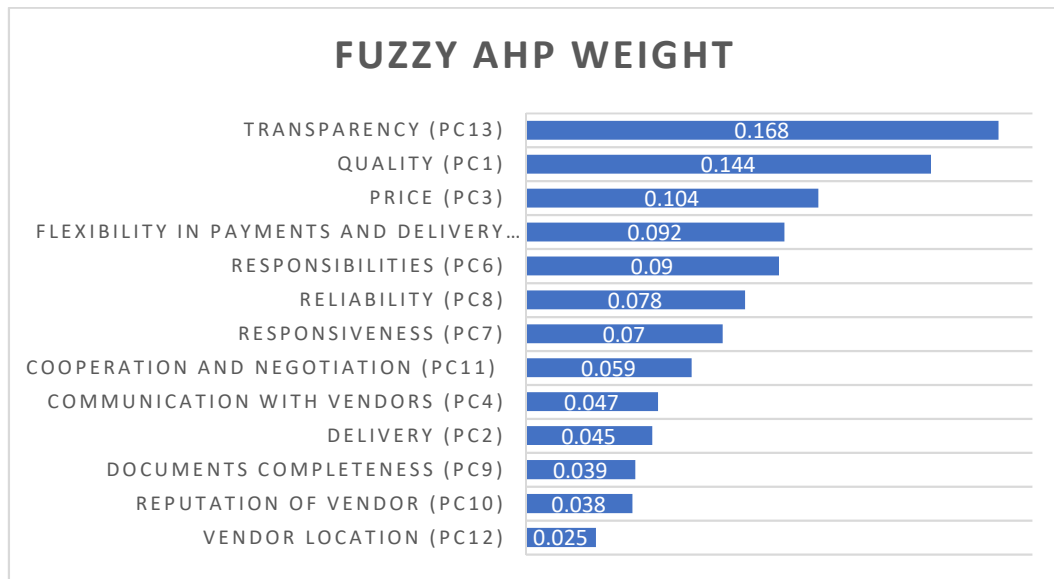


Figure 5. 2 Fuzzy AHP Weighting Results

There are several differences in priority rank of criteria from the initial AHP weight, which are documents completeness, reputation of vendor, managements and delivery. The weight differentiation will be shown below in figure 5.3

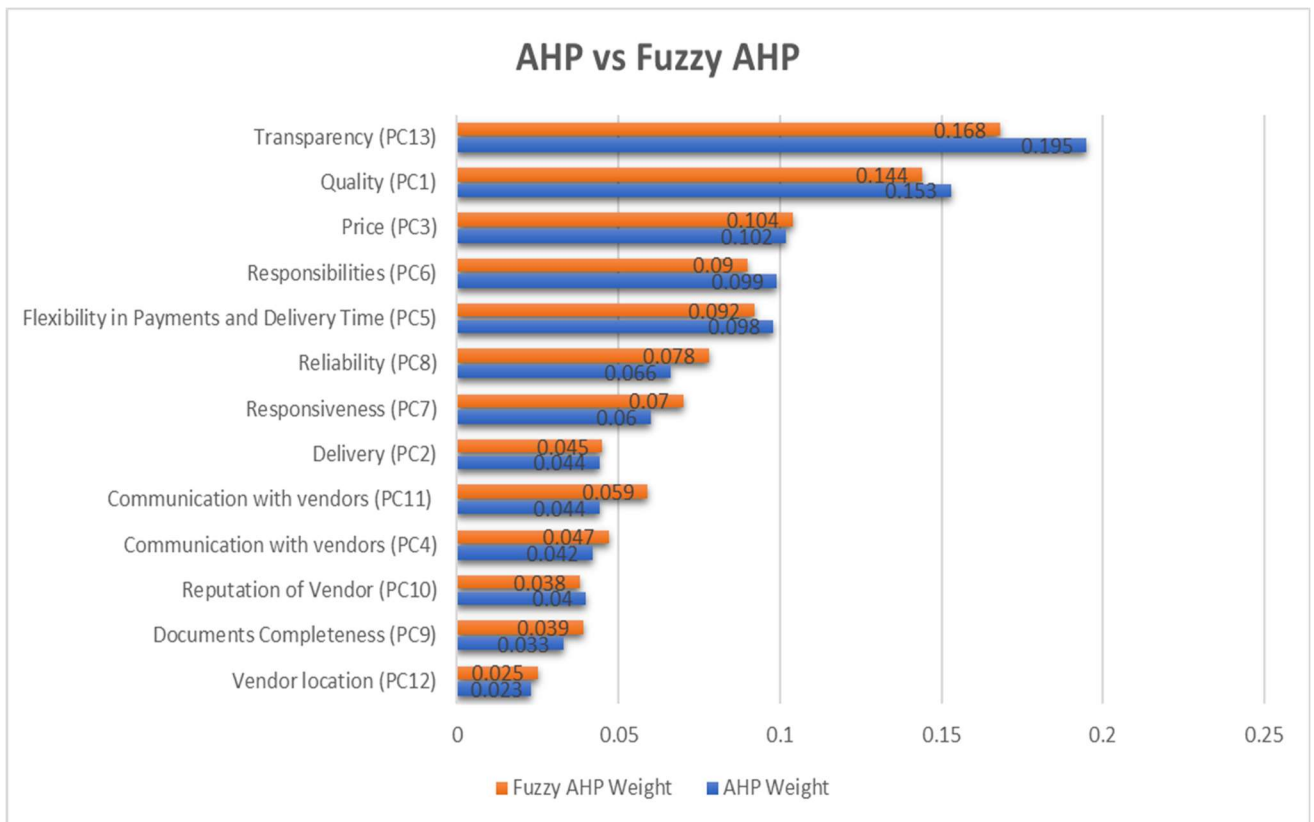


Figure 5. 3 Weighting Results Difference Between AHP and Fuzzy AHP

Above is the chart that shows the results between weighting using AHP and Using Fuzzy AHP. There are several differences in priority rank of each criterion. After using fuzzy, the weighting result is more objective while in AHP the priority weight still subjective.

## 5.2. Proposed Framework of Vendor Performance Assessments

In general, this research has similarity with research that conducted by Lau et al. (2018) and Onder & Kabadayi, (2015) both of them conducted research about supplier performance assessments in food supplier, compared to other research. this study produced an assessment framework that can be used to assess the performance of food vendors. In general, the purpose of the two studies is the same, to make a model that can facilitate the user in getting the right vendor. Although, there are differences where the research involves supermarket as research objects and involved hospitality but in the produced models, there were several criteria in common like quality, price, on-time delivery, reliability, documentation, trust, communication and etc.

In this research there are thirteen important criteria that involved in assessing the vendor performances. Further, it will be explained about each criterion based on the prioritize weight. The transparency criterion has a weight of 0.168 which is the largest weight if compared to other criteria. It indicates that honest and able to keep secrets is a very important factor in evaluating vendor performance, because the hotel is prioritizing good cooperation with the vendors. Therefore, the vendors need to maintain honesty and keep the secret so that trust, cooperation, and relationships can be established well.

The second priority factor is quality which has a weight of 0.144. The difference in weight is not too far with the honest criteria, this because it deals with various actions that can improve and maintain the quality of the material supplied by vendors. Price becomes the third important criteria which have the weight of 0.104. It means that it quite far from previous criteria, in a case to maximize money turnover the company should find the best price for suppliers that provide good quality also.

Flexibility in payments and delivery time become the fourth important criteria because the payment process tends to be done directly and when making a purchase it tends to be sent shortly even after the payment process is done. Responsibilities become the fifth



important criteria in vendor performance since it deals with responsible of vendors when dealing to a complaint, and how long the complaint from consumers can be resolved.

Reliability is the sixth important criteria and it deals with the vendor ability to ensure the right requirements in delivery as agreed in the contract by the supplier. Next is responsiveness as the seventh important criteria. It deals with the response time and effectiveness of the supplier, how fast and sufficient the supplier responds to company Xs for questions, requests, and problems.

Cooperation and negotiation, and communication with the vendor are the eighth and the ninth important criteria, where negotiation deals with consideration of the cooperation, flexibility, and policies from supplier to the company. How the supplier considers "win-win" perspective for a seller-buyer relationship. Then, communication could make everything easy, in case something happened, the customer can directly announce it to the vendor for other things happened.

On time delivery and documents completeness are the tenth and eleventh important criteria where delivery deals with delivering goods to the customer, whether they will be delivered on time or delay. Since late delivery will affect the company performance. While, document completeness is considered to guarantee the existence of important documents and legality. In this case, vendor location is not very important as it shows from the result of the weight. The customers not really consider about location as long as the products that they offer could fulfill the requirements.

Next are reputation and location of vendor as the last criteria that used in vendor performance assessment, they are positioned at the bottom of the list at the twelve and thirteenth and have weight of 0.053 and 0.035, if the vendor has a good reputation, the vendor is able to provide good service to customer, it affects the vendor's reputation. Vendor location deals with the duration of the deliverance in terms of how far the location situated.

### 5.3. Framework Validation

In validating the framework, framework that has been produced should be implemented, in this research there are five food vendors involves to be validated, which are collaborated with Sofyan Inn Unisi Hotel. The process of collecting data in assessing vendor performance is carried out through a vendor performance assessment form, the form can be seen in the appendix page. The forms are distributed to the purchasing manager of Sofyan Inn Unisi Hotel. Data from the vendors can be seen in Table 5.1 below.

Table 5. 1 Vendor Information

No	Vendor Name	Address	Category	Type of goods	Total Procurements Budget
1	UD. Siaga	Jl. Kelomponcapir, Soragan, Ngetisharjo	Food ingredients	Fruits	
2	CV. Mulia	Jl. Dongkelan, Panggunharjo, Sewon, Bantul	Food ingredients	Chickens and eggs	
3	CV. Putra Mandiri	Jl. Pakem, Taman Martani, Kalasan, Sleman	Food ingredients	Fishes	IDR 40.000.000/Months
4	CV. Puspa Jaya	Jl. Kenayan, Wedomartani, Ngemplak, Sleman	Food ingredients	Vegetables	
5	CV. Embun Pagi	Jl. Jagalan, Kota Yogyakarta	Food ingredients	Meats	

### 5.3.1. Framework Implementation Procedure

In implementing this model, there are several things that should be considered related to who will fill the appraisal form that will separate there several criteria that should be filled by the experts, brief explanation will be shown below:

1. For criteria quality, responsibilities, reliability, and document completeness it supposed to be filled by the persons in expert at quality control, or people that maintain and handle every activity that related to product in the company and make sure that the quality, quantity, and on time is adequate.
2. For on time delivery, communication, responsiveness, and vendor location supposed to be filled by the person that expert at warehouse who usually conduct the inspection for product in and out of the company.
3. Criteria price, flexibility in payments and delivery time, reputation of vendor, cooperation and negotiation, and transparency supposed to be filled by the person that expert in procurements due to critically of the criteria because this decision making could impact the company.

Below is the standard operational procedure of filling process of framework:

- a. Purchase requisition (PR) is filled by department that concerned, acknowledged and signed by head of department and purchasing manager, then PR will be given to purchasing department
- b. Purchasing department will find the requested item proposed by concerned department from several vendors and negotiate about the price.
- c. After that the purchasing department will continue by making purchase order (PO) in accordance with existing PR. Purchase order contains the type of item, quantity of goods, price and date shipping that has been approved by purchasing and supplier.
- d. Next receiving is done by warehouse person and quality control to receive the ordered goods, and they have responsibilities for receiving goods in accordance with the quantity and quality ordered.

- e. Next department is the party that helps receiving the goods receipt. However, the department only functioned to re-check the condition of the goods received in accordance with the specifications of the purchase request.
- f. Then, account payable is the party that has responsibilities to receive copy invoice, copy travel documents, as well as receiving record which is given by receiving party.
- g. Supplier will send the invoice to the company for the purchase transaction.
- h. Next, account payable has responsibilities to prepare all payment documents to supplier and send to general cashier.
- i. General cashier is the person that responsible to transfer all payment to bank for whole payment documents that already received from account payable.
- j. Supplier got the payment then exchange receipt from both parties.

Below is the flow of the purchasing process as shown in Figure 5.4.

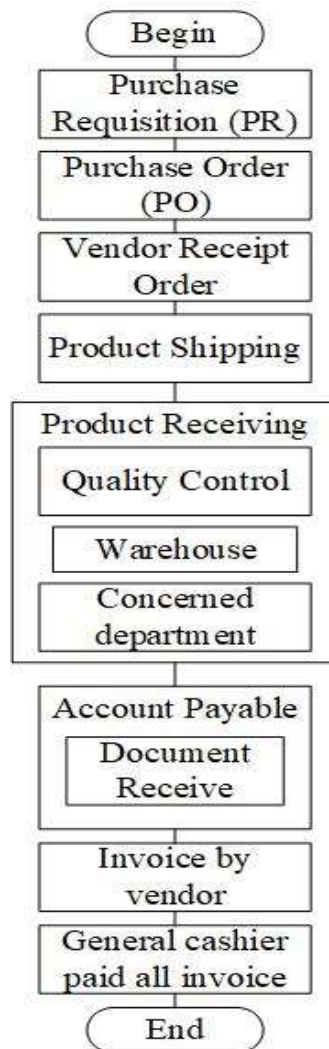


Figure 5. 4 Procedure to Implement the framework

### 5.3.2. Vendor Final Score Based on Framework

Based on the results of the final calculation performance scores of five food vendors from Sofyan Inn Unisi hotel, as can be seen in figure 5.4, each criterion has different weights. And based on the results of calculations using the proposed model, the results obtained are shown below in figure 5.5

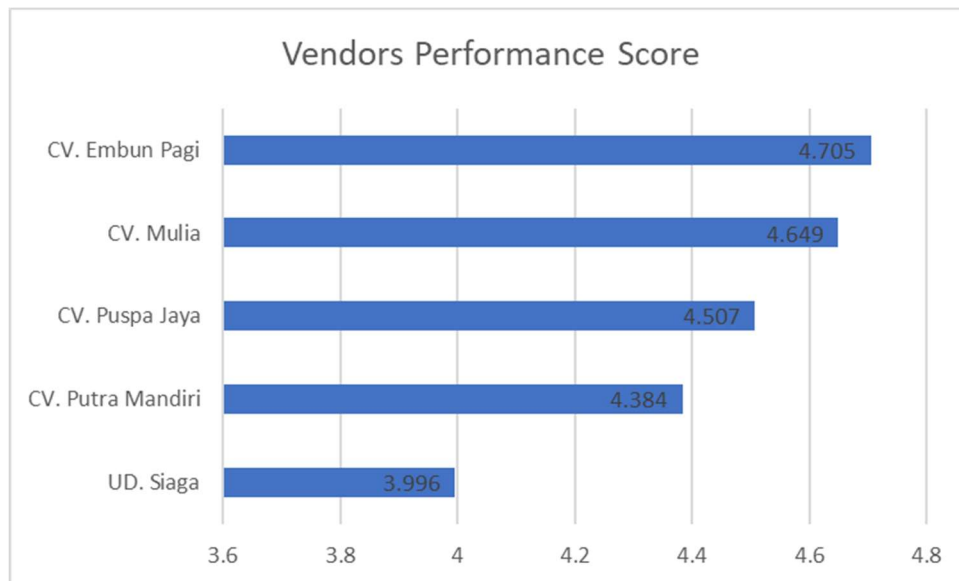


Figure 5. 5 Vendor Performance Final Score

CV. Embun pagi get the highest final score which is 4.705, the second is CV. Mulia with final score 4.649, third is CV. Puspa Jaya with final score 4.507, the fourth is CV. Putra Mandiri with score 4.384 and the last is UD. Siaga with performance score of 3.996.

Four over five vendors have a very good performance, which are CV. Embun Pagi, CV. Mulia, CV. Puspa Jaya, and CV. Putra Mandiri where the final score of each vendor is  $>4-5$ , it means that they have very good performance and the Sofyan Inn Unisi hotel can make those four vendors become priority and keep maintaining the good relation with this vendor, while the last vendor which is UD. Siaga have adequate performance, in which the performance valued  $>3-4$ , it needs to enhance the performance.

#### **5.4. Limitation and Future Research**

Limitation of this research is in the respondent that involves, many of the hospitality industries reject to provide data about this research such as criteria validation, from 15 hospitality industries only 5 that give feedback. There are differences in the results between the first questionnaire and the second questionnaire due to differences in the method of calculating data, literature review that carried out similar research still very rare especially in performance assessments on hospitality, most of performance assessments literatures are conducted in manufactures company, that makes this research quiet difficult.

For future research, next researcher can involve a larger amount of hospitality industries so that the results obtained are better, specifically the hospitality that will be used as an object of research, for example, the respondent is five stars hotel or etc. Using other methods in multicriteria decision making such TOPSIS, PROMETHEE, and etc. involving more criteria that related to vendor performance assessments. Making further improvements or developments that make the results between two questionnaires are more consistent. Validating the model to more hospitality industries.

## CHAPTER VI

### CONCLUSSIONS AND RECOMMENDATIONS

#### 6.1. Conclusions

This study aims is to create a model of vendor performance assessments in hospitality, using several criteria and then do pairwise comparisons to get the weight of each criterion. in accordance with the research objectives, some conclusions that can be taken are as follows:

1. The important criteria that obtained from the results of respondents are 13, which is Quality, On time delivery, Price, Communication with vendors, Flexibility in payments and delivery time, Responsibilities, Responsiveness, Reliability, Documents completeness, Reputation of vendor, Cooperation and negotiation, Vendor location, and Transparency.
2. The weight of each criterion based on priority rank are: Transparency (0.168), Quality (0.144), Price (0.104), Responsibilities (0.092), Reliability (0.090), Flexibility in payments and delivery time (0.078), Responsiveness (0.070), Cooperation and negotiation (0.059), Communication with vendors (0.047), On time delivery (0.045), Documents Completeness (0.039), Reputation of Vendor (0.038), Vendor location (0.025).



3. The vendor performance assessment framework that produced consists of criteria, weight, and rating scale.
4. The produced frameworks can be used by hospitality around Yogyakarta in assessing the performance of vendors of food, amenities, and others. in the model implementation trials in five food vendors namely UD. Siaga, CV. Embun pagi, CV. Putra Mandiri, CV. Puspa Jaya dan CV. Mulia.
5. The final result of vendor performances in five food vendors got the final score which CV. Embun Pagi has the highest score with final score 4.705, and the lowest ones got by UD. Siaga with final score 3.996.
6. Overall the food vendor performance of Sofyan Inn Unisi Hotel is very good the score is between 3-5.

## 6.2. Recommendations

Based on what has been studied, this research still has many weaknesses in various ways, so it is expected that further studies related to the model of vendor performance assessment for hospitality can complement and improve this research. Recommendation for researchers for future research are:

1. In this study, the hospitality that involved is still in a small amount so that research needs to be carried out involving a larger number of hotels so that the results obtained are better.
2. There are differences in the results between the first questionnaire and the second questionnaire due to differences in the method of calculating data, so that further research can be made further improvements or developments so that the results between two questionnaires are more consistent.
3. The limitations of this research are hotel vendors themselves especially for the implementation in this study, so that further research can be carried out to test the proposed model to the hotels with more vendors.
4. For the Sofyan Inn Unisi Hotel should keep maintaining the relationship with their vendors and routinely check the performance of the vendors, the performance of hotel depends on the performance of its vendors.

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## APPENDIX A

### RESEARCH QUESTIONNAIRE

Greetings.

To honorable Mister/Ma'am

My name is Sofyan Ali I'm students of industrial engineering international program Universitas Islam Indonesia, right now I'm in final year of my study. I conduct research for my undergraduate thesis project entitled **VENDOR PERFORMANCE ASSESSMENTS IN HOSPITALITY**, and in this research the authors need data for criteria selection to design vendor performance assessment model. This data collection will only be used for the purpose of preparing the thesis and confidentiality will be guaranteed.

The willingness and cooperation that Mr./Mrs. provides in the form of correct and complete information will greatly support the success of this research. In addition, the answers that Mr./Mrs. gave also will be a very valuable input for me.

Finally, I would like to express my deepest gratitude for the assistance and willingness of you who have taken the time to complete this questionnaire.

Sincerely

Sofyan Ali

### Introduction:

This is a questionnaire used in research related to the 'Vendor Performance Assessment engaged in Information Technology'. The main objective in this study is to create a model that can facilitate the vendor performance assessment process in hospitality industry.

For Mister/Ma'am who fill this questionnaire please choose the rank of the provide criteria in scale 1-5 in the rating column with checklist (✓) pleased fill the rating based on your opinion.

Below is the explanation of the priority rating of criteria

Rating	Rating explanation
1	Not at all important
2	Slightly Important
3	Important
4	Very Important
5	Extremely Important



**VENDOR PERFORMANCE ASSESSMENTS CRITERIA QUESTIONNAIRE FOR  
HOSPITALITY INDUSTRY IN GENERAL**

**Name:**

**Hotel:**

**Please fill the questionnaire by select scale 1-5 below by (✓) in the column below**

no	Criteria	Criteria Explanation	Priority Rating				
			1	2	3	4	5
1	Quality	Assessed from the suitability of specifications with the wishes of the users, and the defects of the items sent					
2	Delivery	Assessed from the accuracy of the delivery time with the agreed time					
3	Price	Assessed from how low the price that offer by suppliers for good from own prediction price					
4	Communication with vendors	Assessed from how easy to communicate with vendors					
5	Flexibility in payments and delivery time	Assessed from whether or not a payment system change request and delivery time are met					
6	Responsibilities	Assessed from the vendor's responsibility or not to the complaint, and how long the complaint can be resolved					
7	Responsiveness	Assessed from the response time and effectiveness of the supplier, how fast and sufficient the supplier responds to company for questions, requests and problems					
8	Reliability	Assessed from the ability to ensure the right requirements in delivery as agreed in the contract by supplier					
9	Documents Completeness	Assessed from completeness of documents submitted by the vendor to the company and the clarity of the contents of the document for example invoice, delivery documents, and etc.					

10	Reputation of Vendor	Assessed from previous vendor's performance and services provided during work					
11	Cooperation and negotiation	This indicator takes into consideration the cooperation, flexibility and policies from supplier to the company. How the supplier con-sider "win-win" perspective for seller-buyer relationship					
12	Vendor location	Assessed from a nearest location the vendor with the company					
13	Transparency	Assessed by how honest and transparent the vendor is in any matter related to the work Keeping a secret: Assessed from the vendor's commitment to the agreement that has been agreed (related to everything that happens in a business transaction and contained in the document)					
	.....						
	.....						
	.....						

Note: if there are others criteria that researcher not mentioned above please write down in the blank space.

Thank you for fill this research questionnaire Mister/Ma'am

Yogyakarta.....2018

Respondent

( )

## APPENDIX B

### RESEARCH QUESTIONNAIRE

Dear Respondents,

My name Sofyan Ali, hereby I wish you to fill the questionnaire according to your expertise assessments. The data and answers provided through this questionnaire aim to complete the research data in the framework of the preparation of the final assignment entitled "Model of Vendor Performance Assessments in Hospitality Industry". For your help and attention, I thank you.

#### **I. Respondents Identity**

Name:

Address:

#### **II. Instructions**

Give a checklist (✓) in the criteria scale column (A) or in the criteria scale column (B) that matches your opinion.

Scale:

**1: both criteria are equally important**

**3: criteria (A) are slightly more important than criteria (B)**

**5: criteria (A) are much more important than criteria (B)**

**7: criteria (A) are far more important than criteria (B)**

**9: criteria (A) are extremely more important than criteria (B)**

**2,4,6,8: Mid-value** (Definition of mid-value is If Criteria A is slightly more important than Criteria B then we should give a value of 3, but if the value of 3 is considered still too large and value 1 is still too small then the value 2 that we have to give for priority between Criteria A with Criteria B, as well as values 4,6 and 8)

**VICE VERSA FOR CRITERIA B TO CRITERIA A**

Example:

No	Criteria A	Scale A									Scale B									Criteria B
		9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9		
1	Quality			✓															Delivery	

Based on the example above, if you give (✓) to number 7 on Scale A then it means that criterion A is 'Quality' which is more important than criterion B, which is 'Delivery'. And if you feel that criterion B, which is 'Delivery', is more important than criteria A, which is 'Quality', then filling in the columns is as follows: (if equally important put (✓) in 1).

No	Criteria A	Scale A									Scale B									Criteria B
		9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9		
1	Quality															✓			Delivery	

### Research Questionnaire

No	Criteria A	Scale A										Scale B									Criteria B
		9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9			
1	Quality																			Delivery	
2	Quality																			Price	
3	Quality																			Communication with vendors	
4	Quality																			Flexibility (payments and delivery time)	
5	Quality																			Responsibilities	
6	Quality																			Responsiveness	
7	Quality																			Reliability	
8	Quality																			Documents Completeness	
9	Quality																			Reputation of Vendor	
10	Quality																			Managements	
11	Quality																			Vendor location	
12	Quality																			Transparency	

No	Criteria A	Scale A										Scale B									Criteria B
		9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9			
13	Delivery																			Price	
14	Delivery																			Communication with vendors	
15	Delivery																			Flexibility (payments and delivery time)	
16	Delivery																			Responsibilities	
17	Delivery																			Responsiveness	
18	Delivery																			Reliability	
19	Delivery																			Documents Completeness	
20	Delivery																			Reputation of Vendor	
21	Delivery																			Managements	
22	Delivery																			Vendor location	
23	Delivery																			Transparency	

No	Criteria A	Scale A										Scale B									Criteria B
		9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9			
24	Price																			Communication with vendors	
25	Price																			Flexibility (payments and delivery time)	
26	Price																			Responsibilities	
27	Price																			Responsiveness	
28	Price																			Reliability	
29	Price																			Documents Completeness	
30	Price																			Reputation of Vendor	
31	Price																			Managements	
32	Price																			Vendor location	
33	Price																			Transparency	

No	Criteria A	Scale A										Scale B									Criteria B
		9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9			
34	Communication with vendors																		Flexibility (payments and delivery time)		
35	Communication with vendors																		Responsibilities		
36	Communication with vendors																		Responsiveness		
37	Communication with vendors																		Reliability		
38	Communication with vendors																		Documents Completeness		
39	Communication with vendors																		Reputation of Vendor		
40	Communication with vendors																		Managements		
41	Communication with vendors																		Vendor location		
42	Communication with vendors																		Transparency		



No	Criteria A	Scale A									1	Scale B									Criteria B
		9	8	7	6	5	4	3	2	1		2	3	4	5	6	7	8	9		
35	Flexibility (payments and delivery time)																			Responsibilities	
36	Flexibility (payments and delivery time)																			Responsiveness	
37	Flexibility (payments and delivery time)																			Reliability	
38	Flexibility (payments and delivery time)																			Documents Completeness	
39	Flexibility (payments and delivery time)																			Reputation of Vendor	
40	Flexibility (payments and delivery time)																			Managements	
41	Flexibility (payments and delivery time)																			Vendor location	
42	Flexibility (payments and delivery time)																			Transparency	

No	Criteria A	Scale A									1	Scale B									Criteria B
		9	8	7	6	5	4	3	2	1		2	3	4	5	6	7	8	9		
43	Responsibilities																			Responsiveness	
44	Responsibilities																			Reliability	
45	Responsibilities																			Documents Completeness	
46	Responsibilities																			Reputation of Vendor	
47	Responsibilities																			Managements	
48	Responsibilities																			Vendor location	
49	Responsibilities																			Transparency	

No	Criteria A	Scale A									Scale B									Criteria B
		9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9		
50	Responsiveness																		Reliability	
51	Responsiveness																		Documents Completeness	
52	Responsiveness																		Reputation of Vendor	
53	Responsiveness																		Managements	
54	Responsiveness																		Vendor location	
55	Responsiveness																		Transparency	

No	Criteria A	Scale A									Scale B									Criteria B
		9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9		
56	Reliability																		Documents Completeness	
57	Reliability																		Reputation of Vendor	
58	Reliability																		Managements	
59	Reliability																		Vendor location	
60	Reliability																		Transparency	

No	Criteria A	Scale A									Scale B									Criteria B
		9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9		
61	Documents Completeness																		Reputation of Vendor	
62	Documents Completeness																		Managements	
63	Documents Completeness																		Vendor location	
64	Documents Completeness																		Transparency	

No	Criteria A	Scale A									1	Scale B									Criteria B
		9	8	7	6	5	4	3	2	2		3	4	5	6	7	8	9			
65	Reputation of Vendor																				Managements
66	Reputation of Vendor																				Vendor location
67	Reputation of Vendor																				Transparency

No	Criteria A	Scale A									1	Scale B									Criteria B
		9	8	7	6	5	4	3	2	2		3	4	5	6	7	8	9			
68	Managements																				Vendor location
69	Managements																				Transparency

No	Criteria A	Scale A									1	Scale B									Criteria B
		9	8	7	6	5	4	3	2	2		3	4	5	6	7	8	9			
70	Vendor location																				Transparency

Yogyakarta, .....2018.

( )

## APPENDIX C

### RESEARCH QUESTIONNAIRES

Dear Respondents,

My name Sofyan Ali, hereby I wish you to fill in the questionnaire in accordance with your assessment of vendor performance. The data and answers provided through this questionnaire aim to complete the research data in the framework of the preparation of the final assignment entitled "Model of Vendor Performance Assessments in Hospitality Industry". For your help and attention, thank you.

#### **I. Respondents Identities**

**Name:**

**Address:**

#### **II. Vendor Identities**

**Vendor Name:**

**Vendor Address:**

**Goods/services Offers:**

#### **III. Instructions**

Give a checklist (✓) in the criteria scale column that matches your opinion about the vendor

No	Criteria	Weight	Score				
			1	2	3	4	5
1	Transparency	0.168					
2	Quality	0.144					
3	Price	0.104					
4	Flexibility in payments and delivery time	0.092					
5	Responsibilities	0.090					
6	Reliability	0.078					
7	Responsiveness	0.070					
8	Cooperation and negotiation	0.059					
9	Communication with vendors	0.047					
10	Delivery	0.045					
11	Documents Completeness	0.039					
12	Reputation of Vendor	0.038					
13	Vendor location	0.025					