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SELEKSI PROPOSAL PENDANAAN USAHA MIKRO, KECIL, DAN MENENGAH MENGGUNAKAN ANALYTIC NETWORK PROCESS PADA PT SARANA JATIM VENTURA

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2015

FINAL PROJECT – TI 141051

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2015

APPROVAL SHEET

SELECTION OF BUSINESS FUNDING PROPOSALS OF MICRO, SMALL, AND MEDIUM ENTERPRISES USING ANALYTIC NETWORK PROCESS AT PT SARANA JATIM VENTURA

FINAL PROJECT

Proposed as a requirement to obtain
Bachelor Degree in Industrial Engineering Department
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SELEKSI PROPOSAL PENDANAAN USAHA MIKRO, KECIL, DAN MENENGAH MENGGUNAKAN ANALYTIC NETWORK PROCESS PADA PT SARANA JATIM VENTURA

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ABSTRAK

PT Sarana Jatim Ventura (SJV) merupakan perusahaan pendanaan yang dihadapkan pada proses pengambilan keputusan. SJV dituntut untuk turut serta dalam pemodalan dan pengembangan Usaha Mikro, Kecil, dan Medium (UMKM). SJV ditantang untuk lebih teliti dan berhati-hati dalam memilih UMKM yang akan didanai. Kondisi ini membutuhkan suatu prosedur sistematik serta waktu yang lebih lama dalam proses seleksi. Analytic Network Process (ANP) dirasa cocok untuk memecahkan masalah tersebut. ANP mampu mengakomodasi hubungan antar kriteria yang digunakan dalam proses seleksi PT SJV. Dua kriteria kritis digunakan untuk menyaring proposal. Selanjutnya akan digunakan sepuluh kriteria di ANP yang akan menghasilkan ranking. Eliminasi satu persatu juga digunakan sebagai pendekatan terhadap masalah yang dihadapi. Analisa sensitivitas akan dilakukan untuk mengetahui kriteria mana yang paling mempengaruhi komposisi ranking. Diketahui bahwa jumlah dana dan persentase bagi hasil merupakan kriteria yang paling berpengaruh. Setelahnya akan dilakukan pembuktian jika beberapa alternatif tidak diikutkan dalam perhitungan, maka akan merubah komposisi ranking. Terakhir, empat skenario akan diuji dengan kondisi budget terbatas. Hasilnya, ranking yang dihasilkan oleh pendekatan eliminasi satu persatu lebih baik jika dibandingkan dengan skenario yang lain.

Keywords: ANP, Eliminasi Satu Persatu, Pengambilan Keputusan, Ranking

SELECTION OF BUSINESS FUNDING PROPOSALS OF MICRO, SMALL, AND MEDIUM ENTERPRISES USING ANALYTIC NETWORK PROCESS AT PT SARANA JATIM VENTURA

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ABSTRACT

PT Sarana Jatim Ventura (SJV) is a financing company that regularly faced with decision-making in the business process. SJV is required to actively participate in supporting Micro, Small, and Medium Enterprises (MSMEs) development. This includes a financial support for business expansion and competitiveness improvement. Under this scheme, SJV is challenged to carefully choose the right MSMEs as it will greatly affect their financial performance. Thus, the current selection process that heavily relies on discussion and interview results, should be improved. Analytic Network Process (ANP) is deemed suitable to support decision-making in such situation, especially because the decision criteria in SJV case are not independent to each other. Two critical criteria are initially employed as a filter to reduce the number of proposals. The selection process is then continued by applying ANP for the ten selected criteria from which ranking of each alternative is produced. One-by-one elimination rank is also used as an approach in analysis. Sensitivity analysis on criteria significance is also performed. The result showed that funding amount and rate of profit sharing are the most significant criteria to affect the ranking. When several alternatives are removed from the calculation, the resulted ranking also changes. When using budget constrained scenario, the best result of rank is produced by one-by-one elimination approach.

Keywords: ANP, Decision Making, One-by-one Elimination, Ranking

PREFACE

This final project report is submitted in partial fulfillment of the requirements for Bachelor's Degree in Industrial Engineering. It contains work done from March 2015 to June 2015. Mr. Stefanus Eko Wiratno and Mrs. Effi Latiffianti supervise this final project. The report has been made solely by the author. However, some text is based on other scientific sources. Author have done author's best to provide references to these sources.

Around mid-2014, author got an inspiration to do final project on decision-making. However, until early 2015, the right topic for final project have not been got yet. In late February, Mr. Wiratno introduced author about funding proposals selection. Author interested about the topic and asked Mr. Wiratno as his supervisor.

Since this report is written as the final project of the Bachelor's Degree in Industrial Engineering, the text is primarily aimed at lecturers of Industrial Engineering and other students attending the courses there. However, it does not rule out the possibility for different major academics and public to obtain benefits from this report.

Author would like to thank several people because of their contribution to this report.

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This final project report is written as well and as complete as possible. Lots of thanks are due to Mrs. Effi Latiffianti for proof-reading this report. She had the laborious job turning author's attempt at English language into readable prose. Hopefully, she has removed all the serious errors, but any that might be left are wholly author's responsibility. Therefore, author would like to apologize if there are any errors and mistakes, not only from the writing, but also from the content, left in this report. May this report useful for everyone who read it.

Surabaya, July 2015

Author

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CHAPTER 1
INTRODUCTION

Chapter 1 explains about research background, problem formulation, research objectives, research benefits, research scope, and research structure.

1.1 Research Background

In recent years, Micro, Small, and Medium Enterprises (MSMEs) is growing steadily. Based on data provided by Indonesia Statistic (Badan Pusat Statistik - BPS), total number of MSMEs in 2012 reach 56 million unit. Figure 1.1 shows increasing trend of MSMEs year to year.

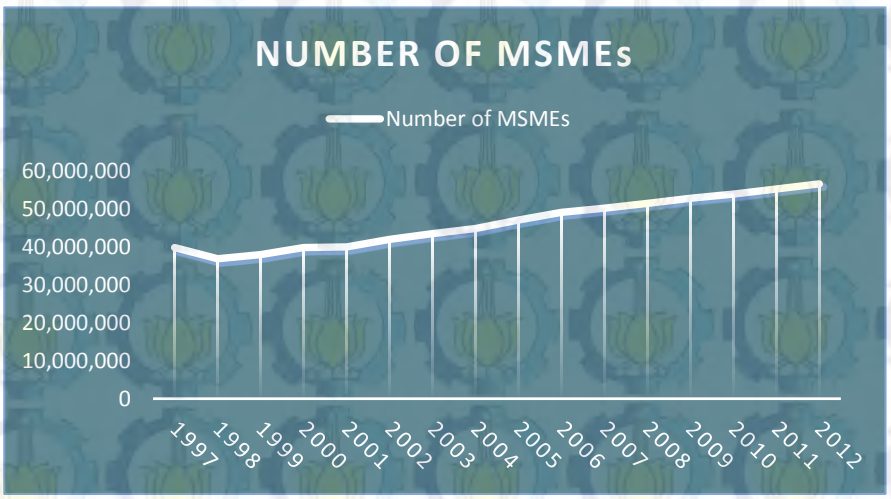

Figure 1.1 Number of MSMEs from 1997 until 2012
BPS (2014)

MSMEs also contribute in Indonesia Gross Domestic Product (GDP). GDP is the amount of products or services produced by Indonesia citizens. Figure 1.2 shows usMSMEs contribution to GDP.

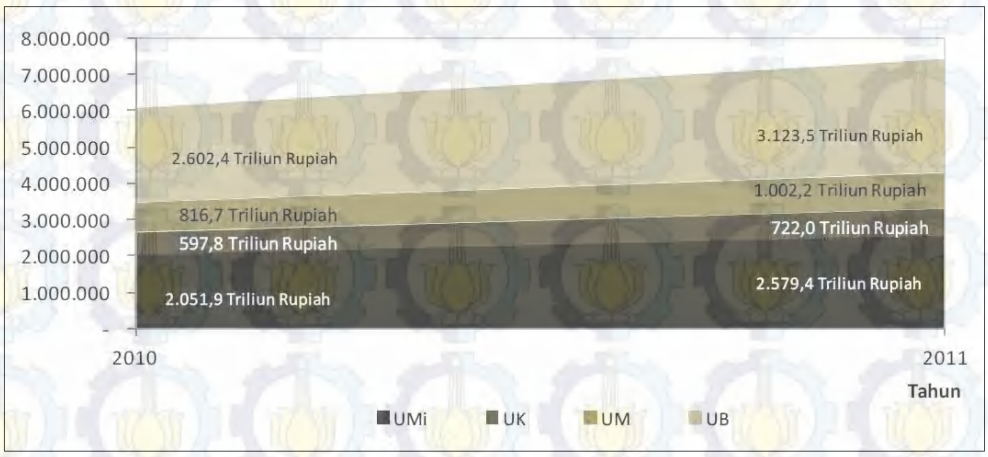

Figure 1.2 MSMEs Contribution to GDP in 2010-2011
(Ministry of Cooperatives and Small-Medium Enterprises, 2013)

In addition to GDP, MSMEs' also contribute to employment as shown in Figure 1.3 and 1.4

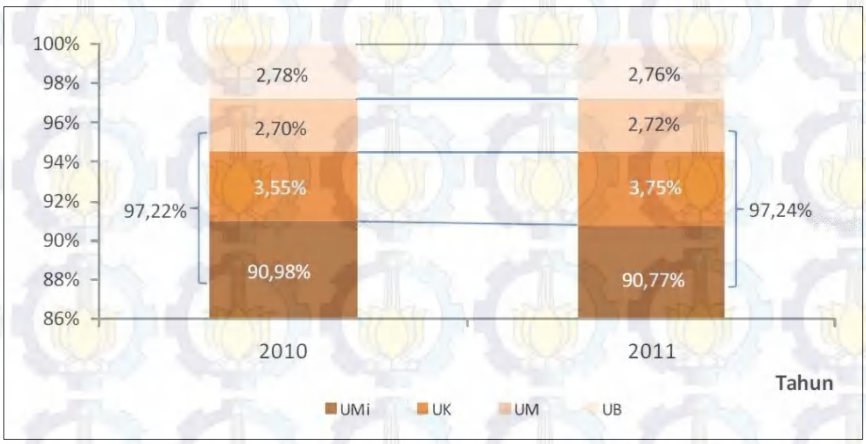

Figure 1.3 Proportion of MSMEs and Large Enterprises' Workforce in 2010-2011
(Ministry of Cooperatives and Small-Medium Enterprises, 2013)

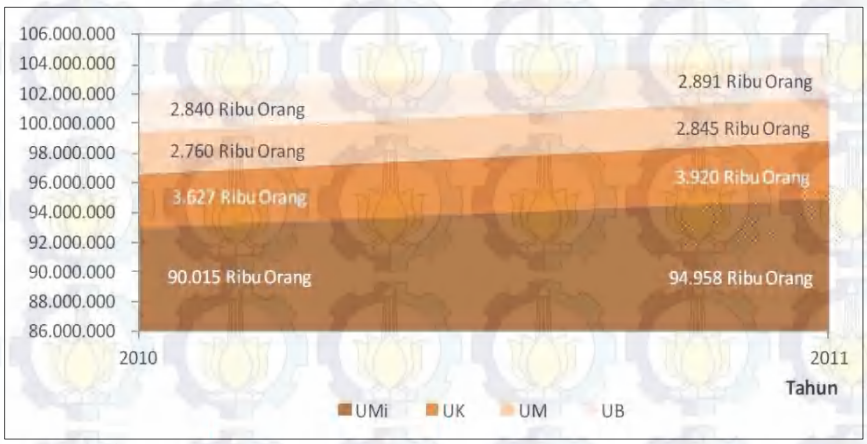

Figure 1.4 Contribution of MSMEs and Large Enterprises' Workforce in 2010-2011
(Ministry of Cooperatives and Small-Medium Enterprises, 2013)

From data presented in Figure 1.2, 1.3, and 1.4, it can be inferred that MSMEs are important part of Indonesia economy. As one of pillars of Indonesia economy, MSMEs role are critical. Government's commitment to improve potency and competitiveness of MSMEs can be seen in enterprises related policies in the past five year. One of them is Regulation of the Minister of Finance of the Republic of Indonesia (Peraturan Menteri Keuangan) number 18/PMK.010/2012. This regulation defines venture capital company (VCC) as one of sources of fund for MSMEs.

As the MSMEs' funding source, VCC is expected to support MSMEs in term of financial capital, especially with the incoming ASEAN Economic Community (AEC) at the end of 2015. One of AEC principles is single market and production base, which allow five-core elements: free flow of goods, free flow of services, free flow of investment, free flow of capital, and free flow of skilled labor (ASEAN Secretariat, 2014). This condition is a big challenge for the current MSMEs, and those that are not ready for this will surely suffer losses.

These losses are the most undesired thing not only for MSMEs, but also for VCCs as one of capital sources for MSMEs. VCC's business schemes, as stated in Regulation of the Minister of Finance number 18/PMK.010/2012 Chapter II Clause 2, are equity participation, quasi equity participation, and revenue sharing. Because of this, anything that affect MSMEs will also affect VCC as well.

PT Sarana Jatim Ventura (SJV), as one of VCCs, has done several preventive actions to avoid losses that might be suffered in MSMEs. One of the preventive actions is a strict selection process. Currently, selection is done by investment committee' meeting, held once a week. Because of the equity participation program instructed by the government, SJV wants to prolong the period of waiting time. The longer period needs to be implemented because SJV needs a better grasp of MSMEs' real condition before approving the funding. This condition leaves one problem. If in one-week period, they reviewed only several proposals, when the period is extended, greater amount of proposals should be reviewed than before.

President Director of SJV, Mr. Fadjar Hutomo, has done a research about selecting business-funding proposals using Analytic Hierarchy Process (AHP) and

Goal Programming. Seven main criteria are used in his research; management, finance, market, technical, social, collateral, and external. These criteria are not fixed, it can be changed depend on the situation. Some of these criteria are connected and influencing each other. For example, market will affect finance, whilst management will affect market. Thus, AHP is not the best approach to this selection process.. It is because AHP works under assumption that every criteria are considered independent, cannot affect or be affected by others.

Looking at the gap between SJV's desire with current condition of MSMEs, and considering the drawback of the previous research, this research, will use analytic network process (ANP). As suggested by Ishizaka and Nemery (2013), ANP is capable of producing ranking, while at the same time accommodating dependent criteria, which AHP is not capable. However, if the large number of criteria and alternatives involved in ANP calculation, amount of time needed to do the pairwise comparison will be long. In addition, pairwise comparison value might be inconsistent due to massive number of comparison (Lesmes, 2009). Therefore, Buffa & Sarin Principle is used to reduce the number of alternatives first before the pairwise comparison. ANP will produce rank for each proposal, and the rank will be used as a basic measurement to determine which proposal is better than the others.

1.2 Problem Formulation

Problem discussed in this research is how to select several best business funding proposals at SJV considering various aspects using ANP and Buffa & Sarin Principle.

1.3 Research Objectives

The aims of this research are:

1. Identify factors that affect selection process of proposal,
2. Construct decision model of ANP based on independent and dependent criteria,
3. Give recommendations for proposal selection process considering goal, benefits, and risks.

1.4 Research Benefits

Research benefits, which could be obtained by SJV, are:

1. Discover critical factors in selection process of capital submission,
2. Discover benefits and risks in choosing the best possible outcomes,
3. Discover method to improve selection process.

1.5 Research Scope

Scope in this research is divided into research limitation and research assumption. Research scope is needed so that the research remain in the relevant boundaries and problem can be solved comprehensively.

1.5.1 Limitation

The following limit this research.

1. Observation of business funding proposals is done for one-year period time in 2014 to increase the complexity of the problem.
2. This research only produces rank for each proposal, not to allocate funds to each proposal.

1.5.2 Assumption

Assumption that should be established in this research are mentioned below.

1. SJV knows all of the data provided by MSMEs in their proposal and it is true as its current MSMEs' condition.
2. Amount of fund requested is as needed by MSMEs.

1.6 Research Structure

Research structure explains detail of each chapter in this research. The following is explanation of each chapter content.

CHAPTER 1 INTRODUCTION

Chapter 1 explains research background, problem formulation, research objectives, research benefits (for academic purpose and for SJV), research scope, and research structure.

CHAPTER 2 LITERATURE REVIEW

Chapter 2 explains about research foundation which supported by literature review and field examination. This is done to provide better understanding of problem and able to solve it with the right method. In literature review explained definition of MSMEs and VCC. Moreover, literature review explain problem decision, used method, and some previous researches.

CHAPTER 3 RESEARCH METHODOLOGY

Chapter 3 explains about step-by-step problem solving performed in this research. Research methodology is a guide to ensure that research can be carried out in systematic way. The order is problem formulation, problem solving, analysis, and conclusion.

CHAPTER 4 RESULTS

Chapter 4 explains about data collection and data processing, which are going to be used as analysis sources in this research. Collected data is obtained by discussion's result, interview's result, MSMEs data, and questionnaires' result.

CHAPTER 5 ANALYSIS AND DISCUSSION

Chapter 5 explains the results from chapter 4. This chapter will analyze each of dataset to give logical explanation for both author and readers.

CHAPTER 6 CONCLUSION

Chapter 6 explains about conclusion that can be drawn from results of this research. Moreover, there will be recommendation for not only SJV, but also for possible oncoming researches.

CHAPTER 2
LITERATURE REVIEW

Chapter 2 explains about scientific resources as the basis of this research. There is also explanation about several methods used in this research.

2 Literature Review

2.1 Decision Problem

Every day, people deal with various decision. Each of decision have different characteristic. Roy (1981), as cited by Ishizaka and Nemery (2013), classify four main groups of decision type:

1. **The choice problem**. Aim to choose one the best alternative or reduce number of choices until several choices consider have same value that cannot be compared to. Choosing the best contractor to do a project is one of examples.
2. **The sorting problem**. Sorting method give high advantage when used in a thing that repeatedly or automatic behavior. It can also use as initial selection to reduce number of choice.
3. **The ranking problem.** Choice is rank from the best to the worst. This can be based on value or pairwise comparison, etc.
4. **The description problem**. Description problem aim to explain choices and its consequences. It usually done for the first time to discover characteristic of decision problem.

2.2 Multi Criteria Decision Analysis (MCDA)

MCDA, known as *multi-attribute decision analysis* (MADA) is discipline that encompasses mathematics, management, informatics, psychology, social science, and economics. (Ishizaka & Nemery, 2013). Whilst Department for Communities and Local Government London (2009) defines MCDA as a way to view complex problem, whether with monetary objective or not, divided into smaller parts to simplify decision making.

In MCDA, there are several methods to solve the problem; AHP, ANP, MACBETH, PROMETHEUS, ELECTRE, TOPSIS, Goal Programming, Data Envelopment Analysis (DEA), etc. Not all method is suitable to solve problems. Figure 2.1 shows comparison between types of problem and the appropriate method to solve the problem.

Table 2-1 MCDA Methods and Problems

Chapter	Choice problems	Ranking problems	Sorting problems	Description problems
2	AHP	AHP	AHPSort	
3	ANP	ANP		
4	MAUT/UTA	MAUT/UTA	UTADIS	
5	MACBETH	MACBETH		
6	PROMETHEE	PROMETHEE	FlowSort	GAIA, FS-Gaia
7	ELECTRE I	ELECTRE III	ELECTRE-Tri	
8	TOPSIS	TOPSIS		
9	Goal Programming			
10	DEA	DEA		
11	Multi-methods platform that supports various MCDA methods			

Source 2-1: (Ishizaka & Nemery, 2013)

2.3 Analytic Network Process (ANP)

ANP is upgraded version of AHP. If AHP assumes that every criterion is independent, ANP removes this assumption. AHP is a unique case in every decision problem. In reality, it is rarely to find independent criteria. ANP model is different from AHP. ANP uses network like model whilst AHP uses hierarchy model. Figure 2.1 and 2.2 explain structure difference between AHP and ANP.

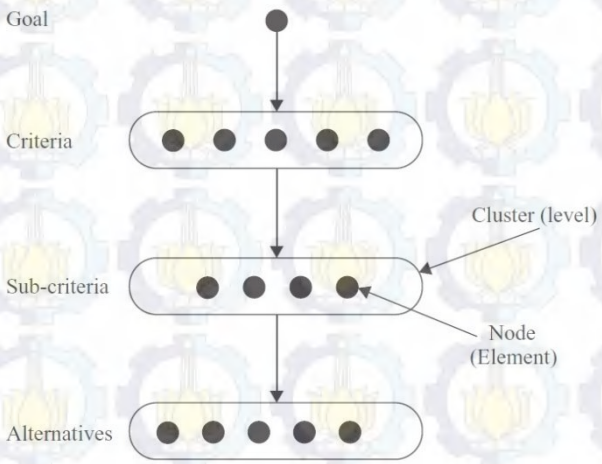

Figure 2.2 Linear Hierarchy of AHP
(Ishizaka & Nemery, 2013)

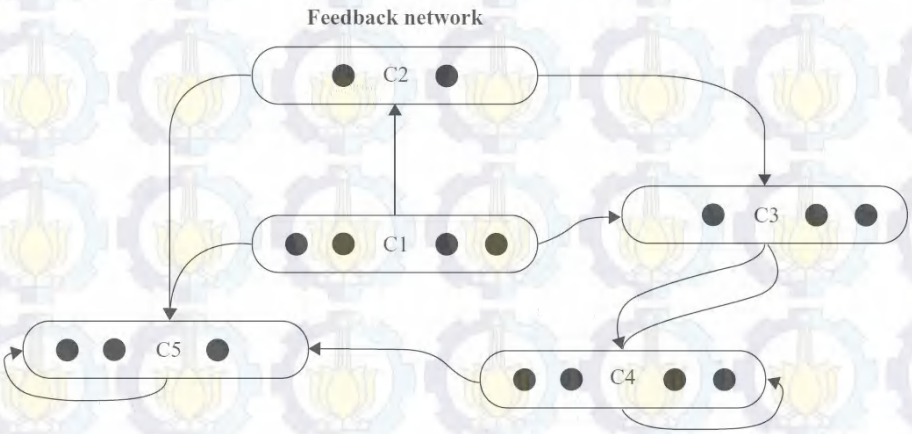

Figure 2.1 Five-Cluster ANP Network with Feedbacks
(Ishizaka & Nemery, 2013)

ANP trying to overcome weaknesses of AHP. Three things that can not be constructed by AHP are:

1. Inner dependency in the criteria cluster. Inner dependency is relation between elements in the same cluster. This means that AHP does not able to cope with dependent criteria.
2. Inner dependency in the alternative cluster.
3. Outer dependency. Outer dependency means relation between clusters. One of its examples is relation between criteria cluster and alternative cluster.

Saaty (1999) explains systematic procedure to use ANP that easy to understand from AHP user point of view. Below is twelve steps in ANP.

1. Determine the control hierarchies including their criteria for comparing the components of the system and their sub criteria for comparing the elements of the system. One hierarchy for benefits, one for costs, one for opportunities, and one for risks.
2. For each control criterion or sub criterion, determine the clusters of the system with their elements
3. To better organize the development of the model, as well you can and roughly, for each control criterion, number and arrange the clusters and their element in a convenient way
4. Determine the approach you want to follow in the analysis of each cluster or element, being influenced by other clusters and elements, or influencing other clusters and elements with respect to a criterion.
5. For each control criterion, construct a three-column table placing each cluster label in the middle column. List in the left column on a line all the clusters that influence the cluster, and in the column on the right those clusters which it influences.
6. Following each entry in the table above, perform paired comparisons on the clusters as they influence each clusters and on those that it influences, with respect to that criterion. The derived weights are used later to weight the elements of the corresponding column clusters of the supermatrix corresponding to the control criterion. Assign a zero when there is no influence.
7. Perform paired comparisons on the elements within the clusters themselves according to their influence on each element in another cluster they are connected to (or elements in their own cluster). The comparisons are made with respect to a criterion or sub criterion of the control hierarchy.
8. For each control criterion, construct the supermatrix by laying out the clusters in the order they are numbered and all the elements in each cluster both vertically and horizontally at the top. Enter in the

appropriate position the priorities derived from the paired comparisons as parts (sub columns) of the corresponding column of the supermatrix.

9. Compute the limiting priorities of each supermatrix according to whether it is reducible (primitive or imprimitive [cyclic]) or it is reducible with one being a simple or a multiple root and whether the system is cyclic or not.
10. Synthesize the limiting priorities by weighting each limiting supermatrix by the weight of its control criterion and adding the resulting supermatrices.
11. Repeat the synthesis for each of the four control hierarchies: one for benefits, one for costs, one for opportunities, and one for risks.
12. Synthesize the results from the four control hierarchies by multiplying the benefits by the opportunities and dividing by the costs multiplied by the risks. Then, read off the highest priority alternative or the desired mix of alternatives.

2.3.1 Types of Components in Network

There are several types of component or cluster in ANP's network. Figure 2.3 shows about types of component.

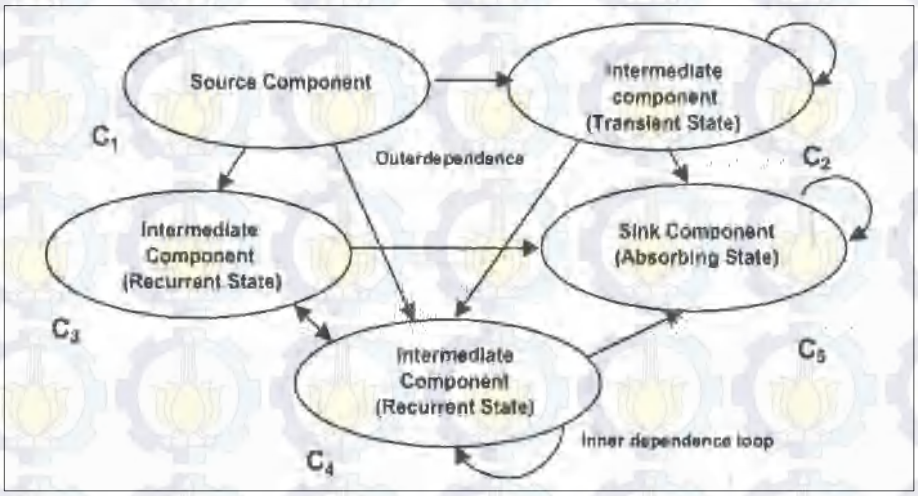

Figure 2.3 Types of Component in a Network
(Saaty & Vargas, 2006)

Component without incoming arrow is source component (C_1 & C_2), whilst component without outcoming arrow known as sink components (C_5), and

component with both incoming and outcoming arrow is transient components (C_3 & C_4). Moreover, C_3 & C_4 form a looping, because it is connected each other. C_2 & C_4 have loop that connect with themselves. This connection known as inner dependent. Otherwise, it is outer dependent, which link clusters and components.

2.3.2 The Benefits, Costs, Opportunities, and Risks Model

Implementation of ANP also widened by adding benefits, costs, opportunities, and risks factor. Four main factor known as BOCR. Figure 2.4 explains usage of BOCR in hierarchical structure.

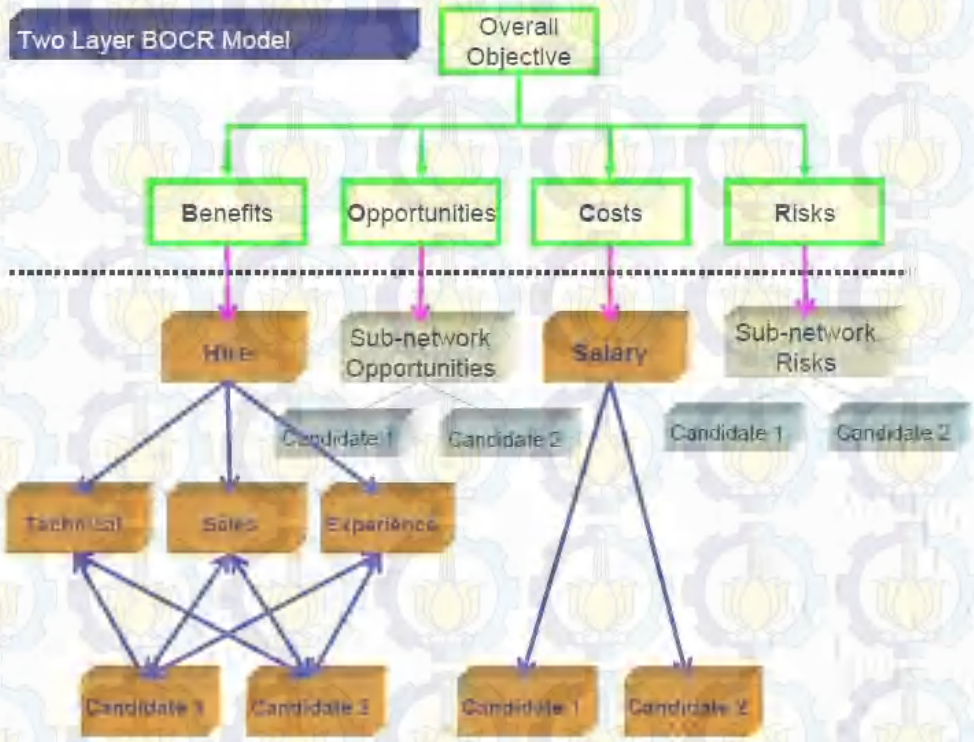

Figure 2.4 Usage of BOCR in Hierarchical Structure

When working with ANP, there will be a lot of time needed to construct supermatrices and calculate each of it. Because of that, this research decides to use SuperDecisions software as a tool to help in calculation.

2.4 Buffa & Sarin Principle

One of methods that can be used for selecting alternatives is Buffa & Sarin, developed in 1987. Although this method is often used in location problem, it does not rule out the possibility to use in SJV selection process. There are three factor in Buffa & Sarin method: critical factor (CF), objective factor (OF), and subjective factor (SF). In this research, only CF will be used as initial selection process. When proposal satisfy the factor, the value is 1, otherwise 0. It means that the proposal needs to meet the requirement factor to pass to the next stage.

2.5 Micro, Small, and Medium Enterprises

The following is explanation about micro enterprises, small enterprises, and medium enterprises as stated in Law of Republic of Indonesia number 20 / 2008.

2.5.1 Micro Enterprise

Micro enterprise is a productive enterprise owned by individual or individual business entities that satisfy the following criteria:

1. Have net worth at most Rp 50.000.000,00 excluding business building ;or
2. Have net sales at most Rp 300.000.000,00.

2.5.2 Small Enterprise

Small enterprise is a standalone productive economic, owned by individual or individual business entities, which is not branch company from medium or big enterprise that satisfy following criteria:

1. Have net worth at least Rp 50.000.000,00 and at most Rp 500.000.000,00 excluding business building ;or
2. Have annual net sales at least Rp 300.000.000,00 and at most Rp 2.500.000.000,00.

2.5.3 Medium Enterprise

Medium enterprise is the standalone productive economy, owned by individual or individual business entities, which is not branch company or have connection from small or big enterprise that satisfy criterion of:

1. Have net worth at least Rp500.000.000,00 and at most Rp10.000.000.000,00 excluding business building ;or
2. Have annual net sales at least Rp2.500.000.000,00 and at most Rp50.000.000.000,00.

2.6 Venture Capital Company

One of business targets from VCCs is MSMEs. This has already regulated in Regulation of the Minister of Finance number 18/PMK.010/2012. VCC is a business entity, which did venture capital financing into a company that received financial aid (*Investee Company*) in certain period in the form of equity participation, quasi equity participation, and revenue sharing. Figure 2.5 and 2.6 shows financing scheme in VCC.

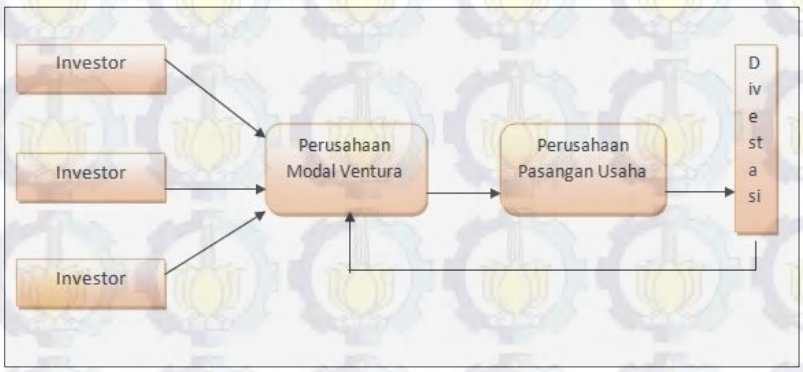

Figure 2.5 VCC Single Tier Approach Scheme

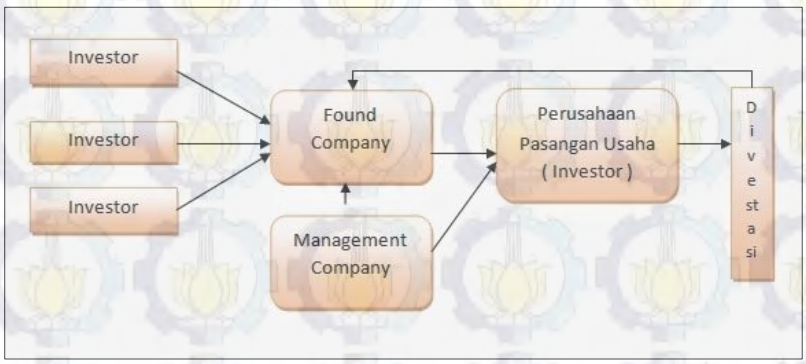

Figure 2.6 VCC Double Tier Approach Scheme

2.7 Previous Research

There are many researches have been done about decision-making, especially alternatives selection. ANP method is also one of several methods in those researches of decision-making. Research from Mr. Hutomo is similar, but not the same one, with this research. The differences are research' coverage and method used to solve the problem. His research is about proposal selection by weighting criteria using AHP and allocating fund using Goal Programming. Whilst this research only use principle of Buffa & Sarin and ANP as a way to rank several proposals. Table 2.2 shows related researches and its differences in term of the method and output.

Table 2-2 Previous Reseaches and Its Methods

No	Author	Year	Category	Methods					Output
				ANP		AHP	GP	TOPSIS	
				Benefit	Risks				
1	Fadjar Hutomo	2005	Thesis			v	v		Proposal selection and funds allocation
2	Rachman Tri Fridian	2012	Final Project	v				v	The best marketing strategy
3	Chintya Ayu Puspaningtyas	2013	Final Project	v		v	v		The best procurement vendor
4	Kevin Karmadi Wirawan	2015	Final Project	v	v				Ranking of best possible alternatives from several proposals

Source 2-2 : Processed Data

Abbreviation

ANP : Analytic Network Process

AHP : Analytic Hierarchy Process

GP : Goal Programming

TOPSIS : Technique for Others Reference by Similarity to Ideal Solution

CHAPTER 3
RESEARCH METHODOLOGY

Chapter 3 explains about overview of this research and step-by-step problem solving that will be performed. Research methodology is a guide to ensure that research can be carried out in systematic way

3.1 Research Flowchart

This research is planned in such a way so that the expected result will satisfy the expectation. Figure 3.1 and 3.2 show planned research procedure.

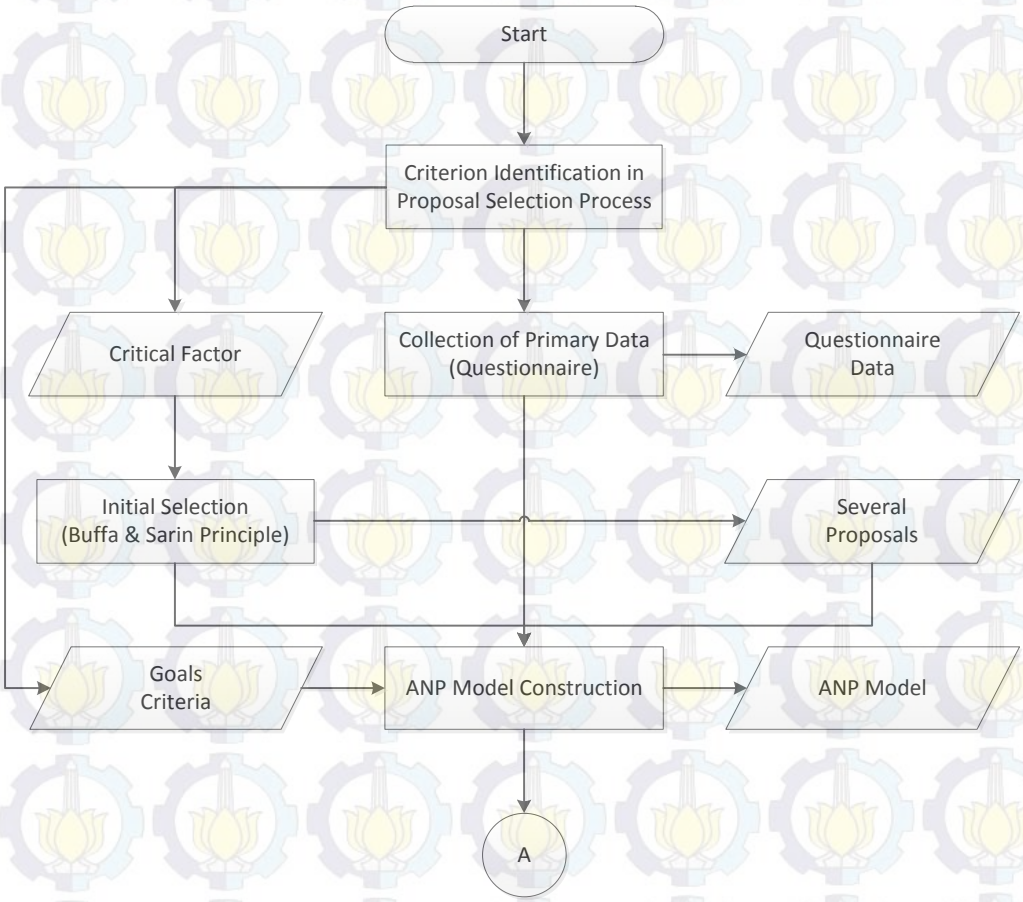

Figure 3.1 Research Flowchart

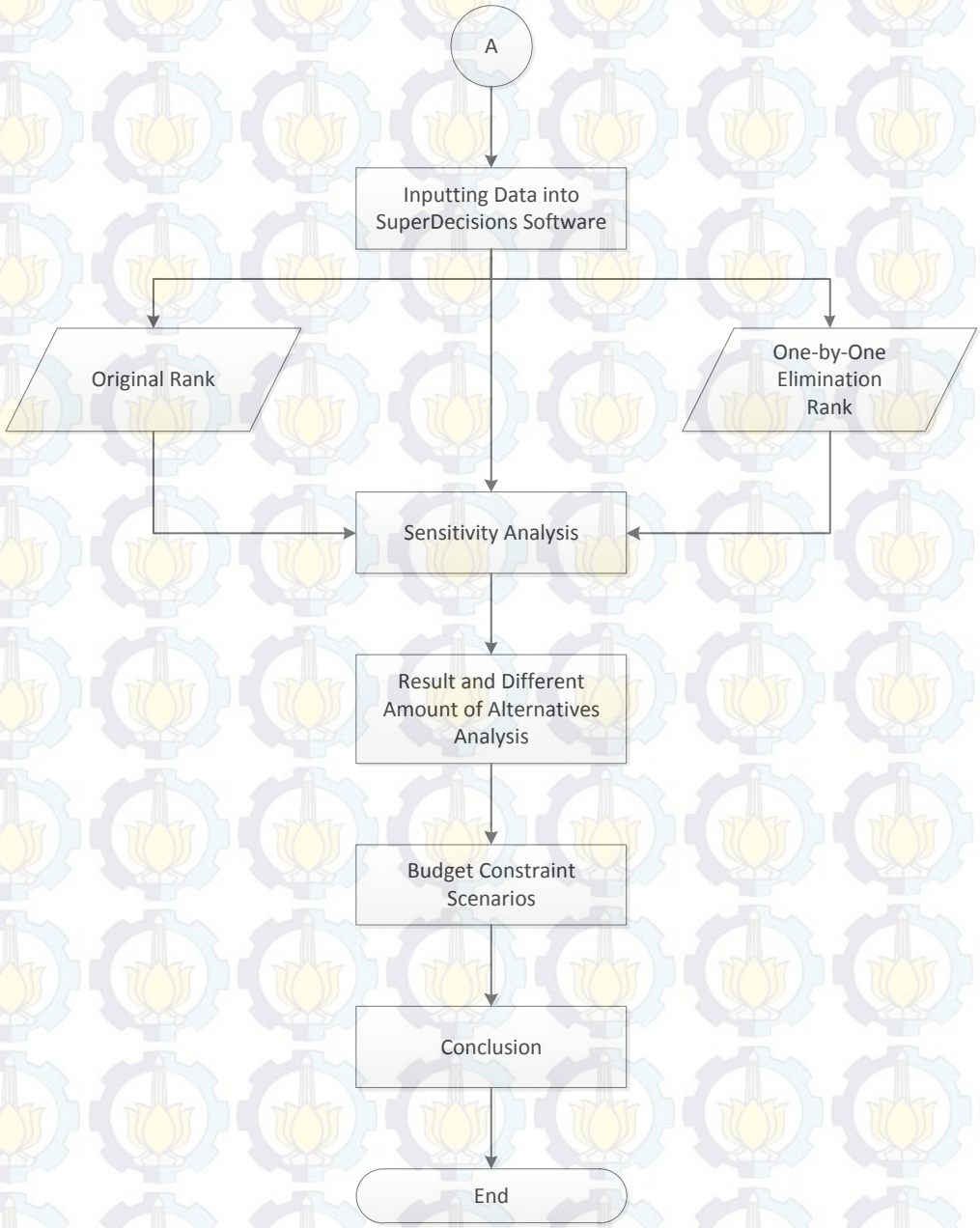

Figure 3.2 Research Flowchart (Cont'd)

3.2 Research Stages

3.2.1 Problem Identification Stage

In this stage, the problem will be formulated to obtain right solution and decide set of data needed in this research. After the problem formulated, research objectives will be determined. Literature review and field examination are done to support problem formulation and research objectives,

3.2.1.1 Literature Review

In this stage, literature review will be done in order to obtain appropriate theory to support this research. Literature review will give more understanding in decision problem, multi criteria decision analysis, ANP, Buffa & Sarin Principle, MSMEs, and VCC.

3.2.1.2 Real Condition Examination

In this stage, interview and discussion will be performed with directors and representatives of investment committee SJV. This is needed to improve understanding in SJV business scheme and also current selection process.

3.2.2 Data Collection Stage

After define research objectives, data needed in this research is collected. After data collected and processed, the existing condition in proposal selection will be known. Collected data consist of proposal selection criterions, criteria relationship, list of questionnaires distributed to representatives of investment committee, and list of proposal and its data that submitted to SJV.

3.2.3 Data Processing Stage

After all of data needed collected, it will be processed. Data processing consist of two steps: initial selection using Buffa & Sarin Principle of Critical Factor and then using ANP to rank the remaining proposals. After proposal ranking known, sensitivity analysis will be performed to find out how many criteria influence the result the most.

There will be two results from ANP, one is the initial rank and the other is rank provided by eliminating the best choice and then running ANP again to determine the second best choice after the best choice excluded. This is called one-by-one elimination and it is repeated until there are only two remaining choices. AHP and ANP can only provide the rank, when it comes to deciding more than one alternative; they are not able to give appropriate solution. This problem in decision analysis have already shown by Russell (2007) in Borda Count method.

In business funding selection, there are five main aspect to analyze, market, management, risk, legal, and financial. Legal aspect will be used in both initial selection process and ANP selection.

3.2.4 Analysis and Discussion Stage

Proposals ranking and result will be analyzed in term of its sensitivity to the rank composition. Different amount of alternatives effect will also be explained. Initial rank and one-by-one elimination rank will be analyzed in budget constraint scenario.

CHAPTER 4
DATA COLLECTION AND PROCESSING

Chapter 4 explains about data needed to solve problem in this research. List of MSMEs in 2014, result of questionnaires, and detail data in each MSME's proposal are explained below.

4.1 Profile of SJV

PT Sarana Jatim Ventura is one of local VCCs. It was established by initiation from Ministry of Finance and investors. SJV have got operational license from Ministry of Finance and officially approved by Mr. Mar'ie Muhammad (Minister of Finance at that time) at 15 October 1994 in Surabaya.

Vision

Real Partner of Independent Enterprises

Mission

Establish strong and independent MSMEs

The current process to select proposal is done by discussion among investment committee. Investment committee consist of board of commissioners, director, investment manager, operation manager, and legal manager. MSME's representative will present its business to investment committee. After that the presentation result will be discussed and then decide whether that MSME going to be funded or not. Because of its short waiting period (one week), only small number of proposals will be reviewed.

4.2 Data Collection

Data needed in this research is obtained through discussion, interview, distribution of questionnaires, and reviewing MSMEs' funding proposals.

4.2.1 Primary Data

Interview, discussion, and distribution of questionnaires are primary data, which are obtained directly. Representatives of investment committee will be interviewed and also done a discussion with them. From discussion, it is known that there are two critical factors in selection process of business funding proposals. The two factors are the legal status of enterprises and permission documents to establish enterprises. These requirements must be met before proceeding to ANP selection. Aside from these factors, several important factors in selection process are obtained too. Table 4.1 shown the important factors in selection process with its definition described in Table 4.2.

Table 4-1 Clusters and Criteria in Selection Process

Code	Cluster	Code	Criteria
A	Financial	A1	Funding amount
		A2	Rate of Profit Sharing
		A3	Equity
		A4	Profit
B	Management	B1	Workforce
		B2	Cooperation
C	Risk	C1	Debt Service Ratio (DSR)
		C2	Coverage
D	Market	D1	Market Type
E	Legal	E1	Legal Document

Table 4-2 Definition of Each Criteria

Criteria	Definition
A1	Total amount of funding needed by MSMEs
A2	Willingness MSMEs to share its profit with SJV (in percentage)
A3	MSMEs' total amount of equities
A4	Profit of each MSMEs
B1	Total workforce of MSMEs
B2	Previous cooperation with SJV
C1	Ability to pay
C2	Ratio of collateral's monetary value with amount of loan
D1	Market type of MSMEs, it might the captive one or not
E1	Legal document owned by MSMEs' in term of its businesses

In this research, three types of questionnaire to investment committee's representatives were distributed. To improve the quality of judgment, different technique to fill the questionnaire is used. Two of representatives are gathered in one place and given three different pieces of questionnaire. They should discuss things first before decided to fill the questionnaire. This way should fix a contrast value if questionnaires were distributed to each person.

Three types of questionnaire are criteria comparison questionnaire, cluster comparison questionnaire, and criteria rating questionnaire. The third one will be filled after initial selection process so that the data needed does not to be that much. Table 4.3 and Table 4.4 shown result of each questionnaires.

Table 4-3 Result of Clusters Comparison

Cluster	A	B	C	D	E	F
A	1	3	1	1	3	3
B		1	1/3	1/3	1/3	1
C			1	1	3	3
D				1	1	1
E					1	3
F						1

Table 4-4 Result of Criteria Comparison

	A				B		C		D	E
	A1	**A2**	**A3**	**A4**	**B1**	**B2**	**C1**	**C2**	**D1**	**E1**
A1	1	1/3	1	1/3	3	1/5	1/3	1	1/3	1/7
A2		1	3	3	7	1	1	1	1	1/3
A3			1	1/3	3	1/3	1/3	1/3	1/3	1/5
A4				1	3	1	1	1	1	1/3
B1					1	1/5	1/5	1/3	1/3	1/5
B2						1	1	1	1	1
C1							1	1	1	1
C2								1	1	1
D1									1	1
E1										1

Table 4-5 Result of Criteria Rating

Unique Code	MSMEs	Criteria		
		Relation	DSR	Market Type
01	LARON, UD	8	7	9
02	JAYA MAKMUR, CV	1	7	7
03	SETIA KAWAN, CV	1	6	7
04	GALENA PERKASA, PT	8	8	8
05	SURYA GRAHA KENCANA, PT	1	7	6
06	BONLI CIPTA SEJAHTERA, PT	8	8	9
07	SARI LOGAM, UD	1	6	7
08	SURYA BINTANG SINERGY, PT	5	8	8
09	MULYA JAYA, UD	1	6	7
10	LENTERA HATI, UD	1	6	8
11	ENOS BINTANG SELAMAT, PT	1	8	9
12	LANGGENG SENTOSA, UD	1	8	8
13	UTOMO, UD	9	8	9
14	TIMBUL REJEKI, CV	8	6	8
15	PUTRA WIDATAMA, CV	9	9	9
16	MUTIARA SEJATI, UD	9	8	9
17	CATUR JAYA NUGRAHA, CV	5	7	7
18	LARIS, UD	8	7	7
19	BINTANG ALAM SENTOSA, PT	8	8	8
20	ARJUNA CREATIVE, CV	5	7	6
21	MANNA, UD	8	8	8
22	JAMUR, UD	7	6	7
23	CITRA PERSADA, UD	9	8	8
24	KHARISMA ASTRA NUSANTARA, PT	8	8	9
25	MAJU BERSAMA SEJAHTERA, CV	7	7	8
26	BINTANG ARSITA SAMUDERA, PT	9	9	9
27	LAGAWICO PRATAMA, PT	8	8	8

The criteria rating questionnaire uses 1 to 10 mark to rate each of MSME. One is the worst mark while ten is the best. It is used because data regarding three factors insufficient.

4.2.2 Secondary Data

Secondary data is data that provided by third party. This data is obtained indirectly. In this research, secondary data is data of business funding proposals. In 2014, there are 126 MSMEs submitted funding proposal to SJV. Table 4.6 shows list of these MSMEs.

Table 4-6 List of MSMEs which Submitted Proposal in 2014

No	Date	MSMEs	Field	Legal Status
1	21-01-14	LARON, UD	Transportation service	UD
2	27-01-14	KOPKAR BRG-BADRUN	Trading	-
3	27-01-14	KOPKAR BRG-HASANUDDIN	Trading	-
4	27-01-14	KOPKAR BRG-DJUMINGAN	Trading	-
5	27-01-14	KOPKAR BRG-PADIYO	Trading	-
6	27-01-14	KOPKAR BRG-SLAMET RIYADI	Trading	-
7	27-01-14	KOPKAR BRG-SUTOMO	Trading	-
8	28-01-14	JAYA MAKMUR, CV	Contractor	CV
9	05-02-14	SETIA KAWAN, CV	Mining	CV
10	10-02-14	WIWIK SUNARWIYATI	Boarding house	-
11	14-02-14	E GIGIH TRI HANDONO	Car trading	-
12	19-02-14	GALENA PERKASA, PT	Transportation service	PT
13	21-02-14	KOPKAR BRG-YENI	Personal	-
14	04-03-14	SAIFUL ARIS	Trading	-
15	17-03-14	BAMBANG EKO	Farming	-
16	24-03-14	EKO BUDIONO	Trading	-
17	26-03-14	EKO WIT	Forklift and truck rental	-
18	04-04-14	SURYA GRAHA KENCANA, PT	Property	PT
19	04-04-14	RATNAWATI	Building material trading	-
20	04-04-14	ABDUL ADDHIM	Chemicals trading	-
21	07-04-14	ABDUL WAHID	Trading	-
22	07-04-14	BOIMIN	Trading	-
23	07-04-14	EDI SUWARDI	Trading	-
24	07-04-14	KARTINI	Trading	-
25	07-04-14	MIFTAHUL HADI	Trading	-
26	07-04-14	MUSHOLEH	Trading	-
27	07-04-14	SAMUDJI	Trading	-
28	07-04-14	SARNO	Trading	-
29	07-04-14	SUBAKIR	Trading	-
30	07-04-14	SUTOMO	Trading	-
31	07-04-14	TULUS	Trading	-
32	14-04-14	ABDILLAH KARYA	Contractor	-
33	16-04-14	SUPRAYITNO	Shoes trading	-
34	21-04-14	SRI HARDININGSIH	Salon and boarding house	-
35	24-04-14	BONLI CIPTA SEJAHTERA, PT	Bakery	PT
36	28-04-14	SARI LOGAM, UD	Iron and vegetable trading	UD
37	30-04-14	SURYA BINTANG SINERGY, PT	Ship rental	PT
38	05-05-14	GUNAWAN	Trading	-
39	05-05-14	KHOIRUL ANAM	Trading	-
40	05-05-14	SUKACUNG	Trading	-
41	13-05-14	MULYA JAYA, UD	Shoes industry	UD
42	21-05-14	BATU JAYA ABADI, CV	Limestone mining	CV
43	22-05-14	MULYADI TAMPI	Dairy cattle farming	-
44	30-05-14	ASRUL TSANI	Garment	-
45	30-05-14	LENTERA HATI, UD	Plastic industry	UD
46	02-06-14	YULIA DWI PUSPITASARI	Trading	-
47	05-06-14	ENOS BINTANG SELAMAT, PT	Candle industry	PT
48	10-06-14	KOPKAR BRG-DJOKO APRIJANTO	Trading	-
49	10-06-14	KOPKAR BRG-SUGIYONO	Trading	-
50	10-06-14	KOPKAR BRG-DWI WIBOWO BASUKI	Trading	-

No	Date	MSMEs	Field	Legal Status
51	10-06-14	KOPKAR BRG-BAYU SANTOSO	Trading	-
52	10-06-14	KOPKAR BRG-NAVY DOMS SIAHAYA	Trading	-
53	10-06-14	KOPKAR BRG-SUKAMTO	Trading	-
54	10-06-14	KOPKAR BRG-FUAD WINARNO	Trading	-
55	10-06-14	KOPKAR BRG-MOH. RUSLAN	Trading	-
56	10-06-14	KOPKAR BRG-ROHMAN SAIHU	Trading	-
57	10-06-14	KOPKAR BRG-SUWARTO	Trading	-
58	10-06-14	KOPKAR BRG-AKHMAD JAMIL	Trading	-
59	10-06-14	KOPKAR BRG-SUPRIYONO	Trading	-
60	10-06-14	KOPKAR BRG-SULASNO	Trading	-
61	12-06-14	LANGGENG SENTOSA, UD	Shoes industry	UD
62	13-06-14	NANY YUSUF	Trading	-
63	16-06-14	HARRY PURWANTO	Transportation service	-
64	20-06-14	PUDJI LESTARI	Scrap plastic trading	-
65	23-06-14	UTOMO, UD	Rattan industry and land business	UD
66	30-06-14	TIMBUL REJEKI, CV	Transportation service	CV
67	07-07-14	RATNAWATI	Building material trading	-
68	08-07-14	TAN HENDRA TANUJAYA	Forklift rental	-
69	14-07-14	YUSRON	Cellphone trading	-
70	14-07-14	PUTRA WIDATAMA, CV	Car trading	CV
71	22-07-14	KOPKAR BRG-SUYADI	Trading	-
72	22-07-14	KOPKAR BRG-ARIEF AFFANDI	Trading	-
73	22-07-14	KOPKAR BRG-KARDIANTO	Trading	-
74	22-07-14	KOPKAR BRG-KHAIRUL ANAM	Trading	-
75	22-07-14	KOPKAR BRG-SUGIYONO	Trading	-
76	22-07-14	KOPKAR BRG-SAMSUL MAARIF	Trading	-
77	22-07-14	KOPKAR BRG-KHUSNUL HIDAYAT	Trading	-
78	22-07-14	KOPKAR BRG-ASHARI	Trading	-
79	22-07-14	KOPKAR BRG-AJI YUDISTIRO	Trading	-
80	22-07-14	KOPKAR BRG-ROSHID HADI	Trading	-
81	22-07-14	KOPKAR BRG-M. KHAZIN	Trading	-
82	22-07-14	KOPKAR BRG-HANDOKO	Trading	-
83	22-07-14	KOPKAR BRG-RASMIN HARIYANTO	Trading	-
84	24-07-14	JAYENG	Scrap plastic trading	-
85	28-07-14	SUHARTO	Trading	-
86	21-08-14	M SYAIFUDIN ZUHRI	Media consultant	-
87	26-08-14	ANDIK SULAIMAN	Shoes industry	-
88	26-08-14	SUGIONO	Trading	-
89	27-08-14	MUTIARA SEJATI, UD	Limestone trading	UD
90	27-08-14	M. SHOBIR-2	Trading	-
91	01-09-14	CATUR JAYA NUGRAHA, CV	Cloth mold	CV
92	02-09-14	BINTI MAHMUDAH	Garment	-
93	02-09-14	SUDARNO	Contractor	-
94	02-09-14	SUPRAYITNO	Shoe trading	-

No	Date	MSMEs	Field	Legal Status
95	02-09-14	ABDUL LATIF	Trading	-
96	09-09-14	SUDARNO	Contractor	-
97	11-09-14	LUKYTANINGSIH	Tire trading	-
98	25-09-14	MERIDIAN ADITAMA, CV	Musical instrument industry	CV
99	30-09-14	LARIS, UD	Sarong industry	UD
100	06-10-14	BINTANG ALAM SENTOSA, PT	Heavy equipment rental	PT
101	08-10-14	SUPRAYITNO	Shoe trading	-
102	08-10-14	ARJUNA CREATIVE, CV	LCD rental	CV
103	08-10-14	PATSIDO, UD	Leather garment	UD
104	09-10-14	ABDUL ADDHIM	Chemicals trading	-
105	14-10-14	IDRIS	Shoe trading	-
106	17-10-14	MANNA, UD	Garment	UD
107	01-11-14	ERLY FAJARINI	Furniture	-
108	04-11-14	HARRY PURWANTO	Transportation service	-
109	06-11-14	FREDY ARDLIYAN SYAH	Heavy equipment rental	-
110	24-11-14	MASFUFAH	Transportation service	-
111	24-11-14	MALIKI	Car trading	-
112	24-11-14	MOHAMMAD ARIF	Wig industry	-
113	26-11-14	ACHMAD FADHOL	Property	-
114	27-11-14	JAMUR, UD	Iron trading	UD
115	28-11-14	CITRA PERSADA, UD	Scrap plastic trading	UD
116	28-11-14	KHARISMA ASTRA NUSANTARA, PT	Container depot service	PT
117	28-11-14	LAILA BASWEDAN	Embroidery service	-
118	01-12-14	M. ALY SRAFI'I	Multimedia rental	-
119	03-12-14	DANANG SURYA PRASETRAY-3	Transportation service	-
120	03-12-14	R.ARDYAN PUTUT CAHYO	Transportation service	-
121	05-12-14	ANDIK SUSILO HIDAYAT	Car trading	
122	09-12-14	MAJU BERSAMA SEJAHTERA, CV	APBD Contractor	CV
123	10-12-14	VINI PUSPITASARI	Transportation service	-
124	11-12-14	BINTANG ARSITA SAMUDERA, PT	Forklift rental	PT
125	22-12-14	LAGAWICO PRATAMA, PT	Pertamina contractor and heavy equipment rental	PT
126	23-12-14	FAISAL OKBAH	Garment and property	-

4.3 Data Processing

Data processing is divided into two processes, initial selection and ANP selection.

4.3.1 Initial selection

Initial selection is performed to improve the quality of selection of business funding proposal through elimination. Critical factors used as reference to filter unqualified MSMEs. As stated before, there are two critical factors; legal status and its business legal document. Definition of legal status is MSMEs, which

have not approved legally (such as UD, CV, and PT). MSMEs that have not approved legally are excluded in the selection process to avoid conflict with law enforcer in the future. If MSMEs have approved legally, the next step would be checking its legal document related to the business [such as *Surat Izin Usaha Perdangangan* (SIUP), *Tanda Daftar Perusahaan* (TDP), and *Nomor Pokok Wajib Pajak* (NPWP)]. If MSMEs do not have legal documents, it will be excluded too. MSMEs that met these requirements will be processed in ANP calculatoin. Table 4.7 shown result of first process in initial selection.

Table 4-7 First Result of Initial Selection

No	Date	MSMEs	Field	Legal Status
1	21-01-14	LARON, UD	Transportation service	UD
2	28-01-14	JAYA MAKMUR, CV	Contractor	CV
3	05-02-14	SETIA KAWAN, CV	Mining	CV
4	19-02-14	GALENA PERKASA, PT	Transportation service	PT
5	04-04-14	SURYA GRAHA KENCANA, PT	Property	PT
6	24-04-14	BONLI CIPTA SEJAHTERA, PT	Bakery	PT
7	28-04-14	SARI LOGAM, UD	Iron and vegetable trading	UD
8	30-04-14	SURYA BINTANG SINERGY, PT	Ship rental	
9	13-05-14	MULYA JAYA, UD	Shoes industry	UD
10	**21-05-14**	**BATU JAYA ABADI, CV**	**Limestone mining**	**CV**
11	30-05-14	LENTERA HATI, UD	Plastic industry	UD
12	05-06-14	ENOS BINTANG SELAMAT, PT	Candle industry	PT
13	12-06-14	LANGGENG SENTOSA, UD	Shoes industry	UD
14	23-06-14	UTOMO, UD	Rattan industry and land business	UD
15	30-06-14	TIMBUL REJEKI, CV	Transportation service	CV
16	14-07-14	PUTRA WIDATAMA, CV	Car trading	CV
17	27-08-14	MUTIARA SEJATI, UD	Limestone trading	UD
18	01-09-14	CATUR JAYA NUGRAHA, CV	Clothe mold	CV
19	**25-09-14**	**MERIDIAN ADITAMA, CV**	**Musical instrument industry**	**CV**
20	30-09-14	LARIS, UD	Sarong industry	UD
21	06-10-14	BINTANG ALAM SENTOSA, PT	Heavy equipment rental	PT
22	08-10-14	ARJUNA CREATIVE, CV	LCD rental	CV
23	**08-10-14**	**PATSIDO, UD**	**Leather**	**UD**
24	17-10-14	MANNA, UD	Garment	UD
25	27-11-14	JAMUR, UD	Iron trading	UD
26	28-11-14	CITRA PERSADA, UD	Scrap plastic trading	UD
27	28-11-14	KHARISMA ASTRA NUSANTARA, PT	Container depot service	PT
28	09-12-14	MAJU BERSAMA SEJAHTERA, CV	APBD contractor	CV
29	11-12-14	BINTANG ARSITA SAMUDERA, PT	Forklift rental	PT

No	Date	MSMEs	Field	Legal Status
30	22-12-14	LAGAWICO PRATAMA, PT	Pertamina contractor and heavy equipment service	PT

Three MSMEs that marked with bold letters do not have legal documents related to its business. Therefore, it should be eliminated. Table 4.8 shown the final result of initial selection.

Table 4-8 Final Result of Initial Selection

Code	Date	MSMEs	Field	Legal Status
01	21-01-14	LARON, UD	Transportation service	UD
02	28-01-14	JAYA MAKMUR, CV	Contractor	CV
03	05-02-14	SETIA KAWAN, CV	Mining	CV
04	19-02-14	GALENA PERKASA, PT	Transportation service	PT
05	04-04-14	SURYA GRAHA KENCANA, PT	Property	PT
06	24-04-14	BONLI CIPTA SEJAHTERA, PT	Bakery	PT
07	28-04-14	SARI LOGAM, UD	Iron and vegetable trading	UD
08	30-04-14	SURYA BINTANG SINERGY, PT	Ship rental	
09	13-05-14	MULYA JAYA, UD	Shoes industry	UD
10	30-05-14	LENTERA HATI, UD	Plastic industry	UD
11	05-06-14	ENOS BINTANG SELAMAT, PT	Candle industry	PT
12	12-06-14	LANGGENG SENTOSA, UD	Shoes industry	UD
13	23-06-14	UTOMO, UD	Rattan industry and land business	UD
14	30-06-14	TIMBUL REJEKI, CV	Transportation service	CV
15	14-07-14	PUTRA WIDATAMA, CV	Car trading	CV
16	27-08-14	MUTIARA SEJATI, UD	Limestone trading	UD
17	01-09-14	CATUR JAYA NUGRAHA, CV	Clothe mold	CV
18	30-09-14	LARIS, UD	Sarong industry	UD
19	06-10-14	BINTANG ALAM SENTOSA, PT	Heavy equipment rental	PT
20	08-10-14	ARJUNA CREATIVE, CV	LCD rental	CV
21	17-10-14	MANNA, UD	Garment	UD
22	27-11-14	JAMUR, UD	Iron trading	UD
23	28-11-14	CITRA PERSADA, UD	Scrap plastic trading	UD
24	28-11-14	KHARISMA ASTRA NUSANTARA, PT	Container depot service	PT
25	09-12-14	MAJU BERSAMA SEJAHTERA, CV	APBD contractor	CV
26	11-12-14	BINTANG ARSITA SAMUDERA, PT	Forklift rental	PT
27	22-12-14	LAGAWICO PRATAMA, PT	Pertamina contractor and heavy equipment service	PT

4.3.2 ANP Selection

As many as 27 MSMEs passed the initial selection and ready for ANP selection. In ANP, there are several aspects use as reference for selection; financial, management, risk, market, and legal. Each aspect have different criteria. One of unique features in ANP is able to accommodate relation among criterion. Table 4.9 and Figure 4.1 show criterion that have relation to the other criterion. And also Figure 4.2 shows ANP model in SuperDecisions software based on relationship diagram.

Table 4-9 Relation of Each Criterion

Criteria	A1	A2	A3	A4	B1	B2	C1	C2	D1	E1
A1		✓		✓		✓	✓		✓	
A2	✓					✓	✓	✓		
A3										
A4	✓						✓	✓	✓	
B1									✓	
B2	✓	✓					✓	✓		✓
C1	✓	✓		✓		✓		✓	✓	
C2		✓		✓		✓	✓		✓	✓
D1	✓			✓	✓		✓	✓		
E1						✓		✓		

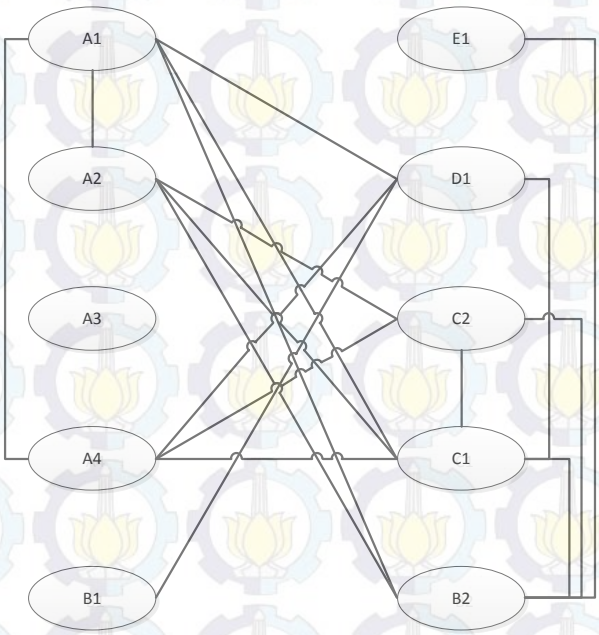

Figure 4.1 Criteria Relationship Diagram

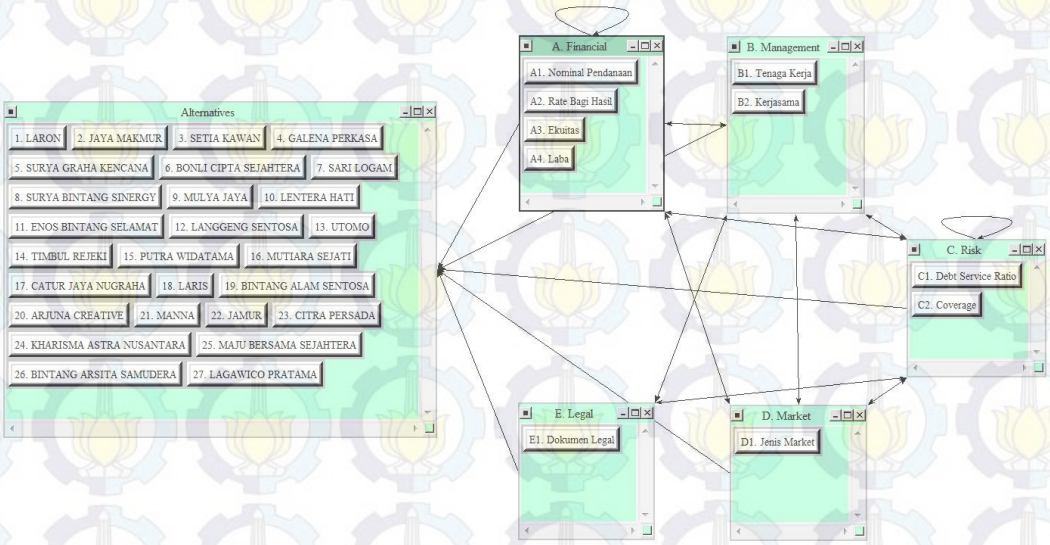

Figure 4.2 Constructed Network Model Based on Criteria Relationship

To complete ANP computation, additional data regarding six clusters and ten criteria is needed. Table 4.10 and Table 4.11 shown data obtained from 27 MSMEs' proposals.

Table 4-10 Financial Data from 27 MSMEs

Code	MSMEs	Financial (in thousand)			
		Funding Amount	Rate of Profit Sharing (%)	Equity	Profit
01	LARON, UD	240,000	0.790%	2,682,755	169,400
02	JAYA MAKMUR, CV	2,000,000	0.012%	47,114,730	5,724,327
03	SETIA KAWAN, CV	339,654	0.500%	2,809,629	2,335,568
04	GALENA PERKASA, PT	1,500,000	2.000%	45,902,955	16,920,816
05	SURYA GRAHA KENCANA, PT	4,000,000	3.700%	17,756,498	1,725,293
06	BONLI CIPTA SEJAHTERA, PT	500,000	14.330%	13,541,084	8,021,144
07	SARI LOGAM, UD	9,000,000	4.720%	2,738,068	924,750
08	SURYA BINTANG SINERGY, PT	500,000	19.000%	5,234,379	1,238,048
09	MULYA JAYA, UD	600,000	4.240%	1,490,883	973,415
10	LENTERA HATI, UD	500,000	2.270%	4,539,685	1,139,743
11	ENOS BINTANG SELAMAT, PT	5,000,000	1.250%	10,300,263	343,344
12	LANGGENG SENTOSA, UD	400,000	2.210%	615,199	33,940
13	UTOMO, UD	500,000	2.300%	5,358,726	2,080,200

Code	MSMEs	Financial (in thousand)			
		Funding Amount	Rate of Profit Sharing (%)	Equity	Profit
14	TIMBUL REJEKI, CV	500,000	0.449%	8,565,896	1,294,636
15	PUTRA WIDATAMA, CV	1,000,000	20.520%	1,450,752	334,225
16	MUTIARA SEJATI, UD	600,000	0.380%	24,164,119	879,338
17	CATUR JAYA NUGRAHA, CV	400,000	3.490%	1,730,396	251,470
18	LARIS, UD	950,000	7.140%	5,241,311	1,078,248
19	BINTANG ALAM SENTOSA, PT	500,000	12.000%	1,000,000	573,762
20	ARJUNA CREATIVE, CV	350,000	1.560%	1,295,152	407,528
21	MANNA, UD	300,000	0.820%	5,514,251	1,142,639
22	JAMUR, UD	200,000	0.860%	961,844	411,304
23	CITRA PERSADA, UD	1,000,000	0.850%	4,401,889	1,648,851
24	KHARISMA ASTRA NUSANTARA, PT	4,500,000	1.340%	10,410,074	850,323
25	MAJU BERSAMA SEJAHTERA, CV	300,000	1.580%	2,127,164	340,478
26	BINTANG ARSITA SAMUDERA, PT	1,500,000	1.310%	21,088,632	3,194,019
27	LAGAWICO PRATAMA, PT	7,000,000	3.350%	58,522,083	3,213,035

Table 4-11 Management, Risk, Market, Legal Data from 27 MSMEs

Code	UMKM	Management		Risk		Market	Legal
		Workforce	Relation	DSR	Cove-rage	Market Type	Legal Documents
01	LARON, UD	17	8	7	232%	9	2
02	JAYA MAKMUR, CV	160	1	7	232%	7	5
03	SETIA KAWAN, CV	39	1	6	173%	7	4
04	GALENA PERKASA, PT	338	8	8	183%	8	4
05	SURYA GRAHA KENCANA, PT	10	1	7	158%	6	5
06	BONLI CIPTA SEJAHTERA, PT	917	8	8	157%	9	4
07	SARI LOGAM, UD	9	1	6	131%	7	2
08	SURYA BINTANG SINERGY, PT	25	5	8	133%	8	3

Code	UMKM	Management		Risk		Market	Legal
		Workforce	Relation	DSR	Cove-rage	Market Type	Legal Documents
09	MULYA JAYA, UD	25	1	6	146%	7	3
10	LENTERA HATI, UD	24	1	6	206%	8	2
11	ENOS BINTANG SELAMAT, PT	50	1	8	134%	9	4
12	LANGGENG SENTOSA, UD	6	1	8	129%	8	3
13	UTOMO, UD	37	9	8	141%	9	2
14	TIMBUL REJEKI, CV	177	8	6	200%	8	4
15	PUTRA WIDATAMA, CV	9	9	9	117%	9	5
16	MUTIARA SEJATI, UD	210	9	8	147%	9	3
17	CATUR JAYA NUGRAHA, CV	7	5	7	182%	7	4
18	LARIS, UD	170	8	7	126%	7	1
19	BINTANG ALAM SENTOSA, PT	2	8	8	140%	8	3
20	ARJUNA CREATIVE, CV	4	5	7	419%	6	3
21	MANNA, UD	18	8	8	126%	8	3
22	JAMUR, UD	11	7	6	118%	7	1
23	CITRA PERSADA, UD	13	9	8	134%	8	3
24	KHARISMA ASTRA NUSANTARA, PT	139	8	8	145%	9	5
25	MAJU BERSAMA SEJAHTERA, CV	2	7	7	85%	8	4
26	BINTANG ARSITA SAMUDERA, PT	140	9	9	126%	9	5
27	LAGAWICO PRATAMA, PT	15	8	8	123%	8	4

Before inputting data to the ANP model, these additional data need to be calculated to produce its eigenvector. Eigenvector calculated by (1) dividing value of each criterion to other criterion, (2) form a matrix, and (3) total value of each

row divided by grand total matrix value. Table 4.12 and Table 4.13 shown us value of eigenvector of each criterion.

Table 4-12 Criteria's Eigenvector

Code	MSMEs	Funding Amount	Financial		
			Rate of Profit Sharing	Equity	Profit
01	LARON, UD	0.00543	0.00699	0.00875	0.00296
02	JAYA MAKMUR, CV	0.04527	0.00011	0.15369	0.09999
03	SETIA KAWAN, CV	0.00769	0.00443	0.00917	0.04080
04	GALENA PERKASA, PT	0.03395	0.01770	0.14974	0.29556
05	SURYA GRAHA KENCANA, PT	0.09054	0.03275	0.05792	0.03014
06	BONLI CIPTA SEJAHTERA, PT	0.01132	0.12685	0.04417	0.14011
07	SARI LOGAM, UD	0.20371	0.04178	0.00893	0.01615
08	SURYA BINTANG SINERGY, PT	0.01132	0.16818	0.01707	0.02163
09	MULYA JAYA, UD	0.01358	0.03753	0.00486	0.01700
10	LENTERA HATI, UD	0.01132	0.02009	0.01481	0.01991
11	ENOS BINTANG SELAMAT, PT	0.11317	0.01106	0.03360	0.00600
12	LANGGENG SENTOSA, UD	0.00905	0.01956	0.00201	0.00059
13	UTOMO, UD	0.01132	0.02036	0.01748	0.03634
14	TIMBUL REJEKI, CV	0.01132	0.00397	0.02794	0.02261
15	PUTRA WIDATAMA, CV	0.02263	0.18164	0.00473	0.00584
16	MUTIARA SEJATI, UD	0.01358	0.00336	0.07882	0.01536
17	CATUR JAYA NUGRAHA, CV	0.00905	0.03089	0.00564	0.00439
18	LARIS, UD	0.02150	0.06320	0.01710	0.01883
19	BINTANG ALAM SENTOSA, PT	0.01132	0.10622	0.00326	0.01002
20	ARJUNA CREATIVE, CV	0.00792	0.01381	0.00422	0.00712
21	MANNA, UD	0.00679	0.00726	0.01799	0.01996
22	JAMUR, UD	0.00453	0.00761	0.00314	0.00718
23	CITRA PERSADA, UD	0.02263	0.00752	0.01436	0.02880
24	KHARISMA ASTRA NUSANTARA, PT	0.10186	0.01186	0.03396	0.01485
25	MAJU BERSAMA SEJAHTERA, CV	0.00679	0.01399	0.00694	0.00595
26	BINTANG ARSITA SAMUDERA, PT	0.03395	0.01160	0.06879	0.05579
27	LAGAWICO PRATAMA, PT	0.15844	0.02965	0.19090	0.05612

Table 4-13 Criteria's Eigenvector (2)

Code	UMKM	Management		Risk		Market	Legal
		Work-force	Relation	DSR	Cove-rage	Market Type	Legal Docu-ment
01	LARON, UD	0.00660	0.05195	0.03518	0.05342	0.04225	0.02198
02	JAYA MAKMUR, CV	0.06216	0.00649	0.03518	0.05342	0.03286	0.05495

Code	UMKM	Management		Risk		Market	Legal
		Work-force	Relation	DSR	Cove-rage	Market Type	Legal Docu-ment
03	SETIA KAWAN, CV	0.01515	0.00649	0.03015	0.03983	0.03286	0.04396
04	GALENA PERKASA, PT	0.13131	0.05195	0.04020	0.04214	0.03756	0.04396
05	SURYA GRAHA KENCANA, PT	0.00389	0.00649	0.03518	0.03638	0.02817	0.05495
06	BONLI CIPTA SEJAHTERA, PT	0.35625	0.05195	0.04020	0.03615	0.04225	0.04396
07	SARI LOGAM, UD	0.00350	0.00649	0.03015	0.03016	0.03286	0.02198
08	SURYA BINTANG SINERGY, PT	0.00971	0.03247	0.04020	0.03062	0.03756	0.03297
09	MULYA JAYA, UD	0.00971	0.00649	0.03015	0.03362	0.03286	0.03297
10	LENTERA HATI, UD	0.00932	0.00649	0.03015	0.04743	0.03756	0.02198
11	ENOS BINTANG SELAMAT, PT	0.01943	0.00649	0.04020	0.03085	0.04225	0.04396
12	LANGGENG SENTOSA, UD	0.00233	0.00649	0.04020	0.02970	0.03756	0.03297
13	UTOMO, UD	0.01437	0.05844	0.04020	0.03247	0.04225	0.02198
14	TIMBUL REJEKI, CV	0.06876	0.05195	0.03015	0.04605	0.03756	0.04396
15	PUTRA WIDATAMA, CV	0.00350	0.05844	0.04523	0.02694	0.04225	0.05495
16	MUTIARA SEJATI, UD	0.08159	0.05844	0.04020	0.03385	0.04225	0.03297
17	CATUR JAYA NUGRAHA, CV	0.00272	0.03247	0.03518	0.04191	0.03286	0.04396
18	LARIS, UD	0.06605	0.05195	0.03518	0.02901	0.03286	0.01099
19	BINTANG ALAM SENTOSA, PT	0.00078	0.05195	0.04020	0.03224	0.03756	0.03297
20	ARJUNA CREATIVE, CV	0.00155	0.03247	0.03518	0.09648	0.02817	0.03297
21	MANNA, UD	0.00699	0.05195	0.04020	0.02901	0.03756	0.03297
22	JAMUR, UD	0.00427	0.04545	0.03015	0.02717	0.03286	0.01099
23	CITRA PERSADA, UD	0.00505	0.05844	0.04020	0.03085	0.03756	0.03297
24	KHARISMA ASTRA NUSANTARA, PT	0.05400	0.05195	0.04020	0.03339	0.04225	0.05495
25	MAJU BERSAMA SEJAHTERA, CV	0.00078	0.04545	0.03518	0.01957	0.03756	0.04396
26	BINTANG ARSITA SAMUDERA, PT	0.05439	0.05844	0.04523	0.02901	0.04225	0.05495
27	LAGAWICO PRATAMA, PT	0.00583	0.05195	0.04020	0.02832	0.03756	0.04396

After the model constructed and all the data needed collected, next step will be comparing criteria with respect to criteria, alternatives with respect to criteria, cluster to cluster with respect to goal. Figure 4.3, 4.4, and 4.5 show captured screens of SuperDecisions software when doing these activities.

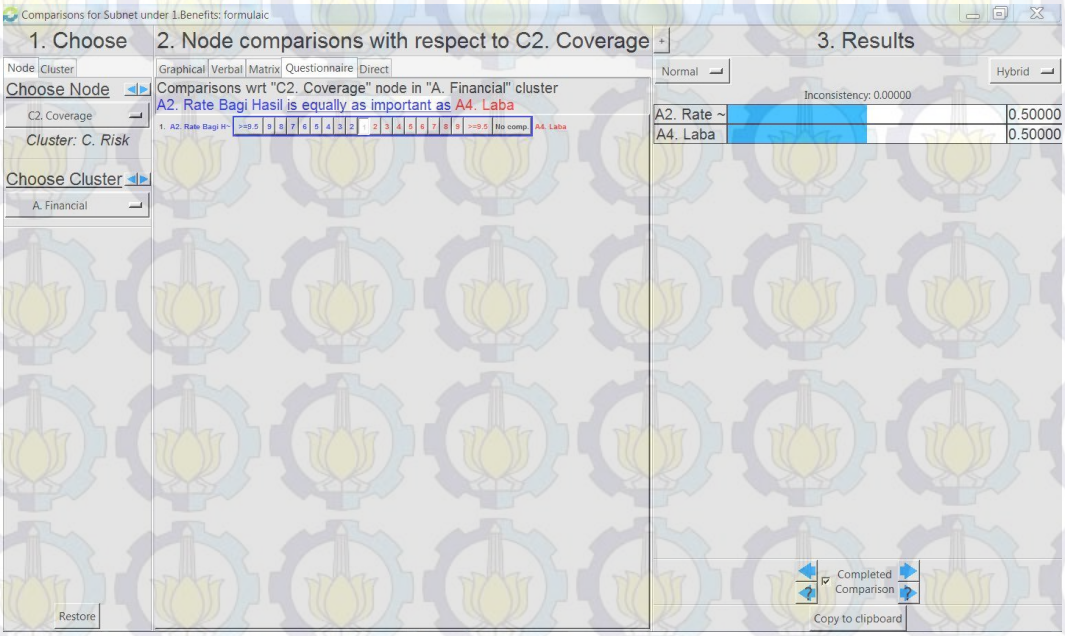

Figure 4.3 Criteria Comparison With Respect to Other Criteria

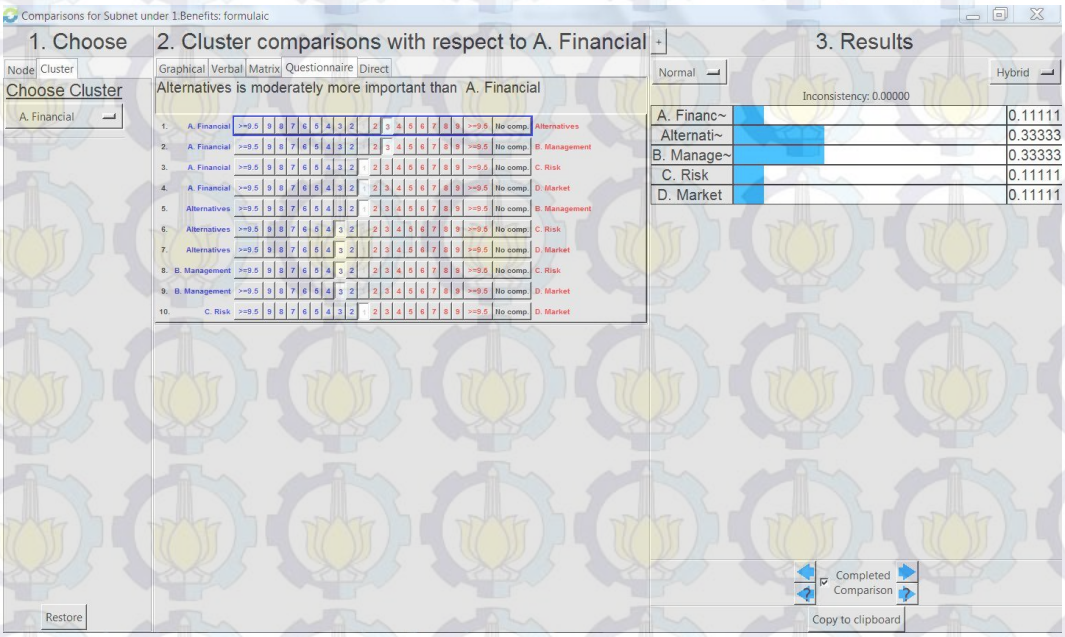

Figure 4.4 Cluster-to-Cluster Comparison With Respect to Goal

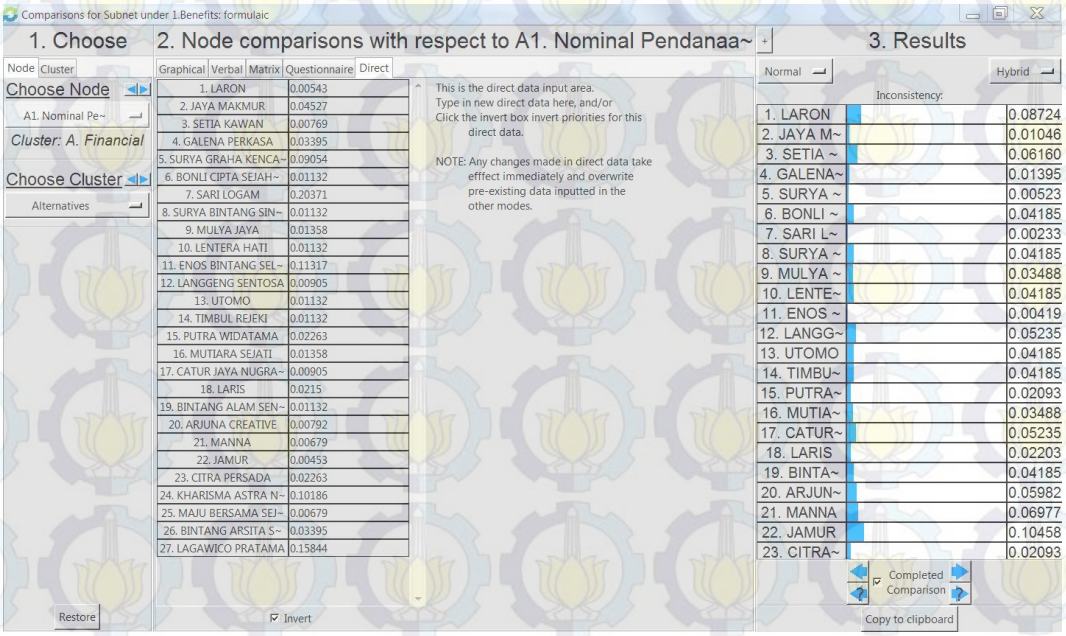

Figure 4.5 Alternatives Comparison With Respect to Criteria

The last thing to do after everything is done, is to synthesize the whole network to get the result. The result will be a rank for each alternative. Figure 4.6 shows synthesize result of the whole network.

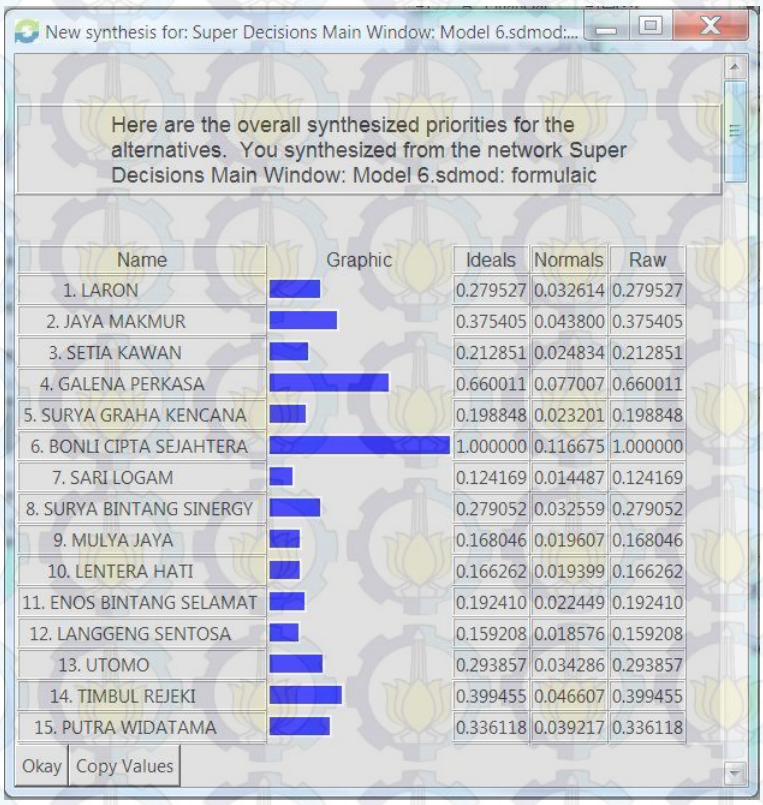

Figure 4.6 Synthesize Result of the Whole Network

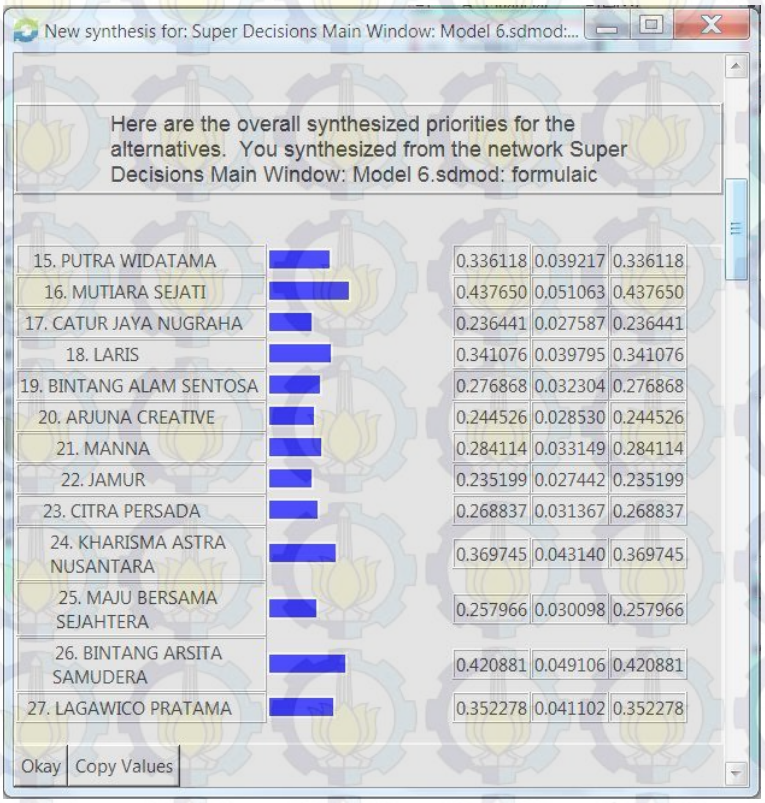

Figure 4.7 Synthesize Result of the Whole Network (2)

The ranking for each MSMEs' proposal will be shown in Table 4.14 below.

Table 4-14 Ranking of Each Proposal Computed Using ANP

Ranking	MSMEs	Ideals	Normals	Raw
1	06. BONLI CIPTA SEJAHTERA	1	0.116675	1
2	04. GALENA PERKASA	0.660011	0.077007	0.660011
3	16. MUTIARA SEJATI	0.43765	0.051063	0.43765
4	26. BINTANG ARSITA SAMUDERA	0.420881	0.049106	0.420881
5	14. TIMBUL REJEKI	0.399455	0.046607	0.399455
6	02. JAYA MAKMUR	0.375405	0.0438	0.375405
7	24. KHARISMA ASTRA NUSANTARA	0.369745	0.04314	0.369745
8	27. LAGAWICO PRATAMA	0.352278	0.041102	0.352278
9	18. LARIS	0.341076	0.039795	0.341076
10	15. PUTRA WIDATAMA	0.336118	0.039217	0.336118
11	13. UTOMO	0.293857	0.034286	0.293857
12	21. MANNA	0.284114	0.033149	0.284114
13	01. LARON	0.279527	0.032614	0.279527
14	08. SURYA BINTANG SINERGY	0.279052	0.032558	0.279052
15	19. BINTANG ALAM SENTOSA	0.276868	0.032304	0.276868
16	23. CITRA PERSADA	0.268837	0.031367	0.268837
17	25. MAJU BERSAMA SEJAHTERA	0.257966	0.030098	0.257966
18	20. ARJUNA CREATIVE	0.244526	0.02853	0.244526
19	17. CATUR JAYA NUGRAHA	0.236441	0.027587	0.236441
20	22. JAMUR	0.235199	0.027442	0.235199

Ranking	MSMEs	Ideals	Normals	Raw
21	03. SETIA KAWAN	0.212851	0.024834	0.212851
22	05. SURYA GRAHA KENCANA	0.198848	0.023201	0.198848
23	11. ENOS BINTANG SELAMAT	0.19241	0.022449	0.19241
24	09. MULYA JAYA	0.168046	0.019607	0.168046
25	10. LENTERA HATI	0.166262	0.019399	0.166262
26	12. LANGGENG SENTOSA	0.159208	0.018576	0.159208
27	07. SARI LOGAM	0.124169	0.014487	0.124169

This is the first result of ANP rank. Because the rank may change due to removal of one or more alternative, the second result is done by eliminating the best alternative (only one) and then synthesize again the network without it. This is done until there are only two remaining alternatives. After 26 iterations, Table 4.15 shows the comparison result between initial rank and one-by-one elimination rank.

Table 4-15 Comparison of the Two Results of ANP

Ranking	Unique Code	
	One-by-One Elimination Rank	Initial Rank
1	06	06
2	04	04
3	16	16
4	26	26
5	14	14
6	02	02
7	18	24
8	24	27
9	27	18
10	13	15
11	15	13
12	08	21
13	11	01
14	21	08
15	03	19
16	23	23
17	01	25
18	19	20
19	22	17
20	25	22
21	17	03
22	20	05
23	05	11
24	10	09
25	09	10
26	07	12
27	12	07

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CHAPTER 5
ANALYSIS AND DISCUSSION

Chapter 5 explains about data analysis from chapter 4 results. There will be also discussion about results, sensitivity analysis, different amount of alternatives effect, and budget constraint situation that might happened in the future.

5.1 Changes in Criteria's Weight

Some criteria might be critical or not. To find this out, sensitivity analysis needs to be performed. The purpose of sensitivity analysis is to give some clues which criterion is influenced composition of ranking the most. Sensitivity analysis does not have to be done manually; SuperDecisions have the tool to do that. Section below will describe the changes of each criterion and its effect to the overall ranking.

Because there is no way to measure sensitivity in term of rank, how many rank changes from the initial one is used to determine it.

Table 5-1 Ranking Changes in A1. Funding Amount Criterion

A1. Funding Amount							
0.0002x	**0.4x**	**0.8x**	**1x**	**1.2x**	**1.6x**	**2x**	**Rank Changes**
0.0001	**0.2001**	**0.4000**	**0.5000**	**0.6000**	**0.7999**	**0.9999**	
←	←	←	**Initial Rank**	→	→	→	
06	06	06	**06**	06	06	22	**8**
04	04	04	**04**	04	22	01	**18**
16	16	16	**16**	16	01	21	**12**
26	26	26	**26**	14	21	25	**17**
14	14	14	**14**	26	25	03	**7**
02	02	02	**02**	01	20	20	**16**
24	24	24	**24**	22	14	17	**17**
27	27	27	**27**	21	03	12	**18**
18	18	18	**18**	15	04	06	**12**
15	15	15	**15**	02	16	14	**10**
13	13	13	**13**	24	17	13	**6**
23	08	21	**21**	18	13	19	**12**
08	23	08	**01**	25	19	08	**14**
19	19	19	**08**	13	08	10	**10**
21	21	01	**19**	27	12	16	**6**
01	01	23	**23**	19	15	09	**9**
25	25	25	**25**	08	26	18	**13**

A1. Funding Amount							
0.0002x	**0.4x**	**0.8x**	**1x**	**1.2x**	**1.6x**	**2x**	**Rank Changes**
0.0001	**0.2001**	**0.4000**	**0.5000**	**0.6000**	**0.7999**	**0.9999**	
←	←	←	**Initial Rank**	→	→	→	
20	20	20	**20**	20	10	15	**12**
17	17	17	**17**	17	18	23	**12**
05	22	22	**22**	23	23	04	**22**
11	05	03	**03**	03	09	26	**19**
03	11	05	**05**	12	02	02	**7**
22	03	11	**11**	10	24	05	**6**
09	09	09	**09**	09	27	24	**8**
10	10	10	**10**	05	05	11	**11**
12	12	12	**12**	11	11	27	**18**
07	07	07	**07**	07	07	07	**0**
Total Changes							**320**

Table 5-2 Ranking Changes in A2. Rate of Profit Sharing Criterion

A2. Rate of Profit Sharing							
0.0002x	**0.4x**	**0.8x**	**1x**	**1.2x**	**1.6x**	**2x**	**Rank Changes**
0.0001	**0.2001**	**0.4000**	**0.5000**	**0.6000**	**0.7999**	**0.9999**	
←	←	←	**Initial Rank**	→	→	→	
06	06	06	**06**	06	06	15	**2**
04	04	04	**04**	04	15	08	**12**
16	16	16	**16**	15	08	06	**23**
26	26	26	**26**	08	19	19	**15**
14	14	14	**14**	19	18	18	**20**
02	02	02	**02**	18	04	07	**21**
24	24	24	**24**	16	27	09	**10**
27	27	27	**27**	26	17	05	**8**
18	18	18	**18**	14	26	17	**4**
13	15	15	**15**	27	09	27	**10**
15	13	13	**13**	24	07	13	**5**
21	21	21	**21**	02	13	10	**10**
01	01	01	**01**	13	05	12	**10**
23	23	19	**08**	21	24	04	**17**
25	19	08	**19**	01	16	25	**14**
19	25	23	**23**	17	14	20	**7**
20	08	25	**25**	25	25	24	**4**
22	20	20	**20**	23	20	26	**5**
08	22	17	**17**	20	21	11	**13**
17	17	22	**22**	22	01	22	**10**
03	03	03	**03**	05	23	23	**9**
05	05	05	**05**	09	10	21	**14**
11	11	11	**11**	03	12	01	**10**
10	10	09	**09**	11	22	03	**18**

A2. Rate of Profit Sharing							
0.0002x	**0.4x**	**0.8x**	**1x**	**1.2x**	**1.6x**	**2x**	**Rank Changes**
0.0001	**0.2001**	**0.4000**	**0.5000**	**0.6000**	**0.7999**	**0.9999**	
←	←	←	**Initial Rank**	→	→	→	
09	09	10	**10**	10	02	14	**14**
12	12	12	**12**	07	11	16	**15**
07	07	07	**07**	12	03	02	**21**
Total Changes							**321**

Table 5-3 Ranking Changes in A3. Equity Criterion

A3. Equity							
0.0002x	**0.4x**	**0.8x**	**1x**	**1.2x**	**1.6x**	**2x**	**Rank Changes**
0.0001	**0.2001**	**0.4000**	**0.5000**	**0.6000**	**0.7999**	**0.9999**	
←	←	←	**Initial Rank**	→	→	→	
06	06	06	**06**	06	27	27	**6**
04	04	04	**04**	04	04	02	**1**
16	16	16	**16**	27	02	04	**3**
26	26	26	**26**	02	06	16	**3**
14	14	14	**14**	16	16	26	**5**
24	24	24	**02**	26	26	05	**7**
15	18	02	**24**	14	05	06	**2**
18	02	18	**27**	24	24	24	**13**
02	15	15	**18**	18	14	11	**7**
13	27	27	**15**	15	11	14	**16**
21	13	13	**13**	13	18	21	**2**
01	21	21	**21**	05	13	13	**4**
19	01	01	**01**	21	21	18	**7**
08	19	08	**08**	08	08	08	**2**
27	08	19	**19**	23	23	10	**12**
23	23	23	**23**	01	15	23	**2**
25	25	25	**25**	19	01	03	**3**
20	20	20	**20**	25	10	07	**6**
17	17	17	**17**	11	25	01	**4**
22	22	22	**22**	20	03	25	**6**
03	03	03	**03**	17	19	17	**8**
11	05	05	**05**	22	17	09	**17**
05	11	11	**11**	03	20	15	**15**
09	09	09	**09**	10	22	20	**6**
10	10	10	**10**	09	07	19	**10**
12	12	12	**12**	12	09	22	**1**
07	07	07	**07**	07	12	12	**9**
Total Changes							**177**

Table 5-4 Ranking Changes in A4. Profit Criterion

A4. Profit							
0.0002x	**0.4x**	**0.8x**	**1x**	**1.2x**	**1.6x**	**2x**	**Rank Changes**
0.0001	**0.2001**	**0.4000**	**0.5000**	**0.6000**	**0.7999**	**0.9999**	
←	←	←	**Initial Rank**	→	→	→	
06	06	06	**06**	06	04	04	**1**
04	04	04	**04**	04	06	06	**1**
16	16	16	**16**	02	02	02	**14**
26	26	26	**26**	26	26	27	**1**
14	14	14	**14**	27	27	26	**5**
24	24	24	**02**	16	13	03	**4**
02	02	02	**24**	14	03	13	**12**
15	27	27	**27**	24	14	05	**6**
18	18	18	**18**	18	23	23	**5**
27	15	15	**15**	13	16	14	**16**
13	13	13	**13**	15	18	08	**6**
01	21	21	**21**	23	05	21	**7**
21	01	01	**01**	21	08	10	**14**
19	19	08	**08**	08	24	18	**4**
08	08	19	**19**	03	21	09	**5**
23	23	23	**23**	19	10	07	**7**
25	25	25	**25**	01	15	16	**6**
20	20	20	**20**	25	19	24	**5**
17	17	17	**17**	05	09	19	**6**
22	22	22	**22**	20	22	22	**1**
03	03	03	**03**	22	25	20	**15**
11	05	05	**05**	17	20	11	**15**
05	11	11	**11**	10	01	25	**8**
09	09	09	**09**	09	07	15	**9**
12	10	10	**10**	11	17	17	**13**
10	12	12	**12**	12	11	01	**2**
07	07	07	**07**	07	12	12	**11**
Total Changes							**199**

Table 5-5 Ranking Changes in B1. Workforce Criterion

B1. Workforce							
0.0002x	**0.4x**	**0.8x**	**1x**	**1.2x**	**1.6x**	**2x**	**Rank Changes**
0.0001	**0.2001**	**0.4000**	**0.5000**	**0.6000**	**0.7999**	**0.9999**	
←	←	←	**Initial Rank**	→	→	→	
04	06	06	**06**	06	06	06	**0**
06	04	04	**04**	04	04	04	**0**
27	26	16	**16**	16	16	16	**3**
15	16	26	**26**	14	14	14	**6**
26	27	14	**14**	26	18	18	**3**
16	15	27	**02**	02	02	02	**8**

B1. Workforce							
0.0002x	**0.4x**	**0.8x**	**1x**	**1.2x**	**1.6x**	**2x**	**Rank Changes**
0.0001	**0.2001**	**0.4000**	**0.5000**	**0.6000**	**0.7999**	**0.9999**	
←	←	←	**Initial Rank**	→	→	→	
14	14	02	**24**	24	26	26	**5**
19	24	24	**27**	18	24	24	**14**
21	02	15	**18**	27	13	11	**15**
01	13	18	**15**	15	11	03	**17**
24	21	13	**13**	13	27	13	**7**
13	19	21	**21**	08	03	08	**6**
08	01	01	**01**	21	08	09	**6**
02	08	19	**08**	01	15	10	**7**
23	18	08	**19**	23	21	21	**18**
25	23	23	**23**	19	01	01	**5**
20	25	25	**25**	25	23	27	**11**
22	20	20	**20**	20	09	23	**8**
17	22	17	**17**	03	22	22	**5**
18	17	22	**22**	22	19	05	**3**
03	03	03	**03**	17	10	15	**10**
05	05	05	**05**	11	17	07	**8**
12	11	11	**11**	05	25	17	**15**
11	12	09	**09**	09	20	12	**14**
10	10	10	**10**	10	05	20	**11**
09	09	12	**12**	12	12	19	**6**
07	07	07	**07**	07	07	25	**5**
Total Changes							**216**

Table 5-6 Ranking Changes in B2. Cooperation Criterion

B2. Cooperation							
0.0002x	**0.4x**	**0.8x**	**1x**	**1.2x**	**1.6x**	**2x**	**Rank Changes**
0.0001	**0.2001**	**0.4000**	**0.5000**	**0.6000**	**0.7999**	**0.9999**	
←	←	←	**Initial Rank**	→	→	→	
06	06	06	**06**	06	06	16	**5**
04	04	04	**04**	04	04	26	**5**
02	02	16	**16**	16	16	15	**3**
16	16	26	**26**	26	26	13	**3**
26	26	14	**14**	14	15	23	**4**
14	14	02	**02**	24	14	06	**17**
24	24	24	**24**	27	13	04	**4**
27	27	27	**27**	15	24	14	**4**
15	15	15	**18**	18	23	24	**4**
08	18	18	**15**	13	27	27	**8**
18	08	08	**13**	21	18	18	**17**
03	21	13	**21**	23	21	21	**10**
05	19	21	**01**	01	01	01	**7**

B2. Cooperation							
0.0002x	**0.4x**	**0.8x**	**1x**	**1.2x**	**1.6x**	**2x**	**Rank Changes**
0.0001	**0.2001**	**0.4000**	**0.5000**	**0.6000**	**0.7999**	**0.9999**	
←	←	←	**Initial Rank**	→	→	→	
11	13	19	**08**	19	19	19	**7**
20	03	01	**19**	02	25	25	**6**
19	01	23	**23**	25	22	22	**20**
17	20	25	**25**	08	08	08	**4**
21	25	20	**20**	22	20	20	**5**
25	05	17	**17**	20	17	17	**6**
01	17	03	**22**	17	02	02	**10**
13	23	22	**03**	03	03	03	**9**
09	11	05	**05**	05	05	05	**9**
10	22	11	**11**	11	11	11	**9**
12	09	09	**09**	09	09	09	**2**
23	10	10	**10**	10	10	10	**2**
22	12	12	**12**	12	12	12	**2**
07	07	07	**07**	07	07	07	**0**
Total Changes							**182**

Table 5-7 Ranking Changes in C1. Debt Service Ratio Criterion

C1. Debt Service Ratio							
0.0002x	**0.4x**	**0.8x**	**1x**	**1.2x**	**1.6x**	**2x**	**Rank Changes**
0.0001	**0.2001**	**0.4000**	**0.5000**	**0.6000**	**0.7999**	**0.9999**	
←	←	←	**Initial Rank**	→	→	→	
06	06	06	**06**	06	06	15	**2**
04	04	04	**04**	04	04	26	**2**
16	16	16	**16**	16	26	06	**2**
26	26	26	**26**	26	16	04	**2**
14	14	14	**14**	14	15	16	**17**
02	02	02	**02**	24	24	27	**9**
24	24	24	**24**	27	27	13	**9**
27	27	27	**27**	02	13	23	**2**
18	18	18	**18**	15	14	21	**7**
15	15	15	**15**	18	21	19	**9**
13	13	13	**13**	13	23	08	**4**
21	21	21	**21**	21	19	11	**3**
01	01	01	**01**	19	02	12	**4**
08	08	08	**08**	23	18	24	**7**
19	19	19	**19**	01	08	02	**5**
23	23	23	**23**	08	01	18	**8**
25	25	25	**25**	25	25	01	**1**
20	20	20	**20**	20	20	25	**1**
22	22	17	**17**	17	17	20	**3**
17	17	22	**22**	22	11	17	**6**

C1. Debt Service Ratio							
0.0002x	**0.4x**	**0.8x**	**1x**	**1.2x**	**1.6x**	**2x**	**Rank Changes**
0.0001	**0.2001**	**0.4000**	**0.5000**	**0.6000**	**0.7999**	**0.9999**	
←	←	←	**Initial Rank**	→	→	→	
03	03	03	**03**	03	12	05	**4**
05	05	05	**05**	11	22	14	**4**
11	11	11	**11**	05	05	03	**11**
09	09	09	**09**	12	03	22	**1**
10	10	10	**10**	09	09	09	**1**
12	12	12	**12**	10	10	10	**13**
07	07	07	**07**	07	07	07	**0**
Total Changes							**137**

Table 5-8 Ranking Changes in C2. Coverage Criterion

C2. Coverage							
0.0002x	**0.4x**	**0.8x**	**1x**	**1.2x**	**1.6x**	**2x**	**Rank Changes**
0.0001	**0.2001**	**0.4000**	**0.5000**	**0.6000**	**0.7999**	**0.9999**	
←	←	←	**Initial Rank**	→	→	→	
06	06	06	**06**	06	06	20	9
04	04	04	**04**	04	20	02	4
16	16	16	**16**	16	04	01	8
26	26	26	**26**	26	02	10	17
14	14	14	**14**	14	14	14	0
02	02	02	**02**	02	01	04	4
24	24	24	**24**	24	16	17	6
27	27	27	**27**	27	26	03	16
18	18	18	**18**	15	24	05	14
15	15	15	**15**	20	17	06	18
13	13	13	**13**	18	15	16	3
21	21	21	**21**	01	27	09	10
08	08	08	**01**	13	13	24	12
19	19	01	**08**	21	19	13	8
01	01	19	**19**	19	18	19	3
23	23	23	**23**	08	23	23	2
25	25	25	**25**	23	10	11	10
22	22	20	**20**	17	03	08	20
17	17	22	**17**	25	08	07	14
03	20	17	**22**	22	21	12	7
20	03	03	**03**	03	05	26	14
05	05	05	**05**	05	22	21	13
11	11	11	**11**	11	25	18	8
09	09	09	**09**	10	11	27	14
10	10	10	**10**	09	09	22	21
12	12	12	**12**	12	12	15	6
07	07	07	**07**	07	07	25	8

C2. Coverage							
0.0002x	**0.4x**	**0.8x**	**1x**	**1.2x**	**1.6x**	**2x**	**Rank Changes**
0.0001	**0.2001**	**0.4000**	**0.5000**	**0.6000**	**0.7999**	**0.9999**	
←	←	←	**Initial Rank**	→	→	→	
Total Changes							**269**

Table 5-9 Ranking Changes in D1. Market Type Criterion

D1. Market Type							
0.0002x	**0.4x**	**0.8x**	**1x**	**1.2x**	**1.6x**	**2x**	**Rank Changes**
0.0001	**0.2001**	**0.4000**	**0.5000**	**0.6000**	**0.7999**	**0.9999**	
←	←	←	**Initial Rank**	→	→	→	
06	06	06	**06**	06	06	06	**0**
04	04	04	**04**	04	04	16	**7**
26	16	16	**16**	16	16	26	**2**
16	26	26	**26**	26	14	24	**4**
27	14	14	**14**	14	26	13	**8**
14	27	02	**02**	02	24	01	**16**
15	02	24	**24**	24	02	15	**5**
02	24	27	**27**	18	18	11	**8**
24	15	15	**18**	27	13	04	**13**
18	18	18	**15**	15	15	14	**6**
13	13	13	**13**	13	27	21	**6**
21	21	21	**21**	21	01	08	**3**
19	19	08	**01**	01	21	27	**9**
08	08	01	**08**	08	08	23	**4**
01	01	19	**19**	19	11	19	**6**
23	23	23	**23**	23	23	25	**2**
25	25	25	**25**	25	19	10	**3**
20	20	20	**20**	22	25	12	**8**
17	17	17	**17**	20	03	18	**4**
22	22	22	**22**	17	22	02	**6**
05	03	03	**03**	03	17	03	**4**
03	05	05	**05**	11	10	22	**6**
11	11	11	**11**	05	20	17	**15**
09	09	09	**09**	10	09	09	**2**
10	10	10	**10**	09	12	07	**8**
12	12	12	**12**	12	05	20	**8**
07	07	07	**07**	07	07	05	**2**
Total Changes							**165**

Table 5-10 Ranking Changes in E1. Legal Document Criterion

E1. Legal Document							
0.0002x	**0.4x**	**0.8x**	**1x**	**1.2x**	**1.6x**	**2x**	**Rank Changes**
0.0001	**0.2001**	**0.4000**	**0.5000**	**0.6000**	**0.7999**	**0.9999**	
←	**←**	**←**	**Initial Rank**	**→**	**→**	**→**	
06	06	06	**06**	06	06	26	**5**
04	04	04	**04**	04	04	24	**5**
16	16	16	**16**	26	26	15	**11**
26	26	26	**26**	16	24	02	**4**
14	14	14	**14**	14	15	05	**3**
18	02	02	**02**	24	02	06	**5**
02	18	24	**24**	02	14	04	**6**
24	24	27	**27**	15	27	14	**4**
27	27	18	**18**	27	16	27	**20**
13	15	15	**15**	18	05	25	**8**
15	13	13	**13**	21	25	17	**12**
01	01	21	**21**	19	17	03	**7**
08	21	01	**01**	25	03	11	**11**
21	08	08	**08**	13	21	16	**5**
19	19	19	**19**	08	19	21	**7**
23	23	23	**23**	23	23	19	**1**
22	22	25	**25**	01	11	23	**9**
20	20	20	**20**	17	08	08	**1**
25	25	22	**17**	20	20	20	**9**
17	17	17	**22**	05	13	09	**10**
03	03	03	**03**	03	01	12	**9**
10	11	05	**05**	11	09	13	**19**
11	05	11	**11**	22	12	01	**12**
05	10	10	**09**	09	18	10	**5**
09	09	09	**10**	12	10	07	**6**
12	12	12	**12**	10	22	18	**5**
07	07	07	**07**	07	07	22	**2**
Total Change							**201**

The rank changes in the right-most column shows how many changes happened when analysis variable is changed. The change can be calculated by counting the difference between the initial and the new rank. These numbers will be used to determine which criteria to have the most and least effect to the composition of ranking.

The highest number of total changes is A1 and A2, which means that these two criteria influence the rank the most. The lowest number of total changes is C1, which means C1 is the least factor that affect the ranking. Table 5.11 shows recapitulation of total changes.

Table 5-11 Total Changes of Each Criterion

Criteria	Total Changes
A1	320
A2	321
A3	177
A4	199
B1	216
B2	182
C1	137
C2	269
D1	165
E1	201

5.2 Difference of Initial Rank and One-by-One Elimination Rank

As explained before, if one alternative remove from calculation, the overall ranking might differ. This is why this research try to provide different approach to select more than one alternative using ANP.

The top rank of the two results is the same; however, almost the rest of the rank is in different order. To get the result of this different approach, 26 iterations need to be done. In each iterations, the best choice will be excluded for the next iteration. This is done until there are only two alternatives. Section below will explain more about this and some scenarios.

5.3 Different Amount of Alternatives Effect to the Ranking

ANP, which is the improved version AHP, might still have some weaknesses. One of weaknesses that might occur is changes happened when several alternatives remove from calculation. To discover whether it is true or not, an analysis needs to be performed. How much ranking order will be messed up because of removal one or several proposal will be done in this section. This research decides to exclude five proposal from highest ranking, lowest ranking, and middle part of ranking. Table 5.12 show the ranking after exclusion of five proposals in three different parts.

Table 5-12 Result of Exclusion of Several Proposals

Ranking	MSMEs' Unique Code			
	Initial Rank	5 Highest Rank Removal	5 Middle rank Removal	5 Lowest Rank Removal
1	*6*		6	6
2	*4*		4	4
3	*16*		16	16
4	*26*		26	26
5	*14*		14	14
6	*2*	2	24	2
7	*24*	18	15	24
8	*27*	24	27	27
9	*18*	27	2	15
10	*15*	15	18	18
11	*13*	13	13	13
12	*21*	21		21
13	*1*	8		8
14	*8*	1		1
15	*19*	23		19
16	*23*	19		23
17	*25*	25	25	25
18	*20*	3	20	20
19	*17*	20	22	17
20	*22*	22	17	22
21	*3*	11	3	3
22	*5*	17	5	5
23	*11*	5	11	
24	*9*	9	9	
25	*10*	10	10	
26	*12*	12	12	
27	*7*	7	7	

Small changes happened when some part of ranking were excluded from ANP calculation. So the hypothesis, that some changes might happened, is proven right from this experiment.

5.4 Budget Constraint

If the problem only choose one alternatives, the highest MSME will be selected. However, when choosing several possible alternatives, the chosen one might not for example the top five rank. When faced with budget constraint, the best rank might not the best possible outcomes.

The budget limit that will be used in this experiment is Rp. 10.000.000.000,00 (ten billion rupiahs). There are four scenarios to be carried out; (1) Fund the highest initial rank MSMEs' proposals, (2) Fund the highest 1-by1 elimination rank MSMEs' proposals, (3) Fund the lowest amount of funding needed, and (4) Fund the highest possible expected return. Return here means amount of money that SJV received from profit sharing. It is calculated by multiplying rate of profit sharing with profit. Table 5.13 shows MSMEs with its calculation.

Table 5-13 Expected Return of Each MSMEs' Proposals

MSMEs' Code	Funding Amount	Profit Sharing Rate	MSMEs' Profit	Expected Return
01	Rp 240,000,000	0.790%	Rp 169,400,000	Rp 1,338,260
02	Rp 2,000,000,000	0.012%	Rp 5,724,326,620	Rp 686,919
03	Rp 339,653,842	0.500%	Rp 2,335,568,168	Rp 11,677,841
04	Rp 1,500,000,000	2.000%	Rp 16,920,816,154	Rp 338,416,323
05	Rp 4,000,000,000	3.700%	Rp 1,725,293,000	Rp 63,835,841
06	Rp 500,000,000	14.330%	Rp 8,021,144,000	Rp 1,149,429,935
07	Rp 9,000,000,000	4.720%	Rp 924,750,000	Rp 43,648,200
08	Rp 500,000,000	19.000%	Rp 1,238,048,000	Rp 235,229,120
09	Rp 600,000,000	4.240%	Rp 973,415,000	Rp 41,272,796
10	Rp 500,000,000	2.270%	Rp 1,139,743,000	Rp 25,872,166
11	Rp 5,000,000,000	1.250%	Rp 343,344,055	Rp 4,291,801
12	Rp 400,000,000	2.210%	Rp 33,940,276	Rp 750,080
13	Rp 500,000,000	2.300%	Rp 2,080,200,000	Rp 47,844,600
14	Rp 500,000,000	0.449%	Rp 1,294,636,000	Rp 5,812,916
15	Rp 1,000,000,000	20.520%	Rp 334,224,610	Rp 68,582,890
16	Rp 600,000,000	0.380%	Rp 879,338,000	Rp 3,341,484
17	Rp 400,000,000	3.490%	Rp 251,470,000	Rp 8,776,303
18	Rp 950,000,000	7.140%	Rp 1,078,248,000	Rp 76,986,907
19	Rp 500,000,000	12.000%	Rp 573,762,000	Rp 68,851,440
20	Rp 350,000,000	1.560%	Rp 407,528,000	Rp 6,357,437
21	Rp 300,000,000	0.820%	Rp 1,142,639,000	Rp 9,369,640
22	Rp 200,000,000	0.860%	Rp 411,303,593	Rp 3,537,211
23	Rp 1,000,000,000	0.850%	Rp 1,648,851,000	Rp 14,015,234
24	Rp 4,500,000,000	1.340%	Rp 850,323,000	Rp 11,394,328
25	Rp 300,000,000	1.580%	Rp 340,478,402	Rp 5,379,559
26	Rp 1,500,000,000	1.310%	Rp 3,194,019,000	Rp 41,841,649
27	Rp 7,000,000,000	3.350%	Rp 3,213,035,000	Rp 107,636,673

First and second scenario is to fund MSMEs with the highest proposal rank. If some budget, remain or not enough for the next rank, the proposal from middle

and lower rank will be chosen to spend the budget but still considering the higher rank available. Table 5.14 and Table 5.15 show the result of this scenario.

Table 5-14 Result of Scenario 1

No	ANP Rank	Code	Funding Amount	Profit Sharing Rate	MSMEs' Profit	Expected Return
1	1	06	500,000,000	14.330%	8,021,144,000	1,149,429,935
2	2	04	1,500,000,000	2.000%	16,920,816,154	338,416,323
3	3	16	600,000,000	0.380%	879,338,000	3,341,484
4	4	26	1,500,000,000	1.310%	3,194,019,000	41,841,649
5	5	14	500,000,000	0.449%	1,294,636,000	5,812,916
6	6	02	2,000,000,000	0.012%	5,724,326,620	686,919
7	9	18	950,000,000	7.140%	1,078,248,000	76,986,907
8	10	15	1,000,000,000	20.520%	334,224,610	68,582,890
9	11	13	500,000,000	2.300%	2,080,200,000	47,844,600
10	12	21	300,000,000	0.820%	1,142,639,000	9,369,640
11	13	01	240,000,000	0.790%	169,400,000	1,338,260
12	17	25	300,000,000	1.580%	340,478,402	5,379,559
Total Expected Return						**1,749,031,082**
The Remaining Budget						**110,000,000**

Table 5-15 Result of Scenario 2

No	ANP Rank	Code	Funding Amount	Profit Sharing Rate	MSMEs' Profit	Expected Return
1	1	06	500,000,000	14.330%	8,021,144,000	1,149,429,935
2	2	04	1,500,000,000	2.000%	16,920,816,154	338,416,323
3	3	16	600,000,000	0.380%	879,338,000	3,341,484
4	4	26	1,500,000,000	1.310%	3,194,019,000	41,841,649
5	5	14	500,000,000	0.449%	1,294,636,000	5,812,916
6	6	02	2,000,000,000	0.012%	5,724,326,620	686,919
7	7	18	950,000,000	7.140%	1,078,248,000	76,986,907
8	10	13	500,000,000	2.300%	2,080,200,000	47,844,600
9	11	15	1,000,000,000	20.520%	334,224,610	68,582,890
10	12	08	500,000,000	19.000%	1,238,048,000	235,229,120
11	14	21	300,000,000	0.820%	1,142,639,000	9,369,640
Total Expected Return						**1,977,542,383**
The Remaining Budget						**150,000,000**

The one-by-one elimination rank gives total expected return and remaining budget more than the initial rank. These two scenarios indicate that the more preferred result is rank by one-by-one elimination.

Third scenario use the lowest amount of funding needed by MSMEs as parameter. This scenario is the one that have the most MSMEs funded. Table 5.16 shows the result of this scenario.

Table 5-16 Result of Scenario 3

No	ANP Rank	Code	Funding Amount	Profit Sharing Rate	MSMEs' Profit	Expected Return
1	20	22	200,000,000	0.860%	411,303,593	3,537,211
2	13	01	240,000,000	0.790%	169,400,000	1,338,260
3	12	21	300,000,000	0.820%	1,142,639,000	9,369,640
4	17	25	300,000,000	1.580%	340,478,402	5,379,559
5	22	03	339,653,842	0.500%	2,335,568,168	11,677,841
6	18	20	350,000,000	1.560%	407,528,000	6,357,437
7	26	12	400,000,000	2.210%	33,940,276	750,080
8	19	17	400,000,000	3.490%	251,470,000	8,776,303
9	1	06	500,000,000	14.330%	8,021,144,000	1,149,429,935
10	14	08	500,000,000	19.000%	1,238,048,000	235,229,120
11	25	10	500,000,000	2.270%	1,139,743,000	25,872,166
12	11	13	500,000,000	2.300%	2,080,200,000	47,844,600
13	5	14	500,000,000	0.449%	1,294,636,000	5,812,916
14	15	19	500,000,000	12.000%	573,762,000	68,851,440
15	24	09	600,000,000	4.240%	973,415,000	41,272,796
16	3	16	600,000,000	0.380%	879,338,000	3,341,484
17	9	18	950,000,000	7.140%	1,078,248,000	76,986,907
18	10	15	1,000,000,000	20.520%	334,224,610	68,582,890
19	16	23	1,000,000,000	0.850%	1,648,851,000	14,015,234
					Total Expected Return	**1,784,425,818**
					The Remaining Budget	**320,346,158**

The fourth scenario will be carried out with the highest expected value as parameter. Table 5.17 shows the result of this scenario.

Table 5-17 Result of Scenario 4

No	ANP Rank	Code	Funding Amount	Profit Sharing Rate	MSMEs' Profit	Expected Return
1	1	06	500,000,000	14.330%	8,021,144,000	1,149,429,935
2	2	04	1,500,000,000	2.000%	16,920,816,154	338,416,323
3	14	08	500,000,000	19.000%	1,238,048,000	235,229,120
4	8	27	7,000,000,000	3.350%	3,213,035,000	107,636,673
5	11	13	500,000,000	2.300%	2,080,200,000	47,844,600
					Total Expected Return	**1,878,556,651**
					The Remaining Budget	**-**

From four scenarios above, the largest expected return SJV will get is from scenario 2. Nevertheless, the highest number of MSMEs funded and the highest remaining budget is scenario 3. The highest expected return in scenario 2 prove that profit sharing rate and MSMEs' profit criteria has already represent the value of expected return. These are just scenarios; the ultimate decision will be left in SJV's hand.

CHAPTER 6
CONCLUSION

6.1 Conclusion

Conclusion, which can be drawn from this research, are:

1. There are several criteria in business funding proposal selection process. Some of them are very critical; such as legal status and MSMEs' business legal document. Others are not critical but important; (1) amount of funding, (2) rate of profit sharing, (3) MSMEs' equity, (4) MSMEs' profit, (5) total workforce, (6) previous relation with SJV, (7) debt service ratio, (8) collateral coverage, (9) market type, and (10) completeness of legal document.
2. Not all of criteria are related to each other; MSMEs' equity is the only criterion, which do not have relationship to other criteria.
3. Funding amount and rate of profit sharing are criteria that most significantly affect overall ranking. On the other hand, debt service ratio has the least impact to the ranking.
4. Exclusion of several proposals from ANP calculation does affect the ranking. However, the effect is very small, only a slight change in the rank composition.
5. In the scenario where budget is the constraint, one-by-one elimination rank performs better in comparison with the initial rank. In addition, the initial rank of ANP produces the smallest expected return value.
6. In this research, rate of profit sharing and MSMEs' profit criteria are good representatives of the expected return value only for this case.

6.2 Recommendation

Based on the research, SJV is recommended to consider the relation of each criterion that might affect the overall ranking and to use ANP as one of methods for choosing the best MSMEs' proposals.

For future research, it is better to consider budget allocation when choosing proposal. This research has not discussed the budget allocation in the case. To choose more than one alternatives, one-by-one elimination ANP approach can be used. However, it is advisable to group several alternatives first and then do pairwise comparison between groups. In addition, the social, environmental, and psychological aspects should be included and quantified in decision-making calculation.

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Kuesioner Pemilihan Proposal Pendanaan

Nama Responden:

	Keuangan				Manajemen		Resiko		Market	Legal			
	Nominal Pendanaan	Model Pembayaran	Ekuitas	Laba Bersih	Tenaga Kerja	Kerjasama	DSR	Coverage	Jenis Market	Dokumen Legal			
Nominal Pendanaan	1	1/3	1	1/3	3	1/5	1/3	1	1/3	1/7			
Model Pembayaran		1	3	3	7	1	1	1	1	1/3			
Ekuitas			1	1/3	3	1/3	1/3	1/3	1/3	1/5			
Laba Bersih				1	~~1~~ 3	1	1	1	1	1/3			
Tenaga Kerja					1	1/5	1/5	1/3	1/3	1/5			
Kerjasama						1	1	1	1	1			
DSR							1	1	1	1			
Coverage								1	1	1			
Jenis Market									1	1			
Dokumen Legal										1			
											1		
												1	
													1

NB: Jika menurut Anda masih ada kriteria yang perlu ditambahkan, silahkan mengisi tempat yang kosong beserta dengan nilai perbandingan.

Kuesioner Pemilihan Proposal Pendanaan – Cluster Comparison

Nama Responden:

Cluster	Keuangan	Manajemen	Resiko	Pemasaran	Legal	Alternatif			
Keuangan	1	3	1	1	3	3			
Manajemen		1	1/3	1/3	1/3	1			
Resiko			1	1	3	3			
Pemasaran				1	1	1			
Legal					1	3			
Alternatif						1			
							1		
								1	
									1

Kuesioner Rating Kriteria

Nama Responden:

No	UMKM	Bidang	Kriteria		
			Kerjasama	DSR	Jenis Market
1	LARON, UD	Jasa transportasi	8	7	9
2	JAYA MAKMUR, CV	Kontraktor	1	7	7
3	SETIA KAWAN, CV	Pertambangan	1	6	7
4	GALENA PERKASA, PT	Jasa transportasi	8	8	8
5	SURYA GRAHA KENCANA, PT	Perumahan	1	7	6
6	BONLI CIPTA SEJAHTERA, PT	Industri roti	8	8	9
7	SARI LOGAM, UD	Perdagangan besi dan sayur	1	6	7
8	SURYA BINTANG SINERGY, PT	Persewaan kapal	5	8	8
9	MULYA JAYA, UD	Industri sepatu	1	6	7
10	LENTERA HATI, UD	Industri plastik	1	6	8
11	ENOS BINTANG SELAMAT, PT	Industri lilin	1	8	9
12	LANGGENG SENTOSA, UD	Industri sepatu	1	8	8
13	UTOMO, UD	Industri rotan dan perdagangan kavling	9	8	9
14	TIMBUL REJEKI, CV	Jasa transportasi	8	6	8
15	PUTRA WIDATAMA, CV	Perdagangan mobil	9	9	9
16	MUTIARA SEJATI, UD	Perdagangan batu kapur	9	8	9
17	CATUR JAYA NUGRAHA, CV	Jasa sablon dan cetak	5	7	7
18	LARIS, UD	Industri sarung	8	7	7
19	BINTANG ALAM SENTOSA, PT	Persewaan alat berat	8	8	8
20	ARJUNA CREATIVE, CV	Persewaan LCD	5	7	6
21	MANNA, UD	Industri konveksi	8	8	8
22	JAMUR, UD	Perdagangan besi	7	6	7
23	CITRA PERSADA, UD	Perdagangan plastik bekas	9	8	8
24	KHARISMA ASTRA NUSANTARA, PT	Jasa depo kontainer	8	8	9
25	MAJU BERSAMA SEJAHTERA, CV	Kontraktor APBD	7	7	8
26	BINTANG ARSITA SAMUDERA, PT	Jasa persewaan forklift	9	9	9
27	LAGAWICO PRATAMA, PT	Kontraktor Pertamina dan sewa alat berat	8	8	8

Pengisian kuesioner ini menggunakan skala 1-10 dimana 1 merupakan poin terendah, sedangkan 10 merupakan poin tertinggi.

APPENDIX 4

EIGENVECTOR CALCULATION FOR CRITERION A1. FUNDING AMOUNT

Code	01	02	03	04	05	06	07	08	09	10	11	12	13	14
01	1.00	0.12	0.71	0.16	0.06	0.48	0.03	0.48	0.40	0.48	0.05	0.60	0.48	0.48
02	8.33	1.00	5.89	1.33	0.50	4.00	0.22	4.00	3.33	4.00	0.40	5.00	4.00	4.00
03	1.42	0.17	1.00	0.23	0.08	0.68	0.04	0.68	0.57	0.68	0.07	0.85	0.68	0.68
04	6.25	0.75	4.42	1.00	0.38	3.00	0.17	3.00	2.50	3.00	0.30	3.75	3.00	3.00
05	16.67	2.00	11.78	2.67	1.00	8.00	0.44	8.00	6.67	8.00	0.80	10.00	8.00	8.00
06	2.08	0.25	1.47	0.33	0.13	1.00	0.06	1.00	0.83	1.00	0.10	1.25	1.00	1.00
07	37.50	4.50	26.50	6.00	2.25	18.00	1.00	18.00	15.00	18.00	1.80	22.50	18.00	18.00
08	2.08	0.25	1.47	0.33	0.13	1.00	0.06	1.00	0.83	1.00	0.10	1.25	1.00	1.00
09	2.50	0.30	1.77	0.40	0.15	1.20	0.07	1.20	1.00	1.20	0.12	1.50	1.20	1.20
10	2.08	0.25	1.47	0.33	0.13	1.00	0.06	1.00	0.83	1.00	0.10	1.25	1.00	1.00
11	20.83	2.50	14.72	3.33	1.25	10.00	0.56	10.00	8.33	10.00	1.00	12.50	10.00	10.00
12	1.67	0.20	1.18	0.27	0.10	0.80	0.04	0.80	0.67	0.80	0.08	1.00	0.80	0.80
13	2.08	0.25	1.47	0.33	0.13	1.00	0.06	1.00	0.83	1.00	0.10	1.25	1.00	1.00
14	2.08	0.25	1.47	0.33	0.13	1.00	0.06	1.00	0.83	1.00	0.10	1.25	1.00	1.00
15	4.17	0.50	2.94	0.67	0.25	2.00	0.11	2.00	1.67	2.00	0.20	2.50	2.00	2.00
16	2.50	0.30	1.77	0.40	0.15	1.20	0.07	1.20	1.00	1.20	0.12	1.50	1.20	1.20
17	1.67	0.20	1.18	0.27	0.10	0.80	0.04	0.80	0.67	0.80	0.08	1.00	0.80	0.80
18	3.96	0.48	2.80	0.63	0.24	1.90	0.11	1.90	1.58	1.90	0.19	2.38	1.90	1.90
19	2.08	0.25	1.47	0.33	0.13	1.00	0.06	1.00	0.83	1.00	0.10	1.25	1.00	1.00
20	1.46	0.18	1.03	0.23	0.09	0.70	0.04	0.70	0.58	0.70	0.07	0.88	0.70	0.70
21	1.25	0.15	0.88	0.20	0.08	0.60	0.03	0.60	0.50	0.60	0.06	0.75	0.60	0.60
22	0.83	0.10	0.59	0.13	0.05	0.40	0.02	0.40	0.33	0.40	0.04	0.50	0.40	0.40
23	4.17	0.50	2.94	0.67	0.25	2.00	0.11	2.00	1.67	2.00	0.20	2.50	2.00	2.00
24	18.75	2.25	13.25	3.00	1.13	9.00	0.50	9.00	7.50	9.00	0.90	11.25	9.00	9.00
25	1.25	0.15	0.88	0.20	0.08	0.60	0.03	0.60	0.50	0.60	0.06	0.75	0.60	0.60
26	6.25	0.75	4.42	1.00	0.38	3.00	0.17	3.00	2.50	3.00	0.30	3.75	3.00	3.00
27	29.17	3.50	20.61	4.67	1.75	14.00	0.78	14.00	11.67	14.00	1.40	17.50	14.00	14.00
Total	**184.08**	**22.09**	**130.07**	**29.45**	**11.04**	**88.36**	**4.91**	**88.36**	**73.63**	**88.36**	**8.84**	**110.45**	**88.36**	**88.36**

Code	15	16	17	18	19	20	21	22	23	24	25	26	27	Total	Eigen
01	0.24	0.40	0.60	0.25	0.48	0.69	0.80	1.20	0.24	0.05	0.80	0.16	0.03	**11.47**	**0.01**
02	2.00	3.33	5.00	2.11	4.00	5.71	6.67	10.00	2.00	0.44	6.67	1.33	0.29	**95.56**	**0.05**
03	0.34	0.57	0.85	0.36	0.68	0.97	1.13	1.70	0.34	0.08	1.13	0.23	0.05	**16.23**	**0.01**
04	1.50	2.50	3.75	1.58	3.00	4.29	5.00	7.50	1.50	0.33	5.00	1.00	0.21	**71.67**	**0.03**
05	4.00	6.67	10.00	4.21	8.00	11.43	13.33	20.00	4.00	0.89	13.33	2.67	0.57	**191.12**	**0.09**
06	0.50	0.83	1.25	0.53	1.00	1.43	1.67	2.50	0.50	0.11	1.67	0.33	0.07	**23.89**	**0.01**
07	9.00	15.00	22.50	9.47	18.00	25.71	30.00	45.00	9.00	2.00	30.00	6.00	1.29	**430.02**	**0.20**
08	0.50	0.83	1.25	0.53	1.00	1.43	1.67	2.50	0.50	0.11	1.67	0.33	0.07	**23.89**	**0.01**
09	0.60	1.00	1.50	0.63	1.20	1.71	2.00	3.00	0.60	0.13	2.00	0.40	0.09	**28.67**	**0.01**
10	0.50	0.83	1.25	0.53	1.00	1.43	1.67	2.50	0.50	0.11	1.67	0.33	0.07	**23.89**	**0.01**
11	5.00	8.33	12.50	5.26	10.00	14.29	16.67	25.00	5.00	1.11	16.67	3.33	0.71	**238.90**	**0.11**
12	0.40	0.67	1.00	0.42	0.80	1.14	1.33	2.00	0.40	0.09	1.33	0.27	0.06	**19.11**	**0.01**
13	0.50	0.83	1.25	0.53	1.00	1.43	1.67	2.50	0.50	0.11	1.67	0.33	0.07	**23.89**	**0.01**
14	0.50	0.83	1.25	0.53	1.00	1.43	1.67	2.50	0.50	0.11	1.67	0.33	0.07	**23.89**	**0.01**
15	1.00	1.67	2.50	1.05	2.00	2.86	3.33	5.00	1.00	0.22	3.33	0.67	0.14	**47.78**	**0.02**
16	0.60	1.00	1.50	0.63	1.20	1.71	2.00	3.00	0.60	0.13	2.00	0.40	0.09	**28.67**	**0.01**
17	0.40	0.67	1.00	0.42	0.80	1.14	1.33	2.00	0.40	0.09	1.33	0.27	0.06	**19.11**	**0.01**
18	0.95	1.58	2.38	1.00	1.90	2.71	3.17	4.75	0.95	0.21	3.17	0.63	0.14	**45.39**	**0.02**
19	0.50	0.83	1.25	0.53	1.00	1.43	1.67	2.50	0.50	0.11	1.67	0.33	0.07	**23.89**	**0.01**
20	0.35	0.58	0.88	0.37	0.70	1.00	1.17	1.75	0.35	0.08	1.17	0.23	0.05	**16.72**	**0.01**
21	0.30	0.50	0.75	0.32	0.60	0.86	1.00	1.50	0.30	0.07	1.00	0.20	0.04	**14.33**	**0.01**
22	0.20	0.33	0.50	0.21	0.40	0.57	0.67	1.00	0.20	0.04	0.67	0.13	0.03	**9.56**	**0.00**
23	1.00	1.67	2.50	1.05	2.00	2.86	3.33	5.00	1.00	0.22	3.33	0.67	0.14	**47.78**	**0.02**
24	4.50	7.50	11.25	4.74	9.00	12.86	15.00	22.50	4.50	1.00	15.00	3.00	0.64	**215.01**	**0.10**
25	0.30	0.50	0.75	0.32	0.60	0.86	1.00	1.50	0.30	0.07	1.00	0.20	0.04	**14.33**	**0.01**
26	1.50	2.50	3.75	1.58	3.00	4.29	5.00	7.50	1.50	0.33	5.00	1.00	0.21	**71.67**	**0.03**
27	7.00	11.67	17.50	7.37	14.00	20.00	23.33	35.00	7.00	1.56	23.33	4.67	1.00	**334.46**	**0.16**
Total	**44.18**	**73.63**	**110.45**	**46.50**	**88.36**	**126.23**	**147.27**	**220.90**	**44.18**	**9.82**	**147.27**	**29.45**	**6.31**	**2,110.91**	**1.00**

APPENDIX 5

EIGENVECTOR CALCULATION FOR CRITERION A2. RATE OF PROFIT SHARING

Code	01	02	03	04	05	06	07	08	09	10	11	12	13	14
01	1.00	65.83	1.58	0.40	0.21	0.06	0.17	0.04	0.19	0.35	0.63	0.36	0.34	1.76
02	0.02	1.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.03
03	0.63	41.67	1.00	0.25	0.14	0.03	0.11	0.03	0.12	0.22	0.40	0.23	0.22	1.11
04	2.53	166.67	4.00	1.00	0.54	0.14	0.42	0.11	0.47	0.88	1.60	0.90	0.87	4.45
05	4.68	308.33	7.40	1.85	1.00	0.26	0.78	0.19	0.87	1.63	2.96	1.67	1.61	8.24
06	18.14	1194.17	28.66	7.17	3.87	1.00	3.04	0.75	3.38	6.31	11.46	6.48	6.23	31.92
07	5.97	393.33	9.44	2.36	1.28	0.33	1.00	0.25	1.11	2.08	3.78	2.14	2.05	10.51
08	24.05	1583.33	38.00	9.50	5.14	1.33	4.03	1.00	4.48	8.37	15.20	8.60	8.26	42.32
09	5.37	353.33	8.48	2.12	1.15	0.30	0.90	0.22	1.00	1.87	3.39	1.92	1.84	9.44
10	2.87	189.17	4.54	1.14	0.61	0.16	0.48	0.12	0.54	1.00	1.82	1.03	0.99	5.06
11	1.58	104.17	2.50	0.63	0.34	0.09	0.26	0.07	0.29	0.55	1.00	0.57	0.54	2.78
12	2.80	184.17	4.42	1.11	0.60	0.15	0.47	0.12	0.52	0.97	1.77	1.00	0.96	4.92
13	2.91	191.67	4.60	1.15	0.62	0.16	0.49	0.12	0.54	1.01	1.84	1.04	1.00	5.12
14	0.57	37.42	0.90	0.22	0.12	0.03	0.10	0.02	0.11	0.20	0.36	0.20	0.20	1.00
15	25.97	1710.00	41.04	10.26	5.55	1.43	4.35	1.08	4.84	9.04	16.42	9.29	8.92	45.70
16	0.48	31.67	0.76	0.19	0.10	0.03	0.08	0.02	0.09	0.17	0.30	0.17	0.17	0.85
17	4.42	290.83	6.98	1.75	0.94	0.24	0.74	0.18	0.82	1.54	2.79	1.58	1.52	7.77
18	9.04	595.00	14.28	3.57	1.93	0.50	1.51	0.38	1.68	3.15	5.71	3.23	3.10	15.90
19	15.19	1000.00	24.00	6.00	3.24	0.84	2.54	0.63	2.83	5.29	9.60	5.43	5.22	26.73
20	1.97	130.00	3.12	0.78	0.42	0.11	0.33	0.08	0.37	0.69	1.25	0.71	0.68	3.47
21	1.04	68.33	1.64	0.41	0.22	0.06	0.17	0.04	0.19	0.36	0.66	0.37	0.36	1.83
22	1.09	71.67	1.72	0.43	0.23	0.06	0.18	0.05	0.20	0.38	0.69	0.39	0.37	1.92
23	1.08	70.83	1.70	0.43	0.23	0.06	0.18	0.04	0.20	0.37	0.68	0.38	0.37	1.89
24	1.70	111.67	2.68	0.67	0.36	0.09	0.28	0.07	0.32	0.59	1.07	0.61	0.58	2.98
25	2.00	131.67	3.16	0.79	0.43	0.11	0.33	0.08	0.37	0.70	1.26	0.71	0.69	3.52
26	1.66	109.17	2.62	0.66	0.35	0.09	0.28	0.07	0.31	0.58	1.05	0.59	0.57	2.92
27	4.24	279.17	6.70	1.68	0.91	0.23	0.71	0.18	0.79	1.48	2.68	1.52	1.46	7.46
Total	**143.00**	**9414.25**	**225.94**	**56.49**	**30.53**	**7.88**	**23.93**	**5.95**	**26.64**	**49.77**	**90.38**	**51.12**	**49.12**	**251.61**

Code	15	16	17	18	19	20	21	22	23	24	25	26	27	Total	Eigen
01	0.04	2.08	0.23	0.11	0.07	0.51	0.96	0.92	0.93	0.59	0.50	0.60	0.24	80.68	**0.01**
02	0.00	0.03	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	1.23	**0.00**
03	0.02	1.32	0.14	0.07	0.04	0.32	0.61	0.58	0.59	0.37	0.32	0.38	0.15	51.06	**0.00**
04	0.10	5.26	0.57	0.28	0.17	1.28	2.44	2.33	2.35	1.49	1.27	1.53	0.60	204.25	**0.02**
05	0.18	9.74	1.06	0.52	0.31	2.37	4.51	4.30	4.35	2.76	2.34	2.82	1.10	377.86	**0.03**
06	0.70	37.71	4.11	2.01	1.19	9.19	17.48	16.66	16.86	10.69	9.07	10.94	4.28	1463.46	**0.13**
07	0.23	12.42	1.35	0.66	0.39	3.03	5.76	5.49	5.55	3.52	2.99	3.60	1.41	482.03	**0.04**
08	0.93	50.00	5.44	2.66	1.58	12.18	23.17	22.09	22.35	14.18	12.03	14.50	5.67	1940.39	**0.17**
09	0.21	11.16	1.21	0.59	0.35	2.72	5.17	4.93	4.99	3.16	2.68	3.24	1.27	433.01	**0.04**
10	0.11	5.97	0.65	0.32	0.19	1.46	2.77	2.64	2.67	1.69	1.44	1.73	0.68	231.83	**0.02**
11	0.06	3.29	0.36	0.18	0.10	0.80	1.52	1.45	1.47	0.93	0.79	0.95	0.37	127.66	**0.01**
12	0.11	5.82	0.63	0.31	0.18	1.42	2.70	2.57	2.60	1.65	1.40	1.69	0.66	225.70	**0.02**
13	0.11	6.05	0.66	0.32	0.19	1.47	2.80	2.67	2.71	1.72	1.46	1.76	0.69	234.89	**0.02**
14	0.02	1.18	0.13	0.06	0.04	0.29	0.55	0.52	0.53	0.34	0.28	0.34	0.13	45.85	**0.00**
15	1.00	54.00	5.88	2.87	1.71	13.15	25.02	23.86	24.14	15.31	12.99	15.66	6.13	2095.62	**0.18**
16	0.02	1.00	0.11	0.05	0.03	0.24	0.46	0.44	0.45	0.28	0.24	0.29	0.11	38.81	**0.00**
17	0.17	9.18	1.00	0.49	0.29	2.24	4.26	4.06	4.11	2.60	2.21	2.66	1.04	356.42	**0.03**
18	0.35	18.79	2.05	1.00	0.60	4.58	8.71	8.30	8.40	5.33	4.52	5.45	2.13	729.18	**0.06**
19	0.58	31.58	3.44	1.68	1.00	7.69	14.63	13.95	14.12	8.96	7.59	9.16	3.58	1225.51	**0.11**
20	0.08	4.11	0.45	0.22	0.13	1.00	1.90	1.81	1.84	1.16	0.99	1.19	0.47	159.32	**0.01**
21	0.04	2.16	0.23	0.11	0.07	0.53	1.00	0.95	0.96	0.61	0.52	0.63	0.24	83.74	**0.01**
22	0.04	2.26	0.25	0.12	0.07	0.55	1.05	1.00	1.01	0.64	0.54	0.66	0.26	87.83	**0.01**
23	0.04	2.24	0.24	0.12	0.07	0.54	1.04	0.99	1.00	0.63	0.54	0.65	0.25	86.81	**0.01**
24	0.07	3.53	0.38	0.19	0.11	0.86	1.63	1.56	1.58	1.00	0.85	1.02	0.40	136.85	**0.01**
25	0.08	4.16	0.45	0.22	0.13	1.01	1.93	1.84	1.86	1.18	1.00	1.21	0.47	161.36	**0.01**
26	0.06	3.45	0.38	0.18	0.11	0.84	1.60	1.52	1.54	0.98	0.83	1.00	0.39	133.78	**0.01**
27	0.16	8.82	0.96	0.47	0.28	2.15	4.09	3.90	3.94	2.50	2.12	2.56	1.00	342.12	**0.03**
Total	**5.51**	**297.29**	**32.37**	**15.82**	**9.41**	**72.42**	**137.77**	**131.36**	**132.91**	**84.31**	**71.50**	**86.24**	**33.72**	**11537.23**	**1.00**

APPENDIX 6
EIGENVECTOR CALCULATION FOR CRITERION A3. EQUITY

Code	01	02	03	04	05	06	07	08	09	10	11	12	13	14
01	1.00	0.06	0.95	0.06	0.15	0.20	0.98	0.51	1.80	0.59	0.26	4.36	0.50	0.31
02	17.56	1.00	16.77	1.03	2.65	3.48	17.21	9.00	31.60	10.38	4.57	76.58	8.79	5.50
03	1.05	0.06	1.00	0.06	0.16	0.21	1.03	0.54	1.88	0.62	0.27	4.57	0.52	0.33
04	17.11	0.97	16.34	1.00	2.59	3.39	16.76	8.77	30.79	10.11	4.46	74.61	8.57	5.36
05	6.62	0.38	6.32	0.39	1.00	1.31	6.49	3.39	11.91	3.91	1.72	28.86	3.31	2.07
06	5.05	0.29	4.82	0.29	0.76	1.00	4.95	2.59	9.08	2.98	1.31	22.01	2.53	1.58
07	1.02	0.06	0.97	0.06	0.15	0.20	1.00	0.52	1.84	0.60	0.27	4.45	0.51	0.32
08	1.95	0.11	1.86	0.11	0.29	0.39	1.91	1.00	3.51	1.15	0.51	8.51	0.98	0.61
09	0.56	0.03	0.53	0.03	0.08	0.11	0.54	0.28	1.00	0.33	0.14	2.42	0.28	0.17
10	1.69	0.10	1.62	0.10	0.26	0.34	1.66	0.87	3.04	1.00	0.44	7.38	0.85	0.53
11	3.84	0.22	3.67	0.22	0.58	0.76	3.76	1.97	6.91	2.27	1.00	16.74	1.92	1.20
12	0.23	0.01	0.22	0.01	0.03	0.05	0.22	0.12	0.41	0.14	0.06	1.00	0.11	0.07
13	2.00	0.11	1.91	0.12	0.30	0.40	1.96	1.02	3.59	1.18	0.52	8.71	1.00	0.63
14	3.19	0.18	3.05	0.19	0.48	0.63	3.13	1.64	5.75	1.89	0.83	13.92	1.60	1.00
15	0.54	0.03	0.52	0.03	0.08	0.11	0.53	0.28	0.97	0.32	0.14	2.36	0.27	0.17
16	9.01	0.51	8.60	0.53	1.36	1.78	8.83	4.62	16.21	5.32	2.35	39.28	4.51	2.82
17	0.65	0.04	0.62	0.04	0.10	0.13	0.63	0.33	1.16	0.38	0.17	2.81	0.32	0.20
18	1.95	0.11	1.87	0.11	0.30	0.39	1.91	1.00	3.52	1.15	0.51	8.52	0.98	0.61
19	0.37	0.02	0.36	0.02	0.06	0.07	0.37	0.19	0.67	0.22	0.10	1.63	0.19	0.12
20	0.48	0.03	0.46	0.03	0.07	0.10	0.47	0.25	0.87	0.29	0.13	2.11	0.24	0.15
21	2.06	0.12	1.96	0.12	0.31	0.41	2.01	1.05	3.70	1.21	0.54	8.96	1.03	0.64
22	0.36	0.02	0.34	0.02	0.05	0.07	0.35	0.18	0.65	0.21	0.09	1.56	0.18	0.11
23	1.64	0.09	1.57	0.10	0.25	0.33	1.61	0.84	2.95	0.97	0.43	7.16	0.82	0.51
24	3.88	0.22	3.71	0.23	0.59	0.77	3.80	1.99	6.98	2.29	1.01	16.92	1.94	1.22
25	0.79	0.05	0.76	0.05	0.12	0.16	0.78	0.41	1.43	0.47	0.21	3.46	0.40	0.25
26	7.86	0.45	7.51	0.46	1.19	1.56	7.70	4.03	14.15	4.65	2.05	34.28	3.94	2.46
27	21.81	1.24	20.83	1.27	3.30	4.32	21.37	11.18	39.25	12.89	5.68	95.13	10.92	6.83
Total	**114.27**	**6.51**	**109.11**	**6.68**	**17.26**	**22.64**	**111.96**	**58.57**	**205.62**	**67.53**	**29.76**	**498.31**	**57.21**	**35.79**

Code	15	16	17	18	19	20	21	22	23	24	25	26	27	Total	Eigen
01	1.85	0.11	1.55	0.51	2.68	2.07	0.49	2.79	0.61	0.26	1.26	0.13	0.05	**26.09**	**0.01**
02	32.48	1.95	27.23	8.99	47.11	36.38	8.54	48.98	10.70	4.53	22.15	2.23	0.81	**458.21**	**0.15**
03	1.94	0.12	1.62	0.54	2.81	2.17	0.51	2.92	0.64	0.27	1.32	0.13	0.05	**27.32**	**0.01**
04	31.64	1.90	26.53	8.76	45.90	35.44	8.32	47.72	10.43	4.41	21.58	2.18	0.78	**446.43**	**0.15**
05	12.24	0.73	10.26	3.39	17.76	13.71	3.22	18.46	4.03	1.71	8.35	0.84	0.30	**172.69**	**0.06**
06	9.33	0.56	7.83	2.58	13.54	10.46	2.46	14.08	3.08	1.30	6.37	0.64	0.23	**131.69**	**0.04**
07	1.89	0.11	1.58	0.52	2.74	2.11	0.50	2.85	0.62	0.26	1.29	0.13	0.05	**26.63**	**0.01**
08	3.61	0.22	3.02	1.00	5.23	4.04	0.95	5.44	1.19	0.50	2.46	0.25	0.09	**50.91**	**0.02**
09	1.03	0.06	0.86	0.28	1.49	1.15	0.27	1.55	0.34	0.14	0.70	0.07	0.03	**14.50**	**0.00**
10	3.13	0.19	2.62	0.87	4.54	3.51	0.82	4.72	1.03	0.44	2.13	0.22	0.08	**44.15**	**0.01**
11	7.10	0.43	5.95	1.97	10.30	7.95	1.87	10.71	2.34	0.99	4.84	0.49	0.18	**100.17**	**0.03**
12	0.42	0.03	0.36	0.12	0.62	0.48	0.11	0.64	0.14	0.06	0.29	0.03	0.01	**5.98**	**0.00**
13	3.69	0.22	3.10	1.02	5.36	4.14	0.97	5.57	1.22	0.51	2.52	0.25	0.09	**52.12**	**0.02**
14	5.90	0.35	4.95	1.63	8.57	6.61	1.55	8.91	1.95	0.82	4.03	0.41	0.15	**83.31**	**0.03**
15	1.00	0.06	0.84	0.28	1.45	1.12	0.26	1.51	0.33	0.14	0.68	0.07	0.02	**14.11**	**0.00**
16	16.66	1.00	13.96	4.61	24.16	18.66	4.38	25.12	5.49	2.32	11.36	1.15	0.41	**235.01**	**0.08**
17	1.19	0.07	1.00	0.33	1.73	1.34	0.31	1.80	0.39	0.17	0.81	0.08	0.03	**16.83**	**0.01**
18	3.61	0.22	3.03	1.00	5.24	4.05	0.95	5.45	1.19	0.50	2.46	0.25	0.09	**50.97**	**0.02**
19	0.69	0.04	0.58	0.19	1.00	0.77	0.18	1.04	0.23	0.10	0.47	0.05	0.02	**9.73**	**0.00**
20	0.89	0.05	0.75	0.25	1.30	1.00	0.23	1.35	0.29	0.12	0.61	0.06	0.02	**12.60**	**0.00**
21	3.80	0.23	3.19	1.05	5.51	4.26	1.00	5.73	1.25	0.53	2.59	0.26	0.09	**53.63**	**0.02**
22	0.66	0.04	0.56	0.18	0.96	0.74	0.17	1.00	0.22	0.09	0.45	0.05	0.02	**9.35**	**0.00**
23	3.03	0.18	2.54	0.84	4.40	3.40	0.80	4.58	1.00	0.42	2.07	0.21	0.08	**42.81**	**0.01**
24	7.18	0.43	6.02	1.99	10.41	8.04	1.89	10.82	2.36	1.00	4.89	0.49	0.18	**101.24**	**0.03**
25	1.47	0.09	1.23	0.41	2.13	1.64	0.39	2.21	0.48	0.20	1.00	0.10	0.04	**20.69**	**0.01**
26	14.54	0.87	12.19	4.02	21.09	16.28	3.82	21.93	4.79	2.03	9.91	1.00	0.36	**205.10**	**0.07**
27	40.34	2.42	33.82	11.17	58.52	45.19	10.61	60.84	13.29	5.62	27.51	2.78	1.00	**569.15**	**0.19**
Total	**211.31**	**12.69**	**177.16**	**58.49**	**306.56**	**236.70**	**55.59**	**318.72**	**69.64**	**29.45**	**144.12**	**14.54**	**5.24**	**2981.41**	**1.00**

APPENDIX 7
EIGENVECTOR CALCULATION FOR CRITERION A4. PROFIT

Code	01	02	03	04	05	06	07	08	09	10	11	12	13	14
01	1.00	0.03	0.07	0.01	0.10	0.02	0.18	0.14	0.17	0.15	0.49	4.99	0.08	0.13
02	33.79	1.00	2.45	0.34	3.32	0.71	6.19	4.62	5.88	5.02	16.67	168.66	2.75	4.42
03	13.79	0.41	1.00	0.14	1.35	0.29	2.53	1.89	2.40	2.05	6.80	68.81	1.12	1.80
04	99.89	2.96	7.24	1.00	9.81	2.11	18.30	13.67	17.38	14.85	49.28	498.55	8.13	13.07
05	10.18	0.30	0.74	0.10	1.00	0.22	1.87	1.39	1.77	1.51	5.02	50.83	0.83	1.33
06	47.35	1.40	3.43	0.47	4.65	1.00	8.67	6.48	8.24	7.04	23.36	236.33	3.86	6.20
07	5.46	0.16	0.40	0.05	0.54	0.12	1.00	0.75	0.95	0.81	2.69	27.25	0.44	0.71
08	7.31	0.22	0.53	0.07	0.72	0.15	1.34	1.00	1.27	1.09	3.61	36.48	0.60	0.96
09	5.75	0.17	0.42	0.06	0.56	0.12	1.05	0.79	1.00	0.85	2.84	28.68	0.47	0.75
10	6.73	0.20	0.49	0.07	0.66	0.14	1.23	0.92	1.17	1.00	3.32	33.58	0.55	0.88
11	2.03	0.06	0.15	0.02	0.20	0.04	0.37	0.28	0.35	0.30	1.00	10.12	0.17	0.27
12	0.20	0.01	0.01	0.00	0.02	0.00	0.04	0.03	0.03	0.03	0.10	1.00	0.02	0.03
13	12.28	0.36	0.89	0.12	1.21	0.26	2.25	1.68	2.14	1.83	6.06	61.29	1.00	1.61
14	7.64	0.23	0.55	0.08	0.75	0.16	1.40	1.05	1.33	1.14	3.77	38.14	0.62	1.00
15	1.97	0.06	0.14	0.02	0.19	0.04	0.36	0.27	0.34	0.29	0.97	9.85	0.16	0.26
16	5.19	0.15	0.38	0.05	0.51	0.11	0.95	0.71	0.90	0.77	2.56	25.91	0.42	0.68
17	1.48	0.04	0.11	0.01	0.15	0.03	0.27	0.20	0.26	0.22	0.73	7.41	0.12	0.19
18	6.37	0.19	0.46	0.06	0.62	0.13	1.17	0.87	1.11	0.95	3.14	31.77	0.52	0.83
19	3.39	0.10	0.25	0.03	0.33	0.07	0.62	0.46	0.59	0.50	1.67	16.91	0.28	0.44
20	2.41	0.07	0.17	0.02	0.24	0.05	0.44	0.33	0.42	0.36	1.19	12.01	0.20	0.31
21	6.75	0.20	0.49	0.07	0.66	0.14	1.24	0.92	1.17	1.00	3.33	33.67	0.55	0.88
22	2.43	0.07	0.18	0.02	0.24	0.05	0.44	0.33	0.42	0.36	1.20	12.12	0.20	0.32
23	9.73	0.29	0.71	0.10	0.96	0.21	1.78	1.33	1.69	1.45	4.80	48.58	0.79	1.27
24	5.02	0.15	0.36	0.05	0.49	0.11	0.92	0.69	0.87	0.75	2.48	25.05	0.41	0.66
25	2.01	0.06	0.15	0.02	0.20	0.04	0.37	0.28	0.35	0.30	0.99	10.03	0.16	0.26
26	18.85	0.56	1.37	0.19	1.85	0.40	3.45	2.58	3.28	2.80	9.30	94.11	1.54	2.47
27	18.97	0.56	1.38	0.19	1.86	0.40	3.47	2.60	3.30	2.82	9.36	94.67	1.54	2.48
Total	**337.96**	**10.00**	**24.51**	**3.38**	**33.18**	**7.14**	**61.91**	**46.24**	**58.81**	**50.23**	**166.74**	**1686.78**	**27.52**	**44.22**

Code	15	16	17	18	19	20	21	22	23	24	25	26	27	Total	Eigen
01	0.51	0.19	0.67	0.16	0.30	0.42	0.15	0.41	0.10	0.20	0.50	0.05	0.05	**11.28**	**0.00**
02	17.13	6.51	22.76	5.31	9.98	14.05	5.01	13.92	3.47	6.73	16.81	1.79	1.78	**381.08**	**0.10**
03	6.99	2.66	9.29	2.17	4.07	5.73	2.04	5.68	1.42	2.75	6.86	0.73	0.73	**155.49**	**0.04**
04	50.63	19.24	67.29	15.69	29.49	41.52	14.81	41.14	10.26	19.90	49.70	5.30	5.27	**1126.46**	**0.30**
05	5.16	1.96	6.86	1.60	3.01	4.23	1.51	4.19	1.05	2.03	5.07	0.54	0.54	**114.86**	**0.03**
06	24.00	9.12	31.90	7.44	13.98	19.68	7.02	19.50	4.86	9.43	23.56	2.51	2.50	**533.99**	**0.14**
07	2.77	1.05	3.68	0.86	1.61	2.27	0.81	2.25	0.56	1.09	2.72	0.29	0.29	**61.56**	**0.02**
08	3.70	1.41	4.92	1.15	2.16	3.04	1.08	3.01	0.75	1.46	3.64	0.39	0.39	**82.42**	**0.02**
09	2.91	1.11	3.87	0.90	1.70	2.39	0.85	2.37	0.59	1.14	2.86	0.30	0.30	**64.80**	**0.02**
10	3.41	1.30	4.53	1.06	1.99	2.80	1.00	2.77	0.69	1.34	3.35	0.36	0.35	**75.88**	**0.02**
11	1.03	0.39	1.37	0.32	0.60	0.84	0.30	0.83	0.21	0.40	1.01	0.11	0.11	**22.86**	**0.01**
12	0.10	0.04	0.13	0.03	0.06	0.08	0.03	0.08	0.02	0.04	0.10	0.01	0.01	**2.26**	**0.00**
13	6.22	2.37	8.27	1.93	3.63	5.10	1.82	5.06	1.26	2.45	6.11	0.65	0.65	**138.48**	**0.04**
14	3.87	1.47	5.15	1.20	2.26	3.18	1.13	3.15	0.79	1.52	3.80	0.41	0.40	**86.19**	**0.02**
15	1.00	0.38	1.33	0.31	0.58	0.82	0.29	0.81	0.20	0.39	0.98	0.10	0.10	**22.25**	**0.01**
16	2.63	1.00	3.50	0.82	1.53	2.16	0.77	2.14	0.53	1.03	2.58	0.28	0.27	**58.54**	**0.02**
17	0.75	0.29	1.00	0.23	0.44	0.62	0.22	0.61	0.15	0.30	0.74	0.08	0.08	**16.74**	**0.00**
18	3.23	1.23	4.29	1.00	1.88	2.65	0.94	2.62	0.65	1.27	3.17	0.34	0.34	**71.78**	**0.02**
19	1.72	0.65	2.28	0.53	1.00	1.41	0.50	1.39	0.35	0.67	1.69	0.18	0.18	**38.20**	**0.01**
20	1.22	0.46	1.62	0.38	0.71	1.00	0.36	0.99	0.25	0.48	1.20	0.13	0.13	**27.13**	**0.01**
21	3.42	1.30	4.54	1.06	1.99	2.80	1.00	2.78	0.69	1.34	3.36	0.36	0.36	**76.07**	**0.02**
22	1.23	0.47	1.64	0.38	0.72	1.01	0.36	1.00	0.25	0.48	1.21	0.13	0.13	**27.38**	**0.01**
23	4.93	1.88	6.56	1.53	2.87	4.05	1.44	4.01	1.00	1.94	4.84	0.52	0.51	**109.77**	**0.03**
24	2.54	0.97	3.38	0.79	1.48	2.09	0.74	2.07	0.52	1.00	2.50	0.27	0.26	**56.61**	**0.01**
25	1.02	0.39	1.35	0.32	0.59	0.84	0.30	0.83	0.21	0.40	1.00	0.11	0.11	**22.67**	**0.01**
26	9.56	3.63	12.70	2.96	5.57	7.84	2.80	7.77	1.94	3.76	9.38	1.00	0.99	**212.63**	**0.06**
27	9.61	3.65	12.78	2.98	5.60	7.88	2.81	7.81	1.95	3.78	9.44	1.01	1.00	**213.90**	**0.06**
Total	171.29	65.11	227.66	53.10	99.78	140.48	50.10	139.19	34.72	67.33	168.15	17.92	17.82	**3811.28**	**1.00**

APPENDIX 8
EIGENVECTOR CALCULATION FOR CRITERION B1. WORKFORCE

Code	01	02	03	04	05	06	07	08	09	10	11	12	13	14
01	1.00	0.11	0.44	0.05	1.70	0.02	1.89	0.68	0.68	0.71	0.34	2.83	0.46	0.10
02	9.41	1.00	4.10	0.47	16.00	0.17	17.78	6.40	6.40	6.67	3.20	26.67	4.32	0.90
03	2.29	0.24	1.00	0.12	3.90	0.04	4.33	1.56	1.56	1.63	0.78	6.50	1.05	0.22
04	19.88	2.11	8.67	1.00	33.80	0.37	37.56	13.52	13.52	14.08	6.76	56.33	9.14	1.91
05	0.59	0.06	0.26	0.03	1.00	0.01	1.11	0.40	0.40	0.42	0.20	1.67	0.27	0.06
06	53.94	5.73	23.51	2.71	91.70	1.00	101.89	36.68	36.68	38.21	18.34	152.83	24.78	5.18
07	0.53	0.06	0.23	0.03	0.90	0.01	1.00	0.36	0.36	0.38	0.18	1.50	0.24	0.05
08	1.47	0.16	0.64	0.07	2.50	0.03	2.78	1.00	1.00	1.04	0.50	4.17	0.68	0.14
09	1.47	0.16	0.64	0.07	2.50	0.03	2.78	1.00	1.00	1.04	0.50	4.17	0.68	0.14
10	1.41	0.15	0.62	0.07	2.40	0.03	2.67	0.96	0.96	1.00	0.48	4.00	0.65	0.14
11	2.94	0.31	1.28	0.15	5.00	0.05	5.56	2.00	2.00	2.08	1.00	8.33	1.35	0.28
12	0.35	0.04	0.15	0.02	0.60	0.01	0.67	0.24	0.24	0.25	0.12	1.00	0.16	0.03
13	2.18	0.23	0.95	0.11	3.70	0.04	4.11	1.48	1.48	1.54	0.74	6.17	1.00	0.21
14	10.41	1.11	4.54	0.52	17.70	0.19	19.67	7.08	7.08	7.38	3.54	29.50	4.78	1.00
15	0.53	0.06	0.23	0.03	0.90	0.01	1.00	0.36	0.36	0.38	0.18	1.50	0.24	0.05
16	12.35	1.31	5.38	0.62	21.00	0.23	23.33	8.40	8.40	8.75	4.20	35.00	5.68	1.19
17	0.41	0.04	0.18	0.02	0.70	0.01	0.78	0.28	0.28	0.29	0.14	1.17	0.19	0.04
18	10.00	1.06	4.36	0.50	17.00	0.19	18.89	6.80	6.80	7.08	3.40	28.33	4.59	0.96
19	0.12	0.01	0.05	0.01	0.20	0.00	0.22	0.08	0.08	0.08	0.04	0.33	0.05	0.01
20	0.24	0.03	0.10	0.01	0.40	0.00	0.44	0.16	0.16	0.17	0.08	0.67	0.11	0.02
21	1.06	0.11	0.46	0.05	1.80	0.02	2.00	0.72	0.72	0.75	0.36	3.00	0.49	0.10
22	0.65	0.07	0.28	0.03	1.10	0.01	1.22	0.44	0.44	0.46	0.22	1.83	0.30	0.06
23	0.76	0.08	0.33	0.04	1.30	0.01	1.44	0.52	0.52	0.54	0.26	2.17	0.35	0.07
24	8.18	0.87	3.56	0.41	13.90	0.15	15.44	5.56	5.56	5.79	2.78	23.17	3.76	0.79
25	0.12	0.01	0.05	0.01	0.20	0.00	0.22	0.08	0.08	0.08	0.04	0.33	0.05	0.01
26	8.24	0.88	3.59	0.41	14.00	0.15	15.56	5.60	5.60	5.83	2.80	23.33	3.78	0.79
27	0.88	0.09	0.38	0.04	1.50	0.02	1.67	0.60	0.60	0.63	0.30	2.50	0.41	0.08
Total	**151.41**	**16.09**	**66.00**	**7.62**	**257.40**	**2.81**	**286.00**	**102.96**	**102.96**	**107.25**	**51.48**	**429.00**	**69.57**	**14.54**

Code	15	16	17	18	19	20	21	22	23	24	25	26	27	Total	Eigen
01	1.89	0.08	2.43	0.10	8.50	4.25	0.94	1.55	1.31	0.12	8.50	0.12	1.13	**41.92**	**0.01**
02	17.78	0.76	22.86	0.94	80.00	40.00	8.89	14.55	12.31	1.15	80.00	1.14	10.67	**394.54**	**0.06**
03	4.33	0.19	5.57	0.23	19.50	9.75	2.17	3.55	3.00	0.28	19.50	0.28	2.60	**96.17**	**0.02**
04	37.56	1.61	48.29	1.99	169.00	84.50	18.78	30.73	26.00	2.43	169.00	2.41	22.53	**833.47**	**0.13**
05	1.11	0.05	1.43	0.06	5.00	2.50	0.56	0.91	0.77	0.07	5.00	0.07	0.67	**24.66**	**0.00**
06	101.89	4.37	131.00	5.39	458.50	229.25	50.94	83.36	70.54	6.60	458.50	6.55	61.13	**2261.22**	**0.36**
07	1.00	0.04	1.29	0.05	4.50	2.25	0.50	0.82	0.69	0.06	4.50	0.06	0.60	**22.19**	**0.00**
08	2.78	0.12	3.57	0.15	12.50	6.25	1.39	2.27	1.92	0.18	12.50	0.18	1.67	**61.65**	**0.01**
09	2.78	0.12	3.57	0.15	12.50	6.25	1.39	2.27	1.92	0.18	12.50	0.18	1.67	**61.65**	**0.01**
10	2.67	0.11	3.43	0.14	12.00	6.00	1.33	2.18	1.85	0.17	12.00	0.17	1.60	**59.18**	**0.01**
11	5.56	0.24	7.14	0.29	25.00	12.50	2.78	4.55	3.85	0.36	25.00	0.36	3.33	**123.29**	**0.02**
12	0.67	0.03	0.86	0.04	3.00	1.50	0.33	0.55	0.46	0.04	3.00	0.04	0.40	**14.80**	**0.00**
13	4.11	0.18	5.29	0.22	18.50	9.25	2.06	3.36	2.85	0.27	18.50	0.26	2.47	**91.24**	**0.01**
14	19.67	0.84	25.29	1.04	88.50	44.25	9.83	16.09	13.62	1.27	88.50	1.26	11.80	**436.46**	**0.07**
15	1.00	0.04	1.29	0.05	4.50	2.25	0.50	0.82	0.69	0.06	4.50	0.06	0.60	**22.19**	**0.00**
16	23.33	1.00	30.00	1.24	105.00	52.50	11.67	19.09	16.15	1.51	105.00	1.50	14.00	**517.84**	**0.08**
17	0.78	0.03	1.00	0.04	3.50	1.75	0.39	0.64	0.54	0.05	3.50	0.05	0.47	**17.26**	**0.00**
18	18.89	0.81	24.29	1.00	85.00	42.50	9.44	15.45	13.08	1.22	85.00	1.21	11.33	**419.20**	**0.07**
19	0.22	0.01	0.29	0.01	1.00	0.50	0.11	0.18	0.15	0.01	1.00	0.01	0.13	**4.93**	**0.00**
20	0.44	0.02	0.57	0.02	2.00	1.00	0.22	0.36	0.31	0.03	2.00	0.03	0.27	**9.86**	**0.00**
21	2.00	0.09	2.57	0.11	9.00	4.50	1.00	1.64	1.38	0.13	9.00	0.13	1.20	**44.39**	**0.01**
22	1.22	0.05	1.57	0.06	5.50	2.75	0.61	1.00	0.85	0.08	5.50	0.08	0.73	**27.12**	**0.00**
23	1.44	0.06	1.86	0.08	6.50	3.25	0.72	1.18	1.00	0.09	6.50	0.09	0.87	**32.06**	**0.01**
24	15.44	0.66	19.86	0.82	69.50	34.75	7.72	12.64	10.69	1.00	69.50	0.99	9.27	**342.76**	**0.05**
25	0.22	0.01	0.29	0.01	1.00	0.50	0.11	0.18	0.15	0.01	1.00	0.01	0.13	**4.93**	**0.00**
26	15.56	0.67	20.00	0.82	70.00	35.00	7.78	12.73	10.77	1.01	70.00	1.00	9.33	**345.22**	**0.05**
27	1.67	0.07	2.14	0.09	7.50	3.75	0.83	1.36	1.15	0.11	7.50	0.11	1.00	**36.99**	**0.01**
Total	**286.00**	**12.26**	**367.71**	**15.14**	**1287.00**	**643.50**	**143.00**	**234.00**	**198.00**	**18.52**	**1287.00**	**18.39**	**171.60**	**6347.20**	**1.00**

APPENDIX 9

EIGENVECTOR CALCULATION FOR CRITERION B2. COOPERATION

Code	01	02	03	04	05	06	07	08	09	10	11	12	13	14
01	1.00	8.00	8.00	1.00	8.00	1.00	8.00	1.60	8.00	8.00	8.00	8.00	0.89	1.00
02	0.13	1.00	1.00	0.13	1.00	0.13	1.00	0.20	1.00	1.00	1.00	1.00	0.11	0.13
03	0.13	1.00	1.00	0.13	1.00	0.13	1.00	0.20	1.00	1.00	1.00	1.00	0.11	0.13
04	1.00	8.00	8.00	1.00	8.00	1.00	8.00	1.60	8.00	8.00	8.00	8.00	0.89	1.00
05	0.13	1.00	1.00	0.13	1.00	0.13	1.00	0.20	1.00	1.00	1.00	1.00	0.11	0.13
06	1.00	8.00	8.00	1.00	8.00	1.00	8.00	1.60	8.00	8.00	8.00	8.00	0.89	1.00
07	0.13	1.00	1.00	0.13	1.00	0.13	1.00	0.20	1.00	1.00	1.00	1.00	0.11	0.13
08	0.63	5.00	5.00	0.63	5.00	0.63	5.00	1.00	5.00	5.00	5.00	5.00	0.56	0.63
09	0.13	1.00	1.00	0.13	1.00	0.13	1.00	0.20	1.00	1.00	1.00	1.00	0.11	0.13
10	0.13	1.00	1.00	0.13	1.00	0.13	1.00	0.20	1.00	1.00	1.00	1.00	0.11	0.13
11	0.13	1.00	1.00	0.13	1.00	0.13	1.00	0.20	1.00	1.00	1.00	1.00	0.11	0.13
12	0.13	1.00	1.00	0.13	1.00	0.13	1.00	0.20	1.00	1.00	1.00	1.00	0.11	0.13
13	1.13	9.00	9.00	1.13	9.00	1.13	9.00	1.80	9.00	9.00	9.00	9.00	1.00	1.13
14	1.00	8.00	8.00	1.00	8.00	1.00	8.00	1.60	8.00	8.00	8.00	8.00	0.89	1.00
15	1.13	9.00	9.00	1.13	9.00	1.13	9.00	1.80	9.00	9.00	9.00	9.00	1.00	1.13
16	1.13	9.00	9.00	1.13	9.00	1.13	9.00	1.80	9.00	9.00	9.00	9.00	1.00	1.13
17	0.63	5.00	5.00	0.63	5.00	0.63	5.00	1.00	5.00	5.00	5.00	5.00	0.56	0.63
18	1.00	8.00	8.00	1.00	8.00	1.00	8.00	1.60	8.00	8.00	8.00	8.00	0.89	1.00
19	1.00	8.00	8.00	1.00	8.00	1.00	8.00	1.60	8.00	8.00	8.00	8.00	0.89	1.00
20	0.63	5.00	5.00	0.63	5.00	0.63	5.00	1.00	5.00	5.00	5.00	5.00	0.56	0.63
21	1.00	8.00	8.00	1.00	8.00	1.00	8.00	1.60	8.00	8.00	8.00	8.00	0.89	1.00
22	0.88	7.00	7.00	0.88	7.00	0.88	7.00	1.40	7.00	7.00	7.00	7.00	0.78	0.88
23	1.13	9.00	9.00	1.13	9.00	1.13	9.00	1.80	9.00	9.00	9.00	9.00	1.00	1.13
24	1.00	8.00	8.00	1.00	8.00	1.00	8.00	1.60	8.00	8.00	8.00	8.00	0.89	1.00
25	0.88	7.00	7.00	0.88	7.00	0.88	7.00	1.40	7.00	7.00	7.00	7.00	0.78	0.88
26	1.13	9.00	9.00	1.13	9.00	1.13	9.00	1.80	9.00	9.00	9.00	9.00	1.00	1.13
27	1.00	8.00	8.00	1.00	8.00	1.00	8.00	1.60	8.00	8.00	8.00	8.00	0.89	1.00
Total	**19.25**	**154.00**	**154.00**	**19.25**	**154.00**	**19.25**	**154.00**	**30.80**	**154.00**	**154.00**	**154.00**	**154.00**	**17.11**	**19.25**

Code	15	16	17	18	19	20	21	22	23	24	25	26	27	Total	Eigen
01	0.89	0.89	1.60	1.00	1.00	1.60	1.00	1.14	0.89	1.00	1.14	0.89	1.00	**84.53**	**0.05**
02	0.11	0.11	0.20	0.13	0.13	0.20	0.13	0.14	0.11	0.13	0.14	0.11	0.13	**10.57**	**0.01**
03	0.11	0.11	0.20	0.13	0.13	0.20	0.13	0.14	0.11	0.13	0.14	0.11	0.13	**10.57**	**0.01**
04	0.89	0.89	1.60	1.00	1.00	1.60	1.00	1.14	0.89	1.00	1.14	0.89	1.00	**84.53**	**0.05**
05	0.11	0.11	0.20	0.13	0.13	0.20	0.13	0.14	0.11	0.13	0.14	0.11	0.13	**10.57**	**0.01**
06	0.89	0.89	1.60	1.00	1.00	1.60	1.00	1.14	0.89	1.00	1.14	0.89	1.00	**84.53**	**0.05**
07	0.11	0.11	0.20	0.13	0.13	0.20	0.13	0.14	0.11	0.13	0.14	0.11	0.13	**10.57**	**0.01**
08	0.56	0.56	1.00	0.63	0.63	1.00	0.63	0.71	0.56	0.63	0.71	0.56	0.63	**52.83**	**0.03**
09	0.11	0.11	0.20	0.13	0.13	0.20	0.13	0.14	0.11	0.13	0.14	0.11	0.13	**10.57**	**0.01**
10	0.11	0.11	0.20	0.13	0.13	0.20	0.13	0.14	0.11	0.13	0.14	0.11	0.13	**10.57**	**0.01**
11	0.11	0.11	0.20	0.13	0.13	0.20	0.13	0.14	0.11	0.13	0.14	0.11	0.13	**10.57**	**0.01**
12	0.11	0.11	0.20	0.13	0.13	0.20	0.13	0.14	0.11	0.13	0.14	0.11	0.13	**10.57**	**0.01**
13	1.00	1.00	1.80	1.13	1.13	1.80	1.13	1.29	1.00	1.13	1.29	1.00	1.13	**95.10**	**0.06**
14	0.89	0.89	1.60	1.00	1.00	1.60	1.00	1.14	0.89	1.00	1.14	0.89	1.00	**84.53**	**0.05**
15	1.00	1.00	1.80	1.13	1.13	1.80	1.13	1.29	1.00	1.13	1.29	1.00	1.13	**95.10**	**0.06**
16	1.00	1.00	1.80	1.13	1.13	1.80	1.13	1.29	1.00	1.13	1.29	1.00	1.13	**95.10**	**0.06**
17	0.56	0.56	1.00	0.63	0.63	1.00	0.63	0.71	0.56	0.63	0.71	0.56	0.63	**52.83**	**0.03**
18	0.89	0.89	1.60	1.00	1.00	1.60	1.00	1.14	0.89	1.00	1.14	0.89	1.00	**84.53**	**0.05**
19	0.89	0.89	1.60	1.00	1.00	1.60	1.00	1.14	0.89	1.00	1.14	0.89	1.00	**84.53**	**0.05**
20	0.56	0.56	1.00	0.63	0.63	1.00	0.63	0.71	0.56	0.63	0.71	0.56	0.63	**52.83**	**0.03**
21	0.89	0.89	1.60	1.00	1.00	1.60	1.00	1.14	0.89	1.00	1.14	0.89	1.00	**84.53**	**0.05**
22	0.78	0.78	1.40	0.88	0.88	1.40	0.88	1.00	0.78	0.88	1.00	0.78	0.88	**73.96**	**0.05**
23	1.00	1.00	1.80	1.13	1.13	1.80	1.13	1.29	1.00	1.13	1.29	1.00	1.13	**95.10**	**0.06**
24	0.89	0.89	1.60	1.00	1.00	1.60	1.00	1.14	0.89	1.00	1.14	0.89	1.00	**84.53**	**0.05**
25	0.78	0.78	1.40	0.88	0.88	1.40	0.88	1.00	0.78	0.88	1.00	0.78	0.88	**73.96**	**0.05**
26	1.00	1.00	1.80	1.13	1.13	1.80	1.13	1.29	1.00	1.13	1.29	1.00	1.13	**95.10**	**0.06**
27	0.89	0.89	1.60	1.00	1.00	1.60	1.00	1.14	0.89	1.00	1.14	0.89	1.00	**84.53**	**0.05**
Total	**17.11**	**17.11**	**30.80**	**19.25**	**19.25**	**30.80**	**19.25**	**22.00**	**17.11**	**19.25**	**22.00**	**17.11**	**19.25**	**1627.21**	**1.00**

APPENDIX 10

EIGENVECTOR CALCULATION FOR CRITERION C1. DEBT SERVICE RATION

Code	01	02	03	04	05	06	07	08	09	10	11	12	13	14
01	1.00	1.00	1.17	0.88	1.00	0.88	1.17	0.88	1.17	1.17	0.88	0.88	0.88	1.17
02	1.00	1.00	1.17	0.88	1.00	0.88	1.17	0.88	1.17	1.17	0.88	0.88	0.88	1.17
03	0.86	0.86	1.00	0.75	0.86	0.75	1.00	0.75	1.00	1.00	0.75	0.75	0.75	1.00
04	1.14	1.14	1.33	1.00	1.14	1.00	1.33	1.00	1.33	1.33	1.00	1.00	1.00	1.33
05	1.00	1.00	1.17	0.88	1.00	0.88	1.17	0.88	1.17	1.17	0.88	0.88	0.88	1.17
06	1.14	1.14	1.33	1.00	1.14	1.00	1.33	1.00	1.33	1.33	1.00	1.00	1.00	1.33
07	0.86	0.86	1.00	0.75	0.86	0.75	1.00	0.75	1.00	1.00	0.75	0.75	0.75	1.00
08	1.14	1.14	1.33	1.00	1.14	1.00	1.33	1.00	1.33	1.33	1.00	1.00	1.00	1.33
09	0.86	0.86	1.00	0.75	0.86	0.75	1.00	0.75	1.00	1.00	0.75	0.75	0.75	1.00
10	0.86	0.86	1.00	0.75	0.86	0.75	1.00	0.75	1.00	1.00	0.75	0.75	0.75	1.00
11	1.14	1.14	1.33	1.00	1.14	1.00	1.33	1.00	1.33	1.33	1.00	1.00	1.00	1.33
12	1.14	1.14	1.33	1.00	1.14	1.00	1.33	1.00	1.33	1.33	1.00	1.00	1.00	1.33
13	1.14	1.14	1.33	1.00	1.14	1.00	1.33	1.00	1.33	1.33	1.00	1.00	1.00	1.33
14	0.86	0.86	1.00	0.75	0.86	0.75	1.00	0.75	1.00	1.00	0.75	0.75	0.75	1.00
15	1.29	1.29	1.50	1.13	1.29	1.13	1.50	1.13	1.50	1.50	1.13	1.13	1.13	1.50
16	1.14	1.14	1.33	1.00	1.14	1.00	1.33	1.00	1.33	1.33	1.00	1.00	1.00	1.33
17	1.00	1.00	1.17	0.88	1.00	0.88	1.17	0.88	1.17	1.17	0.88	0.88	0.88	1.17
18	1.00	1.00	1.17	0.88	1.00	0.88	1.17	0.88	1.17	1.17	0.88	0.88	0.88	1.17
19	1.14	1.14	1.33	1.00	1.14	1.00	1.33	1.00	1.33	1.33	1.00	1.00	1.00	1.33
20	1.00	1.00	1.17	0.88	1.00	0.88	1.17	0.88	1.17	1.17	0.88	0.88	0.88	1.17
21	1.14	1.14	1.33	1.00	1.14	1.00	1.33	1.00	1.33	1.33	1.00	1.00	1.00	1.33
22	0.86	0.86	1.00	0.75	0.86	0.75	1.00	0.75	1.00	1.00	0.75	0.75	0.75	1.00
23	1.14	1.14	1.33	1.00	1.14	1.00	1.33	1.00	1.33	1.33	1.00	1.00	1.00	1.33
24	1.14	1.14	1.33	1.00	1.14	1.00	1.33	1.00	1.33	1.33	1.00	1.00	1.00	1.33
25	1.00	1.00	1.17	0.88	1.00	0.88	1.17	0.88	1.17	1.17	0.88	0.88	0.88	1.17
26	1.29	1.29	1.50	1.13	1.29	1.13	1.50	1.13	1.50	1.50	1.13	1.13	1.13	1.50
27	1.14	1.14	1.33	1.00	1.14	1.00	1.33	1.00	1.33	1.33	1.00	1.00	1.00	1.33
Total	**28.43**	**28.43**	**33.17**	**24.88**	**28.43**	**24.88**	**33.17**	**24.88**	**33.17**	**33.17**	**24.88**	**24.88**	**24.88**	**33.17**

Code	15	16	17	18	19	20	21	22	23	24	25	26	27	Total	Eigen
01	0.78	0.88	1.00	1.00	0.88	1.00	0.88	1.17	0.88	0.88	1.00	0.78	0.88	**26.06**	**0.04**
02	0.78	0.88	1.00	1.00	0.88	1.00	0.88	1.17	0.88	0.88	1.00	0.78	0.88	**26.06**	**0.04**
03	0.67	0.75	0.86	0.86	0.75	0.86	0.75	1.00	0.75	0.75	0.86	0.67	0.75	**22.33**	**0.03**
04	0.89	1.00	1.14	1.14	1.00	1.14	1.00	1.33	1.00	1.00	1.14	0.89	1.00	**29.78**	**0.04**
05	0.78	0.88	1.00	1.00	0.88	1.00	0.88	1.17	0.88	0.88	1.00	0.78	0.88	**26.06**	**0.04**
06	0.89	1.00	1.14	1.14	1.00	1.14	1.00	1.33	1.00	1.00	1.14	0.89	1.00	**29.78**	**0.04**
07	0.67	0.75	0.86	0.86	0.75	0.86	0.75	1.00	0.75	0.75	0.86	0.67	0.75	**22.33**	**0.03**
08	0.89	1.00	1.14	1.14	1.00	1.14	1.00	1.33	1.00	1.00	1.14	0.89	1.00	**29.78**	**0.04**
09	0.67	0.75	0.86	0.86	0.75	0.86	0.75	1.00	0.75	0.75	0.86	0.67	0.75	**22.33**	**0.03**
10	0.67	0.75	0.86	0.86	0.75	0.86	0.75	1.00	0.75	0.75	0.86	0.67	0.75	**22.33**	**0.03**
11	0.89	1.00	1.14	1.14	1.00	1.14	1.00	1.33	1.00	1.00	1.14	0.89	1.00	**29.78**	**0.04**
12	0.89	1.00	1.14	1.14	1.00	1.14	1.00	1.33	1.00	1.00	1.14	0.89	1.00	**29.78**	**0.04**
13	0.89	1.00	1.14	1.14	1.00	1.14	1.00	1.33	1.00	1.00	1.14	0.89	1.00	**29.78**	**0.04**
14	0.67	0.75	0.86	0.86	0.75	0.86	0.75	1.00	0.75	0.75	0.86	0.67	0.75	**22.33**	**0.03**
15	1.00	1.13	1.29	1.29	1.13	1.29	1.13	1.50	1.13	1.13	1.29	1.00	1.13	**33.50**	**0.05**
16	0.89	1.00	1.14	1.14	1.00	1.14	1.00	1.33	1.00	1.00	1.14	0.89	1.00	**29.78**	**0.04**
17	0.78	0.88	1.00	1.00	0.88	1.00	0.88	1.17	0.88	0.88	1.00	0.78	0.88	**26.06**	**0.04**
18	0.78	0.88	1.00	1.00	0.88	1.00	0.88	1.17	0.88	0.88	1.00	0.78	0.88	**26.06**	**0.04**
19	0.89	1.00	1.14	1.14	1.00	1.14	1.00	1.33	1.00	1.00	1.14	0.89	1.00	**29.78**	**0.04**
20	0.78	0.88	1.00	1.00	0.88	1.00	0.88	1.17	0.88	0.88	1.00	0.78	0.88	**26.06**	**0.04**
21	0.89	1.00	1.14	1.14	1.00	1.14	1.00	1.33	1.00	1.00	1.14	0.89	1.00	**29.78**	**0.04**
22	0.67	0.75	0.86	0.86	0.75	0.86	0.75	1.00	0.75	0.75	0.86	0.67	0.75	**22.33**	**0.03**
23	0.89	1.00	1.14	1.14	1.00	1.14	1.00	1.33	1.00	1.00	1.14	0.89	1.00	**29.78**	**0.04**
24	0.89	1.00	1.14	1.14	1.00	1.14	1.00	1.33	1.00	1.00	1.14	0.89	1.00	**29.78**	**0.04**
25	0.78	0.88	1.00	1.00	0.88	1.00	0.88	1.17	0.88	0.88	1.00	0.78	0.88	**26.06**	**0.04**
26	1.00	1.13	1.29	1.29	1.13	1.29	1.13	1.50	1.13	1.13	1.29	1.00	1.13	**33.50**	**0.05**
27	0.89	1.00	1.14	1.14	1.00	1.14	1.00	1.33	1.00	1.00	1.14	0.89	1.00	**29.78**	**0.04**
Total	**22.11**	**24.88**	**28.43**	**28.43**	**24.88**	**28.43**	**24.88**	**33.17**	**24.88**	**24.88**	**28.43**	**22.11**	**24.88**	**740.72**	**1.00**

APPENDIX 11
EIGENVECTOR CALCULATION FOR CRITERION C2. COVERAGE

Code	01	02	03	04	05	06	07	08	09	10	11	12	13	14
01	1.00	1.00	1.34	1.27	1.47	1.48	1.77	1.74	1.59	1.13	1.73	1.80	1.65	1.16
02	1.00	1.00	1.34	1.27	1.47	1.48	1.77	1.74	1.59	1.13	1.73	1.80	1.65	1.16
03	0.75	0.75	1.00	0.95	1.09	1.10	1.32	1.30	1.18	0.84	1.29	1.34	1.23	0.87
04	0.79	0.79	1.06	1.00	1.16	1.17	1.40	1.38	1.25	0.89	1.37	1.42	1.30	0.92
05	0.68	0.68	0.91	0.86	1.00	1.01	1.21	1.19	1.08	0.77	1.18	1.22	1.12	0.79
06	0.68	0.68	0.91	0.86	0.99	1.00	1.20	1.18	1.08	0.76	1.17	1.22	1.11	0.79
07	0.56	0.56	0.76	0.72	0.83	0.83	1.00	0.98	0.90	0.64	0.98	1.02	0.93	0.66
08	0.57	0.57	0.77	0.73	0.84	0.85	1.02	1.00	0.91	0.65	0.99	1.03	0.94	0.67
09	0.63	0.63	0.84	0.80	0.92	0.93	1.11	1.10	1.00	0.71	1.09	1.13	1.04	0.73
10	0.89	0.89	1.19	1.13	1.30	1.31	1.57	1.55	1.41	1.00	1.54	1.60	1.46	1.03
11	0.58	0.58	0.77	0.73	0.85	0.85	1.02	1.01	0.92	0.65	1.00	1.04	0.95	0.67
12	0.56	0.56	0.75	0.70	0.82	0.82	0.98	0.97	0.88	0.63	0.96	1.00	0.91	0.65
13	0.61	0.61	0.82	0.77	0.89	0.90	1.08	1.06	0.97	0.68	1.05	1.09	1.00	0.71
14	0.86	0.86	1.16	1.09	1.27	1.27	1.53	1.50	1.37	0.97	1.49	1.55	1.42	1.00
15	0.50	0.50	0.68	0.64	0.74	0.75	0.89	0.88	0.80	0.57	0.87	0.91	0.83	0.59
16	0.63	0.63	0.85	0.80	0.93	0.94	1.12	1.11	1.01	0.71	1.10	1.14	1.04	0.74
17	0.78	0.78	1.05	0.99	1.15	1.16	1.39	1.37	1.25	0.88	1.36	1.41	1.29	0.91
18	0.54	0.54	0.73	0.69	0.80	0.80	0.96	0.95	0.86	0.61	0.94	0.98	0.89	0.63
19	0.60	0.60	0.81	0.77	0.89	0.89	1.07	1.05	0.96	0.68	1.04	1.09	0.99	0.70
20	1.81	1.81	2.42	2.29	2.65	2.67	3.20	3.15	2.87	2.03	3.13	3.25	2.97	2.10
21	0.54	0.54	0.73	0.69	0.80	0.80	0.96	0.95	0.86	0.61	0.94	0.98	0.89	0.63
22	0.51	0.51	0.68	0.64	0.75	0.75	0.90	0.89	0.81	0.57	0.88	0.91	0.84	0.59
23	0.58	0.58	0.77	0.73	0.85	0.85	1.02	1.01	0.92	0.65	1.00	1.04	0.95	0.67
24	0.63	0.63	0.84	0.79	0.92	0.92	1.11	1.09	0.99	0.70	1.08	1.12	1.03	0.73
25	0.37	0.37	0.49	0.46	0.54	0.54	0.65	0.64	0.58	0.41	0.63	0.66	0.60	0.43
26	0.54	0.54	0.73	0.69	0.80	0.80	0.96	0.95	0.86	0.61	0.94	0.98	0.89	0.63
27	0.53	0.53	0.71	0.67	0.78	0.78	0.94	0.92	0.84	0.60	0.92	0.95	0.87	0.62
Total	**18.72**	**18.72**	**25.10**	**23.73**	**27.49**	**27.66**	**33.15**	**32.65**	**29.75**	**21.08**	**32.41**	**33.67**	**30.80**	**21.72**

Code	15	16	17	18	19	20	21	22	23	24	25	26	27	Total	Eigen
01	1.98	1.58	1.27	1.84	1.66	0.55	1.84	1.97	1.73	1.60	2.73	1.84	1.89	**42.60**	**0.05**
02	1.98	1.58	1.27	1.84	1.66	0.55	1.84	1.97	1.73	1.60	2.73	1.84	1.89	**42.60**	**0.05**
03	1.48	1.18	0.95	1.37	1.24	0.41	1.37	1.47	1.29	1.19	2.04	1.37	1.41	**31.77**	**0.04**
04	1.56	1.24	1.01	1.45	1.31	0.44	1.45	1.55	1.37	1.26	2.15	1.45	1.49	**33.61**	**0.04**
05	1.35	1.07	0.87	1.25	1.13	0.38	1.25	1.34	1.18	1.09	1.86	1.25	1.28	**29.01**	**0.04**
06	1.34	1.07	0.86	1.25	1.12	0.37	1.25	1.33	1.17	1.08	1.85	1.25	1.28	**28.83**	**0.04**
07	1.12	0.89	0.72	1.04	0.94	0.31	1.04	1.11	0.98	0.90	1.54	1.04	1.07	**24.06**	**0.03**
08	1.14	0.90	0.73	1.06	0.95	0.32	1.06	1.13	0.99	0.92	1.56	1.06	1.08	**24.42**	**0.03**
09	1.25	0.99	0.80	1.16	1.04	0.35	1.16	1.24	1.09	1.01	1.72	1.16	1.19	**26.81**	**0.03**
10	1.76	1.40	1.13	1.63	1.47	0.49	1.63	1.75	1.54	1.42	2.42	1.63	1.67	**37.83**	**0.05**
11	1.15	0.91	0.74	1.06	0.96	0.32	1.06	1.14	1.00	0.92	1.58	1.06	1.09	**24.61**	**0.03**
12	1.10	0.88	0.71	1.02	0.92	0.31	1.02	1.09	0.96	0.89	1.52	1.02	1.05	**23.69**	**0.03**
13	1.21	0.96	0.77	1.12	1.01	0.34	1.12	1.19	1.05	0.97	1.66	1.12	1.15	**25.89**	**0.03**
14	1.71	1.36	1.10	1.59	1.43	0.48	1.59	1.69	1.49	1.38	2.35	1.59	1.63	**36.73**	**0.05**
15	1.00	0.80	0.64	0.93	0.84	0.28	0.93	0.99	0.87	0.81	1.38	0.93	0.95	**21.49**	**0.03**
16	1.26	1.00	0.81	1.17	1.05	0.35	1.17	1.25	1.10	1.01	1.73	1.17	1.20	**26.99**	**0.03**
17	1.56	1.24	1.00	1.44	1.30	0.43	1.44	1.54	1.36	1.26	2.14	1.44	1.48	**33.42**	**0.04**
18	1.08	0.86	0.69	1.00	0.90	0.30	1.00	1.07	0.94	0.87	1.48	1.00	1.02	**23.14**	**0.03**
19	1.20	0.95	0.77	1.11	1.00	0.33	1.11	1.19	1.04	0.97	1.65	1.11	1.14	**25.71**	**0.03**
20	3.58	2.85	2.30	3.33	2.99	1.00	3.33	3.55	3.13	2.89	4.93	3.33	3.41	**76.94**	**0.10**
21	1.08	0.86	0.69	1.00	0.90	0.30	1.00	1.07	0.94	0.87	1.48	1.00	1.02	**23.14**	**0.03**
22	1.01	0.80	0.65	0.94	0.84	0.28	0.94	1.00	0.88	0.81	1.39	0.94	0.96	**21.67**	**0.03**
23	1.15	0.91	0.74	1.06	0.96	0.32	1.06	1.14	1.00	0.92	1.58	1.06	1.09	**24.61**	**0.03**
24	1.24	0.99	0.80	1.15	1.04	0.35	1.15	1.23	1.08	1.00	1.71	1.15	1.18	**26.63**	**0.03**
25	0.73	0.58	0.47	0.67	0.61	0.20	0.67	0.72	0.63	0.59	1.00	0.67	0.69	**15.61**	**0.02**
26	1.08	0.86	0.69	1.00	0.90	0.30	1.00	1.07	0.94	0.87	1.48	1.00	1.02	**23.14**	**0.03**
27	1.05	0.84	0.68	0.98	0.88	0.29	0.98	1.04	0.92	0.85	1.45	0.98	1.00	**22.59**	**0.03**
Total	**37.12**	**29.54**	**23.86**	**34.47**	**31.02**	**10.37**	**34.47**	**36.81**	**32.41**	**29.95**	**51.09**	**34.47**	**35.31**	**797.54**	**1.00**

APPENDIX 12

EIGENVECTOR CALCULATION FOR CRITERION D1. MARKET TYPE

Code	01	02	03	04	05	06	07	08	09	10	11	12	13	14
01	1.00	1.29	1.29	1.13	1.50	1.00	1.29	1.13	1.29	1.13	1.00	1.13	1.00	1.13
02	0.78	1.00	1.00	0.88	1.17	0.78	1.00	0.88	1.00	0.88	0.78	0.88	0.78	0.88
03	0.78	1.00	1.00	0.88	1.17	0.78	1.00	0.88	1.00	0.88	0.78	0.88	0.78	0.88
04	0.89	1.14	1.14	1.00	1.33	0.89	1.14	1.00	1.14	1.00	0.89	1.00	0.89	1.00
05	0.67	0.86	0.86	0.75	1.00	0.67	0.86	0.75	0.86	0.75	0.67	0.75	0.67	0.75
06	1.00	1.29	1.29	1.13	1.50	1.00	1.29	1.13	1.29	1.13	1.00	1.13	1.00	1.13
07	0.78	1.00	1.00	0.88	1.17	0.78	1.00	0.88	1.00	0.88	0.78	0.88	0.78	0.88
08	0.89	1.14	1.14	1.00	1.33	0.89	1.14	1.00	1.14	1.00	0.89	1.00	0.89	1.00
09	0.78	1.00	1.00	0.88	1.17	0.78	1.00	0.88	1.00	0.88	0.78	0.88	0.78	0.88
10	0.89	1.14	1.14	1.00	1.33	0.89	1.14	1.00	1.14	1.00	0.89	1.00	0.89	1.00
11	1.00	1.29	1.29	1.13	1.50	1.00	1.29	1.13	1.29	1.13	1.00	1.13	1.00	1.13
12	0.89	1.14	1.14	1.00	1.33	0.89	1.14	1.00	1.14	1.00	0.89	1.00	0.89	1.00
13	1.00	1.29	1.29	1.13	1.50	1.00	1.29	1.13	1.29	1.13	1.00	1.13	1.00	1.13
14	0.89	1.14	1.14	1.00	1.33	0.89	1.14	1.00	1.14	1.00	0.89	1.00	0.89	1.00
15	1.00	1.29	1.29	1.13	1.50	1.00	1.29	1.13	1.29	1.13	1.00	1.13	1.00	1.13
16	1.00	1.29	1.29	1.13	1.50	1.00	1.29	1.13	1.29	1.13	1.00	1.13	1.00	1.13
17	0.78	1.00	1.00	0.88	1.17	0.78	1.00	0.88	1.00	0.88	0.78	0.88	0.78	0.88
18	0.78	1.00	1.00	0.88	1.17	0.78	1.00	0.88	1.00	0.88	0.78	0.88	0.78	0.88
19	0.89	1.14	1.14	1.00	1.33	0.89	1.14	1.00	1.14	1.00	0.89	1.00	0.89	1.00
20	0.67	0.86	0.86	0.75	1.00	0.67	0.86	0.75	0.86	0.75	0.67	0.75	0.67	0.75
21	0.89	1.14	1.14	1.00	1.33	0.89	1.14	1.00	1.14	1.00	0.89	1.00	0.89	1.00
22	0.78	1.00	1.00	0.88	1.17	0.78	1.00	0.88	1.00	0.88	0.78	0.88	0.78	0.88
23	0.89	1.14	1.14	1.00	1.33	0.89	1.14	1.00	1.14	1.00	0.89	1.00	0.89	1.00
24	1.00	1.29	1.29	1.13	1.50	1.00	1.29	1.13	1.29	1.13	1.00	1.13	1.00	1.13
25	0.89	1.14	1.14	1.00	1.33	0.89	1.14	1.00	1.14	1.00	0.89	1.00	0.89	1.00
26	1.00	1.29	1.29	1.13	1.50	1.00	1.29	1.13	1.29	1.13	1.00	1.13	1.00	1.13
27	0.89	1.14	1.14	1.00	1.33	0.89	1.14	1.00	1.14	1.00	0.89	1.00	0.89	1.00
Total	**23.67**	**30.43**	**30.43**	**26.63**	**35.50**	**23.67**	**30.43**	**26.63**	**30.43**	**26.63**	**23.67**	**26.63**	**23.67**	**26.63**

Code	15	16	17	18	19	20	21	22	23	24	25	26	27	Total	Eigen
01	1.00	1.00	1.29	1.29	1.13	1.50	1.13	1.29	1.13	1.00	1.13	1.00	1.13	**31.25**	**0.04**
02	0.78	0.78	1.00	1.00	0.88	1.17	0.88	1.00	0.88	0.78	0.88	0.78	0.88	**24.31**	**0.03**
03	0.78	0.78	1.00	1.00	0.88	1.17	0.88	1.00	0.88	0.78	0.88	0.78	0.88	**24.31**	**0.03**
04	0.89	0.89	1.14	1.14	1.00	1.33	1.00	1.14	1.00	0.89	1.00	0.89	1.00	**27.78**	**0.04**
05	0.67	0.67	0.86	0.86	0.75	1.00	0.75	0.86	0.75	0.67	0.75	0.67	0.75	**20.83**	**0.03**
06	1.00	1.00	1.29	1.29	1.13	1.50	1.13	1.29	1.13	1.00	1.13	1.00	1.13	**31.25**	**0.04**
07	0.78	0.78	1.00	1.00	0.88	1.17	0.88	1.00	0.88	0.78	0.88	0.78	0.88	**24.31**	**0.03**
08	0.89	0.89	1.14	1.14	1.00	1.33	1.00	1.14	1.00	0.89	1.00	0.89	1.00	**27.78**	**0.04**
09	0.78	0.78	1.00	1.00	0.88	1.17	0.88	1.00	0.88	0.78	0.88	0.78	0.88	**24.31**	**0.03**
10	0.89	0.89	1.14	1.14	1.00	1.33	1.00	1.14	1.00	0.89	1.00	0.89	1.00	**27.78**	**0.04**
11	1.00	1.00	1.29	1.29	1.13	1.50	1.13	1.29	1.13	1.00	1.13	1.00	1.13	**31.25**	**0.04**
12	0.89	0.89	1.14	1.14	1.00	1.33	1.00	1.14	1.00	0.89	1.00	0.89	1.00	**27.78**	**0.04**
13	1.00	1.00	1.29	1.29	1.13	1.50	1.13	1.29	1.13	1.00	1.13	1.00	1.13	**31.25**	**0.04**
14	0.89	0.89	1.14	1.14	1.00	1.33	1.00	1.14	1.00	0.89	1.00	0.89	1.00	**27.78**	**0.04**
15	1.00	1.00	1.29	1.29	1.13	1.50	1.13	1.29	1.13	1.00	1.13	1.00	1.13	**31.25**	**0.04**
16	1.00	1.00	1.29	1.29	1.13	1.50	1.13	1.29	1.13	1.00	1.13	1.00	1.13	**31.25**	**0.04**
17	0.78	0.78	1.00	1.00	0.88	1.17	0.88	1.00	0.88	0.78	0.88	0.78	0.88	**24.31**	**0.03**
18	0.78	0.78	1.00	1.00	0.88	1.17	0.88	1.00	0.88	0.78	0.88	0.78	0.88	**24.31**	**0.03**
19	0.89	0.89	1.14	1.14	1.00	1.33	1.00	1.14	1.00	0.89	1.00	0.89	1.00	**27.78**	**0.04**
20	0.67	0.67	0.86	0.86	0.75	1.00	0.75	0.86	0.75	0.67	0.75	0.67	0.75	**20.83**	**0.03**
21	0.89	0.89	1.14	1.14	1.00	1.33	1.00	1.14	1.00	0.89	1.00	0.89	1.00	**27.78**	**0.04**
22	0.78	0.78	1.00	1.00	0.88	1.17	0.88	1.00	0.88	0.78	0.88	0.78	0.88	**24.31**	**0.03**
23	0.89	0.89	1.14	1.14	1.00	1.33	1.00	1.14	1.00	0.89	1.00	0.89	1.00	**27.78**	**0.04**
24	1.00	1.00	1.29	1.29	1.13	1.50	1.13	1.29	1.13	1.00	1.13	1.00	1.13	**31.25**	**0.04**
25	0.89	0.89	1.14	1.14	1.00	1.33	1.00	1.14	1.00	0.89	1.00	0.89	1.00	**27.78**	**0.04**
26	1.00	1.00	1.29	1.29	1.13	1.50	1.13	1.29	1.13	1.00	1.13	1.00	1.13	**31.25**	**0.04**
27	0.89	0.89	1.14	1.14	1.00	1.33	1.00	1.14	1.00	0.89	1.00	0.89	1.00	**27.78**	**0.04**
Total	**23.67**	**23.67**	**30.43**	**30.43**	**26.63**	**35.50**	**26.63**	**30.43**	**26.63**	**23.67**	**26.63**	**23.67**	**26.63**	**739.58**	**1.00**

APPENDIX 13

EIGENVECTOR CALCULATION FOR CRITERION E1. LEGAL DOCUMENT

Code	01	02	03	04	05	06	07	08	09	10	11	12	13	14
01	1.00	0.40	0.50	0.50	0.40	0.50	1.00	0.67	0.67	1.00	0.50	0.67	1.00	0.50
02	2.50	1.00	1.25	1.25	1.00	1.25	2.50	1.67	1.67	2.50	1.25	1.67	2.50	1.25
03	2.00	0.80	1.00	1.00	0.80	1.00	2.00	1.33	1.33	2.00	1.00	1.33	2.00	1.00
04	2.00	0.80	1.00	1.00	0.80	1.00	2.00	1.33	1.33	2.00	1.00	1.33	2.00	1.00
05	2.50	1.00	1.25	1.25	1.00	1.25	2.50	1.67	1.67	2.50	1.25	1.67	2.50	1.25
06	2.00	0.80	1.00	1.00	0.80	1.00	2.00	1.33	1.33	2.00	1.00	1.33	2.00	1.00
07	1.00	0.40	0.50	0.50	0.40	0.50	1.00	0.67	0.67	1.00	0.50	0.67	1.00	0.50
08	1.50	0.60	0.75	0.75	0.60	0.75	1.50	1.00	1.00	1.50	0.75	1.00	1.50	0.75
09	1.50	0.60	0.75	0.75	0.60	0.75	1.50	1.00	1.00	1.50	0.75	1.00	1.50	0.75
10	1.00	0.40	0.50	0.50	0.40	0.50	1.00	0.67	0.67	1.00	0.50	0.67	1.00	0.50
11	2.00	0.80	1.00	1.00	0.80	1.00	2.00	1.33	1.33	2.00	1.00	1.33	2.00	1.00
12	1.50	0.60	0.75	0.75	0.60	0.75	1.50	1.00	1.00	1.50	0.75	1.00	1.50	0.75
13	1.00	0.40	0.50	0.50	0.40	0.50	1.00	0.67	0.67	1.00	0.50	0.67	1.00	0.50
14	2.00	0.80	1.00	1.00	0.80	1.00	2.00	1.33	1.33	2.00	1.00	1.33	2.00	1.00
15	2.50	1.00	1.25	1.25	1.00	1.25	2.50	1.67	1.67	2.50	1.25	1.67	2.50	1.25
16	1.50	0.60	0.75	0.75	0.60	0.75	1.50	1.00	1.00	1.50	0.75	1.00	1.50	0.75
17	2.00	0.80	1.00	1.00	0.80	1.00	2.00	1.33	1.33	2.00	1.00	1.33	2.00	1.00
18	0.50	0.20	0.25	0.25	0.20	0.25	0.50	0.33	0.33	0.50	0.25	0.33	0.50	0.25
19	1.50	0.60	0.75	0.75	0.60	0.75	1.50	1.00	1.00	1.50	0.75	1.00	1.50	0.75
20	1.50	0.60	0.75	0.75	0.60	0.75	1.50	1.00	1.00	1.50	0.75	1.00	1.50	0.75
21	1.50	0.60	0.75	0.75	0.60	0.75	1.50	1.00	1.00	1.50	0.75	1.00	1.50	0.75
22	0.50	0.20	0.25	0.25	0.20	0.25	0.50	0.33	0.33	0.50	0.25	0.33	0.50	0.25
23	1.50	0.60	0.75	0.75	0.60	0.75	1.50	1.00	1.00	1.50	0.75	1.00	1.50	0.75
24	2.50	1.00	1.25	1.25	1.00	1.25	2.50	1.67	1.67	2.50	1.25	1.67	2.50	1.25
25	2.00	0.80	1.00	1.00	0.80	1.00	2.00	1.33	1.33	2.00	1.00	1.33	2.00	1.00
26	2.50	1.00	1.25	1.25	1.00	1.25	2.50	1.67	1.67	2.50	1.25	1.67	2.50	1.25
27	2.00	0.80	1.00	1.00	0.80	1.00	2.00	1.33	1.33	2.00	1.00	1.33	2.00	1.00
Total	**45.50**	**18.20**	**22.75**	**22.75**	**18.20**	**22.75**	**45.50**	**30.33**	**30.33**	**45.50**	**22.75**	**30.33**	**45.50**	**22.75**

Code	15	16	17	18	19	20	21	22	23	24	25	26	27	Total	Eigen
01	0.40	0.67	0.50	2.00	0.67	0.67	0.67	2.00	0.67	0.40	0.50	0.40	0.50	**19.33**	**0.02**
02	1.00	1.67	1.25	5.00	1.67	1.67	1.67	5.00	1.67	1.00	1.25	1.00	1.25	**48.33**	**0.05**
03	0.80	1.33	1.00	4.00	1.33	1.33	1.33	4.00	1.33	0.80	1.00	0.80	1.00	**38.67**	**0.04**
04	0.80	1.33	1.00	4.00	1.33	1.33	1.33	4.00	1.33	0.80	1.00	0.80	1.00	**38.67**	**0.04**
05	1.00	1.67	1.25	5.00	1.67	1.67	1.67	5.00	1.67	1.00	1.25	1.00	1.25	**48.33**	**0.05**
06	0.80	1.33	1.00	4.00	1.33	1.33	1.33	4.00	1.33	0.80	1.00	0.80	1.00	**38.67**	**0.04**
07	0.40	0.67	0.50	2.00	0.67	0.67	0.67	2.00	0.67	0.40	0.50	0.40	0.50	**19.33**	**0.02**
08	0.60	1.00	0.75	3.00	1.00	1.00	1.00	3.00	1.00	0.60	0.75	0.60	0.75	**29.00**	**0.03**
09	0.60	1.00	0.75	3.00	1.00	1.00	1.00	3.00	1.00	0.60	0.75	0.60	0.75	**29.00**	**0.03**
10	0.40	0.67	0.50	2.00	0.67	0.67	0.67	2.00	0.67	0.40	0.50	0.40	0.50	**19.33**	**0.02**
11	0.80	1.33	1.00	4.00	1.33	1.33	1.33	4.00	1.33	0.80	1.00	0.80	1.00	**38.67**	**0.04**
12	0.60	1.00	0.75	3.00	1.00	1.00	1.00	3.00	1.00	0.60	0.75	0.60	0.75	**29.00**	**0.03**
13	0.40	0.67	0.50	2.00	0.67	0.67	0.67	2.00	0.67	0.40	0.50	0.40	0.50	**19.33**	**0.02**
14	0.80	1.33	1.00	4.00	1.33	1.33	1.33	4.00	1.33	0.80	1.00	0.80	1.00	**38.67**	**0.04**
15	1.00	1.67	1.25	5.00	1.67	1.67	1.67	5.00	1.67	1.00	1.25	1.00	1.25	**48.33**	**0.05**
16	0.60	1.00	0.75	3.00	1.00	1.00	1.00	3.00	1.00	0.60	0.75	0.60	0.75	**29.00**	**0.03**
17	0.80	1.33	1.00	4.00	1.33	1.33	1.33	4.00	1.33	0.80	1.00	0.80	1.00	**38.67**	**0.04**
18	0.20	0.33	0.25	1.00	0.33	0.33	0.33	1.00	0.33	0.20	0.25	0.20	0.25	**9.67**	**0.01**
19	0.60	1.00	0.75	3.00	1.00	1.00	1.00	3.00	1.00	0.60	0.75	0.60	0.75	**29.00**	**0.03**
20	0.60	1.00	0.75	3.00	1.00	1.00	1.00	3.00	1.00	0.60	0.75	0.60	0.75	**29.00**	**0.03**
21	0.60	1.00	0.75	3.00	1.00	1.00	1.00	3.00	1.00	0.60	0.75	0.60	0.75	**29.00**	**0.03**
22	0.20	0.33	0.25	1.00	0.33	0.33	0.33	1.00	0.33	0.20	0.25	0.20	0.25	**9.67**	**0.01**
23	0.60	1.00	0.75	3.00	1.00	1.00	1.00	3.00	1.00	0.60	0.75	0.60	0.75	**29.00**	**0.03**
24	1.00	1.67	1.25	5.00	1.67	1.67	1.67	5.00	1.67	1.00	1.25	1.00	1.25	**48.33**	**0.05**
25	0.80	1.33	1.00	4.00	1.33	1.33	1.33	4.00	1.33	0.80	1.00	0.80	1.00	**38.67**	**0.04**
26	1.00	1.67	1.25	5.00	1.67	1.67	1.67	5.00	1.67	1.00	1.25	1.00	1.25	**48.33**	**0.05**
27	0.80	1.33	1.00	4.00	1.33	1.33	1.33	4.00	1.33	0.80	1.00	0.80	1.00	**38.67**	**0.04**
Total	**18.20**	**30.33**	**22.75**	**91.00**	**30.33**	**30.33**	**30.33**	**91.00**	**30.33**	**18.20**	**22.75**	**18.20**	**22.75**	**879.67**	**1.00**

APPENDIX 14
ONE-BY-ONE ELIMINATION ITERATIONS

Rank	Iterations													
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th
1	06													
2	04	04												
3	16	16	16											
4	26	26	26	26										
5	14	14	14	14	14									
6	02	02	02	02	02	02								
7	24	24	24	24	24	18	18							
8	27	18	18	18	18	24	24	24						
9	18	27	27	27	27	27	27	27	27					
10	15	15	15	15	15	15	13	13	13	13				
11	13	13	13	13	13	13	15	15	15	15	15			
12	21	08	08	08	21	21	08	08	08	08	08	08		
13	01	21	21	21	08	08	21	21	11	11	11	21	11	
14	08	01	01	01	01	01	23	01	21	21	21	11	21	21
15	19	19	23	23	23	23	01	23	03	03	03	23	23	03
16	23	23	19	19	19	19	03	03	01	23	23	03	03	23
17	25	25	25	25	25	25	19	11	23	01	01	01	01	01
18	20	20	20	20	03	03	11	19	19	19	19	19	19	19
19	17	17	03	03	20	20	25	25	25	05	05	05	05	05
20	22	22	22	22	22	22	20	22	22	25	25	25	25	22
21	03	03	17	17	17	11	22	20	17	22	22	22	22	25
22	05	11	11	11	11	17	17	17	20	17	17	17	17	09
23	11	05	05	05	05	05	05	05	05	20	20	20	20	10
24	09	09	09	09	09	09	09	09	09	10	10	10	09	17
25	10	10	10	10	10	10	10	10	10	09	09	09	10	20
26	12	12	12	12	12	12	12	12	12	12	12	12	12	07
27	07	07	07	07	07	07	07	07	07	07	07	07	07	12

	Iterations													Recap
Rank	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	
1														**06**
2														**04**
3														**16**
4														**26**
5														**14**
6														**02**
7														**18**
8														**24**
9														**27**
10														**13**
11														**15**
12														**08**
13														**11**
14														**21**
15	03													**03**
16	23	23												**23**
17	01	01	01											**01**
18	19	05	05	19										**19**
19	05	19	19	05	22									**22**
20	22	09	10	22	25	25								**25**
21	25	10	09	10	05	17	17							**17**
22	17	22	22	09	17	20	20	20						**20**
23	10	25	25	25	09	05	05	05	05					**05**
24	09	17	17	17	10	09	09	09	09	10				**10**
25	20	20	20	20	20	10	10	10	10	09	09			**09**
26	07	07	07	07	07	07	12	12	12	12	12	07		**07**
27	12	12	12	12	12	12	07	07	07	07	07	12	12	**12**

APPENDIX 15

SENSITIVITY ANALYSIS FOR CRITERION

A1. FUNDING AMOUNT

No	MSMEs' Code	0	0.2	0.4	0.6	0.8	1
		0.0001	0.2001	0.4000	0.6000	0.7999	0.9999
1	22	0.0216	0.0239	0.0262	0.0402	0.0685	0.1046
2	01	0.0284	0.0300	0.0317	0.0418	0.0620	0.0872
3	21	0.0302	0.0314	0.0325	0.0396	0.0532	0.0698
4	25	0.0269	0.0281	0.0294	0.0369	0.0517	0.0698
5	03	0.0222	0.0232	0.0243	0.0303	0.0435	0.0616
6	20	0.0259	0.0270	0.0280	0.0338	0.0454	0.0598
7	17	0.0255	0.0263	0.0272	0.0319	0.0410	0.0523
8	12	0.0160	0.0170	0.0180	0.0238	0.0359	0.0523
9	06	0.1246	0.1214	0.1182	0.1011	0.0719	0.0419
10	14	0.0471	0.0469	0.0467	0.0456	0.0438	0.0419
11	13	0.0335	0.0338	0.0341	0.0362	0.0394	0.0418
12	19	0.0312	0.0316	0.0321	0.0347	0.0388	0.0418
13	08	0.0316	0.0320	0.0324	0.0346	0.0383	0.0418
14	10	0.0178	0.0184	0.0191	0.0227	0.0307	0.0418
15	16	0.0524	0.0519	0.0513	0.0481	0.0420	0.0349
16	09	0.0185	0.0189	0.0194	0.0219	0.0273	0.0349
17	18	0.0413	0.0407	0.0401	0.0370	0.0306	0.0220
18	15	0.0400	0.0397	0.0394	0.0375	0.0315	0.0209
19	23	0.0318	0.0317	0.0315	0.0306	0.0273	0.0209
20	04	0.0827	0.0804	0.0782	0.0662	0.0429	0.0140
21	26	0.0517	0.0507	0.0496	0.0437	0.0309	0.0140
22	02	0.0465	0.0455	0.0444	0.0374	0.0246	0.0105
23	05	0.0243	0.0239	0.0234	0.0202	0.0135	0.0052
24	24	0.0459	0.0448	0.0437	0.0371	0.0230	0.0047
25	11	0.0238	0.0232	0.0227	0.0191	0.0122	0.0042
26	27	0.0434	0.0425	0.0416	0.0355	0.0219	0.0030
27	07	0.0153	0.0150	0.0147	0.0125	0.0081	0.0023

APPENDIX 16

SENSITIVITY ANALYSIS FOR CRITERION

A2. RATE OF PROFIT SHARING

No	MSMEs' Code	0	0.2	0.4	0.6	0.8	1
		0.0001	**0.2001**	**0.4000**	**0.6000**	**0.7999**	**0.9999**
1	15	0.0339	0.0360	0.0382	0.0636	0.1173	0.1816
2	08	0.0277	0.0297	0.0316	0.0553	0.1062	0.1682
3	06	0.1174	0.1171	0.1168	0.1163	0.1185	0.1268
4	19	0.0294	0.0306	0.0317	0.0453	0.0734	0.1062
5	18	0.0389	0.0392	0.0396	0.0439	0.0528	0.0632
6	07	0.0136	0.0140	0.0143	0.0187	0.0287	0.0418
7	09	0.0191	0.0193	0.0195	0.0223	0.0288	0.0375
8	05	0.0230	0.0231	0.0232	0.0242	0.0274	0.0327
9	17	0.0274	0.0274	0.0275	0.0284	0.0299	0.0309
10	27	0.0414	0.0413	0.0412	0.0393	0.0352	0.0297
11	13	0.0345	0.0344	0.0343	0.0326	0.0279	0.0204
12	10	0.0195	0.0195	0.0194	0.0192	0.0192	0.0201
13	12	0.0186	0.0186	0.0186	0.0185	0.0188	0.0196
14	04	0.0796	0.0785	0.0775	0.0661	0.0432	0.0177
15	25	0.0304	0.0303	0.0302	0.0281	0.0226	0.0140
16	20	0.0290	0.0288	0.0286	0.0262	0.0207	0.0138
17	24	0.0442	0.0438	0.0433	0.0380	0.0264	0.0119
18	26	0.0503	0.0499	0.0494	0.0430	0.0290	0.0116
19	11	0.0230	0.0228	0.0226	0.0200	0.0153	0.0111
20	22	0.0278	0.0277	0.0275	0.0250	0.0182	0.0076
21	23	0.0319	0.0317	0.0315	0.0281	0.0197	0.0075
22	21	0.0338	0.0335	0.0333	0.0296	0.0204	0.0073
23	01	0.0332	0.0330	0.0327	0.0291	0.0200	0.0070
24	03	0.0257	0.0254	0.0250	0.0211	0.0132	0.0044
25	14	0.0481	0.0475	0.0469	0.0396	0.0238	0.0040
26	16	0.0527	0.0521	0.0514	0.0432	0.0254	0.0034
27	02	0.0459	0.0450	0.0442	0.0352	0.0180	0.0001

APPENDIX 17

SENSITIVITY ANALYSIS FOR CRITERION

A3. EQUITY

No	MSMEs' Code	0	0.2	0.4	0.6	0.8	1
		0.0001	**0.2001**	**0.4000**	**0.6000**	**0.7999**	**0.9999**
1	27	0.0332	0.0364	0.0395	0.0711	0.1310	0.1909
2	02	0.0380	0.0403	0.0426	0.0658	0.1097	0.1537
3	04	0.0732	0.0747	0.0762	0.0916	0.1206	0.1497
4	16	0.0496	0.0502	0.0508	0.0566	0.0677	0.0788
5	26	0.0481	0.0485	0.0489	0.0530	0.0609	0.0688
6	05	0.0214	0.0221	0.0228	0.0301	0.0440	0.0579
7	06	0.1205	0.1190	0.1174	0.1022	0.0732	0.0442
8	24	0.0436	0.0434	0.0432	0.0413	0.0376	0.0340
9	11	0.0219	0.0221	0.0223	0.0247	0.0291	0.0336
10	14	0.0476	0.0472	0.0468	0.0429	0.0354	0.0279
11	21	0.0339	0.0336	0.0333	0.0301	0.0241	0.0180
12	13	0.0352	0.0348	0.0345	0.0309	0.0242	0.0175
13	18	0.0410	0.0405	0.0400	0.0353	0.0262	0.0171
14	08	0.0334	0.0330	0.0327	0.0295	0.0233	0.0171
15	10	0.0196	0.0195	0.0194	0.0185	0.0166	0.0148
16	23	0.0323	0.0319	0.0315	0.0280	0.0212	0.0144
17	03	0.0257	0.0253	0.0250	0.0217	0.0154	0.0092
18	07	0.0148	0.0147	0.0145	0.0134	0.0112	0.0089
19	01	0.0339	0.0334	0.0329	0.0278	0.0183	0.0088
20	25	0.0313	0.0308	0.0303	0.0255	0.0162	0.0069
21	17	0.0287	0.0283	0.0278	0.0232	0.0144	0.0056
22	09	0.0204	0.0201	0.0198	0.0167	0.0108	0.0049
23	15	0.0410	0.0403	0.0396	0.0323	0.0185	0.0047
24	20	0.0298	0.0293	0.0288	0.0237	0.0139	0.0042
25	19	0.0338	0.0332	0.0326	0.0265	0.0149	0.0033
26	22	0.0287	0.0282	0.0277	0.0226	0.0129	0.0031
27	12	0.0194	0.0191	0.0187	0.0153	0.0086	0.0020

APPENDIX 18

SENSITIVITY ANALYSIS FOR CRITERION

A4. PROFIT

No	MSMEs' Code	0	0.2	0.4	0.6	0.8	1
		0.0001	**0.2001**	**0.4000**	**0.6000**	**0.7999**	**0.9999**
1	04	0.0667	0.0708	0.0749	0.1208	0.2083	0.2955
2	06	0.1157	0.1161	0.1165	0.1213	0.1305	0.1401
3	02	0.0412	0.0423	0.0433	0.0549	0.0772	0.1000
4	27	0.0405	0.0407	0.0410	0.0439	0.0499	0.0561
5	26	0.0488	0.0489	0.0491	0.0503	0.0529	0.0558
6	03	0.0240	0.0244	0.0247	0.0282	0.0347	0.0408
7	13	0.0341	0.0342	0.0343	0.0348	0.0356	0.0363
8	05	0.0229	0.0230	0.0231	0.0244	0.0271	0.0301
9	23	0.0315	0.0314	0.0314	0.0308	0.0297	0.0288
10	14	0.0478	0.0473	0.0468	0.0418	0.0321	0.0226
11	08	0.0330	0.0329	0.0327	0.0304	0.0261	0.0216
12	21	0.0337	0.0335	0.0333	0.0308	0.0256	0.0200
13	10	0.0194	0.0194	0.0194	0.0195	0.0198	0.0199
14	18	0.0408	0.0404	0.0400	0.0355	0.0271	0.0188
15	09	0.0197	0.0197	0.0196	0.0191	0.0181	0.0170
16	07	0.0144	0.0144	0.0145	0.0146	0.0152	0.0161
17	16	0.0528	0.0521	0.0514	0.0438	0.0295	0.0154
18	24	0.0445	0.0440	0.0434	0.0372	0.0257	0.0149
19	19	0.0333	0.0329	0.0325	0.0279	0.0190	0.0100
20	22	0.0283	0.0279	0.0276	0.0239	0.0161	0.0072
21	20	0.0295	0.0291	0.0287	0.0242	0.0157	0.0071
22	11	0.0233	0.0229	0.0226	0.0189	0.0122	0.0060
23	25	0.0312	0.0307	0.0303	0.0255	0.0160	0.0060
24	15	0.0408	0.0402	0.0395	0.0324	0.0190	0.0058
25	17	0.0287	0.0282	0.0278	0.0230	0.0138	0.0044
26	01	0.0339	0.0334	0.0329	0.0270	0.0153	0.0030
27	12	0.0194	0.0191	0.0187	0.0151	0.0079	0.0006

APPENDIX 19

SENSITIVITY ANALYSIS FOR CRITERION

B1. WORKFORCE

No	MSMEs' Code	0	0.2	0.4	0.6	0.8	1
		0.0001	**0.2001**	**0.4000**	**0.6000**	**0.7999**	**0.9999**
1	06	0.0539	0.0784	0.1037	0.1649	0.2610	0.3562
2	04	0.0619	0.0678	0.0739	0.0880	0.1097	0.1313
3	16	0.0428	0.0460	0.0493	0.0572	0.0695	0.0816
4	14	0.0407	0.0430	0.0454	0.0511	0.0600	0.0688
5	18	0.0330	0.0356	0.0384	0.0451	0.0556	0.0660
6	02	0.0382	0.0404	0.0426	0.0475	0.0549	0.0622
7	26	0.0471	0.0479	0.0487	0.0502	0.0523	0.0544
8	24	0.0399	0.0412	0.0425	0.0453	0.0497	0.0540
9	11	0.0237	0.0232	0.0227	0.0218	0.0206	0.0194
10	03	0.0280	0.0267	0.0255	0.0229	0.0190	0.0152
11	13	0.0398	0.0377	0.0354	0.0303	0.0223	0.0144
12	08	0.0385	0.0362	0.0338	0.0280	0.0188	0.0097
13	09	0.0228	0.0215	0.0203	0.0176	0.0136	0.0097
14	10	0.0229	0.0216	0.0201	0.0174	0.0133	0.0093
15	21	0.0402	0.0375	0.0346	0.0279	0.0174	0.0070
16	01	0.0401	0.0372	0.0342	0.0274	0.0169	0.0066
17	27	0.0487	0.0457	0.0427	0.0340	0.0199	0.0058
18	23	0.0382	0.0355	0.0328	0.0261	0.0155	0.0051
19	22	0.0343	0.0316	0.0289	0.0228	0.0135	0.0043
20	05	0.0278	0.0260	0.0241	0.0193	0.0116	0.0039
21	15	0.0478	0.0445	0.0410	0.0320	0.0177	0.0035
22	07	0.0179	0.0166	0.0152	0.0123	0.0079	0.0035
23	17	0.0342	0.0316	0.0289	0.0226	0.0126	0.0027
24	12	0.0237	0.0217	0.0196	0.0153	0.0088	0.0023
25	20	0.0357	0.0329	0.0300	0.0231	0.0123	0.0016
26	19	0.0404	0.0373	0.0340	0.0260	0.0133	0.0008
27	25	0.0379	0.0349	0.0317	0.0242	0.0124	0.0008

APPENDIX 20

SENSITIVITY ANALYSIS FOR CRITERION B2. COOPERATION

No	MSMEs' Code	0	0.2	0.4	0.6	0.8	1
		0.0001	**0.2001**	**0.4000**	**0.6000**	**0.7999**	**0.9999**
1	16	0.0461	0.0480	0.0500	0.0527	0.0557	0.0584
2	26	0.0458	0.0471	0.0484	0.0510	0.0548	0.0584
3	15	0.0371	0.0379	0.0387	0.0428	0.0504	0.0584
4	13	0.0265	0.0295	0.0326	0.0393	0.0490	0.0584
5	23	0.0237	0.0266	0.0297	0.0369	0.0478	0.0584
6	06	0.1263	0.1225	0.1186	0.1036	0.0776	0.0520
7	04	0.0791	0.0782	0.0774	0.0720	0.0619	0.0520
8	14	0.0438	0.0449	0.0460	0.0478	0.0500	0.0520
9	24	0.0407	0.0416	0.0426	0.0449	0.0484	0.0519
10	27	0.0375	0.0389	0.0403	0.0432	0.0476	0.0519
11	18	0.0341	0.0362	0.0386	0.0422	0.0471	0.0519
12	21	0.0277	0.0298	0.0320	0.0372	0.0449	0.0519
13	01	0.0265	0.0289	0.0314	0.0368	0.0447	0.0519
14	19	0.0282	0.0298	0.0314	0.0362	0.0440	0.0519
15	25	0.0268	0.0281	0.0294	0.0334	0.0397	0.0454
16	22	0.0212	0.0236	0.0262	0.0315	0.0389	0.0454
17	08	0.0349	0.0340	0.0330	0.0323	0.0321	0.0325
18	20	0.0288	0.0287	0.0286	0.0293	0.0308	0.0325
19	17	0.0280	0.0279	0.0277	0.0286	0.0306	0.0325
20	02	0.0542	0.0502	0.0460	0.0361	0.0210	0.0065
21	03	0.0318	0.0292	0.0263	0.0212	0.0139	0.0065
22	05	0.0309	0.0280	0.0248	0.0196	0.0128	0.0065
23	11	0.0289	0.0264	0.0238	0.0190	0.0125	0.0065
24	09	0.0252	0.0231	0.0208	0.0169	0.0116	0.0065
25	10	0.0240	0.0222	0.0204	0.0167	0.0115	0.0065
26	12	0.0240	0.0219	0.0197	0.0161	0.0113	0.0065
27	07	0.0183	0.0168	0.0153	0.0126	0.0093	0.0065

APPENDIX 21

SENSITIVITY ANALYSIS FOR CRITERION

C1. DEBT SERVICE RATIO

No	MSMEs' Code	0	0.2	0.4	0.6	0.8	1
		0.0001	**0.2001**	**0.4000**	**0.6000**	**0.7999**	**0.9999**
1	15	0.0381	0.0385	0.0390	0.0409	0.0432	0.0445
2	26	0.0493	0.0492	0.0491	0.0486	0.0470	0.0442
3	06	0.1257	0.1220	0.1184	0.0999	0.0694	0.0402
4	04	0.0813	0.0796	0.0779	0.0690	0.0543	0.0402
5	16	0.0519	0.0516	0.0512	0.0493	0.0454	0.0402
6	27	0.0408	0.0410	0.0411	0.0414	0.0413	0.0402
7	13	0.0332	0.0337	0.0341	0.0361	0.0387	0.0402
8	23	0.0299	0.0305	0.0311	0.0339	0.0378	0.0402
9	21	0.0321	0.0325	0.0329	0.0351	0.0381	0.0402
10	19	0.0310	0.0316	0.0321	0.0344	0.0377	0.0402
11	08	0.0318	0.0321	0.0324	0.0338	0.0365	0.0402
12	11	0.0212	0.0217	0.0222	0.0252	0.0316	0.0402
13	12	0.0170	0.0176	0.0182	0.0221	0.0300	0.0402
14	24	0.0431	0.0431	0.0431	0.0430	0.0421	0.0400
15	02	0.0454	0.0447	0.0441	0.0412	0.0376	0.0360
16	18	0.0401	0.0399	0.0398	0.0391	0.0375	0.0352
17	01	0.0319	0.0322	0.0325	0.0339	0.0352	0.0352
18	25	0.0292	0.0296	0.0299	0.0317	0.0340	0.0352
19	20	0.0276	0.0280	0.0284	0.0302	0.0329	0.0352
20	17	0.0266	0.0270	0.0274	0.0293	0.0324	0.0352
21	05	0.0224	0.0227	0.0230	0.0250	0.0293	0.0352
22	14	0.0478	0.0473	0.0468	0.0442	0.0387	0.0315
23	03	0.0247	0.0248	0.0248	0.0254	0.0271	0.0303
24	22	0.0269	0.0271	0.0273	0.0285	0.0299	0.0301
25	09	0.0189	0.0192	0.0195	0.0211	0.0248	0.0301
26	10	0.0187	0.0190	0.0193	0.0209	0.0247	0.0301
27	07	0.0133	0.0138	0.0142	0.0170	0.0227	0.0301

APPENDIX 22

SENSITIVITY ANALYSIS FOR CRITERION C2. COVERAGE

No	MSMEs' Code	0	0.2	0.4	0.6	0.8	1
		0.0001	**0.2001**	**0.4000**	**0.6000**	**0.7999**	**0.9999**
1	20	0.0238	0.0257	0.0276	0.0385	0.0620	0.0965
2	02	0.0440	0.0439	0.0438	0.0441	0.0469	0.0534
3	01	0.0309	0.0316	0.0323	0.0360	0.0433	0.0534
4	10	0.0178	0.0184	0.0191	0.0231	0.0326	0.0474
5	14	0.0468	0.0467	0.0466	0.0463	0.0459	0.0461
6	04	0.0808	0.0793	0.0778	0.0701	0.0572	0.0421
7	17	0.0260	0.0267	0.0273	0.0304	0.0359	0.0419
8	03	0.0238	0.0242	0.0246	0.0271	0.0324	0.0398
9	05	0.0220	0.0225	0.0230	0.0256	0.0306	0.0364
10	06	0.1262	0.1223	0.1185	0.0994	0.0684	0.0362
11	16	0.0527	0.0521	0.0514	0.0479	0.0414	0.0339
12	09	0.0186	0.0190	0.0194	0.0217	0.0267	0.0336
13	24	0.0435	0.0434	0.0432	0.0421	0.0389	0.0334
14	13	0.0340	0.0341	0.0342	0.0345	0.0341	0.0325
15	19	0.0315	0.0318	0.0322	0.0333	0.0338	0.0322
16	23	0.0307	0.0310	0.0312	0.0323	0.0326	0.0309
17	11	0.0220	0.0221	0.0223	0.0237	0.0267	0.0308
18	08	0.0322	0.0324	0.0325	0.0328	0.0324	0.0306
19	07	0.0135	0.0139	0.0143	0.0167	0.0222	0.0302
20	12	0.0178	0.0181	0.0184	0.0203	0.0244	0.0297
21	26	0.0502	0.0498	0.0493	0.0466	0.0398	0.0290
22	21	0.0328	0.0330	0.0331	0.0334	0.0323	0.0290
23	18	0.0409	0.0405	0.0400	0.0376	0.0333	0.0290
24	27	0.0415	0.0414	0.0412	0.0399	0.0357	0.0283
25	22	0.0272	0.0273	0.0274	0.0277	0.0277	0.0272
26	15	0.0387	0.0390	0.0391	0.0390	0.0358	0.0269
27	25	0.0300	0.0300	0.0301	0.0297	0.0268	0.0196

APPENDIX 23

SENSITIVITY ANALYSIS FOR CRITERION

D1. MARKET TYPE

No	MSMEs' Code	0	0.2	0.4	0.6	0.8	1
		0.0001	0.2001	0.4000	0.6000	0.7999	0.9999
1	06	0.0930	0.1040	0.1130	0.1373	0.1468	0.0424
2	16	0.0481	0.0495	0.0506	0.0537	0.0549	0.0423
3	26	0.0493	0.0493	0.0492	0.0490	0.0477	0.0423
4	24	0.0422	0.0427	0.0430	0.0441	0.0447	0.0423
5	13	0.0360	0.0352	0.0345	0.0328	0.0325	0.0422
6	01	0.0345	0.0335	0.0329	0.0307	0.0305	0.0422
7	15	0.0435	0.0416	0.0399	0.0354	0.0318	0.0422
8	11	0.0217	0.0219	0.0223	0.0235	0.0275	0.0422
9	04	0.0740	0.0756	0.0767	0.0798	0.0767	0.0376
10	14	0.0445	0.0455	0.0463	0.0483	0.0487	0.0376
11	21	0.0357	0.0345	0.0335	0.0308	0.0291	0.0375
12	08	0.0349	0.0338	0.0329	0.0305	0.0291	0.0375
13	27	0.0464	0.0441	0.0421	0.0367	0.0312	0.0375
14	23	0.0342	0.0329	0.0318	0.0289	0.0273	0.0375
15	19	0.0356	0.0341	0.0328	0.0293	0.0270	0.0375
16	25	0.0328	0.0315	0.0305	0.0276	0.0263	0.0375
17	10	0.0191	0.0191	0.0193	0.0198	0.0231	0.0375
18	12	0.0189	0.0186	0.0186	0.0184	0.0212	0.0375
19	18	0.0370	0.0383	0.0394	0.0421	0.0434	0.0329
20	02	0.0430	0.0435	0.0437	0.0448	0.0439	0.0329
21	03	0.0252	0.0250	0.0248	0.0245	0.0256	0.0329
22	22	0.0291	0.0283	0.0277	0.0257	0.0250	0.0329
23	17	0.0300	0.0289	0.0280	0.0253	0.0239	0.0328
24	09	0.0198	0.0196	0.0196	0.0196	0.0217	0.0328
25	07	0.0146	0.0145	0.0145	0.0146	0.0176	0.0328
26	20	0.0314	0.0301	0.0290	0.0255	0.0227	0.0282
27	05	0.0256	0.0245	0.0236	0.0213	0.0199	0.0282

APPENDIX 24

SENSITIVITY ANALYSIS FOR CRITERION

E1. LEGAL DOCUMENT

No	MSMEs' Code	0	0.2	0.4	0.6	0.8	1
		0.0001	**0.2001**	**0.4000**	**0.6000**	**0.7999**	**0.9999**
1	26	0.0475	0.0481	0.0488	0.0503	0.0526	0.0549
2	24	0.0405	0.0415	0.0426	0.0453	0.0498	0.0549
3	15	0.0349	0.0366	0.0384	0.0425	0.0488	0.0549
4	02	0.0440	0.0439	0.0438	0.0444	0.0477	0.0549
5	05	0.0181	0.0201	0.0221	0.0280	0.0395	0.0549
6	06	0.1344	0.1273	0.1202	0.1025	0.0738	0.0440
7	04	0.0851	0.0819	0.0786	0.0706	0.0575	0.0440
8	14	0.0469	0.0468	0.0467	0.0463	0.0453	0.0440
9	27	0.0400	0.0405	0.0409	0.0418	0.0430	0.0440
10	25	0.0262	0.0278	0.0293	0.0330	0.0386	0.0440
11	17	0.0241	0.0255	0.0269	0.0305	0.0368	0.0440
12	03	0.0221	0.0231	0.0243	0.0276	0.0344	0.0440
13	11	0.0193	0.0205	0.0218	0.0256	0.0332	0.0439
14	16	0.0542	0.0530	0.0517	0.0482	0.0415	0.0330
15	21	0.0319	0.0324	0.0329	0.0338	0.0342	0.0330
16	19	0.0309	0.0315	0.0320	0.0331	0.0338	0.0330
17	23	0.0296	0.0303	0.0310	0.0324	0.0335	0.0330
18	08	0.0323	0.0324	0.0325	0.0328	0.0330	0.0330
19	20	0.0279	0.0282	0.0284	0.0293	0.0310	0.0330
20	09	0.0177	0.0184	0.0192	0.0215	0.0263	0.0330
21	12	0.0163	0.0172	0.0181	0.0207	0.0260	0.0330
22	13	0.0353	0.0349	0.0345	0.0329	0.0289	0.0220
23	01	0.0335	0.0332	0.0328	0.0315	0.0280	0.0220
24	10	0.0197	0.0196	0.0195	0.0195	0.0202	0.0220
25	07	0.0136	0.0139	0.0143	0.0155	0.0181	0.0220
26	18	0.0448	0.0428	0.0408	0.0353	0.0247	0.0110
27	22	0.0293	0.0286	0.0278	0.0254	0.0198	0.0110

APPENDIX 25

SYNTHESIZE RESULT

AFTER EXCLUSION OF FIVE HIGHEST RANK

No	MSMEs' Code	Ideals	Normals	Raw
1	02	1	0.08737	1
2	18	0.909574	0.07947	0.909574
3	24	0.906364	0.079189	0.906364
4	27	0.697368	0.060929	0.697368
5	15	0.59918	0.05235	0.59918
6	13	0.596751	0.052138	0.596751
7	21	0.53516	0.046757	0.53516
8	08	0.531593	0.046445	0.531593
9	01	0.51418	0.044924	0.51418
10	23	0.509032	0.044474	0.509032
11	19	0.485902	0.042453	0.485902
12	25	0.451973	0.039489	0.451973
13	03	0.447695	0.039115	0.447695
14	20	0.427561	0.037356	0.427561
15	22	0.426362	0.037251	0.426362
16	11	0.426111	0.037229	0.426111
17	17	0.420089	0.036703	0.420089
18	05	0.378989	0.033112	0.378989
19	09	0.335854	0.029344	0.335854
20	10	0.333408	0.02913	0.333408
21	12	0.277491	0.024244	0.277491
22	07	0.234931	0.020526	0.234931

APPENDIX 26

SYNTHESIZE RESULT

AFTER EXCLUSION OF FIVE MIDDLE RANK

No	MSMEs' Code	Ideals	Normals	Raw
1	06	1	0.129644	1
2	04	0.673836	0.087359	0.673836
3	16	0.464267	0.06019	0.464267
4	26	0.450708	0.058432	0.450708
5	14	0.427634	0.05544	0.427634
6	24	0.396699	0.05143	0.396699
7	15	0.388562	0.050375	0.388562
8	27	0.382232	0.049554	0.382232
9	02	0.379938	0.049257	0.379938
10	18	0.368239	0.04774	0.368239
11	13	0.331356	0.042958	0.331356
12	25	0.295954	0.038369	0.295954
13	20	0.277923	0.036031	0.277923
14	22	0.273586	0.035469	0.273586
15	17	0.268778	0.034846	0.268778
16	03	0.231183	0.029972	0.231183
17	05	0.213802	0.027718	0.213802
18	11	0.20407	0.026457	0.20407
19	09	0.18531	0.024024	0.18531
20	10	0.182835	0.023703	0.182835
21	12	0.179232	0.023236	0.179232
22	07	0.137261	0.017795	0.137261

APPENDIX 27

SYNTHESIZE RESULT

AFTER EXCLUSION OF FIVE LOWEST RANK

No	MSMEs' Code	Ideals	Normals	Raw
1	06	1	0.125032	1
2	04	0.66529	0.083182	0.66529
3	16	0.44439	0.055563	0.44439
4	26	0.430751	0.053858	0.430751
5	14	0.409076	0.051147	0.409076
6	02	0.388737	0.048604	0.388737
7	24	0.379924	0.047503	0.379924
8	27	0.362326	0.045302	0.362326
9	15	0.352175	0.044033	0.352175
10	18	0.345244	0.043166	0.345244
11	13	0.302486	0.03782	0.302486
12	21	0.295572	0.036956	0.295572
13	08	0.294039	0.036764	0.294039
14	01	0.291828	0.036488	0.291828
15	19	0.289621	0.036212	0.289621
16	23	0.277729	0.034725	0.277729
17	25	0.270884	0.033869	0.270884
18	20	0.260629	0.032587	0.260629
19	17	0.250894	0.03137	0.250894
20	22	0.244622	0.030585	0.244622
21	03	0.228003	0.028508	0.228003
22	05	0.213756	0.026726	0.213756

BIOGRAPHY

Before sunrise could greet the day, Kevin Karmadi Wirawan was born. At that day, 18 August 1993, Mr. Budy Wirawan and Mrs. Hoo Fen Thauw joyously welcome their new family member, their first child. Three years later, their second child came into this world. SDK Santa Maria II Malang, SMPK Santa Maria 2 Malang, SMAK Santo Albertus Malang are education institutions that have been passed by author.

Spending most of his life in Malang, author decided to study in Surabaya, at Sepuluh Nopember Institute of Technology, started in September 2011. New atmosphere made author a little bit uncomfortable firstly. Studying and learning is interesting, but eventually he got bored. In his final year at university, he participated some International Office events. One of those events is Community and Technological Camp – Insight 2015. As one of class assistants, he helped some of international students in their study. This is one of great experiences for him.