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# The Element Analysis on The Development of Cattle Industry in Jambi

[1] SUMARSONO, [2] FIRWAN TAN, [3] RUDI FEBRIAMANSYAH

[1,2,3] Concentration of Agricultural Science Program of Agricultural Development
Andalas University Graduate Program
[1,2,3] email: rsumarsono@gmail.com

**Abstract.** The aim of this paper is to formulate the structure of the key elements and determine the development of beef cattle livestock industry system that must be done. The method used is ISM and Fuzzy ME-MCDM.. Results of the ISM data analysis can know that the key element to the needs of the program is the production technology, quality standardization Ranch Cattle, capital, and competent employees. The constraint of program: capital, facilities, infrastructure, quality, human resources, technology, and institutional. The purpose of the program is to improve the mastery of technology, increase the added value Ranch Cattle, improving competent human resources, and economic development of Ranch Beef Cattle Industry. The results is alternative activities that must be done is the development of by systems Industrial raw materials and production process.

*Keywords:* key elements, fuzzy ME-MCDM, Industrial systems development, Ranch Cattle

## Introduction

Development is a continuous series of events and activities in line with the intensity of the public and the government. Sustained economic growth is the main condition for the sustainability of regional economic development (Yana T, 2015) Development of Livestock, especially cattle in areas in Indonesia aimed at meeting the needs of meat in order to achieve national food security.

Beef demand in Indonesia is likely to increase, but the rate of increase of domestic production is slower than the demand, so that Indonesia had to import meat in quantities greater (Inounu et al. 2007). According Luthan (2009), almost 42% of domestic meat consumption met by imports. An estimated population of Indonesian beef consumption in 2020 will increase 2-3 times that of the average current consumption of less than 2 kg / capita / year, so that Indonesia is feared to be an importer of beef cattle in the world (Diwyanto 2008). Without a serious effort, then in 2015 almost 55% of meat consumption society will be met from cattle and beef imports, while Indonesia has the potential of local livestock sizeable managed by 4.6 million households (Luthan 2009). Last livestock census in 2011 showed that the beef cattle population reached 14.82 million head (DG PKH 2012), more than is expected. This potential should be empowered to reduce dependence on imported cattle.

Department of Animal Husbandry and Animal Health is one of the government agencies in charge of managing industrial development policy beef cattle farms located in West Ring Road I Km.12 No. 78 Kota Baru District of the city of Jambi, Jambi Province. Lately it happens Beef cattle farms decreased productivity caused by many things such as the low quality of raw materials, less competent employees, and so forth. Therefore, research is needed on key elements of the analysis and development of alternative systems Beef cattle breeding industry with the aim to formulate the structure of the key elements and determine the development of beef cattle livestock industry system that must be done by the Department of Animal Husbandry and Health of Jambi Province.

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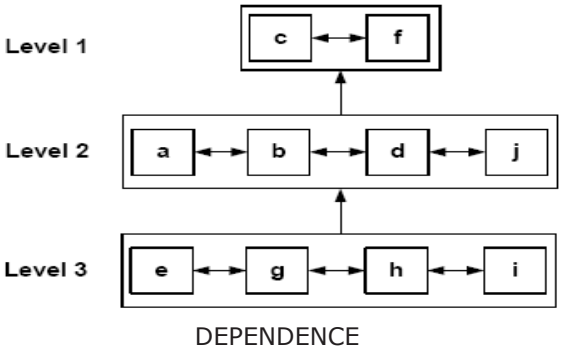
**Tabel 1**
**Reachability Matrix (RM) Final Elemen Program Needs**

| | a | b | c | d | e | f | g | h | i | j | DP | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 9 | 2 |
| b | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 9 | 3 |
| c | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 8 | 2 |
| d | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 9 | 1 |
| e | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 10 | 1 |
| f | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 8 | 3 |
| g | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 10 | 1 |
| h | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 | 1 |
| i | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 10 | 1 |
| j | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 9 | 2 |
| D | 10 | 10 | 9 | 10 | 10 | 9 | 4 | 10 | 10 | 10 | | |

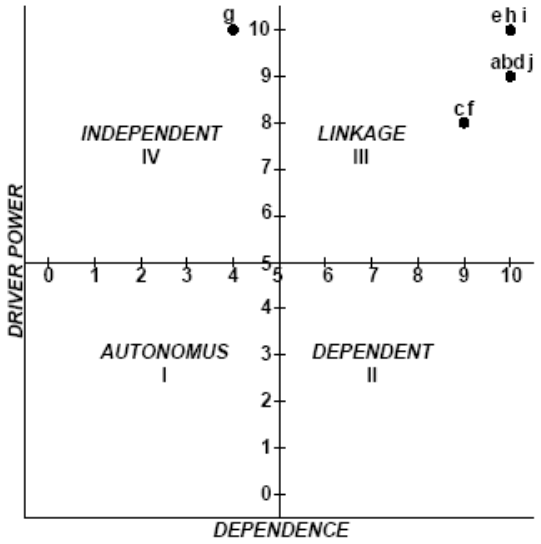
## Inetrpretative Structural Modeling (ISM) Analysis

The results obtained in elemental analysis needs can be seen in Table 1. The results of the analysis of the 10 sub-elements of the program requirements indicate that a key element is the value-Power Driver highest of: The production technology (e), standardization of quality Cattle Cut (g), Capital (h), and the employees were competent (i). It makes clue that in the development of the quality of beef cattle farms should focus on the four sub-elements, but other elements are also considered sub-. Other elements are also considered.

Based on the aspect of a thrust driver power (DP) from the *Reachability Matrix* (RM) can be made final structural model diagram. The number of levels based on the level of the value of DP, which is occupying the bottom levels are sub- elements that have the highest DP value. Production technology, quality standardization of beef cattle, capital, and competent employees at the level of the three because of the sophistication of the production technology used, capital, and competent employees determine the quality of the products dihasilkan.Menurut Gilarso (2004 ), factors that influence the success of the production among other things human, material, equipment/ machinery, capital and entrepreneur activities . In addition, an industry that has standardize the quality of beef cattle will produce a quality product and uniform. According to Official (2011), the company must have a clear policy regarding the quality of a product perusahaan. Diagram program needs structural model elements can be seen in Picture 1.




*Picture 1*
*Diagram DP-D Needs Elemen Program*




*Picture 2*
*DP-D Matrix Element Program Needs*

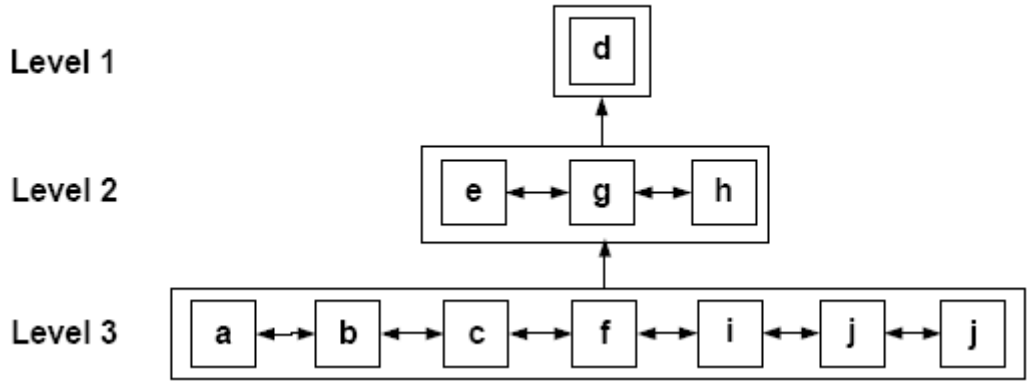
Based on the aspect of a thrust (power driver) from the RM can be made final

structural model diagram. The number of levels based on the level of the value of DP, which is occupying the bottom levels are sub-elements that have the highest DP value. Production technology, quality standardization *Ranch Cattle*, capital, and competent employees at the level of the three because of the sophistication of the production technology used, capital, and competent employees determine the quality of the resulting product. According Gilarso (2004) factors that affect success production, among others, human, material, equipment / machinery, capital and entrepreneur activities. In addition, an industry that has standardize the quality of beef cattle will produce a quality product and uniform. According to Official (2011), the company must have a clear policy regarding the quality of a company's products. Diagram program needs structural model elements can be seen in Picture 1.

Based on the value obtained Driver Power and Dependence Matrix DP-D for the needs of program elements that can be seen in Figure 2. Sub-key elements in the matrix DP-D in the top position with a value driver power (DP) is the highest, both the Independent or Linkage. Matriks shows that sub-element of quality standardization Ranch Cattle (g) are in sector IV (Independent) which included independent variables. This means the need for standardization of the quality of beef cattle in the industry to get quality products. The standardization of quality beef cattle farms have little dependence on the program due to the sub-element is a rule or measure the quality of beef cattle which have become the guidelines, so whatever happens in the industry will not change the quality the meat standardization. According Herjanto (2011), the role of quality is very important so we need to follow and adhere to international standards and requirements of each country. Sub-other elements that are in the sector III (Linkage). Where the infrastructure requirements (a) infrastructure; (b) the implementation of training Cattle (c) the raw material standards; (d) the production technology; (e) implementation of cooperation with Industrial Company; (f) capital; (h) competent employees; (i) as well as the implementation of quality beef and FOSTER Standards; (j) which will produce quality beef cattle quality and the least attention to the sub-elements can degrade performance so make quality cattle ranch.

## Program Main Obstacle Element Analysis

The results of the analysis of 11 sub-elements of the constraints of the program showed that a key element is the capital (a), infrastructure (b) Infrastructure (c), quality (f), human resources (i), technology (j), and institutional (k). Low or poor availability of capital, infrastructure, quality of raw materials, human resources, technology, and institutions in the industry would result in reduced quality of the product. According Pramesti, et al., (2013), with their lack of adequate capital, the quality of human resources, limited application of technology, facilities and infrastructure are lacking or inadequate, poor infrastructure, and institutions can hamper the development of the system of Livestock Cattle. It makes the instructions for the industry that must focus on the seven sub-elements that are not obstacles. Based on the aspect of a thrust (power driver) from the RM can be made final structural model diagram. Number of degree level, based on the value of DP, which is occupying




*Picture 3*
*Diagram Main Obstacle Element Analysis Program*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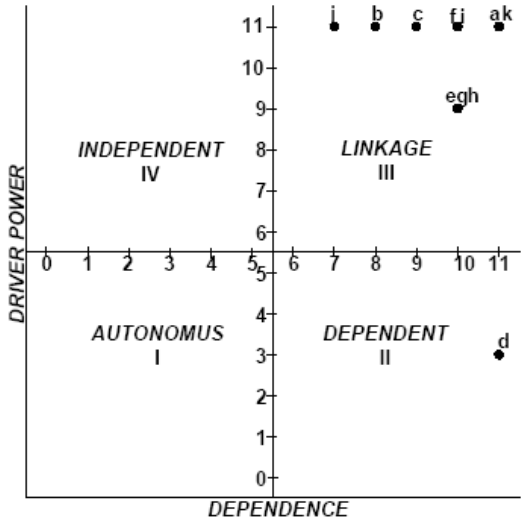
the bottom levels are sub-elements that have the highest DP value. Capital (a), infrastructure (b), infrastructure (c), quality (f), human resources (i), technology (j), and institutional (k) are at the basic level or three because if there is a constraint on the sub-these elements will degrade the quality piece of Cattle ranch that generated. According to Fuad, et al., (2006), factors directly affect production output is institutional, labor, equipment, machinery, capital, raw materials, mobility, and information systems. Sub-element Drugs And Cattle Feed Supplement (d) at the level 1 because of constraints on the drug and cattle feed supplement did not significantly affect the declining quality of beef cattle produced. Structural model diagram elements main obstacle courses can be seen in Figure 3.

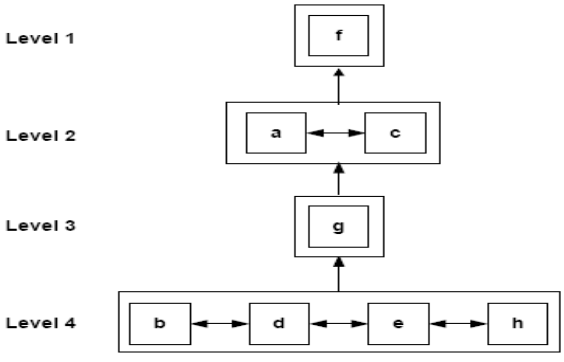



*Picture 4. DP-D Matrix Elements Main Obstacle Courses*

Based on the value obtained Driver Power and Dependence DP-D matrix element main obstacle to a program that can be seen in Figure 4.Sub-a key element in the matrix DP-D in the top position with a value driver power (DP) is the highest, both the Independent or Linkage.Matriks shows that the sub-elements of capital (a), infrastructure (b), productivity (c), quality (d), quantity (e), continuity (f), Human Resources (g),technology (j), and institutional is in the third sector (Linkage). This is because the sub-elements has an important role in the production process, in which a problem with the sub-elements that make the performance of the industry will decline, so that the development of livestock industry system Cow elusive. Therefore, the industry must maintain the performance of sub-elements in order not to experience problems. Sub-elements of the drug and additional feed cattle (d) are in sector II (Dependent), because the medication and additional feed cows has no effect on the quality Ranch Cattle, but with a quality product that will enhance the value of drugs and additional feed cows a product that the selling price will be high. According to Case and Fair (2007), a quality product that will enhance the resale value.

## Program Objectives element Analysis

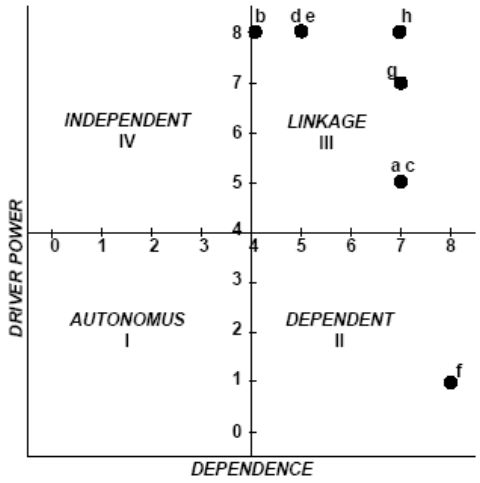
The results of the analysis of eight sub-element indicates that the program objectives are a key element is to improve the mastery of technology (b), increase the added value of quality Ranch Cattle (d), increasing the competent human resources (e) and economic development (h). An industry must provide added value to the product by using better technology, competent human resources, and a good economy so that the industry is able to meet any needs which is used to produce a quality product. According to Kader and uphold (2007), economic growth will not be without qualified human resources in mastering science and technology (Science and Technology). Where economic growth tend to be correlated with the mastery of science and technology that will spur the production system so as to make a product will have a better added value.




*Picture 5*
*Diagram element structural model program objectives*

Based on the aspect of a thrust (power driver) from the RM can be made final structural model diagram. Number of degree level, based on the value of DP, which is occupying the bottom levels are sub-elements that have the highest DP value. Improving mastery of technology (b), increasing the

added value Ranch Cattle (d), increasing the competent human resources (e), and the economic development of breeder Cattle (h) at the level of four. It makes an industry must achieve these goals that the program systems development beef cattle industry that cause Cow farm successfully. Diagram element structural model program objectives can be seen in Picture 5.




*Picture 6*
*Matriks DP-D for elemen program Objectives*

Based on the value obtained Driver Power and Dependence Matrix DP-D to a destination element program that can be seen in Picture 6. Sub-key elements in the matrix DP-D in the top position with a value driver power (DP) is the highest, both the Independent or Linkage .Matriks stated that the sub-elements enhance the competitiveness of products (a), increasing mastery of technology (b), increase market share (c), increasing the added value Ranch Cattle (d), increasing the competent human resources (e), increase productivity (g), and the economic development of beef cattle breeders (h) are in the third sector (Linkage). The achievement of these objectives, will be able to maintain the quality of the beef cattle farming that produced for that purpose were able to make the industry has a good performance. Therefore, the industry must achieve these goals so that the quality of Cattle ranch could maintain even better. Sub-elements encourage industrial development Ranch beef (f) are in sector II (Dependent), because the systems development industry beef cattle breeding to make an industry has an opportunity to compete and improve the economy so that the development in the construction industry beef cattle breeding can be done.

## Element Analysis on Institutions involved

The results of the analysis of 11 sub-elements of institutions involved in the development of quality breeding cows show that a key element is the Department of Industry and Trade (b), Universities (g), and the Research and Extension (h). Department of Industry, Trade and Cooperation, Higher Education and Research and Extension extremely helpful in directing the parties to provide training, counseling and disseminating innovations or the latest technology in processing so that the development of livestock industry system Cow can reached. Based on the aspect of a thrust (power driver) from the RM can be made final structural model diagram. Number of degree level, based on the value of DP, which is occupying the bottom levels are sub-elements that have the highest DP value. Department of Industry, Trade and Cooperation (b), Universities (g), as well as researchers and Extension (h) at the level of five. Cooperative Office, Higher Education and Research and Extension extremely helpful in directing the parties to provide training, counseling and disseminating innovations or the latest technology in processing so that the development of beef cattle livestock industry system can be achieved. Diagram element structural model agencies involved can be seen in Picture 7.

Based on the value obtained Driver Power and Dependence Matrix DP-D for agencies involved elements that can be seen in Figure 8. Sub-key elements in the matrix DP-D in the top position with a value driver power (DP) is the highest, both the Independent or linkage .SUB-element beef cattle breeder (a), the Department of Industry and Trade (b), animal feed unit (c), banking (d), wholesalers of fresh beef cattle farms (e), employee (f), Universities (g), as well as researchers and Extension (h) are in the third sector (Linkage). Problems within the agency, will make the program development system potongsulit Cow livestock industry achieved because these institutions have an important role related to industries ranging from raw material suppliers of fresh beef cattle farms, the production process, lend capital, provide counseling and training. It is intended that these bodies should be properly addressed and the industry should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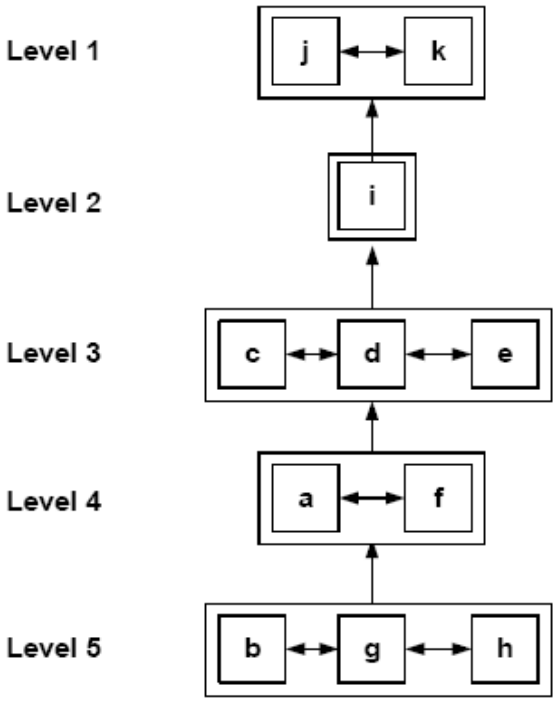
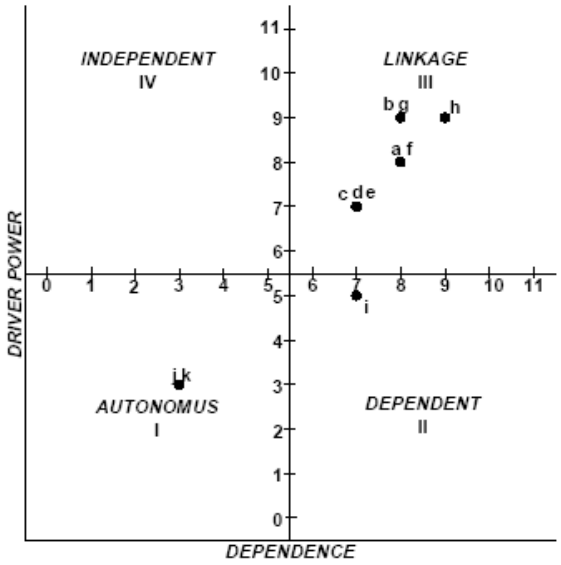
have a good relationship so that the program can be achieved. Sub-element distributor (i) are in sector II (Dependent), because the distributor is only responsible for distributing the finished product and does not significantly contribute in improving the quality of livestock Cattle potongtetapi working distributors will be affected when the quality of the product declines as consumer demand has decreased. Realtors (j) and consumers (k) is in sector I (autonomous), for realtors and consumers did not assist directly in the program development system Ranch Beef Cattle Industry.




*Picture 7*
*Structural Model Diagram Elements*
*Institutions involved*




*Picture 8*
*DP-D matrix for the elements*
*involved Institutions*

## Fuzzy Multi Expert-Multi Criteria Decision Making Analysis

The results of the questionnaire weighting of criteria used to define the label and the negation of each criterion are presented in Table 3. It appears that the criteria in the development alternative predetermined also be a key element in the results of ISM. This makes the proof that indeed these five criteria is very influential in the development of systems Ranch Beef Cattle Industry. The good work to these criteria will make the product has a good quality.

Based on the results of questionnaires from three experts in alternative development in each criterion can be seen in Table 4.

**Table 3**
**Negasi each Criterion**

| No. | Criteria | Weight (VPI) | Label | Negation |
|---|---|---|---|---|
| 1. | The ability of HR | 0,284 | very high (VH) | very low (VL) |
| 2. | Supporting Organization | 0,079 | L | T |
| 3. | The sophistication of machinery / equipment | 0,326 | VH | VL |
| 4. | Mastery of science and technology | 0,264 | H | L |
| 5. | Capital | 0,048 | VL | VH |

Source: Primary Data Processing (2014)

Results of the questionnaire showed that the ability of human resources has a very high value in the three alternative compared to other criteria. Competent human resources to be able to master the process and the technology well, so it will produce much output quality. Therefore, an industry must select competent employees. According Zainuri, et al., (2003), lack of knowledge and skills of SMEs in terms of human resources is an obstacle in the development of system products industry.

Criteria support institutions generally worth being on the third alternative for supporting institutions here are not in direct contact with the production process such as machinery, labor, and technology that have a lower contribution in the development of system products industry. Institutions supporting role in the provision of training and education in the way of a good production. According to Iqbal (2007), stakeholder support, is mediating in the process of delivering aid activities.

## Aggregation Criteria

The final value alternative in each expert is determined through aggregation of the value of each criterion by taking into account the weight of the criteria and weighting criteria negation (Marimin, 2013). Calculation aggregation criteria are as follows: Based on the calculation of the aggregation criteria is obtained which, according to experts 1 and 2, an alternative system development Industrial raw materials and the development of production processes of high value, whereas the alternative development of the handling of the post-production of medium- as a major factor in improving the quality of breeding beef cattle should be supported by the quality of raw materials quality and good production process. In accordance with the statement Yusdja et al (2004), states that the development of systems of beef cattle livestock industry must be supported by the quality of the raw material quality with good production process. According to experts, 3, the entire high-value alternative for a third alternative to highly interrelated and mutually supportive in improving the quality Ranch Cattle.

## Aggregation Expert

Before performing the aggregation of experts, expert value weighting performed by using the formula: Qk = Int [1 + k * (q-1) / r] with the following results: After determining the weight value of experts, then conducted expert aggregation formula: Vi = Max [Qj A bj] with Qj is an expert and bj weight value is the final value of each alternative are sorted from large to small. Result of the aggregation of experts as follows: V1 = Max [L A H, H A H, VH A H] = Max [L, H, K] = H (first alternative high value) V2 = Max [L A H, H A H, VH A H] = Max [L, H, H] = H (second alternative high value) V3 = Max [L A H, H A M, VH A M] = Max [L, M, M] = M (A third alternative is worth being) The analysis results showed that the first and second alternative is the development of systems Industrial raw materials and

**Table 4**
**Value Alternative to-i by three experts on each criterion**

| Alternative | Criteria | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Expert 1 | | | | | |
| 1. improving the quality of cattle | VH | M | H | VH | L |
| 2. improvement of production processes | VH | L | H | H | VL |
| 3. improvement of handling post-production | VH | M | M | H | VL |
| Expert 2 | | | | | |
| 1. improving the quality of cattle | VH | M | H | VH | M |
| 2. improvement of production processes | VH | H | VH | VH | H |
| 3. improvement of handling post-production | VH | L | M | M | VL |
| Expert 3 | | | | | |
| 1. improving the quality of cattle | VH | M | VH | H | H |
| 2. improvement of production processes | VH | L | VH | H | H |
| 3. improvement of handling post-production | H | M | H | H | M |

Source: Primary Data Processing (2014)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production process development of high value compared to the third alternative (development of handling post-production). It is intended that in the development of livestock industry system Cow must more attention in terms of system development Industrial raw materials and production process development by focusing on key elements of the results of the ISM method.

## Conclusions

According to analysis by the ISM method can be obtained that is a key element in: (a). Elements of the program needs is a production technology, quality standardization Ranch Cattle, capital, and competent employees. (b). Elements of the program are capital constraints, infrastructure, infrastructure, quality, human resources, technology, and institutional. (c). Elements of the program's objectives is to improve the mastery of technology, increasing the added value Ranch Cattle, improving competent human resources, and economic development Ranch Beef Cattle Industry. (d). Elements of the agencies involved are the Department of Industry and Trade, Higher Education and Research and Extension. The results of the analysis using method ME-Fuzzy MCDM, it is known that the form of the development of livestock industry Cattle potongyang system should be done by the Department of Animal Husbandry and Health of Jambi Province is the development of the quality of raw materials and production processes by focusing on the key elements. The Department of Animal Husbandry and Health of Jambi Province is advisable to build a good partner and perform activities according to the results of research in order to achieve development in the quality of beef Cattle farm is generated. Research selanjutnnya, should involve more experts with a more diverse disciplines so that a more comprehensive opinion.

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