

# Development of Beef Cattle Agroindustries Performance Model in East Nusa Tenggara, Indonesia

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## Abstract

The purpose of this paper is to develop a strategic map and set priorities based on the relationship of performance measures dependency and feedback of intra and inter cluster strategic goals. This is intended to develop an integrated solution for beef cattle agro-industry performance in Kupang, NTT, Indonesia. The study was conducted in Kupang City as one of the locations for agro-industry development of beef cattle, in the province of NTT in 2013. This study used a critical review of published relevant reports as well as the observation of a reference field research through expert meeting in the selection of system elements are believed to be appropriate for the development of agro-industry performance in the area of Kupang, NTT. The results showed that the model approach in an integrated ISM and ANP are able to explore insights and opinions with regard to the decision makers in the organization's strategic objectives agro-industry development of the area of beef cattle in Kupang, NTT, and has a strong relevance to create a systematically coherent strategic map. Through this strategic map that is designed using the results of the integration of logical facts ISM models and models of ANP, it is possible to make a visual and comprehensive evaluation of the strategic objectives and modifications made to map out strategies to increase the effectiveness of the system in the future. Organizations can deliver the biggest priority on learning and growth perspective, followed in succession by the perspective of investment and market share growth, internal business process improvement, and customer growth in order to generate the development of agro-industry management effectively and efficiently.

**Keywords:** Development of performance measures, integrated approach of ISM-ANP, beef cattle agro industry in East Nusa Tenggara.

## 1. Introduction

Beef cattle is one of potential commodity for development in Indonesia. The cattle population is spread throughout the country. In certain areas, beef cattle are seen as a superior commodity and it can be developed to be an agro-industrial product. Development of the beef processing industry is largely determined by the availability and distribution of livestock (Foster and Burt, 1992). The importance role of beef cattle agro-industry in Indonesia can be seen in terms of employment for approximately 44.3% of the Indonesian population and as a source of raw material to the industry. East Nusa Tenggara province (known as Nusa Tenggara Timur-NTT) is one the beef cattle centers in eastern Indonesia and the population of cattle and buffalo in 2012 reached 929,324 head (Central Buereau of Statistics, 2012). As one of the centers of beef cattle in eastern Indonesia, NTT is believed to be quite successful in developing beef cattle farms, however development of beef processing industry is not yet achievable.

Development of beef processing industry should be seen as a cooperation network in the form of Triple Helix partnerships among government, farmers and capital owners. Through agro-industry activities, it is expected that farmers enable to obtain value-added products/services, income generation, and further lead to promote regional economic growth and create employment opportunities for rural communities. On the other hand, the slow development in the beef processing-industry is currently caused by low level of knowledge and skills of farmers, weak bargaining position, lack of venture capital and limited trainings by relevant agencies, as well as lack of infrastructure. All of these factors will hinder the development of beef processing industry. These conditions would be a concern of all parties in relation to the sustainability of rural businesses. Accordingly, development of systems approach is required based on the ability and skills in the use of appropriate technology to produce a competitive product, especially for rural farmers. Development of beef agro-industry has a great opportunity to expand because of its substantial capacity. In some areas, beef cattle production is abundant compared to other regions, however model of strategic planning and policy evaluation in order to increase income of farmers and shareholders is not available. Downstream products of beef cattle have not been optimally processed to attain high added-value products. Therefore, strategic steps for beef agro-industries development using resource-based at NTT should be taken into consideration.

Beef cattle industry at NTT are categorized into small and medium-scale enterprises and use simple technology. This leads to low production and irregular product quality. In the mean time, the government of NTT province has set up to restore the image of the region to be a center for beef cattle production through planning and development strategy beef cattle in a holistic approach to meet domestic market demand of 13.2 million heads per year (Central Buereau of Statistics, 2012)

Contemporary management development strategies provide valuable lessons about the importance of investing in human capital to build future prosperity. Thus, the management of any business organization is basically the management of human resources in the harness. In recent years, there has been a shift in the three related phenomena, that is appropriate technology according to the needs, competitive products in knowledge, and human capital that are able to learn and to foster competitiveness (Mulyadi, 2009). Hence, it is necessary to put into account proper management planning strategy to assess performance of NTT government as an organization in terms of beef agro-industry development. Proper assessment of the performance will be very useful as an input in order to achieve organizational goals.

Phenomena development of agro-industry nowadays shows that in the early development, high motivation of stakeholders tend to encourage the inclusion of strategic objectives with maximum performance measures. The results is seen to make the system become large agro-industry (bulky) and less efficient. The performance of agro-industry, as measured by the Balanced Scorecard, often contain a set of indicators which are aggregate into four dimensions of the Balanced Scorecard without the effort of mapping the relationship of each indicator. As a result, it is difficult to control by stakeholders during the change of the internal-external factors in the region. The lack of decision makers' awareness in the importance of segregating the driver dependence (leading-lagging indicators) relationship in the organization goal that could produce an efficient agro-industry performance measurement, result in less effective strategy.

This study aims to develop an integrated model as an approach that reflects real life cases of the development in the beef cattle agro-industry region in Kupang, which includes: (1) the dependency relationship of strategic maps and feedback between the strategic objectives in the context of the perspective of the Balanced Scorecard as a performance development of integrated solutions agro-industry cattle in Kupang, (2) Set the priority measures of performance based on the relationship of dependence and feedback, both intra-and inter-cluster strategic goals.

## 2. Methodology

The study was conducted in beef processing centers Kupang, NTT from January to June 2013. This study is an explorative design modeling that aims to seek efficient solution with regard to the development of the beef cattle agro-industry performance in Kupang, NTT, through a set of strategies based on the analysis of material needs in the form of the strategic objectives of agro-industry development without disregarding the relationship between strategic goals. This study used a critical review of published relevant reports as well as the observation of a reference field research through expert meeting in the selection of system elements are believed to be appropriate for the development of agro-industry performance in the area of Kupang, NTT. Respondents were drawn to perform the expert meeting include: Kupang Chief District Veterinary Office, Ministry, head of the farmers' group (both active and inactive), traders, wholesalers/exporters, farm observers, academic experts and extension officers.

The analyses method employed both quantitative and qualitative approaches, which is integrated to formulate a strategic map. This systemic approach is formulated in to the following stages: (1) identifying the organization's strategic goals based on the accuracy and performance of the agro-industry interests in the development of beef cattle; (2) grouping the strategic goals based on performance indicators and performance results (leading and lagging indicators); The purpose of the strategic development of agro-industry performance of beef cattle in Kupang, NTT was identified by the method of Strategic Assumption Surfacing and Testing (SAST), Model Interpretive Structural Modeling (ISM) (with a supporting software system structure) used to create a driver-dependence relationship diagraph (leading-lagging indicators) between organizational goals. ISM model results are used as input to a model of Analytic Network Process (ANP) (with software Super Decisions as supporters) to manipulate the strategic map and the dependency relations feedback between the strategic objectives in the context of the Balanced Scorecard perspectives and frameworks that can be controlled as an integrated solution development performance agro-industry cattle in Kupang, NTT.

## 3. Results and Discussion

### 3.1 Identifying Strategic Goals and Purpose Cluster

The analysis on the level of interest and action elements predictive accuracy of the SAST method identified 13 key elements (from 21 elements proposed). These elements will so forth be referred as strategic goals. All four balanced scorecard analysis of performance was verified by the experts (through the expert meeting) and were segregated into four goal clusters with regard to the analysis of agro-industry, namely: (1) increasing capacity and skills, (2) developing internal business processes, (3) increasing customer trust, and (4) enhancing investment and market share. These objective clusters serve as an important part in manipulating maps and prioritizing strategic development of the beef cattle agro-industry performance in Kupang, NTT using ANP.

### *3.1.1 Performance Analysis on Learning and Growth Perspective*

Capturing the dynamics of regional agro-industry organizations in developing an appropriate beef "Performance Analysis", was made possible through the measurement of an organization's ability to develop and utilize human resources (responsibility center), as such, interacting with other organizational strategies and obtaining present and future objectives. The learning and growth perspective in this study is referred as the perspective of capacity building and skills, which rely on the ability of personnel as organizations increasingly recognize the importance of innovation in production to increase consumer value on an ongoing basis. In the context of this assessment and mapping assumptions or organizational performance trigger criteria (indicators of the key sub-elements) submitted the following aspects: (1) the application of appropriate technology; (2) increase in cooperation among farmers, (3) increase in the competence of human resources, (4) the provision of incentives and (5) an integrated information system applications. These aspects were proposed to be verified through the expert meeting based on the level of interest and confidence or certainty. Assumptions that belong to the quadrant with high certainty level of interest and priority are selected as the preferred choice of elements and predicted to cause an increase in the performance area. The results show that there are two aspects that are considered as the main factors, namely: (1) the application of appropriate technology, and (2) increase in HR competencies. This is due to technology and human resources competence is needed in learning and growth perspective.

### *3.1.2 Performance Analysis on Internal Business Perspective*

The survival of the organization can be assured if an organization can compete and excel in the overall business process. Further measurement of organizational performance from the perspective of internal business processes determines the strategic objectives related to the cycle time, the quality, the organization's management skills, productivity of the organization's members, and determine the size of the results (outcome measures) for each of the strategic objectives of the organization. In this study includes: (1) improving the quality of the service; (2) strengthening the supply chain; (3) continuity of contract; (4) innovation and quality control; (5) differentiation of processed products; (6) the completeness of the institutional arrangements; (7) improvement of the marketing function; (8) the strengthening of infrastructure; and (9) the local government policy. The results of the analysis based on the level of interest and compatibility with almost all the region's development strategy can be seen as a factor that is overlooked, excluding the quality of the service process.

### *3.1.3 Performance Assumption Analysis on Customer Perspective*

The quality of service provided to the consumers is an important aspect of the assumption (predictive) to achieve long-term success of the organization. Satisfactory service and pampering will make customers continually utilize the products produced by the organization. Interests of customers are generally grouped into four sections, namely the right time, quality of products and services, as well as competitive prices. The main measurement of the customers' perspective include: (1) service through outlets; (2) the quality of the relationship with the customer; (3) improving the image of the organization; (4) institutional arrangements of industrial enterprises; and (5) customer trust. Based on the study of the importance, the five above-mentioned aspects can be integrated into a single category of customer trust as a key indicator.

### *3.1.4 Analysis on Financial Performance*

Assumptions that affect the analysis of the financial performance measurements were carried out through the following characteristics: (1) an increase or expansion of market share; (2) the growth of investment; (3) the business climate policy; (4) annual GDP growth; and (5) efficient market. Based on the study of the importance, the five above-mentioned aspects in the expert meeting can be integrated into two categories, namely the expansion of market share, growth in investment.

## **3.2 Dependency Analysis System Elements and ISM Diagrams**

After conducting analysis based on the interest rate and accuracy, as mentioned above, the 13 elements of the system were re-verified by experts (expert meetings) to determine the degree of dependency between elements. Structural analysis utilized a system called the ISM. The overall key elements that have been identified by SAST analysis methods were grouped into four quadrants, namely: autonomous, independent, dependent and linkage. This identifies the grouping level characteristics and the level of dependence as the driving force for each system element or elements. Studies in the form of inter-related program planning provide in-depth understanding of the various elements, in order to achieve a better solution and readily accepted. This analysis technique provides an analysis of the base program where the information generated is very useful in the formulation of policy or strategic planning, as presented in figure 1.

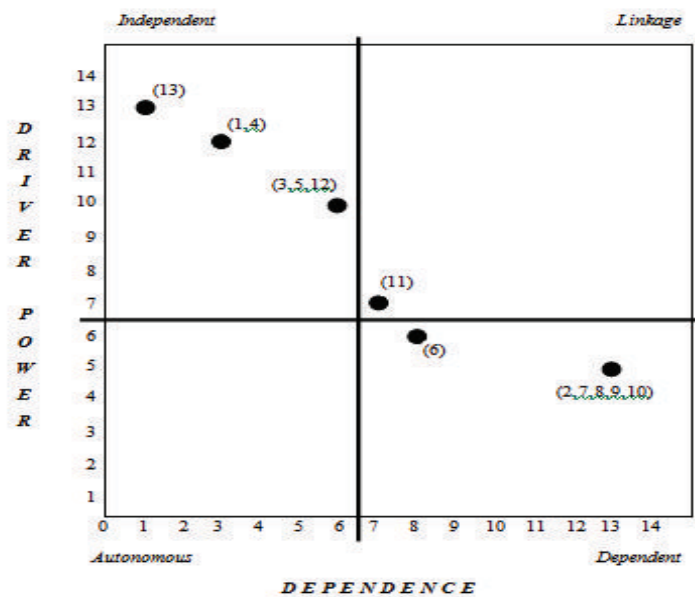


Figure 1. Matrix Driver-Power Dependence Agro-industry Beef Cattle in NTT

Figure 1 shows that further analysis on this independent sector result in the elements system such as: government policy (13) to increase the competence of human resources (1) application of appropriate technology (4) innovation and quality control (3) strengthening the supply chain (5) and strengthening infrastructure agro-industry (12) is included independent variables. In this case the element is to be a great driving force, but has little dependence on the program. Elements of government policy (13), an independent element, has a great deal of freedom as the driving performance of the system (with the Driver Power = 13). It can be interpreted that to drive the performance of beef cattle in NTT Agro-industry, the government has an enormous role. In order for the development of agro-industries to work well, the government should play a major role in facilitating a wide range of policies and regulations in the provision of sub-systems strengthening, upstream or downstream.

The results of this analysis show that the policy of the local government (13), required to contribute directly to the improvement of HR competencies (1) application of appropriate technology (4). The effect of increased competence of HR will have strong links to the elements of innovation and quality control (3) the application of appropriate technologies (4), while the role of the government has strong powers to strengthen the supply chain (5) and strengthening of agro-industry infrastructure (12). The six elements are classified into the independent quadrants together or separated freely with the power of each element affects the dependent category such as investment growth (6) and other elements: the expansion of market share of products (2) the sustainability of the partnership contract (7) strengthening marketing function (8) diversification of processed products (9) and an increase in institutional arrangements (10). It also shows that the fifth element is located in the dependent quadrant, where its performance will depend on the extent to which the improvement of independent elements, in other words can be interpreted as a result of a previous action. However, with regard to the customer trust element (11) has different characteristics compared to other elements because it is located in the quadrant linkage. This element has dependence and a large driving force and independent of overall system performance. Therefore, these elements are referred to as variable hooks. Means that any action against these elements will result in successful agro-industry programs, and lack of attention results in a significant failure of the agro-industry development program of beef cattle in NTT.

The agro-industry System Structure Diagram-Based Beef Cattle is presented in Figure 2. The results yield from this ISM model is utilized as input to the ANP model in developing a strategic map of dependency and reverse (feedback) relationship between strategic objectives and strategic goal clusters.

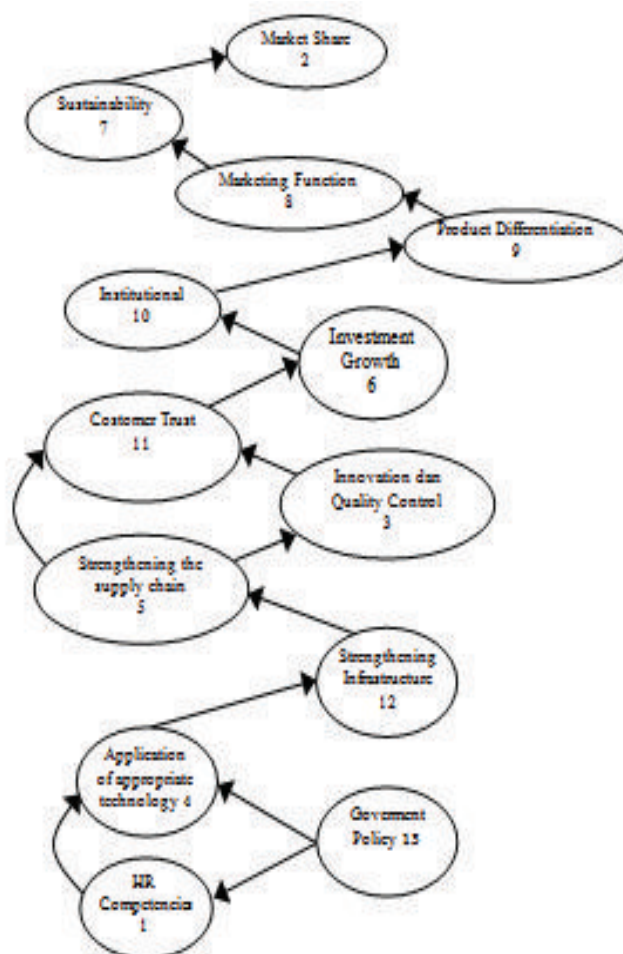


Figure 2. Structure Diagram of Beef Cattle Agro Industry System

Aspects presented in the diagram were then identified as the strategic objectives of the system design for further development in the agro-industry performance. This can provide benefits in the development of agro-industry organizational performance. Gates (1999) also indicated that accompany that is managed with a balanced performance measurement system and integrated course has its own advantages. This implies that the mapping strategy objectives including organizational objectives and outlines the existence of a causal relationship between goals and performance measurement systems that measure characteristics of its own (a key indicator) is important in the management strategy. Variations in goals and severity of measurements depends on the people involved, culture, and past experience of the organization.

Research Neely et al. (2000) utilized a process-based approach to performance measurement system, which leads to the development of an integrated performance measurement, multidimensional balanced manner. Furthermore, Kaplan and Norton (2000) in the form of four perspectives of balanced scorecard. The concepts of the approach is deemed to be able to provide answers to fundamental questions, such as: (a) how the customer sees an organization; (b) the internal business perspective; (c) how the value creation occurs; (d) how the organization responsible for the interested parties. In this case, the question able aspect is an integral component in the development of agro-industry performance of the region in general.

Even so, behind the theory-practice lead as question able logic of the principle of causality to the time dimension and the independence of perspective. In this study, as a precaution can be done by proposing an integrated approach to the analysis of the ISM and ANP as one approach to a solution to the weaknesses of each method in assessing causal relationships in organizational performance measurement system. The design of the planning system will continue with respect to the understanding and restructuring of the real world into a system capable of providing thorough and transparent images to further analysis and recommendations.

General view of the system components can help to see the characteristics of the system while the character's perspective will help categorize the system through a certain angle. Seeing the system in terms of perspective we

can incorporate the results of field observations and review of the literature with a consideration based on the interests and beliefs in order to again a thorough knowledge and scientific nature. A process to know about the elements of a complex system is an important step as the process to decompose into parts that are simpler, making it easier to understand. Mapping the strategic objectives of agro-industry development in Kupang NTT performance begins with the identification of aspects that are considered important measures and appropriate as a reference in the expert meeting.

It is based on the consideration that the application of the method of precise measurement of system performance ensures that the action should be aligned with the strategies and goals (Lynch and Cross, 1991). Variations purpose and severity measurements (quality and quantity) depend on the people involved. Furthermore, the latter aspect is seen correctly as an objective strategy in the framework of performance development work in the area of agro-industrial NTT as done in this study. For good measures, jointly positive effect on organizational performance can be further described below.

### **3.3 Agroindustri Strategic Map Modeling based on ANP**

The concept of ideas with the performance evaluation of the Balanced Scorecard frame work was originally an experiment to improve the performance measurement system executives on profit-motivated corporation. However, it is now widely and effectively applied in the sub sequent development of a core strategy management system on the types of any organization, such as nonprofit organizations, public sector organizations as well as the industrial strategy development area. To be effective in its application, according to Mulyadi (2009), it requires the following rules: (1) the identification of responsibility centers and personnel to be comprehensive; (2) accountability center can serve as a source of value for the customer (internal and external) as well as a mission and service center; (3) performance mission center and a service center needs to be comprehensively measured in units of time specified on the four perspectives: financial, customer/customer, process and learning and growth; (4) performance measurement is used to ensure that each responsibility centers and personnel has an ongoing commitment to the vision, mission and basic beliefs, basic values and overall strategy.

To improve the effectiveness of management relative factors, elements and sub-elements of the system must also be selected carefully and carried out by the parties who are deemed qualified and experienced in their field. The assessment elements in agro-industry systems in NTT is carried out through expert meeting (academicians and related agencies). Starting sensing activities on the environment agro industrial region by researchers as a result of the above, then filed for reference in the expert meeting to be confirmed again based on the interests and the nature of certainty and conviction rate as triggering component towards the development in the performance of the region. The results from the discussions with the experts is then used as the basis of reference in further analysis, including ISM and ANP, where it is integrated to determine alternative effective strategies based on value priorities.

#### **3.3.1 Strategic Map**

Diagraph driver-dependent relationship between strategic objectives generated from the ISM models are used as inputs to develop a strategic map in the ANP model. Strategic networking maps containing strategic objectives that have dependency relationship and feedback, whether an inter performance measure perspective (inner dependence) or among performance measure perspectives (outer dependence), with regard to the beef cattle agro-industry (Figure 3).

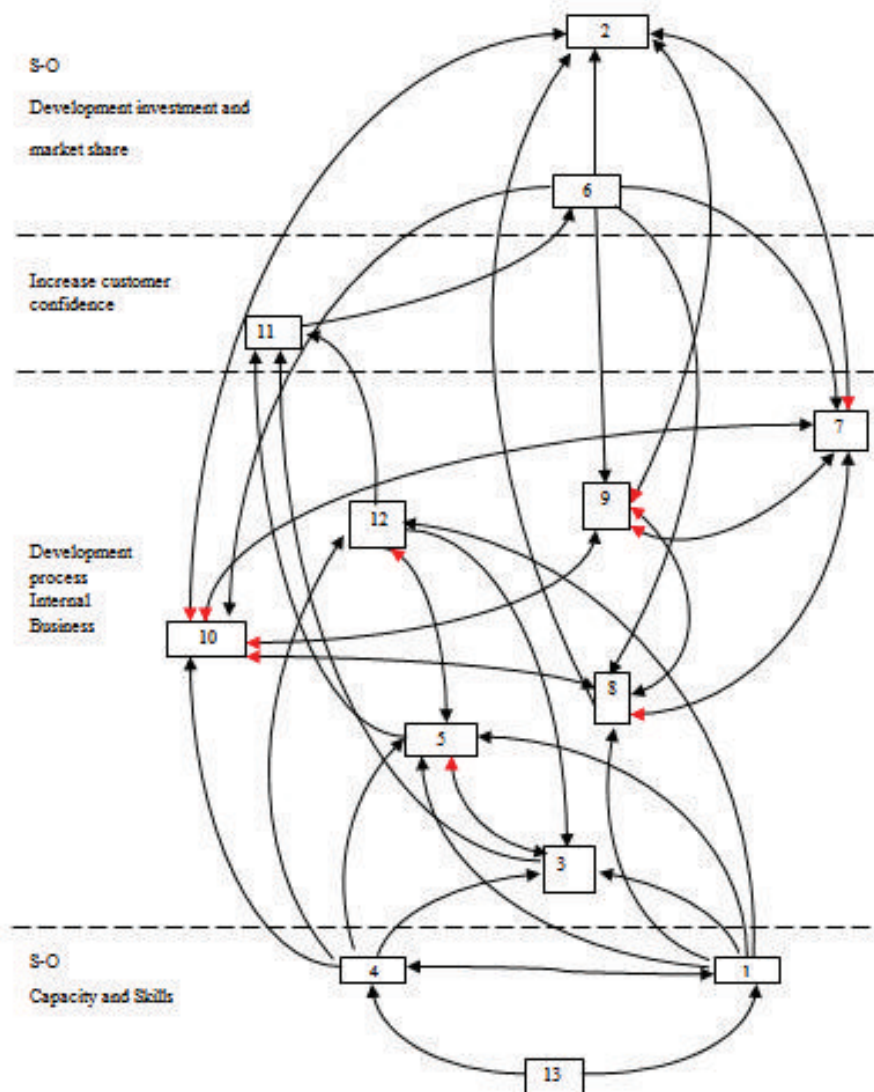


Figure 3. Strategic Map Indicators of the Beef Cattle Agro-Industry Development in NTT

Note: 1 =Increased competence of HR, 2=Expansion of the market share of processed products, 3=Innovation and quality control, 4=Application of appropriate technology, 5=Strengthening the supply chain, 6=Growth in investment, partnership contract 7=Sustainability, 8=Strengthening marketing function, 9=Differentiation of processed meat products, 10=Completeness institutional arrangement,11= confidence of customers, 12=Strengthening agro-industry infrastructure, 13=local government policy.

### 3.3.2 Synthesis of Agro-Industry Performance Measurement Priority Based on ANP

The weight of each objective based cluster-based model of ANP proposed for the strategic map indicate that alternative strategies through the Learning and Growth perspective has the highest priority (weight: 0.3203), followed in succession by the Financial perspective (weight: 0.3184), perspective Internal Business (0.2223), and perspective customers with a weight of (0.1388). The ratio scale priorities in the ANP models shows that the allocation of resources in accordance with their priorities. The Learning and Growth Perspective is the first step to develop the beef cattle agro-industry. The synthesis of beef cattle agro-industry performance measurement priority, for inter-and intra-cluster strategic objectives is summarized in Table 1.

Table1. Synthesis of beef cattle agro-industry performance measurement priority, for inter-and intra-cluster strategic objectives Using ANP

No	Cluster Objectives	Strategic Objectives
1	Improved capability and skills (0,3204)	1.Increased competencies (0,5000) 2. Application of appropriate technologies (0,5000)
2	Development investment and market share (0,3185)	1. Expansion of market share (0,7624) 2. Growth investment (0,2376)
3	Development of internal business processes (0,2223)	1.Innovation and quality control (0,0719) 2. Strengthening the supply chain (0,0878) 3. Sustainability partnership contracts (0,1682) 4.Repair/strengthening of infrastructure for agro-industry (0,0857) 5.Strengthening the marketing function (0,1638) 6. Differentiation processed meat products (0,1694) 7. Completeness of institutional arrangements (0,1783) 8. Government policy (0,0744)
4	Increased customer confidence (0,1388)	1. The customer's trust Growth (1,000)

Results show that the alternative capacity building and skills (learning and growth perspective) of personnel is the main priority required. This can be done by improving the competence of HR (0.5000) and technology application (0.5000). This further implied that the performance of the agro-industry will also increase. As long as there is an increased in the ability and effectiveness of personnel in applying the technology, market development and investment (financial perspective) can also affect the growth and the learning perspective. Alternative investment development strategy and market share (0.3185) as the second priority is seen to have an important role in the context of the development of other strategies such as the objective of internal business processes (0.2227), improved customer service (0.1388), as well as in building conductivity in the working environment.

If viewed structurally, the government's policy is the biggest push factor to drive the system as the center of social responsibility. It can also be a stimulus to other elements such as in the case of the development to innovation, supply chain, collaboration, strengthening the function of marketing/institutional and infrastructure provision in the field of agro-industry.

In the development of internal business processes, it is also important to provide and facilitate assistance/mentoring in enhancing technological competencies and capabilities. Overall, the contextual relationship between the objective and the strategy elements will be able to move between system performance, especially through the expansion of market share and growth investment gradually. The effectiveness of the handling of the elements of the system in question affects the growth of customer trust and eventually led to the financial perspective in general.

#### 4. Conclusion and Recommendations

##### 4.1 Conclusion

The SAST analysis approach, through the ISM and ANP modeling are able to explore insights decision-makers and opinion regarding the organization's strategic goals in the development of the beef cattle agro-industry in Kupang, NTT, and has a strong relevance to create a strategic map coherent systematically. This approach is very helpful in terms of exploring stakeholder opinion-based design to create the organization's strategic objectives, making strategic goals booster separation performance (these include government policy), the competence of human resources, the application of technology, innovation and quality control, strengthening the supply chain, and agro-industry infrastructure and the strategic objectives of performance outcomes (customer trust, investment growth, market share, partnership contracts, the marketing function and differentiation of processed meat products, as well as an increase in institutional arrangements) in one entity mapping strategy.

Through the strategic map, it is possible to make a visual and comprehensive evaluation of the strategic objectives and modifications made to map out strategies to increase the effectiveness of the system in the future. Organizations can give the greatest priority to the allocation of its resources on human learning and growth perspective, followed by a financial perspective, internal business perspective, and the perspective of the customer in order to generate the development of agro-industry management effectively and efficiently.



## 4.2 Recommendations

The proposed model is a relatively new initiative in the area of performance measurement system design with regard to agro-industry in Indonesia. Strategic map and the results of the integration of the model ISM ANP models can be controlled through a mechanism that is ripe for the development of agro-industry performance measurement system that is efficient. However, this study reveals the limitations of the proposed integrated approach with regard to the validity of the strategic map that contains the logical relationships among the strategic objectives when applied in a business environment that is constantly changing in the short term (short-run future goal). The existence of an evolutionary process of organizational performance management requires effective adaptation and adjustment programs that constantly changes every time the system structure and strategy of the organization.

In an effort to summarize the process of preparing a strategic map using a mix of quantitative and qualitative approaches to case-based agro-industry of this region, it takes a computer software system that is able to improve the efficiency of the proposed approach. It should also be designed in a table format based on region Balanced Scorecard framework to be easily managed. The framework includes at least the organization's strategic goals, performance measures, performance measures of priority weights, unit, responsible for the activities, targets, and evaluation of performance measures.

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