Analysis of North Sulawesi's Beef Cattle Farming Empowerment Strategy with Websites

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ABSTRACT

The production of beef cattle farming enterprises in North Sulawesi has not been able to meet people consumption needs. This condition is due to their slow absorption of breeding technology information among farmers, while the existing internet technology is merely used for entertainment needs. This research paper is to encourage the formation of an empowering model for beef cattle farmers in rural areas using websites. The findings suggested that the design model should be based upon farmer's capabilities and existence of farmers, since they have adequate information about websites as outreach media needed for farmer empowerment.

Keywords: EFE, IFE, Technology Engineering, Social Engineering

INTRODUCTION

Outreach materials conventionally distributed through printed and electronic media are supposed to adapt to the recent development of internet. This requires adjustments to farmer empowerment activities through outreach programs. As empowerment programs provide inputs tho the business growth of SMEs (Putra, Kepramareni, & Suryandari, 2019), it is crucial to find other empowerment strategy since there is no significance change in the development of beef cattle farming enterprises in North Sulawesi due to the ineffectiveness of agricultural outreach activities to encourage farmers to develop cattle populations, production and productivity. They could not keep up with the increasing demand, highly exceeding the production availability (Lainawa, Kindangen, & Rotinsulu, 2019) (see Table 1).

Table 1. Comparison of Beef Production and Consumption

Year	North Sulawesi					
	Production Amount (tons)	Percentage of Total Production	Growth per Year (%)	Total Consumption (tons)	Percentage of Total Consumption	Growth per Year (%)
2012	4.501	18.642	-	6.432	11.395	3.10
2013	4.565	18.907	1.40	6.642	11.767	3.16
2014	4.587	18.998	0.48	6.841	12.119	2.90

2015	3.611	14.955	-21.28	7.154	12.674	4.38
2016	3.431	14.210	-74.50	7.456	13.209	4.05
2017	3.450	14.289	0.62	7.665	13.579	2.72
Total	24.145	100	-93.28	56.447	100.00	23.66
Average	3.45		-13.33	7.055		3.38

Source: Lainawa et al., (2019)

According to Purwatiningsih, Fatchiya, and Mulyandari (2018), agricultural outreach for farmer empowerment is highly important, in which the outreach agents could take the role as motivators, innovators, facilitators, consultants, and communicators. Therefore, several research (e.g., Bahua, 2013; Gatut, 2008; Hidayat, 2009; Marliati, Sumardjo, Asngari, Tjitropranoto, & Saefuddin, 2008; Muliady, 2009; Purwatiningsih et al., 2008; Utami, Widiyanti, & Wibowo, 2018) emphasized the value of outreach agents' competence and performance. Outreach and competency measures are closely related to the ability to use one of the media, namely the internet, for the outreach activities. The constraints of visiting limitations for can be overcome by internet-based outreaches.

Based on this, the problem formulation in this research is (1) how is the perception of farmers on the use of websites for outreach programs; (2) how is the design model of beef cattle farming systems with websites; (3) how effective is the use of websites; and (4) how is the long-term planning strategy model with websites to increase beef cattle production in North Sulawesi.

This study aims to describe and formulate strategies for developing agricultural outreach programs using websites to implement the master plan of Unsrat Higher Education Research for the development of beef cattle farming in North Sulawesi on food security.

RESEARCH METHOD

This study used a qualitative method with a case study approach to describe, and summarize various conditions, situations, or various problems of phenomena of farmers in beef cattle farming enterprises, pertaining to their knowledge about beef cattle farming technology innovation, which is further stated by the formulation of development strategies. Case studies are research intended to describe a particular setting, object, or event (Bogdan & Sari, 1982). Case studies are the strategy to answer the question of how they will be implemented in the future. The data were collected by observation, interviews with 100 farmers, Focus Group Discussion (FGD), questionnaires, documentation, and joint / triangulation.

For the data analysis, this study used four qualitative stages, including data collection, data reduction, data display, and conclusion drawing (Sugiyono, 2017, p. 133). Bogdan and Sari in Moleong (2017, p. 248) described qualitative data analysis as an effort by working with data, data organizing, breaking them down into manageable units, data synthesizing, searching and finding patterns, finding what is important and what is learned, and deciding what to tell others.

Dey in Moleong (2017, p. 289) added that the core of qualitative data analysis is focused in three related processes, including phenomena description, phenomena classification, and determining how the concepts are related one another. Sugiyono (2005, p. 89) added that data analysis in qualitative research is carried out before, during, and after the field observation.

Additionally, Likert scale was used to measure farmers' assessments by the perception analysis. Meanwhile, to make long-term planning, the formulation of strategies is made with a three-stage strategy formulation analysis method (David & David, et al., 2015), including Stage I (Input), Stage II (Matching), and Stage III (Decision).

RESULTS AND DISCUSSION

The questioners distributed to the respondents provided the respondent demography. The majority age was 41-50 years (41%), followed by 31-40 years (24%), 20-30 years (19%), and above 50 years (16%). In addition, the respondents mostly were senior high school graduates (41%), junior high school graduates (35%), elementary school graduates (22%), and 2% is university graduates.

Predominantly, 63% respondents were familiar with the internet, 15% were getting used to use the internet, and 22% never use the internet. As by gender, women (66%) used the internet more. By devices for internet connectivity, 76% respondents used their mobile, 19% used wifi, and 5% used modem.

These data imply that the farmers fairly used the internet on a daily basis. However, according to the respondents, internet usage was more widely used for entertainment and communication needs (Facebook and Whatsapp by 40%-70%, Youtube by 30%-50%, and others under 30%).

The social design model of using website consists of four stages, including input, process, output, and outcome stages (see Table 2).

Table 2. Website Usage Design Model

INPUT	PROCESS	OUTPUT	OUTCOME
- Beef cattle farming enterprises with more than three cows - Available access to internet network - Computer and smartphone communication technology equipment availability - Farmers as internet users	- Learning - Mentally coaching awareness - Self-development - Training and assignment	- Knowledge Awareness - Attitudes - Skill - Behavior - Practice - Decision	- To make websites as effective outreach media - To increase beef cattle population, production, and productivity - To improve farmers' welfare - To create efficient and effective outreaches

Sharples in Nurfathiyah and Jamaluddin (2018) argued that the use of websites could support the long-distance outreach process whenever, and wherever. Motowalla inNurfathiyah and Jamaluddin (2018) found that information media applications for website-based instructors could be used in class or in counseling as the alternative of in-room-counseling. If the two were combined, counselings/outreaches would be more effective and flexible. This presupposes that the process of agricultural outreaches with websites could be the way to overcome limited information facilities for agricultural outreach.

Further, the questioners collected data about farmer's perception of several issues of the outreach programs. In addition, EFE Matrix and IFE Matrix are described to summarize the oppurtinity, threats, strength, and weakness of the website usage for the programs.

Farmers' Perception
The Likert Scale method was used to measure farmers' perceptions of the use of websites in agricultural outreaches. The level of approval was classified into five options of scale consisting of Strongly Agree (SA), Agree (A), Neutral (N), Disagree (D) and Strongly Disagree (SD). The results are presented in Table 3, Table 4, and Table 5.

Table 3. Farmers' Perceptions of the Effectiveness of Outreach Program

No	Question to Farmers (100 Respondents)	SA	A	N	D	SD
1	Quality of Outreach	13	55	15	6	11
2	Outreach Quantity	11	42	19	18	10
3	Utilization of Time	10	63	14	9	4

4	Increase in Human Resources	18	56	10	11	5
5	Breeding Expertise and Management Skills	16	44	20	8	12
Total		**68**	**260**	**78**	**52**	**42**
Average Score		**13.60**	**52.00**	**15.60**	**10.40**	**8.40**

Source: Processed Data

The above data were then processed with the equation:

$$T \times Pn \qquad (1)$$

where,
T = Total number of respondents
Pn = Choice of Likert score

The equation produces:
1. Strongly-agree respondents (5)   = 13.60 x 5 = 68.00
2. Agree respondents (4)   = 52.00 x 4 =208.00
3. Neutral respondents (3)   = 15.60 x 3 = 46.80
4. Disagree respondents (2)   = 10.40 x 2 = 20.80
5. Strongly-disagree respondents (1)   = 8.40 x 1 = 8.40

The accumulation of 68.00 + 208.00 + 46.80 + 20.80 + 8.40 is 352.00. The following criteria for interpretation of scores are based on intervals;
  1. Figures 0% - 19.99% = Strongly Low
  2. Figures 20% - 39.99% = Low
  3. Figures 40% - 59.99% = Medium
  4. Figures 60% - 79.99% = High
  5. Figures 80% - 100% = Strongly High
The calculation of farmers' perceptions is:
  = Total score / Y x 100
  = 352.00 / 500 x 100
  = 70.40%
This final score (70.40%) is classified as "High" category. This confims website effectiveness for the empowerment of beef cattle farmers in North Sulawesi.

Table 4. Farmers' Perceptions of Outreach Efficiency

No	Question to Farmers (100 Respondents)	SA	A	N	D	SD
1	Accuracy in how to conduct outreach	25	53	11	5	6
2	The ability to carry out tasks properly and precisely without wasting time, money, and energy	49	23	5	10	13
3	Better than direct outreach to farmers	15	20	40	12	13
4	Better than group outreach	10	22	42	14	12
5	Better than other mass media (Radio, TV, and Newspapers)	20	29	20	20	11

	SA	A	N	D	SD
Total	**119**	**147**	**118**	**61**	**55**
Average Score	**23.80**	**29.40**	**23.60**	**12.20**	**11.00**

Source: Processed Data

The average scores are then processed with theequation:

$$Tx \, Pn \qquad (2)$$

where,
T = Total number of respondents
Pn = Choice of Likert score

The equation produces:
1. Strongly-agree respondents (5)   = 23.80 x 5 = 119.00
2. Agree respondents (4)   = 29.40 x 4 = 117.60
3. Neutral respondents (3)   = 23.60x 3 = 70.80
4. Disagree respondents (2)   = 12.20 x 2 = 24.40
5. Strongly-disagree respondents (1)   = 11.00 x 1 = 11.00

The accumulation score of farmers' perceptions of website efficiency in empowering farmers is:

= Total Score / Y x 100
= 342.80 / 500 x 100
= 68.60%

The final score of 68.60% is classified as "High" category. This justifies website efficiency as agricultural outreach media for the empowerment of beef cattle farmers in North Sulawesi.

Table 5. Farmers' Perceptions of Supporting Facilities

No	Question to Farmers (100 Respondents)	SA	A	N	D	SD
1	Easy to access internet network	10	25	26	20	19
2	Laptops and smartphones easily obtained	17	14	18	24	27
3	Instructors / trainers are available	4	9	24	30	33
4	Proactive farmer groups to facilitate training and use websites	3	5	27	35	30
5	Training and websites are easy to conduct and access	10	9	26	38	17
Total		**44**	**62**	**121**	**147**	**126**
Average Score		**8.80**	**12.40**	**24.20**	**29.40**	**25.20**

Source: Processed Data

The average scores are then processed with the equation:

$$Tx \, Pn \qquad (3)$$

where,
T = Total number of respondents

Pn = Choice of Likert score

The equation produces:
1. Strongly-agree respondents (5)　　　= 8.80 x 5 = 44.00
2. Agree respondents (4)　　　　　　 = 12.40 x 4 = 49.60
3. Neutral respondents (3)　　　　　 = 24.20 x 3 = 72.60
4. Disagree respondents (2)　　　　　= 29.40 x 2 = 58.80
5. Strongly-disagree respondents (1)　= 25.20 x 1 = 25.20

The accumulation score of farmers' perceptions of the supporting facilities of the use of website technology in empowering farmers is:
　　= Total score / Y x 100
　　= 250.20 / 500 x 100
　　= 50%

The final score (50%) is classified as "Medium" category. This implies that the farmers are doubtful about the ability of supporting facilities in using the websites as media for empowering beef cattle farmers in North Sulawesi.

EFE Matrix (External Factor Evaluation) and IFE Matrix (Internal Factor Evaluation)
As mentioned by David (2011, p. 105), external factor evaluation matrix (EFE) allows strategists to summarize and evaluate economic, social, cultural, demographic, environmental, political, government, legal, technological, and competitive information. It summarizes and evaluates main strengths and weaknesses in the functional areas of a business, and forms the basis for identifying and evaluating, in which the first step of the process is to analyze the external and internal environment to determine the resources, capabilities, and core competencies of strategic input sources (Hitt, Ireland, & Hoskisson, 2009, p. 33).

In addition, Hunger and Wheelen (2012, p. 67) described strategy formulation as the development of a long-term plan for effective management of environmental opportunities and threats, by considering strengths and weaknesses. According to David and David (2015, p. 169), important strategy formulation techniques can be integrated into three decision-making frameworks, including input, matching, and decision.

To determine the factors of strategy formulation, the EFE and IFE matrix models was calculated with the following results (see Table 6).

Table 6. EFE Matrix (Opportunity Factor)

	Opportunity Factor	Weight (%)	Rating	Score	Priority
1	Efficient use of production costs	0.07	2	0.14	IV
2	Business productivity increases	0.09	3	0.27	III
3	Excel in Business Competition	0.07	2	0.14	IV

		Weight	Rating	Score	Priority
4	Encouraging young farmers to raise beef cattle	0.11	4	0.44	II
5	Increasing the number of beef cattle female farmers	0.11	4	0.44	II
6	Providing actual and trusted information without reducing the information speed	0.09	3	0.27	III
7	Increase beef cattle population	0.09	3	0.27	III
8	Production competitiveness	0.11	4	0.44	II
9	Increasing farmers' productivity and trust in beef cattle farming	0.11	4	0.44	II
10	The ability to increase production, market expansion and market penetration	0.15	4	0.60	I
	TOTAL			3.45	

Source: Processed Data

Based on the ranking in Table 5, the main opportunity factors related to farmer empowerment through websites are increased production, market expansion and market penetration. In addition, the involvement of women and young farmers in the beef cattle farming couples the increased productivity due to business efficiency, so that it can excel in competition.

Table 7. EFE Matrix (Threat Factor)

	Threat Factor	Weight (%)	Rating	Score	Priority
1	Business patterns are easy to change	0.09	3	0.27	V
2	Local wisdom is degraded	0.11	4	0.44	III
3	Elderly farmers are selected by young farmers	0.10	3	0.30	IV
4	Agricultural working hours are reduced	0.10	3	0.30	IV
5	Farmers' expenditure increases	0.10	3	0.30	IV
6	Influence the intensity of outreach on farm visits	0.13	4	0.52	II
7	Influence the intensity of group outreach	0.11	4	0.44	III
8	There is a knowledge gap among young farmers, female farmers and elderly farmers	0.06	2	0.12	VI
9	The apathy of elderly farmers due to limited website knowledge	0.05	2	0.10	VII

10	There are pros and cons of business development strategies between elderly farmers and young farmers	0.15	4	0.60	I
TOTAL				**3.39**	
Average Total Score (Opportunity + Threat)				**3.42**	

Source: Processed Data

Table 6 signifies that the major threat to the farmer empowerment is the divergence of young farmers and elderly farmers view since the websites were mostly used by old farmers, while older farmers preferred conventional outreach, such as farm visits and group outreaches. This might trigger the degradation of local wisdom as their special cattle farming characteristic.

Table 8. IFE Matrix (Strength Factor)

	Strength Factor	**Weight (%)**	**Rating**	**Score**	**Priority**
1	The internet network coverage occupies the countryside	0.11	4	0.44	III
2	Farmers can easily access the website 24 hours a day	0.09	3	0.27	V
3	Outreach agents can save time and money	0.10	3	0.30	IV
4	Easy to learn by anyone without any certain formal educational background	0.10	3	0.30	IV
5	Socio-cultural situation of North Sulawesi farmers who are easily adaptable to technological developments	0.10	3	0.30	IV
6	The website has been a rich source of information since the advent of the internet	0.09	3	0.27	V
7	Vast range and instant access, from low-end to high-end smartphones	0.06	2	0.12	VI
8	Outreach materials are easily accessed several times	0.12	4	0.48	II
9	The cost of using a website is relatively affordable, even though by low-income farmers	0.10	3	0.30	IV
10	It does not require a certain space and time to access the website	0.14	4	0.56	I

Sub Total			**3.34**	

Source: Processed Data

Table 7 signifies that the main strength factor related to the farmer empowerment is that websites do not need space and time as much as group outreaches or farm visits. In addition, outreach materials can be accessed several times. Besides, people of North Sulawesi are easy to adapt to technology. Meanwhile, the internet network can be accessed in several production centers at affordable costs, as agribusiness development strategies are based on how to build market-driven forces (Lainawa, 2020).

Table 9. IFE Matrix (Weakness Factor)

	Weakness Factor	Weight (%)	Rating	Score	Priority
1	There is general recommendation on the website usage	0.11	1	0.11	III
2	Contraints on exchanging direct communication between outreach agents and farmers	0.09	2	0.18	VII
3	Farmers are more interested in entertainment content than agricultural knowledge content	0.09	1	0.09	I
4	Farmer groups in rural areas have not properly occupied their role	0.11	1	0.11	III
5	Poor internet network	0.14	1	0.14	V
6	The sample image displayed can only be seen	0.10	2	0.20	VIII
7	The instructors do not accompany the farmers all the time	0.08	2	0.16	VI
8	Unrelated contents	0.12	1	0.12	IV
9	Limited media to print the outreach materials	0.06	2	0.12	IV
10	Low speed internet connection	0.10	1	0.10	II
Sub Total				**1.33**	
Average Total Score (Strength + Weakness)				**2.34**	

Source: Processed Data

Table 8 shows the main weakness of the farmer empowerment is farmers are more interested in entertainment content than educational and agricultural contents, despite the fact that they have difficulty to access the website. In addition, not all agricultural areas in North Sulawesi have speed internet connection, aside from farming communities in rural areas who unproperly played their roles.

Additionally, most of the website contents do not meet the needs of farmers. They have troubles to record the outreach materials on the website, in addition to companion and interactivity limitations.

CONCLUSIONS

Beef cattle farmers in North Sulawesi have considerable knowledge about website usage as an outreach media to empower farmers. Therefore, the design model needs to be tailored to the farmer's capabilities and existence by technological and social engineering.

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