Communication Strategy of User-based Mapping Rice Cultivating Innovation Technology Dissemination

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Abstract

Research on communication strategy of user mapping-based rice cultivating innovation dissemination technology has been carried out South Sulawesi Province covering in two districts, namely in Baranti Sub-district of Sidrap District and Bantimurung Sub-district of Maros District, during May-December 2014 and using a survey method. Simple random sampling technique was applied with total 200 respondents, each of 100 respondents for each sub-district. Total farmer's population of Baranti Sub-district was 6558 persons, while total farmers of Bantimurung Sub-district were 4,658 persons. Obtained field level data were processed through some stages namely editing, coding, and tabulating in accordance to the objectives of the research. By using Statistical Product and Services Solution (SPSS) ver. 21 for Windows then the data were analyzed using non-parametric statistical techniques. Descriptive and inferential statistical analyses were applied. The descriptive statistical analysis was appli ed to analyze variables constructing a community's condition mapping; while in the inferential statistical analysis, a Spearman rank correlation test was applied to perform correlation analysis. The results of the analysis showed that the mapping basis of communication media of rice cultivating technology dissemination in two research sites are as the following: low utilization category by farmers for media of newspaper, radio broadcasts and magazine; medium utilization category by farmers for media of pamphlets, posters and radio broadcasts; and high category for other nine media, which generally extension workers played with intensive roles.

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Farmer's characteristics were associated with farmer's cosmopolite and it positively influenced and correlated significantly with communication media and communication patterns, while farmer's status, land size and motivation significantly influenced in a negative manner with media communication and communication patterns. Innovation characteristics indicators of relative advantage, suitability, complexity, and observability is significantly influenced and correlated in a positive way communication media and communication patterns. Physical environment with indicators of potential land category was significantly correlated in a positive way with media communication, production input and information availabilities correlated significantly in a positive manner with communication pattern. Indicators within the physical environment variables and social environment variables, social system, local wisdom function were significantly influenced and correlated with communication media, while business partner significantly influenced and correlated in a negative way with communication media.

Keywords: Innovation; mapping; cosmopolitan.

1. Introduction

Agricultural technologies that specifically related to the cultivation of rice have been produced by the Ministry of Agriculture, in particular by the Research Agency of Agriculture. The resulting innovations have been evenly distributed across provinces as well as disseminating widely to the transfer of knowledge from source to major users until such knowledge is properly understood and applied to their farming efforts as a behavioral change of farmers [7]. Knowledge transfer is always performed in some places because the innovation may have been understood in certain communities but not in other places, Lionberger and Gwing [10]. Efforts are made simultaneously in all districts in South Sulawesi Province, although it is known that the characteristic of farming communities in South Sulawesi is not the same for all districts. Some differences or cultural diversity characterizes the community in South Sulawesi, for example, the Bugis and Makassar tribe. The diversity influences the process of dissemination of rice cultivation technology that implicates fast or slow, high or low adoption of rice cultivating innovation technology in South Sulawesi. The results of the monitoring and evaluation indicated that the failure is caused by differences in accessibility to sources of information, media dissemination, values and socio-cultural relations as well as local customs [2]. Based on the facts described, it appears that the research question is formulated as follows: What kind of dissemination and communication method for rice cultivation in South Sulawesi as well as dominant factors (base mapping of user: farmers characteristics, characteristics of technological innovation and environmental characteristics) that determine the dissemination and communication method of rice cultivation technology in South Sulawesi?

1.1. Purpose

The research objective is directed to analyze the dissemination and communication method of rice cultivating innovation technology during specific time in South Sulawesi, and analyze the relationship between the dominant factors in dissemination and communication method of rice cultivating innovation technology in South Sulawesi.

2. Research methods

2.1. Research design

The study was conducted to create appropriate communication methods in the dissemination of rice cultivation technology based on user mapping, using quantitative research approaches. Referring to the focus of the study, the researchers sought to examine the relationship towards disseminating innovation strategy and communication method of rice cultivation technology based on user mappings in South Sulawesi. To achieve this goal, researchers designed this research with explanatory descriptive survey method. That is, combine between explanatory research design and descriptive research. According to Babbie [1] explanatory research is a survey research that aims to explain the relationship between variables through hypothesis testing. The study design with explanatory research was conducted to test and build a model in determining the strategy of disseminating communication method of rice cultivation technology innovation. Design research with descriptive approach is done to make mapping to the variables studied.

2.2. Location and Time of Research

The research of communication strategy of dissemination of rice cultivation technology innovation based on user mapping took place in South Sulawesi Province in Sidrap and Maros regencies. Region which is used as the study site is a rice production center in Eastern Indonesia. During the research phase, the first phase of the preliminary survey was conducted in May 2014, the questionnaire trial was conducted from June to July 2014. The second phase of research, especially the quantitative data collection survey and intensive field observation, was conducted in November-December 2014.

2.3. Population and Sample of Research

The experiment was conducted in a population are farmers who control the land for rice plant farming. Rice farmers in Sub Baranti were approximately 6,558 farmers, and from these 100 selected as respondents, while District Bantimurung were 4,658 farmers, and selected 100 people to become respondents. Total respondents were 200 people. Samples are the farmer population in Baranti Sidrap and Sub Bantimurung Maros. Sampling was conducted by using simple random sampling.

2.4. Processing and analysis of data

Data processing obtained through the stages of editing, coding, and tabulated in accordance with the purpose of research. Data analysis was then performed with non-parametric statistical techniques, using SPSS (Statistical Product and Services Solution) ver. 21 for Windows.

Analysis of data using quantitative analysis, which includes: analysis of descriptive statistics and inferential statistical analysis. Descriptive statistics were used to analyze the variables to build a mapping of the condition of society. Descriptive statistical analysis using frequency, percentage, mean score, total mean scores and percentiles. For inferential statistical analysis using correlation analysis, the Spearman rank correlation test.

3. Results and discussion

3.1. Dissemination in Communication Methods

Dissemination takes on the theory of the traditional view of communication, which involves a sender and receiver. The traditional communication view point is broken down into a sender sending information, and receiver collecting the information processing it and sending information back. With dissemination, only half of this communication model theory is applied. The information is sent out and received, but no reply is given. The message carrier sends out information, not to one individual, but many in a broadcasting system.To disseminate messages, a variety of communication media that can be used, corresponding to its function. Likewise disseminating rice cultivation technology innovation delivered to the farmers in widely agricultural fields. It may include information about technical farming (planting, plant spacing, crop prices and information for agricultural products) [12]. Table 1 below shows the description of the average score of dissemination media in rice cultivating communication technology. South Sulawesi Province contribute to the national rice stock as much as 4.478.915 tons and harvest area of 881.874 ha per year, Sidrap and Maros are two districts that contribute enough in the rice stocks as Sidrap contributes 425.868 tons and Maros 257.899 tons annually, the rest by other districts such as Pinrang, Wajo, Soppeng, Bone, Gowa and Bantaeng. (South Sulawesi BPS, 2014).

Table 1: Description of the average score of the media dissemination in rice cultivating communication technology Sidrap and Maros

Communication media	mean score *)
1. Radio streaming	2,14
2. Television broadcast	1.78
3. Newspaper	1.80
4. Magazine	1.75
5. Pamphlet	2.00
6. Poster	2.20
7. Colloquium	2.56
8. Demonstration / pilot	2.76
9. Discussion / deliberation	2.75
10. Dialogue / brainstorming	2.80
11. Lecture / briefing	2.80
12. Visits farming	2.70
13. Officials visit	2.75
14. Instructions from government	2.60
15. Suggestion / recommendation	2.60
16. Internet	0,00
Total	2.40

Note: *) Interval score: 1.3 to 1.8 = low; 1.9 to 2.4 = moderate; 2.5-3.0 = high

Table 1 shows the use of a variety of media dissemination: colloquium, demonstration / pilot, discussion, dialogue / exchange opinions, lectures / briefings, visits farm, officials visit, government instructions and suggestions at Sidrap and Maros are in high category.

This is consistent with the fact that in general farmers in Maros and Baranti Sidrap particularly prefer direct communication, interpersonal communication where the instructor plays an important role. Particular habit that has been entrenched in Baranti farmers is that they have no activities in paddy fields and perform Friday prayers together, after Friday prayers they will eventually talk about farming.

There are several units of Agricultural Research in Maros: Sorgum and Serelia Research Institute, Seed Certification Center, Plant Protection and Protection Center, Soil Research Laboratory, Center for Assessment and Development of Agricultural Technology, at any time there is always a demonstration plot that can be accessed by farmers, even if it is known that farmers from other regions such as Sidrap Are more active in visiting these centers than farmers from Maros Regency. Discussions with some researchers say that historically Sidrap society (ethnic Bugis in general) have a character of a very high fighting spirit and always wanted to expand.

Media communication occupies the second group are posters, radio broadcasts and pamphlets that had a moderate score value. Fact is based on interviews of farmers and direct field observations indicate that the farmer puts three media as a second choice; the reason is that it provides a new picture poster, increase knowledge and insight.

Posters generally obtained at the offices of agriculture, seminar, and workshop. Radio broadcasts according to the respondents are only for entertainment, they cannot be used as a source of information on rice cultivation, because agricultural broadcasts are inconsistent, not routine, not well-scheduled, while the presentation pamphlets are limited and the language is difficult to understand.

Media communications in groups of three are: newspapers, television and magazines. These three media are categorized as low level. Field facts show that this media has been well known by the general public as entertainment not as information technology innovation of rice cultivating, the three media is not routinely presents information technology of agriculture especially like innovation technology of rice cultivating.

It is generally recognized as a source of information from the current situation, such as football, politics, new government policies and public opinion.

3.2. Correlations of Dominant Factors (Base Mapping Users: Characteristics of Farmers, Innovation and Environment) with Dissemination Methods in Rice Cultivating Technology Innovation
3.2.1. Correlations between characteristics of farmers with the dissemination method

Spearman rank correlation test results between farmers characteristics (age, education, status of farmers, land use, motivation, and cosmopolitan) by disseminating the communication method, presented in Table 2 below.

Table 2: Correlations between characteristics of farmers with the dissemination method.

The individual characteristics	Dissemination of communication methods (rs)	
	Communication media	communication pattern
Age	-0.062	0.009
Education	0.079	0,027
Farmers status	-0.174 *	-0.186 **
Land area	0,036	-0.14 *
Motivation	-0.279 **	-0.075
Work ethic	-0.24	-0.42
Cosmopolitan	0.380 **	0.283 **

Notes: * significant level at $p < 0.05$ r_s: Spearman rank correlation coefficient

   ** very significant extent on < 0.01

3.2.2. Correlations between farmer status with communication media and communication patterns

Based on Table 2 Spearman rank correlation test results demonstrated an association between the statuses of farmers by disseminating the communication method. Farmers status have a significant level of negative communication media at $p < 0.05$, and has a very significant level of negative communication patterns at $p < 0.01$. This means that farmers with high status (landowners) would prefer pamphlets, posters and radio broadcasting as a source of information rice cultivation technology innovation; even utilizing the media of newspapers, TV and magazines merely as entertainment sources. Landowners have not selected one of the methods and patterns of communication as the best method for obtaining information about technological innovation (all methods are considered equal). In addition, the results of this analysis can also be interpreted that the owners and the owners of the tillers are more independent (less likely to depend on the extension) in the search for technological innovation resources. Conversely it can also mean that the lower farmer status level will increase the use of communications media and communication patterns, but cannot afford their activeness in applying into the rice-planting efforts due to limited land ownership.

3.2.3. Correlations between Land Area with Communication Media and Communication Pattern

Spearman rank correlation test to land with the method of dissemination. Land area is not related to communication method, but relates to dissemination pattern. Land area has a significant negative level with communication pattern at $p < 0,05$. This result means that there is no relationship between land area of farmers and the choice of communication media. In addition, farmers with a wider area of land tend not to distinguish communication patterns used as sources of information. In other words, farmers with large areas of land tend not to depend on extension agents as the only source of information on technological innovation.

3.2.4. Correlations between Motivation with Media Communication and Communication Patterns

Based on Table 2 Spearman rank correlation test results showed negative significant connection between the motivation of farmers to the communications media, at p <0.01. This means that high motivation (customs, fulfilling the needs of business-like manner) not affected by the preferred method of communication. In other words, farmers with high motivation (business orientation) tends to not depend on the choice of communication methods, contrary to the farmers with low motivation which more frequent and active in the use of communication media. This means that farmers with low motivation tend to be followers only. Frequently attending meetings but does not affect anything in the development of rice cultivation technology adoption.

3.2.5. Cosmopolitan Correlation with Media Communication and Communication Patterns

Based on Table 2 Spearman rank test results show that there is a relationship between cosmopolitan with dissemination in communication method. Cosmopolitan positively correlated with communication method and also positively correlated with communication pattern at p <0,01. This result means the higher the cosmopolitan the higher the use of communication methods and patterns. The higher a cosmopolitan can increasingly utilize existing information. Strongly strives to gain a source of technological innovation information and able to choose the communication media as a source of information needed. Also, cosmopolitan will increasingly able to utilize the communication patterns used, in line with the research of Gallupe and his colleagues [3] that suggest that collaborative system support and good cooperation will increase the quantity of information. Good communication will improve by reducing social barriers and serve as a consultant among its members.

3.2.6. Characteristic relationships Rice Cultivation Technology Innovation the dissemination Communication Methods

Correlation between the characteristics of innovation carried out with methods of dissemination and statistical test nonparametric Spearman rank test to each element of technological innovation characteristics (relative advantage, compliance, and complexity, available to be tried and observed) with the communication method. Table 3 below shows the test results.

Table 3: Relationship characteristics of innovation with the method of dissemination

No.	characteristics of Innovation	Dissemination Methods (rs)	
		Communication media	Communication patterns
1	relative advantage	0,146 *	0.190 **
2	conformity	0.207 **	0.227 **
3	non-difficulty	0.140 *	-0.170 *
4	available to be tried	0,015	0,050
5	can be observed	0.151 *	-0.037

Notes: * significant level at p <0.05 r_s: Spearman rank correlation coefficient

** very significant extent on <0.01

3.2.7. Relative Advantages Relations with the Media Communication and Communication Patterns

Based on Table 3 Spearman rank correlation test results showed that there are correlation between relative advantages with the method of dissemination. Positive significant relative advantage associated with the communications media at $p < 0.05$. Significant relative advantage is also associated positively with the communication patterns at $p < 0.01$. This means that the higher consideration of the relative advantages of respondents to a technical innovation increasingly selective in choosing a variety of communication media as a source of information. Similarly, communication patterns, where the higher consideration of the relative advantages of respondents to a more precise technological innovation in performing communication patterns, people will look for information strengthen understanding (Roger & Shoemaker 1995).

3.2.8. Compliance with the Communications Media Relations and Communication Patterns

Spearman rank correlation test results showed a positive significant relationship between the suitability of agricultural technology innovation with the communication media at $p < 0.05$, and positive significant touch of conformity with the communication patterns at $p < 0.01$. This means that the higher the level the higher the suitability of the use of the communications media and the higher level of communication patterns. The higher the respondent's considerations of the appropriateness of a technological innovation the higher possibility to be able to take advantage of a variety of communication media and the interactions that occur between farmers and existing resources will be better.

3.2.9. Non-difficulty Correlations with Media Communication and Communication Pattern

Test result data of Table 3 indicate a positive significant relationship between the non-difficulty with media communications at $p < 0.05$ and non-difficulty significant negative associated with the communication patterns at $p < 0.01$. It means that the higher level of consideration of non-respondents to the elements difficulty a technological innovation, the higher selectivity towards communication media. In addition, the higher consideration of respondents to the complexity the more perfect technological innovation in performing communication patterns.

3.2.10. Correlation Between Observable with the Media Communication and Communication Patterns

Table 3 shows the positive significant connection between the observable element of technological innovation with the communication media at $p < 0.05$, and the absence of a relationship between observable elements with the communication pattern, the higher level of respondent's consideration regarding the observable elements of a technological innovation, the higher selectivity in communications media, but does not consider the communication patterns.

3.2.11. Relationship of Characteristics of the Physical Environment with Communication Method of Dissemination

Physical characteristics of an environmental correlation performed with disseminating communication methods

and statistical tests of non-parametric. Spearman rank test to each element of an environmental characteristic physical (land potential, availability of facilities, affordability of infrastructure and access to information) and dissemination of communication methods. Table 4 below shows the test results.

Table 4: Relationship with the physical environment dissemination of communication methods

No.	Physical environment	Dissemination dissemination methods (rs)	
		Communication media	communication pattern
1	potency	0.285 **	-0.030
2	Availability of inputs and information	0.114	0.208 **
3	Affordability saprodi and information	-0.106	-0.131

Description: very significant extent on the * p <0.01 r_s: Spearman rank correlation coefficient

Based on Table 4 Spearman rank correlation test results showed that there is a relationship between the potential of land with communications media. Land potential positive significant relationship with the communications media at p <0.01. This means that the higher the potential of land will increase the need for more communication media is closely connected with the communication media. Increasingly require communication media for development, are increasingly making use of communication media.

Availability of infrastructure and access to information has a significant positive relationship with communication pattern at p <0,01. This means that higher levels of infrastructure availability will improve the quality of communication patterns. The availability of infrastructure facilities is essential to enable farmers to apply their knowledge based on information on technological innovations gained, infrastructure and information needs to be available as well as Sharma and his colleagues [6] who have implemented a geographic information system (GIS) in analyzing the harvest system as an effort to assess sustainable agriculture systems in several districts of India. From this study it can be concluded that the use of geographic information systems and remote sensing allows for the collection of recurrent data that can facilitate mapping of long-term harvesting patterns and harvest rotation.

The linkage to this research is the availability of land, the availability of infrastructure and access to information as well as collected in one well-maintained and well-organized data and can always be a source of information for farmers who have high cosmopolitan, as in the results of this study. Hossain and Sadat [4] research on the application of geographic information systems where the research focuses on the classification of soil texture and land type in Chuadanga District, as well as the specially treated harvest pattern.

3.2.12. Correlation Between Social Environment with Dissemination Methods

To determine the relationship (correlation) between social support and method of dissemination, the non-parametric statistical test Spearman rank correlation with each element of the social environment (family support, institutional support, support social systems, and support of business partners, as well as local wisdom functions) was tested in this study.

Table 5: Correlation Between Social Environment with Dissemination Methods

No.	Social environment	Dissemination Methods (rs)	
		Communication media	communication pattern
1	Family support	0073	-0.020
2	Institutional	-0.092	0,015
3	social system	0.190 **	0.051
4	Business partner	-0.165 *	-0.045
5	The functioning of local wisdom	0.18 **	0,000

Note: * the level of significance at $p < 0.05$ rs: Spearman rank correlation coefficient

   ** very significant extent on < 0.01

Based on Table 5 Spearman rank correlation test results show there is a correlation between the social environments with communication media. The social system had a markedly positive correlation at $p < 0.01$. This means that a strong social system will increasingly require a variety of effective and efficient communication media. Strong social systems often have habits that are difficult to change or abandon even though those changes will provide a better upgrading, and so communication media are needed, so that the information disseminated will be widely supported. Mass media in favor of inter-personal communication plays significant role in the adoption and diffusion [9].

The results showed that the business partners has a significant negative level of correlation with communication media at $p < 0.05$. This means that the greater the value, the smaller the business partners utilization of communications media. The functioning of local wisdom has a very significant level of positive relations with the media communication at $p < 0.01$. This means that the stronger the functioning of local knowledge will improve the quality of the benefits of the communications media. A very strong influence of the community leaders will strongly shapes public opinion in the acceptance of agricultural technology [14].

4. Conclusion

1. Dissemination method of rice cultivating technology innovation in South Sulawesi using newspaper, television and magazine is included in low category, while the use of posters and radio broadcasts and pamphlets is included in the medium category. The use of communication media of speech, demonstration / pilot, deliberation, dialogue / exchange opinion, lectures, farm visits, official visits, government instructions, is considerably high.

2. The dominant factors of the user mapping base that correlate significantly with the methods of dissemination in rice cultivating technology innovation are:

a. Status of farmers, land area, motivation and cosmopolitan on the characteristics of farmers

b. The relative advantage, suitability, complexity and observability of innovation characteristics

c. Potential land, availability of production facilities and information on the physical environment.

d. Social systems, business partners, and the functioning of local wisdom in the social environment.

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