

Decision making analysis model of technology adoption: Empirical study on pasteurized milk retailers behavior

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ABSTRACT: The objectives of this research were to measure the variables of knowledge, persuasion, and behavior concerning with technology adoption of pasteurized milk products and to analyze the influence of one on another of those variables. Fifty five pasteurized milk retailers were taken as respondents in a survey by conducting interviews and observation from September to November 2007. The data were analyzed by linear regression. The results indicated that milk retailer has adequate knowledge about pasteurized milk product. Nevertheless, milk retailers had low levels of adoption behavior concerning with technology of pasteurized milk handling. Adoption of handling technology was influenced by retailer's persuasion. This study showed that 62,7% technology of pasteurized milk handling can be explained by the effect of persuasion. Milk retailer's persuasion of technology of pasteurized milk handling was not influenced by milk retailer's product knowledge as measured by subjective or objective measurement.

Key words: technology adoption, pasteurized milk, milk retailers

INTRODUCTION

Intermediary is an alternative form of connecting products from producers to consumers as end users (David, 2009) with his duties as a liaison. Some of the producers involved in pasteurized milk distribution are CV Nasional Cita, Batu Malang Dairy Cooperative, and Warga Mulya Dairy Cooperative. These producers use intermediaries as retailers in the distribution channels. Milk products are marketed by retailers as the circumference by visiting places such as playgroups, kindergartens, elementary schools, public areas such city squares, university park, and traditional market.

Consumers' concern to product is product quality that showed in product attributes that offered by an intermediary (Tjiptono, 1997). Application of handling technology during the distribution of pasteurized milk is necessary in an effort to maintain product quality, as the nature of milk which is easily damaged. Pasteurized milk handling technology includes using a cooler to control and maintain proper the temperature.

Retailer attitude is influenced by knowledge of technological innovation. In this case the product knowledge includes knowledge of pasteurized milk, product quality, and handling of pasteurized milk during distribution. According to Rogers (1995), there are five stages before a person is willing to accept and implement innovations i.e. knowledge, persuasive, decisions, implementation, and confirmations. Knowledge is the beginning stage of the decision process innovations. This stage aimed to direct the individual so that individuals become aware of innovations and gain an understanding or information about the functions and innovative work. Philippe and Ngobo (1999) in Syahlani (2007) explains that there are two types of knowledge, subjective and objective knowledge. Subjective knowledge is based on individual ability to understand matters deemed to know. Objective knowledge is based on evaluations conducted by others to determine the level of knowledge of the target.

The objectives of this research were to measure the variables that are knowledge, persuasion, and behavior concerning with technology adoption of pasteurized milk products and to analyze the influence of one on another of those variables.

MATERIALS AND METHODS

Data were collected using interviews with 55 retailers of pasteurized milk produced by CV Cita Nasional Retailer, Batu Malang Dairy Cooperative, and Warga Mulya Dairy Cooperative. Variables measured were subjective and objective knowledge, persuasion and behavior concerning with retailers' adoption to the technology of pasteurized milk handling. Questionnaires were prepared in order to perform variables to be analyzed using the Likert scale, aside from those with wrong -- correct multiple choice questions

RESULTS AND DISCUSSIONS

Fifty-five respondents composed of 39, 13 and 3 (or 70.91, 23.64 and 5.45%) retailers for the CV Cita Nasional with "Susu Nasional" brand, Batu Malang Dairy Cooperative with "Susu KSB" brand, and Warga Mulya Dairy Cooperative with "Susu Mulya" brand, respectively.

Respondent characteristics are presented in Table 1. Table 2 shows that the mean percentage of subjective knowledge on retailers (73%) was larger than average percentage of objective knowledge (66%). This difference indicated that self-perception of knowledge about products retailers was higher compared to knowledge actually owned. According to Damen and Steenbekkers (2007) a good individual knowledge of an object has not been able to change individual attitudes. Furthermore it is explained that the source of individual knowledge may come from the experiences of individuals or the information from somebody. Knowledge about the product can also be obtained from books (Downey and Erickson, 1989). To be able to change individual behavior it is required strong persuasion process of an innovation (Rogers, 1995). Several dimensions which can affect persuasion are relative advantage, compatibility, complexity, trialability, observability of innovation.

Table 3 shows that retailers have low technology adoption behavior. Retailers did not perceive the advantage of handling technology using cooler box with thermometer. For them, it was useless, expensive, too complex, difficult to apply, and difficult to observe whether it worked. Attitude can be developed if there are external stimuli. The results of Syahlani (2007) about the effects of advertising and advertorials on the knowledge and persuasion within the process of adoption of functional foods indicated that the presence of external stimuli from the manufacturer and independent institutions such as advertisements and advertorials had the ability to improve the knowledge of individuals. In this study, the external stimuli could be given by the manufacturer to provide additional knowledge about the product, quality and handling of milk pasteurization. An increasing knowledge of the retailers are expected to establish a strong persuasion about technology of pasteurized milk handling.

This study also discovered that in addition to the retailer persuasion about technology innovation, adoption behavior was influenced also by habit and experience. According Damen and Steenbekkers (2007) in handling an individual's behavior can be affected by the product of habit. Apart from habit, the individual is also still want a way of handling product in a simple way and in accordance with the tools they use. This is caused by handling of the individual doing, the individual feels confident that will not happen something that can be harmful.

Table 4 indicates that the persuasion dimension of retailers about innovation technology was low. Mean of relative advantage dimensions was 2.07 with the average percentage of 41.4%. It means that technological innovation gave low profit and less benefit to retailer. Dimensional compatibility had a mean of 1.92 with the average percentage of 38.4%. It indicates that the technology has a low level according to the circumstances of the individual. Dimensional complexity of milk pasteurization was 1.94 with the average percentage of 38.8% which means that these technologies had a level of complexity that made an individual had low attitude toward technology. Dimensions trialability was 2.06 (41.2%) which means that retailers had low attitudes toward technology. Dimensions observability was 2.11 (42.2%) which shows that this technology had low rate of success, or that the retailer had a lower attitude toward technology.

Results of hypothesis testing in Table 5 shows insignificant effect on subjective and objective knowledge on persuasion. There was a significant influence on the persuasion of the technology adoption. T value for persuasion of technology adoption is 9.444 with significance value of 0.000, thus giving the conclusion that persuasion influence the adoption of technology. R^2 value on the effect

of persuasion on technology adoption was 0.627. It means that 62.7% adoption of technology was influenced by persuasion, while the rest of 37,3% was influenced by several other factors that were not observed in the study.

Table 1. Characteristics of study respondents

Category	Number of respondents	% repondent
Sex		
Female	1	1,82
Male	54	98,18
Age, yr		
21 - 25	17	30,91
26 - 30	16	29,09
31 - 35	11	20,00
36 - 40	10	18,18
41 - 45	1	1,82
Education		
Elementary	6	10,91
Junior high	33	60,00
Senior high	16	29,09
Length of working (months)		
1 - 12	22	40,00
13 - 24	9	16,36
25 - 36	7	12,74
37 - 48	5	9,09
49 - 60	3	5,45
61 - 72	3	5,45
73 - 84	1	1,82
85 - 96	5	9,09
Main job		100,00
Retailers	55	
Marital status		
Single	20	36,36
Married	35	63,64
Family members involved		
Present	-	-
Not present	55	100,00

Table 2. The mean and the mean percentage of maximum value of subjective knowledge and objective knowledge variables

Variable	Mean	Mean % of maximum value	Information
Subjective knowledge	3,65	73	Feel out
Objective knowledge	7,93	66	Known enough

Table 3. The mean and the mean percentage of the maximum value of persuasion and behavioral variables retailer adoption

Variable	Mean	Maximum		Information
		value	Mean % of maximum value	
Persuasion	2,01	5	40,2	Low
Adoption behaviour	1,99	5	39,8	Low

Table 4. Mean and mean percentage of the maximum value the variable dimensions of persuasion

Variable	Mean	Maximum value	Mean % of maximum value	Information
Relative advantage	2,07	5	41,4	Low
Compatibility	1,92	5	38,4	Low
Complexity	1,94	5	38,8	Low
Trialability	2,06	5	41,2	Low
Observability	2,11	5	42,2	Low

Table 5. Simple regression analyses of independent variables affect the dependent variable

Free Variable	Fixed Variable	N	R ²	Coefficient	T _{value}	Significant
Subjective knowledge	Persuasion technology	55	0,018	-0,134	-0,982	0,331
Objective knowledge	Persuasion technology	55	0,019	0,140	1,026	0,310
Persuasion technology	Technology adoption	55	0,627	0,792	9,444	0,000

CONCLUSIONS

This study identifies that persuasion about technology was not influenced by either knowledge of subjective product knowledge or objective knowledge. There were low rate of persuasion and low adoption of technology, because retailers did not perceive that the technology had advantages. On the contrary, it had fewer benefits, was expensive, complex, difficult to apply, and did not work well.

Retailers still relied on their habits in handling the products. They wanted to have simple handling technique with equipment that retailers used. About 62.7% of persuasion technology adoption was influenced by persuasion, while the rest of 37.3% was influenced by other factors that were not observed in this study.

Pasteurized milk retailers have enough knowledge about the products. Yet, persuasion and behavior of the retailer has low adoption. It is suggested for manufacturers to give external stimuli to improve their knowledge about pasteurized mil products and handling. External stimulus can be given by providing guidance or training on the understanding of pasteurized milk, pasteurized milk-making processes, the goal of the process of pasteurization, causes of the damage and low quality of pasteurized milk after freezing.

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