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Short Communication

Latent and Manifest Variables of PLS-SEM Model in the Decision Making of PIKNET Sound Wave-Based Attractor Innovation by Fishermen in Bulak Sub-District, Surabaya, Indonesia

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ABSTRACT

A study of the diffusion process of sound wave-based attractor innovation in fishing groups needs to be done because the application of innovation requires an adaptation process so that one can adopt the new subject through the established stages. The innovation-decision process is a mental process by which a person or institution goes from initial knowledge about an innovation. This research aims to analyze the measurement model and the relationship between variables in the decision-making of Piknet innovation by fishermen in Bulak Surabaya. SEM PLS data analysis was used to determine the relationship between latent and manifest variables. The test results showed that the CR value is above 0.7; therefore, it can be said that the variable has been met. The AVE values for X1-X5, Y1 and Y2 are above 0.5. Therefore, each latent variable has a valid measurement model. The conclusions from the research are as follows: (1) The analysis results of the measurement model met the requirements with good characteristics. Therefore, it can be continued to the next stage of structural model analysis; (2) Furthermore, 11 eliminated indicator variables did not meet the standard requirements of the outer loading value ; (3) A significant relationship was found in the latent variables of X1-X5,

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Y1 and Y2; (4) Indicator variables related to the latent variable are X1.4, X2.1, X3.2, X4.1-X4.3, X5.1, X5.2, Y1.1-Y1.3 and Y2.1,-Y2.3. To develop this research, continuous research is needed by examining each of the variables used in depth.

Keywords: Attractor, fishermen, innovation, Piknet

INTRODUCTION

In general, gill net fishers in Bulak District, Surabaya City, are traditional fishermen with education levels ranging from elementary to high school. The level of education affects the ability to access changes in the surroundings, especially those related to technological changes. Therefore, the application of technology given to gill net fishermen must pay attention to aspects of education and local culture in their environment. One factor influencing fishery resources' sustainability is applying environmentally friendly technology for fishermen and assisting so that fishermen can operate them. The innovation offered to the gill net fishermen is a fish caller device called an attractor, designed based on sound waves with a wave range of 500-1000 Hz, named Piknet.

A study of the diffusion process of sound wave-based attractor innovation in fishing groups needs to be done because the application of innovation requires an adaptation process so that one can adopt the new subject through the established stages. The innovation-decision process is a mental process by which a person or institution goes from initial knowledge about innovation to forming an attitude towards the innovation, implementing the new idea, and confirming the decision (Rogers, 2003).

The sound wave-based attractor innovation from research by Rosana et al. (2018) describes testing a sound wave-based fish calling device called Piknet. The experiment was carried out to see the fish's response to the sound coming out of the tool. Rosana and Muminin (2019) explained the difference in the number of catches of *"Bulu Ayam"* fish (Oxyporhamphus micropterus) using a sound wave-based attractor compared to not using a tool. Rosana et al. (2019) explained efforts to introduce sound wave-based attractors to fishermen in *Bulak* District, Surabaya, in their Analysis of the Difference in Frequency Sound Waves to the Catch of Gulamah Fish *(Johnius trachycephalus)* Using a Trammel Net in the Coastal Area of Surabaya. Rosana et al. (2021) explained the results of the trial of Piknet with the catch of gulamah fish, where there was a difference in the number of catches compared to not using Piknet.

This research examines the innovation of a Piknet sound wave-based attractor tested by a group of fishermen in the Bulak Sub-district, Surabaya. In principle, the Piknet attracts the attention of the fish to the gill fishing net gear because of the sound emitted by the tool. Fish that respond to the sound will approach, crash, and then become entangled in the body of the net. In the early stages of testing the Piknet, socialization regarding the

purpose, benefits, and methods of use was conducted on groups of gillnet fishermen. The responses include the ease of use when operated in the waters, changes in the number of catches obtained, the presence of several attracted fish species, and the desire to use Piknet, as well as the suitability of the fishing gear used (Rosana et al., 2019).

In this research, the innovation diffusion concept from Rogers (2003) was used as a latent variable consisting of five aspects, including the innovation characteristics, communication channels, certain periods, social systems, as well as knowledge and persuasion. Meanwhile, the innovation decision-making process uses the adoption and implementation stages as well as confirmation and support. Furthermore, the innovation of fishing gear showed the need to further research the diffusion process to its target users (gill net fishermen group in Bulak Sub-district, Surabaya) by analyzing the factors that influence the fishermen's decision to adopt Piknet. Therefore, this research aims to analyze the measurement model (outer model) and the relationship between variables in the decision-making of Piknet innovation by fishermen in the Bulak Sub-district.

MATERIALS AND METHODS

This research used a variant-based Partial Least Square (PLS)-Structural Equation Modeling (SEM) approach based on exogenous, endogenous latent, and indicator variables (Mun'im, 2015). Suitably, a measurement model was used to describe the relationship between latent/construct variables and their indicators, also known as outer relations (Jaya & Sumertajaya, 2008).

The measurement model described the relationship between the latent variable and its indicator variable (manifest), also known as the outer relation or measurement model. This model consisted the formative indicator model and the reflective indicator model. The reflective model can occur if the latent variable influences the manifest variable. The formative model explained that the manifest variable affects the latent variable with the direction of causality flowing from the manifest variable to the latent variable. Equations 1 and 2 show the reflective model (Haryono, 2016):

$$x = \Lambda x\xi + \delta \quad (1)$$

$$y = \Lambda y\eta + \varepsilon \quad (2)$$

Where x and y are indicators for exogenous (ξ) and endogenous (η) latent variables, x and y are loading matrices describing a simple regression coefficient that relates the latent variable to the indicator. Residuals are measured by and can be interpreted as measurement error or noise.

The formative indicator model can be written as Equations 3 and 4 (Haryono, 2016):

$$\xi = \Pi_{\xi} X_i + \delta \quad (3)$$

$$\eta = \Pi_{\eta} Y_i + \varepsilon \quad (4)$$

Where ξ, η, X, and Y are the same as the previous equation. Where Π_{ξ} dan Π_{η} are like multiple regression coefficients of the latent variable on the indicator, while δ dan ε are the residuals of the regression.

The latent/construct variable consisted of seven variables (5 exogenous (X_1-X_5) and two endogenous (Y_1 and Y_2). Meanwhile, the manifest/indicator variable consisted of 24 variables (Table 1).

Table 1
Exogenous, endogenous latent, and manifest variables with PLS-SEM

Latent/construct variables	**Manifest/indicator variables**	**Symbol**
Innovation characteristics		X1
• Schiffmen & Kanuk (2010) • Tjiptono & Chandra (2012) • Mardikanto (2007) • Kusdibyo & Leo (2018)	Relative advantage	X1.1
	Suitability	X1.2
	Complexity	X1.3
	Testable	X1.4
	Observable	X1.5
Communication Channels		X2
• Leeuwis (2004) • Septiani & Esfandari (2018) • Indraningsih (2011) • Warnaen & Cangara (2013)	Interpersonal/local with discussion	X2.1
	Cosmopolitan/outside the local system using electronic media	X2.2
	Cosmopolitan/outside the local system using print media	X2.3
Certain periods		X3
Adianto (2018)	Taking 1–4 months for adoption	X3.1
	Taking 5–8 months for adoption	X3.2
	Taking 9–12 months for adoption	X3.3
Social Systems		X4
Amanah (2006)	Actively participating in fisherman group organization	X4.1
	Actively participating in counseling	X4.2
	Actively participating in training	X4.3
Knowledge and persuasion		X5
Adianto (2018)	Being aware and knowing innovation	X5.1
	Being interested and actively seeking information	X5.2
	Having guidance in the understanding process	X5.3
Adoption and implementation		Y1
• Adianto (2018) • Pannell et al. (2006) • Warnaen & Cangara (2013)	Adopted by individual/own initiative	Y1.1
	Adopted by group	Y1.2
	Implementing innovation continuously	Y1.3
	Implementing innovation occasionally	Y1.4
Support and Confirmation		Y2
Rogers (2003)	Having the support of the closest people	Y2.1
	Having support from community leaders/role models	Y2.2
	Having support from local regional officials (village head)	Y2.3

The variable indicators used based on quantitative analysis were expressed in statements, which are scored in numbers ranging from strongly disagree to strongly agree with a score of 1 to 5. A purposive sampling method was used by considering the criteria of fishermen in the Bulak Sub-district, Surabaya. They operated gill net fishing gear and participated in the Piknet sound wave-based attractor trial. The number of samples used was 50, following the research conducted by Sholihin and Ratmono (2013). In addition, the minimum number of samples used is 45 respondents, while the maximum number of arrows to the latent variable is 5, with a significance of 0.1. Data in qualitative form were analyzed using SEM-PLS with the student version of the Smart PLS tool.

The research was conducted in Bulak Sub-district, Surabaya, East Java, especially in the group of gillnet fishermen in the area, and the map of the research location is shown in Figure 1.

The outer model assessment test (indicator test) was conducted using the criteria in Table 2, including convergent validity (individual reliability), discriminant validity (internal consistency), average variance extracted (AVE), and composite reliability (discriminant validity).

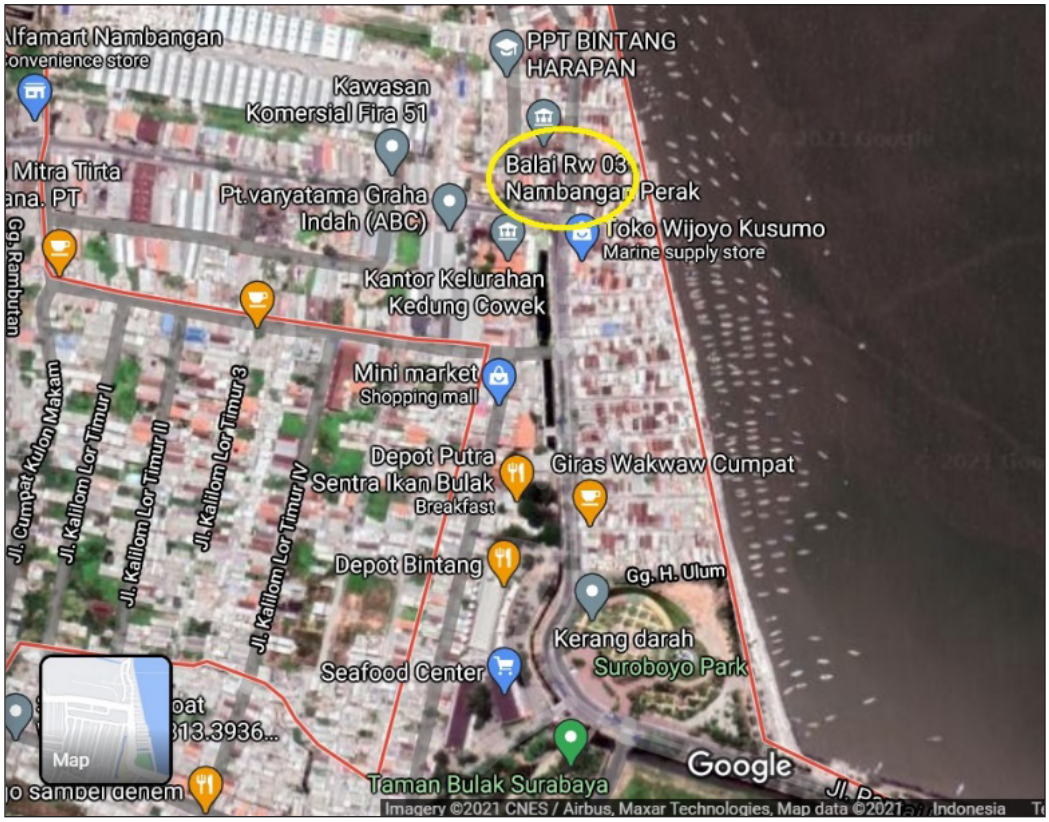

Figure 1. Research location, Bulak Sub-district, Nambangan Perak Village, Surabaya

Table 2
Model assessment criteria

Model Test	Output PLS	Criteria
Outer Model (Indicator Test)	a. Convergent validity test (individual reliability) b. Discriminant validity test (internal consistency) c. Average Variance Extracted d. Composite reliability test (discriminant validity)	a. Load factor above 0.7 b. Cross-loading correlation > correlation to other latent variables c. AVE > 0.5 d. CR ≥ 0.7

This research was part of a research on the adoption of an attractor innovation model based on the Piknet sound wave for fishermen in Bulak District, Surabaya. The innovation-decision process used the elements of innovation, such as characteristics of tools, communication channels, a certain period and social systems. At the same time, in the stages of the innovation-decision process, the factors used were knowledge and persuasion, adoption and implementation and confirmation (Rosana et al., 2021). The conceptual framework can be seen in Figure 2, and the research flow can be seen in Figure 3.

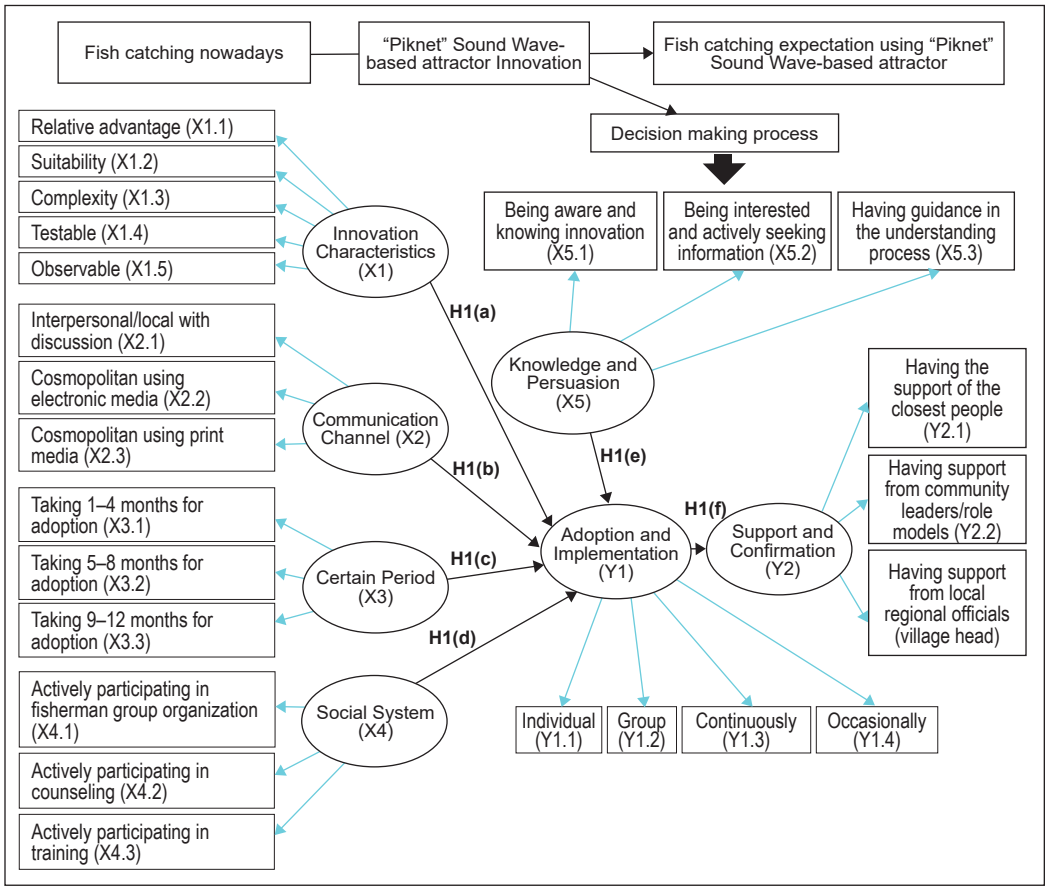

Figure 2. Conceptual framework

RESULTS AND DISCUSSIONS

Measurement Model Analysis Results

The measurement or outer model determines the relationship between latent variables and their indicators or manifestations (Nurwullan & Suharno, 2015). Furthermore, the analysis of the outer model was conducted with four stages of testing, namely individual reliability, internal consistency reliability, average variance extracted (AVE), and discriminant validity. The test was carried out on 24 indicator variables shown in Figure 4.

The initial stage in determining the relationship between the latent variable and the indicator variable is explained by describing the relationship as a whole according to the concept of the innovation diffusion process (Figure 4), followed by analyzing the magnitude of the relationship between the latent variable and its indicator variable using the individual

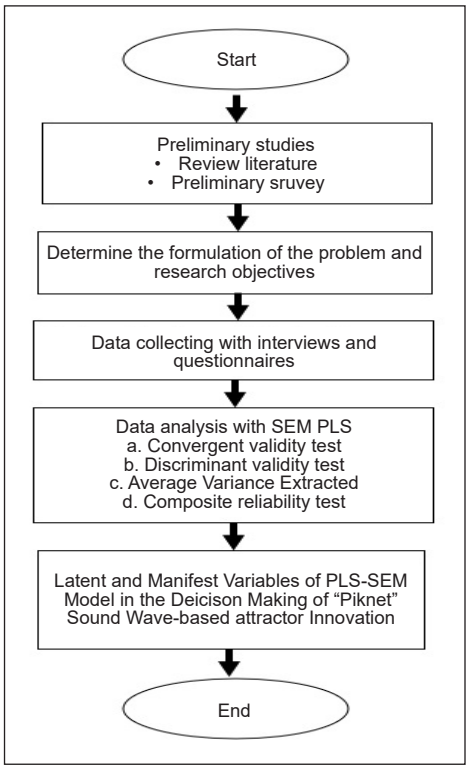

Figure 3. Research flowchart

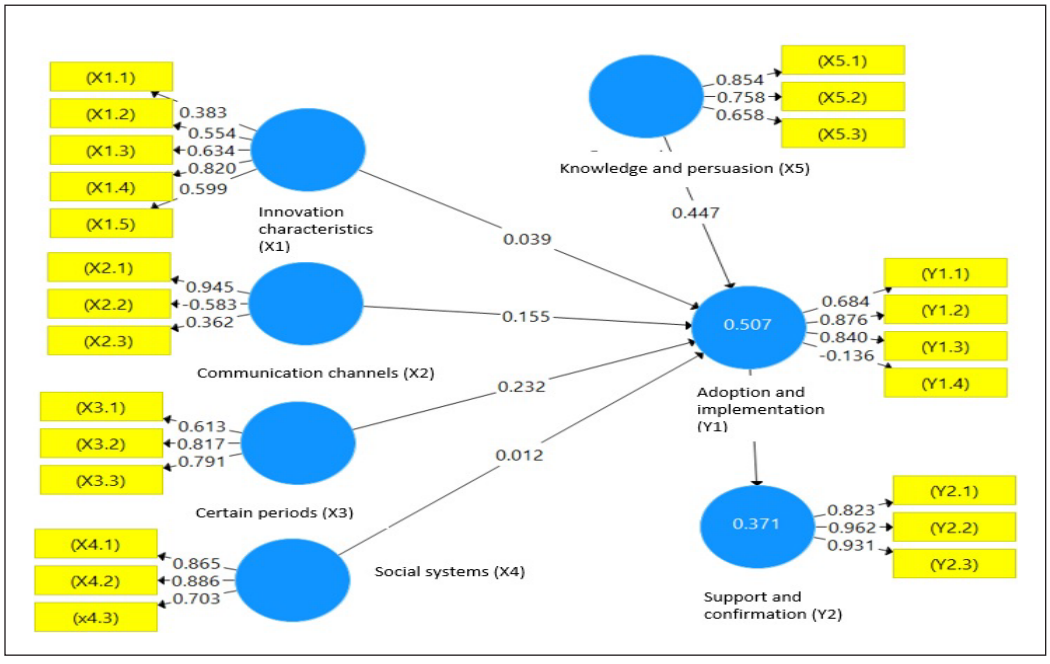

Figure 4. Initial outer model

reliability test so that from the test it can be seen several indicator variables that do not meet the requirements and are eliminated from the model. This stage is described in the individual reliability test sub-section and is depicted in Figure 5.

Individual Item Reliability Test. Individual item reliability testing was conducted by investigating the loading factor value, which explains the magnitude of the relationship between latent variables and their indicators. The loading factor is good above 0.7 because it can measure or explain the latent variable. After obtaining the loading factor, the indicators with a value less than 0.7 are eliminated, such as relative advantage (X1.1), suitability (X1.2), complexity (X1.3), observable (X1.5), cosmopolitan/outside the local system with print media (X2.3), taking 1–4 months for adoption (X3.1), having guidance in the understanding process (X5.3), and implementing innovation occasionally (Y1.4). The variable elimination results are shown in Figure 5.

The reliability test results (loading factor) are shown in Table 3, where the variable with the gray block was eliminated due to a loading factor below 0.7.

Internal Consistency Reliability Test. The internal consistency reliability test was conducted using the composite reliability value with a threshold of 0.7 (Hair et al., 2011). In addition, composite reliability measures internal consistency reliability compared to Cronbach's alpha because it does not assume a similarity between all indicator variables. The test results showed that the CR value is above 0.7; therefore, it can be said that the variable has been met. The CR results are shown in Table 4 and Figure 6 below.

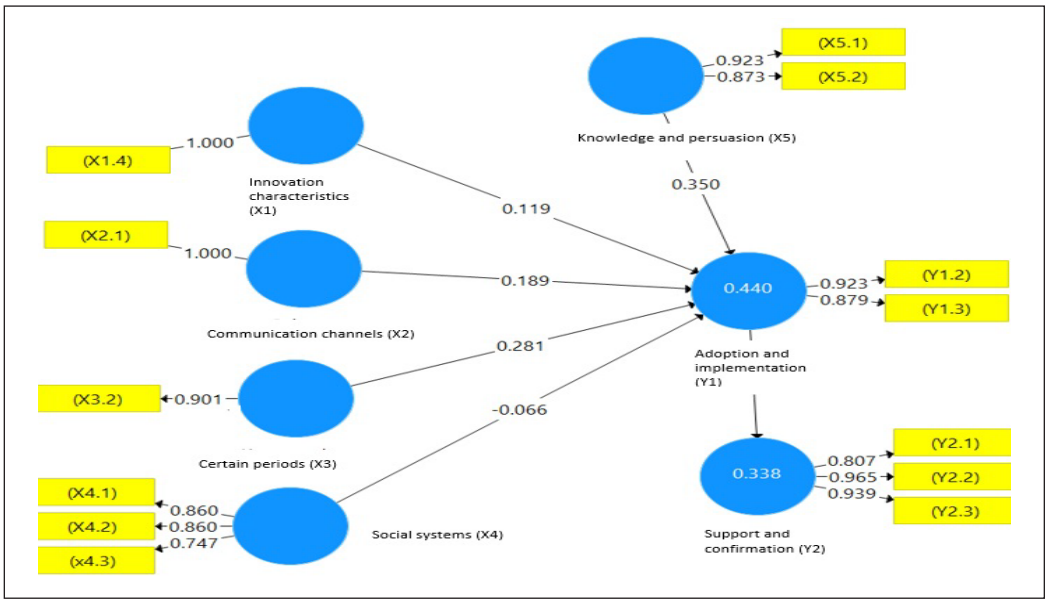

Figure 5. Outer model results with tested loading factor values

Table 3
The loading factor test results after eliminating several indicator variables

Indicator Variables	Latent Variables						
	Innovation characteristics (X1)	Communication channels (X2)	Certain periods (X3)	Social systems (X4)	Knowledge and persuasion (X5)	Adoption and implementation (Y1)	Support and confirmation (Y2)
X1.1							
X1.2							
X1.3							
X1.4	1.00						
X1.5							
X2.1		1.00					
X2.2							
X2.3							
X3.1							
X3.2			0.901				
X3.3			0.854				
X4.1				0.840			
X4.2				0.840			
X4.3				0.707			
X5.1					0.923		
X5.2					0.873		
X5.3							
Y1.1							
Y1.2						0,923	
Y1.3						0,879	
Y1.4							
Y2.1							0,807
Y2.2							0,965
Y2.3							0,939

Table 4
Composite reliability (CR) test results

Code	Variable	Composite Reliability (CR)	Result
X1	Innovation characteristics	1.000	Reliable
X2	Communication channels	1.000	Reliable
X3	Certain periods	0.870	Reliable
X4	Social systems	0.863	Reliable
X5	Knowledge and persuasion	0.893	Reliable
Y1	Adoption and implementation	0.897	Reliable
Y2	Support and confirmation	0.932	Reliable

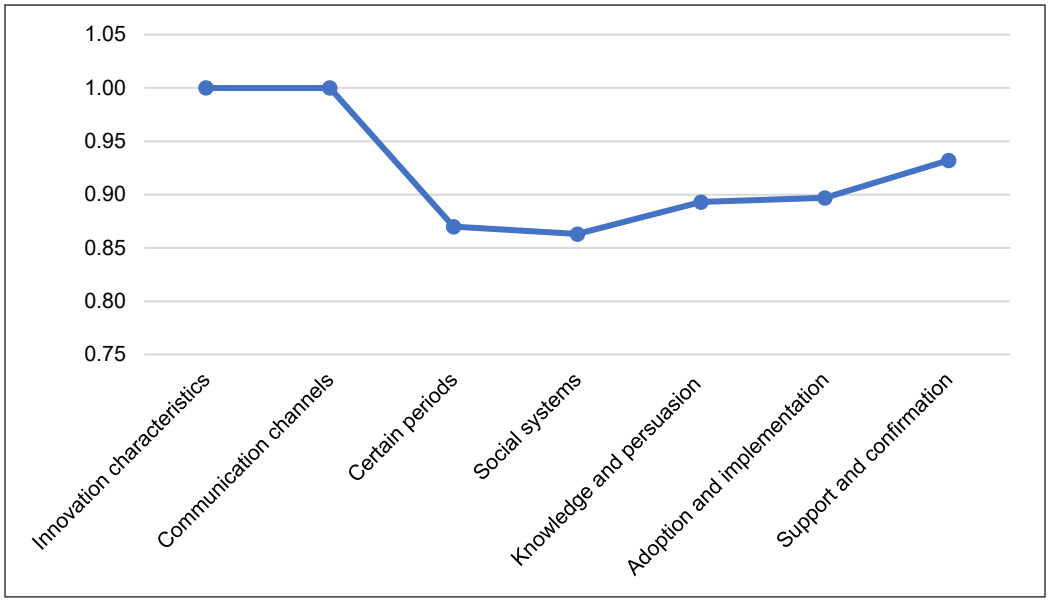

Figure 6. Value of Composite Reliability (CR)

Average Variance Extracted Test. The Average Variance Extracted (AVE) test showed a value above 0.5 for each variable. Therefore, the requirements were fulfilled. Also, the AVE value states the variance or diversity of the indicator/manifest variables owned by the latent construct. The greater the variance or diversity of the manifest variables that can be contained by the latent construct, the greater the representation of the latent construct.

Fornell and Larcker (1981) stated that the AVE value is used to assess convergent validity (as cited in Ghozali, 2014). A value of at least 0.5 indicates a good measure of convergent validity. Therefore, the latent variable can explain the average of more than half the variance of the indicators. The AVE values for X1, X2, X3, X4, X5, Y1, and Y2 are above 0.5. Therefore, each latent variable has a valid measurement model, as shown in Table 5 and Figure 7.

Table 5
Average Variance Extracted (AVE) test results

Code	Variable	Average Variance Extracted (AVE)
X1	Innovation characteristics	1,000
X2	Communication channels	1,000
X3	Certain periods	0,777
X4	Social systems	0,679
X5	Knowledge and persuasion	0,807
Y1	Adoption and implementation	0,812
Y2	Support and confirmation	0,822

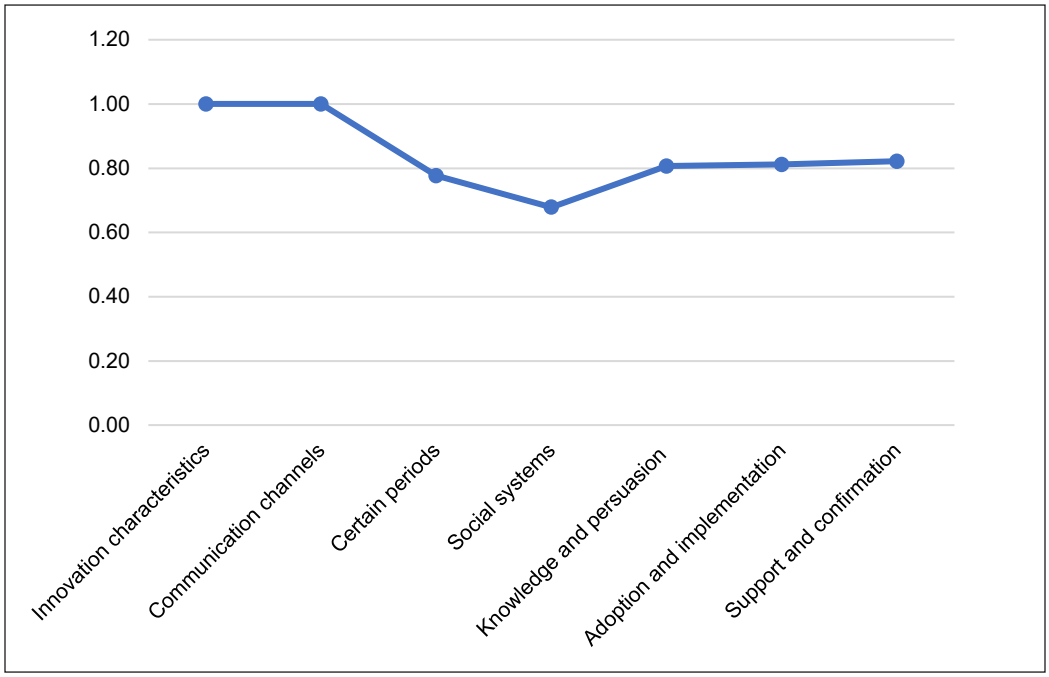

Figure 7. Value of Average Variance Extracted (AVE)

Discriminant Validity Test. The discriminant validity test determines the correlation between latent variables, where the value of the AVE root should be greater than this correlation. The test is conducted in two stages, analyzing the value of cross-loading between indicator variables, as well as Fornell lacker's cross-loading. Furthermore, the correlation between the indicator variables and their constructs should be higher than the correlations with other block constructs, which indicates that the construct can predict the size of the block better than others (Tables 6 and 7).

In research conducted by Schiffman and Kanuk (2010), the general analysis results of the relationship between the construct/latent variables and the indicator/manifest variables were the innovation characteristic variable (X1) used to measure perceptions. It consists of benefits obtained, conformity with adopters, level of complexity, the possibility of being able to try, and ease of observing. In this research, the innovation characteristic variable was closely related to the testable indicator variable (X1.4). Communication channels are part of the decision-making process, where according to Leeuwis (2004), dissemination of innovation to users is conducted between actors involved in innovation, seen as a feedback mechanism. According to Septiani and Esfandari (2018), innovation in the fisheries sector should be conducted by holding meetings and direct guidance with groups of fishermen in the field to smoothly run the process of implementing innovation. Furthermore, the communication channel (X2) and indicator variables are closely related, such as interpersonal and discussion (X2.1).

Table 6
Discriminant Validity Test (cross-loading)

Indicator Variables	Latent Variable						
	Adoption and implementation (Y1)	Support and confirmation (Y2)	Innovation characteristics (X1)	Certain periods (X3)	Knowledge and persuasion (X5)	Communication channel (X2)	Social system (X4)
X1.4	0.452	0.555	1.000	0.542	0.404	0.354	0.428
X2.1	0.403	0.501	0.354	0.342	0.275	1.000	0.316
X3.2	0.505	0.341	0.507	0.901	0.455	0.178	0.546
X3.3	0.421	0.299	0.441	0.854	0.335	0.448	0.500
X4.1	0.366	0.483	0.278	0.457	0.474	0.315	0.860
X4.2	0.366	0.483	0.375	0.457	0.546	0.315	0.860
X5.1	0.536	0.487	0.345	0.400	0.923	0.343	0.477
X5.2	0.422	0.459	0.388	0.424	0.873	0.127	0.612
Y1.2	0.923	0.548	0.483	0.532	0.540	0.452	0.457
Y1.3	0.879	0.497	0.316	0.413	0.421	0.255	0.285
Y2.1	0.371	0.807	0.505	0.278	0.406	0.323	0.427
Y2.2	0.585	0.965	0.566	0.295	0.507	0.552	0.444
Y2.3	0.585	0.939	0.456	0.413	0.507	0.453	0.479
X4.3	0.305	0.228	0.419	0.582	0.449	0.132	0.747

Table 7
Discriminant Validity Test (cross-loading Fornell Lacker)

Latent variable	Latent Variable						
	Adoption and implementation (Y1)	Innovation characteristics (X1)	Support and confirmation (Y2)	Certain periods (X3)	Knowledge and persuasion (X5)	Communication channels (X2)	Social system s (X4)
Adoption and implementation (Y1)	0,901						
Innovation characteristics (X1)	0,452	1,000					
Support and confirmation (Y2)	0,581	0,555	0,906				
Certain periods (X3)	0,530	0,542	0,366	0,878			
Knowledge and persuasion (X5)	0,539	0,404	0,526	0,455	0,8990		
Communication channel (X2)	0,403	0,354	0,501	0,342	0,275	1,000	
Social systems (X4)	0,421	0,428	0,494	0,597	0,595	0,316	0,824

The certain periods variable (X3) is related to the need for an adoption time of 5–8 months (X3.2), where according to Adianto (2018), the decision to be taken by a person is within a certain period. The social system variable is based on the activeness of fishermen in the organization by actively participating in counseling and training. According to Amanah (2006), the activities aim to increase their understanding. Furthermore, there was a close relationship between actively participating in fisherman group organizations (X4.1), actively participating in counseling (X4.2), and actively participating in training (X4.3) with the latent variable of the social system (X4).

Knowledge and persuasion variables are a phase where individuals begin to analyze something that has been learned to decide on accepting an innovation with several steps, such as success, ease of access, and guidance (Adianto, 2018). Therefore, the indicator variables: knowledge of innovation (X5.1) and being interested and actively seeking information (X5.2), have a close relationship with the latent variables of knowledge and persuasion (X5).

The adoption and implementation variable (Y1) is the decision-making process to accept or reject an innovation (Adianto, 2018). Meanwhile, Pannell et al. (2006) stated that adoption is utilizing and implementing innovations to meet needs. In addition, Warnaen and Cangara (2013) stated that the first fishermen to implement innovation are the administrators and group leaders in a community. Therefore, the indicator variables having a close relationship with the construct are individual adoption (Y1.1), group adoption (Y1.2), and continuous application of innovation (Y1.3).

The confirmation variable is expected to determine the support from other parties for the innovation decision taken by the adopter (Rogers, 2003), such as the fishermen group. Furthermore, the confirmation and support variables (Y2) have a close relationship with the indicators, namely having support from the closest people (Y2.1), community leaders (Y2.2), and local regional officials (Y2. 3). It is hoped that the research results can be used as the basis for carrying out the process of diffusion of Piknet innovations to fishermen and can be adopted and used in fishing operations to increase catches.

CONCLUSION

The conclusions from the research has achieved all the objectives and can be explained, as follows: (1) The analysis results of the measurement model (outer model) met the requirements with good characteristics, therefore, it can be continued to the next stage of structural model analysis (inner model); (2) Furthermore, 11 eliminated indicator variables did not meet the standard requirements of the outer loading value; (3) A significant relationship was found in the latent variables of innovation characteristics (X1), communication channels (X2), certain periods (X3), social systems (X4), knowledge and persuasion (X5), adoption and implementation (Y1) as well as confirmation and support (

Y2); (4) Indicator variables related to the latent variable are testable (X1.4), interpersonal with discussion (X2.1), taking 5–8 months (X3.2), actively participating in fisherman group organizations (X4.1), actively participating in counseling (X4.2), actively participating in training (X4.3), being aware and having knowledge of innovation (X5.1), being interested and actively seeking information (X5.2), adopted by individuals (Y1.1), adopted by groups (Y1.2), implementation of continuous innovation (Y1.3), supported by the closest people (Y2.1), supported by community leaders (Y2.2), and having support from local regional officials (Y2.3).

To develop this research, continuous research is needed by examining each of the variables used in depth. Some recommendations for future research are related to the addition of other variables, improving the quality of Piknet as an attractor for fishing and the effectiveness of using Piknet for fishermen.

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REFERENCES

Adianto. (2018). Proses adopsi inovasi lokal terhadap peningkatan kesejahteraan masyarakat di kawasan Minapolitan Desa Koto Mesjid Provinsi Riau [The Process of Adopting Local Innovations for Improving Community Welfare in the Minapolitan Area, Koto Mesjid Village, Riau Province]. *Jurnal Sosio Konsepsia*, *7*(2), 1-30. https://doi.org/10.33007/ska.v7i2.1144

Amanah, S. (2006). Penyuluhan perikanan [Fisheries Counseling]. *Jurnal Penyuluhan*, *2*(4), 62-69. https://doi.org/10.25015/penyuluhan.v2i4.2117

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, *19*(2), 139-152. https://doi.org/10.2753/MTP1069-6679190202

Indraningsih, K. S. (2011). Pengaruh penyuluhan terhadap keputusan petani dalam adopsi inovasi teknologi usaha tani terpadu [The Effect of Extension on Farmers' Decisions in Adopting Integrated Farming Technology Innovations]. *Jurnal Agro Ekonomi, 29*(1), 1-24.

Ghozali, I (2014). *Structural equation modeling, metode alternatif dengan partial least square* [Structural Equation Modeling, Alternative Method with Partial Least Square]. Badan Penerbit Universitas Diponegoro.

Haryono, S. (2016). *Metode SEM untuk penelitian manajemen dengan AMOS 22.00, LISREL 8.80 dan Smart PLS 3.0* [SEM method for management research with AMOS 22.00, LISREL 8.80 and Smart PLS 3.0]. Badan Penerbit PT.

Jaya, I. G. N. M., & Sumertajaya, I. M. (2008). Pemodelan persamaan structural dengan partial least square [Structural equation modeling with partial least square]. *Prosiding Semnas Matematika dan Pendidikan Matematika*, *1*, 118-132.

Kusdibyo, L., & Leo, G. (2018, October). Adopsi e-learning di perguruan tinggi [Adoption of e-learning in universities]. In *9th Industrial Research Workshop and National Seminar* (Vol. 9, pp. 371-379). https://doi.org/10.35313/irwns.v9i0.1125

Leeuwis, C. (2004). *Communication for rural innovation: Rethinking agricultural extension*. Wiley Publishers.

Mardikanto, T. (2007). *Redifinisi dan revitalisasi penyuluhan pertanian* [Redefinition and Revitalization of Agricultural Extension]. PUSPA.

Mun'im, A. (2015). Analisa usaha petambak garam dan perannya dan perkonomian tahun 2012 (Studi kasus Petambak Garam PUGAR) [Analysis of salt farmers business and its role and the economy in 2012: Case study of PUGAR salt farmers]. *Jurnal Sosial dan Ekonomi Kelautan Perikanan*, *10*(2), 217-228. http://dx.doi.org/10.15578/jsekp.v10i2.1261

Nurwullan, E., & Suharno, N. T. (2015). Aplikasi partial least square dalam pengujian implikasi jaringan kerjasama dan inovasi usaha mikro kecil pengolahan kedelai [Partial least square application in testing the implications of network cooperation and innovation for soybean processing micro and small enterprises]. *Jurnal Informatika Pertanian*, *24*(2), 205-214.

Pannell, D. J., Marshall, G. R., Barr, N., Curtis, A., Vanclay, F., & Wilkinson, R. (2006). Adoption of conservation practices by rural landholders. *Australian Journal of Experimental Agriculture*, *46*(11), 1407-1424. https://doi.org/10.1071/EA05037

Rogers, E. M. (2003). *Diffusion of innovations*. Free Press.

Rosana, N., & Muminin A. (2019). Effect of the difference in sound wave-based attractor frequency on the catch of halfbeak fish (*Oxyporhamphus micropterus*) using trammel net at Surabaya Coast. *International Journal of Advanced Research, 7*(9), 1352-1356. http://dx.doi.org/10.21474/IJAR01/9790

Rosana, N., Harahab, N., Ciptadi, G., Kurniawan, A., Supartono, Prasita, V. D., Suryadhi, Rifandi, S., & Muminin, A. (2021). Analysis of the difference in frequency sound waves to the catch of gulamah fish (*Johnius trachycephalus*) using a trammel net in the coastal area of Surabaya. In *International Conference on Innovation and Technology (ICIT 2021)* (pp. 70-74). Atlantis Press. https://dx.doi.org/10.2991/aer.k.211221.009

Rosana, N., Sofijanto, M., & Suryadhi. (2019). Assistence on the use of sound wave attractor to increase fishermens number of catches Bulak District Surabaya. *International Journal of Advanced Research*, *7*(8), 324-327. http://dx.doi.org/10.21474/IJAR01/9507

Rosana, N., Suryadhi, & Rifandi, S (2018). Trial test of fish attractor "Piknet" device in saltwater fish tank. *MATEC Web of Conferences*, *177*, Article 01021. https://doi.org/10.1051/matecconf/201817701021

Schiffman, L. G., Kanuk, L. L., & Wisenblit, J. (2010). *Consumer Behavior* (10th Ed.). Pearson College Div.

Septiani, T., & Esfandari, D. A. (2018). Difusi inovasi sistem teknologi inovasi tata niaga perikanan PT Aruna Jaya Nuswantara di Desa Tanjung Baru, Kalimantan Timur [Diffusion of technology innovation

system for fishery trading system innovation of PT Aruna Jaya Nuswantara in Tanjung Baru Village, East Kalimantan]. *Prosiding Konferensi Nasional Komunikasi*, *2*(1), 696-707.

Sholihin, M., & Ratmono, D. (2013). *Analisa SEM-PLS dengan Warppls 3.0 untuk hubungan nonlinear dalam penelitan sosial dan bisnis* [SEM-PLS analysis with Warppls 3.0 for nonlinear relationships in social and business research]. Penerbit Andi.

Tjiptono, F., & Chandra, G. (2012). *Pemasaran global: Konteks offline dan online* [Global marketing: Offline and online context]. STIM YKPN.

Warnaen, A., & Cangara, H. (2013). Faktor-faktor yang menghambat inovasi pada komunitas petani dan nelayan dalam meningkatkan kesejahteraan masyarakat di Kabupaten Takalar [Factors that hinder innovation in farming and fishing communities in improving people's welfare in Takalar Regency]. *KAREBA: Jurnal Ilmu Komunikasi*, *2*(3), 241-250.