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Acceptability of Medical Device Maintenance Management in Hospital Service Industry Based on the Diffusion of Innovation Theory

Muhammad Ramli [1*]; Bambang Jati Sentot [2]; Tine Yuliantini [3]; Hasyim Hasyim [4]

[1] **m.ramli@civitas.unas.ac.id, Universitas National, Jakarta, Indonesia**
[2] **bambangjatisentot2019@gmail.com, Universitas Mercu Buana, Jakarta, Indonesia**
[3] **tine.yuliantini@mercubuana.ac.id, Universitas Mercu Buana, Jakarta, Indonesia**
[4] **hasyim.ahmad@esaunggul.ac.id, Universitas Esa Unggul, Jakarta, Indonesia**

(*) Corresponden Author

ABSTRACT

Objectives*: The objectives of this study to determine the level of acceptance of health service managers of the WHO 2011 Programe maintenance system innovation.The level of adoption was studied by measuring the influence of innovation attributes and knowledge as moderators on the application of WHO 2011 Programe maintenance.Research is a Quantitative research with survey methods and causality techniques.Research from August - October 2019 with a research population of hospital service industries that have been accredited with KARS Plenary Accreditation with SNARS Standard 1 (2018).*
Methodology*: The sample was taken with saturated sample technique. The sample is an individual who represents IPSRS Management, Electromedical Technicians and Medical Equipment Users.Innovation Attributes, Knowledge as a moderator and the level of Adoption are the Variables in the study.The research instrument uses a Likert scale.Validity test, Reliability test, Moderated Regression Analysis (MRA) test and Three box method are used in the study.All Variables are Reliable, Valid and there is no Multicollinierity between variables and all hypotheses are accepted.*
Finding*: The WHO 2011 Programe maintenance aims to ensure better access, quality, and use of medical products and technology. The WHO 2011 Programe Maintenance Innovation Adoption Process by maximizing the functions of financial management, personnel management, operational management, performance monitoring and performance improvement is needed to form a good and measurable medical equipment maintenance system.*
Conclusion*: There are differences in research results between previous research conducted by Everet Rogers, Bass and Mahajan et all with the results of the author's research. Knowledge Management is needed in accelerating the system adoption process in order to improve the effectiveness and achievement of medical equipment quality.*

Keywords*: Innovation Attributes; Knowledge; Adoption Rate*

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INTRODUCTION

The effectiveness and quality of the use of medical equipment is supported by the proper maintenance of medical equipment.(World Health Organization, 2011)The success rate of the medical equipment maintenance system is influenced by user knowledge when adopting and innovating a scalable and planned maintenance system. Equipment categories with high Saverity index values demand high maintenance costs.(Wu, 2017)The large maintenance budget, equipment damage during use and the limited number of electromedical engineering human resources are the main problems in maintaining medical equipment (Sodikin, 2006). Some biomedical applications can help avoid medical device failure, Collection and analysis of performance test results can help prevent major problems and expansion of analysis (Sezdi, 2013).(Sezdi, 2013)Risk management of medical devices helps make decisions, prioritize actions and create alternative actions.(Am *et al*, 2009)Maintenance based on risk can be used to determine how much loss if the equipment is not functioning(Syamsuddin *et al* ,2018).

Research on medical equipment maintenance always shows a gap between research results and applications.(Wu, 2017)The maintenance program with priority scale is determined by the application of equipment function, location, frequency of use, classification of high, medium and low risk categories. Equipment that has been overloaded, or mishandled will inevitably give questionable results / outside the specified prerequisites.(TAF, 2017)Budgeting constraints, poor leadership management and governance are the causes of poor maintenance and availability of medical equipment.(Access, 2017)Poor medical equipment maintenance management leads to an increase in the failure rate (Khan and Haddara, 2003). (Khan and Haddara, 2003)Medical equipment management if implemented correctly will reduce the maintenance costs by about 20-30%, reduce investment through planning by 10-20%, reduce development time for acquisition specifications (2-4 weeks), introduction of appropriate technology by 10-90%, user training, reduce maintenance by 10% (Judd, 2004).

Data from the Indonesian Ministry of Health in April 2018 Hospitals in Indonesia amounted to 2,773 hospitals consisting of public hospitals and private hospitals. The growth in the number of hospitals in Indonesia from 2012 to April 2018 was 0.4% for public hospitals and 15.3% for private hospitals. (Public, 2018)Hospitals in Indonesia are divided into 5 regions. DKI Jakarta, West Java, Central Java, Yogyakarta Special Region, East Java and Banten are included in regional 1 (1,444 hospitals). West Sumatra, Riau, South Sumatra, Lampung, Bali and West Nusa Tenggara are included in regional 2 (391 hospitals). NAD, North Sumatra, Jambi, Bengkulu, Babel, Riau Islands, West Kalimantan, North Sulawesi, Southeast Sulawesi, Gorontalo are included in regional 3 (694 hospitals).Central Kalimantan, South Kalimantan, East Kalimantan and North Kalimantan are included in regional 4 (128 hospitals).NTT, Maluku, North Maluku, Papua and West Papua are included in regional 5 (160 hospitals).The highest growth in the number of hospitals is in region 1 (East Java and West Java provinces) with a growth of around 7% - 8%. further research was conducted on class B hospitals that have been fully accredited with SNARS 2018 standards (edition 1).

The Hospital Accreditation Committee in July 2019 has released data on hospitals that have been fully accredited using the 2018 edition of the SNARS Accreditation standard 1 as many as 339 class A, B, C and D hospitals

The Hospital Accreditation Committee requires the maintenance of medical equipment to be included in one of the assessments, precisely in the Facility Management and Safety (MFK) section with a fulfillment value of ≥ 80 for the Plenary accreditation level. (KARS, 2017)The fulfillment of the requirements to pass accreditation refers to standard MFK 8, the

hospital is obliged to plan and implement a program for inspection, testing, and maintenance of medical equipment and document the results. Electromedical Technicians are responsible for the management of medical equipment including management and technical aspects. Management aspects include planning, procurement, installation, testing and acceptance. While technical aspects are advanced activities from management aspects including operation, training, maintenance including calibration and removal.(Saguni n.d., 2018)This condition forces the Hospital to have a planned and measurable maintenance system. The hospital must develop a facility and environmental risk management program that covers six areas including **Medical** Equipment (KARS, 2017). (KARS, 2017)This includes equipment selected, maintained, and used in such a way as to reduce risk.

One of WHO's strategic goals in medical care is to "*ensure better access, quality and use of equipment (medical products and technologies)" (World Health Organization, 2011).*(World Health Organization, 2011). *WHO 2011 Programe Maintenance* is a system developed by *WHO* as a form of concern for the maintenance of medical equipment in a professional manner. There are 5 important things in *WHO* 2011 *Programe Maintenance*, namely (1) Financial management, (2) Personnel management, (3) Operational management, (4) Performance monitoring, (5) Performance improvement.

The WHO 2011 Programe Maintenance Innovation Adoption Process is needed to establish a good and measurable medical equipment maintenance system. Innovation is not just something new, but something that can encourage renewal in society or in certain localities (Gwin, 1982). Rogers (1995: 262) and Anurag Pant *et al* (2011: 443) equally divide the recipients of *innovation* (*adopter innovation*) in 5 (five) categories

Knowledge is a moderator of innovation attributes on the level of adoption. Innovations are new ideas, new practices, or objects that can be perceived as something new by individuals or extension societies (Roger and Shomaker, 1971).

The purpose of the study was to determine the level of acceptance of health service managers towards the adoption of WHO 2011 *Programe maintenance* system innovations. This research is important to do in health service managers because it relates to the level of patient safety. The level of acceptance of innovation is obtained by observing the effect of innovation attributes on the level of user innovation adoption of the WHO 2011 *Programe maintenance-based* medical equipment maintenance system moderated by system user knowledge.

LITERATURE REVIEW

The concept of innovation diffusion is a theory related to how to measure the level of acceptance of a person or group of people towards new things. The acceptance of something new (innovation) is related to the results of a person's evaluation of the benefits or risks that the new thing will cause, the more categorized as something that can provide benefits or provide smaller risks, the faster the innovation is accepted by the community, and vice versa.

There are two things that cause this difference, first is that every new thing has an element of *uncertainty*, because of people's ignorance (*unfamiliarity*), secondly, due to this uncertainty, it will lead to certain risks that can be caused by the new thing. A person's instinct when facing something new is an attitude of assessment, this assessment lasts a long time and some lasts quickly depending on the characteristics of the individual recipient.

In addition to the evaluation results, the level of acceptance of a person or group towards innovation is also related to the nature or characteristics of the person or community. Some community groups can quickly adapt and accept an innovation, but there are also groups of

people who take a long time to accept the innovation. The difference in acceptance time creates a group of innovation recipients in society, where in Rogers' theory (1995: 262) divides *innovation* recipients (*innovation adopters*) into 5 (five) categories as follows: (1)*Innovators (*2.5%), (2)*Early adopters* (13.5%), (3)*Early majority (*34%), (4)*Late majority* (34%), and (5)*Laggards (*16%).

The percentage of category division is based on two things, namely the condition of the community and the characteristics of the object introduced to the community. The division above is not a final one because it is very dependent on the condition of the community where the innovation is introduced and the factors that influence it, however, in general, there are groups of people who quickly accept an innovation and there are also groups of people who have to delay for a certain time before making a decision whether to accept or not.

Differences in community conditions will provide differences in the pattern of acceptance of an innovation, people who belong to an open group generally immediately react to everything that is introduced to them, on the other hand there are also more closed community groups that do not immediately respond to something that is considered to change the pattern of behavior that has been going on for generations.Departing from the above assumptions, the results of Rogers' research (1995) concluded that the distribution of innovation recipients can be seen in Figure 1. The vertical side is the accumulated frequency of recipients of the innovation. The magnitude of each group is calculated from the number of community groups with a certain period of time receiving the innovation by calculating the average and standard deviation.

Mahajan *et al* (1990:37) further elaborate on the above categories in a statistical breakdown that calculates the *mean* and standard (table.1).

The first group is called *Innovators, which are* those who first receive an innovation. They have broad capabilities about something new which makes it easier for them to accept it.

Figure 1. Adopter Categorization on the Basis of Innovativeness

Source: Everet Rogers (1995:262)" Diffusion of Innovation", The Free Press.,4th , edition

Adopter Category	*% adopters*	*Area covered under normal curve*
Innovators	2.5	Beyond $t - 2\sigma$
Early Adopters	13.5	Beyond $t - 2 - \sigma$and $t- 2\sigma$
Early Majority	34.0	Beyond t and $t - \sigma$
Late Majority	34.0	Beyond $t - t + \sigma$
Laggards	16.0	Beyond $t - \sigma$

Source: Mahajan et al (1990)

This group plays an important role in receiving and spreading innovations to other community groups. The number of this group is very small, only around 2.5% of the overall community group.

This group is the first to bear the risk if the adopted innovation has a negative impact, on the other hand, if the innovation has a positive influence or advantage, the innovator group is the first to feel the benefits. The innovator group is also called the *risk taker* group, which is a group of people who dare to bear the consequences of any changes.

This group is a pioneer group in society to accept an innovation, this is because the characteristics of this group are that they tend to conduct a more in-depth evaluation before accepting or rejecting an innovation, so that the *early adopters* group becomes a reference or agent of change in society as stated by Bennet (2004) that *Early adopters* act as agents of change in accepting a diffusion of innovation, this is because this group provides information to the community on the advantages and disadvantages of an innovation.

The third group is the *Early-majority*. This group is the largest group in terms of percentage, the characteristic of this group is that they tend to accept an innovation after all groups in society accept it. In addition to making considerations, this group also tends to refer to people who are considered influential as a *group reference.* If the reference group accepts the innovation, then this group also adopts the innovation, so it is often late to benefit from an innovation.

The *late majority* group is also a large group in society, the difference with the *early majority* group is that organizations in the *late-majority category* adopt innovations after the average organization in an industry accepts innovations. Acceptance in this group tends to be reactive rather than proactive, thus this group is the last group to accept an innovation.

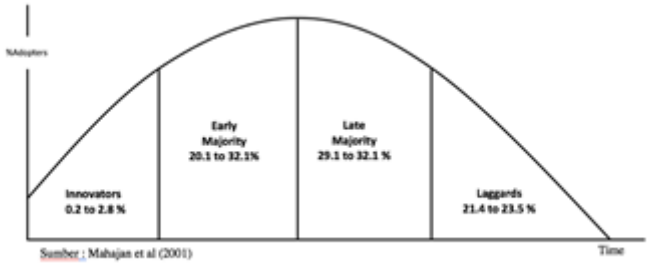
Laggards are a group separated from the rest of society, characterized by their tendency to reject the opinions of other groups. They are very dependent on what they have done in the past. So that the acceptance of innovations from this group usually takes a very long time compared to other community groups. They tend to avoid failure or risk in doing something when using something new or commonly called a *risk averter*.

In line with the division of adopter categories as proposed by Rogers (1995), Anurag Pant *et al* (2011: 443) divides the *adopter category* with different terms into 5 (five) categories as follows: (1) *Technology enthusiasts*, (2) *Visionaries*, (3) *Pragmatists, (*4) *Conservatives*, (5) *Skeptics.*

The distribution of innovation recipients described by Rogers (1995) in a normal distribution, in reality the distribution of innovation recipients is not always normally distributed because it depends on the characteristics of the recipient of the innovation and the type of innovation introduced and how it is communicated.

Richardson's (2009:161) research in Cambodia shows a different percentage of categories than Rogers' findings. Similarly, the results of Mahajan *et al* (1990:682-683) who tested Bass' theory showed graphs that had *skewness* and percentages per recipient category that differed from Rogers' (1995) findings.

Figure 2. The Bass Adopter Categories (1969)

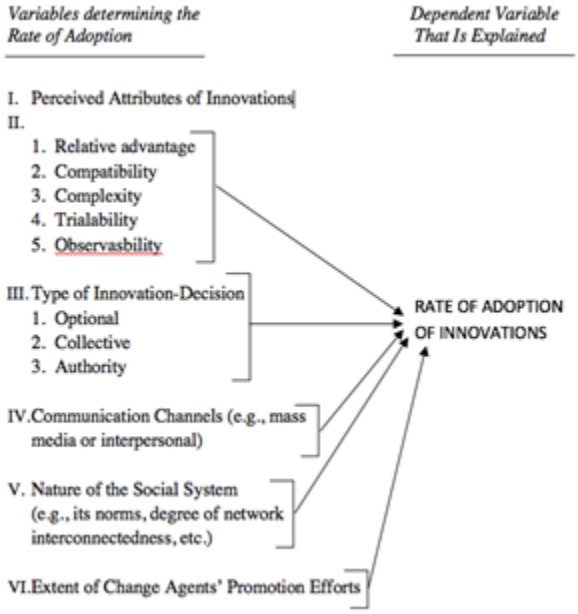


From the figure above, it can be seen that the percentage of each category depends on the response of the community to the innovation communicated to them as well as several other influencing factors. Bass (1969) categorized the recipients of innovations into 4 (four) parts in contrast to Rogers (1975) even though Bass' findings are basically the same as those of Rogers (1975).Furthermore, from the above review, the categories of recipients of innovations (*Innovators*, *Early adopters*, *Early majority*, *Late majority* and *Laggards*) are the dependent variables measured in this study.

Innovation Attributes

Innovation is a new idea, practice, or object that can be perceived as new by individuals or society (Roger and Shomaker, 1971). Innovation is not just something new, but something that can encourage renewal in society or in a particular locality (Gwin, 1982).

Factors that influence the acceptance of innovation according to Rogerrs in the journal *Implementation Success of Internet-based Electronic Commerce for Small- and Medium-sized Enterprises in Australia Sandy Chong, Graham* Pervan (Chong *et al*, 2001) (1) The *perceived of innovations (*2) The *type of innovation decision* to accept or not the innovation, (3) The channels used to communicate the innovation (*communication channels*), (4) The *nature of* the social system that will receive the innovation and (5) The group that will communicate the innovation (*Extent of change agents' promotion efforts).*These five things according to Roger are considered as independent variables that will affect the level of acceptance of innovation, as the dependent variable.



Source: Diffusion of Innovations, Fourth Edition, Everett M. Rogers, 1995

Factors affecting innovation acceptance

Relative Advantages show the extent to which the WHO 2011 *Programe Maintenance-based* maintenance system is considered favorable to adopters *(notion of usefulness).*(Davis and Venkatesh, ,1996) and the second influencing factor is *ease of use (Davis and Venkatesh, 1996).*(Davis, 1989) adopters consider that this innovation is easier than the old system. The third influencing factor is the characteristics of the innovation consisting of *Compability* (the extent to which the new system is considered suitable and consistent with the values, beliefs in meeting maintenance needs), image, *result demonstrability, visibility and triability.*Image is the same as *Relative Advantages*, the extent to which *adopters* (users) feel the *WHO 2011 Programe Maintenance-based* maintenance system has more value, *demonstrability* is the result of tangible innovations and visibility shows the extent to which users that this system reflects a vision of the future, and finally *triability* is a measure of where a potential *adopter* views this new innovation as an opportunity for them to experiment with new technology. (Chong *et al*, 2001)

According to Roger (1995: 36) time is the main thing in the diffusion process, where the time is divided into three phases, namely: (1) *the innovation-decision process;* namely a mental process where an *innovation is* first introduced until the acceptance or rejection of the innovation, (2) *innovativeness;* is the position of a person or group of people in terms of the *relative speed* of accepting an *innovation* compared to other members of society (*social system*) *(*3) *an innovation's rate of* adoption;

Furthermore, Rogers (1995: 162) divides the innovation process into 5 (five) stages, namely: (1) Initial understanding of the *innovation (first knowledge of an innovation (*2) *Forming an attitude toward the innovation*, (3) Forming a decision whether *to* accept or reject the innovation (*Adecision to adopt or reject, (*4) *Implementation* of the *new idea innovation*, (5) Adjustment to the decision to accept the innovation (*Confirmation of the adoption* decision).

The five processes mentioned above are sequential from the first process to the final process, in other words, the next process is a continuation of the previous process. The initial

process is the process of recognizing an innovation, if this process is passed then the next process is the formation of attitudes towards the innovation, positive attitudes tend to adopt innovations while negative attitudes tend to reject or a *priori* towards an innovation. After the attitude formation process, the next process is to determine whether to accept or reject the innovation.

The acceptance of innovation will continue to the implementation process which is then followed by adjustment actions to the innovation. The *adopter of innovation* provides an assessment of the characteristics of an attribute to accept or reject, this is because the characteristics or attributes of the innovation are perceived by the recipient of the innovation, whether they provide benefits or even pose a risk.

Community groups or individuals assess an innovator based on 5 (five) indicators, namely: (1) Relative advantages is a situation where an innovation is perceived to provide benefits if implemented. The benefits can be measured in economic *terms*, social *prestige*, *convenience*, *and* satisfaction. This means that the greater the advantages of an innovation perceived by the community, the faster the acceptance rate will be, *and* vice versa.(2) *Compatibility:* The innovation attribute related to the environment is *Compatibility*, which is a level at which an innovation is perceived as *being consistent* with the *existing* values, *past experiences, and needs*. An idea that is suitable or compatible with societal values and norms will be accepted more quickly and vice versa, an idea or product that is considered less suitable for the environment is usually slow to be accepted. (3) *Complexity* is the public's perception of the level of difficulty of an idea or innovation. According to Davis' theory (1989) *Perceived* usefulness (PEoU) refers to the amount of effort a person puts into the level of ease of using technology in other words how much effort a person puts into understanding an innovation *(the degree to which a person believes that using a particular system would be free of effort)* while *Perceived of Usefulness (*PU) is how much benefit a person can get from using a technology or how much the technology can help get their job done. (4) *Triability* is the degree to which an innovation can be tested in a limited way. New ideas that can be tested will gain general acceptance faster than ideas that cannot be tested. If a new idea cannot be tested then it will be accepted more slowly. (5)*Observability* is the degree to which an innovation can be seen, the easier it is for someone to see the results the faster the innovation will be accepted.

Knowledge as a Moderator

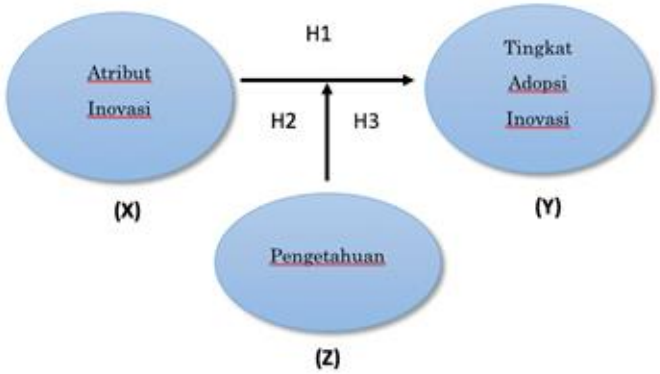
Moderator variables are variables that can strengthen or weaken the relationship between the Independent Variable and the dependent. Moderator variables are also referred to as the second independent variable. In this study, knowledge acts as a moderator variable on innovation attributes in influencing the level of adoption of the *WHO 2011 Programe maintenance system.* Electromedical Technician Knowledge of the *WHO 2011-based* medical equipment maintenance system maintenance *program* is a type of empirical knowledge or a posteriori knowledge, where knowledge prioritizes empirical and rational observations and experiences.Empirical knowledge can be developed into descriptive knowledge where if someone describes or describes with various explanations regarding all the characteristics, characteristics and effects contained in the empirical object.Knowledge is strongly influenced by education, media and information.Knowledge has a gradual level including Know *(know)*, understand *(Comprehension)*, application (*Aplication)*, analysis (Analysis) and Evaluation (*Evaluation).*The system can work well and create value when a company is able to exploit the resources and internal knowledge capabilities of human resources on a system.(Daud, Fadzilah,

and Yusoff, 2010).Experience is directly proportional to knowledge of the activities of implementing a system, especially very influential in solving a problem.(Musen, 1992)(Szulanski, 1996).For example, knowledge transfer through a unit, group or department (Argote and Ingram, 2000), knowledge transfer goes further when a contributor shares the knowledge and is used by the adopter (Darr and Kurtzberg, 2000), motivational factors affect knowledge transfer (Ko et al, 2005).(Ko *et al*, 2005)The factors of education level and low credibility/competence can hinder communication and learning (Bashien and Markus, 1997), low communication skills affect the level of knowledge absorption of a system (Scott and Vessey, 2002), ultimately mutual understanding removes barriers, allows both parties to minimize differences of opinion and increases the ability to apply a system.

Relationship between variables and hypothesis development

The relationship between variables in this study can be described as follows:

Figure 4. Research Model



Source: Data processed by researchers

METHOD

The research is a Quantitative research with survey method and causality technique. The research started from August - October 2023 with the research population of Class B Hospitals located in DKI Jakarta Province which have been accredited by KARS Plenary Accreditation with SNARS 1 Standard.

The sample was taken with saturated sample technique. The sample is an individual who represents IPSRS Management, Electromedical Technicians and Medical Equipment Users with a total sample of 60 people.Innovation Attributes, Knowledge as a moderator and the level of Adoption are variables in the study.The research instrument uses a Likert scale.Validity test, Reliability test, Moderated Regression Analysis (MRA) test and *Three box method* are used in the study.

RESULTS AND DISCUSSION

Results

Distribution of Respondent characteristics

Table 2. Distribution of Respondent Characteristics

Item	Percentage	Frequency
Gender		
Male	83.33%	50
Female	16.67%	10
Length of service (Years)		
1-5 years	65.00%	39
5-10 years	28.33%	17
10-15 years	5.00%	3
15-20 years	2.00%	1
30 years -	-	-
Education		
D3	55.00%	33
S1	41.67%	25
S2	3.33%	2
Position		
Management	33.33%	20
Technician	33.33%	20
User	33.33%	20

Source: data processed by researchers

Validity Test

The provisions of instrument validation are measured based on validity criteria which state that if $r_{count} \geq r_{tabel}$ then the instrument is declared valid, but if $r_{count} < r_{tabel}$ then the instrument is declared invalid. It is known that r_{tabel} uses a significant level $\alpha = 0.05$ with $n = 30$, then the value of r_{tabel} is 0.349. There are 2 invalid statements in the validity test of innovation attributes and 1 invalid statement in the validity test of the adoption level.

Table 3. Validity Test of X,Y,Z Variables

Validity Test					
Question	**Innovation Attributes**	**Question**	**Knowledge**	**Question**	**Adoption Rate**
X1.1 to X1.12	Valid	Z2.24 to Z2.29	Valid	Y1.30 to Y1.33	Valid
X1.13	**Invalid**			Y2.34	Valid
X114 to X1.15	Valid			Y2.35	**Invalid**
X1.16	**Invalid**			Y3.36 to Y3.37	Valid
X1.16 to X1-23	Valid			Y4.38 to Y4.39	Valid
				Y5.40 to Y5.41	Valid

Source: data processed by researchers.

Reliability test

Table 4. Reliability Test

Variables	Item Reliability	Alpha	Description
Innovation Attributes	23	0,750	Reliable
Knowledge	6	0,757	Reliable
Adoption Rate	12	0,692	Reliable

Source: data processed by researchers

Based on the reliability test results, it shows that all variables have a *Cronbach's Alpha* value> 0.6. This means that all variable indicators in this study are reliable

Hypothesis Test

Descriptive Analysis Test (*Three Box Method)*

Variable Description is used to determine the respondent's answer to the variables of *innovation attributes*, *knowledge* and *adoption level*.This analysis uses index analysis. To get the tendency of respondents' answers to each variable. The score range is based on the *Three box Method* calculation (Ferdinand, 2006).
Upper limit of range: (%F*5)/5=(60*5)/5 = 60
Lower limit of range: (%F*1)/5=(60*1)/5= 12
The resulting index number shows a score of 12 - 60, with a range of 48 if using the Three box Method the range is divided by 3, resulting in a range for each section of 16.

Table 5. Interpretation of the index

High	Medium	Low
44,1 - 60	28,1 - 44	12 - 28

Source: data processed by researchers

Variable Description of Innovation Attributes (X)

The higher the value of the innovation attribute, it is estimated that the higher the system is accepted, and if the level of adoption of a system has reached a saturation point, automatically if there is no more system renewal or in other words all have been adopted, the value of the Innovation Attribute process itself will decrease.

Table 6. Distribution based on Innovation Attribute Variables (X)

No.	Innovation Attribute Component	Score	Category
1	Relative Advantages	48.68	High
2	Compability	47.55	High
3	Complexcity	45.88	High
4	Triability	48.2	High
5	Observabiity	45.1	High

Source: data processed by researchers

Description of Knowledge Variable as Moderator (Z)

Table 7. Distribution based on Knowledge Variable as Moderator (Z)

No.	Knowledge Component	Score	Category
1	Motivation	57.6	High
2	Competence	57	High
3	Communication	59.3	High

Source: data processed by researchers

When observed, the knowledge variable as a moderator gets a high average score index, so it can be concluded that the role of Knowledge Management is very influential.

Variable Description of Adoption Level as the dependent Variable (Y)

Table 8. Distribution based on adoption rate variable (Y)

No.	Adoption Rate Component	Score (%)
1	Innovator	28.21
2	Early Adopter	17.97
3	Early Majority	26.70
4	Late Majority	26.67
5	Langgard	0.45

Source: data processed by researchers

When observed Innovator in this study Innovator has the highest score and the system can be said to experience absolutely no rejection from all users.

Hypothesis Test Analysis

Table 9. Hypothesis Test of each Variable with MRA

Variables	*P*	VIF	Tlr	Description
Innovation and Knowledge attributes simultaneously influence the adoption rate of *WHO 2011 Program Maintenance.*	0.000	2.693	0.371	H1: Accepted
Innovation attributes affecting adoption rate *WHO 2011 Programe Maintenance*	0.000	-	-	H2: Accepted
Knowledge moderates the influence of innovation attributes on the level of adoption.	0.000	2.693	0.371	H3: Accepted

Source: data processed by researchers

Hypothesis testing is carried out to determine whether or not the independent and moderator variables have an effect on the dependent variable. The hypothesis is declared accepted if the P value is <0.005, the Hypothesis test is significant if P <0.005. The results can be concluded that all variables have a significant effect. The results of the MRA test show that there is no Multicollinearity between variables (VIF = 2.693), Multicollinearity ideally has a VIF of 1 with a maximum limit of Multicollinearity occurring at a value of 10.Tolerance obtained is worth 0.371 (tolerance> 0.1).

Discussion

Hypothesis 1: The results of the calculation description are supported by the results of the distribution of innovation attributes The Average Score Index on Relative Advantages is 48.68 **(High**), this shows that this system has been considered profitable by new users in helping medical equipment maintenance work. The desire to try a system that can be tested (triability) has a high score (48.62), *Compability* Score (47.55) is in the next order, this is very reasonable because when users feel this system has more value and can be tested automatically users will start fusing the system with the existing system as a complement or enhancement.

The process of integrating the old system into the new system will show more about the difficulty (*Complexcity*, score 45.88) or performance of the crossover system.

The last action of the user will perform *obervability*(45,1) on the system resulting from the renewal or combination of the old system with the new system.

The factor that most influences the level of adoption is *Relative Advantages* showing the extent to which the *WHO 2011 Programe Maintenance-based* maintenance system is considered favorable to adopters *(notion of usefulness).*(Davis and Venkatesh, 1996)..(Chong et al, 2001). Antecedents of Knowledge Transfer from Consultants to Clients in Enterprise System Implementations discusses the user's knowledge of something has a gradual level including Know (*know),* understand (*Comprehension),* application *(Aplication),* Analysis (*Analysis)* and *Evaluation (Evaluation)* motivational factors affect knowledge transfer.(Ko, Kirsch, and King, 2005)Motivational factors influence knowledge transfer (Ko, Kirsch, and King, 2005), and extraneous motivators are important in the early stages of implementation (O'Dell and Grayson, 1998). Education level and low credibility/competence factors hinder communication and learning (Bashien and Markus, 1997), low communication skills affect the level of knowledge absorption of a system (Scott and Vessey, 2002), Innovation is a new idea, new practice, or object that can be perceived as something new by individuals or the extension community (Roger and Shomaker, 1971).

The results of the calculation description are supported by the results of the distribution of innovation attributes showing the Knowledge Variable Distribution Score as a Moderator from the highest to the lowest value is (1) Communication (59.3) (2) Motivation (57.6), (3) Competence (57.0).Motivation from users can be formed from good communication between users spontaneously.

So it can be concluded that simultaneously the attributes of innovation and knowledge affect the level of adoption.

The results of the calculation description are supported by the results of the distribution of innovation attributes showing that the new system is accepted among users. *Early adopter* has the lowest average score (31.6), this illustrates that almost all users feel they are not the originator of the use of this system, they are more likely to follow after knowing this system and trying to innovate (average score 49.62) against the new system through assessment with innovation attributes.

Hypothesis 2: The betha value$_0$ on Unstanddardized Coeficients is 3.991, this shows that innovation attributes positively affect the value of the adoption level. The innovation attribute has a betha value on Unstanddardized Coeficients of -0.59, meaning that every time the influence of the Innovation Attribute increases by 1 unit, the Adoption level decreases by 60%, this is because when a system that is a standard guide and does not undergo changes, the system has been totally adopted so that any innovations that recur along with technological developments can cause the new system to decrease its function.

The results of the analysis show the extent to which the maintenance system based on the WHO 2011 *Maintenance Program is* perceived as beneficial to adopters *(notion of usefulness).*Acceptance of innovations will continue to the implementation process which is then followed by perceptions of being beneficial to adopters (*notion of usefulness)*(Davis and Venkatesh 1996)

Hypothesis 3: Moderator variables are variables that can strengthen or weaken the relationship between the Independent Variable and the dependent. Moderator variables are also referred to as the second independent variable. In this study, knowledge acts as a moderator variable on innovation attributes in influencing the level of adoption of the *WHO 2011 Programe* maintenance system.

Knowledge as a moderator positively affects the value of the adoption rate. The innovation attribute has a betha value on Unstandardized Coeficients of 0.116, meaning that every Knowledge as a Moderator increases by 1 unit, the adoption rate will increase by 11.6% with a sign value of 0.000 (P <0.005).The results of the calculation distribution are supported by the results of the distribution of knowledge as a moderator where the communication element (59.3) plays a high role in transferring something new. Where in knowing the existence of something new, a form of communication and motivation is needed, supported by competence in carrying out innovation attributes.

Research Findings

Relative Advantages (48.68) has the highest score of innovation attributes, the system does not experience rejection at all. Innovators according to research by Rogers (1995), Richardson (2009: 161), Mahajan *et al* (1990: 682-683) experienced different levels of acceptance with their research. The difference is due to the situation of the community receiving innovation supported by Knowledge management has experienced pressure to use this system as a mandate from hospital regulations. The motivation of the hospital's Knowledge Management organization strongly supports performance improvement, competitive advantage, leveraging the expertise of medical equipment users, increasing network linkages between internal and external individuals and managing intellectual capital and intellectual

assets in accelerating the system adoption process so that the system can be used by the hospital in order to effectiveness and achievement of medical equipment quality. In its implementation, users began to be influenced by other users in the realization of a system that could be adopted and absorbed in the hospitals of each user

Research Limitation

Knowledge management is something that is very supportive in the level of acceptance of a system. The limitations found in this study are

a. There are still many other variables that are not used in this study
b. There is still limited literature related to this research
c. There are obstacles in data collection, especially the problem of time that respondents have in filling out questionnaires and see more of what has been filled in by their leaders, especially their burden because the hospital is fully accredited.

CONCLUSION

Conclusion

Innovation attributes and knowledge as moderators affect the level of adoption simultaneously, innovation attributes have a negative effect on the level of adoption, knowledge moderates innovation attributes positively on the level of adoption.

Theory Implications

Teamwork in Financial Management, Personnel Management**,** Operational Management, Performance Monitoring and Performance Improvement is expected to support the objectives of the *WHO 2011 Maintenance Program* in obtaining effective medical equipment conditions starting from planning, management and application of health technology.

The level of adoption obtained an average score of (1) *Innovators* (28.2%), (2) *Early adopters* (17.975) (3) *Early majority* (26.7%), (4) *Late majority* (26.67%) and Laggards (0.45%). There is a fairly high difference between the theory issued by Roggers and the results of the research conducted. In the research results, the value of Innovators is quite high, this is possible because of regulations from the government and hospital management that force the use of this system in order to obtain accreditation certificates.

However, innovation is strongly influenced by the knowledge of the user (Chong et al, 2001) with stages including Know, *Comprehension, Application, Analysis and Evaluation*, motivational factors affect knowledge transfer (Ko, Kirsch, and King, 2005).(Ko, Kirsch, and King, 2005)Motivational factors affect knowledge transfer (Ko, Kirsch, and King, 2005), and extraneous motivators are important in the early stages of implementation (O'Dell and Grayson, 1998). Low education level and credibility/competence factors hinder communication and learning (Bashien and Markus, 1997), low communication skills affect the level of knowledge absorption of a system (Scott and Vessey, 2002), Innovation is a new idea, new practice, or object that can be perceived as something new by individuals or the extension community (Roger and Shomaker, 1971).

From the results of the distribution of knowledge as a moderator has a very high dimension of influence with the scores obtained Motivation (59.3), Communication (57.6) and Competence (57.0*).*

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