

# Indonesian Health Insurance: Application Of Digital Mobile Technology

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## Abstract

BPJS Health Insurance is the institution authorized to manage the implementation of the national health insurance program in Indonesia. Since operating in 2014, BPJS Health Insurance is required to continue to develop its programs, in order to provide optimal services for the entire community. Including the demands for the adoption of the latest technology in service operations and technical implementation of service programs. It has been more than 2 years that BPJS Kesehatan has implemented mobile digital services. The goal is to provide convenience and service optimization, considering that almost all people already have mobile phones. However, in practice, services using this technology are still not optimal, especially for the informal community sector. The low use of mobile digital in the informal sector is the basis for the study in this research. In essence, the purposes of using the BPJS health program's mobile digital services are : the ease of paying and changing membership data, the ease of knowing information on family participant data, the ease of knowing information on participant contribution bills, the ease of obtaining information on health facilities and the ease of submitting complaints, and requests for information about the program. This research is directed at measuring the constraints of customer participation in using digital mobile, and measuring customer responses about the effectiveness of this application. The results of this study show that, some of the obstacles that affect the participation target of the National Health Insurance program in BPJS health insurance informal sector workers are : 1). Information on the places where BPJS health insurance participants receive; 2). Socialization of the BPJS Health insurance; 3). Current fees are applied to participants; 4). Health service facilities and infrastructure in the hospital; 5). Availability of Medicines. Factors that causing low JKN application usage are: a). The member has tried the application before, but they don't really understand how to use it; b). Bad signals in some areas, so the JKN mobile services in unaccessible; c). The member only use it for check the participant menu and dues.

## Keywords:

Health\_Insurance, Digital\_Mobile, JKN, BPJS, Indonesia.

## 1. Introduction

National Health Insurance (JKN) which held by BPJS health insurance has been implemented by January 1<sup>st</sup> 2014. JKN was held through Social Healthcare Assurance mechanism (*Mandatory*) by law No. 14 in 2004 about National Social Guarantee Systems. The purpose is to cover all Indonesian people in Assurance Systems, so it can fulfill the primary needs of decent public health (Anonim, 2018). JKN membership which is managed by BPJS consists of 2 types of membership, namely:

a. Contribution Assistance Recipients (PBI) consisting of the poor and needy

b. Not PBI or independent participants consisting of:

- 1) Salaried workers who are usually called formal workers are those who have fixed wages, for example Civil Servants, Indonesian National Army, Police and Employees
- 2) Non-wage earners, commonly referred to as informal workers, are those who do not have a fixed wage or wages that vary, for example being self-employed / owning their own business
- 3) Non-workers: Do not have a job and are from a well-off socio-economic group

In 2019 the government has targeted Universal Health Coverage (UHC). UHC is a health system that ensures that every citizen in the population has fair insurance for quality health services with promotional, preventive, curative and rehabilitative services at affordable costs. This universal coverage contains two core elements, namely access to fair and quality health services for every citizen and protection of financial risks. UHC is a target set out in the road map for the national health insurance program in which all people must be registered as participants in national health insurance and can access health services.

According to BPJS health insurance data ([www.bpjs-kesehatan.go.id](http://www.bpjs-kesehatan.go.id), 2018), the membership target of JKN in 2018 is around 245 million people and the membership target for non-recipient wages is the informal workers is around 58,96 million people must be covered by healthcare assurance. According to Badan Pusat Statistik (BPS) in Bogor for 2018 (BPS, 2018) an informal workers in Bogor reach more than 70% but the membership level of participant still on the low level, it is 30% of Bogor population (Andria and Kusnadi, 2017 ; 2018).

In implementing social security in the health sector, the World Health Organization (WHO) in "Health System Financing: The Path to Universal Coverage" introduces three important dimensions as indicators of UHC achievement, namely:

- a. Receipt of health service benefits for the entire population states that a country is said to be achieved in UHC if more than 80% of the population is covered by health insurance or health insurance.
- b. Equitable and accessible availability of essential services
- c. Health protection coverage ranges from simple services to high-cost services which include promotive, preventive, curative and rehabilitative services (Thabrany, 2014).

Table 1. JKN's Membership Target per-Year and Its Realization

Year	Maps of JKN's Target	Realization	Presentate (%)
2015	155,450,000	156,790,287	100
2016	189,300,000	171,939,254	90.8
2017	223,150,000	184,486,348	82.6
2018	254,000,000	207,009,000	80.5

Source : BPJS Health Insurance, 2018

The Indonesian government always strives to improve the quality of public health with social security. Social security is a form of social protection that is administered by the government to guarantee citizens or society to fulfill their basic decent life needs. BPJS health insurance is committed to providing the best services for the community both in terms of health services and providing information well as recruiting qualified health personnel (Sirait et al., 2020).

BPJS health insurance is not left behind to continue to adapt to existing technological developments. This can be seen through the breakthroughs made by BPJS health insurance. One of them is the presence of the JKN mobile application as an effort to improve services to participants of the National Health Insurance-Indonesian Health Card (JKN-KIS).

JKN application is a transformation of BPJS health insurance administrative digital model business that turns into an application that can be used everywhere and everytime. This digital mobile (JKN mobile) application has been implemented for more than two years, but it doesn't work yet. The use of the JKN mobile application can provide several conveniences for the public and participants, namely the ease of paying and changing membership data, the ease of knowing information on family participant data, the ease of knowing information on participant contribution

bills, the ease of obtaining information on health facilities and the ease of submitting complaints, and requests for information about JKN-KIS.

Check out this data of using this mobile application in Bogor District.

Tabel 2. Amount of JKN Mobile Application Users.

No	Description	Total
1	Population of BPJS Medical Healthcare Members	519,073
2	JKN Mobile Application Users	2,974

Source: BPJS Health Insurance of Bogor District, 2018 (Ferdiana, 2018)

Table 2. shows that BPJS member doesn't really need using JKN mobile application (0.57% from BPJS health insurance member). This research focus on measuring target of participant constraints, also the effectiveness of JKN mobile application target.

## 2. Literature Review

According to JKN RI Team (2014), The principles that must be considered in the application of the National Health Insurance program are as follows:

- a. The principle of mutual cooperation; meaning that participants are able to help participants who are less fortunate and participants who are healthy help participants who are sick. This is because membership is mandatory for all residents without exception.
- b. Principles of Non-Profit; meaning that the management of BPJS funds is non-profit, not for profit.
- c. Principles of openness, prudence, accountability, efficiency and effectiveness.
- d. Principle of Portability; intended to provide continuous assurance to participants even if they change jobs or live in the territory of the Republic of Indonesia.
- e. The participation principle is mandatory; meaning that it is mandatory for all Indonesian people to become JKN-BPJS participants.
- f. The principle of trust funds; means that the funds collected are in the form of deposits to the organizing agency which is managed properly.
- g. Principles of results of social security management.

In order to achieve better and comprehensive health insurance, the Indonesian government enacted Law no. 40 of 2004 concerning SJSN (National Social Security System) which has now changed its name to National Health Insurance. Health insurance is a priority that will be developed to achieve UHC. The National Health Insurance Program (JKN) is part of the National Social Security System (SJSN) which is implemented using a social health insurance mechanism which is compulsory for all Indonesian people, as well as for foreign nationals who work for at least 6 months in Indonesia whose regulations are based on law. Law No.40 of 2004 concerning SJSN with the aim of meeting the basic needs of proper public health which is given to everyone who has paid dues or whose contributions have been paid by the government (Kemenkes RI, 2014).

Rothenberg et al., (2016) proposed a theory about the creation of an informal sector society in Indonesia, as well as identifying its characteristics in the face of global economic competition. The data used comes from a national survey covering micro, small and medium enterprises (MSME's). There is little evidence to support the theory that high registration fees are a major barrier for firms leaving the informal sector. Informal enterprises in Indonesia tend to differ from formal firms in the way they operate, their size, employee wages, low labor productivity, and limited market reach. This characteristic is inconsistent with the idea "Registration fees prevent informal firms from formalizing their business". Descriptive analysis methods and qualitative surveys make research results more optimal through a comprehensive study.

Testing of the impact of health insurance has been carried out by Rolindrawan et al., (2015). The analytical method used is descriptive analysis and inferential methods through examination of the distribution of BPJS health insurance for poor and near poor PBIs in Indonesia. The main results indicate a tendency for PBI to be poor and near poor in the use of public and private health facilities for outpatient and inpatient care. However, there are indications of leaks in this scheme, so the government and BPJS need a tighter control mechanism. The implementation of PBI BPJS health insurance in the first year succeeded in getting the poor and near-poor to choose outpatient facilities in private hospitals / doctors / clinics compared to other facilities. These results indicate the reverse in the implementation of Jamkesmas. The uninsured population has a higher tendency to choose private health facilities

than those covered by Jamkesmas. The tendency to use private hospitals for inpatient care from other facilities for the population covered by the PBI BPJS health is greater than the uninsured population. The BPJS health insurance program has been able to increase the tendency for the elderly to choose inpatient facilities at private hospitals compared to other facilities.

Social constraints faced in the implementation of employment social security for informal workers include indown factors (low levels of education, access to information and economy) as well as external factors that include the handling of birkorat parties. The expansion of social security membership for informal workers can be encouraged through reforming the bureaucracy and fostering micro and small enterprises. Improving the education and information sector through the sub-district or village office (considered to be easier to reach the community) is the main reinforcing factor in achieving the target (Triyono, 2013).

At present risks and uncertainties occur in protecting health for the community. This requires a national health insurance program that can guarantee health care costs. One of the program participants is a resident who works in the informal sector. This group is vulnerable as well as the potential for the implementation of health insurance programs. However, the level of participation of informal sector workers is still low, so an analysis of the constraints affecting it is needed (Salmah, et.al., .2019).

The second research conducted by Marlinah (2018) entitled "The Role of E-Health as Health Service Reform in Efforts to Improve the Quality of Indonesian Public Health". E-health is an internet-based application or information system and technology related to the health care industry which aims to improve services through fast internet access, efficiency and effectiveness both in terms of time and cost, as well as the integration of the quality of business and medical processes. . The concept offered by e-health includes products, systems and services in health information. E-health is a field that emerges as an interaction between medical informatics, public health data and health business information referring to health services and information conveyed via the internet and related technologies. The role of e-health is expected to improve the quality of life of the people and will increase economic growth in Indonesia. E-health has been implemented in Indonesia in collaboration with several parties. The development of e-health has not been able to match progress in developed countries.

According to Ferdiana (2018) that "to use the Mobile JKN application, the conditions are very easy, just download the application through the Google Play Store and Apple Store". This application is recommended for smartphones using the Android system version 4.0 and above and the iOS 10 system. After the application is installed, participants must register on the menu available in the Mobile JKN application.

In Muharam, et. al. (2020), research study highlighted that there is a positive relationship between process innovation, market innovation and financial performance of firms. While, results indicated that disruptive technology moderate the relationship of process innovation with financial performance, but it has no moderating role on the relationship of market innovation with financial performance. The results of this study contribute to the body of knowledge by adding to the existing literatures in the domain of innovation capabilities and financial performance. Moreover, the findings of the study have shown that innovation capabilities are capable of influencing the performance of firms. This condition is also strengthened by the results of research (Andria, et. al, 2020).

### **3. Methodology**

Sampling was done by means of multi-stage sampling. The initial stage, the sample was taken by the area sampling method (sample area) in order to determine the areas that became the object of research. After the area representation of each region was determined, respondents were selected in each area to go through purposive sampling. This method is carried out by taking people selected by the researcher according to special considerations or characteristics possessed by the sample (Husein 2013; Sirait et al., 2020). Based on the purposive sampling method, the following criteria were obtained for respondents:

- a. Small Traders (including hawkers / street vendors, street vendors, hand-carrying herbalists, groceries / market traders, mobile food vendors, roadside cigarette sellers and others).
- b. Service sellers, (tailors, scavengers, motorcycle taxi drivers, pedicab drivers, parking attendants, tire repairmen, massage / massage workers, garbage collectors and others).
- c. Farm Workers, Livestock Workers, and others.

To find out the constraints, the Data Mining analysis method with the C.45 Algorithm can be used through the formation of a decision tree (Elisa, 2017). Data in a decision tree is usually expressed in tabular form with attributes. Attribute states a parameter that is made as a criterion for tree formation. As shown below.

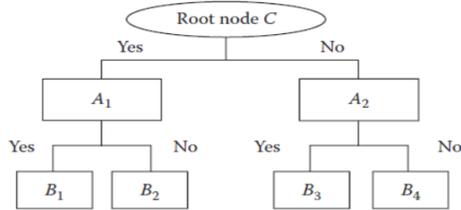


Figure 1. Example of Decision Tree Structure  
 Source: Dua and Xian, 2016

Furthermore, a descriptive analysis of each item of the questionnaire was carried out, in order to obtain frequency data in the form of ideal scores and acquisition scores for each question.

$$\text{Effectiveness} = \frac{\text{score obtained}}{\text{ideal score}} \times 100\%$$

The results of the effectiveness value are then interpreted using the success rate table according to Utami and Samopa (2013). The complete framework of this research is shown in the following figure:

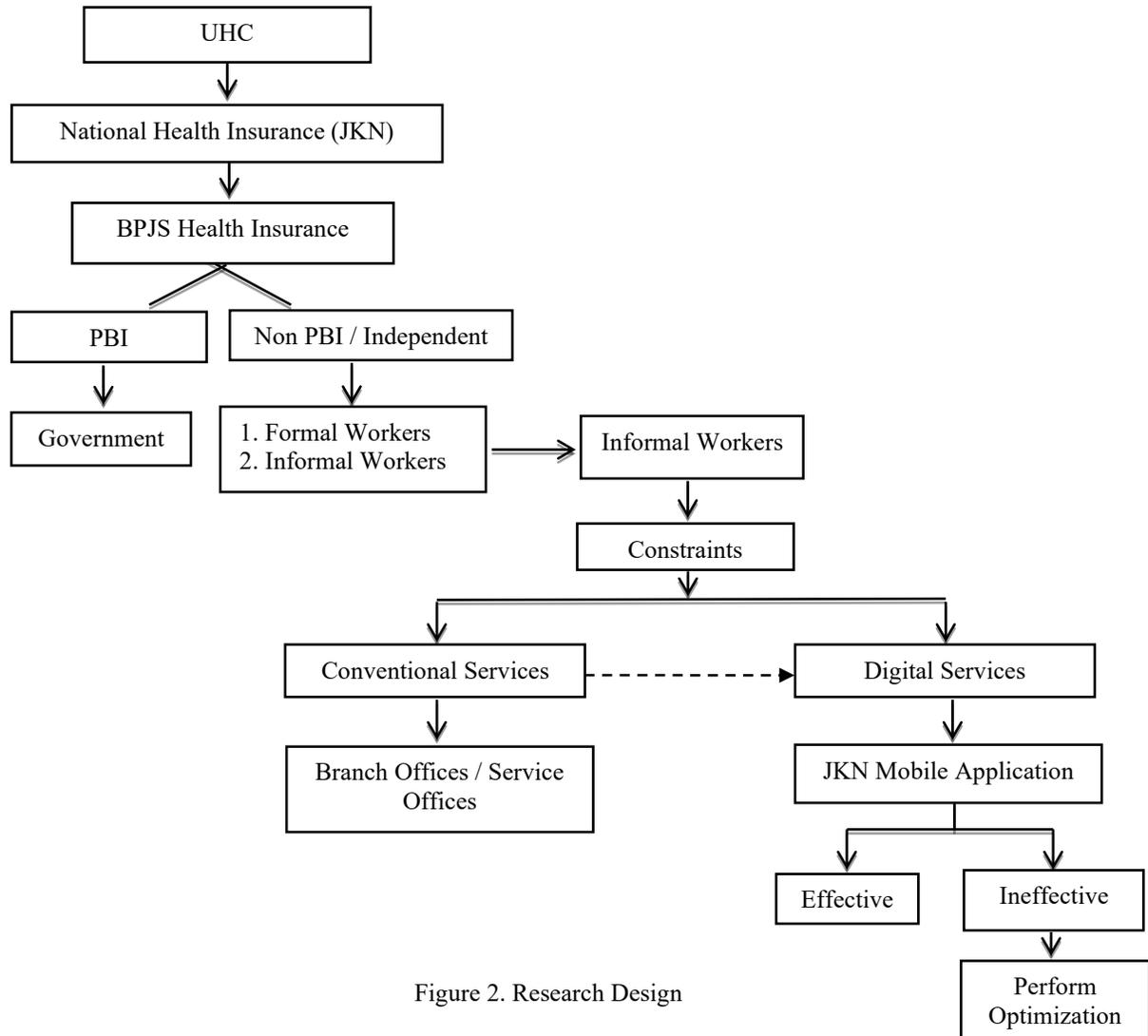


Figure 2. Research Design

#### **4. Analysis and Discussion**

The results of descriptive analysis using the DeLone and McLean information system success model (D & M Success Model) show the results of measuring the effectiveness of mobile applications. The results of the D&M Success Model measurement for the 5 variables are shown as follows:

##### **a. Variabel System Quality**

Based on the results of descriptive analysis regarding the ease of use, it can be seen that out of a total of 100 respondents, 70 respondents stated Agree, followed by 27 people who stated Strongly Agree, while only 3 people stated Disagree. This means that the JKN mobile application has provided benefits for its users, can be used with procedures that are easy and can be understood by many people in assisting administrative activities without having to come directly to the BPJS Health insurance office. For system reliability indicators, as many as 75 respondents stated Agree, followed by 16 respondents stated Strongly Agree and 9 respondents stated Disagree. This means that the JKN mobile application is reliable for BPJS health insurance participants who use it. A reliable JKN mobile application means that the application can perform its function properly when needed for a certain period of time and conditions (Andria, 2018).

Furthermore, regarding the speed of access indicator, 62 respondents stated that they agreed, 24 respondents stated that they strongly agreed, while 12 respondents stated that they did not agree and 2 respondents stated that they strongly disagreed. This means that accessing the JKN mobile application does not require a long time to assist BPJS health insurance participants in completing administrative matters through the application. And for system security engineers, as many as 70 respondents stated Agree, 27 respondents stated Strongly Agree, while 3 respondents stated Disagree. This means that the system in the JKN mobile application can be said to be safe with the existence of data protection and confidentiality so that BPJS health insurance participants who use the application do not have to worry if personal and family data are disseminated or used by irresponsible parties.

##### **b. Variabel Information System**

The results of the analysis for the indicators of the availability / completeness of information show that out of a total of 100 respondents, 67 respondents stated that they agreed, 20 respondents stated that they strongly agreed, while 13 respondents stated that they did not agree. The point is that in the JKN mobile application, complete information is available so that BPJS health insurance participants can access it through the application anywhere and anytime. Meanwhile, for the ease of understanding indicator, 76 respondents stated that they agreed, 20 respondents stated that they strongly agreed, while only 4 respondents stated that they did not agree. This means that the JKN mobile application can be understood easily by every group of society, especially those in the language used in the application. Furthermore, for the indicators of relevance of needs, 72 respondents stated that they agreed, 14 respondents stated that they strongly agreed, while 14 respondents stated that they did not agree. This condition means that the information available on the JKN mobile application is in accordance with what is needed by BPJS health insurance participants and can be accessed anywhere and anytime, without the need to come directly to the Service Office. And for the information accuracy indicator, 76 respondents stated that they agreed, 18 respondents stated that they strongly agreed, while 6 respondents stated that they did not agree. This means that the information available on the JKN mobile application is accurate or can be trusted (Triyono, 2013)

##### **c. Variabel Service Quality**

Based on the results of descriptive analysis for the system assurance indicator, information was obtained that as many as 73 respondents stated Agree, 25 respondents stated Strongly Agree, while only 2 respondents stated Disagree with. This means that the JKN mobile application system security is guaranteed. And for the indicators of empathy, there is empathy for the BPJS Health services provided through the JKN mobile application, for example when a user has a complaint, it is processed immediately. This condition is from the respondents' answers that as many as 58 respondents stated Agree, while 27 respondents stated Disagree, 13 respondents stated Strongly Agree and only 2 respondents stated Strongly Disagree.

Furthermore, for the service response time indicator, 55 respondents stated that they agreed, while 30 respondents stated that they did not agree, 13 respondents stated that they strongly agreed and only 2 respondents stated that they strongly disagreed. This means that the services provided by BPJS health insurance through the JKN mobile application are responsive. The point is that if users of the JKN mobile application have complaints, then BPJS health insurance will respond and respond quickly.

**d. Variabel User Satisfaction**

BPJS health insurance participants feel that the JKN mobile application is very helpful for administrative activities without the need to come directly to the Service Office. This was stated by 51 respondents who agreed, 31 respondents stated that they strongly agreed, while 18 respondents stated that they did not agree. Meanwhile, for the indicator of the frequency of return visits, 39 out of 100 respondents chose twice, then 30 respondents chose more than three times, while 24 respondents chose once and 7 respondents chose three times. This means that as many as 76% of respondents visited the JKN mobile application again more than once.

The next indicator for this variable is the availability of recommendations, it is known that 59 respondents received recommendations from branch offices, 27 respondents obtained information from the internet, 8 respondents received recommendations from relatives / family and 6 respondents stated that they received recommendations from friends. This means that 59% of the total respondents who used the JKN mobile application were recommended by BPJS health insurance, while the other 41% were recommended by other parties outside BPJS health insurance who were willing to recommend the application, namely the internet, relatives / family and friends. And then for service indicators, information was obtained that 59 respondents chose to come directly to the Service Office, while 41 respondents preferred to use the JKN mobile application in obtaining BPJS health insurance services. The reasons for choosing the service were participants who chose to come directly to the Service Office because they felt it was clearer, lived in a signal-difficult area when using the application and only used the application if they wanted to check membership and dues bills. Meanwhile, participants used the application more because they found it easier, faster and more practical (Ferdiana, 2018).

**e. Variable net benefit**

The results of descriptive analysis for the net benefit variable have two indicators, namely, a measure of efficiency based on cost and efficiency based on time. For the cost efficient indicator, 61 respondents stated that they agreed, 31 respondents strongly agreed, while 8 respondents stated that they did not agree. This means that the JKN mobile application can be said to be efficient based on the costs incurred in carrying out an activity. This shows that if participants use the JKN mobile application in carrying out administrative activities, they can save costs so that they do not have to pay additional costs for transportation.

While for the time efficient indicator, it is known that 60 respondents stated that they agreed, 30 respondents stated that they strongly agreed, while 10 respondents stated that they did not agree. These results show that the JKN mobile application can be said to be efficient, measured based on the time it takes to carry out activities. In other words, this condition shows that BPJS health insurance participants who use the JKN mobile application only need a short time to carry out administrative activities without the need to spend time queuing so that the time can be used for more productive activities (Marlinah, 2018)

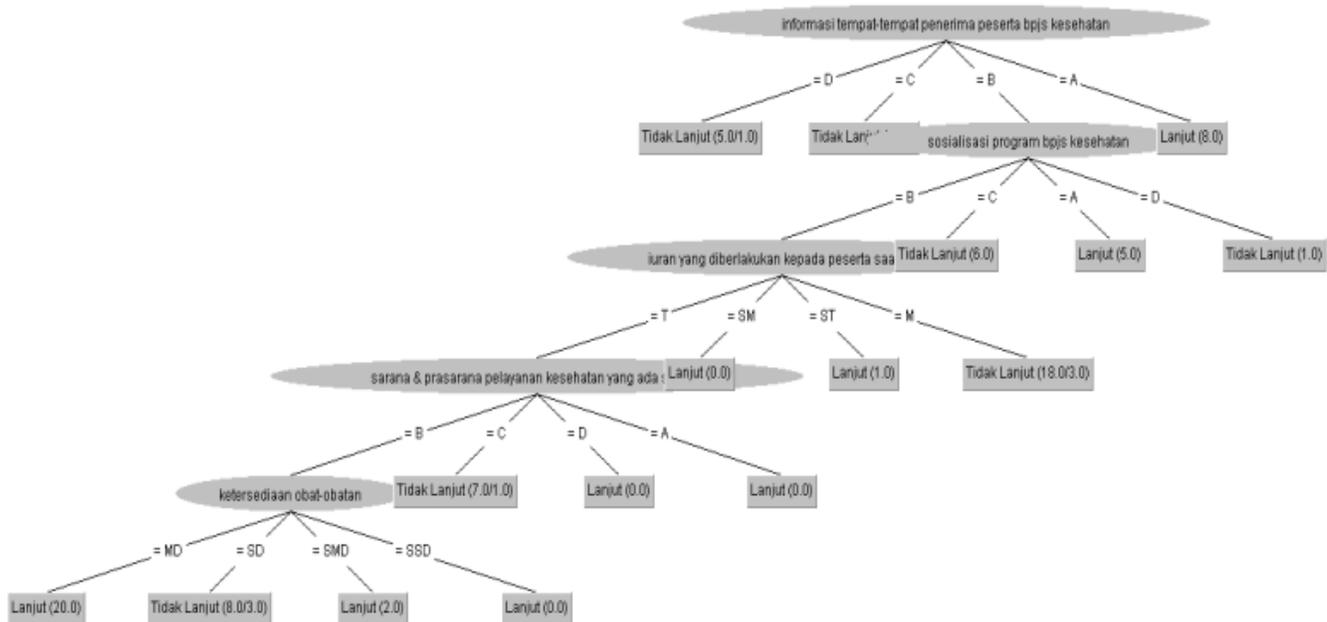


Figure 3. Decision Tree of Data Mining Models

According to implementation of C4.5 algorithm Data Mining methods on membership of healthcare and guarantee constraint classification (Andria, et.al., 2019 ; Tosida, et.al., 2012) and the application for data processing is using Weka 3.8 (Tosida, et.al., 2018; Tosida, et al. 2019), resulted the arrangement of information in the form of a decision tree as shown in Image 3. above.

According to seven main constraints (Andria, et.al., 2019), there are five constraints that impactful on informal sector of the membership BPJS health programme: (1) Where the participants receive information; (2) Programme socialization; (3) Dues; (4) Health service facilities and infrastructure; (5) Availability of medicine. Also there are two constraints (Program implementation; the need of joining BPJS health insurance program) considered to have the same meaning with the five constraints above. The final decision tree pattern shows the good results, it is proven of 84% of accuracy (Mantas and Abellan, 2014).

Based on the questionnaire distributed to respondents, it can be seen that the respondents' statements regarding the implementation of the use of the JKN mobile application. To facilitate the assessment of respondents' answers, measurement criteria were made using a Likert scale.

Table 3. Respondents' Statements Regarding the Implementation of Using the JKN Mobile Application

No	Attributes of variables	Frequency				Score
		SA/ 4	A/ 3	DA/ 2	TD/ 1	
<b><i>System Quality</i></b>						
1	The JKN mobile application can be used with an easy procedure	27	70	3	0	324
2	The JKN mobile application can function properly	16	75	9	0	307
3	Access to the JKN mobile application does not take a long time	24	62	12	2	308
4	The existence of data protection and confidentiality is maintained	27	70	3	0	324
Sub Total						1,263
<b><i>Information System</i></b>						
5	All information is complete and accessible on the JKN mobile application	20	67	13	0	307
6	The language used in the JKN mobile application is easy for all groups to understand	20	76	4	0	316
7	Information that consumers need is available on the JKN mobile application	14	72	14	0	300
8	The truth of the information available on the JKN mobile application is reliable.	18	76	6	0	312
9	Information on the JKN mobile application is always updated every time	11	67	22	0	289
Sub Total						1,524
<b><i>Service Quality</i></b>						
10	The JKN mobile application is guaranteed safety	25	73	2	0	323
11	Consumer complaints on the JKN mobile application are processed quickly	13	58	27	2	282
12	Responses given to complaints are responsive	13	56	30	2	282
Sub Total						887
<b><i>User Satisfaction</i></b>						
13	I feel that the JKN mobile application is very helpful for administrative activities without having to come directly to the Branch Office	31	51	18	0	313
<b><i>Net Benerfit</i></b>						
14	Using the JKN mobile application can save costs	31	61	8	0	323
15	The JKN mobile application can be used easily	25	73	2	0	323

No	Attributes of variables	Frequency				Score
		SA/ 4	A/ 3	DA/ 2	TD/ 1	
16	Using the JKN mobile application only takes a short time	30	60	10	0	320
Sub Total						966
<b><math>\Sigma X = \text{Total}</math></b>						<b>4,953</b>

Factors that causing low JKN application usage are:

1. The member has tried the application before, but they don't really understand how to use it.
2. Bad signals in some areas (Putri, et.al., 2017), so the JKN mobile services in unaccessible.
3. The member only use it for check the participant menu and dues.

Table 4. below shows effectiveness of JKN mobile users whether it is good and effective. For further target BPJS health insurance stakeholder is to optimize the usage of this mobile application for membership growth and BPJS health insurance operational, either it's new or not.

Tabel 4. Effectiveness and Achievement of JKN's Mobile

Variable	Effectiveness	Description
System Quality	78.94 %	Success (Effective)
Information System	76.20 %	Success (Effective)
Service Quality	73.916 %	Success (Effective)
User Satisfaction	78.25 %	Success (Effective)
Net Benefits	80.50 %	Beyond Success (Beyond Effective)
<b>Total of Effectiveness</b>	<b>77.39 %</b>	<b>Success (Effective)</b>

Source : Processed from primary data, 2019

## 5. Conclusion

Some of the obstacles that affect the participation target of the National Health Insurance program in BPJS health insurance informal sector workers based on data mining analysis with the C4.5 algorithm are:

- a. Information on the places where BPJS health insurance participants receive
- b. Socialization of the BPJS Health insurance
- c. Current fees are applied to participants
- d. Health service facilities and infrastructure in the hospital
- e. Availability of Medicines

The results of descriptive analysis show that the use of the JKN mobile application with the Quality System variable has been effective, namely the effectiveness value of 78.94%, the Information Quality variable is effective, namely the effectiveness value of 76.20%, the Service Quality variable is effective, namely the effectiveness value of 73.92 %. Then for the User Satisfaction variable it was effective, namely the effectiveness value of 78.25% and for the Net Benefit variable it was effective, namely the effectiveness value of 80.50%. Based on these results it can be concluded that the use of the JKN mobile application at BPJS health insurance branch offices according to the responses of respondents in this study is in the "successful" or "effective" category. The percentage of respondents' assessment was 77.39%.

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