



Analysis of the Impact of the Use of Electronic Money on Community Consumption Behavior in The Bogor Station Environment

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ABSTRACT

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With the existence of non-cash payment instruments such as electronic money (e-money), which is part of the new policy in the payment system by Bank Indonesia, it will be able to optimize people's purchasing power which at the same time has an impact on improving the country's economy. This non-cash payment system makes it easier for people to transact. As happened in several cases regarding the effect of using e-money on people in Indonesia, namely the increase in consumptive behavior and the difficulty of saving when they have more than enough money for their daily needs. The method used by the author to obtain the necessary data is by observation, interviews, and literature study. The results of the analysis of this problem are to find out what impacts can affect the behavior of people who use e-money, as well as precautions that can be taken to reduce the impact and influence of using e-money.

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1. Introduction

The rapid development of science and technology has had a considerable impact and has changed the standard of living and consumption patterns in society [1][2][3]. People want convenience in various aspects of life to meet their daily needs, including in terms of transactions [4][5][6]. Payment patterns and instruments in economic transactions are constantly changing [7].

At first, the payment system in Indonesia was only limited to direct cash payments [8]. However, along with the development of financial technology (fintech), new innovations have emerged in the implementation of electronic payment transactions [9]. One of the non-cash payment instruments that are currently developing in Indonesia is electronic money or commonly called e-money [10].

Since its introduction in 2008, the use of electronic money in Indonesia has continued to grow. although currently, its use is not as much as cash transactions [11]. The technology in e-money services offers convenience that is useful for users through the features provided [12]. Through current technology, everyone can make transactions through an application on a smartphone without having to bother carrying a wallet and cash, because users can make digital payments easily, safely, and in a short time [13].

2. Methods

To obtain data that can support the preparation of this research, the authors use several research methods as follows:

2.1 Observation

In this method, the author makes direct observations to the Bogor Railway Station to see the activities of the people in the environment who use electronic money as a transaction tool.

2.2 Interview

In this case, the author conducted direct interviews with people who use electronic money around the Bogor Railway Station.

2.3 Literature Study

With this method the authors study books, articles, journals including data from the internet related to electronic money, consumption behavior, the Simple Additive Weighting (SAW) method, and information about the Bogor Railway Station.

3. Results and Analysis

3.1 Simple Additive Weighting Structure

The following is an overview of the Simple Additive Weighting structure that will be used in this study:

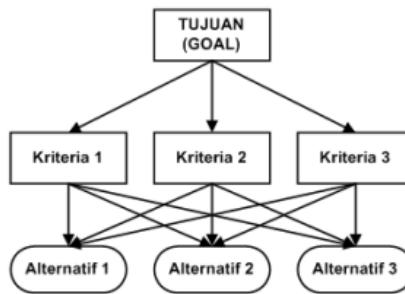


Fig 1. Alternative Hierarchical Structure Determining the Use of E-Money

3.2 Simple Additive Weighting Data Collection Results

a. Determination of Criteria for the Simple Additive Weighting Method

To make this decision, there are objects to be discussed such as goals, criteria and alternatives. The following are the criteria needed to measure and assess who will be selected for E-Money users:

1) Service Provider Company

The indicators used in determining E-Money users are based on the service provider company.

TABLE 1
CRITERIA A

Criteria	Rang e	Weigh t
	1	5
Service Provider Company	2	4
	3	3
	4	2
	5	1

2) How to get

The indicator used in determining E-Money users based on how to get it.

TABLE 2
CRITERIA B

Criteria	Rang e	Weigh t
	1	5
How to get	2	4
	3	3
	4	2
	5	1

3) Existence

The indicator used in determining E-Money users based on their existence.

TABLE 3
CRITERIA C

Criteria	Range	Weight
	1	5
Existence	2	4
	3	3

4) Uniqueness

The indicators used in determining E-Money users are based on their uniqueness.

TABLE 4
CRITERIA D

Criteria	Range	Weight
	1	1
Existence	2	2
	3	3
	4	4
	5	5

Based on the main requirements or criteria above, then determine the preference weight (W) as follows:

$$W_1 = A (40\%) = 0,4$$

$$W_2 = B (30\%) = 0,3$$

$$W_3 = C (20\%) = 0,2$$

$$W_4 = D (10\%) = 0,1$$

In determining E-Money users with the Simple Additive Weighting (SAW) method based on the criteria above, the following data are obtained

TABLE 5
VALUE OF EACH CRITERION

No	Name	Criteria			
		A	B	C	D
1	Aditya Putra Permana	1	1	1	1
2	Icha Nabila Islamia	1	1	1	1
3	Ilham Dwi Nugroho	1	1	1	1
4	Komang Tri Bintang	1	1	1	1
5	Moriadun Tristan Leba	1	1	1	1
6	Muhammad Bahrun Aminullah	1	1	1	1
7	Muhammad Billy Ihya Achsan	1	1	1	1
8	Anindya Saraswati	1	1	1	1
9	Cindy Aprilia Sandra	1	1	1	1
10	Kenny Nadia Lestari	1	1	1	1
11	Purnami Kumala Dewi	1	1	1	1
12	Putri Oktaviyani	1	1	1	1
13	Rivan Anggara Putra	1	1	1	1
14	Ari Pratama Putra	1	1	1	1
15	Ravello Niki Alhafizh	1	1	1	1
16	Rendra Afrilian Pratama	1	1	1	1
17	Rendy Furqon Ismail	1	1	1	1
18	A.A. Dika Pramana Putra	1	1	1	1
19	Abdul Suliwa	1	1	1	1
20	Adinda Vania Putri Noverta	1	1	1	1
21	Bagus Mahendra	1	1	1	1
22	Denis Febriawan Putra	1	1	1	1
23	Fahri Adnan Saputra	1	1	1	1
24	Fandi Andika Sampurna	1	1	1	1
25	Gede Juniada Putra	1	1	1	1
26	Hidayanti	1	1	1	1
27	I Gede Putu Cahyana	1	1	1	1
28	I Kadek Dwi Apriliana	1	1	1	1
29	I Nyoman Semarajaya	1	1	1	1
30	Masdury Maulana Silva	1	1	1	1
31	Muhamad Afandi	1	1	1	1



No	Name	Criteria			
		A	B	C	D
32	Amaroosa Sudiani	1	1	1	1
33	Tania Rosita Ayu Nanda	1	1	1	1
34	Riska Wulandari	1	1	1	1
35	Mila Lestari	1	1	1	1
36	Rihana Febrianti	1	1	1	1

Description

A = Service Provider Company

B = How to Get

C = Existence

D = Uniqueness

b. Determination of the Suitability Rating of Each Alternative With Each Criteria

In determining the suitability rating, the value of each criterion is entered into the match rating table which has been adjusted to the value from the criteria table. Then the match rating table can be seen as follows.

TABLE 6
MATCH RATING

No	Name	Criteria			
		A	B	C	D
1	Aditya Putra Permana	3	3	1	5
2	Icha Nabila Islamia	3	3	1	5
3	Ilham Dwi Nugroho	3	1	1	4
4	Komang Tri Bintang	3	4	1	4
5	Moriadun Tristan Leba	3	3	1	4
6	Muhammad Bahrun Aminullah	3	2	1	4
7	Muhammad Billy Ihya Achsan	4	3	5	5
8	Anindya Saraswati	2	4	1	5
9	Cindy Aprilia Sandra	2	2	1	5
10	Kenny Nadia Lestari	2	4	1	5
11	Purnami Kumala Dewi	2	5	1	5
12	Putri Oktaviyani	4	3	5	4
13	Rivan Anggara Putra	1	4	1	4
14	Ari Pratama Putra	1	5	5	5
15	Ravello Niki Alhafizh	4	2	5	5
16	Rendra Afrilian Pratama	2	4	1	5
17	Rendy Furqon Ismail	4	5	5	5
18	A.A. Dika Pramana Putra	2	2	1	4
19	Abdul Suliwa	2	3	1	4
20	Adinda Vania Putri Noverta	2	1	1	4
21	Bagus Mahendra	2	2	1	4
22	Denis Feibriawan Putra	2	1	1	4
23	Fahri Adnan Saputra	2	2	1	4
24	Fandi Andika Sampurna	2	2	1	4
25	Gede Juniada Putra	2	1	1	4
26	Hidayanti	2	2	1	4
27	I Gede Putu Cahyana	2	3	1	4
28	I Kadek Dwi Apriliana	2	2	1	4
29	I Nyoman Semarajaya	1	3	1	4
30	Masdury Maulana Silva	1	3	1	4
31	Muhamad Afandi	1	3	1	4
32	Amaroosa Sudiani	2	4	5	4
33	Tania Rosita Ayu Nanda	2	2	5	4
34	Riska Wulandari	2	4	1	4
35	Mila Lestari	2	3	1	4
36	Rihana Febrianti	2	2	1	4

Description

A = Service Provider Company

B = How to Get

C = Existence

D = Uniqueness

c. Creating a Decision Matrix Based on Criteria

The value from the results of the match table is then made in the form of a matrix as follows:

	3	3	1	5
	3	3	1	5
	3	1	1	4
	3	4	1	4
	3	3	1	4
	3	2	1	4
	4	3	5	5
	2	4	1	5
	2	2	1	5
	2	4	1	5
	2	5	1	5
	4	3	5	4
	1	4	1	4
	1	5	5	5
	4	2	5	5
	2	4	1	5
	4	5	5	5
	2	2	1	4
X	2	3	1	4
	2	1	1	4
	2	2	1	4
	2	1	1	4
	2	2	1	4
	2	2	1	4
	2	1	1	4
	2	2	1	4
	2	3	1	4
	2	2	1	4
	1	3	1	4
	1	2	1	4
	2	3	1	4
	2	3	5	4
	2	3	5	4
	2	4	1	4
	2	2	1	4
	1	4	1	4

d. Matrix Normalization

Make a normalization matrix based on an equation that is adjusted to the type of attribute (profit attribute and cost attribute) in order to obtain a normalized matrix R.

DETERMINATION OF COST OR BENEFIT		
Criteria	Benefit	Cost
Service Provider Company	-	V
How to get	V	-
Existence	V	-
Uniqueness	V	-

Determine the value of R with the following formula:

$$R_{ij} = \frac{X_{ij}}{\text{Max } X_{ij}} \quad \text{if the attribute is of benefit}$$

$$R_{ij} = \frac{\text{Min } X_{ij}}{X_{ij}} \quad \text{if the attribute is cost}$$



- 1) For service provider company criteria (A) is a cost attribute because the smaller the better.

Alternative 1	Alternative 2
$R_{11} = \frac{\min(1)}{3}$	$R_{21} = \frac{\min(1)}{3}$
$R_{11} = \frac{1}{3}$	$R_{21} = \frac{1}{3}$
$R_{11} = 0.3333$	$R_{21} = 0.3333$

- 2) For the criteria for how to get (B) is a benefit because the higher the better.

Alternative 1	Alternative 2
$R_{12} = \frac{3}{\max(5)}$	$R_{22} = \frac{3}{\max(5)}$
$R_{12} = \frac{3}{5}$	$R_{22} = \frac{3}{5}$
$R_{12} = 0.6$	$R_{22} = 0.6$

- 3) The existence criteria (C) is a benefit because the higher the better.

Alternative 1	Alternative 2
$R_{13} = \frac{1}{\max(5)}$	$R_{23} = \frac{1}{\max(5)}$
$R_{13} = \frac{1}{5}$	$R_{23} = \frac{1}{5}$
$R_{13} = 0.2$	$R_{23} = 0.2$

- 4) Criteria for uniqueness (D) is a benefit because the higher the value the better.

Alternative 1	Alternative 2
$R_{14} = \frac{5}{\max(5)}$	$R_{24} = \frac{5}{\max(5)}$
$R_{14} = \frac{5}{5}$	$R_{24} = \frac{5}{5}$
$R_{14} = 1$	$R_{24} = 1$

From the above calculation, the R matrix is obtained as follows:

$$X \begin{pmatrix} 0.3333 & 0.6 & 0.2 & 1 \\ 0.3333 & 0.6 & 0.2 & 1 \\ 0.3333 & 0.2 & 0.2 & 0.8 \\ 0.3333 & 0.8 & 0.2 & 0.8 \\ 0.3333 & 0.6 & 0.2 & 0.8 \\ 0.3333 & 0.4 & 0.2 & 0.8 \\ 0.25 & 0.6 & 1 & 1 \\ 0.5 & 0.8 & 0.2 & 1 \\ 0.5 & 0.4 & 0.2 & 1 \\ 0.5 & 0.8 & 0.2 & 1 \\ 0.5 & 1 & 0.2 & 1 \\ 0.25 & 0.6 & 1 & 0.8 \\ 1 & 0.25 & 0.2 & 0.8 \\ 1 & 1 & 1 & 1 \\ 0.25 & 0.4 & 1 & 1 \\ 0.25 & 0.8 & 0.2 & 1 \\ 0.5 & 1 & 1 & 1 \\ 0.5 & 0.4 & 0.2 & 0.8 \\ 0.5 & 0.6 & 0.2 & 0.8 \\ 0.5 & 0.2 & 0.2 & 0.8 \end{pmatrix} X \begin{pmatrix} 0.5 & 0.4 & 0.2 & 0.8 \\ 0.5 & 0.2 & 0.2 & 0.8 \\ 0.5 & 0.4 & 0.2 & 0.8 \\ 0.5 & 0.4 & 0.2 & 0.8 \\ 0.5 & 0.2 & 0.2 & 0.8 \\ 0.5 & 0.4 & 0.2 & 0.8 \\ 0.5 & 0.6 & 0.2 & 0.8 \\ 0.5 & 0.4 & 0.2 & 0.8 \\ 1 & 0.6 & 0.2 & 0.8 \\ 1 & 0.6 & 0.2 & 0.8 \\ 1 & 0.6 & 0.2 & 0.8 \\ 1 & 0.6 & 0.2 & 0.8 \\ 0.5 & 0.8 & 1 & 0.8 \\ 0.5 & 0.4 & 1 & 0.8 \\ 0.5 & 0.8 & 0.2 & 0.8 \\ 0.5 & 0.6 & 0.2 & 0.8 \\ 0.5 & 0.4 & 0.2 & 0.8 \end{pmatrix}$$



e. Determining Rank

To find the value of each sample to be determined as an E-Money user, use the following formula:

$$V_i = \sum_{j=1}^{ni} W_i R_{ij}$$

Description:

V_i = Final and alternative values

W_i = Predefined weight

R_{ij} = Matrix Normalization

To determine the value of V_1 to V_{36} is as follows:

$$\begin{aligned} V_1 &= (0.4 * 0.3333) + (0.3 * 0.6) + (0.2 * 0.2) + (0.1 * 1) = 0.45332 \\ V_2 &= (0.4 * 0.3333) + (0.3 * 0.6) + (0.2 * 0.2) + (0.1 * 1) = 0.45332 \\ V_3 &= (0.4 * 0.3333) + (0.3 * 0.2) + (0.2 * 0.2) + (0.1 * 0.8) = 0.31332 \\ V_4 &= (0.4 * 0.3333) + (0.3 * 0.8) + (0.2 * 0.2) + (0.1 * 0.8) = 0.49332 \\ V_5 &= (0.4 * 0.3333) + (0.3 * 0.6) + (0.2 * 0.2) + (0.1 * 0.8) = 0.43332 \\ V_6 &= (0.4 * 0.3333) + (0.3 * 0.4) + (0.2 * 0.2) + (0.1 * 0.8) = 0.37332 \\ V_7 &= (0.4 * 0.25) + (0.3 * 0.6) + (0.2 * 1) + (0.1 * 1) = 0.58 \\ V_8 &= (0.4 * 0.5) + (0.3 * 0.8) + (0.2 * 0.2) + (0.1 * 1) = 0.58 \\ V_9 &= (0.4 * 0.5) + (0.3 * 0.4) + (0.2 * 0.2) + (0.1 * 1) = 0.46 \\ V_{10} &= (0.4 * 0.5) + (0.3 * 0.8) + (0.2 * 0.2) + (0.1 * 1) = 0.58 \\ V_{11} &= (0.4 * 0.5) + (0.3 * 1) + (0.2 * 0.2) + (0.1 * 1) = 0.64 \\ V_{12} &= (0.4 * 0.25) + (0.3 * 0.6) + (0.2 * 1) + (0.1 * 0.8) = 0.56 \\ V_{13} &= (0.4 * 1) + (0.3 * 0.25) + (0.2 * 0.2) + (0.1 * 0.8) = 0.595 \\ V_{14} &= (0.4 * 1) + (0.3 * 1) + (0.2 * 1) + (0.1 * 1) = 1 \\ V_{15} &= (0.4 * 0.25) + (0.3 * 0.4) + (0.2 * 1) + (0.1 * 1) = 0.52 \\ V_{16} &= (0.4 * 0.5) + (0.3 * 0.8) + (0.2 * 0.2) + (0.1 * 1) = 0.58 \\ V_{17} &= (0.4 * 0.25) + (0.3 * 1) + (0.2 * 1) + (0.1 * 1) = 0.7 \\ V_{18} &= (0.4 * 0.5) + (0.3 * 0.4) + (0.2 * 0.2) + (0.1 * 0.8) = 0.44 \\ V_{19} &= (0.4 * 0.5) + (0.3 * 0.6) + (0.2 * 0.2) + (0.1 * 0.8) = 0.5 \\ V_{20} &= (0.4 * 0.5) + (0.3 * 0.2) + (0.2 * 0.2) + (0.1 * 0.8) = 0.38 \\ V_{21} &= (0.4 * 0.5) + (0.3 * 0.4) + (0.2 * 0.2) + (0.1 * 0.8) = 0.44 \\ V_{22} &= (0.4 * 0.5) + (0.3 * 0.2) + (0.2 * 0.2) + (0.1 * 0.8) = 0.38 \\ V_{23} &= (0.4 * 0.5) + (0.3 * 0.4) + (0.2 * 0.2) + (0.1 * 0.8) = 0.44 \\ V_{24} &= (0.4 * 0.5) + (0.3 * 0.4) + (0.2 * 0.2) + (0.1 * 0.8) = 0.44 \\ V_{25} &= (0.4 * 0.5) + (0.3 * 0.2) + (0.2 * 0.2) + (0.1 * 0.8) = 0.38 \\ V_{26} &= (0.4 * 0.5) + (0.3 * 0.4) + (0.2 * 0.2) + (0.1 * 0.8) = 0.44 \\ V_{27} &= (0.4 * 0.5) + (0.3 * 0.6) + (0.2 * 0.2) + (0.1 * 0.8) = 0.5 \\ V_{28} &= (0.4 * 0.5) + (0.3 * 0.4) + (0.2 * 0.2) + (0.1 * 0.8) = 0.44 \\ V_{29} &= (0.4 * 1) + (0.3 * 0.6) + (0.2 * 0.2) + (0.1 * 0.8) = 0.7 \\ V_{30} &= (0.4 * 1) + (0.3 * 0.6) + (0.2 * 0.2) + (0.1 * 0.8) = 0.7 \\ V_{31} &= (0.4 * 1) + (0.3 * 0.6) + (0.2 * 0.2) + (0.1 * 0.8) = 0.7 \\ V_{32} &= (0.4 * 0.5) + (0.3 * 0.8) + (0.2 * 1) + (0.1 * 0.8) = 0.72 \\ V_{33} &= (0.4 * 0.5) + (0.3 * 0.4) + (0.2 * 1) + (0.1 * 0.8) = 0.6 \\ V_{34} &= (0.4 * 0.5) + (0.3 * 0.8) + (0.2 * 0.2) + (0.1 * 0.8) = 0.56 \\ V_{35} &= (0.4 * 0.5) + (0.3 * 0.6) + (0.2 * 0.2) + (0.1 * 0.8) = 0.5 \\ V_{36} &= (0.4 * 0.5) + (0.3 * 0.4) + (0.2 * 0.2) + (0.1 * 0.8) = 0.44 \end{aligned}$$



From the results of the calculation of the value of V1 to V36 from each sample that will be determined as E-Money users, a ranking table is made as follows:

TABLE 8
RANKING

No	Name	Value	Percentage	Ranking
1	Aditya Putra Permana	1	100%	1
2	Icha Nabila Islamia	0.72	72%	2
3	Ilham Dwi Nugroho	0.7	70%	3
4	Komang Tri Bintang	0.7	70%	4
5	Moriadun Tristan Leba	0.7	70%	5
6	Muhammad Bahrun Aminullah	0.7	70%	6
7	Muhammad Billy Ihya Achsan	0.64	64%	7
8	Anindya Saraswati	0.6	60%	8
9	Cindy Aprilia Sandra	0.59	59%	9
10	Kenny Nadia Lestari	0.58	58%	10
11	Purnami Kumala Dewi	0.58	58%	11
12	Putri Oktaviyani	0.58	58%	12
13	Rivan Anggara Putra	0.58	58%	13
14	Ari Pratama Putra	0.56	56%	14
15	Ravello Niki Alhafizh	0.56	56%	15
16	Rendra Afrilian Pratama	0.52	52%	16
17	Rendy Furqon Ismail	0.5	50%	17
18	A.A. Dika Pramana Putra	0.5	50%	18
19	Abdul Suliwa	0.49	49%	19
20	Adinda Vania Putri Noverta	0.46	46%	20
21	Bagus Mahendra	0.45	45%	21
22	Denis Febriawan Putra	0.45	45%	22
23	Fahri Adnan Saputra	0.44	44%	23
24	Fandi Andika Sampurna	0.44	44%	24
25	Gede Juniada Putra	0.44	44%	25
26	Hidayanti	0.44	44%	26
27	I Gede Putu Cahyana	0.44	44%	27
28	I Kadek Dwi Apriliana	0.44	44%	28
29	I Nyoman Semarajaya	0.44	44%	29
30	Masdury Maulana Silva	0.43	43%	30
31	Muhamad Afandi	0.38	38%	31
32	Amaroosa Sudiani	0.38	38%	32
33	Tania Rosita Ayu Nanda	0.38	38%	33
34	Riska Wulandari	0.38	38%	34
35	Mila Lestari	0.38	38%	35
36	Rihana Febrianti	0.37	37%	36

From determining the priority of the proposed impact of using E-Money using the Simple Additive Weighting (SAW) method, it is determined that the E-Money user who feels the most impact is a sample named Aditya Putra Permana.

4. Conclusion

E-money users feel the many impacts they experience after using e-money product services and have a considerable influence in their daily lives. By calculating using the Simple Additive Weighting method and with reference to the criteria for service providers, how to get, existence and uniqueness can be obtained by people who feel the impact of using e-money.

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