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Decision Support System in Determining Smart TV using MOORA

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Abstract:
Smart TV, also known as a TV connected to the internet, is a traditional television device integrated with an internet connection and interactive features. This TV allows users to hear music and videos in realtime, surf the internet, and view photos. Smart TV is a convergence of computer technology, television, and set-top boxes. In addition to the traditional functions of television sets and set-top boxes provided through traditional broadcast media. It provides Internet, online interactive media, over-the-top content (OTT), and streaming media-on-demand, and home network access. Choosing a Smart TV is not easy because of the many brands and types on the market. Several criteria must be met in choosing a Smart TV. The MOORA method is one of the methods of decision support systems that can help a person choose the best Smart TV according to the weight of the preferences set by the user. Users can emphasize a weight on specific criteria to determine the focus of the search. By applying the MOORA method, users can get the best Smart TV recommendations according to their choice.

Key Words: Smart TV, MOORA, SPK, criteria, weight, preference

INTRODUCTION

TV is an entertainment tool that is often used by someone to spend everyday time. There are several types of TVs, tube TVs and flat screen TVs. On flat screen TVs, the technology developed has been more advanced. This brings the TV has advanced features such as browsing and sending e-mails. This type of TV is called Smart TV. There are several types of Smart TV models on the market. Smart TVs have higher specifications than LED TVs in general. The selection of Smart TV is not easy to do because there are many types and brands in circulation. The more features offered by the TV, the more expensive the TV's selling price. Smart TV is a TV that is said to be smart because it has an operating system like a computer. The TV has a processor so the TV has an interactive interface such as menus that can be selected to enter certain features. The main advantage of Smart TV is that it can browse into cyberspace like mobile phones and computers in general [1].

Several criteria that must be met before choosing Smart TV which is someone's recommendation. Because the price is higher than a normal TV, determining which Smart TV to choose requires a good calculation to avoid making a wrong choice. Decision support systems can help provide the best Smart TV recommendations. In a decision support system, the results of the assessment depend on the weight of the preferences used as the process of finding the best Smart TV. The MOORA method is one method that can be used to determine the best Smart TV for consumers. This method can give prospective buyers an idea before making a payment.

THEORIES

2.1 Decision Support System

Decision support systems are a special class of computerized information systems that support business and organizational decision making activities[2]. Decision support system is a kind of the interactive software-based system. It is to help decision makers gather useful information from raw data, documents, personal knowledge, and business models. It helps to check and solve problems and make business decisions [3], [4].

Decision support systems are interactive software-based systems intended to assist managers in making decisions. It works by determining large number of information that is generated from various sources which are related to the information systems involved in the organization's business processes, such as office automation systems, transaction processing systems, etc[5]. DSS uses a summary of information, exceptions, patterns, and trends using analytical models. Decision support systems help in making decisions but do not necessarily provide the decisions themselves. Decision makers collect useful information from raw data, documents, personal knowledge, and / or business models to identify and solve problems and make decisions [6], [7].

2.2 MOORA

Multi-Objective Optimization on the basis of Ratio Analysis (MOORA) is a multi-objective system that optimizes two or more conflicting attributes simultaneously. This method is applied to solve problems with complex mathematical calculations [8]. Moora was introduced by Brauers and Zavadskas in 2006, applied to solve many economic, managerial and construction problems by calculating mathematical formulas with precise results. Initially this method was introduced by Brauers in 2004 as "Multi-Objective Optimization" which can be used to solve various complex decision-making problems in a factory environment [9].

The MOORA method has a level of flexibility and ease of understanding in separating the subjective parts of an evaluation process into decision weight criteria with several attributes of decision making [10]. This method has a good level of selectivity because it can determine the objectives of conflicting criteria. Where the criteria can be beneficial (benefit) or not profitable (cost) [11]. The MOORA method is applied to solve many economic, managerial and construction problems in a company or project. This method has a good level of selectivity in determining an alternative. The approach taken by MOORA is defined as a process simultaneously to optimize two or more conflicting criteria on several constraints [12].

METHODOLOGY

3.1 Research Framework

The research framework clearly illustrates the flow or stages that will be traversed in carrying out this research. There are three phases where research related to determining Smart TV is carried out. The following figure is the phases worked on to support the creation of the best Smart TV determination application program.

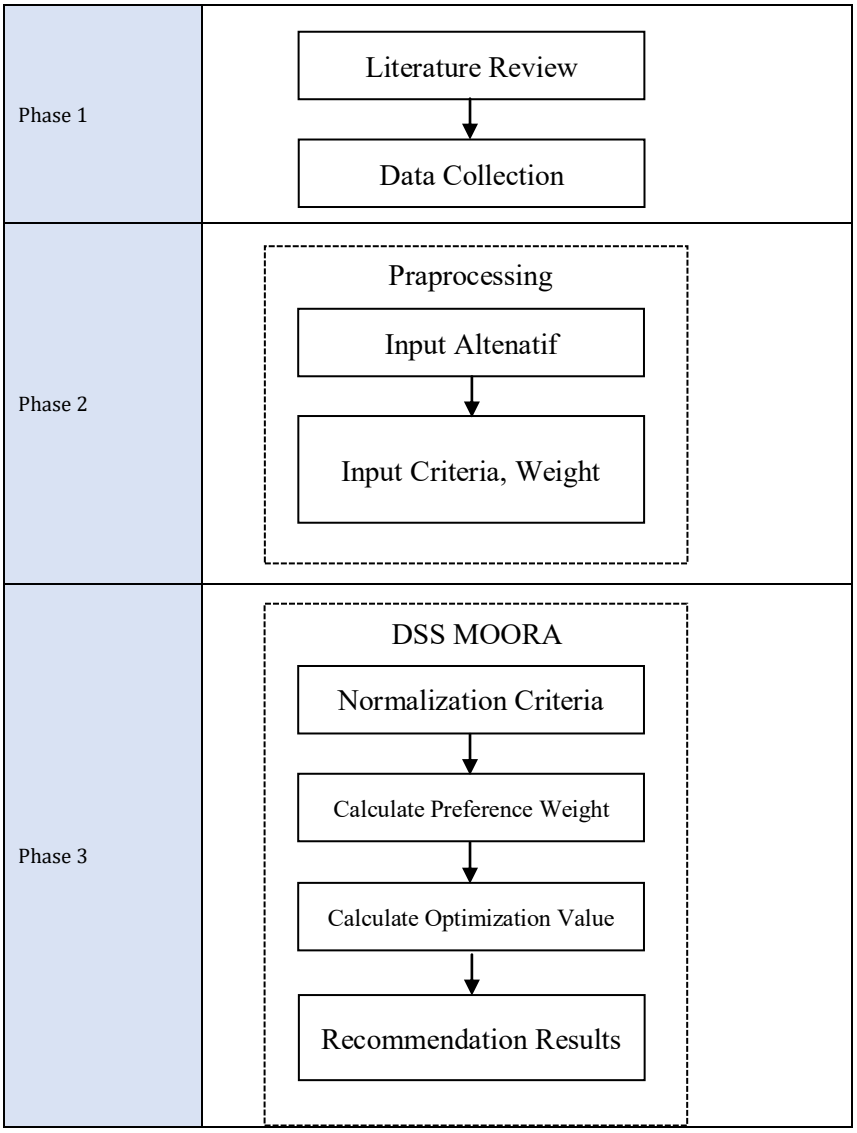

Figure 1. Research Framework

3.2 Criteria Design

Criteria design is division or weighting based on predetermined criteria categories. This design aims to minimize the values that have differences to be grouped into values that have similarities to facilitate the calculation of decision support systems with the MOORA method. The following tables is a grouping of criteria.

Table 1. Criteria of Price

Price (IDR)	Weight
0 - 2.000.000	1
2.000.000 - 4.000.000	2
4.000.000 - 7.000.000	3
7.000.000 - 10.000.000	4
> 10.000.000	5

Table 2. Criteria of Resolution

Resolution	Weight
720	1
1080	2
2K	3
4K	4
8K	5

Tabel 3. Criteria of Port

Port	Weight
RCA	1
RCA, HDMI	2
RCA, HDMI, VGA	3
RCA, HDMI, VGA, USB	4
RCA, HDMI, VGA, USB, LAN/WIFI	5

Table 4. Criteria of Screen Type

Screen	Weight
LCD	1
LED	2
IPS	3
AMOLED	4
Super AMOLED	5

Table 5. Criteria of Size

Size (inch)	Weight
24	1
32	2
43	3
55	4
65	5

Tables 1 to 5 are weighted to the five criteria that support the determination of the best Smart TV. Ratings or weights are given on a scale of 1 to 5, where a value of 1 is for the worst rating, and 5 is for the best rating.

RESULT AND DISCUSSION

The chapter is to test the results of a decision support system calculation to determine the best Smart TV. Testing is done in two ways, namely manually and using the application program. Both outputs must obtain the same MOORA value so that the calculation does not experience an error. Several steps need to be done in calculating the value of MOORA, namely the provision of alternatives, criteria, and preference weights. Table 6 is the initial data used.

Table 6. Data

		Harga	Resolusi	Port	Jenis Layar	Ukuran Layar
No.	**Alternatif**	**C1**	**C2**	**C3**	**C4**	**C5**
		Cost	Benefit	Benefit	Benefit	Benefit
1	Samsung 4K Frame Smart TV	18.000.000	4K	RCA, HDMI, VGA, USB, LAN/WIFI	S. AMOLED	65
2	LG c8 OLED TV	22.000.000	4K	RCA, HDMI, VGA, USB, LAN/WIFI	AMOLED	55
3	SONY Bravia 4K OLED TV	40.000.000	4K	RCA, HDMI, VGA, USB	LED	55
4	PANASONIC FZ802/FZ800 4K Pro OLED TV	18.000.000	4K	RCA, HDMI, VGA	IPS	55
5	SHARP Aquos N7000 Smart TV	15.000.000	4K	RCA, HDMI	IPS	55
6	Hisense H8E Smart 4K UHD TV	7.000.000	4K	RCA, HDMI, VGA, USB, LAN/WIFI	LED	50
7	Philips 6753 Ambilight TV	10.500.000	2K	RCA, HDMI, VGA, USB, LAN/WIFI	LED	50
8	Toshiba 32L5650	8.000.000	1080	RCA, HDMI, VGA	IPS	50
9	Changhong L40G5i Smart TV LED 40	3.000.000	1080	RCA, HDMI, VGA, USB	LCD	40
10	LG LED Smart TV 55″ 55UJ632T	10.000.000	1080	RCA, HDMI, VGA, USB	LED	40

The data above is the data that is used as the initial Smart TV data. In the data, there are five criteria used to support the MOORA process. Each criterion is filled with specific values. This criterion must be normalized to determine the MOORA value. Table 7 is the result of normalization criteria.

Table 7. Data after normalization criteria

		Harga	Resolusi	Port	Jenis Layar	Ukuran Layar
No.	Alternatif	C1	C2	C3	C4	C5
1	Samsung 4K Frame Smart TV	4	4	5	5	5
2	LG c8 OLED TV	5	4	5	4	4
3	SONY Bravia 4K OLED TV	5	4	4	2	4
4	PANASONIC FZ802/FZ800 4K Pro OLED TV	4	4	3	3	4
5	SHARP Aquos N7000 Smart TV	3	4	2	3	4
6	Hisense H8E Smart 4K UHD TV	2	4	5	2	3
7	Philips 6753 Ambilight TV	3	3	5	2	3
8	Toshiba 32L5650	2	2	3	3	3
9	Changhong L40G5i Smart TV LED 40	1	2	4	1	2
10	LG LED Smart TV 55″ 55UJ632T	2	2	4	2	2

Data after normalization has weight values between 1 and 5. This weighting serves to simplify the calculation of MOORA. The next step is to determine the preference weights. Table 8 shows the preference weights used.

Table 8. Preference Weight

Criteria	Weight	Normalization	Percent
C1	3	0,16	16%
C2	5	0,26	26%
C3	2	0,11	11%
C4	4	0,21	21%
C5	5	0,26	26%
C6	19	1	100%

Table 9. Normalization of Criteria

		Price	Resolution	Port	Screen	Size
No.	Alternative	C1	C2	C3	C4	C5
1	Samsung 4K Frame Smart TV	0,3763	0,3698	0,3835	0,5423	0,4490
2	LG c8 OLED TV	0,4704	0,3698	0,3835	0,4339	0,3592
3	SONY Bravia 4K OLED TV	0,4704	0,3698	0,3068	0,2169	0,3592
4	PANASONIC FZ802/FZ800 4K Pro OLED TV	0,3763	0,3698	0,2301	0,3254	0,3592
5	SHARP Aquos N7000 Smart TV	0,2822	0,3698	0,1534	0,3254	0,3592
6	Hisense H8E Smart 4K UHD TV	0,1881	0,3698	0,3835	0,2169	0,2694
7	Philips 6753 Ambilight TV	0,2822	0,2773	0,3835	0,2169	0,2694
8	Toshiba 32L5650	0,1881	0,1849	0,2301	0,3254	0,2694
9	Changhong L40G5i Smart TV LED 40	0,0941	0,1849	0,3068	0,1085	0,1796
10	LG LED Smart TV 55″ 55UJ632T	0,1881	0,1849	0,3068	0,2169	0,1796

Tabel 10. Optimization Value

No.	Alternative	Y-Max	Y-Min	Y
1	Samsung 4K Frame Smart TV	0,3690	0,0602	0,3088
2	LG c8 OLED TV	0,3228	0,0753	0,2475
3	SONY Bravia 4K OLED TV	0,2688	0,0753	0,1935
4	PANASONIC FZ802/FZ800 4K Pro OLED TV	0,2832	0,0602	0,2230
5	SHARP Aquos N7000 Smart TV	0,2747	0,0452	0,2295
6	Hisense H8E Smart 4K UHD TV	0,2539	0,0301	0,2238
7	Philips 6753 Ambilight TV	0,2299	0,0452	0,1847
8	Toshiba 32L5650	0,2118	0,0301	0,1817
9	Changhong L40G5i Smart TV LED 40	0,1513	0,0151	0,1362
10	LG LED Smart TV 55″ 55UJ632T	0,1741	0,0301	0,1440

After being sorted from largest to smallest, obtained the best Smart TV list. For example, if we take the two best Smart TVs, the result is Samsung 4K Frame Smart TV and Hisense H8E Smart UHD TV.

CONCLUSION

From the results obtained by the MOORA method in determining the best Smart TV tablets, some conclusions can be drawn from the results of this study. The MOORE method works very quickly in determining Smart TV to be purchased by consumers. The preference weights can be used to get the focus of the criteria so that the results of recommendations can vary. The resulting optimization value has high accuracy based on the results of the recommendations received.

REFERENCES

1. I. Cholissodin, R. Nurrachman, W. N. U. Albab, M. U. Mubiin, R. Krusdianto, and I. Safii, “Sistem Pendukung Keputusan Pemilihan Smart TV Menggunakan Metode Analytical Hierarchy Process Dan Weight Product,” *INFOSYS J.*, pp. 1–12, 2019.

2. B. Basiroh and M. Nur Hilal, "Decision Support System In Determining Class On Accupuncture Clinic," in *Proceedings of the Proceedings of The 2nd International Conference On Advance And Scientific Innovation, ICASI 2019, 18 July, Banda Aceh, Indonesia*, 2019.
3. D. Nofriansyah, "Konsep Data Mining Vs Sistem Pendukung Keputusan," *Deepublish*. 2014.
4. E. Rochman *et al.*, "Decision Support System of Poor Community Category in Sampang District using AHP (Analytical Hierarchy Process)," in *Proceedings of the The 1st International Conference on Computer Science and Engineering Technology Universitas Muria Kudus*, 2018.
5. R. Fiati, "An Analysis of SAW Modelling Results and TOPSIS As a Recommendation for Toddlers' Health Recovery at Mother and Children Health Care Center," in *Proceedings of the The 1st International Conference on Computer Science and Engineering Technology Universitas Muria Kudus*, 2018.
6. L. A. Latif, M. Jamil, and S. H. Abbas, *Sistem Pendukung Keputusan: Teori dan Implementasi*. Yogyakarta: Deepublish, 2018.
7. C. Hellyana, E. Pratama, S. Fitriana, F. I, R. Wijianto, and V. Ma'arif, "Comparison Methods of ELECTRE and Simple Additive Weigthing (SAW) Methods in Determining the Best Employees of Reward Recipients," in *Proceedings of the The 1st International Conference on Computer Science and Engineering Technology Universitas Muria Kudus*, 2018.
8. W. Brauers, R. Ginevicius, and A. Podviezko, "Development of a methodology of evaluation of financial stability of commercial banks," *Panoeconomicus*, vol. 61, no. 3, pp. 349–367, 2014.
9. Diana, *Buku Metode Dan Aplikasi Sistem Pendukung Keputusan*. Yogyakarta: Deepublish, 2018.
10. U. K. Mandal and B. Sarkar, "Selection of Best Intelligent Manufacturing System (IMS) Under Fuzzy MOORA Conflicting MCDM Environment," *Int. J. Emerg. Technol. Adv. Eng.*, vol. 2, no. 9, pp. 301–310, 2012.
11. S. Manurung, "Sistem Pendukung Keputusan Pemilihan Guru Dan Pegawai Terbaik Menggunakan Metode MOORA," *J. SIMETRIS*, vol. 9, no. 1, pp. 701–706, 2018.
12. R. Attri and S. Grover, "Decision making over the production system life cycle: MOORA method," *Int. J. Syst. Assur. Eng. Manag.*, vol. 5, no. 3, pp. 320–328, Sep. 2014.