

IMPLEMENTATION OF PROFILE MATCHING METHOD IN DECISION SUPPORT SYSTEM SMARTPHONE SELECTION BASED ON CONSUMER NEEDS

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ABSTRACT

Smartphones are Internet-enabled phones and typically provide Personal Digital Assistant (PDA) functions such as calendar functions, to-do books, address books, calculators, and notes. At first, the smartphone is a rare item and considered luxurious. However, the lack of community information about smartphone specs also greatly affects the selection of smartphones they will use. Smartphones have a variety of specifications such as processor speed, clear screen, battery life, camera strength, and storage space that makes people tend to be confused in buying a smartphone. For that people need a computerized system that can assist consumers in obtaining a decision to choose a smartphone that suits the wants and needs. Decision Support System (SPK) is a process of selecting alternative actions to achieve a specific goal or goal. SPK is used as a tool for decision-makers to develop decision-making capabilities, but not to replace judgments of decision makers. This SPK test uses Profile Matching Method by looking at the calculation of Criteria Weight Value, Calculation of Sub-Criteria Weight Value, Gap Value calculation, Core Factor and Secondary Factor calculation, and Total Value Ranking Calculation. The end result of this system is ranking the existing smartphone according to the criteria that the buyer has input.

Keywords: Smartphone, SPK, Decision Support System, Core and Secondary Factor

INTRODUCTION

As the development of the increasingly sophisticated era, has brought many changes to human life, especially in the field of technology and communication. Currently people use mobile phones not just to send text messages or to call. But more than that the function of mobile phones has increased, ranging from the camera feature, internet browsing, to social media. Mobile that has the function better known by the name of the smartphone. One solution to problem solving is using a decision support system. This system is used as a process to get quicker and more accurate decision. Decision support system combines the capabilities of a computer in interactive services with the processing or manipulation of data or models that utilize unstructured settlement rules (Conejar and Kim, 2014; Mohemad *et al.*, 2010) .Decision support system (SPK) is a computer-based information system that combines models and data to provide support to decision makers in solving structured problems (Power, 2007).

On the other hand, the lack of community information about smartphone specs also greatly affects the selection of smartphones they will use. Smartphones have a variety of specifications such as processor speed, clear screen, battery life, camera strength, and storage space that makes people tend to be confused in buying smartphone. For that we need a computerized system that can assist consumers in obtaining the decision to choose a smartphone that is compatible

with the needs. With so many types, brands, and smartphone models that circulate in the market will cause potential buyers to be observant in choosing products that suit their needs. Through questionnaires that have been spread, there are some vendors that become the favorite place of Palembang people in buying a smartphone. There are Eraphone, MDP Store, PS Mall Electronic Outlet, and Online shop. Meanwhile, there are also criteria that become the benchmark Palembang community in buying a smartphone, the criteria are price, internal memory, RAM, front camera, rear camera, battery capacity, screen size.

MATERIALS AND METHODS

Decision Support System

DSS supports decision maker to use very large databases, support managers to apply checklists and rules, make extensive usage of mathematical models (Power, 2007). The role of human capital has changed and used the DSS to make strategic decisions (Edvinson and Malone, 1997). Companies have to become aware of new possibilities that have been produced by the maturation of information and communication technologies in the warehousing and sharing of data. Managers and decision makers needs relevant and topical information about their business and the business environment. Companies are forced to utilized business information more effectively than before and this is not possible without systematic information management. Information management consists of identifying what information is required, how it should be gathered, how it should be formed, where it should be stored, and who in the company should own admittance to it (Tiwana, 2002). The world convert into globalization and business have also gone across the boundaries and known as international business. Evidence of the competitive business environment, companies introduced DSS for better decision making. Jain (2000) presents factors to marketing performance, strategic planning, organizational support, knowledge management and technology innovation. These factors are identifying as input factors towards marketing performance. DSS/BI is moderator variable which effect on the relationships between marketing performance and above mentions factors. Strategic planning analyzes the competition, market dynamics and environmental shifts (Jain, 2000).

Organizational support has two dimensions. The first one is organization behavior and the second is organizational management. These two dimensions are separately subdivided into different factors. Organizational behavior divided into organizational culture, organizational commitment and organizational learning. Organizational management is divided into organizational structure, change management, conflict management, and organizational communication. Knowledge management is a discipline that promotes an integrated approach to identifying capturing, evaluating, retrieving, and sharing all of an enterprise's information assets. These assets may include databases, documents, policies, procedures, and previously un-captured expertise and experience in individual workers (Duhon, 1988). Technology innovation increases the competition between companies. Increase of advance technology improves the DSS/BI tools that can

support user to make better and more competitive decisions. Technology plays a significant part in managing marketing decision takes accurately. To take market decision accurately, an organization needs to integrate the right technology (Chalmeta, 2006). Decision support systems support users in decision making and problem solving (Duan and Burell, 1995).

Result and Discussion

Based on the results of Likert scale calculations on the above, it is concluded there are 7 main criteria in determining the selection of smartphones based on the needs of buyers, namely: Price, Internal Memory, Front Camera, RAM, Rear Camera, Battery Capacity, and Screen Size.

Table 1.
 Smartphone Criteria Weight

No	Criteria	Initials	Weight
1	Price	C1	5
2	Internal Memory	C2	5
3	Rear Camera	C3	5
4	RAM	C4	4
5	Front Camera	C5	4
6	Battery Capacity	C6	3
7	Screen Size	C7	3

Determination of weight value that has been obtained from the results of the questionnaire here will be the determinant of Core Factor and Secondary Factor and become the weight value used to determine the Gap on Profile Matching method.

Calculation of Weight Value of Sub Criteria

The following is the weighting of sub criteria obtained from the questionnaire that has been filled by the respondent.

Table 2.
 Weight Sub criteria Price

Sub Price	Value
1.000.000 – 1.499.999	5
1.500.000 – 2.999.999	4
3.000.000 – 4.999.999	3
5.000.000 – 6.999.999	2
> 7.000.000	1

Table 3.
 Weighted Sub Criteria RAM

Sub RAM	Value
6 GB	5
4 GB	4
3 GB	3
2 GB	2
1,5 GB	1

Table 4.
 Weight of Internal Memory Criteria

Sub Internal Memory	Value
64 GB	5
32 GB	4
16 GB	3
8 GB	2
4 GB	1

Table 5.
 Weight of Front Camera Criteria

Sub Front Camera	Value
21-25 MP	5
16-20 MP	4
11-15 MP	3
6-10 MP	2
2-5 MP	1

Table 6.
 Weight of Rear Camera Criteria

Sub Rear Camera	Value
21-25 MP	5
16-20 MP	4
11-15 MP	3
6-10 MP	2
2-5 MP	1

Table 7.
 Weight Sub Criteria Battery Capacity

Sub Battery Capacity	Value
3000 - 3500 mAh	5
2600 - 2900 mAh	4
2100 - 2500 mAh	3
1600 - 2000 mAh	2
1100 - 1500 mAh	1

Table 8.
 Weighted Sub Screen Criteria Size

Sub Screen Size	Value
> 6 inch	5
5,5 - 6 inch	4
5 - 5,4 inch	3
4 - 4,9 inch	2
< 4 inch	1

The determination of Core Factor and Secondary Factor values was obtained from the recapitulation result and determined from the questionnaires already filled by the respondents. Here are the results of Core Factor and Secondary Factor:

Table 9.
 Core Factor and Secondary Factor Score

No.	Criteria	Weight	Type	Abbreviation
1.	Price	5	CF	C1
2.	Internal Memory	5	CF	C2
3.	Rear Camera	5	CF	C3
4.	RAM	4	SF	C4
5.	Front Camera	4	SF	C5
6.	Battery Capacity	3	SF	C6
7.	Screen Size	3	SF	C7

Gap Value Calculation

Having obtained the value of the profile of each criterion, then the next calculation of competency gaps.

Table 9.
 Smartphone Candidate Specification Data

Initials	Criteria	Samsung Galaxy S7 Flat	LG K10 2017	Xiaomi Redmi 4A
C1	Price	3.800.000	2.500.000	1.350.000
C2	Internal Memory	32 GB	16 GB	32 GB
C3	Rear Camera	12 MP	13 MP	13 MP
C4	RAM	4 GB	2 GB	2 GB
C5	Front Camera	5 MP	5 MP	5 MP
C6	Battery Capacity	3000 mAh	2800 mAh	3120 mAh
C7	Screen Size	5.1 Inch	5.3 Inch	5.0 Inch

Table 10.
 Table Determination of GAP Profile Smartphone Value

No	Smartphone Candidate	Criteria						
		C1	C2	C3	C4	C5	C6	C7
1	Samsung Galaxy S7 Flat	3	4	3	4	1	5	3
2	LG K10 2017	4	3	3	2	1	4	3
3	Xiaomi Redmi 4A	5	4	3	2	1	5	3
Weight Criteria Value		5	5	5	4	4	3	3
GAP Value								

1	Samsung Galaxy S7 Flat	-2	-1	-2	0	-3	2	0
2	LG K10 2017	-1	-2	-2	-2	-3	1	0
3	Xiaomi Redmi 4A	0	-1	-2	-2	-3	2	0

Having obtained the value of each smartphone gap, then each smartphone profile value is given the weight of the value with the benchmark weighted table gap value. The following table weighted the gap value (Sari, 2015):

Table 11.
 Weighting Gap Profile Smartphone

No.	Gap	Weight Value	Description
1	0	5	No difference (Competence as required)
2	1	4.5	The individual competence is excess of 1 level / level
3	-1	4	Individual competencies lack a level / level
4	2	3.5	Competence of individual excess 2 levels / level
5	-2	3	Individual competencies lack two levels
6	3	2.5	The individual competence is 3 levels
7	-3	2	Individual competence lacks 3 levels / levels
8	4	1.5	Competence of individual excess 4 levels / level
9	-4	1	Individual competencies lack four levels

Here is the weight value of each smartphone after going through the process of calculating the gap and matching with a weighted table of gap values.

Table 12.
 Weighting Gap Value

No	Smartphone Candidate	C1	C2	C3	C4	C5	C6	C7
1	Samsung Galaxy S7 Flat	3	4	3	5	2	3.5	5
2	LG K10 2017	4	3	3	3	2	4.5	5
3	Xiaomi Redmi 4A	5	4	3	3	2	3.5	5

Calculation of Core Factor and Secondary Factor

After all the gap values are obtained, the next process is to group these competencies into Core Factor (CF) and Secondary Factor (SF) groups. The formula is: To calculate the Core Factor,

$$NCF = \frac{\sum NC}{\sum IC}$$

To calculate Secondary Factor,

$$NSF = \frac{\sum NS}{\sum IS}$$

Information:

NCF: the mean value of core factor

NC: total value of core factor

IC: number of core factor items

NSF: the mean value of secondary factor
 NS: total number of secondary factor values
 IS: number of items secondary factor

Furthermore, the existing criteria are grouped, then calculated the value of CF and SF it. In the present study the price criteria (C1), Internal Memory (C2), and Rear Camera (C3) became the core factor, while the other criteria were the supporting criteria. Then calculated using the formula:

$$NCF = \frac{3 + 4 + 3}{3} = 3,3$$

$$NSF = \frac{5 + 2 + 3.5 + 5}{4} = 3.88$$

Table 13.
 Weighting Gap Core Factor and Secondary Factor

Smartphone Candidate	C1	C2	C3	C4	C5	C6	C7	CF	SF
Samsung Galaxy S7 Flat	3	4	3	5	2	3.5	5	3.3	3.88
LG K10 2017	4	3	3	3	2	4.5	5	3.3	3.62
Xiaomi Redmi 4A	5	4	3	3	2	3.5	5	4	3.38

Calculation of Total Value

Based on the calculation of each criteria above, then calculated the total value based on the percentage of core and secondary factor which is expected to affect the performance of each profile. The formula is:

$$N = (X) \% NCF + (X) \% NSF$$

Description:

N: the total value of each aspect

NCF: the mean value of core factor

NSF: the mean value of secondary factor

(X)%: percentage value entered

The total value calculation is:

$$N = (60\% \times 3.3) + (40\% \times 3.88) = 3.532$$

Table 14.
 Calculation of Total Value

No	Smartphone Candidate	CF	SF	Weight Value
1	Samsung Galaxy S7 Flat	3.3	3.88	3.532
2	LG K10 2017	3.3	3.62	3.428
3	Xiaomi Redmi 4A	4	3.38	3.752

Ranking

From the calculation of the total value above, then the value of each alternative sorted from the largest to the smallest.

Table 15.
 Ranking

No	Smartphone Candidate	CF	SF	Weight Value
1	Xiaomi Redmi 4A	4	3.38	3.752
2	Samsung Galaxy S7 Flat	3.3	3.88	3.532
3	LG K10 2017	3.3	3.62	3.428

Based on the calculations that have been done by using Profile Matching method in this study based on the value of evaluation weight on each Smartphone, it can be concluded that alternative Xiaomi Redmi 4A selected as smartphone required by consumers because it has the highest total value of other smartphone data.

CONCLUSION

This research produces Decision Support System that can be applied and integrated with existing smartphone database on research object, that is MDP Store Palembang, Erafone, and HP PS Mall Outlet. Profile Matching method can be used to compare between smartphone candidates with each other based on existing criteria, namely price, internal memory, rear camera, RAM, front camera, screen size, and battery capacity and with this research is expected to provide convenience (effectiveness and efficiency) for users in comparing and selecting smartphones in accordance with the criteria and needs. The end result of this system is ranking system the existing smartphone according to the criteria that the buyer has input. The system also does not serve the process of buying and selling and only generate smartphone recommendations, so the final decision remains on the buyer

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