Knowledge-based Utilization in Organizational IT Support. A Case Study at BPS-Statistics Indonesia

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Abstract. Many problems in the IT sector are experienced by employees in carrying out daily government activities. The problems faced often disrupt government activities in providing services to the community. This study analyzes the IT problems that are often found in organizations and their impacts. As many as 43 people have participated in the survey to identify what problems are often experienced and the impact they have had. The survey started with 7 IT service groups and produced 37 IT problems. The result is an implementation of a knowledge-based system that can help employees in solving IT problems on their own in their work environment.

1. Introduction

The President of Indonesia has formulated a priority program that is outlined in the Nawacita. This program was initiated to show priority changes to an Indonesia that is politically sovereign, economically independent, and has a cultural personality. One of the programs in it is digital transformation in the government sector. This program aims to make the performance of all government organizations more effective and efficient. One of the points of the 2020-2024 BPS Strategic Plan also establishes effective and efficient IT to support the provision of quality statistical data and information.

One of the changes that have occurred in digital transformation is the use of IT to support business processes in government. The use of IT can increase the efficiency of organizations [1]. IT supports business process automation which can cut long and time-consuming processes so that the business process flow becomes more efficient.

However, the transformation in business processes is hampered due to ineffective IT implementation.

The use of IT cannot be separated from the problems experienced by its users. 78% of internal organizations still experience problems and difficulties in technical matters [2]. These problems become obstacles in running an organization's business processes. In the government sector, obstacles that occur in IT implementation can have an impact on services to the public. It can be concluded that the problems that occur in the implementation of IT have a crucial influence on the output of public services.

Based on these problems, this study aims to explore these research questions "What information system design to support everyday IT problem-solving at BPS?". This study provides an overview of the flow of analysis, development, and implementation of information system design in an organization.

2. Theoretical Background

Knowledge Management (KM) is a process to find, capture, disseminate, and apply knowledge so that it can achieve the goals of an organization [1]. In addition, the implementation of KM can also increase the competitive value of an organization [2]. KM is considered central to product and service innovation, executive decision-making, and organizational adaptation and renewal in government [3]. KM is also a tool for transferring knowledge. Even for organizations whose employees are cross-generational [4].

KM has been widely implemented in organizations, companies, and governments. The implementation also covers many fields such as finance [5], services [6], supply chain [7], education [8,9,10], and others. However, not all organizations are ready to implement KM [11]. Various factors affect the implementation of KM in organizations, such as perceived compatibility, top management support, complexity, benefits, competitive pressure, and organizational culture [12].

A knowledge-based Information System (KBS) is one type of KM solution. KBS is an information system that makes the knowledge function approach the main source of information [1]. KBS is widely used in the implementation of KM in organizations because knowledge is seen as a good resource to improve processes of administrative in government organizations [13].

The rapid development of Information Technology (IT) has affected all social systems and made technology an inevitable life part [3]. Including the continuity of the organization that cannot be separated from IT support. Organizations need a strong relationship between business and IT to achieve long-term success [4]. However, IT implementation in an organization is not without problems. As figure 1 shows, there are seven types of IT services, namely a) internet, b) network infrastructure, c) hardware, d) system security, e) system integration, f) software, and g) IT maintenance [2].
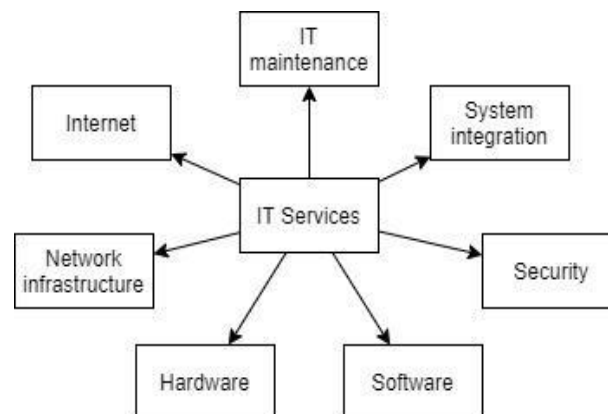

Figure 1. General IT Services

IT support in an organization has a close relationship with KM. IT plays a role in supporting the implementation of KM in an organization [14]. IT plays a role in significant investment that supports KM practice in organizations. IT also has a vital task in increasing knowledge resources in an organization [15]. Conversely, KM can also be used to help solve problems in IT implementation. Disseminated and implemented knowledge can improve the performance of an organization [7].

3. Methodology

This research utilizes a qualitative approach to obtain information on IT issues that often become problems in daily activities at BPS. We analyzed the collected data which were then used as a benchmark for compiling the proposed KM solution.

3.1 Data collection

Data was collected through an online survey of IT coordinators at BPS in all regions. The questionnaire contains 16 open-ended questions about IT problems that are often experienced and how they affect them. Based on types of IT services [2] we initiated 7 groups of services that are mostly experienced by users i.e.

- Internet: this group includes internet services to employees, both in terms of quality and availability of services.
- Network infrastructure: this service includes access to local devices that are still directly connected to the user.
- Hardware: the use of PCs/laptops, tablets, printers to supporting devices such as UPS, hand key machines, and others is a service that is widely used by employees daily.
- Software: employees are also provided with services to use supporting office software as well as access to several systems at BPS, which are almost entirely connected online.
- Security: security protection for various applications is also provided to employees, such as protection against phishing emails, protection against viruses and malware, and others.
- System integration: to support the use of tiered applications from regencies/cities, provinces to the center, there needs to be good data integration so that no data is lost or delayed in delivery.
- IT maintenance: in addition to supporting when problems are found, the devices and software used are also routinely maintained so that the likelihood of problems occurring is small.

3.2 Data analysis

Data is processed using the sensemaking method furthermore. This method is suitable for capturing the phenomenon as a whole through the process of framing, data collection, and appropriate analysis to arrive at a substantive theory [16]. From the given answers we analyzed and grouped into 7 IT service groups. This method can provide more structured information. Grouping information is used as a base to support system development.

4. Result and Discussion

4.1. Data collection

A total of 97 people have participated and have the eligible answer in the survey. They are spread across several offices that are geographically separated but have the same role which is to be responsible for technical IT support at BPS.

Table 1. Respondent demography

Age	Gender		
	Male	Female	Total
20-24	3	4	7
25-29	8	3	11
30-34	36	6	42
35-39	12	1	13
40-44	3	2	5
45-49	6	1	7
50 >	8	4	12
Total	76	21	97

Table 1 shows that respondents are dominated by male employees (78%) and aged 30-34 years (43%). This illustrates that employees in charge of IT in each office are dominated by male employees in productive age.

4.2. Problems grouping analysis
We have analyzed several IT problems that are often experienced by employees and then grouped by type of service as illustrated in table 2.

Table 2. IT services problems grouping

No	Types of services	Problems	No	Types of services	Problems
1	Internet	Internet access problems			Application installation failed
		Internet access speed is slow			The database backup process on the BPS application failed
		Inadequate bandwidth availability			The BPS application database cannot be accessed
2	Network infrastructure	Problem local network access			Application installation was unsuccessful
		Local network access speed is slow			VICON is not working properly
		Firewall & Router problems	5	Security	Interference with phishing, spamming, etc. on Email
3	Hardware	The connection to the handkey machine has a problem			Firewall interference
		PC/laptop is slow in processing/hangs			Viruses, malware, spyware, etc. on your PC/laptop
		PC/laptop dead	6	System integration	The attendance recap is not synchronized to the central attendance system
		Laptop or Tablet is free of charge			Employee status, position/grade are not synchronized with the TK Online application
		PC turns on but no display appears on the monitor	7	IT maintenance	Hardware often breaks down
		Print results are unclear/faded/streaked			The operating system is not up to date
		The printer/Scanner is damaged	8	Others	Email cannot be accessed
		UPS is damaged			Forgot username/password
4	Software	BPS application error			Email quota full
		BPS web application cannot be accessed			Submission of a new email account
		Force-closed BPS web application			The Laci BPS website cannot be accessed
		Failed to save (upload) data to the central server using web application			

Hardware and software services are widely used by employees to do the work. Many employees have complained about disturbances on PCs/laptops, tablets, and other supporting tools such as UPS and printers. Employees have also complained about the use of software and application systems. Disturbances such as inaccessible websites, failed backup processes or data transmission, to unsuccessful application installations were experienced by many employees.

The disturbances experienced by employees certainly have an impact on the job. From the questions posed, almost all employees answered that the disturbance they experienced was an obstacle to the work being carried out. Employees must rearrange their work schedules, adjusting to predetermined deadlines. In addition, many disturbances cause employees to have to repeat work that has been completed previously. Not only had an impact on employees, some disruptions even had a direct impact on the services provided to the public.

4.3. Design and system development

After formulating the IT problems we design a solution system. we designed a proposed system where users can search, get, and ask the topic of IT problems to experts or a knowledgeable person who stated as agents. Employee as a user can read and search article also can create a question ticket if their problems not solved. Knowledge Agent as knowledge producer has a role to create and manage knowledge on the system. Then admin can manage content, user, and service groups on the system. Figure 2a and 2b below shows the use case and class diagram activities in the system design.
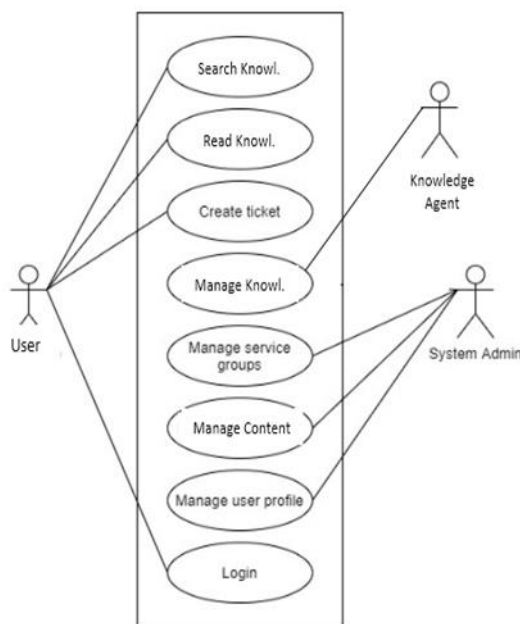

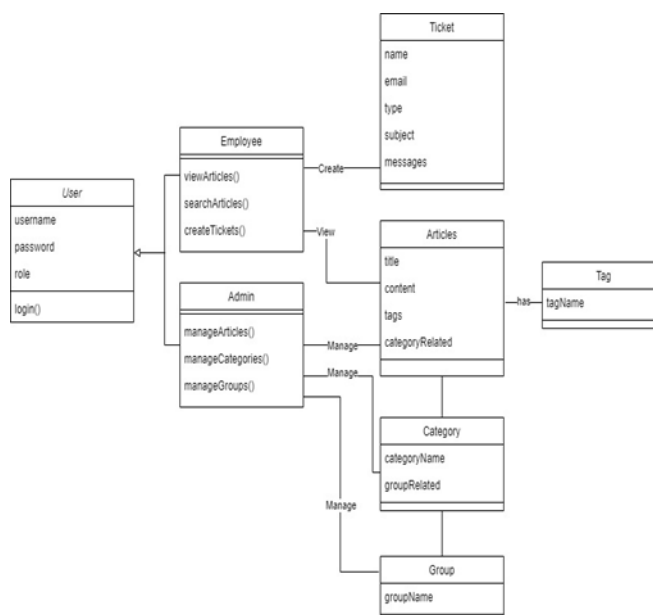**Figure 2a.** Use case diagram   **Figure 2b.** Class diagram activity

All designs were then implemented to a knowledge-based information system, named HaloSiTI. The main features in HaloSiTI are

- Knowledgebase discovery: users can search for the solution for their problems through a keyword search or choose topic categories (figure 3a).
- Knowledge search result: system display the search result as knowledge to the users (figure 3b).
- Ticket creation: another useful way to get knowledge if existing information in the system has not solved the problem (figure 3c).
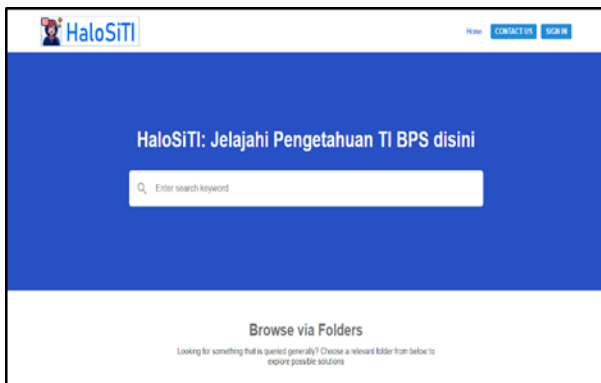- Knowledge & System Management: content and knowledge management system from admin (figure 3d).
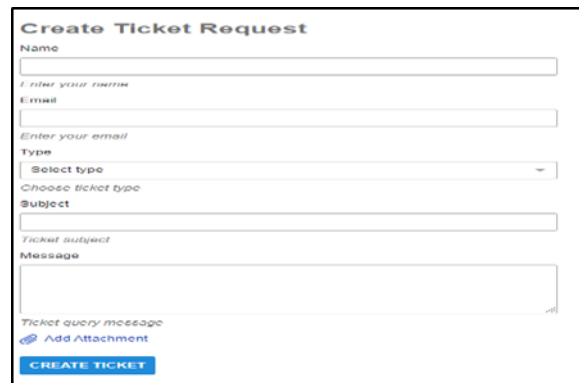
Figure 3a. Knowledgebase discovery

Figure 3c. Ticket creation

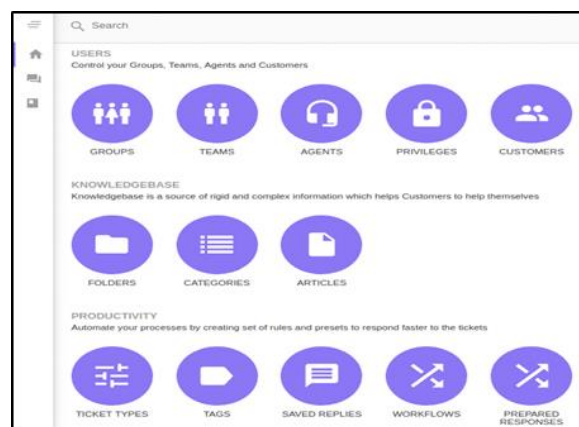**Figure 3b.** Knowledge search result

Figure 3d. Knowledge & system management

5. Conclusion

We have developed a new knowledge-based information system to support IT problem-solving at BPS. The offered solution is to create a system that can be used as a medium to get knowledge for employee's IT problems. The stored knowledge in the system generates knowledge values because it helps users directly to solve IT problems.

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