HUMANIS
(Humanities,Management and Science Proceedings)

Vol. 2 • No. 1 • December 2021

Pege (*Page*): 349 – 359

ISSN (*online*): 2746 - 4482
ISSN (*print*): 2746 - 2250

Special Issue :
ICoMS2021
The 2nd International Conference on Management and Science

Website. :
http://www.openjournal.unpam.ac.id/index.php/SNH

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MIS Application Increases Blood Donation Participants at Indonesian Red Cross (PMI) Towards 2025

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Abstract: Based upon Government Regulation No. 7 of 2011, the Indonesian Red Cross (PMI) has carried out blood donation services in Indonesia. The Management Information System (MIS) of Blood Donation owned by PMI's Blood Donation Unit (UDD) has not yet reached all parts of Indonesia, both for internal use and for public access due to several factors, such as, the low capacity of PMI in some areas and the lack of optimal synergized system at PMI with other stakeholders. Based on the SWOT analysis that has been developed, this paper provides suggestions on how the PMI Blood Donation Service Management Information System strategy has been utilized to increase blood donation participants by 2025. Involvement of the government and the business sector at every level through collaboration and a common goal of the need for blood bags is the key strategy to realize these goals, including how to get support from partners of the red cross movement from other countries, such as, the American Red Cross and the Australian Red Cross. These strategies should be developed into a roadmap for the grand design of the PMI blood donor service management information system towards 2025 to achieve the targeted 5.2 million blood bags per year, and of course, the target will continue to increase every year in accordance with population growth in Indonesia.

Keywords: MIS, PMI, blood donation, 2025

INTRODUCTION

Blood is an important element in the human body because it has various and vital functions. The condition of lack of blood is certainly fatal and, in the end, it has the potential to threaten a person's life. The Indonesian Red Cross or *Palang Merah Indonesia* (PMI) as a social organization that supports government tasks continues to carry out Blood Services based on Government Regulation (PP) N0. 7/ 2011 on Blood Services. The blood service at PMI is not for commercial purposes because it is a health service activity that utilizes human blood for humanitarian purposes. In accordance with the Government Regulation which

states that the organization of blood donation and processing is carried out by the Blood Donation Unit or *Unit Donor Darah* (UDD) which is under a social organization with the main tasks and functions in the Red Cross Movement sector or in this case PMI [1]. PMI is responsible for ensuring that blood donated from donors is safe. It is important to note that blood can also be a medium for the transmission of diseases, such as, HIV, Hepatitis B, Hepatitis C and Syphilis [2].

Since the past, PMI has continued to carry out blood donation campaigns as a lifestyle trend for the community. Referring to the standardization of the World Health Organization (WHO) where two percent of the population in a country will need blood and PMI has set a target of up to 5.2 million bags per year for national blood needs [2]. The demand for blood needs at any time from the community should be everyone's concern, especially to the government because it resulted in an impact on the health and survival of citizens. Often the bloodstock is not sufficient with the demand, and this condition occurs in several PMI districts/cities in Indonesia, even some of which are not available for Blood Donation Units within certain cities, and people must look for other cities closest to them. According to the Director-General of Health Services at the Ministry of Health, Abdul Kadir, data taken from the Director-General of Health in 2021, as many as 421 regencies/cities in Indonesia already have Blood Transfusion Unit or *Unit Transfusi Darah* (UTD), but there are still around 93 regencies/cities that do not yet have UTD [3]. This condition can certainly be fatal due to the long process, and it takes quite a long time to get the blood needed from one city to another. Even if they can manage to get to the UTD in the nearest city, it's not guaranteed that the patient will certainly get the blood because of bloodstock problems. This situation can be minimized if a good information system is available and well understood by the public. The ease of obtaining blood donation information will be very useful to avoid things that are detrimental to the community.

However, in the implementation of the blood donation service, several problems still arise such as the unavailability of an information system that can provide complete and integrated information, so that it is useful and easily accessible to the public, for example, information related to donor criteria, donor recipients, schedule, location, availability of bloodstock, and most importantly service cost. The information provided to the public is also often varied and the system is not yet centralized, even not all of them can be accessed. Simple initiatives have been developed by several PMI in each city such as providing information to the public on updating the availability of blood types on a daily basis and the mechanism for blood donation services in several digital platforms on social media (Facebook, Instagram, WhatsApp and Twitter) and some have attached this information on the organization's official website by several PMI districts/cities such as PMI in the city of Bekasi, Semarang, Surakarta and others, some are even more advanced by developing web-based information systems such as PMI DKI Jakarta, PMI Surabaya City, and using android based-system as implemented by PMI Semarang City.

Digital information systems have developed rapidly, and it is currently playing an important role in the dissemination of various information, both official and rumors. The benefits of this digital information system can be obtained and are easily accessible to the public in need, especially since the era of social media platforms such as Facebook, Instagram, and Twitter. The advancement of digital information has certainly become a challenge not only for PMI but for all users of blood donation services because the dissemination of this information if not managed wisely will provide incorrect information and can endanger all parties.

PMI has developed an MIS for Blood Donation services called SIMDONDAR or Blood Donation Management Information System in each UDD. Through this system, data, documentation, and record, can be shared and obtained for the blood needs and services as well has been integrated with the database at PMI National Headquarters because it is working online (real-time) [4]. However, SIMDONDAR is also not perfect, there are still some shortcomings in dealing with the problems that arise as it is still partial and for internal PMI. However, from this initiate system, PMI then developed a website-based Information

System, namely **Ayodonor**, which can be accessed by the public but has not yet functioned optimally.

Several studies related to blood donation service information systems have been conducted at PMI UDD in several cities such as Bandung [5], Pekanbaru [6], Samarinda [7], and Mojokerto [8] aimed to improve PMI blood donation services. The above studies have also been collected and reviewed by the author for a literature study. Based on Government Regulation Number 7 of 2011 concerning blood services, the Government is responsible for the implementation of blood services that are safe, useful, easily accessible, and in accordance with the needs of the community [1]. The success of the management of blood services is highly dependent on the availability of blood donors, facilities, infrastructure, personnel, funding, and methods. Therefore, its management must be operated in a standardized, integrated, and sustainable manner and carried out in a coordinated manner between the Government, regional governments, and the active participation of the private sector and the community. To achieve all the above, we certainly need an information system that can provide complete, easily accessible information and can provide education to the public about the importance of blood donation.

In 2025, PMI is expected to have a Road Map of a blood donor service information system that is centralized, integrated, and able to provide comprehensive and easy information that can be understood by the public. The detail road map can be seen in the results and discussion section.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The information system is a system that has the ability to collect information from various sources and use various media to display that information (McLeod, 2001). But in general, what is meant by Information System is a system that utilizes technology and human activities that interact with each other to support the performance of management and operational activities in this case humans, data, information, technology, and algorithms [9]. Each company manages information systems from various data to save the required resources and time. In addition to shortening the process of this data source can also be used anytime and anywhere.

PMI Blood Donation Service

Based on Indonesia Law no. 1 of 2018, one of PMI's tasks is to provide blood donation services by utilizing blood for humanitarian purposes and not for business purposes [10]. Referring to the Health Law and PP 7/2011 which states that blood donation activities are part of blood services. This blood donation activity is in a blood transfusion service which include planning, mobilizing and preserving blood donors, supplying blood, distributing blood, and giving blood to patients for the purpose of healing disease and restoring health [1].

Blood Donation Unit (UDD) is PMI's main facility that organizes **blood donations** including providing blood, processing, and distributing it to those in need**.** UDD PMI operates 1 (one) at UDD Main Center in Jakarta and 216 UDD in 215 Regencies/Cities throughout Indonesia which continues to campaign for blood donation as part of a lifestyle because the national blood demand per year is 5.2 million according to the standards of the World Health Organization (WHO) or 2% of the total population of Indonesia [11]. For making it easier for the public in blood donation services, the next effort is to provide Blood Donation outlets in several public facilities and community centers in the city, such as in malls and traditional Markets that served by PMI DKI Jakarta, PMI Bekasi City, PMI Surabaya City and PMI Makassar City. The blood donation outlet was also carried out at several campuses in Jakarta and Makassar.

UDD PMI in Indonesia has also started operating a 100 mobile blood donation unit since July 2011 in collaboration with partners to support PMI's blood donation services through the provision of blood donation fleets for PMI's UDD operations in 33 provinces in Indonesia.

Through this blood donation fleet, PMI in several areas can maintain regular blood stocks to meet blood needs for at least four days, in accordance with the 4 x 4 motto, which means that four million bags of blood are available for 4 days nationally [12]. PMI has also built a blood bag factory to reduce operational costs per unit of blood to make the price cheaper [12]. According to data, about 92% of these needs have only been met by the Indonesian Red Cross (PMI) [2].

This target is certainly a challenge for PMI so that an integrated and effective strategy is needed in the future. The role of a good information system is certainly important and needs to be the attention of all parties including the government and the private sector to support this noble goal. The public must be understood that the blood donation service certainly incurs a large operational cost starting from the initial administrative process and equipment such as a prospective donor form, a tool to check the donor's hemoglobin (Hb), needles, hoses, cotton swabs and bags to store blood [11]. The cost above does not include the components needed by the laboratory to check and ensure the safety of blood, storage of stock in special containers and special treatments such as stable temperatures and required conditions [11]. Another cost is the process of ensuring that suitable and appropriate blood is available until the transfusion process is completed. In addition, for improper blood processing, an extermination process is needed which also requires operational costs.

The details of the operational costs mentioned above are as replacement costs for blood donation operations or service costs that must be covered by patients or those who need it so that blood processing is managed safely for patients but for the price of the blood itself, it is free of charge.

MIS of Blood Donation Service in PMI

To manage the bloodstock that must be available at UDD PMI, PMI continues several campaigns through printed and electronic media and in collaboration with several Community Organizations who have the same concern about the importance of blood donation aiming of finding blood donors. Having rapidly growing digital world, to achieve this goal, the MIS plays an important role in building communication and providing useful and appropriate information for UDD PMI regarding better and easier blood services.

PMI NHQ currently has two Management Information Systems for Blood Donation Services, namely the Blood Donation Information System (SIMDONDAR) which is specifically used and utilized by internal UDD throughout Indonesia and a web-based Information System, namely http://ayodonor.pmi.or.id/ which is accessible to the public. The Ayodonor website is a simple information system to the public that contains information related to the amount of blood stock, region, finding blood availability, PMI blood donation activities, and other information about blood donation.

SIMDONDAR is a program that includes documentation, recording in a digital system related to information on blood service activities operated by each PMI UTD which is integrated and centralized in the National database system where the required data is timely and online [4]. The data in question can be shared by UTD PMI personnel only so that security is maintained and the interests of the blood service

UTD Center at PMI have formed a National MIS Team in 2016 with the aim of accelerating the use of the SIMDONDAR application in the territory of Indonesia and to facilitate system service, maintenance, and troubleshooting towards the program [4]. UTDP PMI acts as a coordinator in the national SIM team, constantly reviewing and improving the SIMDONDAR software system. The update of the system will later be adjusted to the monitoring and assessment system nationally and internationally so that the needs and targets of blood stock between PMI UTDs can be facilitated by UTD in each class, namely the pratama class, middle class and Main class which have sufficient capacity and donations [4].

PMI UTDs throughout Indonesia who wish to install the SIMDONDAR application are required to prepare the facilities and infrastructure required by the SIMDONDAR software program [4]. Central PMI is currently developing a method for combining the required data from each PMI UTD so that later PMI UTDs are connected to each other through this

application. Currently, there are 78 PMI UDDs using the SIMDONDAR application. They can be integrated with fellow UTD and centralized in UTDP PMI. It is expected that the SIMDONDAR program will increase to 2-3 PMI UTDs every month and continue to grow to all PMI UTDs in Indonesia [4]. If all PMI UTDs already have SIMDONDAR, it will contribute to the completeness of information on **The Ayodonor** website.

METHODS

This paper seeks to provide recommendations based on the results of literature studies, observations and discussions with several relevant informants regarding the PMI Blood Donation Service Information System strategy, hence the methodology applied. **Firstly**, analyzing strengths, opportunities, weaknesses and threats to achieve a centralized and well-understood information system by the public by 2025. Through this SWOT analysis, strengths and opportunities will be seen that contribute to supporting and accelerating each component, while weaknesses and threats can be identified that would affect and slow down the implementation process. Later, the authors issue recommendations to support the new strategy and address potential weaknesses and threats during the process. **Secondly**, the attention and support of the Indonesian government and the private sector is the key to how this new strategy can be achieved where at least 5.2 million bags of blood per year are needed by the public and the government and the private sector must pay attention to PMI in having a competent blood service information system strategy. It is believed that with the support of all parties in improving the public acceptance strategy through information and education of blood donations to all levels of society and the involvement of all stakeholders, the need for blood will certainly increase in 2025 and thus the commitment of the government and the private sector to the PMI blood service information system strategy in 2025 can be realized. **Thirdly**, the development of a Road Map that is able to provide an overview in the next few years related to the PMI blood donation service information system strategy which contains long-term targets and current conditions to obtain gap analysis in making development plans, then create activity programs that must be implemented and finally develop indicators of success. **Fourthly**, coordinate and build cooperation with international movement partners who have an information system for blood donor services that has already run well, where as a member of the International Red Cross and Crescent Movement, PMI has the opportunity to open coordination and build cooperation in improving the information system for donor services. blood and draw lessons from models shared by other member states such as the American Red Cross (https://www.redcrossblood.org/) and the Australian Red Cross (https://www.lifeblood.com.au/about), this includes efforts to improve the Blood Service Information System into Mobile Apps on the Android and IOS systems so that they are more easily accessible to the public.

RESULTS AND DISCUSSION

With the same problem, the public has difficulty in accessing information on blood donation services when they need blood. Several PMI UTDs have independently developed an information system for the management of blood donation services to facilitate access to information on blood services. However, almost all of them focus on information on the supply or stock of blood and are not comprehensive enough to target the mechanism for donating blood or getting blood donors. Currently, PMI Head Quarter has built an integrated national system which is called SIMDONDAR. This system can only be accessed internally between PMI UTDs in Indonesia because it is integrated and is expected to contribute to the blood donation service system for the public, namely Ayodonor.pmi.or .id. For this reason, how can these two systems support and synergize each other and what is the strategy for the information system for blood donation services at PMI in 2025. Following are the recommendations.

To utilize SWOT analysis for the SIM strategy for blood donation services towards 2025

The analysis of strengths, weaknesses, opportunities and threats (SWOT) helps to foresee that the PMI Blood Donation Service Information System in 2025 can run successfully. The need for a good information system is certainly very important not only for PMI but also the public in Indonesia. PMI, according to its mandate has held a blood donation services for year, the PMI fifth congress in Bogor, 1951, Red Cross Blood Donation Unit has carried out blood sampling demonstration attended by President Sukarno. Since then, PMI in a number of big cities, such as Jakarta, Semarang, Medan, Surabaya, Makassar, and other big cities, has also started to provide blood transfusion services. This extensive experience has certainly resulted in professional resources and governance. However, in carrying out this service, the PMI capacity in Indonesia also varies, some have good capacities such as PMI Central Java Province, PMI DKI Jakarta, PMI Bali and also PMI in several cities in Indonesia such as PMI Solo City, PMI Semarang City, PMI Malang City, nevertheless there is also PMI with minimal capacity. These diverse conditions are of course a special concern in developing a blood donation service information system strategy. Table 1 will show a SWOT analysis for the PMI Blood Donation Service Information System in 2025.

Table 1. SWOT analysis to establish MIS of blood donation service by 2025.

Strengths	Opportunities
- PMI is a large organization widely spread across Indonesia - Government Regulation (PP) N0. 7/ 2011 concerning Blood Services - PMI has experience and capacity in blood donation services. - The public needs blood. - There is funding from the government, private sector and world movement partners. - Some PMI districts/cities already have adequate infrastructure and facilities. - PMI has volunteer blood donors as part of the organization's membership.	- Requests for blood from patients in need. - The public gets quick and accurate information regarding blood donation services. - Cooperation with the private sector and partners of the World Red Cross Movement. - PMI Go Digital and Advances in Science and Technology
Weaknesses	Threats
- PMI capacity in some areas is still low - Technical problems (servers, electricity and others) - Funding in several PMI districts/cities - Information is not well understood and accessed by the public	- Geographical and regional conditions spread across Indonesia - Policy Government (Ministry of Health) on Blood Donor Services - The existence of other actors providing blood donor services - The unclear information about PMI blood donation

Based on Table 1, it can be seen that PMI's strengths and opportunities are more than weaknesses and threats. This shows that it is very possible that the PMI blood donation service information system in 2025 is able to provide the information needed and is easy to access and minimizes inaccurate information in the public.

To build the synergy and strong support from the Government at every level.

Since 2016, PMI has developed a blood donor service information system (SIMDONDAR) which is operated by every PMI UTD, which is integrated and centralized in the National database system where the required data is real time and online. It is expected that the update of the system will be adjusted to the national and international monitoring as well as assessment system so that the needs and targets of blood stock between PMI UTDs can be facilitated by other UTDs.

Currently, there are 78 PMI UDDs using the SIMDONDAR application because UTDs PMI across Indonesia who wish to install the SIMDONDAR application are required to prepare the facilities and infrastructure required by the SIMDONDAR software program. In the future, the SIMDONDAR program will increase in 2-3 PMI UTDs every month and continue to grow until all PMI UTDs in Indonesia have reached at least 80% by 2025. Government and business sector support both at the center and in the regions to PMI UDDs that in districts and cities that have low capacity, of course, is needed to achieve these expectations. The following are the solution points that the authors recommend, namely, **First**, PMI in each region is expected to communicate with the government and the business sector to help prepare facilities and infrastructure such as internet connection installation, computer equipment, trained personnel and others. This communication can be done through dialogues or presentations related to the grand design of the blood donor service information system and inviting key stakeholders in each region. **Second**, with the support from the government and the business sector, blood stock information and activity schedules for each UTD PMI City/Regency will automatically synchronize to the web, not only to the Ayodonor.pmi.or.id website, but also to the government and private sector websites which have become PMI Cooperation partners such as Mitsubishi, Indomaret, Toyota, Danone, Unilever and others to reach a wider public. This synchronization will increase public understanding and increase the number of donations and distribution of blood donors. This can be seen from the increase that occurred in Table 2 below.

Table 2. The number of donations and blood distribution after SIMDONDAR installation (Source: Presentation Material for UDD PMI Head Quarter and direct data from UDD for Year2018)

Name of blood donation unit (UDD)	Number of blood donation			Number of distributions		
	Year 2010	Year 2014	Year 2018	Year 2010	Year 2014	Year 2018
UDD PMI BJM	17,156	33,442	58,363	17,560	38,296	60,176
UDD PMI KOTA SKB	NA	10,123	17,803	NA	8,539	15,162
UDD PMI KAB BGR	9,652	20,674	14,237	9,401	25,035	21,020
UDD PMI BWX	NA	28,632	23,958	NA	16,904	19,700

PMI NHQ (National Headquarter) is currently developing the method of combining the required data from each UTD. This application later makes among them connected to each other. When all PMI UTDs already have SIMDONDAR, it will then contribute to the completeness of information on the Ayodonor website and contribute information related to blood stocks on government and private sector websites.

The Development of PMI-MIS for road map of blood donation services

PMI is expected to develop the Roadmap of MIS strategy for blood donation services in 2025 can be seen the following figure.

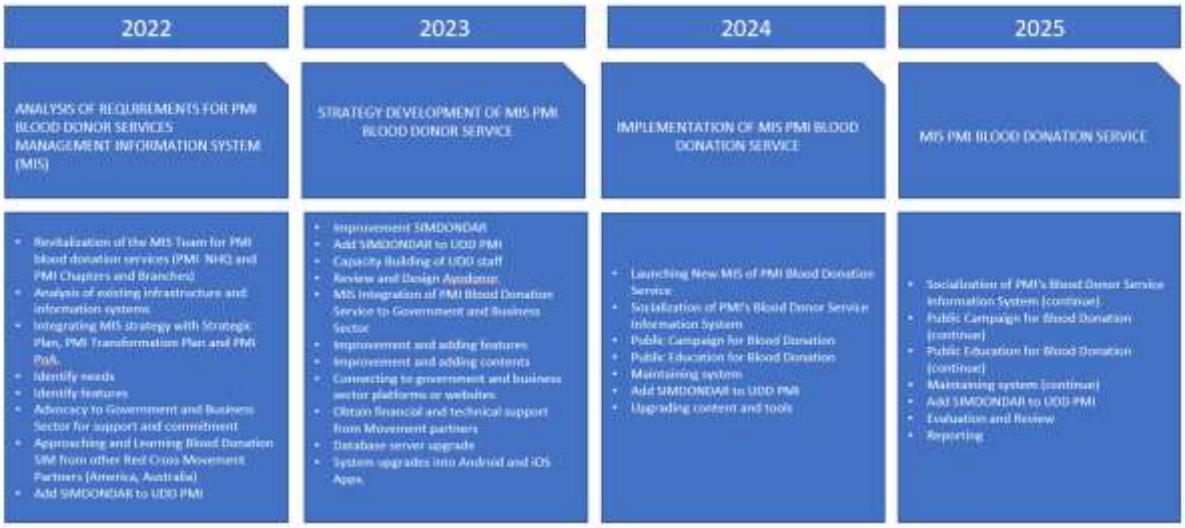

Figure 2. Road map of MIS for blood donor services PMI by 2025

Figure 2 describes the development of the MIS PMI Blood Donor Service which can be implemented based on a road map through the following stages:

Stage 1 (Targets achieved in 2022)

This is the initial stage by conducting a Needs Analysis of the MIS of PMI Blood Donation Service which will be from January to December 2022 with the scope of activities such as:

1. Revitalizing the MIS Team for PMI blood donation services (PMI Head Quarter and regional)
2. Analysis of existing infrastructure and information systems
3. Integrating MIS strategy with Strategic Plan, PMI Transformation Plan and PMI PoA (Plan of Action).
4. Identification of needs
5. Identification of features
6. Advocacy to the Government and Business Sector for potential support
7. Approaching and learning about MIS Blood Donation from Red Cross Movement Partners in other countries (United States, Australia, and other countries)
8. Adding SIMDONDAR to UDD PMI.

Stage 2 (Targets achieved in 2023)

Development of Management Information System for PMI Blood Donation Services which will be from January to December 2023 with the scope of activities

1. Improvement SIMDONDAR
2. Addition of SIMDONDAR at UDD PMI
3. Human Resources Capacity Building at UDD PMI
4. Review and Design of Ayodonor Display
5. MIS Integration of PMI Blood Donor Services to Government and Business Sector
6. Improvement and Addition of features
7. Improvement and Addition of contents
8. Connecting with government and business sector platforms or websites
9. Obtain financial and technical support from Movement partners

10. Upgrade data base servers
11. Improved information systems into Mobile Applications through Android and iOS

Stage 3 (Targets achieved in 2024)

Implementation of the MIS PMI Blood Donation Service which will be in January to December 2024 with the scope of activities:

1. Launching the new PMI Blood Donation Service Information System
2. Socialization of PMI Blood Donation Service Information
3. Public campaign of Blood Donation service
4. Public education of Blood Donation service
5. System Maintenance
6. Adding SIMDONDAR to PMI UDD
7. Upgrade content and tools

Stage 4 (Targets achieved in 2025)

This is the final stage, namely the MIS PMI Blood Donation Service that able to provide faster and more reliable blood donation information services as well as the synergy of the process of sharing shared data resources at various levels of administration of blood donor service management both within PMI (between UDD) and the implementation of data communication connectivity with government institutions, business, and public sectors with scope of activities:

1. Continuing the Socialization of the Blood Donation Service Information System
2. Continuing public campaign of Blood Donation service
3. Continuing public education of Blood Donation service
4. Maintaining the system
5. Addition of SIMDONDAR at UDD PMI
6. Monitoring, Evaluation, Accountability and Learning
7. Reports

The other things that are very important to be implemented are the strong support from the Executives and its related ministries and agencies as well as that from related association and private companies. Therefore, the PMI target to achieve the number of blood donors of 5.2 million in 2025 will become real.

CONCLUSIONS

One of the efforts of the Indonesian Red Cross (PMI) to achieve the target of 5.2 million bags of bloodstock per year is by improving the strategy information service system for blood donation for both internal PMI and those that can be accessed by the public. The public must certainly receive clear, precise, and accessible information. PMI in 2016 has developed a Blood Donation Management Information System (SIMDONDAR) for their internal UDD PMI across Indonesia and the Management Information System of Ayodonor for public access. By having the development of the digital world, the strategy of PMI MIS Blood Donation Service (SIMDONDAR) by 2025 is targeting to reach 80% of Indonesia's territory or around 178 of 216 UDD PMI operating in 215 districts/cities across Indonesia. SIMDONDAR PMI automatically synchronizes bloodstock info and activity schedules for each UTD PMI City/Regency Mobile Unit to the Ayodonor.pmi.or.id which can be accessed by the public. SIMDONDAR and the Ayodonor.pmi.or.id website still need to be improved to provide clear, accurate, educative, and easily accessible information to the public. The strategy MIS PMI Blood Donation Service in 2025 is expected to be implemented if PMI can maintain its current strengths and understood the opportunities while overcoming some of its shortcomings and recognizing threats that could potentially hinder these goals. Communication and collaboration with all parties is a certainly strong recommendation, especially the support of the government and the private sector at all levels. The synergy and integration of information systems developed by PMI and the Government must be a priority because not all PMI UDDs in Indonesia have a qualified capacity to implement a

centralized and precise Information System. A well-functioning information system certainly has an impact on increasing the number of donations and the need for blood bags. Lastly, a Road map of the MIS Blood Donation Service in 2025 needs to be developed to implement the strategy based on the expected target, namely the existence of a clear, accurate, fast, and easily accessible Blood Donation Information System for the public to meet the ever-increasing need for blood bags which is increasing every year parallelly with the growth of the population in Indonesia. The need for blood is for everyone regardless of race, ethnicity, class, and religion.

ACKNOWLEDGEMENT

The authors give high appreciation for the blood donation services that have been carried out by the Indonesian Red Cross. The task of this blood donation service is a very noble task, for that the author is very grateful to PMI, especially the PMI Blood Donor Unit. Acknowledgments to the Head and all UDD PMI NHQ staff and PMI NHQ IT staff and UDD PMI Sukabumi staff for the support and information provided to enrich this paper. This paper is expected to contribute or make recommendations to PMI and stakeholders regarding the importance of the public in receiving fast, accurate, and easily accessible information related to blood donation services in Indonesia. The authors also give high appreciation for all lecturers in Magister Management Program, Pamulang University, South Tangerang, Banten, Indonesia who has delivered knowledges given for the guidance and time for authors in developing this research paper.

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