Implementation Of E-Government To Improve The Quality Of Public Services In The Border Area Between Indonesia And Timor-Leste

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Abstract.

This community service initiative aims to enhance public service delivery in Weulun Village, a remote border area in East Nusa Tenggara, Indonesia, through the implementation of an e-Government system. Located adjacent to Timor-Leste, Weulun Village faces significant challenges such as limited infrastructure, geographical isolation, and shortages in human resources, which often hinder access to administrative and public services. In response, a participatory and collaborative approach was employed to design and implement a digital public service platform tailored to the village's specific needs. The process included needs assessment, system planning, capacity building, system testing, and final implementation. The developed web-based system features two user levels: general public and village administrators. It enables digital access to population data, official documents, village profiles, and correspondence services, reducing residents' dependency on travel to distant government offices. Following system deployment, training and socialization sessions were held to ensure effective use and sustainability. After four months of use, notable improvements were observed in service efficiency, transparency, and community satisfaction. Despite challenges such as limited internet connectivity and hardware constraints, the community's enthusiasm and adaptability contributed significantly to the program's success. This project demonstrates the transformative potential of digital technology in improving public service delivery in remote and underserved areas. The successful implementation in Weulun Village offers a model for similar efforts in other Indonesian border villages. Furthermore, this initiative supports the higher education institution's goals by integrating community engagement with practical learning opportunities for students.

Keywords*: E-Government; Public Services and Indonesia–Timor-Leste Border.*

I. INTRODUCTION

In this digital era, e-Government (electronic-based governance) has become one of the most relevant solutions for improving the quality and efficiency of public services. e-Government refers to the use of information and communication technology (ICT) to facilitate interactions between the government, society, and the private sector. Its implementation in border areas, such as Weulun Village—which covers an area of 4.51 km² and is located in a regency that directly borders Timor-Leste—offers opportunities to address various challenges in public service delivery, often constrained by geography, infrastructure, and limited human resources. This village has a total population of 1,297, consisting of 640 males and 657 females. Of the 345 households, 316 are farmers, while the rest are categorized as entrepreneurs and civil servants.Border areas of Indonesia, especially those adjacent to Timor-Leste, often face a number of challenges in public service delivery. Limited access to government services, underdeveloped infrastructure such as unstable internet networks, and a shortage of human resources at the village level often result in low-quality public services[1]–[3]. One way to address these issues is by implementing e-Government, which enables public services to be accessed easily and efficiently through digital platforms[4], [5].

Public services in border areas are often hindered by the following factors:

1. Limited Geographical Access: Border areas generally have underdeveloped infrastructure, including limited transportation access and difficulty in reaching government offices.
2. Limited Human Resources: Village-level governments often lack trained staff to manage data or provide efficient administrative services.

3. Lack of Technology and Infrastructure: While technological advancements are progressing rapidly in urban areas, border regions often lag behind in ICT infrastructure, such as stable or widespread internet connectivity.
4. Isolated Regions: Due to geographical factors, some Indonesian border areas are difficult to access, both by the community and government officials, thereby hindering public service delivery.

In this context, e-Government can be an effective solution. Through digital technology, e-Government allows people to access various public services more easily and efficiently, without relying on geographical proximity to government offices[6], [7]. This is especially beneficial in border areas with limited access to government facilities or other service institutions[8].The implementation of e-Government in Indonesian border areas, particularly in villages bordering Timor-Leste, is expected to improve the quality of public services in a more efficient and affordable manner[8]. Using information and communication technology, administrative services such as population identity processing (ID cards, family cards), business licensing, as well as health and education services, can be carried out digitally[9].

Specifically, the benefits of implementing e-Government in border areas include:

1. Improved Service Accessibility: Residents of isolated border villages can access government services without traveling long distances to cities or district centers. This access can be achieved via mobile devices or internet-connected computers[10].
2. Time and Cost Efficiency: With e-Government systems, people can save time and travel costs since services can be accessed online[11].
3. Increased Transparency and Accountability: Through digital systems, every transaction and service is properly recorded, enhancing transparency and reducing the potential for corruption or abuse of power[2], [11].
4. Ease of Information Dissemination: e-Government enables the government to more easily disseminate information related to policies or services to the public through online platforms[2], [12].

This community service activity will focus on the implementation process of e-Government in a border village, aligning with the Key Performance Indicators (KPIs) of Higher Education Institutions numbers 2, 3, and 5. It is hoped that by leveraging technology and digitalization, village governments can more effectively achieve development goals and provide better public services to the community. This initiative may also help create more advanced, sustainable, and inclusive villages.

II. METHODS

This community service activity will be carried out through several stages involving stakeholders, including village government officials, local residents, and other relevant parties. The methodology used will be a participatory and collaborative approach that prioritizes community involvement in every stage of planning and implementation.

1. Assessment of Village Needs and Potential

   The first stage is to assess the needs and potentials of Weulun Village. This involves collecting data through interviews with village officials, community leaders, and direct surveys with residents to identify the main issues in public service delivery. The results of this assessment will serve as the foundation for designing an e-Government system tailored to local needs.
2. Formulation of the E-Government Implementation Plan

   Based on the needs assessment, the community service team will formulate an e-Government implementation plan, which includes selecting appropriate technology platforms, designing digital public service systems, and providing training for village officials on operating the system.
3. Training and Capacity Building for Human Resources

   As part of the implementation process, both village officials and community members will receive training on the use of information technology and the e-Government system. This training will cover basic knowledge of digital device usage, how to access online services, and how to involve the community in data management and service delivery.

4. System Testing and Trial Runs
   Once the e-Government system is designed, the next step is to conduct a trial run to ensure the system operates properly and is accessible to the public. This phase includes evaluating the system's effectiveness and gathering feedback from both the community and village officials regarding its strengths and weaknesses.
5. Implementation and Monitoring
   After testing and refinement, the e-Government system will be fully implemented in Weulun Village. The community service team will conduct regular monitoring to ensure the system runs smoothly and provides real benefits to the community. Monitoring will also ensure that any emerging issues can be addressed promptly.

It is expected that through the implementation of e-Government, Weulun Village will see significant improvements in the quality of public services. Faster, more transparent, and accountable services will reduce administrative burdens for both village governments and citizens. Additionally, e-Government is expected to accelerate development in border areas by improving resource management efficiency and enabling faster, data-driven decision-making.More broadly, the successful implementation of e-Government in Weulun Village can serve as a model for other villages in the Indonesia–Timor-Leste border region in improving public service quality and strengthening inter-country relations. In the future, this initiative is expected to make a tangible contribution to building a more advanced, just, and prosperous Indonesia, especially in border areas that have great potential but face challenges in access and public service delivery. Thus, this community service activity is expected not only to provide practical solutions to existing problems but also to be part of a broader effort to improve the welfare of communities in the Indonesia–Timor-Leste border region through appropriate technology and innovation. Furthermore, students who participate in this activity will be eligible to receive academic recognition of 3 credits for the course *Professional Software Development Project (P3LP)*.

III. RESULT AND DISCUSSION

The previously designed system has been successfully developed and implemented in Weulun Village, Wewiku Sub-district, Malaka Regency, East Nusa Tenggara Province. The system features two types of users: the general public and administrators at the village office. Community members can access various types of information such as news, announcements, downloadable documents, village profiles, organizational structure, and contact details. Administrators are responsible for inputting the information to be accessed by the public. Additionally, they manage population data, village potential data, and administrative records related to official letters issued by the village for the residents.

The following image shows the system interface as viewed by the general public. It displays the main homepage that appears when users first access this web-based application.

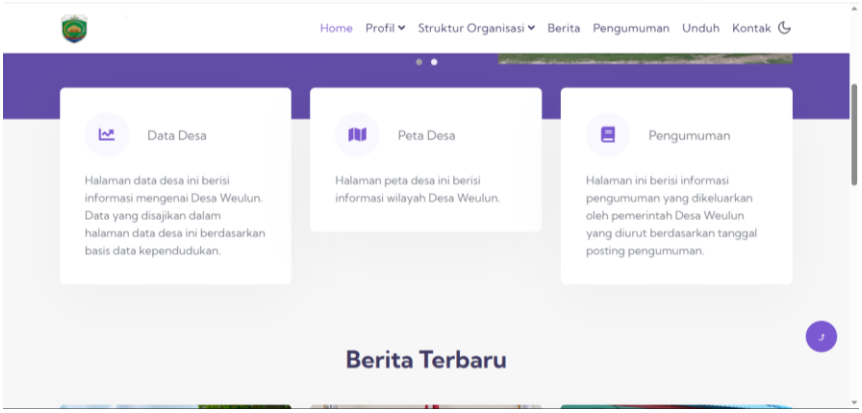

Fig 1. User interface of the home menu for community members

After the application was successfully developed, it was then tested to identify any shortcomings that needed to be addressed for further refinement. Following the testing phase, the application was introduced to the village government and to the administrators who would be responsible for operating it. A socialization

session was conducted by gathering the administrators and several community members to receive training on how to use the application. Once the administrators were deemed capable of operating the system, the website was officially introduced to the broader community so it could be continuously used to support the needs of the people of Weulun Village.

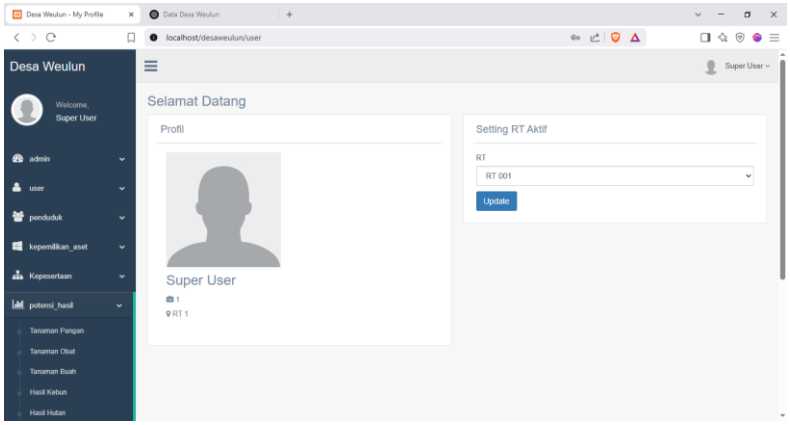

Fig 2. User interface of the admin page

During the socialization and training sessions, participants were actively engaged, attentively listening and asking questions. This indicates a high level of interest from the application users and reflects their recognition of the potential benefits the application offers. At the end of the session, participants expressed their hope for follow-up activities, even if conducted online, so that any issues encountered during the use of the application can be addressed with appropriate solutions.

Fig 3. Socialization and training activities

After approximately four months of application use, it was observed that the residents of Weulun Village experienced a significant improvement in accessing population administration and correspondence services. Previously, villagers had to travel long distances to the sub-district office to process documents, but now these services are available digitally through devices provided at the village office. This demonstrates that technology can bridge geographical barriers in border areas.

Fig 4. Group photo after the training session

The new system has brought significant changes to the work processes of village officials. The adoption of a digital system has accelerated service delivery, minimized the accumulation of physical documents, and reduced administrative errors. The training provided successfully improved the digital skills of village officials, who were initially less familiar with information technology.During the implementation process, several challenges arose, such as limited internet connectivity and constrained hardware resources. However, the community's enthusiasm for transitioning to digital made these obstacles less impactful.

IV. CONCLUSION

The community service program focusing on the implementation of e-Government in Weulun Village, a border area between Indonesia and Timor-Leste, was successfully carried out with the active participation of the village government, local residents, and other relevant stakeholders. Through a participatory and collaborative approach, this initiative effectively addressed various public service challenges in the border region, particularly those related to limited infrastructure, geographic access, and human resources.The outcomes of the program demonstrate that the adoption of digital-based public service systems significantly improves efficiency, transparency, and accountability.

Village residents are now able to access administrative services such as population data and correspondence more easily without the need for long-distance travel. Furthermore, capacity building for village officials through information technology training has also supported the sustainability of the implemented system.This success serves as evidence that digital technology, when applied appropriately and in accordance with local context, can be an effective solution to improve service quality in remote areas. The experience of Weulun Village can serve as a model for e-Government implementation in other border villages as part of efforts to build a more inclusive, efficient, and modern system of governance.

V. ACKNOWLEDGMENTS

The authors are grateful to the Institute for Research and Community Service of Widya Mandira Catholic University for supporting this project. We also extend our sincere thanks to our partners from the Democratic Republic of Timor-Leste for their invaluable assistance.

REFERENCES

[1] Kalistus Gudensius Wayong Huler, Yohanes Arman, and Allesandro Patricio Quinaldy Ragat, "Faktor Penyebab Pembangunan Insfrastruktur Untuk Pelayanan Publik Yang Masih Terbatas Didaerah Perbatasan," ***Student Sci. Creat. J.***, vol. 1, no. 5, pp. 213–228, Jul. 2023, doi: 10.55606/sscj-amik.v1i5.1981.

[2] D. F. Eprilianto, Y. Lestari, S. Megawati, and T. A. Oktariyanda, "Pendampingan Tata Kelola Pemerintahan Berbasis Digital Sebagai Upaya Adaptasi Desa Dalam Penyelenggaraan Pelayanan Publik Di Era New Normal," ***Community Dev. J. J. Pengabdi. Masy.***, vol. 2, no. 3, pp. 767–776, 2021, doi: 10.31004/cdj.v2i3.2587.

[3] B. J. Kim, "Political efficacy, community collective efficacy, trust and extroversion in the information society: Differences between online and offline civic/political activities," *Gov. Inf. Q.*, vol. 32, no. 1, pp. 43–51, 2015, doi: 10.1016/j.giq.2014.09.006.

[4] Q. Zou, Z. Mao, R. Yan, S. Liu, and Z. Duan, "Vision and reality of e-government for governance improvement: Evidence from global cross-country panel data," *Technol. Forecast. Soc. Change*, vol. 194, no. March 2022, p. 122667, 2023, doi: 10.1016/j.techfore.2023.122667.

[5] M. F. Nasrulloh, M. F. Nasrulloh, P. Wahono, F. N. Amanah, C. Mufarrohah, and W. S. Satiti, "Optimalisasi Penggunaan Aplikasi Open SID pada Sistem Administrasi Pemerintah Desa Gabusbanaran," ***Jumat Inform. J. Pengabdi. Masy.***, vol. 2, no. 3, pp. 142–146, 2022, doi: 10.32764/abdimas_if.v2i3.2166.

[6] S. K. Sharma, B. Metri, Y. K. Dwivedi, and N. P. Rana, "Challenges common service centers (CSCs) face in delivering e-government services in rural India," *Gov. Inf. Q.*, vol. 38, no. 2, p. 101573, 2021, doi: 10.1016/j.giq.2021.101573.

[7] S. Nookhao and S. Kiattisin, "Achieving a successful e-government: Determinants of behavioral intention from Thai citizens' perspective," *Heliyon*, vol. 9, no. 8, p. e18944, Aug. 2023, doi: 10.1016/j.heliyon.2023.e18944.

[8] R. A. Wahab and Arsyad, "The Study of E-Government Implementation in Border Area," ***J. Pekommas,*** vol. 18, no. 1, pp. 1–14, 2015.

[9] K. Kurniawan and D. Antoni, "Visualisasi Data Penduduk Dalam Membangun E-government Berbasis Sistem Informasi Geografis (GIS)," ***J. Sisfokom (Sistem Inf. dan Komputer)***, vol. 9, no. 3, pp. 310–316, Aug. 2020, doi: 10.32736/sisfokom.v9i3.828.

[10] S. Wulandari and A. Widowati, "Implementasi Program Sipelandukilat dalam Peningkatan Pelayanan Publik di Wilayah Perbatasan dan Pedalaman," ***J. Kebijak. Pemerintah.***, vol. 6, no. 1, pp. 11–24, 2023, doi: 10.33701/jkp.v6i1.3179.

[11] A. Rivan and Maksum I, "Penerapan Sistem Keuangan Desa dalam Pengelolaan Keuangan Desa Application of Village Financial System in Village Financial Management," ***Public Adm. J.***, vol. 9, no. 2, pp. 92–100, 2019, [Online]. Available: http://dx.doi.org/10.31289/jap.v9i2.2487http://ojs.uma.ac.id/index.php/jap

[12] J. F. Purba, U. Tarigan, I. Nasution, and A. Suharyanto, "Implementasi Sistem Informasi Administrasi Kependudukan dalam Pengurusan Kartu Tanda Penduduk Elektronik," *PERSPEKTIF*, vol. 8, no. 2, pp. 77–83, Jul. 2019, doi: 10.31289/perspektif.v8i2.2597.