



Analysis Of Readiness For Smart City Implementation In Blora City Indonesia

Joko Handoyo¹, Indra Gunawan², Retno Wahyusari³

¹⁻³ Sekolah Tinggi Teknologi Ronggolawe/Informatic Department, Cepu, Indonesia

Corresponding email: jokohandoyo2013@gmail.com

Abstract. *Smart city is a concept initiated by the forum for the future which is predicted to be able to solve all aspects of problems in the lives of urban communities. The Smart City Framework consists of six aspects, namely Smart Governance, Smart Economy, Smart Branding, Smart Living, Smart Society and Smart Environment. However, this concept is too broad and complex, covers many things and involves many parties who will be involved in its implementation, so it is needed mature concepts and frameworks as a reference in implementation. Apart from that, each city has different problem characteristics, so it is necessary to carry out analytical studies to find out the problems in each aspect of a smart city. This research aims to analyze the readiness for smart city implementation in the city of Blora, Central Java Province, Indonesia. This analysis will be carried out on 6 aspects of smart cities which will be divided into 17 variables. The approach taken is a qualitative method where an assessment of readiness to achieve achievement targets is carried out through interviews. From the analysis that has been carried out, it can be said that the readiness achieved by the City of Blora for Smart City implementation has reached 66.7% so it still really needs to be improved.*

Keywords. *Smart city; readiness; implementation; analysis*

INTRODUCTION

The use of information technology has become a necessity in life in the modern era, especially in urban areas. Smart city is a concept where modern cities can provide better facilities for their residents. This can be done by building and improving living standards in various fields. The smart city concept itself is divided into several areas, namely Smart Governance, Smart Economy, Smart Branding, Smart Environment, Smart Society and Smart Living. To achieve this, readiness is certainly needed in various fields and includes various related parties (Apanaviciene et al., 2020; Caird & Hallett, 2019; Hämäläinen, 2020; Kumar et al., 2020), so this requires analysis to test the city's readiness in implementing smart cities. So this research is important.

The aim of this research is to analyze the readiness for smart city implementation in the city of Blora, Central Java Province, Indonesia. This is done by dividing smart city into smaller concepts, then dividing, outlining the standards and achievements of each government unit so that regional government institutional units can be mapped and which smart city concepts need to be improved in readiness.

There has been several studies related to the implementation of smart cities in Indonesia. Arief researched the readiness for smart city implementation in the city of Ternate, and the result was that the readiness stage was on a scale of 2. Other research was conducted by the State regarding the smart city framework in the city of Kulonprogo, Yogyakarta, the

result was that a framework concept for a smart city-based industrial city had been built. Next is research from Syalianda which found that the city of Jakarta has implemented 6 smart city concepts through various information technology applications. Another research came from Fadli who conducted an analysis of the readiness for smart city transformation in the city of Bandung, the result was that the city had implemented smart governance, infrastructure, data centers and had built several information technology applications. Next, Parlina conducted a literature review study on the topic of smart cities in Indonesia. From this study, it was concluded that IoT and big data are the 2 most important information technology factors in implementing smart cities. Another research was from Supangat which examined the readiness of 15 cities in Indonesia in implementing smart cities, the result was that Smart Governance was the main factor in achieving success in implementing smart cities in a city. The conclusion of all this research is that each city has its own characteristic problems in implementing a smart city, so analysis is needed to assess various problems, as well as to test a city's readiness to implement a smart city (Arief et al., 2020; Darmawan et al., 2019, 2019; Fadli & Sumitra, 2019; Negara & Emmanuel, 2019; Parlina et al., 2019; Supangkat et al., 2018; Syalianda & Kusumastuti, 2021; van der Linden, 2020).

The most widely used smart city framework is the 6 concept framework which was first proposed at the Forum for the Future. This model is the most recognized and most widely used in the world. The six aspects in the framework are Smart Governance, Smart Economy, Smart Branding, Smart Environment, Smart Society and Smart Living. The framework can be seen in Figure 1.

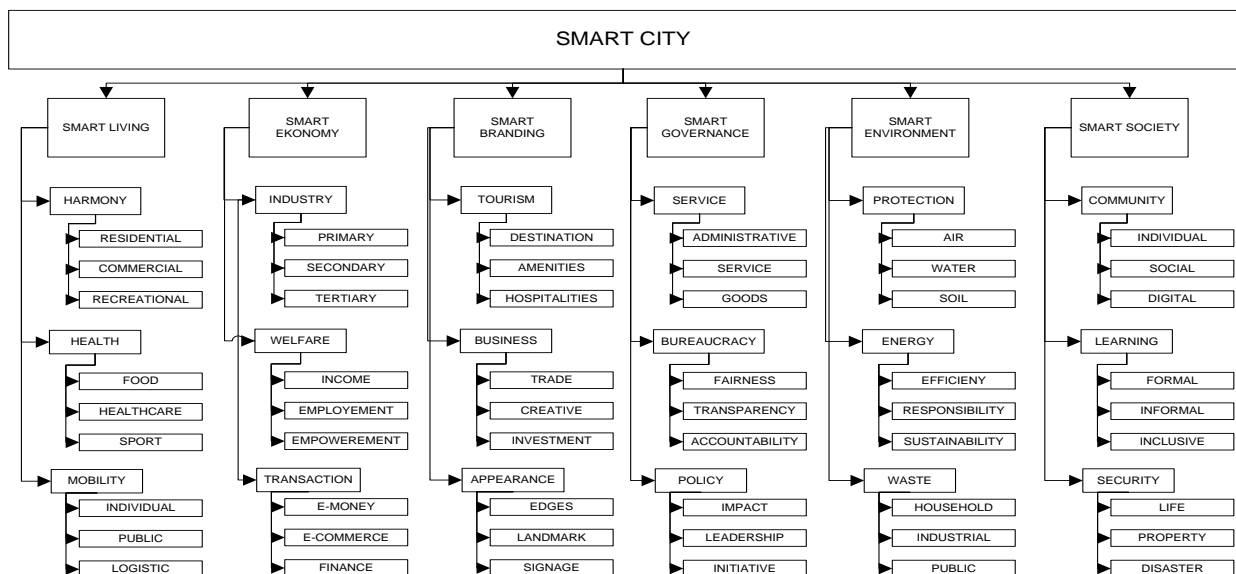


Figure 1 Smart City Framework

(National Medium Term Development Plan – RPJMN 2020-2024)

METHOD

This research uses qualitative approaches. In a qualitative approach, a literature study was carried out on all aspects of smart city implementation, then in-depth interviews were conducted involving several smart city implementers in several levels of government in Blora Regency. The interview was structured to answer various questions regarding the readiness of various parties in implementing smart cities in each government institution. The 17 of research question was came from the standart of smart city implementation guide released by Ministry of Communication and Informatics. Then an analysis of the answers was carried out and the achievement of each aspect of the smart city was measured based on the RPJMN standards created by the Indonesian Government. The results of this analysis are then mapped into a map of the readiness of each government institution to implement a smart city. From this mapping, a roadmap for smart city implementation in each institution is then created. Then recommendations are made to six aspects of the smart city implementation in Blora city, Indonesia.

RESULTS AND DISCUSSION

After going through the literature study stage regarding the smart city framework, the next step is to set target standards for each of the six smart city aspects. This target standard is taken from the six smart city components and then translated into 17 variables where each component has two to three variables. These components and variables are based on smart city guidelines from the Ministry of Communication and Information. The 17 smart city variables were then translated back into indicators for each variable based on the development targets contained in the Blora Regency RPJMD for 2021-2026. This 17 variables become question that will be asked to the target interviews. The components, variables and indicators of the smart city of Blora Regency can be seen in Table 1 dan Figure 2.

Table 1 Question variables

| Aspect | Variable | Indicator |
|------------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Smart Governance Measurement | Public service | <ul style="list-style-type: none"> Implementation of licensing and non-licensing services in the PTSP investment sector |
| | | <ul style="list-style-type: none"> Percentage of regional officials who prepare SOPs and SPPs and 'good' SMEs |
| | | <ul style="list-style-type: none"> Percentage of documents well maintained |
| | | <ul style="list-style-type: none"> Availability of land for local government needs |
| | | <ul style="list-style-type: none"> Main food productivity (rice) |
| | | <ul style="list-style-type: none"> Paddy rice productivity |
| | | <ul style="list-style-type: none"> Field rice productivity |

| | | |
|----------------------------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| | | <ul style="list-style-type: none"> • Corn productivity |
| | | <ul style="list-style-type: none"> • Beef cattle productivity |
| | | <ul style="list-style-type: none"> • Fisheries productivity |
| | | <ul style="list-style-type: none"> • Number of traditional markets |
| | Efficient bureaucratic management | <ul style="list-style-type: none"> • Number of local government management information systems |
| | | <ul style="list-style-type: none"> • Percentage of officials who comply with competency |
| | | <ul style="list-style-type: none"> • LHE SAKIP value |
| | | <ul style="list-style-type: none"> • Percentage of ASN who take part in functional education and training |
| | Public policy efficiency | <ul style="list-style-type: none"> • Percentage of Draft Regional Regulations discussed and adopted |
| | | <ul style="list-style-type: none"> • Percentage of villages that have good quality RPMNDes and APBDes |
| | | <ul style="list-style-type: none"> • Percentage of the number of BUMDes |
| Smart Branding Measurement | Building and marketing a tourism ecosystem | <ul style="list-style-type: none"> • Number of tourist visits |
| | | <ul style="list-style-type: none"> • Number of restaurants |
| | | <ul style="list-style-type: none"> • Number of accommodations |
| Smart Economy Measurement | Industry | <ul style="list-style-type: none"> • Number of Industries |
| | | <ul style="list-style-type: none"> • Number of MSMEs |
| | | <ul style="list-style-type: none"> • Export Value of products from Blora Regency |
| | People's welfare | <ul style="list-style-type: none"> • Percentage Increase in PAD/year |
| | | <ul style="list-style-type: none"> • TPT(Open Unemployment Rate) |
| | | <ul style="list-style-type: none"> • Percentage of job seekers placed |
| | Digital financial transaction ecosystem | <ul style="list-style-type: none"> • Coverage of farmer group development |
| | | <ul style="list-style-type: none"> • Percentage of healthy cooperatives |
| Smart Living Measurement | Harmonization of regional spatial planning | <ul style="list-style-type: none"> • Increased organized location of street vendors |
| | | <ul style="list-style-type: none"> • The size of the slum area |
| | | <ul style="list-style-type: none"> • Coverage of drinking water services |
| | | <ul style="list-style-type: none"> • Life Expectancy |
| | Creating health infrastructure | <ul style="list-style-type: none"> • Human Development Index (HDI) |
| | | <ul style="list-style-type: none"> • Gender Development Index (IPG) |
| | | <ul style="list-style-type: none"> • Gender Empowerment Index |
| | | <ul style="list-style-type: none"> • Maternal Mortality Rate (MMR) |
| | | <ul style="list-style-type: none"> • Infant Mortality Rate (IMR) |

| | | |
|-------------------------------|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| | | <ul style="list-style-type: none"> • Toddler Mortality Rate (AKBA) |
| | | <ul style="list-style-type: none"> • Percentage of Malnutrition |
| | Ensure the availability of transportation facilities | <ul style="list-style-type: none"> • Long district roads are in good condition |
| | | <ul style="list-style-type: none"> • The bridge percentage is in good condition |
| | | <ul style="list-style-type: none"> • Availability of road equipment/signs, markings, guardrails, APILL, etc.) on city roads |
| | | <ul style="list-style-type: none"> • Percentage of transportation infrastructure in good condition |
| Smart Society Measurement | Realizing efficient community interaction | <ul style="list-style-type: none"> • Formed arts group |
| | Building an efficient learning ecosystem | <ul style="list-style-type: none"> • Average length of school |
| | | <ul style="list-style-type: none"> • Expected age number for years of schooling |
| | | <ul style="list-style-type: none"> • Kindergarten teachers who meet S1/D4 qualifications |
| | | <ul style="list-style-type: none"> • Elementary/MI teachers who meet S1/D4 qualifications |
| | | <ul style="list-style-type: none"> • Middle School/MTS teachers who meet S1/D4 qualifications |
| | | <ul style="list-style-type: none"> • Number of library visitors |
| | Realizing a community security system | <ul style="list-style-type: none"> • Percentage of disaster management officers who meet qualification standards |
| Smart Environment Measurement | Develop environmental protection | <ul style="list-style-type: none"> • Percentage of available public green open space |
| | | <ul style="list-style-type: none"> • Percentage of irrigation in good condition |
| | | <ul style="list-style-type: none"> • Blora Regency IKLH Standards |
| | | <ul style="list-style-type: none"> • Coverage of sanitation services |
| | Develop waste and waste management | <ul style="list-style-type: none"> • Percentage of waste transported |

Measurement

After getting detailed answers to 17 questions from each interview target. So measurements are made using variables, indicators, current conditions and targets to be achieved. The measurements were carried out on six aspects of smart cities. The measurement results on the smart governance aspect can be seen in table 2.

Smart Governance

Table 2 Smart Governance Measurement

| Variable | Indicator | Current | Target |
|----------|-----------|---------|--------|
|----------|-----------|---------|--------|

| | | | |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|---------|---------|
| Public service | <ul style="list-style-type: none"> Implementation of licensing and non-licensing services in the PTSP investment sector | 3 | 1 |
| | <ul style="list-style-type: none"> Percentage of regional officials who prepare SOPs and SPPs and 'good' SMEs | 37.5 | 100 |
| | <ul style="list-style-type: none"> Percentage of documents well maintained | 60 | 100 |
| | <ul style="list-style-type: none"> Availability of land for local government needs | 100 | 100 |
| | <ul style="list-style-type: none"> Main food productivity (rice) | 49.84 | 51.97 |
| | <ul style="list-style-type: none"> Paddy rice productivity | 403.067 | 420.295 |
| | <ul style="list-style-type: none"> Field rice productivity | 35.725 | 36.373 |
| | <ul style="list-style-type: none"> Corn productivity | 260.669 | 276.705 |
| | <ul style="list-style-type: none"> Beef cattle productivity | 211.559 | 278.397 |
| | <ul style="list-style-type: none"> Fisheries productivity | 813.080 | 890.450 |
| | <ul style="list-style-type: none"> Number of traditional markets | 12 | 13 |
| Efficient bureaucratic management | <ul style="list-style-type: none"> Number of local government management information systems | 5 | 7 |
| | <ul style="list-style-type: none"> Percentage of officials who comply with competency | 47.02 | 57.6 |
| | <ul style="list-style-type: none"> LHE SAKIP value | 60 | 80 |
| | <ul style="list-style-type: none"> Percentage of ASN who take part in functional education and training | 3.06 | 16.94 |
| Public policy efficiency | <ul style="list-style-type: none"> Percentage of Draft Regional Regulations discussed and adopted | 80 | 80 |
| | <ul style="list-style-type: none"> Percentage of villages that have good quality RPMNDes and APBDes | 50 | 95 |
| | <ul style="list-style-type: none"> Percentage of the number of BUMDes | 9 | 70 |

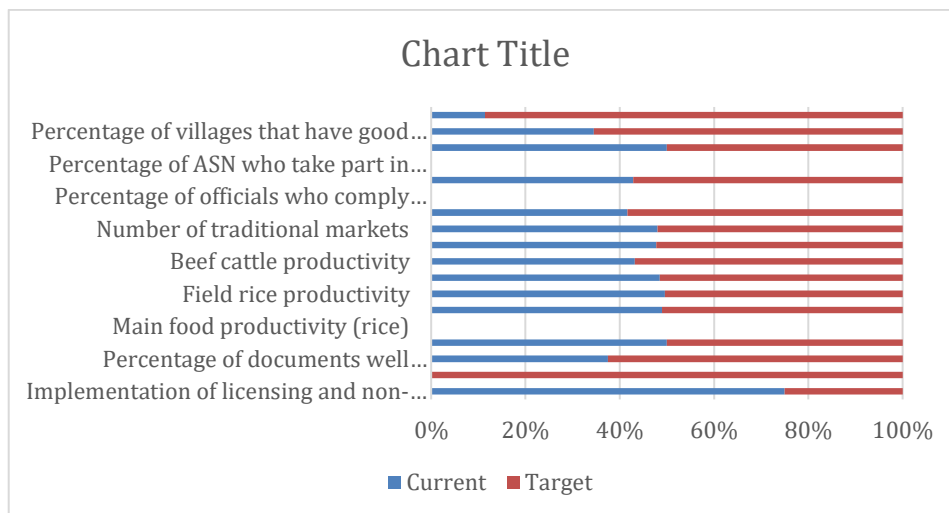


Figure 2 Smart Governance Measurement

From the results of the measurements that have been carried out, in general it can be concluded that the Smart governance aspect has not achieved the expected target. The achievement score is around 50% of the target expected, so it need to be improved. Next,

measurements were taken of the smart branding aspects. The results can be seen in Table 3 and Figure 4.

Smart Branding

Table 3 Smart Branding Measurement

| Variable | Indicator | Current | Target |
|--------------------------------------------|----------------------------|---------|---------|
| Building and marketing a tourism ecosystem | • Number of tourist visits | 141.250 | 300.000 |
| | • Number of restaurants | 46 | 110 |
| | • Number of accommodations | 32 | 56 |

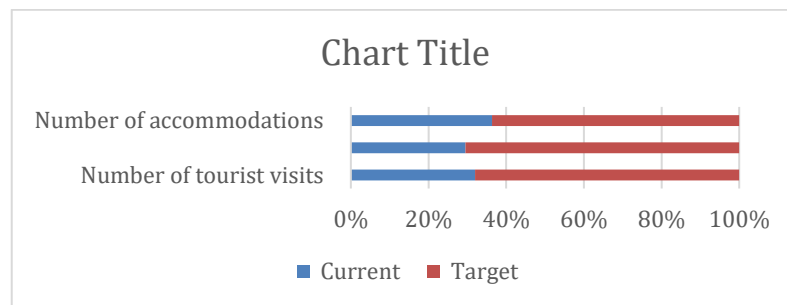


Figure 3 Smart Branding Measurement

From the measurement results obtained in the Smart branding aspect, it can be concluded that the general target achievement is below 40% so it really needs to be improved. Next, measurements were taken of the smart economy aspects. The results of these measurements can be seen in Table 4 and Figure 5.

Smart Economy

Table 4 Smart Economy Measurement

| Variable | Indicator | Current | Target |
|-----------------------------------------|-----------------------------------------------|---------|---------|
| Industry | • Number of Industries | 11710 | 11.825 |
| | • Number of MSMEs | 6679 | 6825 |
| | • Export Value of products from Blora Regency | 2771862 | 2942679 |
| People's welfare | • Percentage Increase in PAD/year | 6.01 | 6.11 |
| | • TPT(Open Unemployment Rate) | 5.22 | 3.4 |
| | • Percentage of job seekers placed | 66.41 | 80 |
| Digital financial transaction ecosystem | • Coverage of farmer group development | 76 | 83 |
| | • Percentage of healthy cooperatives | 24 | 80 |

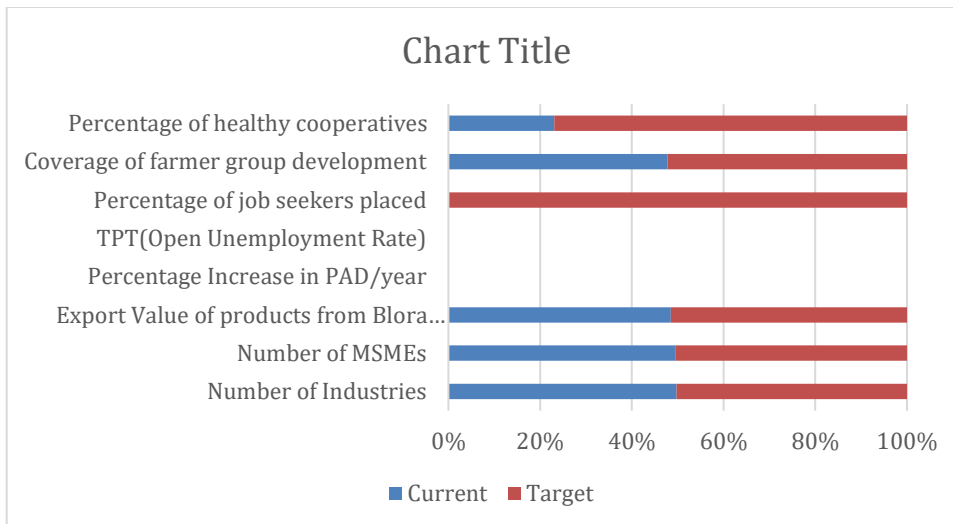


Figure 4 Smart Economy Measurement

From the measurement results on this Smart Economy aspect, in general it can be concluded that the achievement has only reached 50% of the set target, so it still really needs to be improved. Next, measurements were taken of the Smart living aspect, the results of these measurements can be seen in Table 5 and Figure 6.

Table 5 Smart Living Measurement

| Variable | Indicator | Current | Target |
|------------------------------------------------------|------------------------------------------------------------------------------------------|---------|--------|
| Harmonization of regional spatial planning | • Increased organized location of street vendors | 6 | 12 |
| | • The size of the slum area | 51 | 42 |
| | • Coverage of drinking water services | 54.21 | 73.55 |
| Creating health infrastructure | • Life Expectancy | 73.85 | 74 |
| | • Human Development Index (HDI) | 66.22 | 68.84 |
| | • Gender Development Index (IPG) | 82.66 | 82.77 |
| | • Gender Empowerment Index | 67.34 | 68.84 |
| | • Maternal Mortality Rate (MMR) | 124.2 | 95 |
| | • Infant Mortality Rate (IMR) | 14.1 | 8.5 |
| | • Toddler Mortality Rate (AKBA) | 16.2 | 9.5 |
| Ensure the availability of transportation facilities | • Percentage of Malnutrition | 0.13 | 0.04 |
| | • Long district roads are in good condition | 65.7 | 65 |
| | • The bridge percentage is in good condition | 75 | 81 |
| | • Availability of road equipment/signs, markings, guardrails, APILL, etc.) on city roads | 75 | 98 |
| | • Percentage of transportation infrastructure in good condition | 70 | 98 |

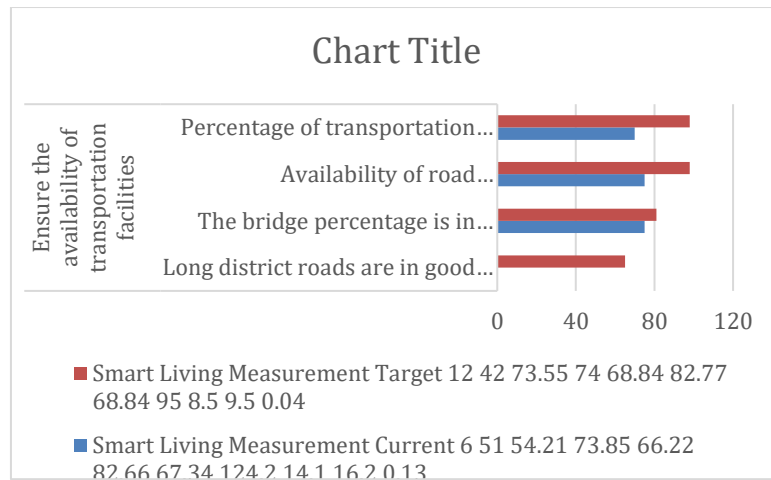


Figure 5 Smart Living Measurement

From the results of measurements carried out on the Smart Living aspect, it can be concluded that in this aspect, the general achievement is quite good at 70%, so it can still be improved. Next, measurements were taken of the Smart Society aspects, the results of these measurements can be seen in Table 6 and Figure 7.

Smart Society

Table 6 Smart Society Measurement

| Variable | Indicator | Current | Target |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|---------|--------|
| Realizing efficient community interaction | <ul style="list-style-type: none"> Formed arts group | 50 | 65 |
| Building an efficient learning ecosystem | <ul style="list-style-type: none"> Average length of school | 6.04 | 6.6 |
| | <ul style="list-style-type: none"> Expected age number for years of schooling | 11.91 | 12.85 |
| | <ul style="list-style-type: none"> Kindergarten teachers who meet S1/D4 qualifications | 81.89 | 83 |
| | <ul style="list-style-type: none"> Elementary/MI teachers who meet S1/D4 qualifications | 83.76 | 94 |
| | <ul style="list-style-type: none"> Middle School/MTS teachers who meet S1/D4 qualifications | 92.69 | 98.75 |
| | <ul style="list-style-type: none"> Number of library visitors | 97 | 100 |
| Realizing a community security system | <ul style="list-style-type: none"> Percentage of disaster management officers who meet qualification standards | 43 | 95 |

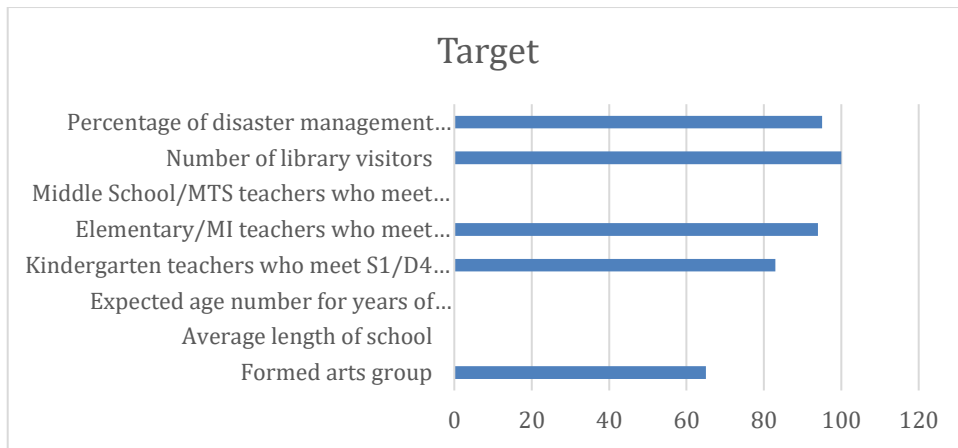


Figure 6 Smart Society Measurement

From the results of measurements carried out on the Smart Society aspect, in general it can be said that the achievements made are around 90%, so they can be improved again. Next, measurements were taken of the Smart environment aspects, the results of which can be seen in Table 7 and Figure 8.

Table 7 Smart Environment Measurement

| Variable | Indicator | Current | Target |
|------------------------------------|---------------------------------------------------|---------|--------|
| Develop environmental protection | • Percentage of available public green open space | 7.5 | 20 |
| | • Percentage of irrigation in good condition | 20.3 | 30 |
| | • Blora Regency IKLH Standards | 58.9 | 70.42 |
| | • Coverage of sanitation services | 87.88 | 100 |
| Develop waste and waste management | • Percentage of waste transported | 65.78 | 95,24 |

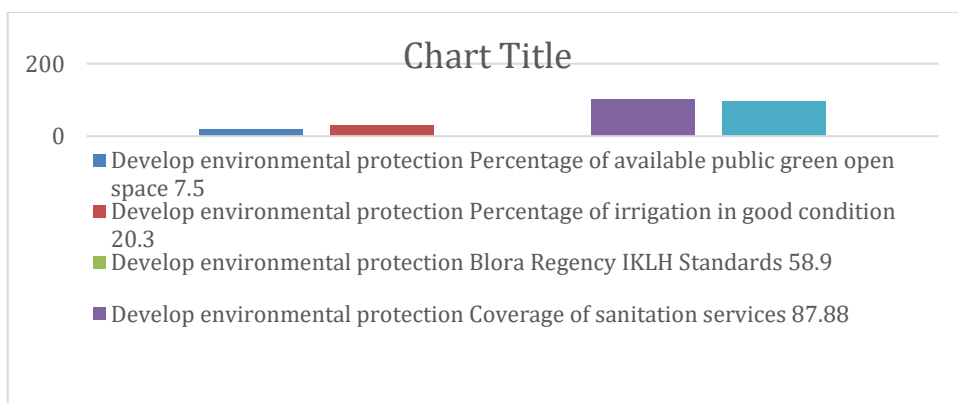


Figure 7 Smart Environment Measurement

From the results of measurements carried out on the Smart city environment aspect, it can be concluded that in general the achievements made are in the range of 70%, so they can be improved more.

Furthermore, from the results of measurements that have been carried out on the six aspects of Smart City, recommendations are made regarding all deficiencies in each aspect. These recommendations can be seen in table 8.

Recommendation

Table 8 Recommendation

| Aspect | Recommendation |
|-------------------|---------------------------------------------------------------------|
| Smart Governance | • Improvement of Public Services |
| | • Efficient Bureaucratic Management |
| | • Public Policy Efficiency |
| Smart Branding | • Building and Marketing a Tourism Ecosystem |
| | • Building a platform and marketing the regional business ecosystem |
| | • Building and marketing the face of the city |
| Smart Economy | • Building a competitive industrial ecosystem |
| | • Realizing people's welfare |
| Smart Living | • Harmonization of regional spatial planning |
| | • Creating health infrastructure |
| | • Improving the availability of transportation facilities |
| Smart Society | • Realizing efficient community interaction |
| | • Building an efficient learning ecosystem |
| | • Realizing a community security system |
| Smart Environment | • Develop environmental protection |
| | • Develop waste and waste management |

CONCLUSION

After measuring six aspects and 17 variables, it can be concluded that the achievement and level of readiness for Smart City implementation in Blora City only reached 61.6%, with details of 50% for Smart Governance, 40% for Smart Branding, 50% for Smart Economy, 70% for Smart Living, 90% for Smart Society, 70% for Smart Environment.

REFERENCES

- Apanaviciene, R., Vanagas, A., & Fokaidis, P. A. (2020). Smart Building Integration into a Smart City (SBISC): Development of a New Evaluation Framework. *Energies*, 13(9), 2190. <https://doi.org/10.3390/en13092190>
- Arief, A., Abbas, M. Y., Wahab, I. H. A., Latif, L. A., Abdullah, S. D., & Sensuse, D. I. (2020). The Smart Islands Vision: Towards Smart City Readiness in Local Government of Archipelagos. *Journal of Physics: Conference Series*, 1569(4), 042006. <https://doi.org/10.1088/1742-6596/1569/4/042006>
- Caird, S. P., & Hallett, S. H. (2019). Towards evaluation design for smart city development. *Journal of Urban Design*, 24(2), 188–209. <https://doi.org/10.1080/13574809.2018.1469402>

- Darmawan, A. K., Siahaan, D., Susanto, T. D., Hoiriyah, & Umam, B. (2019). Identifying Success Factors in Smart City Readiness using a Structure Equation Modelling Approach. 2019 International Conference on Computer Science, Information Technology, and Electrical Engineering (ICOMITEE), 148–153. <https://doi.org/10.1109/ICOMITEE.2019.8921312>
- Fadli, M., & Sumitra, I. D. (2019). A Study of Application and Framework Smart City in Bandung: A Survey. IOP Conference Series: Materials Science and Engineering, 662(2), 022083. <https://doi.org/10.1088/1757-899X/662/2/022083>
- Hämäläinen, M. (2020). A Framework for a Smart City Design: Digital Transformation in the Helsinki Smart City. Dalam V. Ratten (Ed.), *Entrepreneurship and the Community* (hlm. 63–86). Springer International Publishing. https://doi.org/10.1007/978-3-030-23604-5_5
- Kumar, H., Singh, M. K., Gupta, M. P., & Madaan, J. (2020). Moving towards smart cities: Solutions that lead to the Smart City Transformation Framework. *Technological Forecasting and Social Change*, 153, 119281. <https://doi.org/10.1016/j.techfore.2018.04.024>
- Negara, J. G. P., & Emmanuel, A. W. R. (2019). A Conceptual Smart City Framework for Future Industrial City in Indonesia. (IJACSA) *International Journal of Advanced Computer Science and Applications*, 10(7), Article 7.
- Parlina, A., Murfi, H., & Ramli, K. (2019). Smart City Research in Indonesia: A Bibliometric Analysis. 2019 16th International Conference on Quality in Research (QIR): International Symposium on Electrical and Computer Engineering, 1–5. <https://doi.org/10.1109/QIR.2019.8898264>
- Supangkat, S., Kosala, R., & Anindra, F. (2018). Smart Governance as Smart City Critical Success Factor (Case in 15 Cities in Indonesia). <https://doi.org/10.1109/ICTSS.2018.8549923>
- Syalianda, S. I., & Kusumastuti, R. D. (2021). Implementation of smart city concept: A case of Jakarta Smart City, Indonesia. IOP Conference Series: Earth and Environmental Science, 716(1), 012128. <https://doi.org/10.1088/1755-1315/716/1/012128>
- Van der Linden, S. (2020). The relevance of the smart city for the low-income part of the population in Yogyakarta, Indonesia [Radboud University]. <https://theses.uhn.ru.nl/handle/123456789/9987>