Modeling Smart City of Kendari City: Gap Analysis and Strategic Potential

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ABSTRACT: Kendari has significant potential to develop into a smart city. Urban infrastructure, such as road networks, public services, and the availability of internet and technology, has improved in recent years. However, the challenges faced in developing a smart city in Kendari cannot be underestimated. Major challenges include limited government budgets, a lack of sectoral integration, and societal resistance to new technologies. Therefore, an approach is needed to develop a region-based smart city model in Kendari, enabling the city to achieve its vision of sustainable development. This study aims to analyze the gap between actual conditions and standard indicators across six dimensions of a smart city in Kendari, identify strengths, weaknesses, opportunities, and threats (SWOT analysis) in smart city development, and provide strategic recommendations to accelerate its implementation. The result of this reserach reveal that Kendari has immense potential to become a smart city but still faces significant challenges in every dimension. Gap analysis indicates that the smart government and smart environment dimensions require priority attention. The SWOT analysis offers strategic directions to leverage strengths and opportunities to address weaknesses and threats.

KEYWORDS: Smart City, Kota Kendari, Analisis Gap, Strategi Pengembangan

1. INTRODUCTION

The increasing rate of urbanization presents significant challenges for cities worldwide, including Kendari City. The city is under pressure to improve public services, manage urban growth, and maintain environmental sustainability. One strategic approach widely adopted by modern cities is the implementation of the smart city concept. A smart city integrates information and communication technology with the goal of creating a more efficient, environmentally friendly, and sustainable city [1] [2].

Smart city is an urban development concept that integrates information and communication technology (ICT) to enhance efficiency, quality of life, and environmental sustainability [3]. Smart cities leverage digital technology and citizen engagement to improve urban life, with a focus on sustainability, economic growth and improved governance through integrated ICT infrastructure and collaborative initiatives [4]. Smart city implementation focuses on six main dimensions: smart government, smart branding, smart economy, smart living, smart society, dan smart environment [5]. Each dimension has a significant role in determining the success of smart city implementation. However, many cities in Indonesia, including Kendari, face major challenges in integrating this technology. These challenges include people's low digital literacy, lack of supporting infrastructure, and resistance to technological change [6] [7].

Gap analysis is a method used to assess differences between the design and actual implementation of a project, identifying differences to improve performance and prevent failure [8]. Gap analysis between actual conditions and ideal standards can help identify areas that need improvement. In addition, SWOT analysis provides strategic insight into strengths, weaknesses, opportunities and threats in implementing the smart city concept. SWOT analysis is a strategic planning tool that identifies internal strengths and weaknesses, as well as external opportunities and threats [9]. Research shows that this combined approach has been successfully used in various cities to design technology-based development strategies [10] [11].

This research focuses on Kendari City, which has great potential for developing the smart city concept. However, gaps in infrastructure and city management are the main obstacles that must be overcome by understanding strengths and weaknesses through SWOT and gap analysis. This research aims to analyze the gap between actual conditions and standard indicators in six smart city dimensions in Kendari City, identifying strengths, weaknesses, opportunities and threats (SWOT analysis) in smart city development. Provide strategic recommendations to accelerate smart city implementation in Kendari City.

2. METHOD

2.1 Reserach Approach

This research uses a mixed methods approach (quantitative and qualitative). Quantitative data was obtained from gap analysis, while qualitative data was obtained from interviews and SWOT analysis.

2.2 Data Sources

The primary data in this research is a Kendari community survey, interviews with stakeholders, and field observations. Meanwhile, secondary data in this research are government reports, academic literature, and statistical data related to smart city indicators.

2.3 Research Stages

The stages in this research are as follows:

a. Data collection on six smart city dimensions (smart governance, smart branding, smart Economy, smart living, smart society, smart environment)
b. Analysis of the gap between actual conditions and ideal standards (gap analysis)
c. SWOT analysis based on gap analysis results.
d. Strategic recommendations based on analysis results.

3. RESULT AND DISCUSSION

3.1 Gap Analysis

3.1.1 Smart Governance

Gap analysis based on the dimensions of Smart Governance represents the difference or gap between the current condition and the expected condition when the concept of Smart Governance is realized in the future. The gaps used as the basis for this analysis are as follows.

1. The city of Kendari is still in the early stages of implementing the Smart Governance concept.
2. The policies that have been made are still being adjusted to align with development directions.
3. The availability of human resources and performance achievements are still not optimal.
4. The synergy between government and private institutions in promoting public services is still not optimally aligned with policy development goals.

Currently, the city of Kendari is in the initiation stage in an effort to prepare the structure, build infrastructure, and develop superstructure to implement the Smart City concept. Therefore, to accelerate the realization of the Smart Governance concept in the city of Kendari, several initiation steps that can be taken need to be considered.

1. Formation of the Smart City organization: The first step that needs to be taken is to establish an organizational structure specifically for managing the Smart City project. This includes the formation of the Smart City Council, which will serve as the supervisor and oversee the project's progress, as well as the formation of the Smart City implementation team, which will be directly responsible for implementing various Smart City programs and initiatives.
2. Development of policies, procedures, and standards for Smart city development: Additionally, it is important to develop clear policies, structured procedures, and reliable standards in the development of Smart city. This will ensure that every step taken has a strong and consistent foundation, and leads to the achievement of the long-term goals that have been set.

3. Strengthening human resource capacity: Investing in the strengthening of human resource capacity (SDM) is also a crucial step in building a Smart city. Training, education, and skill development will help ensure that the professionals involved have the knowledge and skills necessary to successfully manage and implement various technologies and innovations related to Smart city.
4. Strengthening stakeholder engagement in Smart city: Finally, it is important to strengthen the engagement and participation of various stakeholders in the development of Smart city. Involving the community, private sector, government institutions, and non-governmental organizations will ensure that the needs and aspirations of all parties are considered in every decision and step taken, thereby ensuring the sustainability and overall success of the Smart city project.

By comprehensively implementing these initiation steps, the city of Kendari can build a solid foundation for the sustainable and inclusive advancement of a Smart city.

3.1.2 Smart Branding

Smart Branding is a marketing strategy that focuses on efforts to strengthen the image of a region with the aim of bringing significant positive impacts. The main objective is to introduce the potential of the region, enhance community engagement, and increase the area's attractiveness, thereby stimulating economic growth and overall community welfare. Gap analysis based on the dimensions of Smart Branding represents the difference or gap between the current conditions and the expected conditions when the Smart Branding concept is realized in the future. The gaps that serve as the basis for this analysis are as follows:

1. The minimal development of platforms and promotion of trade ecosystems that create a supportive and comfortable atmosphere for business actors, for example, by introducing local online markets.
2. The need for improved development and promotion of a simple yet efficient investment ecosystem, such as through the implementation of Investment Lounges, Dashboards, and Regional Investment Portals, to facilitate investors in exploring investment opportunities.
3. The insufficient efforts in building and marketing products and services from the local creative industry sector, including food and beverages, handicrafts, fashion, digital, and various other sectors, with the aim of enhancing the attractiveness and added value of the region's creative potential.

The strategic plan to realize the Smart Branding concept in Kendari City is outlined as follows.

1. Development of platforms and promotion of a conducive and enjoyable trade ecosystem, such as introducing a marketplace specifically for the local area.
2. Development and promotion of a simple and effective investment ecosystem, by introducing facilities such as an Investment Lounge, Dashboard, and Regional Investment Portal.

3. Efforts to build and market a variety of products and services from the local creative industry sector, such as food, crafts, fashion, digital technology, and other unique fields.

4. Implementation of urban face-lifting to highlight the architectural richness that reflects local cultural values, in line with the need for an attractive, clean, and orderly urban spatial and territorial layout with internationally recognized architectural quality.

5. Development of essential elements in urban planning, including clear territorial boundaries, creation of attention-grabbing landmarks, provision of unique navigation, orderly road structures, and focal points for city activities such as squares and roundabouts.

6. Improvement of infrastructure that supports the comfort of tourists, such as road development, transportation, accommodations like hotels, motels, and bed & breakfast (B&B), as well as restaurants.

7. The creation of a visitor-friendly culture, including improving foreign language communication skills, the availability of tour guides, and other efforts to warmly welcome visitors.

3.1.3 Smart Economy

Gap analysis based on the dimensions of Smart Economy represents the difference or gap between the current condition and the expected condition when the Smart Economy concept is realized in the future. The gaps that serve as the basis for this analysis are as follows.

1. Poor accessibility, lack of adequate facilities, and insufficient efficient monitoring systems can be obstacles in achieving the ideal conditions of an economic center.

2. The scarcity of skilled human resources, limited access to knowledge and technology, complexity in obtaining permits, challenges in business management, and difficulties in obtaining capital, especially for Small and Medium Enterprises (SMEs).

3. The limited availability of access and infrastructure that supports the development of tourism potential owned and managed by various stakeholders within the tourism area.

4. The need for management and identification of resources in the agriculture, forestry, culture sectors, and youth participation.

The realization of a Smart Economy in the development efforts of Kendari City will become a reality when the basic needs of the community are well met. This includes aspects such as access to food, clean water, health, and decent education. In addition, the achievement of a Smart Economy is also marked by equitable economic growth across all layers of society, which can be achieved through efforts such as the creation of new jobs, local economic empowerment, and equitable wealth distribution. Moreover, massive investments in key sectors such as industry and tourism will act as a catalyst for sustainable economic growth. By developing industrial activity centers and attractive tourism destinations, the city of Kendari can create new jobs, increase regional income, and optimize its economic potential.

3.1.4 Smart Living

Gap Analysis based on the Smart Living dimension represents the difference or gap between the current condition and the expected condition when the Smart Living concept is realized in the future. The gaps used as the basis for this analysis are as follows.

1. The collaboration between various parties has not yet been maximized, as an effort to enhance security and disaster preparedness and to create a safer and more resilient environment for all.

2. The need for equitable access to quality education services from the government as a form of commitment to the overall welfare of the community.

3. The need for improvement in the ease of access and availability of medical services and healthcare facilities.

Smart Living aims to create an environment that prioritizes comfort, safety, and convenience for all residents. This includes efforts to provide various local facilities and services that cover important aspects such as security, education, health, and efficient management of social welfare issues. With a holistic approach, Smart Living seeks to improve the quality of life for the community by providing better access and innovative solutions in terms of security, education, health, and management of social welfare issues. The strategic plan to realize the Smart Living concept in Kendari City is outlined as follows.

1. Security and Disaster Mitigation

To create a conducive security environment and disaster mitigation measures, more specific strategies are formulated to accelerate the realization of the Smart Living concept in Kendari City in the following forms:

a. Introduction and promotion of environmental security awareness conducted participatively by the community.

b. Establishment of a 24-hour emergency call center, accessible via phone or application, to respond to various incidents including crimes and disasters.

c. Implementation of an early warning system (EWS) that uses sensors to detect potential security issues early on.

d. Increase in the number of personnel, especially those focused on disaster mitigation.

e. The implementation of a digital recording and monitoring system for Social Welfare Problems, which can be integrated with a system that records data on low-income residents.

2. Education

To optimize and improve the quality of education, more specific strategies have been formulated to accelerate the realization of the Smart Living concept in Kendari City in the following forms:

a. Increasing the number of teachers to match the student-to-classroom ratio and the need for the number of classes or study groups.

b. Increasing school participation rates to reach 12 years.
c. Improving teacher qualifications through training programs aimed at obtaining certification.
d. Enhancing the quality of educational institutions through the accreditation process.
e. Digitizing fundamental school data, including student data, teaching staff, subjects, and learning processes.
f. Implementing a monitoring system for school facilities.
g. Developing an educational content management system to ensure the equitable distribution of learning materials across all schools, with an online-based approach.
h. Legalization of Non-Permanent Teachers through a Decree from the Regent.
i. Developing an online New Student Admission system.
j. Initiating computer-based national exams and online reporting of results.

3. Health

In the smart living concept, having access to adequate healthcare services is one of the main goals in achieving community welfare. Furthermore, to address the gaps that arise in the availability of healthcare services, more specific strategies have been formulated to accelerate the realization of the Smart Living concept in Kendari City in the following forms:

a. Increasing the number of healthcare workers, especially doctors and nurses.
b. Integrating health data with other population administration systems such as the National Identity Card (KTP) and the Social Security Agency (BPJS).
c. Providing online health information as an effort to socialize the importance of maintaining environmental health and preventing infectious diseases, among other things.
d. Developing an integrated information system to track and monitor healthcare services from hospitals, community health centers, polyclinics, to health offices.
e. Implementing an online interaction system between doctors, patients, and other stakeholders to facilitate communication and overcome the limitations of direct access to doctors.
f. Development of a monitoring system for maternal, infant, and child health, which records data on pregnant women and newborns to reduce maternal and infant mortality rates.

3.1.5   Smart Society

Gap analysis based on the dimensions of Smart Society represents the difference or gap between the current condition and the expected condition when the Smart Society concept is realized in the future. The gaps that serve as the basis for this analysis are as follows.

a. The need for easy and widespread access to ICT infrastructure such as fast broadband networks, reliable connectivity, and connected smart devices.
b. The community's participation and engagement have not yet been maximized in providing input and feedback.
c. The integration of individual, community, and institutional roles has not yet been maximized in the functions of digital networks, information exchange, collaboration, and coordination.
d. The functions of technologies such as the Internet of Things (IoT), artificial intelligence (AI), data analytics, and cloud computing have not yet been optimized for various aspects of daily life.

The Smart Society concept emphasizes collaboration among individuals with the aim of expanding reach into various physical and virtual aspects without sacrificing existing local wealth and wisdom. The main focus is to build a community that is communicatively connected, equipped with creative abilities to interact through various digital platforms that require a high level of literacy. The strategic plan to realize the Smart Society concept in Kendari City is outlined as follows.

a. Creating an inclusive educational environment that supports collaboration between formal and informal educational institutions, so that all individuals, including those with disabilities, have equal access to educational opportunities.
b. Development of various innovative educational platforms, such as smart schools, smart campuses, smart pesantren, smart training programs, and the like, to provide broader access to education for the community.
c. Implementation of a comprehensive security system to protect citizens from various risks, including personal safety, property, and disaster threats, by utilizing digital sensor technology and the Internet of Things (IoT) as well as existing government resources and infrastructure.

3.1.6   Smart Environment

Gap analysis based on the dimensions of Smart Environment represents the difference or gap between the current condition and the expected condition when the Smart Living concept is realized in the future. The gaps that serve as the basis for this analysis are as follows.

a. The suboptimal monitoring and control system for construction, both permanent and semi-permanent buildings on a massive scale, will certainly affect the spatial planning design of Kendari City.
b. The lack of Smart Lighting installations in urban spaces can lead to excessive electricity consumption.
c. The need for good design in waste management to minimize environmental pollution.

Achieving a livable environment, free from pollution, and in harmony with spatial planning and energy-saving efforts is the main focus of the Smart Environment concept. The city of Kendari has demonstrated an impressive level of success in addressing environmental issues with a relatively low incidence rate. To maintain this success and reduce potential risks in the future, several initiative steps can be taken.

a. Application-based waste management and transportation system

b. Initiation of the development of waste disposal sites based on 3R (reduce, reuse, recycle)
c. Energy-saving socialization
d. GRID development for energy management and control
e. Implementation of Smart Lighting for main roads
f. Monitoring and control system for development
g. Spatial oversight system to ensure land use suitability based on GIS (land use database, waste, etc.)
h. Monitoring system for public works, water resources, and creation and works.

3.2 SWOT Analysis

To gain a comprehensive understanding of the most suitable strategy, the step that can be taken is through the application of SWOT analysis. SWOT analysis is a strategic evaluation method that focuses on identifying and utilizing strengths (Strength/S) and opportunities (Opportunity/O), while also addressing or improving weaknesses (Weakness/W) and facing existing threats (Threat/T). Through this analysis process, a deeper understanding of the general conditions in the city of Kendari will be created, providing a strong foundation for formulating appropriate and sustainable strategies.

3.2.1 Strength (S)

The strength factors in the application of smart city in Kendari City based on gap analysis results are as follows:
a. The Regional Head has affirmed their commitment to bureaucratic reform and ensuring an open and efficient governance.
b. Efforts to develop an integrated healthcare service system, including hospitals, community health centers, medical practitioners, and midwives, are being carried out with a focus on integration and comfort for children.
c. Currently, various service systems are being developed with the main goal of helping the community overcome various problems, including bureaucracy, permits, and other aspects.
d. The potential for developing the agriculture, plantation, and food crop cultivation sectors is driven by fertile geographical conditions, especially plains and hills supported by a suitable climate.
e. The city of Kendari can boast a variety of tourist destinations, ranging from natural beauty to fascinating man-made attractions.
f. The surface water resources in the area have great potential to meet the water needs of the residents.
g. The trend of increasing Life Expectancy is evidence of the improvement in the quality of life of the community in the region.
h. The community lives in a peaceful atmosphere of harmony, supported by a safe and well-maintained environment.

3.2.2 Weakness (W)

Faktor kelemahan dalam pengaplikasian smart city di Kota Kendari berdasarkan hasil analisis gap adalah sebagai berikut:

a. Distribusi jumlah sumber daya manusia yang belum merata pada setiap perangkat daerah.
b. Persebaran penduduk tidak merata sehingga terjadi ketimpangan antar kecamatan, baik dari jumlah penduduk maupun kepadatannya.
c. Belum optimalnya akses masyarakat terhadap pelayanan kesehatan serta kurangnya ketersediaan dan kurang meratanya distribusi tenaga kesehatan beserta sarana.
d. Masih minimnya kesiapan lahan untuk pembangunan infrastruktur pariwisata.
e. Masih tingginya proporsi penduduk dengan tingkat pendidikan rendah untuk usia bekerja.
f. Kualitas jalan terbangun masih banyak yang harus dibenahi.
g. Belum ada penerapan pemilahan sampah mulai dari rumah tangga.
h. Belum memiliki sistem peringatan dini bencana.

3.2.3 Opportunity (O)

Opportunity factors in the application of smart city in Kendari City based on gap analysis results are as follows:
a. Support from the central and provincial governments regarding budget allocation opportunities for infrastructure improvement.
b. The opportunity to create a fast and efficient public transportation system through online media.
c. The existence of a collaboration ecosystem between the government and business actors.
d. The increasing number of business opportunities and labor needs from the creative industry.
e. The availability of adequate land for long-term planning.
f. A strategic position as a city that connects the provincial capital with other cities.
g. The abundance of skilled human resources in Kendari City that support the smart city initiative.
h. **The ease of access to higher education, both public and private.**

3.2.4 Threat (T)

Threat factors in the implementation of smart city in Kendari City based on gap analysis results are as follows:
a. The increasing need for infrastructure development leading to the reduction of green open spaces.
b. Disaster conditions such as forest and land fires, landslides, droughts, and others.
c. The rapid development of information technology has not been matched by the speed of human resource capacity renewal.
d. The influx of foreign workers has resulted in minimal absorption of local labor.
e. The potential increase in criminality reduces external investment interest.
f. The potential entry of foreign cultures could affect local wisdom.

3.2.5 S-O Strategy

The S-O strategy is a strategy that uses strengths to leverage opportunities. In this research, several S-O strategies

were obtained based on the elaboration of strengths and opportunities in the implementation of a smart city in Kendari City.

a. Mapping and preparing the potential of local human resources to seize opportunities from national, provincial, and internal city-scale programs in anticipation of infrastructure and superstructure improvements.
b. Enhancing innovative programs that align with the national policy of Kendari City as a center for processing agricultural and plantation products.
c. Mapping and identifying tourism sectors that highlight natural and cultural advantages.
d. Optimizing the alignment of programs for developing government information service systems based on applications.
e. Providing facilities and infrastructure that facilitate the younger generation in continuing their education to higher levels.
f. Providing rest areas for travelers passing through the Kendari City area.

3.2.6 W-O Strategy

The W-O strategy is a strategy that minimizes weaknesses to take advantage of opportunities. In this research, several W-O strategies were obtained based on the elaboration of weaknesses and opportunities in the implementation of a smart city in Kendari City.

a. Programs to improve the effectiveness and efficiency of employees' work in government institutions.
b. Development of community services based on technology and digital media and improvement of data and information accessibility through the development of a centralized data management system.
c. Improving the quality of monitoring and evaluation systems for government program implementation through the development of electronic systems.
d. Enhancing accessibility to data and information in the fields of health, education, and culture as priority areas.
e. Improvement of community training centers to enhance community capacity and anticipate increased competitiveness of human resources.
f. Education on waste management for the community.
g. Comprehensive disaster mitigation planning.

3.2.7 S-T Strategy

This S-T strategy is a strategy that uses strengths to overcome threats. In this research, several S-T strategies were obtained based on the elaboration of strengths and threats in the implementation of a smart city in Kendari City.

a. Control of land use through the enforcement of zoning regulations, permits, and the imposition of sanctions for violations of spatial planning.
b. Comprehensive disaster mitigation planning.
c. Programs to improve the effectiveness and efficiency of employees' work in government institutions.

d. Creating regulations that support the absorption of local labor.
e. Providing easy access to capital that supports the development of small and medium enterprises.
f. Providing education to foster pride in local culture.

3.2.8 W-T Strategy

The W-T strategy is a strategy that minimizes weaknesses and avoids threats. In this research, several W-T strategies were obtained based on the elaboration of weaknesses and threats in the implementation of a smart city in Kendari City.

a. Policies to improve the effectiveness and efficiency of employee work, along with imposing sanctions for violations in government institutions.
b. Creating disaster-prone zones and providing disaster mitigation facilities.
c. Restoring the function of rain as a natural absorption area.
d. Limiting the quantity of foreign labor and prioritizing local labor.
e. Imposing restrictions to create and enhance a sense of security in society.
f. Mandating local content subjects at every level of education.

Kendari City has various internal strengths that support regional development, such as the commitment of local leaders to bureaucratic reform, the development of an integrated healthcare service system, and the potential of the agriculture and tourism sectors. However, there are also weaknesses that need to be addressed, including the uneven distribution of human resources, suboptimal access to healthcare services, and infrastructure that still needs improvement.

On the other hand, Kendari City has great opportunities for development, such as budget support from the central and provincial governments, opportunities for the development of technology-based public transportation, and the potential for collaboration with business actors. However, threats such as the need for infrastructure development that reduces green open spaces and the influx of foreign labor that decreases the absorption of local labor need to be anticipated with appropriate policies.

4. CONCLUSIONS

The conclusion of this research is as follows:

a. Kendari City has great potential to become a smart city, but there are still significant challenges that need to be addressed in every dimension.
b. The gap analysis shows that the smart government and smart environment dimensions require priority attention.
c. The SWOT analysis provides strategic directions to leverage strengths and opportunities to address weaknesses and threats.

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