



## Metaverse innovation in public service transformation in Makassar metropolitan city

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**Abstract:** Metaverse is one of the innovations that can be used in various types of activities without the need to meet in the same room, just through virtual space that can be widely operated. This study aims to 1) analyze forms of metaverse-based public service innovation, 2) analyze opportunities and challenges in implementing metaverse-based public service innovations in Makassar Metropolitan City, 3) analyze government efforts made in implementing public service innovations based on metaverse in Makassar Metropolitan City. The research method used is based on descriptive qualitative by observing and collecting data from previous researchers as well as conducting direct interviews with several parties concerned. Based on the results of the research, it shows that the Makassar city government has shown strong efforts, including adopting policies and regulations that support the implementation of metaverse-based public services. In addition, the provision of infrastructure, campaigns related to metaverse education, collaboration with the private sector and academia, as well as procuring a pilot project as an implementation of the effectiveness of using metaverse-based public services.

**Keywords:** education, metaverse, public service

**Abstrak:** Metaverse menjadi salah satu inovasi yang dapat digunakan dalam berbagai jenis kegiatan tanpa perlu bertemu di ruang yang sama, cukup melalui ruang virtual yang dapat dioperasikan secara luas. Penelitian ini bertujuan untuk 1) Menganalisis bentuk-bentuk inovasi pelayanan publik yang berbasis metaverse, 2) Menganalisis peluang dan tantangan dalam menerapkan inovasi pelayanan publik yang berbasis metaverse di Kota Makassar, 3) Menganalisis upaya pemerintah yang dilakukan dalam menerapkan inovasi pelayanan publik yang berbasis metaverse di Kota Makassar. Metode penelitian yang digunakan yaitu berbasis kualitatif deskriptif dengan melakukan observasi dan mengumpulkan data dari peneliti terdahulu serta melakukan wawancara secara langsung kepada beberapa pihak bersangkutan. Berdasarkan hasil penelitian menunjukkan bahwa pemerintah kota Makassar telah menunjukkan upaya yang kuat diantaranya telah mengadopsi kebijakan dan peraturan yang mendukung penerapan pelayanan publik berbasis metaverse. Selain itu, penyediaan infrastruktur, kampanye terkait edukasi metaverse, kolaborasi dengan pihak swasta dan akademisi, serta pengadaan *pilot project* sebagai implementasi efektivitas penggunaan pelayanan publik berbasis metaverse.

**Kata Kunci:** edukasi, metaverse, pelayanan publik

### Introduction

Technological developments in the current era of globalization are very rapid. In various lines of human life, all of them have used information technology as a supporting medium in facilitating their affairs. One of the new technologies that has become popular since the end of 2021 is the metaverse (Harry, 2022). The Metaverse is the Internet part of shared virtual reality made similar to the real world in the second stage of the Internet world. Metaverse in a broader sense may not only refer to virtual environments operated by social media companies but the entire spectrum of reality that is affected. Previously, the Metaverse was a virtual space that other users could create and explore without meeting in the same space (Fauzi, 2022). The metaverse is a necessity, sooner or later its development will be so massive along with the adoption of crypto and blockchain assets that can become part of the virtual world that will be built later. The adoption of crypto and blockchain will accelerate the development of the metaverse which has great potential in Indonesia. Imagine, there will be many innovations that appear at this time, will run towards the metaverse in the future. What we feel in the real world, can also happen in the metaverse.

The era of the industrial revolution 4.0 has turned many things upside down, not only the economy, but also public services and even supervision. This change is an opportunity for those who can adapt

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through various innovations. On the other hand, many of those who are unable or unwilling to adapt to this turmoil will fall (Masthuri, 2021). If applied in the dimension of public service, quotes from Steve Jobs are also very relevant to explain current conditions. The thinking and creativity of service users is one step ahead of service providers. Strengthening citizen participation through various digital communities is able to answer their service needs, and sometimes it occurs without the role of the state, or if there is one that is very minimalist. It's exciting at first, but at the same time has a disturbing effect.

Digitalization of public services also forms a new culture in terms of citizen participation in the process of public services. Citizens who are dominated by the generation of thinking are very open in addressing public services. They even prefer social media to express their disappointment with the service rather than the complaint counter provided by the service provider. Various big cities in Indonesia have started exploring metaverse technology in public services, one of which is Jakarta. The DKI Jakarta Provincial Government has established a strategic partnership with PT WIR Asia Tbk (WIR Group) to develop the metaverse platform.

This step is an effort to support visits to Jakarta as a developed city through excellent public services that can be compared to other big cities in the world. Jakarta is ready to adopt metaverse technology to realize Jakarta's vision as an advanced, sustainable and cultured city whose citizens are involved in realizing civilization, justice and prosperity for all (Anggita, 2022). In addition, the Bandung City Government is also initiating the use of metaverse technology in various fields, including education, tourism, economy, and culture (Fikri, 2022). Another example is the Regional Government of Sumedang Regency preparing for the development of a Digital Public Service Mall or Digital Public Service Mall (MPP) (Wijaya, 2022).

In Makassar City itself, as a metropolitan city with a vision of becoming a world city, it will implement the Metaverse concept in its administration. This idea is considered appropriate for preparing and responding to technological advances in the future (Said, 2022). This metaverse-based service is planned to run virtually with 3D technology that will enable people to access public services more interactively. The Covid-19 pandemic has taught city governments to be effective in public services that interact directly, while at the same time developing more efficient services. With this metaverse innovation, it is hoped that it will be able to solve problems that have been faced by society (Yunus, 2022). Based on this background description, it is important to study more deeply about Metaverse Innovation in the Transformation of Public Services in the Makassar Metropolitan City.

## **Materials and Methods**

The type of research that will be used is descriptive qualitative research by making observations or direct observations for several days, besides that researchers will also collect data from previous research results to be developed according to needs and conduct direct interviews with the people concerned. The approach used in this study is the SWOT analysis approach to the application of metaverse innovations in public services. This analysis will assist researchers in their efforts to investigate the opportunities and challenges that will be faced by the Makassar City government if using metaverse-based public service innovations.

## **Result and Discussion**

### **A. Metaverse-Based Public Services**

In a broader context, the Metaverse refers to virtual environments generated by the digital world that are integrated with the physical world. Considering that the Metaverse concept is still in its development stage, there is a lot of potential for implementing public service innovations in this space. Several forms of public service innovation that can be built based on the Metaverse, such as the Virtual Government Center, where the government can build a virtual government center in the Metaverse that can be accessed by citizens. This can include virtual government offices, meeting rooms, discussion forums, and access to various government services online. Citizens can interact with government representatives and get information and public services without having to go to a physical office.

Makassar City Government has shown various forms of concern in public services to improve people's quality of life. Some examples of this form of concern include the One-Stop Integrated Service Program (PTSP), the Makassar City Government has implemented PTSP as an effort to simplify the administrative process and obtain permits. With PTSP, the community can efficiently and transparently manage various permits and other public services in one place.

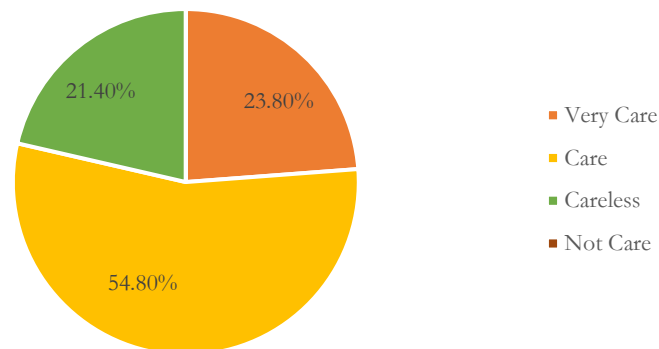


Figure 1. Survey of community assessment of the Makassar City Government's concern for public services, 2023

Makassar City Government has made efforts to improve the accessibility and quality of health services for the community. In addition, infrastructure improvements have been made to improve accessibility and mobility of the community and have implemented various programs to maintain environmental sustainability.

The form of Makassar City government's concern for public services reflects efforts to improve the quality of life and welfare of society as a whole. In metaverse-based public services, the public can participate in a simulation or virtual environment that mimics real experiences, for example in obtaining permits, reporting problems, or obtaining information about certain public services. Through avatars or digital representations, users can interact with virtual officers, ask questions and get guidance so that they become more interactive, efficient and easily accessible to the public.

#### 1. Metaverse in Education Sector

The metaverse can have various implications and great potential in the field of education. In an educational context, the metaverse can provide immersive, virtually interactive learning experiences. Here are some examples of how metaverse can be applied in education

##### a. Learning Simulation

Metaverse can be used to create interactive simulations that combine real and virtual world elements. For example, students may explore realistic historical or scientific environments, experience specific time periods or observe natural phenomena on a larger scale. Some examples, such as metaverse-based learning simulations can create deep and intensive learning experiences. In this simulation, students can interact with a specially created virtual world to reinforce their understanding of certain concepts or encounter situations similar to real life. Such as scientific simulations, teamwork simulations and technical skills simulations.

##### b. Virtual Course

Metaverse can enable teaching through virtual courses where students can participate in lectures, discussions and other activities using their avatars. This provides flexibility for students to study from anywhere, while staying connected with their peers. Metaverse-based virtual courses are a learning approach where students can take courses or classes through a virtual environment similar to the metaverse. It allows students to interact, participate and learn online using their avatars.

##### c. Collaboration and Team Work

Metaverse-based collaboration and teamwork allows students or individuals from different locations to work together virtually in a metaverse environment. This creates a deep and immersive collaborative experience. Some of the features and benefits of metaverse-based collaboration and team work are the Metaverse Virtual Workspaces providing virtual workspaces where team members can meet and work

together. These workspaces can be customized according to the needs of the team, with amenities such as a digital whiteboard, file sharing area or other collaboration tools.

#### d. Game-Based Learning

Metaverse can be used to create engaging and interactive game-based learning experiences. By leveraging play elements such as challenge, achievement, and competition, metaverse can make learning more fun and motivating. Game-based learning using the metaverse combines game elements with interactive virtual environments. This creates an engaging and actively engaged learning experience.

#### e. Virtual Laboratory

In science, metaverse can be used to create virtual laboratories where students can conduct experiments and observe the results virtually. This allows students to learn scientific concepts practically without having to use physical equipment. Metaverse-based virtual labs are virtual environments specifically designed to simulate a virtual laboratory experience. It enables students to conduct experiments and observe scientific phenomena realistically through a virtual environment.

#### f. Cultural Experiences and Virtual Tours

Metaverse can allow students to visit historic sites, museums, or other places of importance virtually. They can explore and learn about the culture, art and history of a place without having to physically travel. It creates an immersive experience that is close to the real experience, enabling people to experience cultural diversity and far-flung places first hand. Metaverse in education can create learning experiences that are more engaging, collaborative, and accessible to all students, regardless of their geographic location. However, it is important to remember that the implementation of the metaverse in education must also consider accessibility, safety, and ethical issues to ensure the maximum benefit for students.

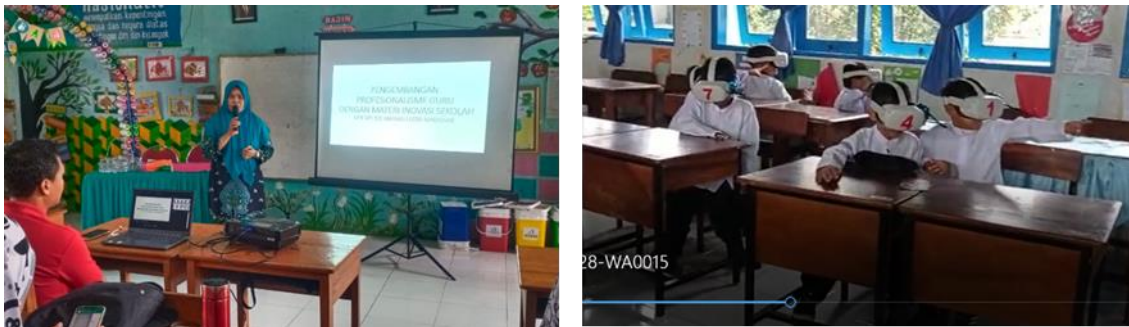


Figure 2. Training on the use of metaverse media for teachers and students by the Makassar City Education Office

## 2. Metaverse in Tourism

The following are some examples of the application of Metaverse in tourism:

### a. Virtual Tourism

Metaverse can be used to create virtual travel experiences that allow users to explore tourist attractions around the world without having to physically travel. Through the use of virtual reality (VR) and augmented reality (AR) technologies, users can visit famous landmarks, historical places or popular tourist destinations virtually.

### b. Interaction with Local Culture

Metaverse can provide immersive interactive experiences with the local culture of a place. Users can interact with local residents, take part in cultural activities, take traditional cooking classes, or even attend local festivals through virtual space. This provides an opportunity for tourists to get to know and understand the culture of a place directly. Interaction with Metaverse-based Local Cultures includes using the metaverse platform to provide immersive, immersive experiences related to the local culture of a place. This allows users to interact with local residents, learn about their traditions and customs, and get to know more about their cultural heritage.

### c. 360 Degree Travel Destinations

With the help of VR technology, metaverse can present a 360-degree experience that allows users to "visit" tourist destinations as a whole. They can explore natural landscapes, beaches, mountains, or even places that are difficult to access physically. This experience can provide a more complete picture of a tourist destination before users decide to actually visit it.

#### d. Virtual Tour Guide

Metaverse can provide interactive and informative virtual tour guides. Virtual tour guides can guide users through tourist destinations, providing historical information, interesting facts and stories related to each place visited. Users can also interact with tour guides to get specific recommendations or answer their questions.

#### e. Game-Based Tourism

Metaverse can incorporate game elements into travel experiences. Users can engage in location-based missions, puzzles or challenges that require them to explore tourist destinations and complete certain tasks. This provides a new dimension in how people interact with tourist destinations and increases user engagement.

#### f. Interdestination Collaboration

Metaverse can enable collaboration between different travel destinations. For example, multiple travel destinations can work together to create a connected experience, where users can "move" from one place to another and gain knowledge about those destinations.

### 3. Metaverse in the Social Sector

The following are some examples of the application of Metaverse in public services in the social sector

#### a. Mental and Emotional Support Platform

Metaverse can be used as a platform to provide mental and emotional support to individuals in need. For example, people with mental health problems or loneliness can participate in virtual therapy sessions using their avatars. They can interact with therapists or other community members who are going through similar situations, get support, and share their experiences. This can help reduce stigmatization and increase the accessibility of mental health care.

#### b. Education and Skills Training

Metaverse can be used to provide education and skills training to individuals in need. For example, the Metaverse platform may offer online courses or interactive training in areas such as employability, entrepreneurship, or personal development. This can provide broader access to education to individuals who do not have physical or financial access to traditional educational institutions. Social skills education and training based on Metaverse can be an innovative and effective solution for developing social skills in individuals.

#### c. Community Liaison

The Metaverse can serve as a gathering place for communities that share the same interests or goals. Individuals can join virtual communities, interact with their avatars, and participate in activities and discussions. This can help overcome geographic boundaries and broaden social networks, so that individuals can gain support, share knowledge, and engage in social activities. Metaverse-based Community Liaison allows individuals to connect with communities who share the same interests or goals in a virtual environment.

#### d. Universal Accessibility

Metaverse can provide universal accessibility for individuals with physical limitations or limited mobility. The Metaverse Platform can be designed with accessibility features that enable individuals with disabilities to participate and interact easily. For example, avatars that can be controlled by body movements or technological assistive devices can help individuals with motor impairments participate fully in virtual activities.

#### e. Social Simulation

Metaverse can be used to present simulations of certain social situations, such as cultural sensitivity training, life experiences as people with special needs, or situations related to complex social issues. This can help increase understanding, reduce prejudice, and promote social inclusion in society.

#### 4. Metaverse in Economics

The following are some examples of public services using the Metaverse in the economic field

##### a. Virtual Exhibition and Trade

Governments or organizations can host virtual trade shows or economic events in the metaverse. Participants can participate in exhibitions, showcase products or services, establish business relationships, and make transactions online. Metaverse-based virtual exhibitions and trades are a form of event or platform where people can participate virtually using metaverse technology. Metaverse refers to a virtual world that is connected to the real world, where users can interact with each other and with the built virtual environment.

##### b. Economic Training and Education

Metaverse can be used as a platform to provide economic training and education to the public. Governments or educational institutions can organize virtual classes, workshops, or seminars in the metaverse to increase people's economic understanding and skills. Metaverse-based economics training and education refers to approaches in which economic concepts and related training can be taught and learned through the use of metaverse technologies.

##### c. Economic Information Center

Metaverse can be used to build a virtual economic information center that provides data, statistics, analysis and news related to the economic aspects of a region or country. The public can access this information through their avatars in the metaverse. Public service through the Center for Economic Information (PIE) is an approach in which relevant economic information is made available to the public to enhance their understanding of economic issues, public policies and existing economic opportunities. PIE aims to provide easy and transparent access to economic information to the general public, business people, government and other stakeholders.

##### d. Virtual Payments and Finance

Metaverse can provide a virtual payment and financial system that enables secure and efficient economic transactions. Users can make payments, transfer money, or invest in the metaverse environment, similar to real-world online transactions. Public services through metaverse-based virtual payments and finance refers to the use of metaverse technology to provide payment and financial services to the public. In this context, metaverse acts as a virtual platform where financial transactions can be carried out and innovative payment solutions can be implemented.

##### e. Economic Simulation and Testing

Metaverse can be used as a simulation environment to test economic and public policy scenarios. Governments can develop virtual economy models to test the impact of policies, identify risks and plan economic strategies. Metaverse-based economic simulation and testing refers to using metaverse-based virtual environments to conduct experiments and analysis in an economic context.

##### f. Business Development and Innovation

Metaverse can be a platform for entrepreneurs to grow their business and innovate. Communities can interact with virtual businesses, attend business meetings, or build business networks in a metaverse environment. Metaverse-based business development and innovation refers to the utilization of a metaverse-based virtual environment to expand and improve business and produce new innovations.

#### 5. Government Metaverse

Metaverse-based public services in the field of government refer to the use of metaverse-based virtual environments to provide public services that are more efficient, affordable, and connected to the community. The Metaverse is a virtual world consisting of digital spaces inhabited by users who interact through their avatars. The following are some examples of metaverse-based public services in the context of government

##### a. Governance and Public Participation

Metaverse can be used as a platform to engage citizens in government decision-making processes and public participation. Governments can hold virtual meetings, discussion forums, or polls in a metaverse environment, allowing citizens to participate and provide their input without having to be physically present. This allows for broader and inclusive public participation.

#### b. Administrative Services

The government can provide administrative services through the metaverse to simplify the public administration process. For example, citizens can submit administrative documents such as licenses, tax filings, or license applications through the metaverse platform, which will speed up the process, reduce bureaucracy, and make it easier to access.

#### c. Education and Public Information

Metaverse can be used as a means to provide education and public information to the public. The government can organize virtual seminars, workshops or conferences that can be accessed by the public through their avatars. It can be used to convey information about public policy, citizens' rights and obligations, or other important issues.

#### d. Supervision and Law Enforcement

Metaverse can be used as a tool for surveillance and law enforcement. Governments can monitor activity in the metaverse to detect violations of law or unlawful behavior. This can assist in maintaining security and order within the metaverse environment, in line with applicable laws and regulations.

#### e. Health and Welfare Services

Metaverse can be used to provide health and welfare services to the community. Governments may provide medical consultations or mental health services through the metaverse platform. This can help people access health services without having to come to a physical facility, especially in emergency situations or when access is limited. Metaverse-based public services in government can improve efficiency, accessibility, and public participation in government processes.

## B. Public Service Transformation

Public service transformation is a process of change that aims to improve the quality, efficiency, and public satisfaction with the services provided by government agencies. This transformation involves changes in government systems, processes and work culture with a focus on the interests and needs of the community. Public service transformation aims to improve the quality of services provided to the community. This includes increasing the speed, efficiency, reliability, and accessibility of services. Good service must meet the needs and expectations of the community and provide effective solutions to the problems faced.

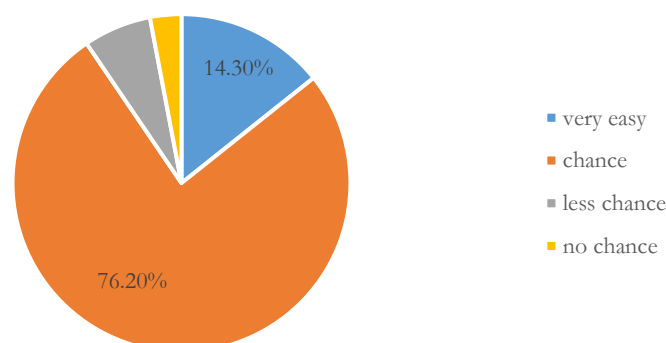


Figure 3. Opportunities for implementing metaverse-based public services in Makassar City, 2023

The application of information and communication technology (ICT) is one of the key elements in the transformation of public services. Digitizing administrative processes, implementing integrated information systems, using mobile applications, and developing e-government can improve the efficiency, transparency, and accessibility of public services. an important step in improving the efficiency, accessibility, and quality of public services. The application of information and communication technology (ICT) enables government agencies to optimize the use of technology in providing services

to the public. The application of ICT in public services must pay attention to aspects of data security and public privacy.

Protection of personal data and information security must be a major concern in the use of technology. In addition, it is also important to ensure ICT accessibility to all levels of society, including those who may have limited technology or limited internet access. With the proper application of ICT, public services can be significantly improved, increasing the efficiency and quality of services, as well as improving the relationship between government and society.

The transformation of public services also includes the provision of wider participation space for the community in decision-making and the formulation of public policies. Community participation can be carried out through mechanisms such as public consultations, dialogue forums, or the use of online platforms that allow the public to provide input and feedback on public services. The transformation of public services also requires increasing the competence and work ethic of government officials. Training, coaching and human resource development are important to increase the professionalism, integrity and skills of public service. Improving the work ethic is also necessary to create a service culture that is oriented to the interests of the community.

Public service transformation must be supported by systematic measurement and evaluation. The government needs to monitor the quality of services provided, collect feedback from the public, and evaluate policy implementation. This aims to identify weaknesses, correct ineffective policies, and continue to improve service quality. The transformation of public services is an ongoing effort and requires collaboration between the government, society and the private sector. The goal is to create public services that are responsive, efficient, transparent, and able to meet the needs of society optimally.

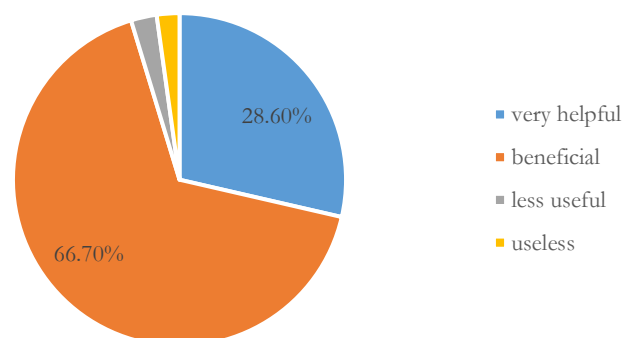


Figure 4. The level of usefulness obtained by the government of Makassar City in the implementation of metaverse-based public services, 2023.

Metaverse-based public service transformation refers to the use of metaverse technology, such as augmented reality (AR) and virtual reality (VR), in the provision of public services. In this context, metaverse can be used to create interactive and immersive experiences for citizens in interacting with the government and accessing public services. The benefits of transforming public services based on the metaverse include increased accessibility, more engaging interactive experiences, and efficiency in service delivery. However, it should be noted that implementing the metaverse also requires adequate technological infrastructure, protection of personal data, as well as adequate community skills and digital literacy.

Along with technological developments, the potential for metaverse application in public services continues to grow. It is important for the government of Makassar City to carry out research, consult with stakeholders, and careful planning before implementing a metaverse-based public service transformation to ensure positive benefits and impacts for the community. Measures such as upgrading internet infrastructure, training in technology skills, strong data protection policies, and effective outreach campaigns can help increase opportunities for implementing metaverse-based public services in Makassar City.



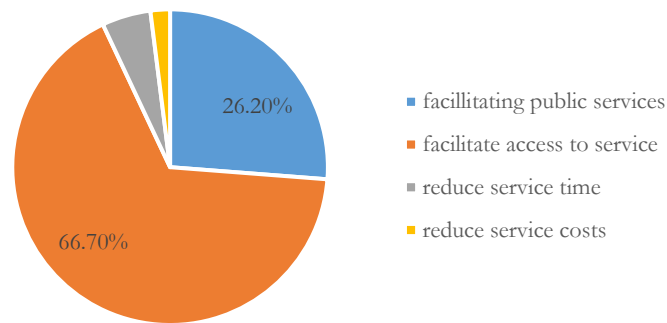


Figure 5. The level of profits obtained by the community in the implementation of metaverse-based public services in Makassar City, 2023.

The implementation of metaverse-based public services also needs to consider several aspects, such as personal data protection, information security, inclusiveness, and accessibility for all levels of society. It is important for the government of Makassar City to carry out research, planning and consultation with stakeholders so that this implementation can be carried out properly and provide significant benefits for the community. The implementation of metaverse-based public services in Makassar City will be supported by several important factors, including adequate technological infrastructure, community readiness, cooperation with the private sector, supporting regulations and policies, data security and privacy, community involvement and participation. On the other hand, several inhibiting factors that may affect the implementation of metaverse-based public services in Makassar City include limited internet access, limited technological skills, security and privacy, regulations and policies, lack of government support and involvement.

To overcome these inhibiting factors, collaborative efforts are needed between the government, public institutions, the private sector, and the community. Measures such as internet infrastructure upgrades, technology skills training, strong data protection policies, and effective outreach campaigns can help increase opportunities for implementing metaverse-based public services in Makassar City.

## Conclusion

The implementation of metaverse-based public services in Makassar City is an innovative step taken by the government to improve the quality, efficiency and accessibility of public services to the community. Based on the efforts previously mentioned, it can be concluded that (1) the government of Makassar City has adopted policies and regulations that support the implementation of metaverse-based public services; (2) In the context of implementing metaverse-based public services, the government of Makassar City has provided adequate technological infrastructure. This includes providing a stable internet connection, necessary hardware, and a metaverse platform that is accessible to the public; (3) Makassar City Government has encouraged technological innovation by involving the private sector and academics. This collaboration enables the development of metaverse solutions that are relevant to the needs of public services, as well as expanding the range of resources and expertise involved in implementation; (4) In addition, the Makassar City government also conducts campaigns and educates the public to increase understanding and participation in metaverse-based public services. This is intended so that people can make good use of this technology and experience significant benefits from its use. (5) Finally, pilot projects and phased implementation have been carried out as the first step in implementing metaverse-based public services. With this approach, the government of Makassar City can test and evaluate the effectiveness and response of the community to the application of metaverse in public services. Overall, the implementation of metaverse-based public services in Makassar City shows the government's strong efforts to improve the quality, efficiency and accessibility of public services. Through collaboration, education, and appropriate technology development, it is hoped that this application can provide significant benefits for the people of Makassar City.

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