Overview of Patent Protection in Public Services Towards Smart City: Case Study in Yogyakarta

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Keywords: *Smart City; Patent Protection; Android-Based*	**ABSTRACT**
	In Indonesia, the smart city idea strives to improve public services by combining various sectors like governance, economy, quality of life, environment, human resources, and transportation. These developments are mirrored in public service applications such as population administration, e-mobile ID cards, non-cash parking retribution, and smart retribution. However, such applications acquire no special protection. The purpose of this study is to define patent protection as an instrument for directing the development of public services toward becoming a smart city in Yogyakarta, Indonesia. This study employs a method of normative juridical legal research in conjunction with qualitative descriptive data analysis. The findings indicate that while the city of Yogyakarta develops android-based public service applications as a method of transforming public services, this innovation lacks legal protection as a means of controlling the application. Patent instruments can be utilized to protect android-based public service applications through the implementation of the Patent Law. The use of this Patent Law has not to affect efforts to reproduce the Android-based public service application in other domains.

1. INTRODUCTION

The concept of a smart city can be achieved if it demonstrates innovation in information technology. The concrete manifestation of information technology innovation takes the form of different android-based public service applications. The application is essentially a sort of integrated public service transformation designed to make life easier and provide optimal community service. Yogyakarta is one of several cities in Indonesia that are attempting to implement the smart city concept. This notion was born out of developing a plan for the City of Yogyakarta, which builds a smart culture encompassing smart tourism and smart education. To promote this notion, the City of Yogyakarta began implementing various information technology innovations and transformations of public services based on seven indicators of smart services. As a result,

many regional innovations supporting smart cities have been developed, including information technology innovation and public service transformation via Android-based public service applications.

The Yogyakarta City Government, on the other hand, is currently focused on initiatives to promote information technology innovation and the transition of public services into Android-based applications. Meanwhile, no attention has been paid to legal protection issues surrounding the control of android-based public service applications. Indeed, it is quite conceivable on a normative level under Law No. 13 of 2016 on Patents (referred to as the Patent Law), giving inventors and government entities chances to obtain patents. Additionally, the Android-based public service application itself may be patentable. According to this description, This paper tries to examine and identify the concept of patent protection to control the development of public services in the city of Yogyakarta towards a smart city.

2. RESEARCH METHODS

This study uses the normative juridical legal method in conjunction with qualitative descriptive data analysis. This research uses primary legal material, namely Law no. 13 of 2016 on Patents and the secondary legal material, which consists of several legal documents relates to the issue, book, scientific journals and other non-legal document related to this research

3. RESULTS AND DISCUSSION
3.1. Innovation in information technology and transformation of public services

All innovation is about reinvention in order to create something new that can be applied to society.[1] Processes, services, governance, organization, and technology can all be considered forms of innovation. In terms of technology, the area of innovation that is seeing rapid development in information technology innovation.[2]

Furthermore, the advancement of information technology innovation is critical for private sector objectives and public sector interests. The significance of information technology innovation for public sector interests is often geared toward encouraging the transformation of public sector services to further improve their performance. More precisely, there are various significant implications of information technology innovation for promoting the transformation of public services in order to further improve their performance, including the following:

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[1] Anahita Baregheh, Jennifer Rowley, and Sally Sambrook, "Towards a Multidisciplinary Definition of Innovation," *Management Decision* 47, no. 8 (2009): 1324–39.

[2] S Roper and J. Love, "The Organization of Innovation: Collaboration, Cooperation and Multi-Functional Groups in UK and German Manufacturing," *Cambridge Journal of Economics* 28, no. 3 (2004): 26–41.

3.1.1. Innovation in information technology enables the provision of rapid public services at any time

Today's fundamental difficulty with public services is that they are still perceived as complicated and time-limited. With this state of affairs, public satisfaction with government services is low. As a result of this predicament, public service units/institutions began taking the initiative to address these issues by applying information technology breakthroughs.[3] This is accomplished through the development of public service applications based on Android and other platforms. For instance, information systems used to create identification cards, information systems used to manage population administration, and so forth. Public services can be performed swiftly and at any time by developing an Android-based public service application. This speed is primarily due to the procedures and timing associated with the delivery of public services. The procedure can be shortened by performing public services between the community and related parties in making decisions while performing public services; this is consistent with the characteristics of Android-based public service applications that can be performed daily.

3.1.2. Innovation in information technology has the potential to increase the transparency of governmental services

Another issue with public services is that when done conventionally, the process of providing them is opaque. In actuality, the community as users of public services is frequently unaware of the evolution of the public service process. Suppose the public wants to know how the public service process is progressing. In that case, it will eventually result in public service behaviour that is rife with extortion and even acts of corruption. By using information technology advancements in public services in Android-based public service applications, the public service process can be made visible.[4]

3.1.3. Innovation in information technology has the potential to increase public access to public services

Public services are essentially the needs of all people, and they should be accessible to all strata of society. However, the reality is that conventional public services are incapable of reaching it adequately. From this issue, information technology innovation in the form of an Android-based public service application can be used to

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[3] Tjandra Setiadi, *Teknologi Untuk Pembangunan Berkelanjutan, Budi Sulistyo, Dkk, MDGs Sebentar Lagi, Sanggupkah Kita Menghapus Kemiskinan Di Dunia?* (Jakarta: Kompas, 2010); Mar Atun Nasikhah, "Inovasi Pelayanan Publik Berbasis Teknologi Informasi," *Junal Invasi Ilmu Sosial Dan Politik* 1, no. 1 (2019): 26–37.

[4] Eko Eddya Supriyanto, "Kebijakan Inovasi Teknologi Informasi (IT) Melalui Program Elektronik Goverment Dalam Meningkatkan Kualitas Pelayanan Publik Di Indonesia," *Jurnal Ilmu Pemerintahan: Kajian Ilmu Pemerintahan Dan Politik Daerah* 1, no. 1 (2016): 141–61.

optimize publicly accessible services.[5] Indeed, public access occurs not only in public spaces but also in private ones. This way, it can increase public access to the public service itself via an Android-based public service application.

3.1.4. Innovation in information technology results in lower costs

Transparent public service procedures have a hefty cost. This ultimately results in the inaccessibility of these vital public services. As a result of this circumstance, public services require reform, one of which is cost reduction. Using information technology breakthroughs in Android-based public service applications is one way to prevent high-cost public services. Indeed, by implementing information technology breakthroughs in Android-based public service applications, high expenses associated with public services can be greatly decreased.[6] The large decrease in high expenses is due to the possibility of reducing the prices of public services that are genuinely superfluous - especially given that it is an illegal charge that the community must pay.

3.1.5. Innovation in information technology can promote environmentally friendly public services

Traditionally, public services are conducted through the use of printed papers. Thousands of sheets of paper are consumed in the usual use of printed documents in public services. This undoubtedly affects environmental conditions, as wood-based paper must always be supplied. As a result, a significant amount of wood is harvested for use as raw material in the manufacture of paper. It is apparent from this environmental situation that paper-based public services are not environmentally beneficial. Thus, it is possible to achieve an ecologically friendly type of public service through information technology innovation in an Android-based public service application. This link is evident because all public service documentation is now produced digitally rather than on paper.[7] This finally results in a large decrease in the amount of paper used in government processes. Thus, information technology innovation in public service applications built on the Android platform will promote environmentally friendly public services.

3.2.   Patents and Its Characteristics

Granting a patent for a technological invention is a long historical process.[8] Initially, the patent concept was proposed because third parties frequently used inventions without any reciprocal benefit to the inventor. As a consequence, the inventor expects

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[5] Nasikhah, "Inovasi Pelayanan Publik Berbasis Teknologi Informasi."

[6] Nasikhah.

[7] Nasikhah.

[8] Anna Guagnini, Ian Inkster, and Cheistine Macleod, "Patents in History: History of Technology," *British Journal for the History of Science* 39, no. 3 (2006): 438–39.

that all inventions be protected. This condition was finally met with the invention of the patent concept.

A patent is an exclusive right granted by the state to innovation in the field of technology for a specified period, allowing the inventor to either execute their invention or grant approval to other parties to do the same.[9] Patents exhibit various properties based on this concept, including:

First, patents, as an exclusive right, confer a monopoly on technological inventions. Monopoly rights can take three forms, including (1). Inventors can implement their inventions; (2). Inventors may authorize others to carry out their innovations, and (3) inventors may prohibit others from carrying out their inventions. Along with being given monopoly rights, the patent system's monopoly rights are essentially limited by applicable laws and regulations, public order, and morals. On this basis, the patent system genuinely strikes a balance between the inventor's and the broader community's interests.

Second, a patent granted by the state. This means that to secure a patent as an exclusive right, and the inventor must file a patent application to the state and consider the innovation through the eligibility requirements of novelty, innovative step, and industrial applicability.

Thirdly, an invention in the field of technology. The term "invention" refers to technological innovation. Patentable inventions cover all disciplines of technology that have a problem-solving function (technical effects). Additionally, the invention meets the criteria for patentability, as indicated in the second reason.

Fourth, the patent is granted for a specified period to visualize this period, and patents have been classified into two categories: patents and simple patents. Patents are normally granted for twenty years from the date of receipt, whereas simple patents are granted for ten years from the date of receipt. As one sort of intellectual property right, patents and simple patents cannot be extended throughout the protection.

Fifth, Patents must be implemented, either directly or indirectly, through permission of third parties. The term "implemented" refers to the fact that the inventor or third parties may produce the patent. A patent can be implemented in two ways: by creating it yourself or licensing it to another party. Apart from self-production or licensing, patents can also be utilized through joint ventures or strategic partnerships between inventors and investors.

Based on the patent principle outlined above, it is apparent that patents provide numerous benefits. These benefits accrue not only to the inventor but also to the broader community. The distribution of information about inventors' discoveries through the filing of a patent application benefits the community since it enables the public to access

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[9] Matthew J Kleiman, "Patent Rights and Flags of Convenience in Outer Space," *The Air and Space Lawyer* 23, no. 3 (2011): 4–7.

information about the invention and track the progress of the invention generated by the inventors. This can also serve as a foundation for further inventions. Along with laying the groundwork for succeeding inventions, patents promote patent-protected inventions and essentially produce jobs and benefit the community.

Meanwhile, by filing a patent application, the inventor obtains state protection for a specified length of time. Protection can take the shape of overseeing and monitoring the inventions it develops to ensure unauthorized parties do not misuse them. Along with protection, inventors are given the option to return their investment in the inventions they create within a specified period. As a result, patents provide a level playing field for inventors and the general public regarding the production of technological inventions.

3.3.   Implementation of Information Technology Innovation to Support the Transformation of Yogyakarta's Public Service

The Smart City concept was born out of the community's need for quick, easy, efficient, precise, and accurate public services in the provision of information and administration.[10] According to the UK Department for Business, Innovation and Skills (BIS), smart cities are concept a static outcome, in which increased citizen engagement, hard infrastructure, social capital, and digital technologies which able to cried cities more livable, resilient, and capable of responding to challenges, while Gabriel Cretu defines smart cities as two major streams, including 1) Smart cities should approach all aspects of governance and economics via new paradigms of thought; and 2) smart cities are all about sensor networks, smart gadgets, real-time data, and ICT integration into every area of human life.[11]

According to the numerous definitions above, a smart city is an urban idea that promotes innovative technology-based urban management by integrating physical, economic, and social infrastructure to improve services and build a successful community. By comprehending the smart city concept, two critical factors must be considered while establishing a smart city: (1) the availability of integrated services; and (2) the integration of services through innovative information technology. The availability of integrated services in metropolitan areas refers to a variety of different types of services. These services include those related to health, social welfare, and transportation. In Indonesia, the smart city concept has been widely implemented by several cities, including Yogyakarta. Yogyakarta's mission is to be a "City of Education-Quality, Character, and Inclusiveness, Cultural-Based Tourism, and Service Center, with

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[10] I. G. A. AG Dewi Sucitawathi, Wayan Joniarta, and Yulyana Dewi, "Konsep 'Smart City' Dan Tata Kelola Pemerintahan Di Kota Denpasar," *Jurnal Administrasi Publik* 3, no. 9–15 (2018).

[11] Andrej Adamuscin, Julius Golej, and Miroslav Panik, "The Challenge for the Development of Smart City Concept in Bratislava Based on Examples of Smart Cities of Vienna and Amsterdam," *European Alliance for Innovation* 1, no. 1 (2016): 1–13, https://doi.org/10.4108/eai.18-7-2016.151629.

an Environmental and People-Centered Economy Concept." The vision is organized around four keywords: tourism, education, culture, and service centres, with smart culture serving as the primary framework. The term "smart culture" refers to two distinct concepts: smart tourism and smart education. Smart tourism takes into account two distinct interests, namely those of tourists and stakeholders. The tourist's interest refers to a citizen-centric and service provision centred on tourist needs. However, if viewed from the stakeholder's perspective, smart tourism is implemented through a stakeholder-centric approach through the strategy and focus are government/business/community-centric.[12]

As presented in Figure 1, the two-sided framework may be used to encompass seven indications of smart service, including smart environment, smart mobility, smart government, smart economy, smart people, smart living, and smart disaster management.[13]
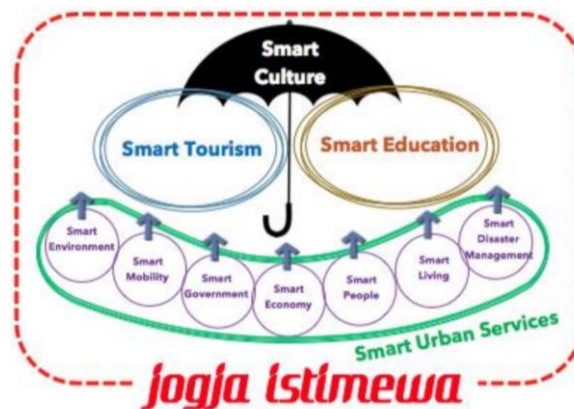

Figure 1. The Smart City Concept of Yogyakarta

Yogyakarta City's Government efforts to support various applications have resulted in the development of 156 regional innovations. Of these conditions, 120 were reported through the Innovative Government Award (IGA) system, including details on 72 regional innovations relating to public services, 11 regional innovations relating to governance, and 37 regional innovations relating to other innovations as determined by regional authorities.[14] They categorized the 120 regional innovations created into 53 non-digital and 67 regional digital innovations, as illustrated in figure 2.

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[12] PSPPR UGM, "Road Map Kota Yogyakarta Menuju Smart City," *Jurnal Online Universitas Gadjah Mada*, no. 1 (2016): 1–27.

[13] PSPPR UGM.

[14] Alfi Novriando, "Efektivitas 'Jogja Smart Service' Terhadap Pelayanan Publik Di Kota Yogyakarta," *Jurnal Ilmu Pemerintahan* 13, no. 2 (2020): 68–75.
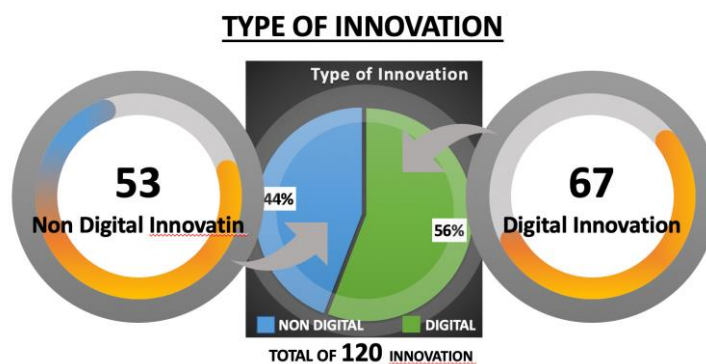
Figure 2. Yogyakarta's Innovation Type

Several of the 67 digital regional innovations are related to information technology in the form of public service apps, such as a population administration services application (*administrasi kependudukan/adminduk*), e-mobile ID card, non-cash parking retribution, and smart retribution.[15]

Based on the data presented above, the Yogyakarta City Government is attempting to promote various regional innovations through strengthening application-based public services. This is part of the endeavour to transform Yogyakarta into a smart city. However, this strategy is not deemed adequate to create an environment of innovation, especially to support application-based public services, unless it is followed by protection to ensure that regional innovations in the form of public service applications do not violate applicable laws and regulations, public order, and morality.

3.4. Patents as a Control Mechanism for Android-based Public Service Applications to Support Yogyakarta's Smart City

Normatively, an application is already protected. This is indicated in the provisions of Patent Law No. 13 of 2016. The relevant laws are set out in the Elucidation of Article 4 letter d of the Patent Law, which states:

> *"... suppose the computer program has characters (instructions) that have technical effects and functions to produce problem-solving, both tangible and intangible. In that case, it is an invention that can be granted a patent.*

Examples of inventions that can be patented:

1. An algorithm is an effective method expressed as a finite series of well-defined instructions for computing a function. Starting with an initial state and an initial that (even empty) input, the instructions describe a computation that, when executed, is processed through a finite number of well-defined sequences of conditions, eventually producing an "output" and stopping at a final state. The transition from one step to the

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[15] Novriando; Head of Bappeda, "Report on the Implementation of Regional Innovation in Yogyakarta City," Yogyakarta, Yogyakarta City Bappeda," 2020.

next is not necessarily deterministic; some algorithms, known as randomization algorithms, use random input.[16]

2. Encryption of information by encoding and decoding to scramble so that information cannot be read by other parties

According to the explanation provided in Patent Law, software or an application form is a subject of patent protection. The requirement is that the program or application has technological effects and functionalities that result in the generation of a solution. Generally, software or programs with technical impacts and functionalities are visible in their business processes, beginning with input, processing, and output.

There are various applications in public service that have technological impacts and functions that result in solutions beginning with the input, process, and output. A patent registration application should be filed after comprehending the characteristics of such public service applications. The applicant is the inventor, and the government agency is directly associated in the context of a patent registration application. This is consistent with Article 13 paragraph (1) of the Patent Law, which states: Patent holders for Inventions produced by Inventors, in official relations with government agencies, are government agencies and Inventors unless agreed otherwise."

According to these laws, if the state grants a patent application through the Directorate General of Intellectual Property of the Ministry of Law and Human Rights, the inventor and the government agency jointly own the patent. With inventors and government agencies as patent holders, public service apps cannot be utilized arbitrarily or violate the law by third parties. Other parties must ask for permission to use the public service application. By requesting authorization, the other party must explain why the public service application is being used. From this perspective, innovators and government entities that own patents can see the urgency. If the permit to use a public service application is intended for reasons that violate the inventor's rights or the law, the inventor and the government agency that owns the patent may not provide the permit. This lawsuit clearly shows that patents can be utilized to regulate public service applications to ensure that they are not used to violate applicable laws and regulations, public order, or morals.

4. CONCLUSION

The city of Yogyakarta produces public service applications. This public service application is expected to support efforts to make Yogyakarta a smart city in the future.

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[16] Hadi Kardoyo et al., *Kebijakan Paten Dalam Mendorong Aktifitas Inovasi Di Indonesia* (Jakarta: LIPI Press, 2011), https://kkp.go.id/an-component/media/upload-gambar-pendukung/brsdm/Sentra KI/Buku/Buku KEBIJAKAN PATEN.pdf; Ahmad Jazuli, Jalan H R Rasuna, and Said Kav, "Peningkatan Pelayanan Publik (Settlement of Application for Patent Registration in Public Service Improvement)" 12, no. 3 (2018): 243–58, https://doi.org/http://dx.doi.org/10.30641/kebijakan.2018.V12.243-257.

In its producing public service applications, the city of Yogyakarta has not carried out legal protection as a means of controlling the application. Normatively, efforts to protect public service applications can be realized through the implementation of the Patent Law. The implementation of the Patent Law does not prevent the implementation of efforts to replicate these public service applications in other areas.

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