

ANALYSIS THE EFFECTIVENESS OF THE AUTOGATE E-PASSPORT SYSTEM AT SOEKARNO-HATTA INTERNATIONAL AIRPORT IN 2024

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Abstract: The Autogate E-passport system is useful for immigration authorities and passengers crossing national borders. It is efficient, secure, and effective. The autogate system only involves biometric verification and automatic passport scanning. Researchers want to see how many people use the Autogate E-passport system at Soekarno-Hatta International Airport. The research method is quantitative, with data collected through surveys and questionnaires. The analysis tool method is SmartPls. The data analysis compares the time needed for the autogate system and the manual method. The Autogate E-passport system is more effective than manual methods. The analysis result shows that Autogate E-passport could reduce waiting times and speeding up the immigration inspection process. It is also highly reliable, detecting fake passports effectively and accurately reading biometrics.

Keywords: *Effectiveness, Autogate E-Passport, System, Soekarno-Hatta, Users, Biometrics*

1. Introduction

Soekarno-Hatta International Airport (CGK) is a major airport located in Benda, in the city of Tangerang and in Kosambi, in Banten, Indonesia. It serves as the primary airport for Jakarta and is named after Indonesia's first president, Soekarno, and vice-president, Mohammad Hatta. The airport is one of the busiest in the world, handling thousands of international and domestic passengers daily. It serves as a critical transportation hub and main entry point for international flights to Indonesia. With increasing international tourism, the airport plays a vital role in maintaining national security and sovereignty. The airport is equipped with advanced technology, including the E-Passport Autogate system, which is designed to facilitate and expedite the immigration process for passengers with electronic passports. The system employs biometric technologies, including fingerprint scanning and facial recognition, to enhance security and efficiency. Historically, immigration checks were conducted manually by immigration officers, a process that was time-consuming and frequently resulted in lengthy queues, particularly during peak hours.

The introduction of the E-Passport Autogate system at Soekarno-Hatta International Airport in 2014 marked a significant advancement in the efficiency and security of immigration processes. Initially, the system was implemented with six units, which have since expanded to a total of 68 units strategically located across both the arrival and departure terminals. This expansion reflects a growing commitment to enhancing the passenger experience and streamlining immigration procedures. However, despite these advancements, the system has faced several challenges that undermine its effectiveness. Key issues include delays in system updates, technical difficulties associated with cameras and sensors, and capacity constraints that have led to prolonged

queues and wait times for travelers. A notable incident involving an outage at a national data center disrupted various immigration services at the airport, necessitating the reversion to manual checks. Such occurrences highlight the critical need for continuous improvement and the establishment of a robust infrastructure to ensure seamless operations.

In summary, Soekarno-Hatta International Airport stands as a vital transportation hub within Indonesia, and the E-Passport Autogate system represents a substantial leap forward in immigration process security and efficiency. Nevertheless, the ongoing challenges underscore the necessity for further development and maintenance to optimize the system's functionality and enhance the overall travel experience for passengers.

2. Literature Review

E-Passport

A biometric passport, also referred to as an e-passport, is a type of passport that incorporates biometric data as a security feature. The biometric data is stored on a chip embedded in the passport, rendering it more difficult to forge than traditional passports, which are more susceptible to forgery (Wikipedia, n.d).

In accordance with Indonesian Immigration Law No. 6 of 2011, a travel document is defined as comprising both a passport and a travel document of a similar nature. Furthermore, passports are classified into three categories: diplomatic, official, and ordinary. The ordinary passport is issued to Indonesian citizens and is managed by the Minister of Immigration or a designated immigration officer (Dewi et al., 2023). The Implementation Regulation of the Immigration Law No. 6 of 2011, issued by the Government of Indonesia, outlines the specifications for the types of passports that may be issued. These include both traditional and electronic passports, the latter of which may be either digital or biometric. The electronic passport is issued via the Immigration Management Information System (Dewi et al., 2023).

The primary distinction between an electronic passport and a traditional one is the inclusion of a microchip in the former. The electronic passport contains more comprehensive and accurate data, including biometric information such as fingerprints and facial features. This biometric data is consistent with the standards established by the International Civil Aviation Organization (ICAO) and is utilized in numerous countries, including Australia, the United States, Malaysia, the United Kingdom, Japan, New Zealand, and Sweden. The e-passport functions in a manner analogous to a contactless credit card, employing near-field communication (NFC) to facilitate communication with a scanner and the transfer of information. The chip employs digital signature technology to guarantee the veracity of the data and incorporates Public Key Infrastructure (PKI) to preclude any modifications, thus providing an additional layer of security through encryption. This enhances the security and efficiency of travel and border control processes.

Benefits of Electronic Passports

The principal benefit of electronic passports (B. H. Putra, 2019). is the enhancement of international travel security. The data stored in the electronic chip is challenging to forge and can be readily validated by immigration authorities at entry points. Furthermore, the integration of biometric technology in electronic passports serves to mitigate the risk of identity fraud and travel scams. Furthermore, electronic passports

provide convenience in travel. Furthermore, holders are able to utilize automated immigration lanes, which are available at select airports, where they can insert their passports into a reader that directly scans and verifies the data stored in the electronic chip. This facilitates the immigration process and reduces the time required to enter a destination country. Furthermore, electronic passports facilitate easier access to certain countries. Some countries have implemented policies that permit only holders of electronic passports to enter their territories. In contrast, traditional passports may necessitate the fulfillment of additional visa requirements or other conditions. An electronic passport allows the holder to take advantage of visa-free policies or more favorable travel regulations offered by some countries, thereby enabling international travel with greater ease and flexibility.

Benefits of Autogate System in Immigration Control

The autogate system (B. H. Putra, 2019). is an electronic, automated system designed to facilitate the inspection of passports and the control of immigration processes in an expedient manner. The system employs sophisticated technology to facilitate self-service verification for passengers, obviating the necessity for direct interaction with immigration officials. The system oversees and regulates access to designated areas within airports, such as entry and exit points, where procedures entail the scanning of passports and fingerprints available on the Autogate equipment. The Autogate system is made available to Indonesian citizens in possession of either electronic or non-electronic passports at Immigration Checkpoints (TPI).

In accordance with the stipulations set forth in Regulation No. 44 of 2015, issued by the Ministry of Law and Human Rights, immigration inspections at TPI may be conducted via electronic means, utilizing autogate machines for Indonesian citizens and a select group of foreign nationals. At the outset, the autogate system was accessible solely to Indonesian citizens entering or exiting Indonesia at Soekarno-Hatta International Airport. However, beginning in 2024, a novel iteration of the autogate system was introduced, enabling foreign nationals with electronic visas (e-VOA or e-Visa) to utilize the facility. Furthermore, citizens of the ten ASEAN countries with visa-free travel arrangements are permitted to utilize the autogate system without registering their arrival via the *evisa.imigrasi.go.id* portal (Soekarno-Hatta, 2024).

The implementation of the autogate system offers a number of advantages, including an improvement in the quality of immigration services. This is achieved by providing tools that facilitate the work of both officers and travelers. The system simplifies, accelerates, and standardizes the immigration inspection process, which was previously conducted manually through counters by immigration officers. The autogate system is aligned with the accountability values espoused by the Directorate General of Immigration. The deployment of this system has the effect of reducing the incidence of errors and inefficiencies that are associated with human intervention. Furthermore, the system minimizes interactions between officers and the public, thereby reducing wait times and congestion at immigration checkpoints. In order to utilise the autogate, a number of criteria must be met. These include being an Indonesian citizen aged 14 or older, using the system individually, having a minimum height of 120 cm, not wearing glasses, hats, or headscarves, and possessing either an electronic or non-electronic passport issued after 2014, along with a boarding pass for international travel (Putra et al., 2022).

The immigration inspection utilising the autogate adheres to the stipulations set forth in Article 86 of the Ministry of Law and Human Rights Regulation No. 44 of 2015 (PERMENKUHAM, 2015). The process comprises the following steps:

1. The scanning of travel documents and boarding passes.
2. The capture of fingerprints and facial images is conducted via the autogate machine.
3. The machine digitally records the data pertaining to the arrival or departure of the individual in question.
4. Subsequently, the autogate door opens automatically, thereby concluding the inspection process.

Upon completion of all requisite steps, the autogate machine proceeds to verify the biometric data stored within the electronic card, ascertain the card's validity, and conduct the requisite checks on the passenger's list of restrictions or detention. Furthermore, the system verifies the validity of passports and immigration documents, including residence permits. In conclusion, the autogate system optimizes efficiency and security in immigration processes by automating checks and minimizing human error, thereby enhancing the quality and convenience of public service.

Implementation of Autogate System in Immigration Control

The autogate system is an electronic, automated immigration inspection facility that employs advanced technology to facilitate the expeditious completion of passport and fingerprint scanning processes. The system is designed to facilitate the immigration check process for both Indonesian citizens and foreign nationals. It does so by automating the process and reducing the need for manual intervention, thereby minimizing wait times.

Key Features and Benefits

1. The objective is to enhance the quality of public services. The autogate system has the effect of enhancing the efficiency and effectiveness of immigration services.
2. The inspection process has been simplified and accelerated. The system facilitates the immigration inspection process, thereby reducing the time required for checks.
3. Enhanced Workflow and Accountability: The system fosters accountability and efficiency in immigration procedures.
4. A reduction in the number of interactions with officials is also a consequence of this process. The system minimizes interactions between immigration officers and the public, thereby reducing the potential for corruption.

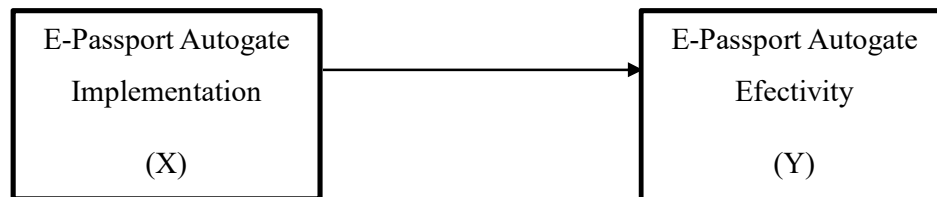
Steps to Use the Autogate System

1. Scan Passport: Holders must scan their passports, ensuring the biodata page is visible and clear.
2. Capture Fingerprint: After scanning the passport, users are required to capture their fingerprints using the autogate machine.
3. Facial Recognition: The system then captures facial biometric data for verification.

Implementation and Limitations

The autogate system was first implemented at Soekarno-Hatta International Airport in early 2013. At the outset, the system was accessible solely to Indonesian citizens in

possession of electronic passports. Subsequently, in 2024, the system was expanded to include foreign nationals with electronic visas (e-VOA or e-Visa). Furthermore, citizens of ASEAN countries who are eligible for visa-free travel may utilize the autogate system without the necessity of prior registration. While the autogate system offers a number of advantages, it is not without its own set of constraints. The system is not yet fully operational, with availability currently limited to a few immigration checkpoints. The system is compatible only with a limited range of passports. In conclusion, the autogate system represents a substantial advancement in immigration technology, enhancing efficiency, security, and the quality of public service while reducing interactions with officials.

**Hypothesis:**

H0 = There is no effect between variable X and variable Y.

H1 = There is an effect between variable X and variable Y.

The introduction of the E-Passport Autogate system at Soekarno-Hatta Airport is closely linked to the efficiency of immigration services. This system employs biometric technology and automation in the passport inspection process, with the objective of accelerating the immigration process, reducing officer workload, and enhancing satisfaction and security for users. In line with the theory proposed by Putra (2019), this technology enables more efficient and accurate immigration checks, reducing the potential for errors due to human intervention. Previous research, such as that conducted by Rafael (2021), supports the hypothesis that the use of automated systems such as Autogate can reduce inspection time by up to 50% compared to manual methods. Furthermore, Nahida's research (2020) emphasises that system reliability and ease of use greatly affect user satisfaction.

Research Concept Framework:

This research concept framework represents a streamlined iteration of the theoretical framework that has been previously discussed and transformed into a comprehensive literature review. The objective of this study is to evaluate the efficacy of the E-Passport Autogate at Soekarno-Hatta International Airport (CGK) in 2024.

The efficacy of the E-Passport Autogate is contingent upon a number of factors, including:

1. Speed of Immigration Process
2. Reduction of Immigration Officer Workload
3. User Satisfaction
4. Increased Security and Order

Furthermore, the efficacy of the E-Passport Autogate implementation is contingent upon a number of factors, including:

1. Speed of Service
2. Ease of Use

3. System Reliability
4. Security
5. User Feedback

This study employs a conceptual framework that focuses on two variables: the independent variable (X), which pertains to the implementation time of the E-Passport Autogate, and the dependent variable (Y), which concerns the effectiveness of the E-Passport Autogate at Soekarno-Hatta International Airport (Alkalah, 2019).

3. Research Method

In order to assess the efficacy of the E-Passport Autogate system, it is essential to conduct a comprehensive examination of its existing implementation at Soekarno-Hatta International Airport. This will enable a thorough analysis of the Autogate E-Passport's performance at Soekarno-Hatta International Airport. The quantitative research methodology encompasses all aspects related to the evaluation of the Autogate E-Passport system at Soekarno-Hatta International Airport. As defined by Sugiyono (2014, p. 7). in his book *Quantitative Research Method*, quantitative data is data expressed in numerical or digitized form. Such data can be processed and analyzed using mathematical or statistical techniques.

As defined by Sugiyono (Adnyana, 2021)., a sample represents a subset of the population, encompassing specific characteristics. In this study, The research uses a method called purposive sampling. This is a way of selecting people who have certain characteristics that are relevant to the research. The sample is made up of people who use the Autogate E-Passport system at Soekarno-Hatta Airport. The purposive sampling method was chosen because only respondents who have used the Autogate system can give relevant information about it. The sample size was also based on the availability of the relevant population and their willingness to provide data, considering the limited time and resources of the study. The sample consists of 106 users who use the E-Passport Autogate system. This technique helps the researcher get reliable data from the Autogate E-Passport users to reach reliable conclusions on the system's effectiveness. As the population of interest was accessible and willing to participate, the sample size for this study was 106 individuals. The participants in this study were individuals who utilize the Autogate E-Passport system at Soekarno-Hatta International Airport. The data were processed using the SPSS 26.0 software (Statistical Package for the Social Sciences).

No	Variable	Dimention	Inddicator	Source
1	Autogate E-passport Implementation	Service speed	Processing time at Autogate	(Nahida 2020).
		User Convenience	Autogate usage guide	
		Security Data	Data Breach Experience	
		User Feedback	User Engagement	
		System Reliability	User Experience	
2		Speed Of Immigration Process	Processing Time Efficiency	

Autogate Effectivity	E-Passport	Reduction of Immigration	Utilization Rate of Immigration Services	(Rafael 2021).
		Officer Workload	Operational Effectiveness	
		User Satisfaction Level	User Satisfaction and Perceived Quality	
		Enhanced Security and Order	Security Data	
		Operational Cost Efficiency	Resource Optimization	

Table 1. Measurement Variable
Source : Source of Nahida 2020 and Rafael 2021

4. Results and discussion Validity and Reliability Testing

The SmartPLS 4.1 tool gave us these results:

Variable	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
E-PASSPORT AUTOGATE EFFECTIVITY (AND)	0,666666667	0,666666667	0,66875	0,413194444
E-PASSPORT AUTOGATE IMPLEMENTATION (X)	0,642361111	0,642361111	0,650694444	0,413888889

Table 2 : Validity Test for Variables X and Y
Source : Data processed by the author, 2024 (SmartPLS 4.0)

All indicators used in this study are considered valid, with a loading factor of > 0.5 , based on the result of the above-mentioned validation and reliability tests, with the Cronbach alpha result > 0.70 and the average > 0.5 , all research variables are considered realisable.

Inner Model R Square

Variable	R-square	R-square adjusted
E-PASSPORT AUTOGATE EFFECTIVITY (Y)	0.855	0.854

Table 3. R-square
Source : Data processed by the author, 2024 (SmartPLS 4.0)

Based on the report in the table above, it means that 0.855 or 85.5% of the variables in the purchase decision can be explained by the independent variable in the regression used, which means that 14.5% of the variation in the purchase decision cannot be explained in the factor due to other factors not covert in this study. The conclusion from the table above shows that R-square value 0.885 in cates that the regression model used is quite good at explaining the variation in purchase decisions, although it is not perfect.

Hypothesis Test

The results of the data processed are

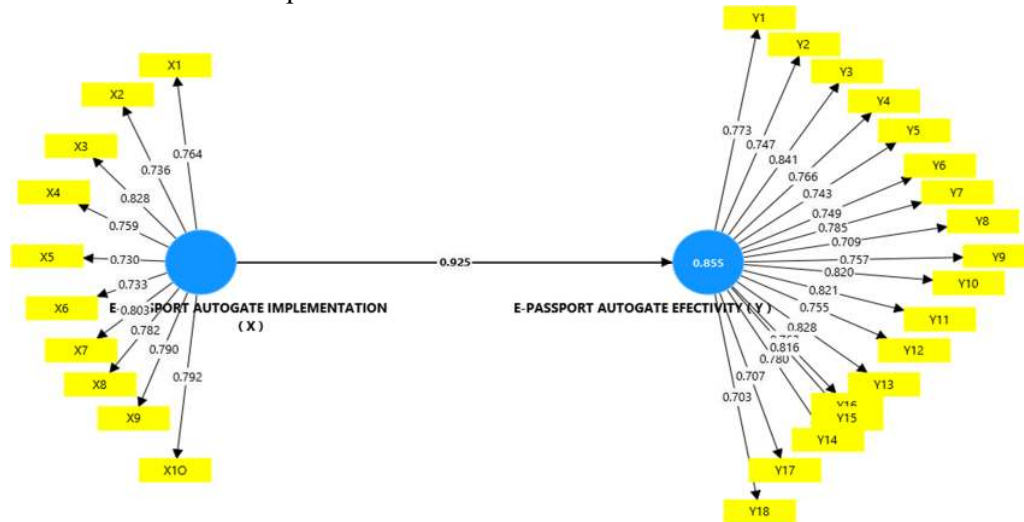


Figure 4. Path Coefficient

Source : Data processed by the author, 2024 (SmartPLS 4.0)

Hypothesis testing was done at the 5% significance level, and it would be accepted if $T_{count} > \dots\dots\dots (T \text{ table})$ and $p < 0.5$. To find out how much influence there is between variables, this study used the smartpls 4.0 bootstrapping method to test the hypothesis between variables.

Variable	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Result
E-PASSPORT AUTOGATE IMPLEMENTATION (X) -> E-PASSPORT AUTOGATE EFFECTIVITY (Y)	0,642361	0,6416667	0.026	35.847	0.000	significant

Table 5. Path Coefficient Numbers

From the table above, it can be seen that the implementation of e-passport autogate on the effectiveness of e-passport autogate $35.847 > 1.659$. This shows that the implementation of e-passport autogate has a direct impact on the effectiveness of e-passport autogate, as measured by a correlation coefficient of 0.642361.

5. Conclusion

The results showed that the significant influence of the E-Passport Autogate Implementation (X) variable on E-Passport Autogate Effectivity (Y) through the

indicator factors above, which are a benchmark for progress and convenience, so that customer satisfaction is created and good time management.

6. Implication

Overall, the E-passport Autogate was created to make life easier for passengers, but it should be further improved in terms of security and effectiveness, supported by customer satisfaction.

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