

**Passengers' Perceptions of Airport Design during a Pandemic
(Study on Passengers at Sultan Hassanudin International Airport–Makassar,
Indonesia)**

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Abstract

There have been many articles about the airport's relationship with the Covid-19 pandemic, but there are still few articles that discuss airport design during the pandemic, especially from a passenger perspective. This article aims to propose airport terminal operations in a pandemic situation at Makassar Sultan Hasanuddin International Airport based on the views of passengers. This research uses a qualitative approach with a case study type. Primary research data was collected through in-depth interviews with 27 passengers at Hasanuddin Airport with various destination destinations classified using Atlas it software I; and secondary data collected through literature study. Airport redesign during a pandemic refers to Brownrigg (2020). The data analysis technique uses four stages of qualitative data analysis techniques, namely data collection, data condensation, data presentation, and drawing conclusions. The results of the study show that: (1) Airport facilities are still inadequate. (2) Compared to other international airports in Indonesia, Hasanuddin Airport still lacks facilities and services. (3) The sense of security at the new airport is minimal. (4) Passenger satisfaction is still in the unsatisfied category. (5) Facilities needed during a pandemic are still relatively lacking. (6) Airport technology facilities are still relatively underdeveloped because most services are carried out manually or with old technology. (7) Facilities during a pandemic need to be permanent. (8) Airport human resources need to improve their professionalism to be more capable of running the latest airport technology.

Keywords: Airport operations, Hasanuddin, Covid-19 pandemic, facilities, satisfaction, sense of security

I. Introduction

The impact of Covid-19 on the aviation industry is unprecedented. Dabachine (2020) suggests that airline capacity has fallen by 70 to 80 percent since 2019. Pivac (2021) found that the impact of the Covid-19 pandemic was the layoff of two-thirds of aircraft fleets globally, and a decrease in passengers reached 95%. The International Airport Council (ACI) report revealed that air travel globally in 2020 fell 95 percent from last year (2019) as a result of travel bans and lockdowns in many countries. ACI also predicts that the number of passengers for 2020 could fall by up to 40% indicating a significant reduction in revenue for airlines and airports worldwide (ACI, 2021).

The impact of the Covid-19 pandemic was far greater than that of SAR (2002-2003) and MER

(2015). After SAR and MER, there has been no second wave of infections, as happened with COVID-19, which further pressured the recovery of travel requests. Also, there was no second terrorist attack after 9/11 in 2001. In November 2020 the events of 9/11 occurred, however the impact of COVID-19 is many times worse than 9/11 on a global scale and, given the ongoing policy variations between and within countries, uncertainty still prevails (Rimmer, 2020).

The implications of the Covid-19 pandemic for airport operations include an increase in the dwell-time for the implementation of the mechanism for prospective passengers, because there are additional stages of health verification, physical distancing, hand washing, and other health measures (Choi, 2021). The check-in mechanism and other activities on departure/arrival tend to take longer, at least plus 60 minutes (Bolat & Atos, 2021).

When the Covid-19 pandemic occurs, airports must continue to operate to be able to maintain medical supplies and other important cargo, but of course with a number of restrictions according to health protocols. When a pandemic occurred, it was felt that all stakeholders at the airport were trying to make adjustments. Among these adjustments is redefining traffic flow in the terminal and adjusting passenger and baggage handling procedures with new social distancing conditions (Pivac, 2021).

Adjustments to airport operational management during a pandemic are not as easy as one might expect, because basically airports with all their operational mechanisms and human behavior in them are not used to dealing with prolonged pandemic conditions such as Covid-19 (Choi, 2021). Crisis conditions such as the Covid-19 pandemic cannot guarantee that it will not happen again, so it is better for airports to also be prepared for how to manage their operations to deal with crises such as the Covid-19 pandemic in the future (Rosario & Patricio, 2020). It is critical for airports to find ways to regain the trust of the public to travel, and provide a safer environment for both staff and passengers. This also happened after the September 11, 2001 attacks, which became the new norm. At that time the airport must comply with the rules and regulations of the local Health Authority and Civil Aviation Authority, which may differ from country to country (Rosario & Patricio, 2020).

A number of solutions have been implemented at several airports, as reviewed by several previous researchers. Brownrigg (2020) through his research provides options related to passenger flow and queue capacity that occur at the airport. The proposed airport concept is similar to the measures put in place for airport security in the aftermath of the September 11, 2001 attacks. This concept consists of screening infected passengers, crew, and workers before they enter the sterile airport zone (Tabares D. A., 2021).

Research conducted by Kour, Jasrotia, and Gupta (Jasrotia & Gupta, 2020) states that crisis situations such as Covid-19 that hit airports need to be adjusted quickly according to the current changing conditions. This is focused on overall airport performance which includes check-in procedures, waiting room facilities, security etc. In research conducted by Evangelista (Evangelista, 2021) at Juanda Airport it was found that to deal with new queue points that appear in the Terminal 1 area of Juanda Airport, it is planned to add tables and/or validation officers in the validation area for Covid-19 free test certificates which is located in the arrival hall, and the e-HAC validation area which is located in the baggage claim area by 2 times, namely 10 tables and 8 tables respectively. In addition, it is also planned to replace the x-ray device with an

Automated Tray Return System to overcome the buildup of passengers in the Security Check Point 1 area (Evangelista, 2021).

Research conducted by Pongtuluran, Alkas, and Sutanto (2021) found that the characteristics and needs of A.P.T Pranoto Samarinda airport parking spaces were adjusted and designed according to the current Covid-19 pandemic, namely starting from parking space capacity, parking space requirements, units parking spaces, and the determination of parking space units. In research conducted by Tabares (2021), it was found that at the airport, starting from certain zones at the terminal, special zones will be built for intercontinental and international traffic, so that social distancing can still be carried out.

Choi's research (2021) emphasizes the need to adjust operational mechanisms at airports. For example, the emergence of online services has required airport operators to change sales strategies, strengthen emotional promotions to stimulate impulse buyers, and align operating policies and operating income.

Research by Tuchen et al (2020) suggests that the airport system during the pandemic crisis in general must be more agile, flexible, and future-proof.

Arora et al's research (2021) proposes that civil aviation systems design a coordinated global response mechanism.

Serrano & Kazda's research (2020) suggests airport designs that implement biometrics in processes that run at airports, so as to reduce or even eliminate human-to-human contact interactions.

Goel et al's research (2021) found a solution that identification through a mathematical model with reduced quarantine combined with testing is as effective as a 14-day quarantine.

These previous studies have also become a reference for Sultan Hasanuddin International Airport in Makassar, Indonesia, to make improvements to the airport layout to deal with a pandemic situation like the current one or other pandemics that cannot be predicted at this time.

So far Hasanuddin Airport has made various efforts to make adjustments, including adjusting the airport design, in connection with the Covid-19 conditions. However, it is not yet known what the opinion of the passengers themselves is regarding the airport design during this pandemic. Was the Hasanuddin airport design during the Covid-19 pandemic sufficient according to passenger perceptions? What are the deficiencies that Hasanuddin airport must improve in dealing with a pandemic based on passenger perceptions?

Based on this background, the problem of this research is "How is the proposed operation of the airport terminal in the future to overcome unpredictable challenges?" Therefore, the general aim of this research is to create a future airport model that can be used to overcome unpredictable challenges.

II. Theoretical study

This theoretical review focuses on how airports prioritize staff and passenger safety during a pandemic. Staff safety is very important and should be ensured by the provision of adequate protective equipment in addition to other health checks, social distancing, and the provision of a safe work environment where staff are protected from potential exposure to the virus. (Choi, 2021).

Staff safety measures may include: (i) Health checks on entry to the terminal; (ii) Social distancing in their work environment and in passenger processing areas; (ii) Provision of

segregation with clear screens to staff facing passengers (manual check-in, immigration, security and customs); (iii) Increasing automation to reduce activities faced by passengers; (iv) Provision of PPE and sanitizers (Brownrigg, 2020).

In addition to staff safety, passenger safety is always the airport's top priority. However, Covid-19 opened a new dimension that required adaptation of airport strategies with more emphasis on health to gain passenger trust (Rimmer, 2020).

Passenger safety measures can be carried out by: (i) Health checks at the entry points on the land side and the air side of the terminal for departing and arriving passengers; (ii) Limiting hand baggage to laptop and hand luggage only; (iii) Wearing a face mask and gloves; (iv) Social distancing in all terminal areas; (v) Separate seating area; (v) Isolation and quarantine communications and public awareness including voice messages and signs; (vi) Surface cleaning and disinfection; (vii) Environmental control measures for public spaces; (viii) Provide additional information counters for health related questions/suggestions (Brownrigg, 2020).

1. Passenger Handling Procedures Before and After the Covid-19 Pandemic

Passenger handling procedures before and after the Covid-19 pandemic were carried out at the departure of domestic passenger flows, departure of international passenger flows, arrival of domestic passenger flows, arrival of international passenger flows, International to Domestic Transfer Passengers, International to Domestic Transfer Passengers, and Passenger Processors, Capacity Assessment & Throughput (Pivac, 2021).

2. Passenger Processors, Capacity & Throughput Ratings

Social distancing will impact all processing facilities resulting in reduced processing volume and terminal throughput. There is however an alternative whereby the number of processing facilities is maintained by providing adequate screening between them and for the queuing public as illustrated in the diagram shown on pages 14 to 23 inclusive.

The following floor markings may be used to assist passengers in maintaining the necessary social distancing with other fellow passengers within the queuing zone. The following are examples of posters and passenger information signs:

Any intervention on the existing terminal processing layout will likely have a direct impact on queuing areas and processing times. Several considerations should be taken into account to assess the impact of the new social distancing on existing processing facilities using the variances in the static and dynamic models as described below (Song & Choi, 2021).

The main input bases for this simulation are: (i) Demand; (ii) processing time; (iii) Peak Design Period; (iv) Maximum queue time; (v) Room per person (Brownrigg, 2020).

As noted above, time and space variations may need to be considered to assess the impact on the number of processing facilities, queuing area requirements and peak capacity: (i) Impact on processing time may depend on potential additional procedures such as: Time required to thoroughly disinfect processing facilities periodically during operating hours, additional health documentation from passengers, and others; (ii) The impact on the queuing area will be directly related to social distancing requirements and the space provided for each passenger; (iii) This must comply with local/international policies which may vary depending on country, city and/or airport requirements; (iv) Peak capacity may or may not be affected, depending on the measures

implemented (Bolat & Ates, 2020).

III. Research Method

The determination of the location for this research was purposive, namely at Sultan Hassanudin International Airport Makassar, Indonesia, with the consideration that Sultan Hassanudin Makassar Airport is one of the airports affected by the Covid-19 pandemic.

This research design uses qualitative research and uses a case study research strategy (Creswell & Creswell, 2018). Primary data collection techniques through in-depth interviews (Sekaran & Bougie, 2016). The interviewees (interviewees) were passengers at Hasanuddin International Airport in Makassar who were randomly selected with different destinations. While the secondary data collection technique is through a literature review (Cooper & Schindler, 2014).

Data analysis techniques use data analysis techniques proposed by Miles, Huberman & Saldana (2014: 33), namely data collection, data condensation, data display, and conclusion: drawing/verification). Specifically, data analysis techniques in research include descriptive analysis techniques, framing analysis techniques, and comparative analysis. Data from observations and interviews were analyzed to obtain proposed solutions regarding proposed airport terminal operations in a pandemic situation, which were then used as proposed airport operational designs. This data analysis technique was carried out using the Atlas.ti software.

IV. Results and Discussion

Based on the results of interviews with 27 passengers at Makassar Hasanuddin International Airport and the results of observations, which were conducted at the end of 2021 and early 2022; then obtained qualitative data regarding the perceptions of passengers regarding Hasanuddin Makassar International Airport. The qualitative data can be summarized with several sub-themes as follows:

1. Current airport facilities

- a. It was perceived on average by informants that the number of passengers had exceeded the airport's capacity, especially when they wanted to check-in, the queues were already very long. It is recommended that the airport enlarge the service area, and rearrange the flow of passengers.
- b. The garbarata facilities were assessed by the informants as still inadequate
- c. The condition of the airport air circulation is rather stuffy, especially in the waiting room
- d. Information boards are still incomplete, especially in turning areas, so passengers are often confused when they want to go to a certain room. Several location changes have not been accompanied by a nameplate change. The size of the information board is relatively small so that it is less visible from a distance.
- e. Toilet space is inadequate, causing relatively long queues
- f. The prayer room is too small which also causes a relatively long queue
- g. The passenger pick-up area is felt to be less extensive.
- h. Seating facilities in the waiting room are lacking, so many passengers stand up and crowds occur.

- i. The security post is still lacking, so it is felt that it is far away to reach the post
- j. Antigen and PCR testing facilities are located in airport halls, so it takes longer to handle them.
- k. Elevator, travelator and escalator facilities are still relatively lacking, thus slowing down the movement of passengers and airport staff
- l. Facilities for people with disabilities are felt to be lacking.

2. Comparison of Hasanuddin Airport Facilities with Destination Airports

Regarding Hasanuddin international airport facilities when compared to other airports, there are variations of opinion among the sources. However, if using a scale of 1-10, the average respondent rates Hasanuddin airport in a position between 8 to 8.5 compared to Juanda airport (9), Yogyakarta (9) and Soekarno Hatta Terminal 3 (10). It is possible that the perceptions of these sources will change after the expansion and renovation of Hasanuddin airport is completed

3. Sense of Security at Hasanuddin Airport

Regarding the sense of security at the airport, in general and at least the passengers feel safe, but have not reached ideal conditions. There are still deficiencies that must be improved, starting from the number of security posts, the number of officers, the number of equipment such as CCTV. In addition, a number of informants still felt that the control by airport security officers over passengers was lacking, especially during a pandemic, so that a number of violations were still found in health protocols.

4. Satisfaction with Current Hasanuddin Airport Facilities

On average, the informants are not satisfied with the current Hasanuddin airport facilities. A number of notes were submitted by the sources. Among them is related to air conditioning (AC) which is still lacking. The number of CCTV has not filled all parts of the room. There is no self-check-in facility. Most of the equipment used at the airport is still manual. Digitalization at this airport is still relatively behind. Restaurant availability facilities are still less varied. To achieve passenger satisfaction, this airport still requires a lot of changes and improvements.

5. Facilities Required during a Pandemic

Various validation activities such as checking antigen data and PCR are felt to be lacking in officers so that the queues are too long and there is a buildup of passengers. The availability of hand sanitizer is still lacking. Likewise, hand washing facilities (sinks) are still lacking. The antigen and PCR test locations outside the airport are considered less efficient for passengers. The available information center does not provide complete, accurate and updated information. Then the relatively narrow room compared to the relatively large number of passengers makes it difficult to carry out social distancing properly. Various health checking facilities that are still manual make the queues too long, it's different when retailing is done online and digitally.

6. Need Pandemic Facility Permanent.

On average, the informants agreed that the facilities and health protocols that had existed and were enforced during the Covid-19 pandemic, needed to be permanent. This is to anticipate the

return of the Covid-19 virus or other viruses. Facilities and health programs during a pandemic are very good for a healthy lifestyle, so that it can continue and be harvested after Covid-19 has passed. Maybe there is something that can be removed temporarily, such as keeping a distance.

7. Technology Facilities at the Airport

On average, the informants felt that the technological facilities at Hasanuddin Makassar International Airport were still far behind. There is still a lot of work that is done manually at the airport, and it makes activities at the airport inefficient. Several sources suggested using technology based on a quick response (QR) code.

8. Human Resource

On average, the interviewees were of the opinion that airport management should also include the preparation of more professional human resources. Because changes and improvements to the operational design must also be supported by qualified human resources. Therefore HR training and education must continue to be carried out in line with the needs of airports which are increasingly leading to the intensive use of technology.

Proposed Design Adjustment

Based on the results of interviews and observations, a proposal was made to make adjustments to the new normal design, especially in the departure area, arrival area and general area.

The proposals given for adjustments to the New Normal area consist of eight parts. The first part is on special services or checking health documents, it is proposed that it is necessary to procure a computer unit and position the e-hacc counter within the operational scope of the branch. In the second part, namely the drop zone and lobby space, especially in the passenger queue, it is necessary to add markings or stickers for queue boundaries.

In the third part, namely SCP 1, SCP 2, and boarding, cutting stickers or markings are also required to limit the queue of passengers. In the fourth section, namely the check-in and immigration rooms, it is proposed that it is necessary to add an acrylic partition between the check-in officers and passengers to reduce direct interaction.

The proposals given for the arrival area are divided into several sections, namely the Landing Area, International Immigration, Baggage Claim, International Customs, Domestic Transit, and Pickup Zone. But overall, they have the same suggestion, namely the need to use paint markings in the area to reduce the close distance between passengers and the addition of an acrylic plexiglass partition to avoid direct interaction with passengers.

Then the proposals given to the public area are divided into two parts, namely the public area and the PMS lift specifications. The proposal for public areas is that it is necessary to add an automatic hand sanitizer machine. The amount adjusts operational needs and points of addition. The battery type is proposed so that there is no additional power installation. Then on the PMS Lift, it is necessary to adjust the specifications of the buttons on the elevator using a foot pedal system or using a non-touch sensor system to avoid direct contact. The proposed design adjustments are then visualized (see attachment).

V. Conclusion

Based on the research results and taking into account the formulation of the problem, the proposed operation of Makassar Hasaunddin International Airport is in the form of a design as attached with this article. The airport design characteristics are in accordance with the results of interviews with the 27 informants, all of whom were passengers flying from the airport to different airports, as follows:

1. Judging from the building area, the building area of Hasanuddin International Airport needs to be expanded again, because the airport's capacity is inadequate compared to the number of passengers.
2. It is necessary to rearrange the flow of passengers, especially in events where there are queues, especially when passengers enter the airport, when screening prokes, when checking in, when getting off the plane, when picking up baggage, and when carrying out medical thesis such as tests antigen and PCR test.
3. Spaces that must be expanded include check-in room facilities, prayer rooms, toilets, waiting rooms and pick-up areas. Then space and facilities for people with disabilities also need to be added
4. The PCR room and other rooms that are directly related to the urgent interests of passengers should be placed inside the airport, not outside the airport.
5. The function division of the room should not be easily changed, because changing the function of the room actually slows down the flow of passengers, because they have difficulty finding the intended space.
6. The airport should improve its technological equipment so that all activities at the airport run more efficiently. Equipment that is still manual should be replaced immediately with more sophisticated equipment such as digital equipment, such as using . For example, for check-in activities there should be self-checkin facilities so that it will speed up the check-in process. Ticketing should be done digitally (not manually).
7. The passenger activity system at the airport should be rearranged, so that passenger lines accumulate.
8. Air circulation at airports must be rearranged, both natural air circulation (such as cross ventilation) and air circulation with the help of air conditioning. The most urgent cooling device to be rearranged is in the waiting room, which currently feels relatively hot and stuffy.
9. The number of security posts should be increased, because many passengers have difficulty finding the security post, because it is too far away.
10. The health protocol procedures during a pandemic were agreed upon by almost all sources, preferably being presented for almost all health program items, except for social distancing,
11. The information board must be added, especially at the parts of the bend which usually make passengers confused. The size of the information board is also expected to be larger so that it can be seen from a greater distance. If there is a change in the location of a facility, it is hoped that the information board will be adjusted immediately.
12. Prokes facilities such as sinks and hand sanitizers should be increased in number. In addition, the use of the system is attempted to be automatic.
13. The surveillance/control and security guarding system needs to be improved, both the system and the equipment (including CCTV needs to be added), as well as increasing the number of

personnel and the number of posts. For example, it must be rearranged whether public taxis may enter the passenger area without proof of being ordered by a passenger.

14. The Information Center Section must have complete, detailed, accurate and up-to-date information; and must remain on standby at all times, both physically and when contacted online.

VI. Recommendations

1. Academic advice

- a. This research method should also be used by future researchers at other airports, so that theoretically more is known about the good service standards of an airport.
- b. It should be studied the theory that connects operational management theory with marketing theory such as customer satisfaction, consumer loyalty, and others
- c. This research in the future should be carried out using a mixed methods approach, so that more accurate and in-depth research results can be obtained.

2. Practical Advice

The results of this research should be used as input for airport management, PT Angkasa Pura I, Indonesia, because it turns out that there are so many passengers' expectations that have not been fulfilled by the services of Sultan Hasanuddin International Airport so far.

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