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Inter-Dom Integrated Terminals - The Impact on Airlines Efficiency and Safety

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This Capstone Project was developed and approved under the direction of the
Group's Capstone Project Chair, Dr. Peter E. O'Reilly
It was submitted to Embry-Riddle Aeronautical
University in partial fulfillment of the requirements
for the Aviation Management
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Acknowledgements

Abstract

Group: Terminators

Title: Inter-Dom Integrated Terminals - The Impact On Airlines Efficiency And
Safety

Institution: Embry-Riddle Aeronautical University

Year: 2021

This report performed research to assess the possibility of implementing hybrid
passenger terminals. The benefits would be the integrating domestic and international
passengers in the same restricted area. The initial hypothesis of this study was to focus on
optimization that could bring advantages in terms of efficiency, customer service, and
operational safety.

The goal of this project was not to bring in-depth data on the topic, but to expose
readers to the main players in the industry and understand the variables that impact the
topic. Thus, although there are different perspectives on the integration of terminals, it was
possible to identify some possible paths for future research. In addition, allow the industry
itself to start discussions on the subject.

The research team identified the need for a broad discussion involving all
stakeholders to create a synergy of ideas and allow this discussion to evolve into a single
front. Other than that, the study recommends a more accurate study related to the cost-
benefit of this proposal. This would allow for the adaptation of a series of structural
adaptations at airports. Such renovations could be compensated by increasing the use of

terminals, improving connection time by airlines, and improve customer experience regarding delays, procedures, service on the terminal.

Regarding the topic of Operational Safety, the research team made recommendations for Brazilian authorities to invest in technologies that could facilitate not only what this research, but also bring more safety to passengers and bodies involved. This would be accomplished through the sharing of passengers information online between airlines and government. In addition, it recommended an investment so that the inspection of checked baggage was applied to all flights. This is because it is an important barrier to acts of unlawful interference, but also because it allows for more synergy with international protocols.

To reach these conclusions, in addition to research with major international bodies such as IATA and ICAO, the group also understood ANAC's perspective to establish current rules. Research also included the US model to support possible improvements in our system, understanding that the country operates with more advanced features than those we currently have in the country. In addition, to researching the available literature, professionals from some of these bodies, airlines, airports, and regulatory agencies were interviewed, which allowed a broad perspective of all players on how to proceed with the topic.

Abstract

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Esse relatório propõe uma pesquisa inicial para avaliar a possibilidade de implementação de terminais híbridos, integrando passageiros domésticos e internacionais na mesma área restrita, com a hipótese inicial de que essa otimização poderia trazer benefícios em eficiência, experiência do cliente e segurança operacional.

O objetivo desse projeto não é trazer dados aprofundados em relação ao tema, mas explora-los com os principais players da indústria e entender as variáveis que impactam o tema. Com isso, embora existam diferentes perspectivas relativas à integração de terminais, foi possível, identificar alguns possíveis caminhos para pesquisas futuras e mesmo para que a própria indústria inicie discussões relativas ao tema.

O grupo identificou a necessidade de uma ampla discussão envolvendo todos os players para criar sinergia de idéias e permitir uma evolução nessa discussão em uma frente única. Fora isso, recomenda um estudo mais apurado relacionado ao custo-benefício dessa proposta, uma vez que a adequação envolve uma série de adaptações estruturais nos aeroportos, mas que podem ser compensadas ao aumentar a utilização de terminais e aumentar a utilização por empresas aéreas. Além de ajudar a melhorar a experiência do

cliente com as possíveis reduções nos atrasos, procedimentos padrões e serviços dentro dos terminais.

No que tange o tema da Segurança Operacional, o grupo traz recomendações para que as autoridades Brasileiras invistam em tecnologias que possam facilitar não só o que se propõe essa pesquisa, mas também trazer mais segurança a passageiros e órgãos envolvidos, por meio do compartilhamento de informação de passageiros online entre empresas aéreas e governo. Além disso, recomenda um investimento para que a inspeção de bagagens despachadas seja aplicada para todos os voos, não só por ser uma importante barreira à atos de interferência ilícita, mas também por possibilitar mais sinergia com os protocolos internacionais.

Para chegar nessas conclusões, além de pesquisas com os principais ógãos internacionais como IATA e ICAO, o grupo também entendeu a perspectiva da ANAC para estabelecer as regras atuais e usou o modelo norte-americano para suportar possíveis melhorias em nossos sistema, entendendo que o país opera com recursos mais avançados do que os que temos atualmente no país. Além das pesquisas na literatura disponível, foram entrevistados profissionais, de alguns desses Órgãos, Empresas Aéreas, Aeroportos e Agências Reguladoras o que nos permitiu uma perspectiva ampla de todos os players sobre como seguir com o tema.

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Chapter I

Introduction

There are many different security requiriments in Brazilian regulations for domestic and international passengers accessing the airport restricted areas. These differences present a possible gap on aviation security procedures and reduce efficiency for airlines. On the security perspective, the Brazilian regulations do not follow the International Organizations' (Federal Aviation Administration – FAA, International Civil Aviation Organization – ICAO, for instance) recommendations for checked baggage screening and forbidden dangerous goods on domestic flights. These differences have an impact on the customers' journey process at the airport. These different procedures have a negative influence on the aircraft allocation at the terminals.

Considering the assumption above, the main goal of this research project is to understand current regulations in Brazil and global regulations. This research project will allow us to evaluate possible improvements for the Brazilian Aviation Industry.

Problem Statement

The Brazilian Aviation Industry is extremely sensitive to operational inefficiencies. It demands a high level of synchronization of flight schedules, ground time, infrastructure, processes on the ground, and safety procedures. Organizing all of these subjects together is not an easy task as some may be in conflict with others. Adding many safety procedures may impact operational efficiency and vice-versa. This is the reason why aviation safety and security must balance with operational efficiency when deciding which procedure to

follow. Such a balance involves all aspects of a customer's journey from the check-in to deplaning.

When going through Aviation Security (AVSEC) procedures any deficiency can be disastrous, even on a small mistake. The need to add AVSEC procedures in various aviation organizations is constantly expanding. It is one of the main ways to guarantee an elevated level of safety for the industry and passengers (ICAO, 2013). There are ways to prevent this kind of situation with regulation and legislation, as well as with the right approach of all the individual organizations such as airlines, airport administration, ground handlers, etc.

Concerning operational efficiencies on the ground, any minute it is important for airlines to have a synchronized schedule and increase revenue. When talking about turnaround time (TAT), besides the countless procedures regarding passenger boarding, fueling, baggage and cargo loading, etc., it is also important to have strategic aircraft allocations on the terminals in order to reduce the Minimum Connection Time (MCT). In this perspective, the airport structure and a close relation with airport administration are essential for airlines. This involves allocating aircraft to the right terminal and to the right position, thus allowing passenger to connect quickly to their next flights.

Besides the airport administration strategy to allow operational efficiencies, there are some different restrictions on AVSEC for domestic and international flights. This matter is regulated by ANAC (Agência Nacional de Aviação Civil) and the local aviation agencies by the RBAC (Regulamentos Brasileiros para Aviação Civil) 107, 108, and 525. These agencies provide AVSEC requirements for airports and airlines. It is important to highlight that even among the domestic airports there are different AVSEC procedures

depending on the size and type of aircraft operation. There are new security procedures at the connecting airport, if a passenger is flying both a domestic and an international flight, as well as at airports with different security levels (ANAC, 2016).

Regarding regulatory differences, some key variances are between international and domestic regulations concerning liquids and checked luggage screening. Liquids are allowed with no restrictions for domestic flights, while for international flights a maximum of 10 items with 3.4 ounces (100 milliliters) are permitted. Concerning checked baggage rules, for international flights it is mandatory to screen 100% of the baggage. On the other hand, for domestic flights, it is not rrequired. Only an interview is necessary during the check-in process and the screening processhappens only in case of suspicious items (ANAC, 2019). Considering this difference, for domestic flights, it is mandatory to remove passengers' bags in case no-show at the gate, thus increasing the possibility of delays.

To summarize the issues related to this lack of standards this research project will list:

- Aviation security weaknesses compared to the international scenario,
- Airlines' efficiencies regarding passenger connections,
- Extra screening processes for international flights at the connecting airport increasing the possibility of delays in case of missing passengers.

For international requirements, the Internacional Civil Aviation Organization - ICAO allows the signatory countries to define the safety and security requirements but also provide Standards and Recommendation Procedures (SARP) that are usually followed in addition to ICAO requirements.

The International Air Transportation Association (IATA) requires baggage screening for international and domestic flights. This requirement demands that airport operators use technology such as Explosive Detection System (EDS) and Explosive Trace Detector (ETD) in order to avoid any dangerous goods or explosive in the aircraft. (IATA, 2021)

The US is recognized as one of the safer countries on AVSEC, mainly after the September 11th attacks when new procedures were adopted. Security regulations are coordinated by the Transportation Security Association (TSA) and require (TSA, 2021):

- Advanced X-Ray Systems Development

- Advanced Algorithms and System Integration

- Supporting Component Technology Development

Considering all the assumptions and requirements above this research study will analyze the gap between the international recommendations and the procedures adopted in the domestic environment in Brazil. These procedures may impact overall safety in the industry and operational efficiencies. Working on this subject will allow this research project to understand why the rules were designed this way. In addition, the research will determine if there is any possibility for improvements in order to promote an even more reliable and efficient aviation operation in Brazil.

Purpose Statement

The public requirements for Aviation Security in Brazil created by ANAC to bring a safer environment for airlines and passengers are significantly different when compared to the international safety regulations and to the ones used by the US (United States)

government. This research project will attempt to Brazilian and United States regulations. The Brazilian current domestic inspection and screening procedures for baggage and passengers are different than the ones required for international flights. There seems to be a gap to be closed that can bring more reliable security procedures and operational efficiencies.

Project Goals

This research project intends to analyze Brazilian and American regulations to demonstrate the main benefits for airlines and the aviation industry overall by adopting these procedures to Brazilian airports. The main goals for this project will be:

1. Critique Brazilian and American regulations to understand the history and reasons for choosing the current Aviation Security Procedures.

2. Compare through benchmarking an international Airport in Brazil and an Airport in the US to understand the best practices and issues.

3. Assess the value to Brazilian airports of combining international and domestic flights in a combined terminal set-up.

4. Estimate the study's expectations to demonstrate the benefits for airlines' operational efficiency by having a unique regulation for domestic and international departures through having a more coordinated and safe process. Such a process can impact not only airlines but also industry safety and customer experiences.

The International regulations require to focus more attention to passenger and baggage screening as well as standardizing processes. Applying these regulations to domestic aviation may bring a safer and more efficient process for the airlines and

passengers. The definition of new requirements will allow airlines to avoid aviation security interception by making the process more reliable to identify dangerous goods in the luggage. On the other hand, having uniform standards for the industry may lead to the following:

- Decreasing the minimum connection time by better-allocating aircraft in different terminals.

- Avoiding an additional screening procedure for passengers flying from domestic to international flights and even between domestic airports with different security categories.

This study aims to evaluate and confirm that these new procedures can reduce MCT (Minimum Connection Time), avoid delays, and bring more reliability to the industry. As an outcome, this research project expects to bring valuable information to understand the possible effects on Guarulhos Airport efficiency.

Research Questions

This study expects to answer the following research questions:

1. Are the current AVSEC procedures safe?

2. Is it possible to improve Brazilian current security procedures?

3. Are there benefits that can result in operational efficiency?

4. What are the pros and cons to airlines, airport operators, and passenger of adding new security procedures?

5. Is it possible to standardize processes to access restricted areas at the airports and create a unique flow for international and domestic passengers?

Definitions of Terms

- AVSEC   Aviation Security - Aviation Security means safeguarding civil aviation against acts of unlawful interference (ANAC, 2018).

- EDS   Explosive Detection System – It's a system that uses in conjunction the Explosive Trace Detector (ETD) to baggage-screening to check is there is any explosive into baggage (IATA, 2020).

- ETD   Explosive Trace Detector – Security screening equipment capable of recognizing explosives in the baggage. Also, the ETD is used combined with EDS (IATA, 2020).

- ISM   IOSA Standards Manual

- KPI   Key Performance Indicators

- MCT   Minimum Connection Time is defined as the shortest time interval required to transfer a passenger and their luggage from one flight to a connecting flight (OAG,2021).

- SARP   Standard and Recommended Procedures – ICAO's technical specifications to manage, provide, and achieve the best practices in aviation safety risk management (ICAO, 2020).

- TAT   Turnaround Time – Period of time that an aircraft is occupying a stand or gate at the airport (IATA, 2018).

List of Acronyms

ANAC   Agência Nacional de Aviação Civil

(National Agency of Civil Aviation)

ECFR   Electronic Code of Federal Regulation

IATA   International Air Transportation Association

ICAO   International Civil Aviation Organization

GAO   Government Accountability Office

RBAC   Regulamentos Brasileiros da Aviação Civil

(Brazilian Regulation of Civil Aviation)

TSA   Transportation Security Administration

U.S.   United States of America

Plan of Study

Having in mind the possible impact of reviewing the current regulation, the research must include the many players that work in the airline industry and even benchmark the reality of a foreign country, in this case, the US. To achieve a conclusion, the idea is to go through the following analysis chapter by chapter:

Chapter Two

In this chapter, we will review the main literature concerning security requirements in Brazil and the USA. The objective is to understand the history and reason why both countries adopted each model. To achieve this result, the team intends to research ANAC's documents RBAC 107, RBAC 108, RBAC 515 that provide the requirements for the

Brazilian aviation industry. The team will also look for this same information using the US regulation and perspective, which is provided by TSA, Homeland Security, and FAA. In addition, IATA (IOSA Standard Manual - ISM) and ICAO (Annex 17) will support the literature review with the international recommendation provided by these Organizations.

Chapter Three

The research methodology will mainly focus on interviews with the professionals involved in the industry in the USA and Brazil. In the USA, the idea is to interview some Airport and Security experts to understand how the process works and what is necessary to implement it. The idea is to select Airport Experts at Embry Riddle, Airport Administration. In Brazil, the interviews will focus on understanding the point of view of some entities about this process and if it is applicable at our Airports. The idea is to interview professionals from IATA Brazil, ANAC, an Airline, and an Airport Administrator. As a plus, this study will look for KPIs (Key Performance Indicators) that can help us understand if allowing domestic and international passengers to transit in the same area brings any harm to safety or operations.

Chapter Four

In this chapter, the main idea is to show the results of the literature research and data collected through research and interviews. Depending on the research results, the group will propose a possible process to be adopted by the Brazilian Airports.

Chapter Five

In this chapter, the group will bring the conclusion from the research. The group will also highlight the constraints and assumptions necessary to adopt this new process in Brazil.

Chapter II

Review of the Relevant Literature

The main focus of this Chapter is to explore how the Security Requirements are recommended by international aviation organizations such as ICAO and IATA. Additionally, we will explore how these requirements are determined by the Brazilian and United Stated governments represented by the local entities as ANAC and TSA. Lastly, we will also go through airport terminal customer journey design in the US in order to understand how it can be adapted for the Brazilian reality.

TSA Requirements for Security Inspections

In the US all the Security Regulations are provided by the Electronic Code of Federal Regulation (ECFR) on Title 49 concerning Transportation. (ECFR, 2021). The specific instructions for Aviation Security are located on Part 1540 that will be explored in this part mainly the topics related to allowed items at the restricted area and screening processes. The reason for focusing on these two topics is to make a correlation to the Brazilian requirements that bring differences between domestic and international flights concerning them.

It is important to highlight that the US Security Requirements brings many possible actions to avoid unlawful interference. These requirements are related to the passenger screening process that requires explosive trace detector devices to detect any explosive trace at the passenger or its belongings such as shoes and coat, for instance. Besides that, TSA also improved technology in order to facilitate the process with airlines and airport operators. (TSA, 2021)

Technology is also a process facilitator at airports. Nowadays, TSA provides an online list of passengers that cross-check data before the boarding. This also allows trusted passengers to be listed on the TSA Pre-check. Such a benefit allows those passengers to have a seamless and faster flow at the airport. Likewise, this technology also allows the government to send to the airlines Selectee Lists that include potential suspicious and random passengers to be double-checked at the gate. (TSA, 2021).

According to TSA, "Secure Flight Program" collects the minimum amount of personal information, such as full name, date of birth, and gender, necessary to conduct effective matching. Secure Flight then transmits the screening instructions back to the airlines. Such information a few purposes:

- to identify low-risk passengers eligible for TSA PreCheck®;

- to indicate individuals on the Selectee List, who are designated for enhanced screening; and

- to establish those who will receive standard screening" (TSA, 2021).

This kind of technology although not required by international organizations, such as ICAO and IATA, facilitates the flow at the airport by sharing information with airlines, government, and airport administration. These organizations are able to collaborate and control passenger data in real-time, thus possibly facilitating the customer's journey at the airport. It also makes it easier to create an integrated process for international and domestic flights. The result being reducing the necessary number of checkpoints throughout the journey.

Figure 1. TSA Precheck Screening facilities. TSA (2021)

Liquids on Carry-on Luggage

After analyzing ECFR and TSA requirements for liquids on carry-on luggage, it is possible to observe that the document provides differences between international and domestic flights. This standardization allows airport operators to have a unique procedure for any passenger entering a restricted area no matter the destination (ECFR, 2021).

It is important to reinforce that all the security requirements were highly impacted by the September 11th attacks that engage all nations to adopt new security procedures which were more costly to the operations. According to Graham (2014), such fundamental changes to the country's airport security system were costly to implement. The security costs incurred by the airports rose from US$556 million in 2000 to US$619 million in 2001, an increase of elevenpercent. They were estimated to have increased to US$853 million, a large 38 per cent rise, in 2002.

According to TSA, passengers "are allowed to bring a quart-sized bag of liquids, aerosols, gels, creams, and pastes in your carry-on bag and through the checkpoint. These are limited to travel-sized containers that are 3.4 ounces (100 milliliters) or less per item" (TSA, 2021). Besides that, any liquid on the carry-on luggage should be separated into a small bag to facilitate the screening process. The only exception includes medications and infant and child nourishments. These items need to be informed at the checkpoint and go through an additional explosive trace test (TSA, 2021).

The limitation of liquid containers at the carry-on luggage emerged after the September 11th attacks in order to avoid liquid bombs threats. The current limit of 3.4 ounces is the critical diameter that could blow inside the aircraft, avoiding any potentially explosive liquid to be carried inside the aircraft (ROSSEM,2018). The image below summarizes the rules for liquids on the carry-on luggage:

Carry-On Bag
3.4 ounces (100 ml) or smaller sized containers that fit in 1 quart-sized, resealable bag may go in carry-on and through checkpoint security.
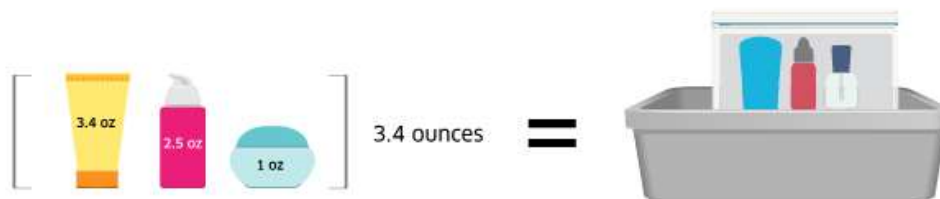
Figure 2. Carry-On Bag. TSA (2021)

Checked Baggage Screening

Checked Baggage screening is also a standard process for international and domestic flights in the U.S. The screening process starts at the counters being mandatory for airlines to "ensure that checked baggage carried in the aircraft is received by its authorized aircraft operator representative" (ECFR, 2021). After the luggage is accepted the airlines must ensure checked baggage inspection: "Except as provided in its security program, each aircraft operator must ensure that all checked baggage is inspected for explosives and incendiaries before loading it on its aircraft" (ECFR, 2021).

The screening process is usually conducted by the TSA but there are different requirements if the airport has no TSA agents or international flights. The following the requirements provided by ECFR, can help with that. (ECFR, 2021):

- **Locations within the United States at which TSA conducts screening**: Each aircraft operator must ensure that the individuals or property have been inspected by TSA before boarding or loading on its aircraft. This paragraph applies when TSA is conducting screening using TSA employees or when using companies under contract with TSA.

- **Aircraft operator conducting screening:** Each aircraft operator must use the measures in its security program, as well as in Subpart E of this part to inspect the individual or property.

- **Locations outside the United States:** Each foreign government conducts screening. Every aircraft operator must ensure that all individuals and property have been inspected by the foreign government. This paragraph applies when the host

government is conducting screening using government employees or when using companies under contract with the government. **(ECFR, 2021)**

According to TSA "Upon check-in, your checked baggage will be provided to TSA for security screening. Once the screening process has been completed, your airline will transport your checked baggage on your respective flight as well as deliver it to the baggage claim area. The majority of checked baggage is screened without the need for a physical bag search" (TSA, 2021)

According to the Government Accountability Office (GAO) (2012), the Transportation Security Administration (TSA) has mandated that all airports checked bags must be screened through the use of explosive detection systems. To carry out this process, TSA utilizes two types of screening equipment within the airports of the United States: Explosive Detection Systems (EDS) and Explosive Trace Detection (ETD) (GAO, 2012). The EDS uses X-rays connected with computer imaging to define and detect explosives. Through the use of ETD machines, a human operator or baggage screener can carry out chemical analysis and manually recognize any explosive materials vapors and residue (GAO, 2012).

Keeping in mind all the research above, it is possible to determine that TSA provides high-level standards for security for any flight departing and arriving in the U.S. The TSA not only standardizes all the procedures for any flights guaranteeing the procedures but also invests in high-level technology in partnership with airlines and airport operators. This action provides a safer and practical environment for all the stakeholders involved in the process. These processes serve as a relevant benchmark to authorities in Brazil.

IATA Standards and Recommended Practices (ISARPS)

The IOSA Standards Manual (ISM) is published in order to provide the IOSA standards, recommended practices (ISARPs), associated guidance material and other supporting information necessary for an operator to successfully prepare for an audit.

The ISM is used as a guide for any operator desiring to structure its operational management and control systems in conformity with the latest industry operational practices.

On the manual we can find more than 8 sections, starting with Organization and Management System (ORG); Flight Operations (FLT); Operational Control and Flight Dispatch (DSP); Aircraft Engineering and Maintenance (MNT); Cabin Operations (CAB); Ground Handling Operations (GRH); Cargo Operations (CGO); and the last one about Security Management (SEC).

The safety and security requirements published in the Annexes to the Convention on International Civil Aviation (ICAO) are the primary source for specifications contained in the ISARPs. Safety and security requirements in the ICAO Annexes used as the basis for ISARPs are those that are applicable either directly or indirectly to the air operator.

Regarding the inspection of Passengers and Baggage on the ISM – IOSA Standard Manual - we can find some recommendation on the section 3: Operational Control and Flight Dispatch (DSP). The first one is about having a notification system, the operator has to have a notification system that ensures information on the types of dangerous goods forbidden to be transported onboard an aircraft is communicated to all passengers. (3.1 Passenger and Baggage Handling).

Dangerous goods information in pictorial form is a preferred method of presentation to passengers. Figure 3.

Figure 3. Prohibited dangerous goods. ANAC.

It is recommended that dangerous goods information be displayed in airport baggage claim areas.

When dangerous goods, which not permitted for carriage on board the aircraft, are discovered on the person or in the baggage of a passenger, a report is made to the appropriate authority of the state of occurrence. (GM). (Ground Handling Operations. GRH 3.1.2).

There is a specific recommendation for battery-operated mobility aids to be transported on the aircraft. The recommendation is that battery terminals must be protected and electrical circuits must be isolated. The pilot in command needs to be informed about that situation. (Ground Handling Operations. GRH 3.1.3).

Airlines have to guarantee a process to identify the origins of their passengers and their cabin baggage. They also need to be aware if the cabin baggage is subjected to screenings prior to boarding an aircraft. This recommendation is a rule just for international

flights. For domestic flights the airline must follow the rules of the security authority. (Security Operations. SEC 3.4.1)

The airlines have to guarantee the screening of the cabin baggage for the second time if the passengers are in transfer, like in a connection. This is to safeguard them from unauthorized interference from the point of screening until they board the next aircraft. (SEC 3.4.3 and SEC 3.4.5).

In both cases, international or domestic flights, the airline must have a process to ensure the origin of the hold baggage and courier baggage. These baggage are subjected to screening prior to being loaded into an aircraft. In addition, they have to be protected for non-authorized people. (3.6 Hold Baggage. SEC 3.6.1 and SEC 3.6.2).

ICAO Recommendation for Security Inspection

In 1974, some safety standards and recommended practices were adopted by the Board and designated through Annex 17 - Safety. The ninth edition of Annex 17 integrates the document of the International Civil Aviation Organization (ICAO). It establishes the basis of the civil aviation security program. The ICAO's main objective is to protect civil aviation and its installations from illegal acts all over the world. **(ICAO, 2021)**

This document addresses administrative and coordination aspects, as well as technical measures that ensure international air transport, attributing responsibilities to States and Airlines for the protection of their passengers, assets and revenues.
The last amendment 10 to annex 17 was adopted by the ICAO Council on 7 December 2001. This amendment addresses the challenges posed to civil aviation by the events of 11

September 2001. It became applicable on 1 July 2002. The amendment includes several definitions and new provisions regarding the applicability of this Annex:

- to domestic operations.

- to international cooperation related to threat intelligence.

- to national quality control.

- to access control.

- to measures relating to passengers and their cabin and hold baggage.

- to onboard security personnel and cabin protection.

- to code sharing / collaborative arrangements.

- to human factors; and

- to managing the response to acts of illegal interference. **(ICAO, 2021)**

By modifying existing technology and applying agreed-upon specifications and procedures, the global aviation community has established a reasonably effective screening system for passengers and their carry-on baggage.

In order to highlight the safety recommendations described in Chapter 4 of Annex 17 of the ICAO, we sequentially summarized the list of the security measures adopted to passengers for carry-on and hold baggage to contribute to this study as a theoretical basis.

Measures relating to passengers and their cabin baggage

- Each Contracting State shall establish measures to ensure that originating passengers of commercial air transport operations and their cabin baggage are screened prior to boarding an aircraft departing from a security restricted area.

- Each Contracting State shall ensure that transfer passengers of commercial air transport operations and their cabin baggage are screened prior to boarding an aircraft, unless it has established a validation process and continuously implements procedures. This step is in collaboration with the other Contracting State, where appropriate. The purpose is to ensure that such passengers and their cabin baggage have been screened to an appropriate level at the point of origin. Also, that the passengers are subsequently protected from unauthorized interference from the point of screening at the originating airport to the departing aircraft at the transfer airport. **(ICAO, 2011)**

Note.— Guidance material on this issue can be found in the Aviation Security Manual (Doc 8973 — Restricted).

- Each Contracting State shall ensure that passengers and their cabin baggage, which have been screened, are protected from unauthorized interference. This protection applies from the point of screening until they board their aircraft. If mixing or contact does take place, the passengers concerned, and their cabin baggage shall be re-screened before boarding an aircraft.

- Each Contracting State shall establish at an airport measures for transit operations to protect transit passengers' cabin baggage from unauthorized interference and protect the integrity of the security of the airport of transit.

- Recommendation. Each Contracting State should ensure that practices are established at airports and on board aircraft to assist in the identification and resolution of suspicious activity that may pose a threat to civil aviation.

Measures relating to hold baggage

- Each Contracting State shall establish measures to ensure that originating hold baggage is screened prior to being loaded onto an aircraft engaged in commercial air transport operations departing from a security restricted area.

- Each Contracting State shall ensure that all hold baggage to be carried on a commercial aircraft is protected from unauthorized interference from the point it is screened or accepted into the care of the carrier, whichever is earlier, until departure of the aircraft on which it is to be carried. If the integrity of hold baggage is jeopardized, the hold baggage shall be re-screened before being placed on board an aircraft.

- Each Contracting State shall ensure that commercial air transport operators do not transport the baggage of persons who are not on board the aircraft unless that baggage is identified as unaccompanied and subjected to appropriate screening.

- Each Contracting State shall ensure that transfer hold baggage is screened prior to being loaded onto an aircraft engaged in commercial air transport operations. This applies unless it has established a validation process and continuously implements procedures, in collaboration with the other Contracting State where appropriate, to ensure that such hold baggage has been screened at the point of origin and subsequently protected from unauthorized interference from the originating airport to the departing aircraft at the transfer airport.

Note.— Guidance material on this issue can be found in the Aviation Security Manual (Doc 8973 — Restricted).

- Each Contracting State shall ensure that commercial air transport operators transport only items of hold baggage which have been individually identified as accompanied or unaccompanied, screened to the appropriate standard and accepted for carriage on that flight by the air carrier. All such baggage should be recorded as meeting these criteria and authorized for carriage on that flight.

- Recommendation. Each Contracting State should establish procedures to deal with unidentified baggage in accordance with a security risk assessment carried out by the relevant national authorities. **(ICAO, 2011)**

Taking into consideration all these measures, ICAO assures that the flight safety is guaranteed, by setting efforts and stakeholders responsible for each action during the passenger journey to assure that. Another highlight is the fact that both passenger and luggage each have their importance.

ANAC Requirements for Security Inspection

Currently, there are no impeditive decrees in the Brazilian civil aviation regulation that derail the mixed passenger's terminals operations at the airports. A few years ago, there was the possibility to have both domestic and international segments in a single flight in Brazil. This means that domestic and international passengers could travel on the same aircraft back then. However, the applicability of safety requirements regarding the safety inspection for international and domestic flights in Brazil are different. That is why nowadays most terminal layouts forbid mixing domestic and international passengers, according to RBAC 107 (Brazilian Civil Aviation Regulation).

The security inspection infrastructure in terminals dedicated to international or domestic operations normally is built to contribute to a better flow in passenger processing, according to their respective flights' needs. This happens mainly because the Brazilian air market has roughly 90% of the total passengers flying domestic flights. Applying safety inspection with international standards for these passengers would generate a capacity problem (physical and procedural) at airports. In addition, most Brazilian airports do not have operational approval to operate as international airports. Changing that would also imply extra government allowances and investment. Therefore, it is currently difficult for the Brazilian market to ensure that passengers boarded from domestic airports have gone through international security procedures.

Despite the different mandatory processes regarding security inspection for Brazilian airports, there are some government entities' constraints. The country's emigration process crosses different department borders, besides that these entities work independently, which makes this situation even worse. There is no sharing of information from international passengers that could facilitate the process as it is done in Europe and in the US, where the federal police, customs, airlines, and regulatory authority systematically maintain the integration of all travelers in the country and share their data. These constraints will also be the object of the analysis of this project.

Airport Layout and Checkpoint Design

Terminal and checkpoint design at the airports is an important subject to guarantee efficiency and the best customer experience to the passengers. According to e Neufville and Odoni (2003), passenger walking distances require designers to look for better

configurations since the geometrical measures of distances are mostly wrong and deceptive. Kusumaningtyas et al. (2007) reinforce that any increase in passenger walking distances results in increases in passengers' transferring time which includes MCT and passengers' waiting time. This is basically not desired by airlines and airport operators.

According to Graham (2014), some airports have one MCT that applies to all services, while in other cases a range of different MCTs may be in operation depending on the airline, terminal, type of passenger and route. For example, at Vienna, Frankfurt and Singapore the MCT for all routes is 30, 45 and 60 minutes, respectively, while at Delhi it is 90 minutes for domestic services and 180 minutes for domestic– international services for all operations except those in terminal 3, where the MCT is 45 and 75 minutes, respectively. Having these numbers as reference it is possible to note that when we have a unique procedure to all flights the MCT time tends to reduce. Also, segregating international and domestic traffic, although efficient because of the different processes involved, hinders the speed of domestic–international transfers. In recent years several airports have been seeking to improve their transfer product. (Graham, 2014).

When we talk about security checkpoint there are many challenges involved considering all requirements involved. It is a sensitive checkpoint and many passengers are not fully aware about the procedures. Graham (2014) believes that improving airport security processes has become one of the most difficult tasks in passenger experience. As the number of airport passengers increases, managing security processes becomes more challenging even without enhancing passengers' convenience. Besides that, there are many different requirements on the international scenario that may impact the flow and procedures. Graham (2014) indicates that it is very difficult to persuade a country to recognize and trust the security agreements that have been made somewhere else.

Customs and boarder control are also an important step of the customer journey that brings the main difference between processes for domestic and international flights and is one of the most important steps to be taken into consideration to standardize the restricted area. Customs procedure represents all the necessary formalities for the clearance of goods made for export or import. (Popa, 2008). In order to obtain clearance, the customs declarant may choose the common customs procedure or a simplified procedure. (Dechaume and Venturelli, 2014).

Besides the customer journey, the gate assignment is also a common problem for airport operators.Being flexible to use all the terminals of an airport can increase efficiency, having in mind it would be possible to allocate any aircraft in any position no matter the nature of the flight (international or domestic). Wells and Young (2011) believe that gates are the most prominent and challenging aspects of planning and management of the apron in dealing with aircraft parking positions. As a result, several recommendations are required to achieve efficient operations.

It is important to have in mind all these subjects when mapping a process to create standards on the restricted area. Not only the checkpoint design needs to be reviewed, but also airport infrastructure, wayfinding, aircraft allocation to reduce MCT, and barriers to avoid international passengers skipping any mandatory stage to leave or arrive the country. During the next chapters the research will collect the point of view of the main players of the aviation industry to understand how all the subjects explored in this chapter can be adopted in real life.

Chapter III

Methodology

This study intended to answer why Brazilian airports' infrastructures deal differently with security and checkpoint design than some other countries. The research used U.S. airports for benchmarking purposes. Research mentioned in the Literature Review highlighted in Chapter Two will be brought into play in this Chapter. The main outcome of the research was to answer the Research Questions presented on Chapter I and highlighted below:

1. *Are the current AVSEC procedures safe?*

2. *Is it possible to improve Brazilian current security procedures?*

3. *Are there benefits that can result in operational efficiency?*

4. *What are the pros and cons to airlines, airport operators, and passengers of adding new security procedures?*

5. *Is it possible to standardize processes to access restricted areas at the airports and create a unique flow for international and domestic passengers?*

To analyze the answers from these questions, the research study was divided into three sections: Airport Security, Check Point Design, and Cost-Benefit. This was done to ensure the study had the most detailed information from various perspectives that concerned the research theme.

First step was the Literature Review that allowed research to better understand what were the recommendations from the main international organizations that regulates the aviation industry concerning Airport Security. This research enlightens that some

international recommendations such as checked baggage screening, and liquids limits on handbag were not followed by the Brazilian Airports.

Another conclusion after analyzing the U.S. procedures for this subject was that the country works with high level standards having strict and standardized procedures for international and domestic flights. This seems to allow terminals to work more efficiently having in mind that the idle capacity can be used by any flight or company on the terminals. It is not separated by the flight category. Besides that, U.S. Airports also use a good deal of technology. They have a close relationship among Airport Administration, Government, Airlines, and Passengers. This allows them to collect and share passenger data. It also allows any of these stakeholders to have previous information about passengers. This process contributes to a smooth security process at the airports.

The second step was to conduct interviews with aviation experts. According to Morris (2015), interviews can give the researcher access to the interviewees' thoughts, reflections, motives, experiences, memories, understandings, interpretations, and perceptions of the topic under consideration. It also allowed the researcher to establish why people think the way they do. Considering this assumption, the interviews allowed us to better understand the reason the procedures where build this way in each country. It also provided knowledge, so we could better comprehend all the points of view from different perspectives. Another outcome from the interviews was to better understand the security processes in the U.S. in order to evaluate their possible application on the Brazilian Airports.

Data Source, Collection, and Analysis

The Research Team collected data and conducted interviews with specialists from different agencies, nationalities, and relations within the airport environment. The interview session allowed the Research Team to better understand different thoughts from all stakeholders involved in this operation. The data gathered allowed for an improved comprehension on what the constraints were for each one of them. It also provided enhanced material for the study's Literature Review from feedback given by the interviewee. The interviews were conducted separately, so it diminished the risk of them being biased.

Airport Security

This section focused on the airport security legislation from the U.S. and Brazil in order to better understand why each country follows certain procedures. This section answered the following research questions presented in Chapter One:

1. *Are the current AVSEC procedures safe?*

2. *Is it possible to improve Brazilian current security procedures?*

The public selected included representatives such as a U.S. Airports Specialist, Brazilian Airline' Security Manager, IATA Brazil representative, and ANAC representatives. The full interview questionnaire can be found in APPENDIX C of this report. Through this approach we were able to establish the best option for Brazilian Airports. The conclusions will be displayed on the next Chapter. Besides that, all the research was enlightened by the following Literature Review posted in Chapter Two concerning:

- TSA Requirements for Security Inspection

- IATA Standards and Recommended Practices (ISARPS)

- ICAO Recommendation for Security Inspection

- ANAC Requirements for Security Inspection

Even security subjects not being the main topic of this discussion, after the literature review and interview with some of the experts, the group was able to understand that this is one of the most important topics to be explored. In Brazil, security requirements are the main guide to determine the nature of the operation (international or domestic), and local regulation needs to be improved if it is decided to move forward with the integrated terminals.

It would be necessary for Brazilian authorities to review the current regulation to create the same standards for all the flights mainly the ones related to passengers and baggage screening. If on one hand, the current regulation makes the domestic flights' requirements more flexible regarding screening, it is important to highlight that this flexibility is recommended by ICAO that deliberates the state is in charge to define the security level. ANAC currently runs several risk assessments to understand how the barriers in the country in order are to define if it is necessary to increase the security level for Brazilian Airports. In the case of enhancing security, it would be necessary to not only review the regulation but also a high investment in infrastructure in many airports which could increase costs for airlines, airport operators, and passengers. It is also important to highlight that Brazil is not a country with a history of attacks or unlawful interference, and this fact is also taken into consideration when defining the level of security requirements.

Regarding screening, to be possible to screen all the luggage it would be necessary to implement infrastructure at most of the airports that currently do not screen domestic baggage. This investment would impact directly the airport operators that would be responsible for providing the structure, and airlines that would be responsible for screening and contracting providers to run the screening. This is one of the main discussions currently happening among the aviation industry players.

Check Point Design

This section focused on the airports check-point design and procedures in the U.S. The main outcome was to answer of the following Project Research Question.

1. *Is it possible to standardize processes to access restricted areas at the airports and create a unique flow for international and domestic passengers?*

To collect data to this question the Research Team interviewed an Embry Riddle Airports Specialist in order to better understand the current passenger flow between terminals in U. S. airports. We also interviewed Brazilian authorities from IATA and ANAC in order to understand their points of view regarding the necessary improvements. This information was related to standardize the security requirements in Brazilian terminals. The full questionnaire used to answer the main research question can be found on the APPENDIX C of this document.

The Research Team also used the Literature Review from Chapter Two to reinforce what would be the best checkpoint design and procedures to allow the airports to have an efficient flow. The information can be found in the Checkpoint Design and Procedures in U.S. Airports section in Chapter Two.

Regarding this topic, it is important to highlight the many differences that exist between domestic and international flights that would demand a review on the checkpoint design. One of the most sensitives areas is the customs area, which is mandatory only for international passengers bringing the need to have a dedicated area for this checkpoint and investments in this structure.

Another solution would be to have a flexible structure to open and close the Customs Hall for international flights only. This strategy would demand data analyses for a Customs Hall concerning the number of daily operations, schedule of daily operations, average and shortest/longest flight processing times, forecasted growth for international flight activity, etc. Also, it would be necessary to create a strategy in case of delays that could impact domestic flights if this area is expected to be used for this flight.

Talking about border control, Brazil still needs to improve in technology to avoid this checkpoint on the passenger customer journey. Nowadays, the passenger must go through this checkpoint to validate departure and arrival. A possible solution would be an integrated system where airlines would send passenger data previously to federal police that could previously check and authorize each passenger avoiding an extra checkpoint for them.

Cost-Benefit

This research segment studied ways to understand the cost-benefit to implementing new procedures in the main Brazilian Airports. The research looked at restrictions that included how such procedures could financially and operationally impacted Airlines,

Airport Administrator and Passengers. This section answered the following Project Research Questions:

1. *Are there benefits that can result in operational efficiency?*

2. *What are the pros and cons to airlines, airport operators, and passengers of adding new security procedures?*

The first step was to complete an interview with some stakeholders such as personnel from ANAC, IATA, and airlines. The objective was to collect their points of view regarding this cost-benefit of having these security standards in the terminals. The full questionnaire can also be found on the APPENDIX C. After the interviews one of the main benefits of having standards was to avoid extra cost of building new terminals considering most of the terminals dedicated to international flights have idle capacity to also receive domestic flights.

Considering this assumption, the group idea was to study the cost of building a new terminal versus the cost of implementing all the needed structural changes to an existing terminal. These construction revisions centered on having a unique restricted security area that allowed the airport to use its idle capacity. This would avoid the need to build new terminals. Considering the complexity of this subject it would demand a robust study that could identify the cost of enhancement of security process in all airports around the country. Considering this assumption, the group will bring only some perceptions during the interviews.

The point of view of some of the interviewees was that it would be a great benefit by adopting this kind of strategy. Some of the main Brazilian International Airports have dedicated international terminals that could be used also for domestic flights avoiding the

need of building a new terminal when the passengers' demands grow. Assuming this point of view it would be probably cheaper to adapt security procedures and checkpoint design than build a new terminal.

The main pain point in this subject is related to the investment that would be necessary for the other airports as well and the criteria that would be used to require the airport to adapt to these procedures. The cost of building on the terminal can be higher from the airport perspective, but if it is necessary to invest in modification in all the airports this cost could not be advantageous.

Another positive point after the research was that this kind of improvement would bring advantages to the MCT considering it would be possible to have aircraft allocated closer at the terminals and reduce the necessary connection time. Also, if the security requirements were standardized it would avoid a new screening at the connection airport reducing this step.

Having in mind the literature review and the interviews done with all these experts the next chapter will bring the conclusion about his subject and suggest a possible way for the Brazilian Aviation Industry to act regarding this theme. The research allowed the group to reinforce the many advantages of having the same structure for international and domestic flights, but also the complexity to adapt the security regulation, and infrastructure at the airports that need to be taken into consideration.

Chapter IV

Conclusions

The main goal of this Chapter will be to present the results of all the researchers and interviews done in the previous chapters. To keep the same structure, we will split the conclusions into the same sections as Chapter III: Aviation Security, Checkpoint Design, and Cost-Benefit. The group focused the research on interviews with the main organization and experts and now we will bring their perspective about this subject.

Conclusion One - Airport SecurityData Gathering

- Interviews with Airport Expert, IATA, ANAC, and Airline Representatives

Results

- Improve Aviation Security requirements for domestic flights would be an improvement on the Airlines perspective.

- Even domestic flights having less strict procedures, risk assessment provided by the local agency confirms they are enough concerning Brazilian Terrorism Risk level.

- Having in mind the majority of passengers are domestic (89%), stiffing regulation for this public could bring more complexity than needed to the local industry according to experts.

- The TSA currently uses technology to share passengers data between TSA, other entities, and Airlines, turning the passenger identification process easier for all sides.

Conclusion

- The current procedures are safe for domestic flights considering the Brazilian terrorism risk level. Even though there are improvements to be done mainly regarding checked baggage procedures in order to avoid unlawful interference. See recommendation 3.

- Creating standards on security procedures could be positive from an airline efficiency perspective, regarding MCT and aircraft allocation.

- Creating new standards could bring impacts on passengers experience and extra costs for airlines and airports in order to adapt the procedures.

- Bring new technology such as BHS on the main airports and passenger data communication through API, PNR, for example, could help the industry to improve procedures and safety. See recommendation 1.

Conclusion Two- Checkpoint Design

Data Gathering

- Interviews with Airport Expert, IATA, ANAC, and Airline Representatives

Results

- It would be necessary several improvements at the airport to create a safe and efficient design to promote standards

- Arrivals are more complex to be standardized concerning customs procedures

- For departures, it would be necessary to invest in technology to share passenger data (API/PNR) between airlines and federal police, avoiding an extra checkpoint for passengers

Conclusion

- Checkpoint design is one of the more sensitive points to be taken into consideration, mainly when we talk about arrivals.

- Talking about departures, before having any infrastructure investment, the main necessary improvement would be in technology to allow federal police or any other department to have real-time information from passengers, like what happens in US Airports. See recommendation 1.

Conclusion Three - Cost-Benefit

Data Gathering

- Interviews with Airport Expert, IATA, ANAC, and Airline Representatives

Results

- Talking about terminal idle capacity, the experts say that by having similar procedures all terminals currently used only for international operations could be used to operate domestic flights and increase the airports capacity.

- It would be necessary a more detailed study evaluate a possible business plan for each scenario and validate this assumption

- This kind of change could also bring benefits for airlines having in mind the MCT could be reduced, and more passengers could be connected improving airlines revenues and passenger experience.

- Having in mind the majority of passengers are domestic in Brazil, 89%, adopting these new procedures could mean less benefit for this public that will be impacted by the new procedures that will be more restrictive to them.

Conclusion

- It would be necessary to have detailed information on the costs of building a new terminal and all the necessary improvements in infrastructure and technology, with the payback for each investment. See recommendation 2.

- It is also important to define which airport should be taken into consideration and create rules bearing in mind the cost-benefit for the smaller airport would be negative. See recommendation 4.

- Stiffing domestic requirements to be similar to the international, would reflect less flexibility and would not be positive for the main passengers**.**

Background

Airport Security

Talking about Aviation Security, on one side Airlines and representatives feel that it would be better for Brazilian Aviation to have a more restricted regulation for Aviation Security in order to make the industry safer. Also, other benefits would be to have a seamless process that would bring some efficiency to airlines regarding passenger

screening from domestic to international flights and reduce MCT. On the other side, The experts see the Brazilian Airports mainly with low risk and bring more restricted procedures could mean more restrictive processes to passengers. It could impact not only passenger experience but also how various government departments should work on the airport environment such as customs, healthy agencies, etc.

It is important to have in mind that, according to the local agency, 89% of the passengers are traveling on domestic flights, and the focus should be to improve the processes for these passengers that represent the majority of fliers. Another important point to be taken into consideration is how smaller, and less risky airports would adapt to more restrictive security levels talking about investment or even how the process would work to connected passengers from these airports to the ones with different risk levels if they do not have the same procedures.

The US current regulation currently has more restricted regulation considering the country's sensitiveness to unlawful interference what would justify this difference. It is important to highlight they invested in technology and passenger information is shared between airlines and TSA in order to make this process easier and seamless at the airport.

Checkpoint Design

Talking about Checkpoint design, there is a consensus regarding the number of necessary improvements on the airports to adapt all the areas to these new procedures. These improvements can be done in different ways, by evaluating a fixed layout design for these situations or a flexible structure for airports with low demand, allowing the airports to adopt the wayfinding depending on the flight nature.

First of all, it is important to divide into departures and arrivals. Talking about departure, it will be necessary to have some improvements in technology regarding mainly passenger information. It would be necessary for airlines and federal police to have access to passenger information online using API, PNR, and even Biometry. It would be necessary to avoid passengers going through this checkpoint having in mind this verification is currently done when the passenger access the international restricted area. For connecting passengers, for example, it would not be possible to have reliable segregation without extra investment in technology,

When we go to arrivals, the main restriction is regarding the customs hall having in mind it is mandatory only for international passengers. It would be necessary to have a different level on the main airports in order to segregate these passengers to the required area. If the airport opts to have a flexible layout flight schedule for international flights should be taken into consideration and a contingency plan in case of delays, bearing in mind it would impact on the airports to open this area to domestic while the flight does not arrive.

Cost-benefit

When we talk about cost-benefit there are two perspectives to be taken into considerations: terminals idle capacity and the increase of requirements for domestic passengers.

Talking about terminal idle capacity, the experts say that by having similar procedures all terminals currently used only for international operations could be used to operate domestic flights and increase the airports capacity. It would be necessary for a more

detailed study to evaluate a possible business plan for each scenario and validate this assumption, but the idea of improving the current layout besides building a brand-new terminal is seen as the best option for some interviewees. This kind of change could also bring benefits for airlines having in mind the MCT could be reduced, and more passengers could be connected improving airlines revenues and passenger experience.

On the other hand, having in mind the majority of the Brazilian passengers are domestic, 89%, adopting these new procedures could mean less benefit for this public that will be impacted by the new procedures that will be more restrictive to this public. Some interviews view this king of action as retrocession having in mind passengers would take more time to go through screening, arrivals, and will lose to current benefits like circulation with food, medicines, etc. on the restricted area, extra screening procedures, etc. So having in mind these perspectives would not be an advantage for passengers and to the industry overall. Besides, that, all the interviewees agreed that if there is a way to have a seamless procedure for all flight nature allowing the usage of all airport terminals full time, it would have a positive cost-benefit in the long-term.

Cost-benefit could be one of the most important point-of-view to be taken into consideration in the subject of this study. Otherwise, considering the complexity of this theme it would be necessary for a more detailed evaluation to understand the cost-benefit of adopting this standardization. It would be necessary to have detailed information on the costs of building a new terminal and all the necessary improvements in infrastructure and technology, with the payback for each investment. It is also important to take into consideration which airport should be taken into consideration and create rules having in mind the cost-benefit for the smaller airport would be negative.

Another aspect to be taken into consideration is the passenger perspective at the point that by stiffing domestic requirements to be like the international, would reflect in less flexibility and new procedures from the passenger perspective. Since most travelers are domestic, it would not be positive for the main passengers.

Chapter V

Recommendations, Future Research, and Lessons Learned

Recommendations

This research focused on finding a possible solution for Brazilian Airports to have similar processes for international and domestic flights and have a unique restrict area in order to improve industry efficiency and security level. Some of the initial assumptions were explored through literature research and interviews enabling us to understand the complexity of the theme. Changing this process means working on a big and long-term business plan involving all the airline industry players and even the society having in mind it will also impact the passengers' journey and safety.

Taking into consideration the complexity of this research the group will bring below some recommendations not only to implement the proposal but also to deep dive into some of the subjects that were not fully explored during this study and will demand a dedicated study with experts. Below you can find 4 recommendations for the theme.

- **Recommendation One- Improvements in technology concerning airport security and passenger information.**
- **Recommendation Two- A dedicated study focusing airport idle capacity, and cost-benefit**
- **Recommendation Three- Start improvements on aviation security regarding checked baggage screening**

- **Recommendation Four- Create a working group within airline industry players to define criteria and rules**

Background

Brazil still does not have an online system that allows passenger information to be shared among airlines and the government what demands an additional and important checkpoint at the airports. Following the US example, the first recommendation is to work in technology to allow airlines and the government to share passenger information through API and PNR. This improvement may bring more efficiency on the border control and allow the federal police to communicate with airlines online and without an extra checkpoint.

This improvement can make the process easier for airlines, passengers, airports, and the government and will also be necessary in case the industry opts to have an integrated restricted area. Without technology the group could not find a feasible way to identify domestic and international passengers without a physical barrier, that is the solution used nowadays.

When we go through cost-benefit of this solution on the airports, it is essential to evaluate if the changes will be profitable and advantageous in the mid-long term. It would be important to understand the cost of having a new terminal from the ground compared to the necessary investment of adapting the current structure to receive international and domestic flights in any terminal what means use the idle capacity and avoid the cost of a new terminal.

The research enables the group to understand that the current security rules for domestic flights consider the airport risk level and having a stiffer process can impact the domestic passengers, who represent most of fliers. Besides that, it would be important to start working on some improvements to avoid risks, and to slowly start a transition to a safer process without big impacts on passengers.

On the Aviation Security side, one of the main gaps found today is related to checked baggage screening. Brazil currently does not screen all the bags what could mean easy access for unlawful interference even for low-risk level airports. Also, this improvement would be necessary to move forward to have a unique process for international and domestic passengers at the airport. Having in mind the complexity of this improvement and that this represents an efficient barrier for unlawful interference, it should be something to be discussed among the players to bring more safety to the industry in Brazil.

The group was also able to understand that it would be possible to have a disruptive change in the industry in order to have a more seamless process at the airports. Even though, there is still no consensus among all players about the possible solutions to make it happen and having it would demand an extensive study and investment in infrastructure, process study, etc. Besides that, it is important to have in mind that Brazil is a continental country with different realities and needs what needs to be taken into consideration when defining the rules.

By having a working group, the industry can start to work on a master plan for this subject considering all the points of view, restrictions, and necessary investment in order to define the goals and start working on it now. Having in mind the complexity of the

theme, this would be something to be implemented in several years, so starting a discussion can be the first step to have this implementation in the future.

Future Research

- Cost-benefit of having a unique criteria for domestic and international flights
- How to improve airports checkpoint design with technology

Lessons Learned

- Even the US, that currently has one of the most efficient and safest airport seamless security processes, still doesn't have a seamless restricted area for all the flights. Being necessary segregated areas. This shows how complex this theme is, but technology can be a way to break these barriers and improve efficiency and safety on aviation.

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Appendix A

APPENDIX A – RESEARCH QUESTIONNAIRE

Brazilian Authorities and Airlines

1. Why the current regulation has different procedures for international and domestic flights?

2. Does this model increase risks for domestic passengers?

3. Is there any discussion in place to standardize the procedures?

4. What would be the necessary improvements to change the security requirements?

5. What are the possible threats of allowing domestic and international passengers to transit in the same area?

6. What are the processes we could conduct to diminish that possible threat?

7. Having both flows in the same area implies in infrastructure investment?

8. If so, in what areas and why?

9. Is this investment higher or lower than building a new terminal?

10. Which stakeholders are impacted positively or negatively by this measure?

11. What are the impacts/benefits for airlines, airport administrators, and passengers of having a unique restricted area?

12. Overall, these changes will be positive or negative for airlines and airport administrators?

US Authorities and Experts

1. Is there any difference concerning security regulation between domestic and international flight operations?

2. Having in mind there are different requirements for domestic and international flights, how are the airports designed so all the passengers can go through all the necessary checkpoints?

3. Who is in charge to screen passengers checked luggage? TSA or the airlines?

4. How does TSA Security Check help to make these procedures harmonious?

5. Are there any restrictions from TSA and Customs?

6. During the arrival, how are airports designed to distinguish international and domestic passengers to guarantee customs and passport control?

7. Do you think, having different procedures for domestic and international flights is a risk for passengers?

8. What about the operation? Is it efficient?