MANAGEMENT INFORMATION SYSTEM FOR THE MANAGEMENT OF LOST OBJECTS IN AIRPORT COMPANIES

SISTEMA DE INFORMACIÓN GERENCIAL PARA LA GESTIÓN DE OBJETOS EXTRAVIADOS EN EMPRESAS AEROPORTUARIAS

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Abstract

The purpose of this paper is to show the design of a management information system to manage lost objects in airport companies, in order to optimize the process management in the organization. A descriptive and qualitative research. The implementation of the management information system will allow the company to apply information technologies in the management of lost objects so that it can be a competitive organization, in response to nowadays increasing demand of greater use of ICT in management processes.

Keywords: Systems, information, management, lost objects.

Resumen

El propósito de este artículo es mostrar el diseño de sistema de información gerencial para gestionar objetos extraviados en empresas aeroportuarias, con el fin de optimizar la gestión de procesos de la organización. Mediante investigación descriptiva y cualitativa. La implementación del sistema de información gerencial permitirá a la empresa aplicar las tecnologías de información en gestión de objetos extraviados para que pueda ser organización competitiva, que día tras día, demanda mayor uso de TIC en procesos desarrollados desde la gerencia.

Palabras clave: Sistemas, información, gerencia, objetos extraviados.

Introduction

The purpose of this research project was to design and propose the implementation of a collection and management platform for the reception, storage and delivery of lost objects through the application of management information systems by the customer service department for an airport company, which responds to the need to optimize the process of managing them, and whose results contribute to the achievement of the objectives of the organization and the stakeholders.

To this end, the diagnosis of the current system was made over a period of six (6) months, during which the types of Management Information Systems (MIS) were widely studied in order to determine the one that best suits the company and meets the need. The

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current process of managing lost objects was diagnosed in order to know the shortcomings to be improved or changed. A proposal for the construction and implementation of a new MIS for the company was designed, and a report was produced to support the proposal.

This paper aims to demonstrate how useful, and even necessary, the adoption of new information technologies is for the fulfillment of the strategic objectives of the company; under much higher and more demanding quality standards, and with the purpose to satisfy not only the external client, but also the internal client with effectiveness and efficiency.

Information systems: their importance and support in organizational management

For the development of the diagnosis it was necessary to research about MIS at a theoretical level in order to give relevance and convenience to the choice of the type of solution proposed. This leads to general and specific definitions of MIS, how to design and build a MIS adjusted to the need of an airport company, and what would be its basic parts.

A management information system combines the theoretical work of computer science, management science and operations research with a practical orientation to develop system solutions to real-world problems and manage information technology resources (Laudon, Laudon, & Ramos, 2004; Romero, de la Ossa y Buelvas, 2021). The term system in MIS implies order, arrangement and purpose. Moreover, a MIS concentrates specifically on providing information to the top management staff, not just data. These two points are important and it is necessary to delve into them.

A management information system is defined as a set of tools that, when executed on a series of data, generate information that is useful for the management staff in the decision-making process (Monterrosa-Castro & Ospino-Pinedo, 2018; De La Hoz, Urzola y De La Hoz, 2021). Data is raw facts without analyzing, such as figures, names or quantities. But as data, these facts have little use for managers. When data is analyzed and processed, it becomes information, which is useful to make decisions.

Logistics information systems

Logistics is the part of the supply chain process that plans, carries out and controls the efficient and effective flow and storage of goods and services, as well as related information, from the point of origin to the point of consumption, in order to meet customers' requirements (Ballou, 2004).

Logistics is an interdisciplinary activity that links the different areas of the company, from purchasing scheduling to after-sales service; going through the supply of raw materials; the planning and management of production; the storage, handling and management of stock, packaging, wrapping, transport, physical distribution and information flows (Mora García, 2016).

Information management covers the collection, storage, processing and analysis of the data necessary to develop planning and control, which supports the entire logistics system (Casanovas & Cuatrecasas, 2003).

Transportation and physical distribution

Logistic administration is the function where all activities related to logistics are coordinated and optimized and integrated with other functions such as marketing, sales, manufacturing, finance and information and communication technologies. It includes activities such as: inbound and outbound transport management, freight management, storage, material handling, order reception, logistics network design, inventory control, demand planning and supply and administration of logistics providers (Mantilla Celis & Sánchez García, 2012).

Nowadays, the saturation of air concentration and distribution centers (hubs) represents‖ the main problems that air transport is facing, due to the fact that it generates inconveniences in airports. (Herrera-García, Moreno-Quintero, & Martner-Peyrelongue, 2014)

In this sense, the review of the literature allows us to develop and present a theoretical framework on the changes that the intensive use of ICT is fostering in tourist distribution systems and the implicit effects of these changes in their structure (Berné Manero, García-González, García-Uceda, & Múgica Grijalba, 2013).

At present, the globalization of markets makes logistics systems and their management more complex. Therefore, it is necessary to improve the conditions of the companies producing or marketing goods and services, which are participating in an international business environment (Olivos, Carrasco, Flores, Moreno, & Nava, 2015).

Air or road intermodal logistics centers associated to air terminals that have facilities for land connection, deposit and / or storage, usually include customs infrastructure to carry out foreign trade controls (nationalization). These platforms can take the form of Road Feeder Services (RFS) to balance air cargo flows between different terminals (Montanez, Granada, Rodríguez, & Veverka, 2015).

Management of lost objects

Logistics activities such as inventory or order management, storage or transport, take advantage of the new possibilities offered by ICT to articulate new forms of relationship in the supply chain of air terminals (Servera Francés, Gil Saura, & Fuentes Blasco, 2009).

Traditionally airports have been understood as places that provide a public service (air transport) with facilities and infrastructure to manage and process aircraft and passengers (Díaz Olariaga, 2015).

Loss of merchandise and deliveries at the wrong time mean a disagreement with the requirements demanded by the clients in the BASC management systems, systems of quality and ISO 28000 (Rojas Amaya, 2014).

ICT provide dynamism and transparency to the processes of the distribution channel, which leads to the appearance of new competitors that are able to coexist with those already established, allowing a more efficient service production (Berné Manero, García-González, García-Uceda, & Múgica Grijalba, 2012).

The rise of ICT in management processes has led to the implementation of ERP (Enterprise Resource Planning). An ERP is a set of MIS, which, typically, manages processes such as production, logistics, distribution, inventory, shipments, invoices, customers, human resources, quality and accounting of the company (Sánchez-Sánchez, García-González, & Ortiz-Ospino, 2017).

Airlines were the precursors of loyalty programs worldwide (Forgas, Moliner, Sánchez, & Palau, 2011). These programs aim to increase customer´s satisfaction with the services and products offered by a company. There is no doubt that a good policy of lost objects management will contribute to the increase of customer satisfaction.

Methodology

This research can be classified as a descriptive and qualitative study. The methodology implemented was based on primary research sources. Data was taken from the storage archives and internal records of the company under study. In addition, direct observation was implemented on the procedures carried out by the personnel of the customer service department in the reception, storage and delivery of each of the lost objects received. Having as well as scope of the research, the aforementioned department, along with the specific process of management and administration of lost objects.

For the previous purpose, it was necessary to apply a SWOT matrix within the descriptive focus of the study, which would allow knowing the pertinence of the same, since the satisfaction of a user with an airline directly and positively influences the user's loyalty to the aerial company (Forgas, Moliner, Sánchez, & Palau, 2011).

Results

Process description

The activity carried out by the Customer Service department of the airport company, in management of lost objects, is carried out in 5 major stages:

1. Receipt: The Airport Information Desk functions as an office of reception and management of lost objects, 18 out of 24 hours of a day. Each object that is abandoned or forgotten by civil aviation (understood as passengers, officials or bystanders) has as its final delivery destination, the instances of the information desk. This place is steadily managed by a customer service advisor. These objects may vary from documents or accessories, to suitcases or musical instruments.

2. Storage and desistance or destruction: Once the object is received (whatever it is), it is registered in two virtual files and in a physical log. These actions are also carried out by the customer service adviser. Next, the object received is stored or desisted. The conditions vary according to the characteristics or nature of the article.

   If the object meets the conditions to be stored, the initial storage takes place in the compartments of the information point for a limited time; either because it is claimed promptly by the owner or because another type of treatment is given.

   In case it must be destroyed (according to the rules that regulate this procedure) either because it has fulfilled its storage time limit or it should be abandoned (if it corresponds to a perishable product or it is in terrible conditions), it is necessary to issue **a record (minutes) of destruction or withdrawal**. This document is drafted and completed manually by the consultant in turn, and in the same way registered (in a consecutive order document as it corresponds) in a file of record of minutes and virtual files, mentioned above.

3. Delivery to entities: This process applies to personal documents such as licenses, passports, cards, and all those of the same nature or type. And for bank documents like debit cards, only. The delivery to entities consists in the cession of the custody of the previously mentioned documents, to the entities responsible for the issuance or administration of the same. This only takes place after a period of 5 to 7 days after receiving this document; as it is established in the procedural regulations.

   For the delivery of the documents, already considered lost objects, it is necessary to hand write a delivery letter. These minutes, likewise the destruction one, has a consecutive order that is modified by the advisor from the same document, who is responsible for the list of each of the missing objects that must be delivered to that X or Y competent entity to receive them. This in addition to the search of each lost object to be related, which is also carried out manually in the files of record of the same, within the time range mentioned above (Lost objects with 5 or 7 days of being in storage).

4. Return: A Lost Object is returned once the owner or an authorized third party approaches the airport facilities for the claim of the lost item. A customer service consultant performs this process.

   In many occasions, the process of delivery of these objects is done through authorizations for the cession of the custody of the same; authorizations that in most cases are received via email, along with digital copies of the owner's identity documents. Somehow the

process is slightly stagnant when there are cases like these, since the staff that works as a service consultant rotates, the momentary loss of those documents is incurred among hundreds of emails.

5. Delivery to HR and Coordination of Social Management for final disposal of Lost Objects: The HR department receives every 3 months the lost items that, after 90 days in storage, were not returned or claimed.

Since the administration and management of the hundreds of lost objects that are received per month, consists of the storage, modification and generation of data and documentation, this activity tends to become complex. And despite its effectiveness, it could undoubtedly be much more efficient.

Process Analysis - SWOT Matrix

Strategic planning is one of the main administrative tools for corporate management, since a large extent on the performance of each company depends on it. (Mejía Argueta, Agudelo, & Soto Cardona, 2016).

Table 1. SWOT Matrix

Weaknesses	Opportunities
• Inaccurate updating data process. • Not efficient process at the reduction of time level. • Very long and manual process. • Need to use many files of different nature and type, for the final achievement of objectives. • Propensity to the error in the transcription of data; errors that many times fail to be corrected.	• The company has two software with a focus on document management in a more efficient manner, which demonstrate the positive impact of MIS on processes. • The two documentary management programs available to the company allow us to set a pattern for the construction and development of the tool. • Use of Macros in Excel for the construction of small MIS software.
Strengths	**Threats**
• The current process carries a correct flow of activities in order to achieve the objectives. • The current process fulfills its final objectives. • The current process has been systematized over time, which is why the improvement options are well received. • The current process sets all the guidelines for the construction of a MIS adjusted to increase its efficiency.	• Generation of non-conformities in the internal and external auditing processes, due to the incongruence of data and their outdatedness. • Non-conformity on the part of the client due to the inaccuracy and agility of the system. • Non-compliance with ISO 9001 standards in terms of quality and efficiency of processes and documentation management, in the administration of airports.

Source: Analysis of the current process of lost objects in an airport company

Design

The design clearly points to the simplification of the effort that must be made by the customer service adviser in each of the stages of the process of managing lost objects, with the main purpose of allowing clear accounts in internal and external audits, with information

updated, truthful and easy to achieve, and for the optimal and on time development of the activities carried out by the HR and Social Management departments. Its added value will be reflected in the unification of all processes in a global one, which will generate most of the results **automatically**. Thus, the new data schemas will only contain the activities in which human intervention and efforts of the adviser are still required and those where is not required will be deleted.

Below, the incidence (additional characteristics and improvement) of this new MIS on the stages of the process will be explained:

Since the receipt: During the reception stage of the hundreds of lost objects that are received at the airport, it is worth mentioning that the activities carried out by the customer service advisors at the time of proceeding to register each item or good, needs to be done in a shorter time, in fewer steps and with less effort, since the advisor performs tasks that in most cases are immediate and even more important.

Table 2. Design of the new MIS since the improvement to the reception process

Step	Execution time *	Improvements
A. Receipt	N/A	N/A

B. Register	2 min.	Registration through a digital platform that will establish **automatically**:
		• Consecutive
		• Quantities
		• Delivery Status
		• Date and time of registration
		• Data validation list for:
		  ✓ Place of loss
		  ✓ Type of lost object
		In addition, new spaces will be added to:
		• Registration of those lost objects that are composed of several items of different natures.
		• Relation of specific data of debit or credit cards, or identification documents.

- Virtual Logs	N/A	They will be kept in Excel files that will be updated **automatically** in the software after the registration process.
C. Physical log Information desk	5 min.	**Note:** This step cannot be omitted.
- ¿ID Card?	N/A	The system will be indicated through the selection of a checkbox
D. ID digitalization	1 min.	Scan from the software of the ID that will provide: • **Automatic** adjustment of the measurements of the image. • **Automatic** attachment file to the next step.

Step	Execution time *	Improvements
- Sending informative email	20 sec.	This email will be previously indexed in the platform, and it will only take a click to generate it. It will be automatically connected to Outlook for pre-check.
E. Storage	10 sec.	Automatic printing of a sticker with: • Consecutive • Date • Place of loss.
Total	**8 ½ min.**	

* Estimated times of use of the platform. Method applied to all stages.

Since the destruction or withdrawal: In this stage, the unification of processes and documents will be evident, since the fulfillment of the objectives will be achieved by only using the platform.

Table 3. Design of the new MIS since the improvement to the destruction / withdrawal process

Step	Execution time	Improvements
- Type of lost object identification	N/A	The system will **automatically** identify if the lost object will be destroyed or withdraw and: • Generate reminders for deadlines. • It will allow to desist or destroy lost objects even if they are not credit cards or food at the beginning.
A. Destruction	10 sec.	Total automation of the process.
- Destruction minutes	N/A	The minutes will be generated **automatically** by the system, since its model will have been previously indexed, and will be updated by itself: • Minutes consecutive • Number of lost objects • Date • Lost objects description • Reason: Destruction A PDF file will be generated, which will keep the system saved as a backup and will provide physical evidence.
B. Evidence digitalization	2 min.	Scan from the software of the TC that will provide: • **Automatic** adjustment of the measurements of the image.

Step	Execution time	Improvements
		• **Automatic** attachment file as physical evidence.
C. Withdrawal	10 sec.	Total automation of the process.
- Withdrawal minutes	N/A	Apply the same improvements of step C.
D. Registration in storage files	5 min.	Automatic update of the delivery status. **Note:** Physical registration cannot be omitted.
E. Final disposition	N/A	N/A
Total Destruction	**7 $^{1/3}$ min.**	
Total Withdrawal	**5 $^{1/6}$ min.**	

Since delivery to entities:
Table **4**. *Design of the new MIS since the improvement of the delivery process to entities*

Step	Execution time	Improvements
- Identification of the Entity concerned	N/A	The system will **automatically** identify if the lost item will be delivered to an entity and: • Generate reminders for deadlines.
A. Letter of Delivery to Entities	20 sec.	The letter will be generated **automatically** by the system, since its model will have been previously indexed, and will be updated by itself: • Letter consecutive **(new)** • Entity identification • Date • Los object description A PDF file will be generated, which will keep the system saved as a backup and will provide physical evidence.
B. Delivery to CAD	N/A	CAD staff will be allowed to access the program. Just the "File" tab will be enabled and the information and delivery status of the lost item will be updated automatically with the corresponding letter consecutive,
C. Registration in storage files	5 min.	Automatic update of the delivery status. **Note:** Physical registration cannot be omitted.
Total	**5 $^{1/3}$ min**	

Since the return: At this point there is enormous evidence of how the activities that take place in the presence of the client are reduced to a few minutes.

*Table **5**. Design of the new MIS since the improvement to the return process*

Step	Execution time	Improvements
A. Identification of the lost object to be delivered	1 min.	The platform will have a specialized and advanced search engine, which will allow to locate the lost object quickly through: • he previously assigned consecutive, if the lost object has already been identified. • Filters by name, object type, date of loss, etc.
- Backup documents.	N/A	When authorizations are received via email, the new tool to attach backup documents will allow: • That the adviser in turn receives the authorization, locate the lost object and attach that authorization to its own file. • That the advisor who makes the delivery of the lost object at the time, will not have to search among hundreds of mail for the supporting documentation, since it will be already in the file of the lost object.
B. ID digitalization	2 min.	Scan from the owner or authorized ID application that will provide: • **Automatic** adjustment of the measurements of the image. • **Automatic** attachment file as physical evidence.
- Minutes of delivery or return	10 sec.	The minutes will be generated **automatically** by the system, since its model will have been previously indexed, and will be updated by itself: • Minutes consecutive • Number of lost objects • Date • Lost objects description
		• Who is delivered/returned to. A PDF file will be generated, which will keep the system saved as a backup and will provide physical evidence.
- Signature of owner or authorized party	N/A	N/A
C. Pertinent documents	1 min.	N/A

Step	Execution time	Improvements
D. Delivery of lost objects	N/A	N/A
E. Registration in storage files	5 min.	Automatic update of the delivery status. **Note:** Physical registration cannot be omitted.
Total	**9 ¹ᐟ⁶ min.**	

Since delivery to HR and Social Management: This is where the greatest positive impact of the system will be evidenced, since the reduction of time and effort will be cut almost to null.

*Table **6**. Design of the new MIS since the improvement to the process of delivery to HR and Social Management*

Step	Execution time	Disadvantages
A. Identification of objects to be delivered	2 min.	As a novelty, the platform will have a section or tab created specifically for the delivery of lost objects that have completed 90 days without being claimed or delivered. For this, it is possible to: • Select the range of time in which those lost objects that have been received must be delivered.
		The system will **automatically** select the lost objects whose delivery status is "Not Delivered"
- Delivery or return minutes	1 min.	The minutes will be generated automatically by the system, since its model will have been previously indexed, and will be updated by itself:: • Minutes consecutive • Number of lost objects • Delivery date • Lost object description • Type of lost object A PDF file will be generated, which will keep the system saved as a backup and will provide physical evidence.
B. Lost objects delivery	N/A	N/A
C. Registration of storage files	5 min.	Automatic update of the delivery status. • **Note:** Physical registration cannot be omitted.
Total	**8 min.**	

The training process for the implementation of the application will be initially imparted to the personnel considered operational in the management of the system, and through them the personnel of the other areas and departments will be trained. Also, the platform will provide a system of secure access, for the protection of information, ensuring that only the users indicated can reach the data that each person, from their area and position, concerns; the application will require a user and individual passwords, for the purpose of generating signature feet, registering activities and sending information.

In addition to having a simple interface developed based on the tools of Macros in Microsoft Excel, with 6 categories or work tabs: New registration, Search, Delivery to entities, Donation (for HR and GS), Profiles Creation (for the inclusion of new entities) and **Generation of Reports**. This last tool points directly to the interest of senior management, and will allow them at any time to obtain a detailed and graphical summary of how effective the process of handling of lost objects is at the level of delivery rates.

Conclusions

The advisors of the Customer Service unit, as stipulated in the charge profile, are responsible for the correct administration of the Lost, Received and Delivered Objects at the airport facilities. But it should be noted that the customer service department not only performs this activity; among its many tasks, some tasks to be mentioned are: advisor of collections and billing as a support, a full-time informant for the airport community, eventual management of the corporate switchboard, performs administrative tasks such as generation of referrals, purchases requisitions, contacts with suppliers, follows-up to tasks, and others that are added to the list.

Once each of the phases of the management of the Lost Objects was evaluated, the following concern arose: What type of Management Information System of collection and management of the reception, storage and delivery of lost objects in an airport company is efficient to be applied? And, in this way, the theoretical design of an application was made possible in response to this question. Concluding that the adoption of new technologies for information processing, and achieving the unification of processes and the automation of the simplest tasks, are the north and the base on which this MIS should be built for the company.

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