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PROACTIVE MANAGEMENT AND INTERNAL AUDIT PROCEDURES IN AIRPORTS USING BI SOLUTIONS

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Abstract: *The paper presents the benefits of implementing a BI system in an airport, on the management and internal audit levels. Airport BI solutions include business performance management and internal audit tools, as well as aeronautical statistics and business planning, simulation and budgeting, and imply a good understanding of the airport environment, operations and documents flow, security standard application, reporting requirements, internal control and audit procedures. The deployment of BI integrated solutions create a proactive management, being involved in the business decision making processes and by embedding internal audit modules, they are bringing greater transparency and efficiency for continuous assurance, risk assessment and management.*

Keywords: *airport BI, internal audit, pro-active management, ERP, AODB*

1. INTRODUCTION

The availability of reliable information anytime and anywhere is one of the major requirements in airport operations today. Numerous parties - internal departments as well as partner companies, humans as well as devices - depend on exact real-time information to perform their tasks in the integrated airport business processes. The main objective of a BI solution is the assurance of availability and integrity of operational data and of controlled access to the right information for all concerned parties.

Due to the dynamic nature of air traffic, continuous increase of the air traffic volume, and therefore data, the growing number of business partners requiring identical information in a timely manner, and the fact that airports need to use limited resources more efficiently, a high degree of flexibility and overall business requirement coverage within a single solution are important features for any airport IT systems.

2. PROACTIVE MANAGEMENT

Being proactive in management is a must in businesses where changes are frequent and is always a challenge to increase or maintain market share. A performant management involves constant study of the market place in order to adjust to trends before they occur helping meet customer demands before they're fully materialized. Implementing proactive management means

changing protocol, updating marketing materials, updating the storefront or adding services or products prior to customer asking.

A proactive airport management requires an ongoing expense for research in the form of customer surveys, data mining, and general market research as well as any expense associated with implementing the change.

The managerial revolution is connected both with the change of management and with the management of change. Change of management refers to identifying methods and techniques to organize the sharing, exchange and use of knowledge (Takahashi and Vandenbrink, 2004). This implies management through learning, emphasis on processes, excellence and not relative quality, networking and interdependence, transparency, and promotion of discomfort that leads to creativity (Moss Kanter, 2006). Management of change, as Moss Kanter (2006: 14) states, may be put into practice on three levels: (1) change projects, which are meant to solve a particular problem or need; (2) change programs, which are interdependent projects meant to strongly influence the organization; and (3) change (learning) organizations, which create the capacity for innovation and continuous improvement, through the desire of change. In such organizations, learning, innovation, collaboration and change are the main drivers of their activity.

Knowledge is the fundamental source of competitive advantage within the knowledge-based society and the core driver for innovations in service organizations. It is brought about by the transformation of information, by making sense of data. Thus, information becomes really important for both service organizations' managers and their clients, as it allows them to make relevant, coherent and fast decisions. Furthermore, the speed of information exchange, the accessibility of information, the search possibilities and storage of information are significant factors that contribute to a rational decision-making process. However, information overload may fail to influence the decision-making process in a positive way, due to the abundance of irrelevant details.

Therefore, it is important to carefully and effectively manage information by taking into account perceptions of the value of information (Dubosson and Fragniere, 2008). If the information is perceived as being valuable we may assume that the response to that information will be prompt. This will result in an amplified innovation capacity, flexibility and adaptability to market requests. The periods of time needed for innovation and dissemination of innovation have become increasingly condensed due to the speed of knowledge, products and technology renewal and due to the contemporary instantaneous connection possibilities to new information.

Development of information and communication technologies has created the premises for better collaboration and communication between service organizations, on one hand, and between them and their clients, on the other hand. It has facilitated the delivery of global services and thus, service providers perform in a global environment, confronting new opportunities for profit while facing world-class competitors (Cunningham et al., 2004: 421).

Information and communication technologies can offer the degree of flexibility and adaptability of services to the clients' needs. Moreover, if effectively integrated in the service process, new technologies could actively support the development of strategies related to innovation, collaboration and value co-creation, playing a key role in providing competitive services (Zamfir, 2010).

3. PROACTIVE INTERNAL AUDIT

Progress of every company decisively depends on the efficiency of use of her own human, natural and financial resources. Internal controls are put in place to keep the company on course toward profitability goals and achievement of its mission, and to minimize surprises along the way. Obtainment of a growing profit may be guaranteed by reduction of incertitude and risk assumed in the economic activity. If incertitude should not exist all elements that

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lead to profit achievement would be known, the economic companies will have the certitude that incomes are higher than expenses. This will lead to an increase in offer in comparison with the demand thus assuring an equilibrium between incomes and costs, making the profit null.

In reality the incertitude generates profits and risk existence and they do not become null due to competition. As in a world without incertitude profits and losses would not exist, we may consider that profit or loss are a consequence of incertitude.

Internal auditors play an important role in evaluating the effectiveness of control systems, and contribute to ongoing effectiveness. Because of organizational position and authority in an entity, an internal audit function often plays a significant monitoring role.

A proactive internal audit programme will be focused on corporate and business unit goals, strategies and risk management processes, will identify risk areas and continuously monitor the company's risk profile.

Internal auditors do not just audit control activities, they also monitor a company's risk profile and play a key role in identifying areas to improve risk management processes. How the company manages the business risk from all the changes required by the proactive management is critical to success.

4. BI IN AIRPORTS. CASE STUDY SKY-BASE BY SAP® ERP

A powerful BI solution will include business performance management and internal audit tools, as well as aeronautical statistics and business planning, simulation and budgeting. Setting up the technical specifications for development of a BI solution for airports, implies a good understanding of the airport environment, operations and documents flow, security standard application, reporting requirements in assuring compliance with the international standards for generating real-time information, internal control and audit procedures (figure 1). Most software developers divided that technical information in operational and management information, generating specific software solutions.

Figure 1 **Factors affecting the development of BI solutions for airports**
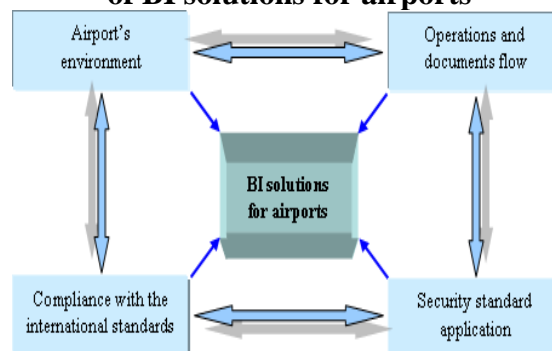
The operational system is referring to the airport operational database (AODB). The *Airport Operational Database (AODB)*, is a central information source which can be shared among many applications and be distributed to other users.

The operations managed by AODB refers to: Communication, Navigation and Surveillance (CNS), Collaborative Decision Making (CDM), Digital Audio and Radar Recording and Playback Systems, Aeronautical Information System (AIS/AFTN), UHF/VHF Communications, Voice Communication systems, Integrated Display Systems, Display Server & Graphics Visualization, High Bright LCD Displays, ATC Services, Training and Simulation Systems.

The Airport Operational DataBase (AODB) is a determinant factor for the business success of an airport, providing accurate real-time information to all customers and business partners, particularly in the aircraft traffic sector.

The management system is reffering to the airport business processes and data and is represented by the *Enterprise Resource Planning systems (ERP)*. ERP systems integrate internal and external management information, facilitating horizontal and vertical integration of business processes across an organization via a synchronized suite of software applications (Hunton et al., 2004).

Depending on the integration level between operational (AODB) and management system (ERP), there are two main strategies in building BI solutions for airports.

An integrated solution allows uploading flight data from an AODB and making the data available for pricing, invoicing, audit and reporting. It is vital that the software solution can offer flexible functions for the modeling quantitative variables of the airport operations and management (charges for landing, passenger, luggage, parking, infrastructure, movements, passengers, destinations, flight data, ground handling agreements) and processes. The main software solutions available offer statistics application module reporting results, capabilities, traffic variables, and historical events, both for internal and external official users, in real-time and on a detailed level.

The embedded ERP module include tools for financial processes, billing, financial and managerial accounting (cost center, profit center, product costing for airport services and ground handling and profitability and ratio analysis), and internal audit.

The internal audit IT solutions goals are bringing greater transparency for continuous assurance and performance and their success is dependent upon the effective use of technology tools. The solutions achieve their goals by 1) monitoring a system's global configuration settings, access controls, and rules that define the parameters of how an event or transaction can be initiated, processed, and recorded, 2) creating rules and

tests run against the actual flow of transactions, identifying exceptions, anomalous patterns and trends, or other outliers that represent risk or are contrary to expected measures of performance such as key performance indicators (KPIs), and 3) providing historical or emerging trends evaluation within risk and performance areas, allowing management to increase business performance (Sabau et al., 2011).

The software solution presented in this study is SKY-Base by SAP® ERP ("Powered by SAP NetWeaver").

The SKY-Base system, using the SAP® standard functions and based on an Oracle database, is developed on two different applications AODB and ERP, offered separately and also as an integrated solution (figure 2). The integrated solution is currently and successfully used by Copenhagen Airports A/S (a multi-airport operator managing Copenhagen and Roskilde airports), Stuttgart and Baden airports.

Figure 2 **Airport BI ecosystem**
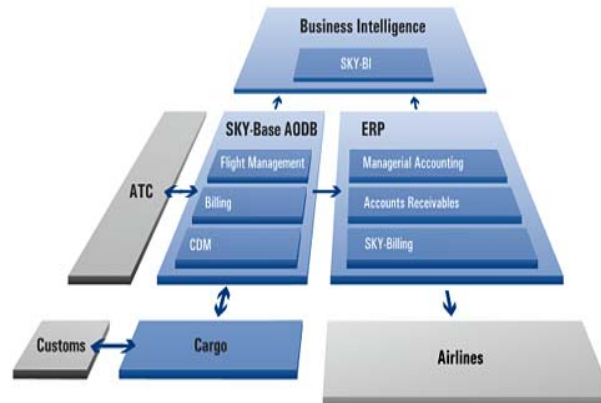
(*Source*: ISO Software Systeme GmbH, n.d.)

It allows operational, management, statistical, audit, and controlling tools in the real-time distribution and reception of all relevant information to and from external systems. The particularity of the integrated suite of modules is the **SKY-Connect module**, used for exchanging information with other software systems in and around the airport. The module supports virtually 100 interfaces to 3rd party systems of the airport operators, to external business partners or to public information platforms and can be individually

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customized for an airport to the local requirements. The **SKY-Connect** may interface with **SITA-Server** (sending, receiving and processing of standardized IATA message formats via SITATEX), with various Flight Information Display Systems **- FIDS** (offering up-to-date information for passengers and airport staff), Resource Management System – **RMS**, Airspace Monitoring System – **AMS**, Extended Airline System Environment – **EASE**, **XML4aero** (supporting electronic billing and setting standards for the electronic exchange of business data between airports and airlines) (ISO Software Systeme GmbH, n.d.).

Many providers consider that implementing various modules of different software will not increase quality and efficiency of the operations and management, but only will multiply interface issues.

5. CONCLUSIONS & ACKNOWLEDGMENT

The deployment of BI integrated solutions creates a proactive management allowing to easily forecast and evaluate different scenarios (best case / worst case / most probable case), and increasing performance. By offering a suite of tools for planning and budgeting airport charges and revenues using historical data (seasonal flight schedules and anticipated seat load factors), BI solutions are also involved in the business decision making processes

Progressing from various, complex and separately IT systems to a fully integrated suite of business applications supported by a single database is already providing numerous benefits both for the airport employees, and for the customers, being considered „the key to supporting business growth successfully"

(Šebánek, 2008).
Implementation of an integrated BI solution in an airport will save time and reduce operational costs, maintain excellent levels of customer service, streamline information flows and enhance efficiency, productivity, and competitiveness.

Correlating the organization's needs, goals and strategies with a matching comprehensive suite of IT tools is the key for implementing proactive management and internal audit procedures, for achieving business performance and protecting the organization's exposure to liability and litigation.

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