TOURISM MANAGEMENT INFORMATION SYSTEM BASED ON MOBILE TECHOLOGY

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Abstract

This work is to provide an efficient solution to take advantages on this gigantic mobile users market with millions of people, for increasing business in tourism. TMIS based on mobile technology architecture, integrates first of all modules already present in known PMS – Property Management Systems for Hotels, for example Amadeus, Medallion, Fidelio, Probrooker. Such modules are: Reservations, FrontDesk, Food and Beverage, Housekeeping, POS, Day Closing, Accounting, RSM - Revenue Management Systems. A second category of modules belongs to the approaching the hotels from the Mobile Enterprise point of view. It's about the ERP modules, Supply Chain Management, Sales and Marketing, Financial, HR, Warehousing and Inventory Control, DMS – Document Management System. The third category are those modules used as software support for the Management of the Hotel as Intelligent Entity for controlling and reducing the energy consuming and hotel services integration and personalizing, according with the profile and requirements of guests and the scope of travel.

Enabling the clients, suppliers and other partners to access and use the hotel information system from mobile devices is a way of increasing efficiency by achieving the specific objectives from tourism and economic business area of interest. For example, increasing numbers of reservations, improving the client clustering and forecasting, a more flexible operational management of booking and using the hotel services and payment facilities. All this are focused on reducing costs with keeping services quality standards and maintain the business profitability status.

TMIS software architecture is based on four components: 1) the RDMS for storing, updating and querying data, Oracle for example, or MS-SQL Server; 2) the GUI friendly and customized; 3) the Business Applications Programs according to the hotel management requirements; 4) the Mobile Applications based on Oracle Database Lite Family which includes multi-devices users sharing and file based synchronization

The most important characteristic of TMIS is that the TMIS is an On-line Interactive Business System powered by the mobile technology using the mobile connections to the hotel network via Internet and Media Gateways.

Key words: *Tourism Information System, Mobile Information System, Mobile Enterprise, Intelligent Hotel, TMIS Architecture*

JEL*: M15*

Theme: *Information and Communication Technologies in Tourism*

1. Introduction

The IT&C technology always was a factor of developing the performances of the tourism management and especially in the hotelier branch where, together with new solutions taken up in constructing and updating the buildings intended for the resorts brought on the market the concept which is called *intelligent hotel*.

The intelligent hotel transposes into practice two categories of objectives. On the one hand the objectives followed by the intelligent buildings' projects, mainly the costs' reduction, firstly the energy costs, then the complete control and the alert in an effective time concerning the elements and the actions from a building.

The second category of objectives includes the objectives characteristic to the hotelier business management. In this branch are already known the incorporated software systems Amadeus, Gallileo, Medallion, Fidelio or Probrooker, based on the CISCO connecting solutions and LAN Wireless network technology.

The investigation efforts were oriented towards the study and analysis of some solutions of developing the

managerial activity's efficiency on the basis of developing the informatics system performances for the hotelier management. The direction towards we were heading for is represented by the exploitation of the gigantic potential of the market of mobile telephony users, which counts millions of people. The managers from the tourism industry are not the only ones interested by this market to transform the potential clients in existing clients and then in faithful clients. From the on line reservations, on line payments, communication and advertising, the mobile phone becomes a cheap, fast mean available in a big number, for the business expansion and developing the quality of the relations with the customers, even in today's hostile conditions when the national and international economic environment is confronting, because of the globalization, the effects of the financial crisis, but other negative phenomenon caused by terrorism, military conflict, inter-ethnics, inter-regional and even intergovernmental tensions.

Our concerns are headed first of all towards defining the general functional architecture of the informatics system named ***TMIS***– ***Tourism Mobile Information System***, which incorporates three components:

-the informatics system for the economic business transactions;

-the informatics system for the building management;

-the mobile informatics applications for the management of the interfaces with the WAP clients.

In defining the mobile informatics system applications we took into consideration the analysis of the specific problems for the projection of MOBIS - Mobile Information System - by Goker and Myerhaug (Goker2008). The architecture definition materialized through establishing the system's objectives and its compounding modules. Next we analyzed the technical architecture of the TMIS m identifying the development particularities of the system software platform through integrating the specific software of the MOBIS applications together with the software modules belongs to the informatics systems already known and implemented in multiple hotelier chains, such as Amadeus system.

2. Tourism Mobile Information System – objectives and architecture

The development of the informatics system based on the mobile telephony use is in accordance with the most important technologic trend of the consumers' market current evolution. The mobile telephony's technology is improving fast under the pressure of satisfying the interpersonal communication necessities and private entertainment. The development of the mobile informatics systems is one step behind due to the lack of some methodological standards approved on a large scale and a scientific literature established to this domain, especially for the economic informatics segment. The applications number is increasing and these are retrieving in the statistic survey achievement, for accessing some general concern information, the currency's progress, the banking indices' progress, the limited banking bargain, the marketing influence automation.

The experts' present concerns are headed for developing the informatics applications based on the mobile telephony for solving some professional tasks, like the ones from the domain of customers relations management, of following the merchandise transports, the human resources management.

The mobile informatics system realization must take into account the frequent modifications of the context in which progress the mobile telephony users, presented in the FIP TC8 Working Group conclusions. It's about the temporal-space context, the personal context, the context of the working activities and tasks, the informational context and the social context.

An analysis of these features is relevant for establishing the content of the interfaces of accessing and interactive communication between the users and the informatics system. Consequently we talked about the following users' system categories:

- the tourists, where are included those tourists who already have a reservation, then the tourists who were the hotel's guests and the anonymous tourists, potential clients who prospect the hotelier services market, with the intention to make a reservation;
- the partners from the hotel business chain, providers, transport companies, firms which offer touristic

services, cultural societies, the local administration organizations;

- the own staff, the employee and the managers.

TMIS is prefigured as an *Mobile ERP* system, consisting of a collection of on line interactive applications, functioning on the basis of a large band mobile communications - mobile broadband communications, essential for the mobile telephony networks with GPRS and UTMS connected to the Internet network through multimedia gateways.

2.1 Objectives

The main objective of the TMIS realization and implementation is represented **by the growth of the tourism activities efficiency, of the hotelier management and of the customers relations quality**, in our case the tourists. For the managers the main problem is represented by the *costs reduction and the growing the profit turn-over, growing the profitableness.*

Correlated with this main objective, for TMIS is registered a first specific objective, namely *reducing the risk of rooms un-occupancy* through insuring the interactive communications with the tourists who already made reservations and even with the ones that visit occasionally the site.

We also included among the TMIS objectives *the growth of the clients' fidelity indicator through* a better information processing regarding the client's profile, both the individual clients and the organized groups, creating a Data Warehouse with all the information collected, stored and updated starting with the moment of the reservation.

The tourists profile Data Warehouse and the information about tourists as a regular consumer allow the implementation of BI – Business Intelligence applications for supporting the decision processes for increasing the efficiency of the Food & Beverage, SPA, Wellness departments and so on.

Even more, the *complementary services offer* can be improved through providing medical treatments, physiotherapy services, in sanitary units from the local area, for the tourists who can't interrupt these treatments, such as those that must do periodic dialysis. These, and others like them, can therefore to spend normal a holiday in an hotel.

We add an objective from the list which is besides big enough, that is *improving the flexibility in relation with customers* especially towards payments for the hotelier services.

We take into consideration not necessarily the on line payment through direct e-banking services, but the possibility of paying a sum of money in advance, at the moment of reservation, and eventually the rest of money payments in installments until arrival, and for some categories of customers even the payment also after the sejour closure. This way are encouraged the group tourism, increasing the incomings for the banqueting sector, and longer sejours. Also, associating the flexibility with the relations interactivity with the customers and partners is insured a bigger cohesion of all the participants on the hotel's business chain, what offers a feeling of stability, safety and confidence for all the actors from this business environment.

We won't talk about those objectives that are specific for the relations with the classic business partners, suppliers, transport companies, firms which offer services, repairs and maintenance, cultural and ecumenical institutions, which are necessarily taken into consideration by the developing of any type of informatics system for the hotel management.

2.2 The functional architecture

The functional architecture of the TMIS system represents the materialization of the informatics system's conception as a whole. The functional architecture establishes component modules, their assembly, the modules functions, which will constitute the structure on which the system is being build, the structure from which they start the realization of the software applications ensemble which finally represents the informatics system.

The functional architecture of the TMIS system has as a starting point the general structure of the classic system of hotel management, from those category which are already in function with remarkable results in many

hotelier chains, such as the Amadeus, Medallion, Fidelio, Probrooker systems.

These complex systems have in their general structure, hardware and software components to support the building's management and respective to support the business management, decision process on the economic area of problems, centered on tourists and the business partners.

TMIS integrates in the general structure of such system a group of software applications which can be launched by the mobile phone users by accessing and registering on the hotel's website. We will mention next, only the modules which implicate the management of the relations with tourists, without approaching the issue of the business partners' access, who is not a novelty anymore.

The tourists' users of the TMIS will have at their disposal the following informatics modules for interacting on line with the incorporated system of the hotelier management:

MVT – Mobile Visiting Tour, to cover a short tour of visiting the hotel, an video clip, which at present, at many hotels, is available only on the room TV systems;

MDD – Mobile Direct Booking, for effectuate a reservation straight on the hotel's website and improving the facilities of interactive direct communication, hotel – client, for stimulating the demand using the personalized presentation of the services offer, of the discounts, of the facilities of supplementary payment, medical assistance, physiotherapy, assistance and entertainment for children and elderly, even for persons with some disabilities.

MCHK- Mobile Checking, to allow to the customer to store and to keep track the data both at the starting of the sejour – **check-in,** and at the leaving moment, **check-out**; for example the room number, the hotel's phone number, the country's emergency phone number, an auto service, the currency at the present time, possible modifications of the initial booking data, period, tariff, and at the end, the tourist can visualize his costs list, during the sejour, such un electronic bill content, an roll-back inventory of all the services claimed and invoiced by the hotel or other firms. These data are also used through the Data Warehouse of the tourists profile, by the RMS – Revenue Management System. This system allows the analyses of the individual customers, of the groups, from the moment of the reservation until the moment of leaving, for improving the selling and the marketing decisions, using reports on segments, on canals, countries, or rooms' types, on tourism agencies , the system watching the trends of reservations and long sejours.

MESA – Mobile Events & Services Agenda, is the application for planning the events, such as traditional festivals, local celebrations, religious celebrations, booking tickets for spectacles, sportive manifestations, restaurants, tennis courts, car rentals, medical treatments appointment and physiotherapy, etc.

MMR - Mobile Medical Record, for registering the minimum medical data necessary in case of accidents and some supplementary data for the persons interested by carrying on some medical treatments or physiotherapy during the holyday;

MGRE – Mobile Guest Revue, for effective registering of the tourist's notes and remarks about the rapport quality - price of the services offered by the hotel, calculating the customer's satisfaction index.

These modules functionality is assured through the technical architecture built-up having as a fundament the powerful hardware and software platforms of the established informatics systems developed on the solutions offered by Oracle or Microsoft.

2.3 The technical architecture

The technical architecture of the TMIS must be compatible with the host system architecture, because it is realized as an extension of the software modules on the applications servers for processing the economic data. The servers for economic applications process the collecting information, storing and updating the Data Base, communications of data, fax, voice, and images .

TMIS is designed to use two levels of module:

- front office module;
- back office module.

Through the front office module, TMIS accepts the connection of users from mobile terminals such PDA PALM, Pocket PC or Smartphone mobile phones, which admit the data transfer through Global System for Mobile communications – General Packet Radio Services GSM – GPRS or CDMA. The actual versions of operating

systems for the mobile phones, Symbian or Mobile Windows, give users the possibility of working with versions for Opera and Internet Explorer browsers. The registered users are connected to the general system from where through the back office module has access to the informatics system's functions.

The system at the back office level operates with three modules:

- DAM, Database Administration Module, based on Oracle, MS SQL- Server or Informix;
- CIM, Client Interface Module based on the Windows Operating System and the developing tools of Object Oriented Programming Languages, for example Visual Basic GUI;
- DPM, Data Processing Module based on using the functions of the C++ or C#.

This technical architecture allows the real time connection of the terminals with the Database Management System and the bidirectional transfer of information between all three categories of actors involved in the processing of data, respective the hotel, the tourists and the business partners of his business chain.

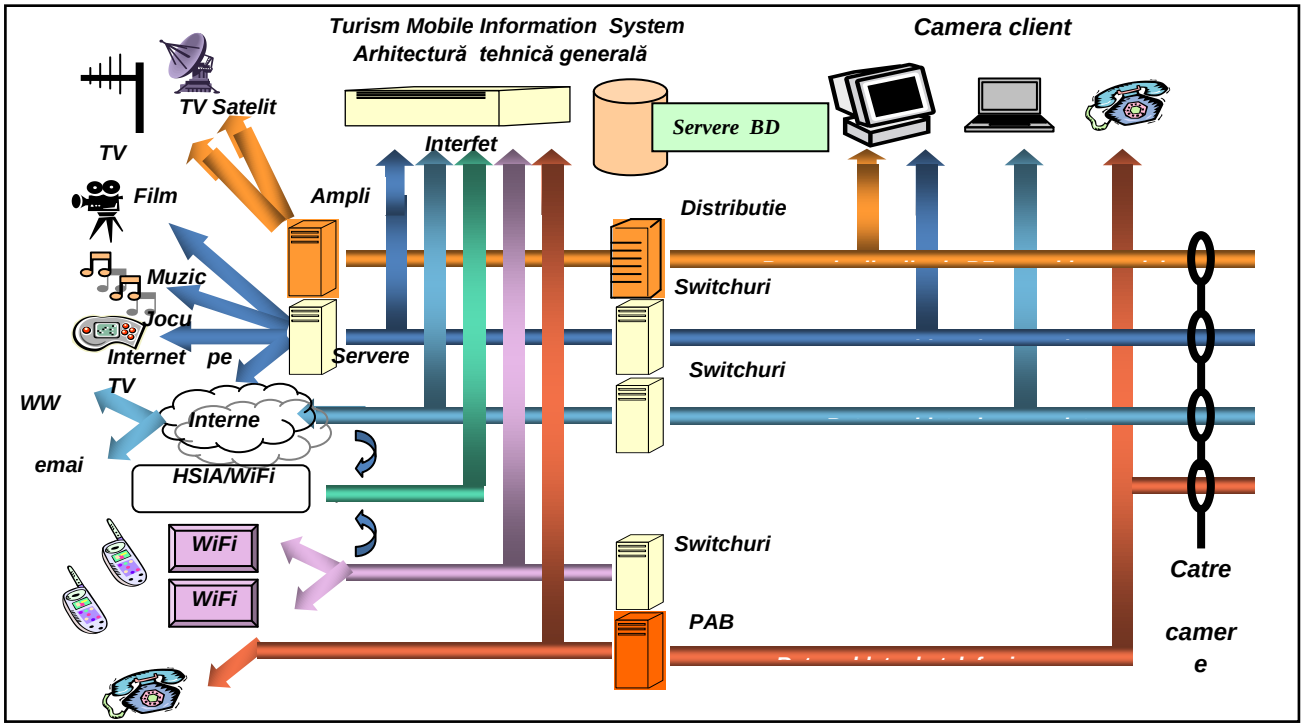

Fig. 1 TMIS – General Architecture

2.4. Information orthogonality in mobile applications for TMIS

The orthogonality is the concept which deals with the identification of the level of similitude of the concepts implemented in different domains of activity.To study the orthogonality are defined series of indicators which analyse the differentiation degree of the concepts and materials which make the object of the studied domain.

In the case of the mobile applications in tourism the orthogonality finds its applicability in studying the level of similitude of the information processed with the help of the mobile technologies and in establishing the way in which applications and implemented technologies cover the demand of presenting and adapting the information.

Through the implementation of the orthogonality concept is intended the growth of originality of the presentation information and the growth of their utility level through building concepts starting from the real domain

founded in the users attention.

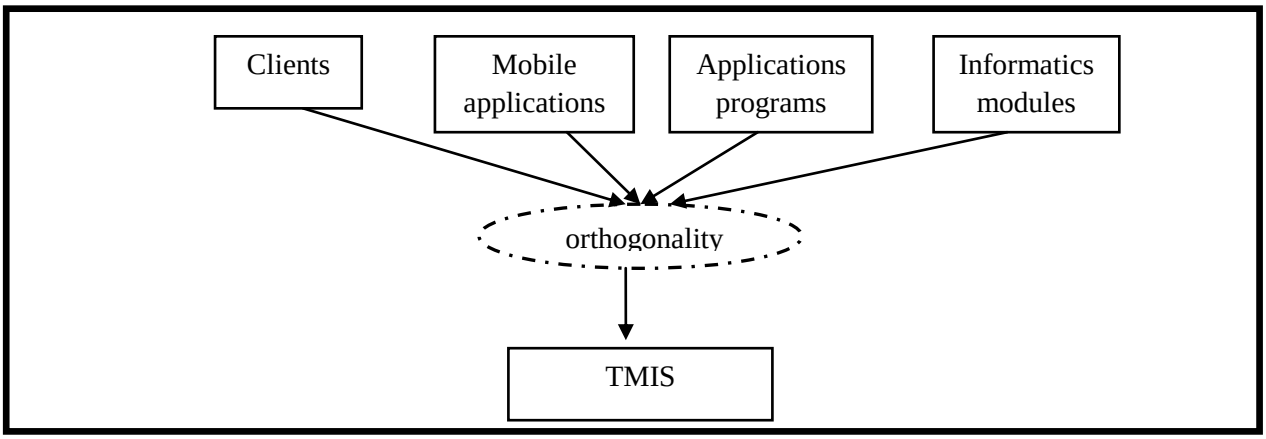

Fig. 2 The role of orthogonality among the TMIS services

Constructing mobile applications which don't find an activity object or which don't satisfy precisely the demanding which were made, although are respected the criteria which lay at the basis of their creation, leads to an reduced efficiency of the concept.

The orthogonality is studied on the basis of the orthogonality criteria. With the help of this criteria are emphasized the characteristics that have the same value for the studied entities and are determined the similarity levels.

The orthogonality criteria which are taken into account for studying the mobile applications' orthogonality are:

- the informatics content delivered with the help of the mobile applications;
- the applicability degree of the implemented concepts;
- the level of belonging of the processed information at the reference domain.

The informational content is studied in order to establish to what extent the information specific to each customer were taken over and stocked in an accurate manner. The applications and the technologies mobile in tourism are dedicated to offers' personalizing depending on the criteria and demanding of each client. It is realized in this manner an personalized offer adequate to each customer.

The applicability degree of the implemented concepts study the modality in which the mobile applications succeed in realizing the demands for which were build. The concept implementation offer a general view over the manner of realizing the application, over the manner of how interact the components and supply solutions for improving the application and for growing the integration degree of the component elements. The orthogonality identifies those components of the applications which must be revised in order to grow its efficiency, on the basis of the orthogonality criteria.

The orthogonality analyses the informatics application both from the point of view of the internal components, and through comparing with the external applications. The concept's implementation offers a general view over the manner of joining the component modules, over the manner of realizing the application, as well as over the manner of how the components interact and deliver solutions.

3.Conclusions

The tourism is a main component of ones country economy. Designing new technologies which allocate the resources existent in tourism contribute to the services improvement. The mobile applications optimize the activities from tourism and contribute to the development of the resources using level. Securing the mobile applications is a main condition for their implementation in tourism.

The managerial solutions' development in connection with the difficulties existing in the domain leads to improving the services from tourism and increasing the degree of satisfying degree of the customers.

The utilization of the IT&C technologies in managing the activities from the tourism domain assures, besides a more efficient resources allocation and implicit a reduction of the costs and succeeding times of the activities, and a diminution of the time that the customer is obliged to allocate for interacting with the administrative staff of the services offering.

Using the mobile technologies, the customer can schedule his spare time in a practical manner, through eliminating the wastages of time dedicated for the documentation about the places that he wants to visit, the programming of the means of conveyance, the periods when he wants to effectuate the visits and, the most important, the risk that once he reaches the wanted location he won't be able to visit it, because of organizational causes.

Also, inside the hotel, the customer can benefit of all the existing facilities, can make a programming for all the available services, can accumulate material about the existent treatments programmes, for relaxation, for entertainment.

Using a mobile with an operating system compatible with the application existent in the hotel, it can be said that, the client has the world with a simple click.

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