SYSTEM APPROACH TO TRAINING OF MANAGERS OF AVIATION ENTERPRISES IN INFORMATION SOCIETY

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ABSTRACT

The article considers the modern approaches to formation of professional information competence of managers of aviation enterprises on the basis of application of modern information technologies used by airports and airlines to improve profitability and the level of loyalty of the target consumers of air transport services in educational process of the air transport university.

Keywords: civil aviation, aviation enterprise, information society, information technology, information systems, air transport university, information competence.

Background. *In modern information society, which is characterized by a high level of development of information and telecommunication technologies and their intensive use by citizens, businesses and public authorities, the information acquires the status of a strategic resource, and information technology (hereinafter – IT) obtain a global character, covering all spheres of social activity of a person.*

Civil aviation is one of the branches of the Russian economy, traditionally uses the most advanced technology and possesses a high degree of informatizaton of management processes. Therefore, in the information society of particular importance is the problem of formation of the graduates of aviation universities, enrolled in the management areas of training, information and analytical competence to ensure strategic compliance of the human capital of aviation enterprises with requirements, determined by a highly turbulent nature of the external business environment.

One of the major reasons for a low efficiency of aviation enterprises, leading often to the withdrawal from the air transport market, is a weak information support of solution of tasks of analysis, planning and management of material resources and passenger traffic, as well as the lack of integration of IT of airlines in the global systems of related industries – hotel reservations, car rental, travel portals, payment systems, and others [1].

Heads of Russian airlines are well aware of the strategic importance of IT in the face of increasing competition. Proof of this is, for example, Strategy of «Aeroflot» group for 2015–2020, which considers the extension of functionality of enterprise management information system as one of the priority areas of investment [2]. This position is fully consistent with the global trend. According to SITA company, which is the market leader in the specialized information technologies used in the airline industry, the size of investments of airports in information technology in 2016 could grow by 64% compared to 2015 [3]. Implementation of IT solutions aimed at improving the passenger service procedures are called by nearly three-quarters of the airports (73%) as their paramount plans.

Objective. *The objective of the authors is to analyze the existing systematic approach to formation of competencies of aviation managers related to information systems and technologies.*

Methods. *The authors use general scientific methods, comparative analysis, evaluation approach.*

Results.

Information technology and systems used in civil aviation

Information technology and information systems (hereinafter – IS) used in civil aviation, are aimed at solving the dual task of improving operational efficiency and ensuring the loyalty of airline passengers based on the quality of service offered to them, and can be divided into two groups:

- *information technology (systems) of general purpose, used to improve management efficiency of an aviation enterprise, as well as of any other kind of commercial activity;*
- *specialized IT, used only in the air transport industry.*

The first group includes such classes of IS, as:

- *ERP (Enterprise Resource Planning);*
- *CRM (Customer Relationships Management);*
- *BI (Business Intelligence);*
- *BPM (Business Process Management);*
- *PM (Project Management).*

These classes of information systems are actively used by the overwhelming majority of airlines, as desktop software for managers at all levels.

In the long term, given the current trend of consolidation of airlines, management of which requires the use of methods of strategic and corporate management, we should expect close attention of top management to such classes of IS as:

- *CPM (Corporate Performance Management; an alternative name – EPM Enterprise Performance Management);*
- *PPM (Project Portfolio Management);*
- *GRC (Governance, Risk, Compliance).*

The data on the practical application of IS of general purpose in Russian and foreign airlines are presented in Table 1 [4].

As the analysis of the table shows, currently the bulk of airlines uses IS of Western manufacturers (SAP, Microsoft and Oracle).

ERP-systems are also used in resource management of most airports [5].

However, the increased cost of ownership of imported ERP-systems in connection with the growth of Western currencies exchange rates has led to the fact that in Russia the opinion «1C is our all» is gaining more and more popularity. As of the end of 2015 the number of implementation projects of 1C: ERP in Russia was comparable to the number of SAP ERP implementations [6]. And system 1C: CRM in the Russian market in 2015 ranked third in popularity [7].

Besides the economic aspect IS selection is affected by the problem of information security of the state, which in the airline industry is very acute. In light of the anti-Russian sanctions the Russian government has declared a policy of «digital sovereignty» – import substitution of products in the field of information technology [8]. Russian companies are increasingly acquiring software from domestic producers, considering the import substitution in the IT field as a preventive measure in the event of imposition of sanctions by Western countries [9]. Possible variants

of import substation in IS of general purpose are shown in Table 2.

The specialized IT used only in the airline industry include information systems and mobile applications, providing automation of business process of airlines, as well as providing passengers with a complex of information, including mobile services [10].

Analysis of the requirements of the federal state educational standards to information competence of managers

To determine the content of the educational process of the university on formation of information competence of managers, it is necessary to compare the relevant requirements of the federal state educational standards (FSES) with the purpose and functionality of IS of different classes (Table 3).

Analysis of Table 3 leads to the conclusion that FSES of training program 38.03.02 «Management» implies the need for a comprehensive study of IS ERP, CRM, BI, BPM, PM in the university. The question of studying specialized IS (IT).

At the same time, the analysis of the information provided on the official websites of the leading universities that train students in the program 38.03.02 «Management», shows that not in all universities a systematic approach to formation of information competence of students is implemented, involving a comprehensive introduction to the educational process all classes of IS, shown in table 3.

The main reasons for this situation are:

• insufficient number of university teachers, who are equally competent in information technology and management techniques;

• isolation of the teaching methods of modern information technologies on the solution of practical management problems and, as a consequence, very little motivation of future managers to master information technology in the walls of the university;

• lack of sufficient time in the training curricula to study IS;

• insufficient use of opportunities provided by university programs of IT companies;

• constant backlog in equipping universities with modern computer equipment and software.

Some practical recommendations on organization of formation in the university of information competencies of airlines' managers

For introduction of the study of modern IS (IT) in the learning process of students it is necessary to answer key questions, such as:

1. Who will teach the relevant subject matters?

2. How to organize the study of IS within the curriculum?

3. On the basis of what software the training will be performed, and how to access them?

Solution of the problem of formation of managers' information competence is possible only in case of a systemic understanding of the teachers, holding classes in IT disciplines, management information needs, which, in turn, requires a deep knowledge of modern management techniques by them in areas such as strategic management, financial management, marketing, accounting and management accounting, budgeting, management of projects, human resources, investment, risk, audit etc.

The best solution to this problem would be to attract to teaching professionals with practical experience in the use of different classes of information systems in solving business problems. However, this approach is difficult to be implemented due to incomparably lower remuneration levels of teachers in the majority of Russian universities in comparison with the level of wages of skilled professionals in the business.

Table 1

Use of IS of general purpose in Russian and foreign airlines

Company	Country	IS
Aeroflot	Russia	SAP ERP Oracle Siebel (CRM)+ Oracle Airline Data Management (BI) ARIS (BPM)
VIM-Avia	Russia	SAP ERP
GTK Rossiya	Russia	Microsoft Dynamics Axapta (ERP)
UTair	Russia	SAP ERP
S7 (Siberia)	Russia	Oracle E-Business Suite (ERP+CRM)
Air France	France	SAP ERP
Air India	India	Oracle E-Business Suite (ERP+CRM)
Alitalia	Italy	SAP ERP, SAP CRM MicroStrategy BI
American Airlines	USA	SAP ERP Infor CRM Epiphany
Austrian Airlines	Austria	mySAP Business Suite (finance, HR, SRM, CRM) Business Information Warehouse BW Cognos (BI)
British Airways	UK	SAP ERP Oracle HR
China Eastern Airlines	China	Oracle E-Business Suite (ERP+CRM)
Finnair	Finland	SAP ERP
Japan Airlines	Japan	SAP ERP, SAP NetWeaver
Lufthansa	Germany	SAP ERP, SAP NetWeaver, SAP BW (BI)
Saudi Arabian Airlines	Saudi Arabia	SAP ERP
Singapore Airlines	Singapore	SAP ERP
Ryanair	Ireland	SAP ERP
Scandinavian Airlines (SAS)	Sweden	SAP ERP SAS Business Intelligence (BI)

Table 2

Domestic application software, which can be considered as an alternative to the products of foreign manufacturers in the implementation of the concept of import substitution

Class of IS	Russian developments
ERP	1C: ERP, Galaktika ERP, Parus
CRM	1C: CRM, Quick Sales, Bitrix 24
BI	Prognoz, Deductor, Project Expert, Audit Expert, Galaktika ERP
BPM	Business- engineer, Business Studio
CPM	1C: Holding management, INTALEV: Corporate management
PM	Spider Project

Realistic ways to solve the problem outlined above are:

• formation of information competence of students in the framework of teaching provided by the curriculum of IT disciplines by teachers of IT departments of universities that have passed advanced training in the framework of the relevant programs of additional vocational training, ensuring the formation of managerial competencies;

Table 3

IS, the study of which is necessary within the framework of the educational process of the university for formation of information competence provided by FSES in training program 38.03.02 «Management» [11]

Information competence according to FSES	IS classes, the study of which provides the formation of these competencies
- Ability to work with information in global computer networks and corporate information systems (OC-18)	ERP
- Ability to design an organizational structure, to carry out distribution of powers and responsibilities on the basis of their delegation (PC-2)	BPM
- Ability to assess the impact of investment decisions and funding decisions on the value(cost) growth of the company (PC-12)	BI
- Possessing of modern personnel management techniques (PC-14)	ERP
- Possessing of project management methods and willingness to implement them with the use of modern software (PC-20)	PM BI
- Knowledge of modern quality management system and ensuring of its competitiveness (PC-23)	BPM
- Ability to solve managerial problems related to operations in the world markets in the context of globalization (PC-24)	ERP
- Ability to analyze behavior of consumers of economic goods and formation of demand (PC-29)	CRM
- Ability to apply quantitative and qualitative methods of analysis in management decisions and to build economic, financial and organizational management model (PC-31)	BI BPM
- Possessing of the means of software for analysis and quantitative modeling of control systems (PC-33)	BI BPM
- Possessing of methods and software for processing of business information, ability to interact with the services of information technology and efficient use of corporate information systems (PC-34)	ERP
- Ability to model business processes and familiarity with the methods of business process reorganization (PC-35)	BPM
- Ability to conduct an audit of human resources and to diagnose the organizational culture (PC-37)	ERP
- Ability to apply the basic principles and standards of financial accounting for the formation of accounting policies and financial reporting of the organization (PC-38)	ERP
- Ability to analyze financial statements and make reasonable investment, credit and financial decisions (PC-40)	BI

• formation of information competence of students in the framework of teaching provided by the curriculum of management and IT disciplines by teachers of management departments of universities, trained on the different classes of information systems within the framework of partnership programs of IS manufacturers.

However, when using the first approach, it is likely that teachers of IT departments, even after appropriate management advanced training, while teaching IT disciplines will subconsciously gravitate towards what is «native» for them, i.e. the architecture of information systems, databases, etc., paying attention to the information needs of management residually. Therefore, the second embodiment is more preferred.

When organizing the studying of students of modern AS three alternatives can be considered:

1. The study of the entire functionality of AS within the discipline «Information Technologies in Management».

2. The study of private components of IS functionality within the existing management disciplines that involve the use of IS within the competences formed by them.

3. Integration of the first and second approaches.

The first approach requires teachers with integral knowledge of all functionality of ERP, CRM and other IS classes. Even if the university finds such a generalist, the market value of his services will be many times greater than the average salary of the teacher of the university financed from the budget. In addition, such a unique person will be a weak link in the system of staffing, as his illness or dismissal will lead to the disruption of studying IT by students.

Using only the second approach leads to fragmentation and non-systemacity of students' knowledge.

The third option is the most preferred, since in this case are provided:

• obtaining by lower-course students a holistic view of the possibilities of different IS classes to improve efficiency of management of an aviation enterprise;

• an in-depth study of senior students of modules (submodules) of IS that are most relevant to future functional specialization of the graduates.

Essential issue is also the question of whether a student needs to study technology of work with a specific type of IS, or a demonstration by a teacher of application of software capabilities is enough, based on the fact that after obtaining employment in a particular organization, a graduate on site will master a type of IS, which is used by this airline. Personal experience of one of the authors of this article suggests that every student should have the opportunity to practice working with IS. It is necessary, first of all, to overcome a psychological barrier in dealing with information systems. Upon receipt of such an experience by a student the modern IS are no longer «black boxes» for a student that it greatly simplifies the mastering IS in the framework of professional adaptation to a particular workplace. The attempt to teach information management aspects without providing a student with an access to a real IS leads to demotivation of a student.

Question of obtaining by a university of an access to IS of an appropriate class and organization of teachers' training is now quite easy to be solved within cooperation programs with universities that are implemented by the most well-known manufacturers of AS.

Given the factor of import substitution noted above a particular role in terms of the interests of universities, is obtained by the programs of cooperation with universities, implemented by Russian companies.

For example, programs of interaction with universities are realized by Russian companies 1C (IS1C:. ERP, etc.) [12], BETEC (IS Business Engineer)

[13] and Expert Systems (IS Project Expert, Audit Expert, Quick Sales) [14], BaseGroup Labs (IS Deductor) [15] and other Russian companies working in the development of application software and IT consulting.

Thus, in the way of solving the problem of formation of information competence of graduates in the direction «Management» as it relates to IS of a general purpose, there are no insurmountable obstacles, only political will and purposeful activity, realizing it, are required. The solution of complex problems described above will allow the university on the one hand, to ensure that the competences of the graduates comply with modern requirements of the information society, and on the other hand, to significantly enhance the attractiveness of the university for applicants of their Bachelor's programs and to create the conditions for formation of competitive Master's programs in management areas of training.

Conclusion. *A much more difficult problem is to get an access to education or to demo versions of specialized IT used only in the airline industry by a university. Unfortunately the leading manufacturers of specialized IS do not have currently programs similar to university programs of manufacturers of IS of general purpose. Given the limited financial capacity of air transport university to have access to specialized information systems, providing automation of business process of airports and airlines, is a very difficult task today. Solving this problem requires new approaches to organization of interaction of universities with the business. For instance, Moscow State Technical University of Civil Aviation (MSTU CA) and the international company SITA, the world leader in the field of information and telecommunications systems for the aviation industry, in March 2016 signed a declaration on cooperation in education and research areas that involve participation of technical experts of SITA in education and research, exchange of scientific and educational literature with the aim of improving the educational system and formation of professional competence of future aviation specialists [16].*

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