

# The Information System of Vertically Integrated Structures as a Pillar of Entrepreneurship in the Information Society

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**Abstract:** *In the article the authors analyze peculiarities of the concept of creating information system of vertically integrated structures as a pillar of entrepreneurship in the information society.*

**Keywords:** information system, information society, vertically integrated enterprise, ERP-system, OLAP-technology, BPM-system, software, SOA information architecture

## 1. Introduction

The dynamics of the external economic environment compels enterprises to transform themselves to the entirely complex system requiring new management methods which are profoundly based on processing the proliferation of information in the real time. We can therefore state that the enterprise performance efficiency can be achieved through a single corporate information system that integrates financial management, human resources, supply and distribution of goods and services. Such systems are namely viewed as a means of achieving major business objectives, such as improving the quality of products and services; extending and increasing a market share and withstanding fierce competition.

It is next to impossible to implement the integration of domestic enterprises into the global economy without introducing innovative processes, which are entirely aimed at changing priorities of using information resources. They are not supposed to be used as fiscal functions, but mainly as a source of providing and supporting decision-making processes in all areas of the company. Only under these conditions does the information system of a vertically integrated company (association) acquire its strategic importance, as investments aimed at its development are the most promising and lucrative in the information society.

## 2. The Problem Solving

The peculiarity of creating the information system of a vertically integrated company (association) is the use of the term «Enterprise-wide Resource Planning» – ERP). The ERP-systems is namely based on the principle of creating a single database repository containing all the corporate business information, mainly the day-to day financial information, production and human resources data. The availability of the single corporate repository eliminates the necessity to transfer data from one system to another (e.g. from the production system to the financial or human resources ones) and provides a simultaneous access of the authorized personnel to the information. The purpose of the ERP-systems is not only to enhance an enterprise's production management, but also reduce the cost and efforts

of supporting its internal information flows. The introduction of such a system makes it possible to significantly reduce transaction costs.

## 3. The integrated information environment

Combining the ERP-system with online analytical processing technology (OLAP), Balanced Score Card and a system of Value Management provides the emergence and development of BPM (Business Performance Management) which is viewed as an efficient business management technique permitting to combine the business operating performance of all its association members with efficient implementation of the vertical links among them.

The efficient functioning of the entire information system in an organization significantly depends on the flexibility and quality of information system of a vertically integrated company; its development is supposed to be carried out in compliance with the vertically integrated union. The implementation of integrated approach eliminates errors at the stage of the information systems design and increases the whole enterprise performance efficiency.

Using modern information technologies companies face issues arising due to exchange of information among various units (participants) of a vertically integrated structure. In corporate structures of a holding type these problems are sorted out by implementing a unified corporate information system, whereas for contractual forms of integration and non-rigid corporate groups, the issue of consolidation of information sources is quite of current concern.

The solution to the above mentioned issue is using CALS technologies (Continuous Acquisition and Life cycle Support), which are interpreted as information support of product life cycle. The essence of this technology lies in implementing integrated information environment via electronic data transfer facilities for all stages of the product life cycle.[3]

The integrated information environment is a specifically purpose-built data depository with a set of distributed databases, which are subject to common rules of information

collection, storage, updating, search and transmission through which the consolidation of information among all participants of the vertically integrated structure is fulfilled. An integrating link will be a database management system based on the method of *service-oriented architecture*. This will combine various business information systems into a single information space of a vertically integrated structure.

The process of vertical integration of applying service-oriented architecture will reduce risks associated with the introduction of information technologies projects in entities, significantly contribute to faster development and integration of composed applications and provide continuous information system support. Applying the most widespread information sharing services, such as the World Wide Web, XML and work with multidimensional databases will enable companies to efficiently handle large data sets interactively. Hence, software built on the concept of CALS, is based on the strategy of systematical improving the efficiency and profitability of vertically integrated formations through the introduction of modern methods of information exchange among all parties of the vertically integrated structure.[2]

In order to evaluate the software and information flows among the units of a particular vertically integrated entity it is accepted to apply an approach of the classic statistical information theory. Entropy can be estimated as the mathematical expected share of information  $I(a_i)$  using the Shannon's formula:

$$H(A) = \sum_{i=1}^n p(a_i) I(a_i) = - \sum_{i=1}^n p(a_i) \log_2 p(a_i);$$

where  $A = (a_1, a_2, \dots, a_i, \dots, a_n)$  - a discrete source of statistically independent messages, such as the management impact in terms of orders, etc.;

$p(a_i)$  - probability of  $i$ -message, namely the probability of the same perception of managerial influence of all members of a vertically integrated structure.[1]

So, the creation and development of information infrastructure results in establishing an enterprise's single information space, which particularly reflects in vertically integrated structures united by information flows among all participants of business processes.

#### 4. Conclusion

The use of modern information systems has become not only desirable and the rule of the day, but also a necessary precondition for companies' establishing and functioning with a vertical form of integration, which involves improving and restructuring information infrastructure.

Information support (relevant software) of vertical integration involves the creation of companies' common information space that make up the association, using modern information technologies aimed at developing information infrastructure. These technologies in the near future will be an objectively necessary precondition for the establishment of vertically integrated structures as a management basis in the information society.

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