DATA AND PROCESSING IN DEVELOPING ECCONOMIC APPLICATIONS

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Abstract
Economic Informatics originates in the industry economy and the electronic processing of information. A clear distinction is made between IT and economic informatics, and further between general and particular economic informatics (the particular economic informatics meaning administration, industrial informatics etc). Economic informatics is deemed to be an applicative science relating to the conception, working modality and representation of IT and communication systems, oriented towards companies which are using electronic computers.
This paper pursues to integrate applications allowing the information systems to interconnect at informational level, by information sharing, and at service level, considering the control of the related processes in real time.

Keywords: *information systems, economic applications, integration, XML, CRM (Customer Relationship Management)*

Introduction

The paper approaches a current theme that takes into account data and information processing which may lead to economic applications development using a series of latest technologies.

Technologies such as XML, HTML, CRM allow the achievement of integrated systems, giving efficiency in user's activity. The revealed text analyses a series of specialized papers, emphasizing and comparing the advantages and disadvantages of the shown systems.

The modern management of the activity of a trading company is unthinkable without being grounded on sufficient information. Obtaining timely and top quality information implies using the **e-computing technology** on a wide scale. The quality of the decisions made to ensure the proper course of the economic activity ultimately depends on the quality of the information that the upper management operates with, and on their ability to analyze it.

Paper content

We could state that, in terms of management, information is the bearer of news about the economic phenomena and processes taking place inside or outside a company, but relating to it, such information being used in business analysis and decision making.

Information is the output of an entire range of primary data processing occurring as result of the carrying out of a trading company's activity.

The processing activity turns data into a useful form, endowing them with additional knowledge. In terms of the processing cycle, **information** represents the outcome of data processing, designed to be used in the management and decision flows.

Seen as a means of knowledge, information represents a news-story, a signal reflecting the state of a system or of the environment within which it operates, and bringing added value.

As information results from data processing, we could say that it means nothing else than the final product of such process.

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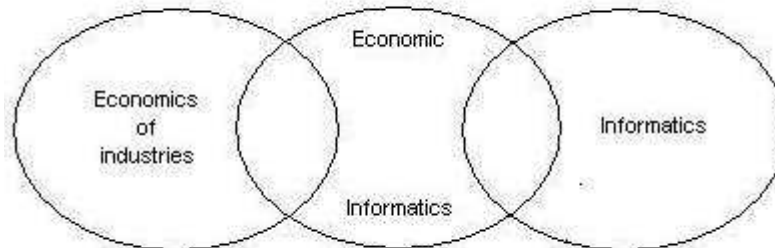
Picture 1 Fields of Economic Informatics

Programming languages, techniques and methods have known a tremendous boost since the appearance of computers until nowadays, due to the need to respond to the continuing increase in number and complexity of miscellaneous issues to be settled and therefore, implicitly, of the related programs. Thus, programming has evolved from the initial stage of introducing notions directly in binary code, and continued with the advent of assembling languages allowing the symbolic representation of instructions for computer.

The main issues arising in data integration process are generated by:

• The use of multiple data sources resorting to different versions of data representation,

• The necessity to synchronize in time the data taken over from different sources

• The use of non-conventional data,

• The ad-hoc connections to be made between different types of data or between different software applications.

Unconventional data are not standardized, semi-structured and newly defined within applications data, data with a dynamic structure or changeable in time. Given the specific characteristics of unconventional data, it is extremely difficult, and sometimes even impossible, to define general rules, universally accepted, for handling and using such types of data in software applications.

The distributed application is that application running on multiple computers simultaneously so as to improve the application performance and scalability.

The use of distributed architectures for the development of economic applications offers several advantages, namely:

• The provision of the application with automatic scalability, by adding other computers to the system,

• The possibility to integrate applications running in different environments, on different platforms or operating systems,

• The possibility to synchronize and to allow real-time communication between multiple clients,

• The possibility to support poor computer systems in terms of technical characteristics to ensure the hardware resources required to run the related applications.
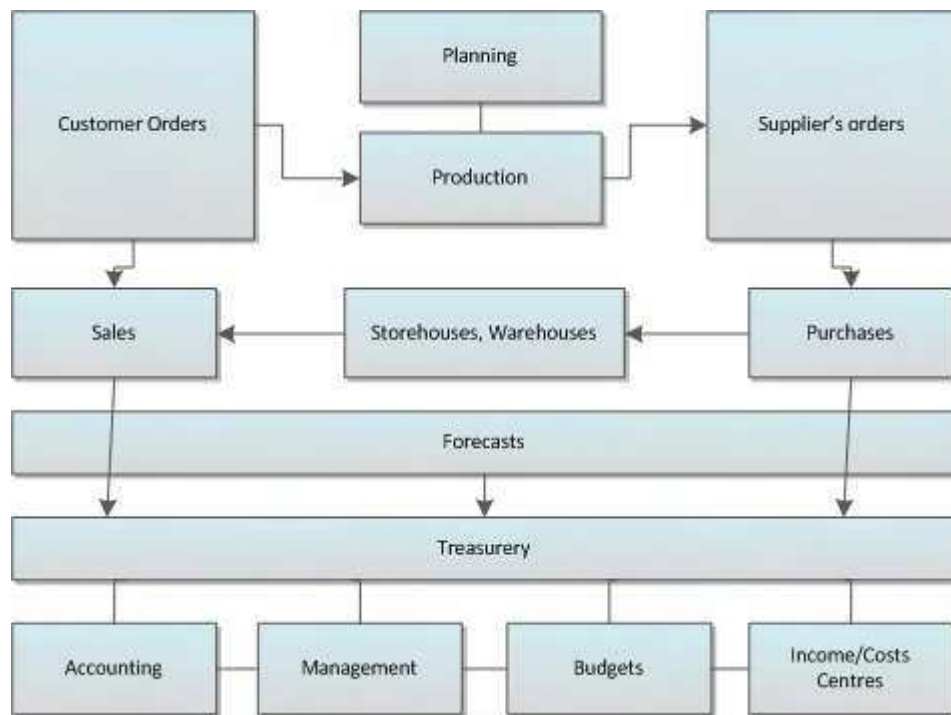
Picture 2 Flow of data exchange between a company's departments

The accelerated changes in the business environment and the increase in complexity of the activities carried out by companies impose a permanent adjustment of the effort and analysis capabilities of the human being.

Able to process a large volume of data and aggregated information in order to optimize processes and to render them more efficient, the ERP systems have been created as a solution to such challenges. The main idea relating to the development of software applications for enterprise systems consists in their evolutionary nature[1].
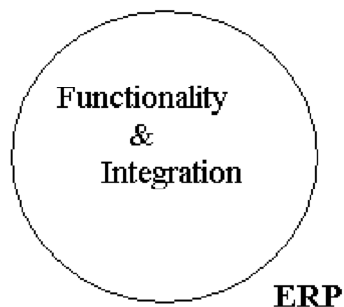
Picture 3 Fundamental Properties of ERP

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[1] Lungu, Ion *Integrarea sistemelor informatice,(IT Systems Integration),* A.S.E. Publishing House, Bucharest, 2007.

Integration ensures the connectivity between the flows of functional economic processes. It may be construed as a communication technique. Here are some common ways in which communication takes place through and for integration: source code, extensive local networks of computers, Internet, e-mail, workflow, automated configuration tools, protocols and databases. We could state that integration is achieved through communication, and communication is achieved through integration.

The functional part of an ERP system ensures the flows of economic processes within each function. Therefore, in an ERP sequence we can find from several to tens of functional modules (general accounting, debtors, payroll, inventory, supply, production planning, logistics and sales orders).

Data integration combines the basic elements of data management systems, content management systems, data warehouses and other enterprise applications, bringing them altogether into a common platform.

Development of XML-based applications

XML is a relatively new technology. Still, this does not prevent it to impose itself almost in all branches of information technology. Obviously, since XML has become a usable component of computerization, business might also be useful.

Less than a year after its release, XML has impressed many developers and users. Currently, XML is becoming increasingly popular and irreplaceable. In 1998 the international organization W3C has strengthened the XML specification as "Extensible Markup Language (XML) 1.0. This meant green light for the development and implementation of XML.

It is clear that HTML and XML documents are based on the same structure using tags. But the functions of these two languages are quite different.

HTML	XML
Used to **display data**	Used to **carry on data**
Used to **visually define data**	Used to **describe data**
Used to show **how data are displayed**	Used to show **how data are used**

Table 1 HTML – XML Differences

The above table reveals that XML is working with data definition and transportation. An eloquent example would be the one described below, where we determine information relating to a physical entity. If we described the given information in a relational database, it would look like below:

Name	James
Surname	John
Date of Birth	07.23.1985
Height	179

The weakness of the above-described information is that it can be processed only by database management systems, which, most often, are incompatible.

From HTML to XML

The two languages have been created for different purposes:

- XML was designed to describe data and to focus on their structure;
- HTML was designed to display data and to focus on their design.

The XML Objectives are reflected by the following characteristics:
- Simple to use on Internet;
- Able to support a wide variety of applications;
- Compatible with SGML (Standard Generalized Markup Language);
- Fit for easy writing of programs processing XML documents;
- Designable quickly, formally and concisely.

The XML data can be used in HTML language and allow a rapid identification of documents via the search engines. By means of codes such as javascript, php etc., the XML files can be embedded in web pages, the most notable example being the RSS system that uses an XML file to carry on information from one web page to several web pages.

Advantages of XML:
- Extensibility (new indicators can be defined, if necessary)
- Validity (the data structural accuracy can be assessed)
- Facility for users to represent their data independently of applications
- Simple and accessible (they are text files created to structure, store and transport information)
- Easy to edit and modify (it only requires a simple text editor such as Notepad, WordPad, etc.).

XML language provides a method of inter-human communication, not of data interchangeability between machines, therefore creating relationships between the designers and the beneficiaries of their documents. XML inherits the neutrality of the platform and speech, and the liberty of the data present in SGML.

All these remarks indicate us that XML provides users with an information markup open standard, without limits in terms of annotation techniques (provided extensibility), easy to use (able to support knowledge databases) and easy to implement.

The future of XML will impact not only the IT employees, but also the political and economic world. The combination of XML with XSL could replace all current formats of text processing and publishing:
- A unique format for Web posting and printing;
- A common format for storing data in various software products;
- A single format for all languages.

The success of XML can be foreseen both as regards Web, where is allows the creation of extensible multimedia applications, and as regards the information processing in general.

Application development using the concept of CRM (Customer Relationship Management)

The CRM application is a dedicated solution for customer relationship management which offers: direct support for developing business strategies and the ability to connect front-office and back-office roles into a complete customer oriented business solution. Also, the ability to collect and analyze information, to be able to anticipate customer needs and build a profitable and long-term relationship is another important feature of this type of software solution.

The sharply increasing transition of "traditional" business towards electronic media has brought along important mutations in the crucial field of relationship administration between companies and their customers. The Customer Relationship Management (CRM) is now one of the

fashionable concepts in the new digital economy, but it is hardly an innovation of recent years. Historically, the relationship between the customer and those who provided a particular product or service has arisen since the first customer. This relationship has been managed over time in the most different ways, yet using the "traditional" methods, which implied direct contact between a company's sales representatives and its customers. As until recently a letter, a catalog sent by mail, a phone call, or an elegant restaurant were "tools" more than sufficient to maintain a close relationship of loyalty with the customer, things have changed with the appearance of the Internet. What the digital revolution brought along was an unprecedented widening of a company's customer base, and thus, almost an exponential growth of the problems involved in dealing with them.

The CRM has become a priority for the companies that have sought to have an advantage in today's stormy economy. Worse now, even if they invest hundreds and thousands, if not millions of dollars in CRM, most companies are not closer then before than when the system appeared.

The Customer Relationship Management can be defined in the following ways:

• Strategy for selecting and maintaining the customers so that their value to the firm is optimal; it involves a business philosophy that puts the customer at the center, through all the processes; the success is possible if and only if the leading team, the strategy and the organizational appropriate culture act simultaneously;

o A process of implementing a business strategy that places the customer at the center, which, in a "chain reaction" determines to redefine all the functional activities - this implies new work processes, possible only by using information technology;

• "Super-class" of business models, processes, methodologies, interactive technologies, to achieve a high retention rate of clients belonging to identifiable groups of customers with great value for business and growth potential;

• Extension of the concept of selling as an ongoing process, considered both art and science, to collect and use customer information in order to "educate" their loyalty - which is impossible without the use of appropriate technology;

o A concept of development and implementation of business strategies and related technology support, to eliminate the difference between the actual and the possible acquisition level, the development and maintenance of customer relationship - which improves the efficiency of assets;

o A timely process for enlarging and applying the knowledge (and not necessarily of data storage) on a client, leading to the individualization of acquired strategies and business to meet the personalized needs of each client;

• Specific management approach that places the customer at the center of the business processes and practices, the purpose of this approach being the increase in the profit and productivity;

• The management of all interactions with the customers, with the purpose of expanding its customer base by bringing in new customers and meeting the needs of the existing ones;

o A term specific to the information domain on potential methodologies, to the software packages offered and to the Internet, to help a company conduct customer relationships in an organized manner;

• The "overall" approach that integrates the processes of receipt of orders, sales and service, which unifies and coordinates all the channels through which the customers interact with the company, that "something" which has most to do with customer satisfaction and, in fact, has nothing in common with technology and for which technology is only a means and not an end in itself;

o A process to guide the entire company towards its outside, towards the clients, which involves understanding the customer needs and process management within the company to develop and maintain customer relations.

The information about the customers is the essence of CRM. Although the development and maintenance are important, clear and well structured data about the customers are vital. Unfortunately, many businesses do not pay enough attention to the importance of consistent and quality data. In fact a study by PriceWaterhouseCoopers showed how widespread are the data on quality problems in companies around the world.

Based on a survey of 600 mid-level companies in the U.S., Europe and Australia, the following conclusions were drawn:

• 70% of companies have recognized that insufficient data have a negative financial effect on the business. 50% added extra costs to reconcile the data.

• 30% have been forced to postpone investments in new systems because of data issues.

○ A company stated that data problems have caused a loss of $ 8 million only in one fiscal year.

Many leaders have considered the subject of data management companies as boring, until they realized how much is at stake. When a critical project can not come alive because of data problems or clarity, or when they realized how much it will cost to clean the institutionalized data, the negative effect of data neglecting became clear, and the responsible persons were notified.

More than money, poor quality data means low analysis and performance indicators which makes the management take appropriate decisions to get out of this impasse. When it comes to customer information, poor data quality can lead to problems that are no less critical. Each has a story about incorrect data related to customers. But the quality of customer data is no joke, they are absolutely necessary to develop and maintain operational CRM enterprise and analytical systems. Thus consistent and quality data are critical components of the CRM system.

Customers require easy and convenient access through the channels that they choose. Creating multiple points of contact with the customer is served is a prerequisite. Unfortunately, creating multiple points of contact increases the risk of appearing inconsistent interactions. In companies where we can not reconcile information about the same customer at various points of contact, dissatisfaction shows up.

The creation of a single universal database is, unfortunately, not feasible for most large companies because of differences in portfolio applications and associated databases. However, an integrated view, and a multi-channel on the customer is feasible and represents one of the main advantages of the CRM applications. To achieve this, these applications must be integrated pragmatically, using intermediate components with intermediate applications, each dealing with a portion of data collection.

A well organized target reduces the development effort necessary to document and code the interfaces between systems, reducing duplication in technology integration, and shortening the time required to change existing applications.

Definition of customer transactions can vary widely between business-to-business (B2B) and business-to-consumer (B2C). In B2B customers are the companies and their customers, and B2C client is usually an individual, but can be a family.

The next step is to inventory the available sources of data, determining where to collect data from internal sources or whether they will be obtained from external sources. To create an analytical view, the data must be extracted from various sources, converted into consistent and usable information, and then loaded into the analytical data structures. Tools for extracting, transforming and loading (ETL) can be used for this. They are driven by data sets and have a strong support for meta-data. In addition to collecting the data from internal sources, methods to fill in the external uncovered gaps should be available.

CRM Implementation

Alone, the CRM is not a technology, but a process of collection and retention of customer information and their interactions with the company. CRM implementation tends to be a complicated and expensive test. It is estimated that during the next two years, 2,000 companies will have to spend

$ 250 million each on CRM solutions. While money is exhausted, many companies have not been able to determine what kind of return on investment they obtain in their system, beyond the obvious data.

A recent study by Andersen Consulting is seeking direct correlation between CRM and the business income. Typically a billion $ turnover could add $ 40 million profit would increase the CRM capacity by 10 percent. Besides this, the CRM increases performance and the business income.

Significantly, companies that have successfully implemented CRM solutions do not see CRM as an IT project driven away from a specific department - that is, they see CRM as a broad initiative. Most CRM implementations have been fragmented, put into operation in a department without an over viewing perspective. Similarly, the CRM software needed to be transferred to all levels throughout their organization. Marketing will be able to formulate responses and to provide the results of specific promotions or campaigns across the customer segments. The employee dealing with customer relations will be able to provide superior customer support and satisfaction services.

When talking about the technologies used to achieve the implementation of CRM system, we must first refer to the server level of the CRM. Thus the operating system on which the CRM system developed is Microsoft Windows 2000 Server and the IIS Web server is used. The application is developed in MS Visual Studio.NET Framework and the Server software is MS Framework 1.1 SDK. CRM customers that will benefit from this application should have as 2k/NT Windows operating system and IE5.

The dynamic information accessed in/through the CRM interface information will be considered as "functional" (interface elements such as labels, Message box sites, input fields sites) and "business" information (data about customers, products).

The support for the "functional" data consists in a MS SQL Server database. These data allow direct access from the interface through a ADO.net. connection. The business information is accessed through predefined Web services.

Advantages of CRM

The impact on the cost and quality data

Using data integration solutions (CDI) can produce a significant return on investment (ROI). Benefits of the CDI are:

- Better cross-selling and up-selling "(facilitated by an improvement in the modeling and better targeting of the customers)
- Improving customer retention (achieved by avoiding worn out customers)
- Improving attracting new customers

Competitive advantage through CRM

The CRM is defined as a strategy to manage customer relationship and interaction with them in the most profitable way possible for both. There are several providers of operational CRM solutions that enable traditional CRM implementation strategies. These typical strategies are supported by solutions focused on how the services, sales and marketing of more effective departments should be made, this increasing the profitability of such organizations and of their customers.

Conclusions

Web services and applications are emerging as a key technology for conducting automated interactions between distributed and heterogeneous applications and for connecting various business processes.

At software and hardware level, *technology integration* is the main phrase for the current IT products. Thus, the various existing technologies allow an interaction with outstanding results between databases and web services.

ICT infrastructures containing databases, large volumes of data, OLAP, Java turn into web platforms, therefore hardware decreasing in relevance.

A series of advantages of IT integration and interaction are outlined below:
- Diminishing of implementation, exploitation, conversion and other hidden costs;
- Increasing of data security due to the submission to common restrictions;
- Diminishing of the complexity of different technologies;
- Avoidance of scalability-related problems;
- Avoidance of issues relating to the implementation and management of different software products by using a single product;
- Obvious evolution of end users.

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