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*Original Contribution*

# CONCEPT OF AN INTEGRATED MARKETING INFORMATION SYSTEM

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**ABSTRACT**

The article presents the results of a research in the field of marketing information technologies. The subjects of the research are the marketing information systems, mainly the information systems used in the marketing business activities of the studied companies. 25 marketing information systems were covered. Data were collected in the period 1999-2002. A study was conducted on the basis of criteria and preliminary indices. Analysis was made, results were obtained and a concept for the building of a marketing information system of an integrated kind was proposed.

**Key words:** Information Technology, Data Warehouse, Online Analytical Processing (OLAP), Data Mining, Integration, Data base, Internet, Web.

## INTRODUCTION

IMIS makes balance between information necessities on one hand and information technologies on the other. If the information technologies are not adapted to the conditions of the companies, they will be inefficient and the money than have been put for their introduction will be lost. On the other side Data warehouse, Data Mining and OLAP might be based on these data, thus creating serious problems for the information security.

In the creation of Marketing Information Systems (MIS) the concrete needs of the organisation, together with the managing process of the organisation's marketing activity are essential. Each company has its specific characteristics of an internal kind and of an external kind influencing the process of decision making. There is an objective need for information about the internal and the external factors and of a system for information management in carrying out marketing activity(1-4)

The following processes are studied in great detail: the information assurance in the system, the information readiness for making decisions, the system brightness and the opportunities resulting from the use of new information and communication technologies.

## SUBJECT, CRITERIA AND METHODS OF RESEARCH

The subject of the research is the information systems available for the marketing activity of companies, also called marketing information systems (**Table 1**).

For the purpose of the present research series with different criteria were created with two different trends in mind: functional purpose and information technology purpose.

The criteria (used in our research) based on an evaluation of the marketing information systems within the functional purpose are the following:

1. Customer orientation of marketing information systems;
2. Keeping of marketing mix elements;
3. Possibilities for making of marketing investigations;
4. Information analysis;
5. Current accountancy;
6. Possibilities for marketing control;
7. Using of information from former periods under review (inherited systems);
8. Prognostication.

We evaluate the second trend on the basis of information technology criteria associated with the application of information and communication technologies in marketing information systems. The criteria for the information technology purpose are as follows:

1. Quality of information for making

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decisions;
2. Platform independence;
3. Information base;
4. Working environment architecture;
5. Working in Internet;
6. Technologies of information analysis;
7. Information protection.

**Table:** Analysed Marketing Information Systems

| № | MIS name | Company |
|---|---|---|
| 1 | iLuxo Suite | iLux Co. |
| 2 | 3M GEDW | Teradata Comp.,a devision of NCR |
| 3 | Arena R | Systems Modeling Corporation |
| 4 | Charles Schwab | Charles Schwab & Co |
| 5 | Clarify eFrontOfficeC | Amdocs Ltd. |
| 6 | DIALOG++ | Balder Technology Group Inc. |
| 7 | EDGE | AIT Group Plc. |
| 8 | Enterprise Rent-A-Car's | CIO Service Inc. |
| 9 | HTS | HNC Software Inc. |
| 10 | Hummingbird | Hummingbird Ltd. |
| 11 | iLuxo Suite | iLux Co. |
| 12 | Imparto Suite | Primus Knowledge Solutions Inc. |
| 13 | Inquisite | Catapult Systems Corp. |
| 14 | IQSupport Application Suite | Logica Advantagekbs Inc. |
| 15 | LeadMaster TM | Lead Master Inc. |
| 16 | Owens & Minor | Owens & Minor Inc. |
| 17 | PJM interconnection | PJM Interconnection L.L.C. |
| 18 | Plan Magic | Plan Magic Corp. |
| 19 | QAD | QAD Inc. |
| 20 | Quadstone | Quadstone Company |
| 21 | Quintus eContact TM Suite | Avaya inc. |
| 22 | SalesLogix R | QGate Software Limited |
| 23 | TeamPOINT | Point Corp. |
| 24 | Tyson Foods | Optio Software Inc. |
| 25 | VANTIVE | VANTIVE Inc. (PeopleSoft Inc.) |

The criteria of this group do not allow for a unification or grouping and they are, to a sufficient degree, segmented in order of priorities or shortcomings of the marketing information systems connected with the respective field of the information technologies, in the evaluation of their influence over the researched characteristics of the information and the information system. From some of these criteria evaluation indices are represented and their purpose is to analyse different techniques, technologies or methods for problem solving. If the marketing information system does not meet all indices in a given criterion it does not mean system incompleteness but is rather connected with another technological decision. Furthermore, there are cases when no sufficient information for an evaluation of the marketing information systems can be obtained even after definite indices or criteria have been collected. Because of all these subjective results have been obtained which invariably reflect the researcher's view.

The criteria connected with the functional purpose as well as the information and technological criteria are complicated and to the scale:

* It complies with the index.
* It does not comply with the index.
* Without a valuation.

The observation and the content analysis are the main methods applied in researching. The observation specificity in this research is the study of demo versions, products being placed at disposal for a definite limited time (usually a month) or the use of products for a free realisation of some tasks, registrations or investigations on the basis of researcher's data. The information obtained through observations was complemented and enriched by the content analysis. It was applied parallel to the observation. By determining the analysis categories, i.e. the most general key words one proceeds from the outlined criteria and indices. The indices selected meet the requirements for content analysis categories. They are comprehensive, mutually exclusive, reliable and appropriate. Some analysis units

are applied, as the analysis is complicated in the following way: theme, contention and sometimes the entire text.

During the analysis process tables are used wherein the studied content analysis categories are registered.

## RESULTS

The evaluation and the analysis of the marketing information systems using the functional criteria give a reason for making the following conclusion - the following trends in the marketing activity of the companies are best developed and most completely included:

* Studying, giving prognosis and influence over the customer's behaviour - Imparto Suite, Quadstone, Claryfy eFront Office, Quintus eContact TM Suite, DIALOG++, EDGE;
* Advertising -iLux Suite, Inquisite;
* Direct marketing - VANTIVE, Imparto Suite, Inquisite;
* Marketing planning - PlanMagic, IQSupport Application Suite;
* Sale managing - HTS, SalesLogix etc.

The generalised results from the research are presented on **Table 2**.

**Table 2:** Generalized results for MIS being evaluated

| Index name | It complies with the index | It does not comply with the index | Without evaluation |
|---|---|---|---|
| Customer orientation of MIS | 87% | 13% | 0% |
| Keeping of marketing mix elements | 56% | 42% | 3% |
| Possibilities for making of marketing investigations | 61% | 39% | 0% |
| Information analysis | 72% | 28% | 0% |
| Possibilities for marketing control | 54% | 46% | 0% |
| Current accountancy | 70% | 30% | 0% |
| Inherited systems | 51% | 45% | 5% |
| Possibilities for making of foresights and prognosis | 41% | 59% | 0% |
| Information base | 50% | 50% | 0% |
| Analysis technology | 60% | 40% | 0% |
| Working in Internet | 74% | 26% | 0% |
| Working environment architecture | 50% | 50% | 0% |
| Quality of resulting information | 66% | 34% | 0% |
| Information protection | 95% | 0% | 5% |
| Platform independence | 70% | 11% | 19% |

The complexity and the multifunctional character of the marketing activity as well as the many possibilities of the modern information technologies allow the marketing information technologies to be developed in the integration direction. The concept about building integrated marketing information systems (IMIS) is based on the conclusions drawn during the research of the modern marketing information systems 1 and the application of the information technologies there in 2.

The integration is comparatively a new development trend in MIS. From an information technology point of view the integration can be considered in three main directions:

* Integration of data;
* Integration of information technologies;
* Integration in Web and Internet.

In the first place lies the question about the integration of data as a main system resource. The main aspects in this research trend are two: integration of data sources and integration of data schemes.

The integration of data sources arises as a result of the data diversity and the difficulty all potential information sources need for solving the system tasks to be foreseen. The analysis shows that the following main groups of data sources can be determined: inherited information systems, operative information systems and external sources.

The essence of the proposed concept for integration is based on the fact that a united warehouse is established ensuring its co-ordination and an aggregation of data being kept. The priority of the Data

Warehouse to be used in MIS is based on the fact that the data in the warehouse are renovated, constantly accumulating new data conformable with the MIS tasks. This is an important aspect for the existence of MIS. Using Data Warehouse in the information systems, the usual business terms are applied.

The integration of data schemes is the other aspect of the whole data integration. The co-ordination of data from different sources stems from the features of the data elements and from the metadata features.

The process of integration of data coming in from different sources includes several consecutive steps.

Integration of information technologies: Every operative and analytical IS can use different information technological solutions. Data Warehouse (DW) and OLAP (On-line Analytical Processing) are applied for the building of IMIS in the concept of the present study.

Both concepts presented do not compete; they mutually complement. They are directly mutually connected and integrated in IMIS. DW can be used as a source of aggregated and detailed data for analysis and the OLAP technology is carrying out the analysis of the integrated data.

Integration of IMIS in Web and Internet: The use of Internet technologies is a new important feature of IMIS. The development of Internet technologies allows a grave enlargement of the integration concept. The special features and the functions of IMIS very well correspond with the possibilities proposed by the global Internet. In this sense the global Internet can be considered as: a resource for establishing of contacts with end-users and the distant sections and employees of the company;

* Channel for producing of integrated direct marketing;
* Resource for advertising
* Information source for planning a marketing campaign
* Source of unplanned information from customers and company employees.

The current concept for MIS structure of an integrated kind can be generalised, presenting it in two groups of components: nucleus (information base, IB) and modules. The information base can include Data Warehouse (DW), Online Analytical Processing (OLAP) and Data Mining (DM). The operations of IMIS about the users' service and the data preparation for their input in the DW involve construction of following modules:

* Module for user's service
* Module for information from operative systems
* Module for geo-demographic information
* Module for information from inherited systems
* Module for unplanned information
* Module for virtual communication

Usually the module realises a number of mutually-connected functions jointly ensuring functionality inherent in the information system.

The Data Warehouse, the Analytical System (OLAP) and the System for Data Mining take a central place in the IMIS structure. They present the basis on which the functionality of IMIS is to be constructed and that gives the reason for calling them Information Base or Nucleus of IMIS. It is clear that the IMIS nucleus, in terms of informatics, ensures the system. Integration in several directions is realised in the IS nucleus: integration of data and integration of technologies. The data integration is realised by the Data Warehouse technology and the analysis technologies namely OLAP. Data Warehouse, OLAP and Data Mining are integrated in Internet.

## CONCLUSIONS

The Data Warehouse technology for the construction of the information base most highly influences the integration of the subjects, the activities and the information sources in comparison with the rest of the technologies being examined. Its contribution to the information readiness for making decisions results from the possibility for detailed data and data of a different generalised level to be saved. It is a precondition for making a thorough OLAP and an Intellectual Data Analysis because it places at a base for researching of the whole data multitude.

The works in Internet and the Web technologies have a great influence on the information readiness for making decisions. The access to external databases offered by the specialised geo-demographic information systems presents an information source which cannot be ignored because it enriches the marketing information systems providing data about changes of user's preferences, tastes, behaviour, *etc.*

The technology of the Intellectual Data Analysis offers techniques, which use technologies like artificial intelligence for in-depth research of great data volumes. Its

application is most effective when it is combined with the Data Warehouse technology. The application of the technology for an Intellectual Data Analysis has an influence over the integration of the activities because it allows a combination between accountancies and data analysis for the generation of decisions.

The conducted research of the marketing information systems using functional criteria shows that complete information integration can be achieved satisfying the managing needs if all possible ways for its use are studied. The satisfying of the needs will be more effective if maximum information quantity and data knowledge, saved in the information base, is unloaded. The service of the specialists and the managing authorities will become more effective and quick if a part of the report materials are prepared initially and saved in a ready form in the information base, if there is a possibility of their repeated use and an access to the information base by all persons from Internet.

The platform independence proves to be obligatory in order to improve the adaptability of the information system using the possibility that data from different platforms and operation media are transferred. The improvement of the quality of the information in the information system is to a significant degree influenced by the working environment architecture giving better results with regard to the service speed if the approach is oriented toward the use of a multilayer N-tier architecture. The security of the information is extremely important especially when there is an access to Internet and a big number of information system users.

The information readiness for support and making decisions is influenced by all information technologies enriching the information qualities, the visualisation forms and the access ways to the information base. The information features depend on the possibility for bigger task number to be included being basic and obligatory in the research, report, analysis and control marketing activities.

The information base of the marketing information system should support detailed as well as generalised information. Prepared report documents, which have the ability to be disseminated in Internet and Intranet, should be saved together with the data. They should allow real-time access.

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