

SOME MODELS OF THE 'VISTEL' PROGRAM USED TO SUPPORT THE MANAGEMENT OF THE BUSINESS PROCESSES OF A TRADING COMPANY

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Abstract: Program VISTEL is an OS WINDOWS software intended for medium-size trading companies which have well-developed wholesale and retail trade functions.

The VISTEL program was developed in the Microsoft Visual FoxPro system between 1999 to 2002 and has been in use since mid-2001. The program was designed by the author of this paper.

This paper represents several original models which are built in the VISTEL program. These models are used to support the management of business processes of trading companies.

Practical application of these models confirms their quality in terms of a significant increase in efficiency of management of a company in all functions supported by the VISTEL program.

Keywords: VISTEL program, models, business processes, trading company, management, goods, warehouse

1. INTRODUCTION

The VISTEL program is an OS WINDOW application intended for medium-sized trading companies with well-developed wholesale and retail trade functions.

The program was developed in the Microsoft Visual FoxPro system between 1999 to 2002 and has been in use since mid-2001.

The program was developed as an open dynamic system that meets the standards of respective business applications, and at the same time it supports and follows the development of the majority of dynamic functions relating to a modern, permanently growing and developing enterprise.

In that sense, the development of the VISTEL program was accompanied by a number of heuristic models and functions that provide direct support to the management of business processes, the most significant ones being the subject of this paper.

From the point of view of a user, the VISTEL program is a system without which it is not possible to accomplish a single business function in a trading company, from the lowest level (operator) to the highest level (manager) and its numerous features, aimed at improving business processes within a trading company, are a permanent source of new ideas for the user.

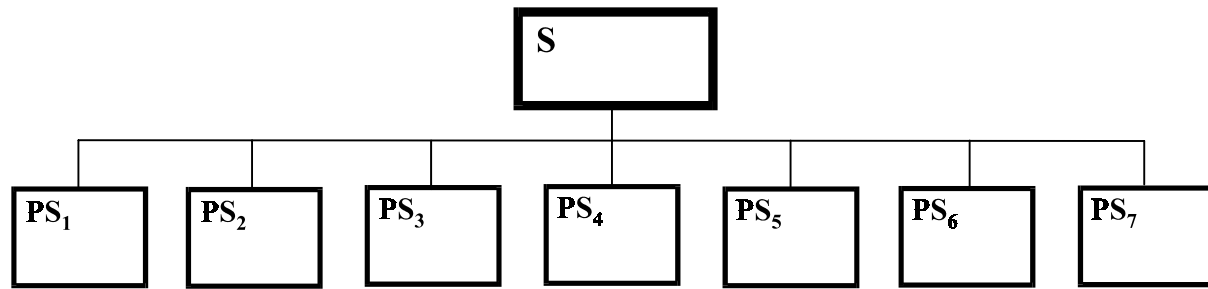
Rather than providing a survey of the data base models and the complete program structure, the objective of this work is primarily to mention only a few significant functions which provide a strong support to business processes.

2. THE 'VISTEL' PROGRAM AS A SYSTEM

The VISTEL program has a modular organization, based on the objective approach to the development of application, which enables:

- modular use of application;
- multi-level definition of user's rights to access to individual application modules;
- simple and fast transfer from one module to another;
- use of joint functions at all levels of application;
- independent development of individual modules, etc.

The hierarchic diagram of the **VISTEL** program is given in Figure 1, where each subsystem represents one of the program modules.



S - **VISTEL** program as a system at the 1st level

PS1 - subsystem for financial book-keeping

PS2 – subsystem for wholesale inventory accounting

PS3 – subsystem for retail inventory accounting

PS4 – subsystem for trade function

PS4 – subsystem for administration/management

PS5 – subsystem for service function

PS7 – subsystem for import/export

Figure 1. Hierarchic diagram of the **VISTEL** program

3. SELECTED MODELS BUILT IN THE 'VISTEL' PROGRAM

Selection of models built in the program was aimed at providing a survey of the models that serve nowadays as a basis for comparison of the existing applications in the field of operation of trading companies.

The author has presented only those models that he considers original and whose implementation in the OS WINDOWS of the **VISTEL** program and practical application represent a significant contribution to the management of business process in trading companies.

3.1. Model of goods' coding system

The fundamental assumption is that a merchandise product code needs to be considered as a system $S = (E, R, F)$, i.e. that it should contain elements (E), structure (R) and function (F) [5]:

E – suppliers, groups and subgroups of products;

R – links between groups and subgroups of products;

F – finding information on the merchandise in the data base by different criteria.

The data base for inventory accounting without a defined and built-in code system has serious and, according to some opinions, insurmountable flaws, as it renders an effective analysis of the turnover of goods by different criteria – impossible.

The structure of products' codes, as organized in the **VISTEL** program, is shown in Figure 2.



Figure 2. Product's code structure

The total range of the code is thirteen characters, of which the first ten are generated in accordance with the worked out register of supplier's marks, groups and subgroups, whereas the last three characters that represent the particular type of merchandise within a group or a subgroup (e.g. a common 60 W bulb from an XX supplier), are generated automatically.

The structure of a product's code is defined as a global variant of the system, while generation of the code of a new product is under the control of the code system, so that a product can not be given a random code.

Establishment or change of products' code system is usually a complex and expensive process in business and information systems. There is a variety of reasons why the existing product's code needs to be changed. Changing of one or more product's codes in the course of one accounting year represents a particular problem.

To meet such requirements, a complex function was built in the **VISTEL** program and it enables complete change of one or more products' code, in accordance with the code system in the complete data base at any point of time, for the current or any of the earlier accounting years.

3.2. Internal bar code system model

The basic feature of contemporary commodity/trade-based system is the use of bar codes and bar code readers for faster and easier manipulation of merchandise.

The first problem is in that a large number of products in different areas do not have international bar codes as yet.

The second problem is that declarations (stickers) with bar codes, apart from the requirements stipulated by the Law, have become a condition of certain trade systems for establishment of trade relations.

The **VISTEL** program uses standard EAN-13 bar code for merchandise items and bar code 128 for location of merchandise in the warehouse.

If an item already has its bar code, determined by the supplier, this bar code is adopted; otherwise, an internal EAN-13 bar code is generated.

The basis for generation of internal bar code of an item is its code generated in accordance with the code system (see 3.1.), and its algorithm is as follows:

```
*****
FUNCTION Make_ean13bc
Parameters zzsifra
* The function generates internal EAN13 barcode out of the code structure
* Standard structure of the code is: AA9999888
* The first two characters are letters and the rest are numbers

zzsifra = alltrim(zzsifra)
xxy1 = alltrim(str(asc(substr(zzsifra,1,1))))
xxy2 = alltrim(str(asc(substr(zzsifra,2,1))))
xxy3 = right("0000000" + alltrim(substr(zzsifra,3,7)), 7)

xyz = xxy1 + xxy2 + xxy3

if len(xyz) = 11
    xyz = xxy1 + xxy2 + "0" + xxy3
endif
if len(xyz) = 13
    xyz = xxy1 + xxy2 + substr(xxy3,2,6)
endif
```

```

if len(alltrim(xyz)) # 12
  xyz = ""
endif

```

```

RETURN M->xyz + Ean13bc_chk(M->xyz) && the 13th char. in the series is the check digit
*****

```

3.3. Model of internal register of goods

Due to requirements of business processes, large trading/merchant companies establish a large number of warehouses. For example, warehouse of goods for trading, bonded warehouse, rough store, warehouse of finished goods, control warehouses of dislocated retail units, etc.

In effect, such organization lacks instantaneous availability of information on the balance of goods in the system. In some classic applications, such as SOPP [3], due to lack of a data base – this problem is solved by generation of appropriate reports.

In the **VISTEL** program the above-mentioned problem has been solved on the level of a data base model, by introducing an integral register of goods which, on one hand, solves the problem of redundancy of general data on goods and, on the other hand, at the same time it represents a synthetic data base in which all cumulative data on the balance of goods within the system are being updated after each transaction in any of the warehouses.

3.4. Model of warehouse/goods subsystem

A classic application-related problem in inventory accounting is in how to support the process of input (procurement) and output (sale) of goods in continuum, without any hitches coming from the information system, caused by the fact that goods can not be put out for sale before the supplier's invoice has been received, as well as the invoice for the accompanying costs. In effect, it is impossible to conclude the input calculation – acknowledgement of delivery.

The **VISTEL** program found a solution to the problem by introducing the warehouse-related subsystem which supports the storing and commercial functions and the goods-related subsystem that supports both the goods-related function and finance-related function (Figure 3).

In that sense, each input/output document is treated twice, firstly as a warehouse-related document (refers to quantities without prices) and, secondly, as commodity-related document (refers to prices).

Both processes are completely transparent and they develop in the same document and on the same analytical commodity item card index.

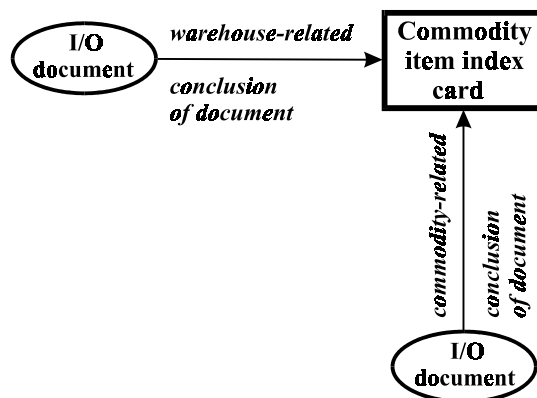


Figure 3. Warehouse-related and goods-related subsystem

Conclusion of the status of goods after the document has been concluded in terms of warehouse is also an important control function, which is realized by the commodity/financial sector of an enterprise.

The model described above enables smooth exchange of goods through a warehouse in real time and without any delay; smooth functioning of the sales department (under conditions of sale at known and pre-planned wholesale prices) and subsequent financial analysis of goods-related documents. The practical application of this model has shown excellent results.

3.5. Model of the location of cost as a centre of profit

Just like in other commercial applications [3], the location cost entity is built in the **VISTEL** program, and it can have different meanings, such as:

- warehouse mark;
- retail unit mark;
- mark of wholesale executive;
- mark of wholesale office salesman ;
- mark of cashier in a retail unit, etc.

By linking all goods-related documents referring to the cost location entity, an effective model of enterprise organization has been created and it ensures efficient monitoring of business processes and easier management of the business system (Figure 4).

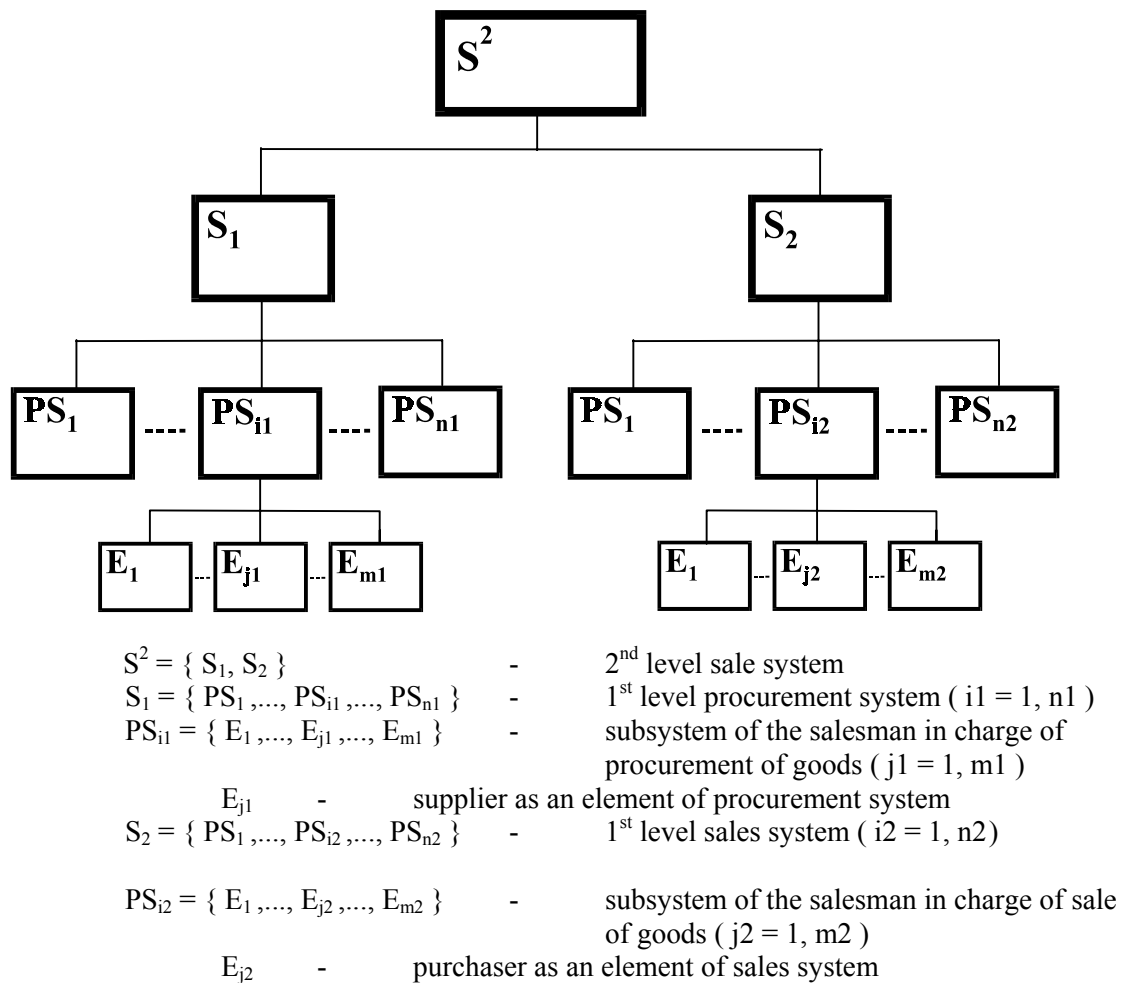


Figure 4. Hierarchic structure of control, based on the entity of a salesman as cost location

In financial and commercial terms, the cost location is considered and monitored as a centre of profit, which enables application of a system of distributed management of the commercial sector, i.e. distributed control of the system of procurement and sale of goods.

The hierarchic structure of managing the processes of control of procurement and sale of goods enables very effective functioning of the system, given that the salesman, as a cost location, has a direct access to all relevant commercial and financial information relating to transactions with business partners.

3.6. Model of procurement management

In a dynamic trading company, optimal control of inventories (optimal ordering and realization of orders) is almost as important as optimal control of sales, and those two processes are in a very close feedback relation.

To solve this problem, the **VISTEL** program has a built-in heuristic model that automatically generates ordered quantities [4], and in practice it turned out to be a very successful model.

Another problem is transparency of orders and procurers' invoices, and that problem is particularly pronounced in cases of discrepancy between the agreed and approved prices and rebates.

In the **VISTEL** program, the mentioned problem was solved by building in procurer's rebate system in terms of a code for each commodity item as a function of the total value of the order and according to the following expression:

$\text{drebate} = f(\text{drebate}_1, \text{drebate}_2, \text{drebate}_3, \text{limit_order})$, where

drebate is calculative rebate on the procurer's invoice price (%);

drebate_1 is basic unconditional rebate on the procurer's invoice price (%);

drebate_2 is basic unconditional rebate on the procurer's invoice price reduced by drebate_1 (%);

drebate_3 is basic unconditional rebate of the procurer's invoice price, reduced by drebate_1 and drebate_2 in case when the total value of the order exceeds the amount of limit_order .

The third problem is the link between the input order of the procurer and the acknowledgement of receipt (input calculation), that is, the procurer's invoice (in most cases it is an order in foreign currency).

In the **VISTEL** program this problem was solved by means of the function of import of the output order to the acknowledgement of receipt, with simultaneous recalculation of the price in foreign currency into domestic currency, which significantly speeds up the process of elaboration of input calculation and taking over of goods.

3.7. Model of wholesale goods management

In case of a large number of customers, the function of distribution of whole sale among a large number of authorized salesmen (cost location) demands systematic protection of a salesman, that would render impossible issuance of goods to a purchaser who does not meet sales requirements.

Sales conditions (KU) for the i^{th} purchaser ($i=1, N$) are most frequently defined by the number of days for deferred payment (currency_i), maximum amount of the total current debit (limit_debit_i) and adequate deposited payment guarantees (guarantees_i):

$\text{KU}_i = f(\text{currency}_i, \text{limit_debit}_i, \text{guarantees}_i)$

In case that the i^{th} purchaser does not meet the requirements KU_i , not a single employee within the information system of the company can generate or issue the outgoing document – the dispatch note, unless the authorized person cancels the preset limitations.

Apart from the above-mentioned limitations and protection that are built in the **VISTEL** program, a salesman has a direct insight into the analytics and synthetics of the mutual financial debits and credits, which enables him to provide purchaser through a direct on-line link with a prompt answer in case of an automatic prohibition of delivery of goods.

The basics of the described model include registers of sale conditions and purchaser's debit limitations, as well as the temporary data base on the current financial balance of the purchaser as a business partner.

3.8. Model of automatic booking of goods

A well-developed wholesale system in which a large number of purchasers takes part and which is realized by a large number of salesmen in real time, can not function effectively without an established subsystem of automatic booking of goods. Absence of such system might result in a state of total chaos.

The problem lies in the fact that in wholesale, unlike retail, purchaser most frequently does not take over goods directly and straight away, but rather later on, through delivery service and the like.

There is also a problem of practical nature here, and it refers to ordering of goods by fax, phone, e-mail, etc. that imply either subsequent delivery or direct takeover of goods.

It happens that a purchaser's order is received, and he comes to take over his goods, but it turns out that there are no goods in stock. Such system lacks seriousness and is very unprofessional, to say the least.

To prevent such situations from happening, each warehouse-related document entered in the **VISTEL** program – at the point of updating the data referring to quantity by the entry on the document, on the level of the trading company in the integral register of goods (chapter 3.3.) and on the level of the warehouse in question at that moment - automatically updates three global variants:

stock	- total amount of the goods in stock
booked	- total booked quantity
available	- total available amount

The model of automatic booking of goods operates on the level of the entry in all output documents (OTP – dispatch note; IZD – delivery note; POD – return receipt for the procurer; PSS – warehouse receipt; DOS – bill of delivery).

In terms of informatics, and from the point of view of approach and updating of the data in the data base, the dynamic function of automatic booking of goods is one of the most sensitive functions.

This sensitivity emerges from the fact that, theoretically, and in many case in practice too, an N number of salesmen-operators in a business network of information systems of companies, want to book the same quantity of goods.

The above-mentioned model, built in the **VISTEL** program, has shown excellent results.

3.9. Model of the warehouse as a system

In order to ensure effective operation of procurement/sale processes, it is imperative to organize a warehouse as a system that enables simple and prompt tracking of goods, allows shortest ways of movement of people and means of manipulation through a warehouse, and does not require an operator-manipulator in a warehouse to have particular knowledge of goods.

In that respect, the **VISTEL** program supports division of the warehouse to locations (separate elements of the warehouse system). Locations are fixed positions in the warehouse at which certain item may be at a certain point of time.

The connections between locations are designed by their logical sequence (sorting in alphabetic order).

The purpose of locations is to enable optimal movement through the warehouse and simple and fast tracking of goods.

The described model is supported by a system of declarations – stickers on goods, with bar codes and locations with bar codes as functions of application of movable bar code scanners.

The structure of location marks may be the following:

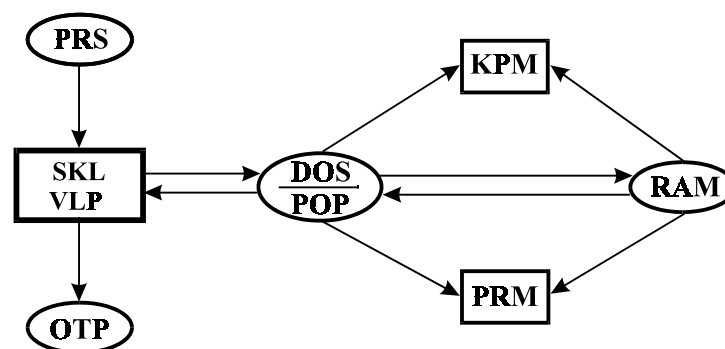
- AA - marking the block – row in the warehouse;
- XX - marking the location within a block (xx = 01, ..., 99);
- YY - marking the level at the location (yy = 01, ..., 99)

3.10. Model of 'internal' retail sale

The basic problem of large trading systems is how to organize in one place (e.g. a discount store) the wholesale and the retail sale at the same time, when all available goods are in stock of the wholesale.

According to the law, prior to retail sale, the goods must be first physically registered at a retail unit.

By introducing the model of 'internal' retail sale, supported by the **VISTEL** program, it is assumed that the retail sale is a subsystem of the wholesale. This means that in retail sale there are no goods in stock, and that the retail sale process begins at the moment when a customer shows up in a retail store. At that point of time, three transactions are in progress: write-off at the wholesale warehouse through a DOS document (bill of delivery – retail calculation), debiting of the retail store (book of entries of supply and sale of goods and synthetics of turnover per means of payment) and write-off of the retail store through issuance of retail bills (Figure 5).



- SKL VLP - wholesale warehouse
- OTP - output –wholesale (dispatch note)
- DOS - write-off at the wholesale warehouse and debiting of the retail store (delivery note)
- POP - return from the retail store to the wholesale warehouse (return receipt)
- KPM - book with procurement and sale entries referring to the retail goods
- PRM - synthetics (total amount) of retail turnover
- RAM - output – retail sale

Figure 5. Model of 'internal' retail sale

The described model is able to provide support for large integrated wholesale – retail systems and, in terms of financial accounting transactions, it essentially simplifies the problem of retail sale accounting.

3.11. Model of the module intended for commercial departments

In modern business systems great attention is paid to performance efficiency of each employee at his or her work post, and it directly depends on the working environment and the quality of business application.

In that regard, it is not enough to have a business application with a high-quality function that supports certain business process. This function must be available for the user of the application at the right place and in the simplest and fastest possible way.

In a well-developed trading company, the above-mentioned criterion refers primarily to the commercial department, therefore a special module has been developed within the **VISTEL** program which gives a salesman direct access to all necessary warehouse-, goods- and finance-related functions and commercial information, and which ensures maximum speed of work for a salesman, without having to make an exit from the module in order to search for certain functions by available application selectors.

3.12. Models of reports intended for the management of a company

Standard business applications that meet legal standards, without features that ensure direct support to the management, sometimes require engagement of accounting departments in working out various analytic and synthetic reports that serve as a basis for decision making.

That is the foundation that all commercial business applications must have and it is self-understood.

However, the contemporary management needs to be able to have an insight in the current situation among the representatives of all business functions of their company of the company at any point of time and without any delay, such as:

- current state of stock and exchange of goods in each warehouse;
- current state of invoiced sales and total receipts per cost locations of the commercial department;
- current state of uncollected debts per purchasers and cost locations of the commercial department;
- current state of all conditions and financial relations with business partners, particularly those who are purchasers, suppliers, etc.

Such functions, the purpose of which is to give a direct support to the management, are considered by the accounting department as analytical accounting. Now they open a new possibility of on-line updating. As for the management, these functions enable them to obtain required information about the major management variables of the business system, at any point of time.

The **VISTEL** program includes a variety of similar reports intended for the management, and they can serve to all those involved in the design of business applications as a pattern for the design of similar solutions.

Due to its considerable significance, the above-mentioned patterns, in a formalized shape, will be the topic of one of the future papers by this author.

4. CONCLUSIONS

Nowadays, there is a large number of business applications by different software manufacturers. However, still there are not many applications developed in OS WINDOWS environment that have relevant advantage over the standard DOS application.

The **VISTEL** program is one of such WINDOWS applications, intended for well-developed medium-sized trading companies.

From the point of view of the user, apart from the apparent power of the business application that is based on the data model, applied data base and tools used to design it and also apart from standard, law-conditioned functions and quantity, the quality of particular functions that support concrete business processes of users is extremely important.

In that regard, the **VISTEL** program is an application through which each participant in business processes in a trading company that represents a business system, realizes majority of his or her business functions, and therefore functioning of a work post without it is practically impossible.

This papers particularly stresses out the range of models – functions that are built in the **VISTEL** program, some of which are original, whereas some have been considerably improved in relation to similar models used in other similar applications.

The theoretical and software basis, as well as the quality of the described group of models, that has been confirmed in practice, can be very useful to all users that deal with the development of new business applications for trading companies, or with improvement of the already existing ones. On the other hand, it can serve as a group of criteria for comparison and evaluation of the existing business application for trading companies.

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Stjepan Vidačić

NEKI MODELI PROGRAMA 'VISTEL' U FUNKCIJI POTPORE UPRAVLJANJA POSLOVNIM PROCESIMA TRGOVAČKOG PODUZEĆA

Sažetak

*Program **VISTEL** je OS WINDOWS aplikacija namijenjena srednjim trgovačkim poduzećima s razvijenim funkcijama veleprodaje i maloprodaje i moderno organiziranom komercijalom.*

Program je razvijen u razvojnom sustavu Microsoft Wisual FoxPro u razdoblju od 1999. do 2002. godine, a u praktičnoj je primjeni od sredine 2001. godine. Autor programa je autor ovog rada.

*U ovom radu prikazano je nekoliko originalnih modela koji su ugrađeni u u program **VISTEL**, a koji su u direktnoj funkciji potpore upravljanja poslovnim procesima poduzeća.*

*Dvogodišnja praktična primjena navedenih modela potvrđuje njihovu kvalitetu u smislu značajnog povećanja učinkovitosti upravljanja poduzećem u svim funkcijama podržanim programom **VISTEL**.*

Ključne riječi: Program VISTEL, modeli, poslovni procesi, trgovačko poduzeće, menadžment, roba, skladište