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The Business Process Needs for Excellent Olap and Data Mining Tools in Kosovo Companies

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Abstract: This paper has to deal with topics relevant to the problem of understanding how OLAP tools and DM applications integrate and how some information support systems can impact to advance business process at companies in Kosovo. Regarding the last sentence, it is clear that the theoretical background includes topics such are the role and impact of excellent OLAP tools and DM applications into information system with objective to increase the performance and business process. The aim of this study is to point out needs of Kosovo companies for excellent OLAP tools and DM applications as well as information supporting system, which include mentioned tools and applications during the business process on way to increase business performance. In this study used quantitative methods with a deductive approach. It means the testing exits theory of OLAP and DM tools, ISS and business processes by using quantitative and executive data with the dequate. The results show that in Kosovo there is a low level of using adequate OLAP and DM tools and applications during the business process with p = 0.52 It means the coefficient P based at the results present accuracy of conclusion that Kosovo businesses in their information system not using adequate tools.

Keywords: OLAP; DM; Business Process; Management Level; Information Systems

JEL Classification: M150; D81

Introduction

Today every business has to deal with a flexibile market and uncertain business situations. Thus, the tools that can help managers to make better business proces are in OLAP (online analytical processing), which can incorporate in every business information systems and to make much more easy business process. According to Liu and Özsu (2009), OLAP tools are also the primary function of business intelligence, which is designed for managers who want to push up the sense of their corporate data related information during the business process. We can understand that managers have the opportunity in the best way to structure hierarchically their own business data with another chance to promote their views on the information. This is changing the relationships to offer more detailed insight into corporate trends influenced by the market and to identify the potential best issues and decisions of doing business process. During the process of finding the best choice and way how to grow up the business activity, managers are also dealing and discover the new knowledge about some business phenomenon; this means the needs for analyzing enormous sets of data and extracting the meaning data. This present process will be analysing data with computer software tools calling Data Mining. According to Data

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Mining tools predict behaviours and future trends, allowing businesses to make proactive, knowledge-driven decisions. Data mining tools can answer business questions that traditionally were too time-consuming to be resolved. They scour databases for hidden patterns, finding predictive information that experts may miss because it lies outside their expectations. On business processes in particular with processes which are developed through information system within enterprises should own sophisticated OLAP and DM tools.

There is many study and research of this phenomenon as is the study of group authors Olson, Dursun Delen and W.W. Eckerson (2008) where is found that just 20 % of OLAP and DM users apply for the work- methodologies CRISP and SEMMA which is the part of DM application. Also there is a study regarding with Data Mining needs for DSS by Rupnik and Kukar 2010, where is found that the traditional techniques of data analyses are not able to give any solution for solved business problems.

This paper has to deal with the study of the business needs for excellent OLAP and DM tools during their business process in Kosovo.

The primary objective of this study is to show the using level of ISS during business processes. The level of OLAP and DM tools as well as application and level of impact at business performance and process of ISS which inside has an excellent OLAP and DM tools. The study was made in Kosovo with companies from different economic fields. Based to the above-mentioned objectives.

In this study, we tried to address the following questions:

- What are the specific in business process according to their needs for information support system?
- What are the specific in business process according to their needs for excellent OLAP tools and DM application trough ISS;
- Which are the based application areas of OLAP and DM methods have been applied?
- What are the commonly used DM applications applied in these business process?
- What are the commonly used OLAP tools applied in these business process??
- Which are the most popular DM and OLAP techniques used in business process models trough Business sector of Kosovo;
- To indicate the fields for further research work in the area.

The Business needs for Excellent OLAP Tools

Naming of these tools for extracting knowledge from OLAP data it started as acronym (abbreviation) of the full naming in English "On-Line Analytical Processing" that can be translated as "Online Analytical Processing". This term was created by the British mathematician E.F. Codd who put the basis of so-called relational calculation and on 1970 presented relational model of data. This data model today is the most popular database-of relational data.

The producers of software quickly understood potentials and revolution impacts that could have application of Codd theory in practice of data managing during business process; therefore they are engaged in developing of respective software solutions for analytical processing of data during business process. It is worth to mention how relational database are increasing and became leading model in data update but is used (served) only for intention (needs) of transactional online processing.

Today ten years later it can be said that there is no important software producer which does not offer own OLAP tools. At the end of 2002 the general turnover realized of the tool market-OLAP has reached the approximate amount of 3.5 billion dollars while on 2006 reached the amount of approximately 5.7 billion dollars.

For more for participation of OLAP tools by producers in the world see the following table.

Table 1. The participation in OLAP produce by companies on the world

Producer	Participation %	Billion	Companies
Microsoft	31,6	1.806	Microsoft
Hyperion	18,9	1.077	Oracle
Cognos	12,9	735	IBM
Business Objects	7,3	416	SAP
Micro Strategy	7,3	416	Micro Strategy
SAP AG	5,7844	330	SAP
Cartesis (SAP)	3,680982	210	SAP
Applix	3,593339	205	IBM
Infor	3,488168	199	Infor
Oracle Corporation	2,787029	159	Oracle
Other	2,66433	152	
		5.705	

Even though OLAP tools were developed before the concept of Intelligence Business (IB) in one way could be considered "embryo" ("seedling") of that concept. The arguments for such thesis are following possibilities that offer modern efficient OLAP systems:

1. OLAP presents conceptual and intuitive model which also users that are not specialized for performing analytical works and are not specially educated easily can understand and apply fast on their work. The model is based on multidimensional analyses method that means data at the same time can be seen through major number of filters, which on professional terminology are called dimensions.
2. OLAP tools enable performing more rapid analyses. The OLAP system's workflow enables managers and experts to ask questions and get a percentage in shorter time than before the release of these tools, which, however has a positive impact on the quality of their decisions.
3. OLAP tools itself contain too large computing capabilities necessary for fulfilling calculating requests of OLAP tools enable to the person, business analyst writing simple formulas which will be applied during many dimensions and on this case should write only some simple program instructions respectively the line codes.

Therefore OLAP tools include a wide spectre of possibilities from simple tracking and navigating, through calculations until serious analysis as time series analyses and complex modelling. In this manner they can "cover" an entire hierarchy chain that comprises the skeleton of obtaining informed business

decisions, the chain that starts with data and continues with completed information on Business Intelligence.

According to JSR-73 Expert Group, today's companies use several types of information support systems during business making process. The most popular support information systems used by companies are MIS, GDSS, DSS.

Inside information supporting system there are elements that help users make much easier decisions. One of these aspects is OLAP tools that are used for advanced data analysis and decision support in business area. OLAP tools follow what is in essence a deductive approach. The quality of this method depends on acquiring the most valuable information, trends and patterns. OLAP tools can help managers to better understand adaptability of data during business making process.

The Business Needs for Data Mining Tools

Before that we start explaining and discuss regarding exploring of data it is important to say that DM (Data Mining) is used or is being used by (Kolich, Storch & Fafandjel, 2016) industries and different businesses starting from producing sector until the serving and trade sector respectively DM is used by all managerial levels of respective companies.

Data exploring could be defined as a discovery of data legitimacy. Data can be organized on database and also can be textual or not structural data derived by webpage or data organized in time series.

This field is very young since scientists started in the 20th century to deal with the theoretical basis of the DM (Kraljevic & Gotovac, 2010) so there is a multitude of methodological approaches to this problematic as well as preferences of applying methods, which go to designated field, depending on authors who deal with this problem.

Some of the methods that are expressed as data exploration methods have been developed in their basic (rudimentary) forms since 1970's and 80's of the 20th century. In the mid-1990's of the 21st century there is a syntax of data exploration (org. DATA MINING), which brings together a set of methods and actions as well as the purpose of which is discovery of legality (collection) of data.

In the 21st century, scientists mostly focus on building Data Mining applications that will need to be appropriate to the needs of enterprises, respectively enterprise management in different business environments that are changed based on market demands (Kraljevic & Gotovac, 2010). DM can be utilized based on two approaches. The first approach is called the data mining software tools where data exploration is done through DM's ad hoc projects. While the second approach of use of DM is DM system or so-called Data Mining Application Access Approach (Rok Rupnik, 2007).

The first exploitation approach of DM usually operates separately from data sources by requiring an additional amount of time to export data from different sources of import, pre-processing, processing and data transfusion (Zekić-Sušac & Has, 2015). Lack of software tools for data exploration is that a large number of experts need to collaborate in the project and deliver results to the relevant model (Srivastava, Cooley, Deshpande & Tan, 2000). DM's models are created, manufactured for the needs of business persons. Since they are intended for business DM applications should be accessible and easy while exploring data effectively to facilitate decision support (Kohavi, 2015).

For this reason was developed another approach of DM use. The second approach of DM or system approach of application is focused, dedicated to the needs of managers and other users to make data exploration easier in a particular model. This model is friendly and users can easily use it. Managers can focus on specific problems and cover a large spectrum of analysis with the ability to make periodic analysis of data and future enterprise planning.

The Integration the OLAP and DM tools Into Business Process

Depending on the nature and business activity varies what business process will steam, derive from those businesses. Therefore businesses differ from each other depending by the business or business scope. But business processes have some common elements and they are for bringing the efficiency and effectiveness of the company which is naturally because the goal of organization is profit while business process enables that. Within business processes, a coordinating activity is carried out, which facilitates the recruitment of its own employees. For example, the application of new technology in enterprise aims to simplify any business activity and increases productivity of work which affects the ease of doing business. Advancement of business processes are goals of an enterprise that want to be competitive and successful on its business.

The advancement of business processes takes place through: technology, capital and persons-field experts. One of the areas of technology that contributes to the advancement of BP is the application of IT technology, respectively the application of IT systems arising from hardware and software technology. Respectively information systems should on the other hand help internal and external processes as well as failures to make their work faster and better.

Information support systems provide support in partially resolving structured and unstructured business problems at all levels of companies. The fundamental properties of these systems are (Quhtani, 2017):

- Provide support for different ways of deciding which steps must be undertaken;
- High flexibility, interactivity and ease of use during business process;
- First of all they improve the effectiveness (accuracy, timeliness, quality) during business process;
- Enable independent development of simpler systems and ultimate one's Users, since they allow modelling and experimentation;
- Allow access to different data in databases, different navigation and multimedia information.

Methodology

The scientific research method used on this study is one of manners that are commonly used in all social researches. The topics treated in this article as is it already known is using OLAP tools and data mining application in business processes with their issues that belong to social categories. In this study is used quantitative method that is based on quantitative data derived by questionnaire. On the other hand, all methods that were used in the social sciences themselves have three main approaches that are related to the treatment of the theory. In this study was used the deductive approach, since the study wants to

confirm existing theory of information systems with excellent tools such as OLAP and Data Mining during business processes.

Sample of Research

In this study number the respondents is from 54(fifty four) enterprises. From this number 8 (eight) of them are respondents from major enterprises and 46 from medium enterprises. The enterprises from geographical point of view cover all 7(seven) regions. The number of respondents is 1232 (One thousand two hundred thirty two), which is the random sample of population in this research. Therefore in this research participated 1232 (One thousand two hundred thirty two) managers from 60 (sixty) enterprises from all Kosovo geographical area.

Operationalization of Variables

On this study the research variables will be: the quality of business process, level of use of OLAP and DM as well as business performance; where the quality of business process is the depending variable while levels of use of OLAP and DM tools as well as business performance are independent variables. The submitted variables were done with aim of testing the hypothesis, collection of information with matter of the level of use of OLAP and DM tools within information system in business processes which are developed in Kosova enterprises. The high or low level of process performance based on the use of OLAP and DM tools as well as the level of influence of OLAP and DM tools and ISS in improving and facilitating of work performance during business process. In order to find answers in all apostrophized cases the model of linear multiplex regression equation will be used. The analysis of work will first start with cross-sectional analysis of variables, correlation analysis with variables, then explanatory analysis or explanation as well as finally the equation regression analysis will be used.

The testing model will base on regression equation.

$$Yc=B0+Bx_{performance}+Bx_{levelof\ olap\ and\ dm\ tools}$$

According to R.Q. the work hypothesis is:

H1: The application of OLAP and DM tools influence quality of business processes;

H2: The adequate applications of OLAP and DM tools influence in better business performance.

Results & Discussion

In this part of the study will be presented research results in which were processed over 60(sixty) companies with over 1232 (One thousand two hundred thirty two) respondents. Respondents asked questions that are bound to make business policy decisions through its information systems for decision support and to understand the purpose of OLAP and DM tools as elements that influence better performance of system and taken decisions.

The following table will display results related to business making by managers. The next table presents the results about whom or which managerial level in companies makes strategic decision. The results

value is based on numeric scale from 1 to 5, where 1 is none and 5 always high. At the table are present results of number of respondents, average, variance, standard deviation and coefficient.

Table 1. Statistical variability of the ratio between the level of managers and using experience by doing their work

Managers Level	Experience				
	Total	Me	Var	Sdev	Coeffi
M.M.	382	3,97	1532,207	39,14	10,25%
L.M	664	2,38	1546,963	39,33	20,59%
T.M	186	3,85	1555,105	24,17	0,08%
Total	1232				

Based on the table 1 the results show:

The managers of all level enterprises base their work on their experience. Therefore managers of middle level mostly undertake their work and do their work based on their experience with an average 3, 97; the managers of lower level undertake their work and work based to their experience in value from 2.38 and ones from the highest level 3.85.

Before we start presenting results regarding level of using OLAP tools and DM applications in support information systems at enterprises in Kosova will be presented results that have to do with how much managers use intuition within their work performance during business processes, since it is vital to know role and use of intuition of managers within their work performance and quality of their work performance on respective business processes. Since based to research group (Tat, Sun Hooi, Mc Grew, Ai Chin & McYus, 2015) the use of intuition during work performance of some business processes depends from information, knowledge, uncertainties which have managers itself. This implies that if there is a high level of intuition, there may be a lack of qualitative development of business processes. The following table presents results related to the level of use of intuition by managers when performing their work in any business process in Kosovo enterprises.

Table 2. Statistical description based to managerial perception regarding use of their intuition during business process.

Managers Level	Using the intuition during the business process				
	Total	Me	Variance	Sdev	Coefficient
M.M.	382	3,24	1539,856	24,4	8,23%
L.M	664	2,75	2339,750	28,45	6,15%
T.M	186	3,54	1338,3218	20,28	13,05%
Total	1232				

Based at the above table respectively presented results it can be concluded that in general managers use above an average level their intuition during business processes that are developed at enterprises. Since the high level managers based to their perception use their intuition in an average from 3.54 (where values vary from-5) that is very high and creates doubt in quality of development and performing business processes if we refer to research group (Tat, Sun Hooi, Mc Grew, Ai Chin & McYus, 2015). Also managers of other levels used their intuition in an average from 3, 14 that is high. The concern is that high level of use of intuition maybe can bring to rationality of business making and it can bring also

not efficiency in information system based on OLAP tools and DM applications and ultimately the inadequate direction of business development. Following will be presented results on the table regarding the use of OLAP tools and DM applications during business processes.

Table 3. Relationship between Managerial Position and using OLAP and DM tools in MBE in Kosovo

Managers Level		No	Sometimes	Yes	Total
MM					
	%	70,0%	10,0%	20,0%	100,0%
	%	60,0%	30,0%	10,0%	100,0%
	%	16,7%	50,0%	33,3%	100,0%

Based on the results from table no.3 we can conclude that 60% or 400 of low-level managers are not using OLAP and DM tools during the business processes. From this we can find that 20% or 75 of middle managers use ODM during business processes. On the other hand 16.7%, or 30, high managers do not use OLAP and DM tools during the business processes. If we compare these results with the results extracted regarding level of use of intuition during work performance in business processes more or less are very contradictory and not logical with results extracted regarding level of use of OLAP tools and DM applications, since these tools are being used by sophisticated information systems with aim of doing objective, rational and quality work as well as offer exact, reliable and verified information which are accessible at any time. Perhaps these results may indicate that OLAP tools and DM applications integrated on IT systems are old and not up-to-date, or perhaps there is a lack of knowledge of managers regarding use of these tools. The following table will show the level of use of information support systems in Kosovar enterprises during business processes. Since supportive IT systems have a positive impact on performance of businesses according to (J. Hall, 2013)

Table 4. Report between the Using of Information supporting systems (ISS) and Managerial Levels in Kosovo MBE

Managers level		Never	Sometime	Often	Too much	Total
	%	20,0%	20,0%	40,0%	20,0%	100,0%
	% of Total	5,3%	5,3%	10,5%	5,3%	26,3%
LM						
	%	100,0%	0,0%	0,0%	0,0%	100,0%
	% of Total	5,3%	0,0%	0,0%	0,0%	5,3%
TM						
	%	33,3%	8,3%	41,7%	16,7%	100,0%
	% of Total	21,1%	5,3%	26,3%	10,5%	63,2%
Total						
	%	36,8%	10,5%	36,8%	15,8%	100,0%
	% of Total	36,8%	10,5%	36,8%	15,8%	100,0%

Table no.4

Highlights that managers use on the level above average during business processes information support systems expressed in percentage 52% since 15.8% from them are used very often, while 36,8% often.

Anyhow cannot be ignored the fact that 36% managers do not use at all supporting information systems during their business processes.

Analyses

The analyses of the study will be based on analysing and discussing the results based on prescribed hypothesis and research variables which influence on some presumption of hypothesis. Firstly on analysis will be observed factorial analyses (Newbold, Calrson & Thorne, 2007) with aim on finding factors or variables that influence in accepting or not accepting any hypothesis. Secondly will be made analyses of correlations by variables extracted from factorial analyses with aim of understanding connection between variables; is important for further analysing of econometric model based to equation of multiple regression and other analyses that come out by application of this equation. The figure of factorial variables analysis follows

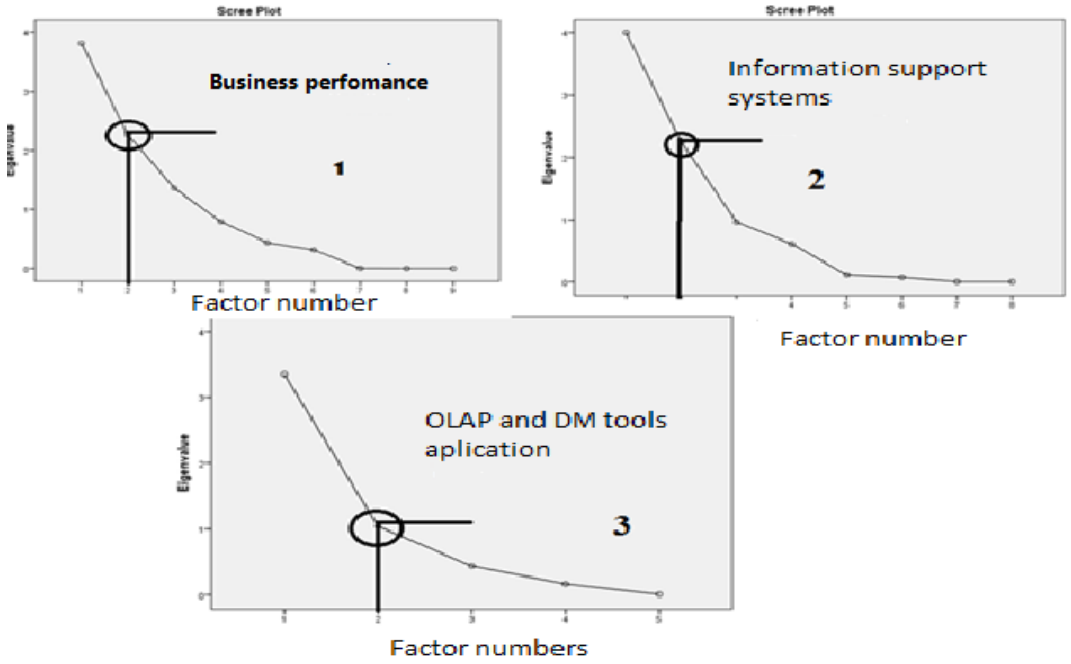

Figure 1. The Factor Analyses for the Variables

Based on the factorial analysis we can determine factors and variables. Information support systems, OLAP tools and DM application as well as business performance are primary variables which influence too better business process and business performance in general. However finding out how much variables affect each other and their influences between each other as well as their relationship it is necessary (Krasniqi, 2012) as is mentioned to make correlation analysis since this analyse helps find the coefficients of relations between variables (Newbold, Calrson & Thorne, 2007).

Table 5. Correlations between SGD, OLAP and DM tools, level of using ISS

Variables		Business performance	OLAP and DM	Level of Using ISS
Pearson Correlation	BP	1,000	,799	,945
	OLAP and DM	,799	1,000	,934
	Level of Using ISS	,945	,934	1,000
Sig. (1-tailed)	BP	.	,003	,000
	OLAP and DM	,003	.	,000
	Level of Using ISS	,000	,000	.
N – Sample Size	BP	1232	1232	1232
	OLAP and DM	1232	1232	1232
	Level of Using ISS	1232	1232	1232

The table below shows the results of correlation analyses between BP, OLAP and DM performance and the level of using ISS. The most reliable positive correlation is between mentioned variables. The results communicate that if managers want to make correct and quality business process they must have information support systems, which consist of algorithm applications, such as OLAP and DM with excellent tools.

The correlation analyses show us positive correlation between variables with high results, 945, 934, 799 and significance, 000 and 003. The meaning of this positive relationship is that testing model inside has the dependent variables that influence each other. The tables present the R-value of testing regression equation model.

Table 6. Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Errorof the Estimate
1	,972[a]	,945	,918	,30339829

a. Predictors: (Constant), OLAP and DM performance, Information Support Systems

b. Dependent Variable: quality of business process

Based on the model, determined that the of R-Value Square is acceptable, as is demonstrated in table 6. Based on R-value can be concluded that ISS constructed by adequate OLAP and DM tools is part of business process system and the business has needs for those excellent tools on the way to increase their performance.

Table 7. ANOVA a

Model		SumofSquares	df	Mean Square	F	Sig.
1	Regression	6,358	2	3,179	34,538	,006[b]
	Residual	,368	4	,092		
	Total	6,727	6			

a. Dependent Variable: Strategic group decision
b. Predictors: (Constant), OLAP and DM performance, Support systems during decision making

The significance of regression model is 0,006 that mean the OLAP and DM tools application both with the information support system influence on business process quality during. The H1 The applications of OLAP and DM tools influence quality of business processes is approved and can be concluded, any information support system which consists the relative OLAP and DM tools and those tools are makes exclusive for business needs, influenced in a positive way on business process and bring a better quality

of the process. The H2 adequate applications of OLAP and DM tools influence in better business performance also was approved, but only some applications influence the business performance.

The quality of business process will depend on using level of adequate information support system. The next table, present the beta value of the regression equation.

Table 8.Coefficients a

Model		Unstandardized Coefficients		StandardizedCoefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	243	,152		1,605	,184
	OLAP and DM and ISS	1,193	,690	1,126	1,728	,159
	Business performance	2,204	,698	2,059	3,159	,034

a. Dependent Variable: Quality of business process

So the constant and depend on the variable quality of the business process is 0,243 with the significance of 0,184 and the independent variable Level of Using ISS have the value of beta coefficient 1.193 with sig = 0.159 and OLAP and DM tools 2.204 with sig 0,034. So, those value of variables can be used for the testing model of mention hypothesis in the.

Conclusion

In this paper was found that all most all managers using experience and intuition during their daily work or their business process. Also, this paper points out the business needs for the information support systems which inside must have adequate applications which must be based on real business demands and needs.

The paper shows the problems and barriers which occupants the managers in Business Kosovo sector regarding with continued development the OLAP tools and Data Mining applications. The reasons for this manager concern is that the firms in Kosovo their ISS baying from universally platform which is not adequate and adapt for Kosovo firm's needs.

Actually, the study shows the needs for great and flexible operative information business system as OLAP and DM tools which must be in line with the clearly defined methodological framework of ISS application.

An understandable development methodology is one of the key parameters for successful modeling of applications which must be integrate in some business support systems is OLAP and DM elements of their business process system which coming up from business market needs.

The main emphasis of this paper was defining a successful model for integrating the OLAP and DM tools trough information support system and how those tools can impact on business process performance.

According to H1 accepted, can be concluded the business in Kosovo must incorporate and integrated the OLAP and DM tools and application in their business process if they want to have and made the quality business process.

Because, as we find the relative and flexible operative system OLAP tools and DM application influence in the decision quality if the decision process is made in certain situation.

Regarding with H2 strongly recommended that the business policy must be oriented to applied software which inside must have the opportunity for upgrade new tools regarding with new algorithm solution regarding with business problem. In other words, the business applied software must give an answer in all business situations in some economic policy system. For example, in Kosovo business encounter with too many no loyal barriers, regarding with this the software must have tools which can show the probability of good decision according to the barriers. However adequate software can influence the business process.

In the future research recommended dealing with building of the whole system for prevention of goods OLAP and Data Mining tools, which are equal with the business market needs in Kosovo. Data Mining model tools in the future according to Kosovo case must defined and described here for detection of potential business problems, opportunities as part of business process systems which is present in Kosovo companies.

Detection model results must be matched with defined segments of users, and for each segment, it is necessary to define the appropriate action. This work is in different complex situations must give the best tools of OLAP and DM tools.

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