Academic Journal of Economic Studies
Vol. 1, No.4, December 2015, pp. 37–44
ISSN 2393-4913, ISSN On-line 2457-5836

Business Intelligence in Insurance Brokerage Companies – a Tool for Decision-Makers

Alexandru Manole

Faculty of Finance and Accounting, Artifex University of Bucharest, Bucharest, Romania
E-mail: alexandru.manole@gmail.com

Abstract *This paper presents several applications of data analysis software in the insurance brokerage activity, particularly in matters related to the decision-making process. The study is based on a dataset loaded in a data warehouse, and several analysis procedures are presented, from the viewpoint of the managers of such company.*

Key words Analysis, commission, warehouse, cube, premium

JEL Codes: G22, C88

1. Introduction

The use of business intelligence applications in the management of companies can offer a valuable toolbox for decision-making process in insurance brokerage companies. The information drawn from business intelligence applications comes in addition to operational level information, obtained through data processing in the company databases, and presented in the form of reports, which describe various facets of the activity of the company.
The insurance broker acts in a highly competition-driven environment, and needs timely information to substantiate his decision. The insurance agents must have accurate knowledge on the profile of the customer, while the managers have to be in permanent touch with the intelligence on the key, large (corporate, for example) customers, whose own network of relationships can boost the portfolio of insurance customers for the broker.

2. Literature review

A previous paper (Manole 2015) describes the conceptual and logical aspects regarding the structure (dimensional model), construction and implementation of the data warehouse dedicated to a company in the insurance brokerage sector, also presenting some aspects on the data loading mechanism. The concept of business intelligence, the components of such application, the uses in business world were presented by Cebotarean (2011), Manole (2008), Muntean (2012). Some applications of business intelligence tools in insurance activity are presented by Popa (2006).

3. Methodology of research

In this study, the focus will be the utility of business intelligence in the activity of an insurance brokerage company. The application is based on a data warehouse structure, discussed in a previous paper, in which also some examples of reports were presented (Manole, 2015). The analysis methods that are to be used belong to economic-financial analysis, statistics. The software used for analysis and presentation of results is SQL Server 2014 with Visual Studio Data Tools 2013. The data warehouse is loaded with a set of data, for exemplification and testing purposes.

4. Data analysis

The analysis method that is to be applied in this paper is based on the additive model (see Manole 2015). The factors that will be taken into consideration at the first step are the time and the number of rates. The managers of the company are interested to see how their customers prefer to schedule their rates. One idea in this respect is that most insurance offers are granting a deduction from the total premium if the customers pay in a smaller number of rates, therefore it is important to have an image on the customers' choices. Another possible analysis could reveal the following fact: if a customer acquires more policies, covering the same risk and object of insurance, for different periods (i.e. successive yearly car insurances), a change in the choice for a given number of rates can be a sign of modification in customer's financial situation. A model for such report is presented in the following figure (the months appear as row headings:

Number of rates per month

	1		10	
	FACTS POL Count	Premium	FACTS POL Count	Premium
10	94	41275.33	7	3411.94
11	66	40722.05	2	1319
12	111	61507.84	6	3347.67
9	5	528.91		

Figure 1. Number of rates for contracts signed across a given range of months, as shown in Visual Studio Data Tools 2013 – selection

Another analysis topic in the same respect is the information on the seasonality of the business. This means to draw the number of policies signed for each month, across, at least, the recent interval. A model for such report is presented in the figure 2 below:

Figure 2. Dataset revealing the seasonality, per months, of the insurance premiums subscribed, as shown in Visual Studio Data Tools 2013

The second step in analyzing the seasonality of the business is to outline what the insurance types are providing the highest levels of premium subscribed in the top months of activity. Based on the data from figure 2, December appears to have the highest intensity of the activity, as far as the total value of premium subscribed is concerned. The dataset can be represented by using the following model:

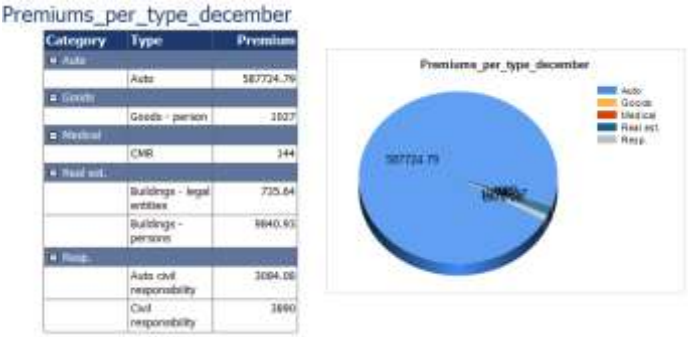


Figure 3. Dataset revealing the predominant insurance type related to the most significant month, as shown in Visual Studio Data Tools 2013

The author's experience in this type of business, in Romania, reveals that, indeed, December has a pivotal role in "keeping the insurance broker busy", mainly due to the auto insurances – the so-called (in Romania, as specified) CASCO optional auto insurance and the mandatory RCA – civil responsibility for the drivers.

The same study can be performed for the number of insurance policies signed, counted from the policy official number, recorded in the data warehouse and made available in the analysis cube.
The monthly status of policies concluded is presented in the following figure:

Contracts signed per month

Month	No. of policies
1	1456
10	2145
11	1573
12	1573
2	1486
3	1731
4	1457
5	1418
6	1453
7	1554
8	1318
9	2150

Figure 4. Dataset revealing the number of contracts per month, as shown in Visual Studio Data Tools 2013

From this viewpoint, the highest values are for September and October.
The next step in the analysis of customer preferences for scheduling the payment of the premium is to outline the structure, during the key months already determined, per number of rates assumed when the policy is signed. The number of rates is standardized, so the analysis will not provide highly granular data, possible to become difficult to be interpreted by the managers. By using the criteria/filter query instrument of the Visual Studio Data Tools, we can narrow the dataset to the three months considered above. The presentation of the data may be constructed as shown in the following model:

Structure per number of rates

No. of rates	No. of policies	Total premium
1	5308	489140.5
2	51	35549.73
4	353	445545.19
6	5	11494
10	31	34065.29
12	29	32310.55
40	1	1730

Figure 5a. Dataset revealing the structure per number of rates, corresponding to the best months, as shown in Visual Studio Data Tools 2013

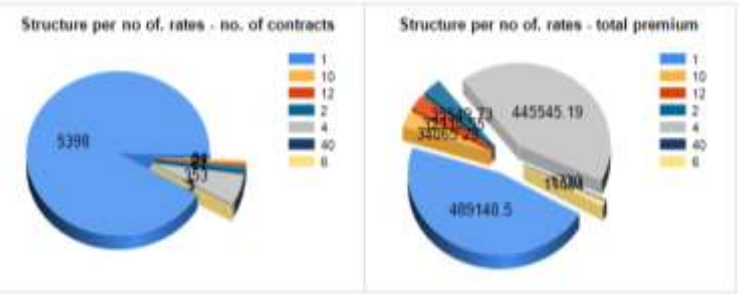


Figure 5b. Graphical representation of the dataset revealing the structure per number of rates, corresponding to the best months, as shown in Visual Studio Data Tools 2013

One useful conclusion that might be extracted from this analysis is the fact that, while the number of policies and total premium record the greatest values for integrally paid premiums-single rate, in the situation of total premium centered analysis, the four-rate contracts have also a significant weight, similar to the integrally paid ones. To be noted, when interpreting this kind of results, the discounts applied by insurance companies for those accepting less rates are to be considered.

Another analysis direction, also in the scope of aiding the decision-makers, is based on another measure defined in the InBroker data warehouse: the revenues from commission (see Manole 2015).

This approach requires a separate cube, whose model, drawn from the InBroker data warehouse, is presented in the figure 6.

Together with the analysis based on premiums, this study should focus on the key dimensions of the company. The first example will pursue the contribution of each insurance type in the total commission. The model structure for this report is presented in the figure 7.

The next report proposed will show the contribution of the insurance agents to the achievement of company revenues (the commissions generated from the policies managed by the respective agent). The structure of the report is presented in the figure 8.

As the business model of the broker depends heavily on the relationships with insurance companies, the analysis of commissions per insurers is a key topic in manager's preoccupations. The managers must be aware of both recent and historical shares/quotas belonging to each insurance company, the most important reason for this being the prospective negotiations that are to take place in the future.

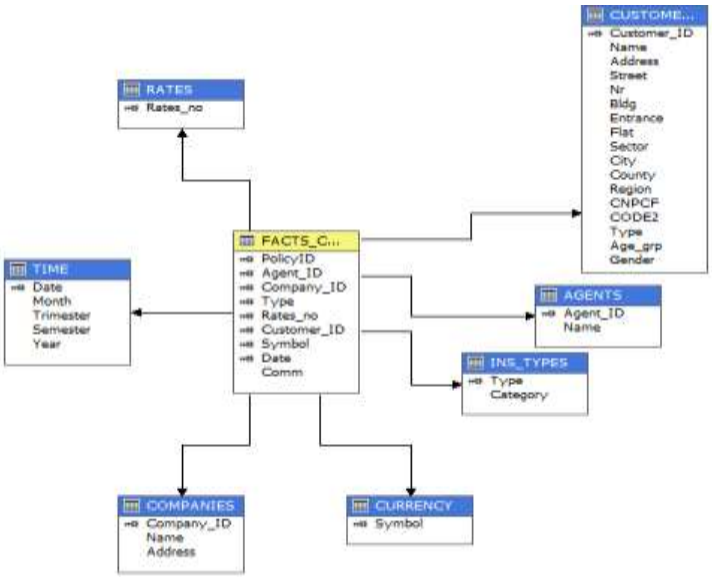
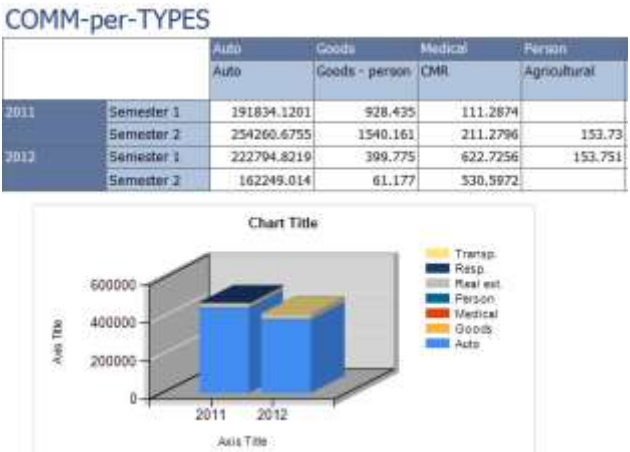


Figure 6. Physical model of the COMM cube, as shown in Visual Studio Data Tools 2013



COMM-per-TYPES

		Auto	Goods	Medical	Person
		Auto	Goods - person	CMR	Agricultural
2011	Semester 1	191834.1201	928.435	111.2874	
	Semester 2	254260.6755	1540.161	211.2796	153.73
2012	Semester 1	222794.8219	399.775	622.7256	153.751
	Semester 2	162249.014	61.177	530.5972	

Figure 7. Evolution, across two years, for commissions grouped per types of insurance, as shown in Visual Studio Data Tools 2013

Comm_per_Agents

	Auto	Goods	Medical
1	1314.999		
10	2738.3385		20.6262
11	17061.612		
12	119455.7108		190.08
14	16755.1161		
15	73895.9111	1871.145	
17	1123.3074		
19	23832.651	349.32	

Figure 8. Contributions of agents in total commissions, as shown in Visual Studio Data Tools 2013 - selection

The proposed model for such report is presented in the figure 9, together with the MDX query on which is based:

```
SELECT NON EMPTY { [Measures].[Comm] } ON COLUMNS, NON EMPTY { ([COMPANIES].[Company ID].
[Company ID].ALLMEMBERS * [INS TYPES].[Category].[Category].ALLMEMBERS ) } DIMENSION PROPERTIES
MEMBER_CAPTION, MEMBER_UNIQUE_NAME ON ROWS FROM ( SELECT ( { [TIME].[Year].&[2011], [TIME].
[Year].&[2012] } ) ON COLUMNS FROM [COMM]) WHERE ( [TIME].[Year].CurrentMember ) CELL PROPERTIES
VALUE, BACK_COLOR, FORE_COLOR, FORMATTED_VALUE, FORMAT_STRING, FONT_NAME, FONT_SIZE,
FONT_FLAGS
```

Comm_companies_types

	I	II
Auto	184370.1315	1303.8912
Goods	349.32	
Medical	199.08	
Person		
Real est.	17957.8299	382.1857
Resp.	522.3185	
Transp.	527.1816	

Figure 9. Report showing the commissions achieved per companies and types of insurance and MDX query, as shown in Visual Studio Data Tools 2013 - selection

Also, a most important component of the business model of the insurance broker is the customer. Accurate knowledge on the reflection of this relationship in the activity measures is extremely important for the manager of the brokerage company.
One aspect of this analysis is the structure of premiums subscribed by customers, per insurance types. The structure of such report might be presented as in the figure 10.
As outlined by other reports, the key insurance type in the portfolio of the broker is the auto insurance.

COMM-CUSTOMER-TYPE

	Accidents-[illegible]	Agricultural	Auto
1			978.457
100			149.3205
10011			253.4745
10012			252.1605
10013			16.95
10014			68.511
10015	3.5112		75.75
10024			92.136
1005			111.5985
1006			146.538
1007			226.5495
1009			378.249

Figure 10. Report showing the commissions achieved per customers and types of insurance, as shown in Visual Studio Data Tools 2013 – selection

5. Conclusions

The complexity of data stored in the electronic archive of an insurance broker company represents, if properly managed by special software – OLTP and business intelligence application, in my opinion, offers a great deal information potential for the managers, able to help them make strategic decisions regarding their activity. Information drawn from business intelligence solutions, such the types presented in this paper, completes the operational information accessible through reports from OLTP software and has a more strategic-oriented character, taking into account the possibility to aggregate data across a larger time interval. The possibilities of analysis are virtually limited only by the dimensions and their levels/members.

References

Cebotarean, E. (2011). Business intelligence. *Journal of Knowledge Management, Economics and Information Technology.* Volume (Year): 1 (2011), Issue (Month): 2 (February), available at http://www.scientificpapers.org/wp-content/files/1102_Business_intelligence.pdf

Manole, A. (2015). Some Considerations Regarding the Design and Implementation of Data Warehouse in Insurance Broker Management, *Academic Journal of Economic Studies,* 3, 115–125.

Manole, A. (2008). *Sistemul informatic pentru modelarea deciziei financiar-contabile*, Artifex Publishing House, Bucharest.

Muntean, M. (2012). Business Intelligence Approaches. University Library of Munich, Germany in *MPRA Paper* with number 41139.

Popa, Gh. et al. (2006). *Microsoft SQL Server*, Economica Publishing House, Bucharest

www.msdn.microsoft.com