Fall 11-28-2006

E-Banking Integrated Data Utilization Platform WINBANK Case Study

Vasilis Aggelis

E-Banking Integrated Data Utilization Platform WINBANK Case Study

Vasilis Aggelis
Senior Business Analyst, PIRAEUSBANK SA, aggelisv@winbank.gr

***Abstract* — we all are living in information society. Companies and Organizations have many information networks. But when we talk about information, we talk about a wide notion. Scope of modern organizations is not only having data. Their target is to gain competitive advantages from them. The basic means to achieve their target are the use of modern and steady methodologies and systems depend on them, in order to find hidden patterns or models. Our platform is an innovative one. We specify our methodology taking into account human factor and we build an integrated data utilization system. In the next paragraphs, we introduce our techniques and system.**

***Keywords* — e-banking, knowledge utilization, data mining, internet banking fraud detection.**

I. INTRODUCTION

Electronic banking adoption is grown rapidly the last years. E-Banking nowadays offers a complete range of services and products facilitating not only the retail customers but also institutional ones to conduct their transactions easily and securely [1].

WINBANK is the electronic banking division of Piraeus Bank. This unit is responsible for bank's alternative channels, such as internet banking, mobile banking, phone banking and ATMs. WINBANK has the most innovative electronic services in Greek e-banking market and keeps a very strong portfolio of services in comparison with other banks worldwide.

Last year WINBANK took winning prize in all awards which participated in. Those prizes prove WINBANK's leadership in electronic banking market.

Apart from prizes, increasing customer satisfaction annually certifies leading position. Those factors increase our concern and make us working harder in order to keep top quality of our services and customer satisfaction in high level.

WINBANK's big challenge was data and knowledge utilization [10, 11, 14, 15]. From this point of view, we designed, implemented and established in-house two major systems. The first one is for knowledge utilization in order to gain advantages both bank and customers. The second one is for data utilization in order to detect and prevent internet banking fraud.

In the next sections we describe briefly our integrated data utilization platform. Section 2 contains K.R.I.O.S. system and its use, while in section 3 internet banking fraud detection system is described. Finally section 4 contains the impacts of our integrated platform.

II. WINBANK K.R.I.O.S. SYSTEM

K.R.I.O.S. is an innovative smart knowledge returning system [3]. The system has dual goal (Figure 1). It serves winbank's business needs, but it is also serves our customer.

We take advantage form K.R.I.O.S. in order to build a steady and healthy relationship with users. As a first step we offer personalized services for each user. Moreover, taking into account many parameters, our internet banking service returns knowledge to user during his/her navigation in our site.

In order to implement the main functions of the systems, there are many cooperating parts of K.R.I.O.S (Figure 2). These parts are:

Data Warehouse: All electronic transactions (both informational and financial), all transactions from other channels (cashier, ATMs, Automatic Payment Systems, etc.) and web log from secure internet banking site are stored in Data Warehouse. All this information is updated in weekly basis.

Modeler: Modeler is the subsystem which consist data mining [12], business intelligence, predictive analytics and ETL (Extract-Transform-Load) tools. This subsystem is responsible for data processing. In addition, modeler creates and educates models and patterns [4, 5, 6], which, in most cases, stored in Knowledge Base.

Knowledge Base: Our Knowledge Base is the main knowledge repository. Every single information represented to users, is exported from this Base. Knowledge Base is updated from Data Warehouse, Modeler and User's interaction.

Smart Agent (optional): This is an optional tool. Its usefulness based on contributing in a more friendly and familiar interface.

III. WINBANK FRAUD DETECTION SYSTEM

WINBANK takes into consideration all parameters which lead in internet banking fraud. Analysts established many detection rules [9]. Apart from the initial ones, new rules are added, when analysis finds out suspect patterns [16] and behaviors. Those rules enhanced in an offline fraud detection system [2].

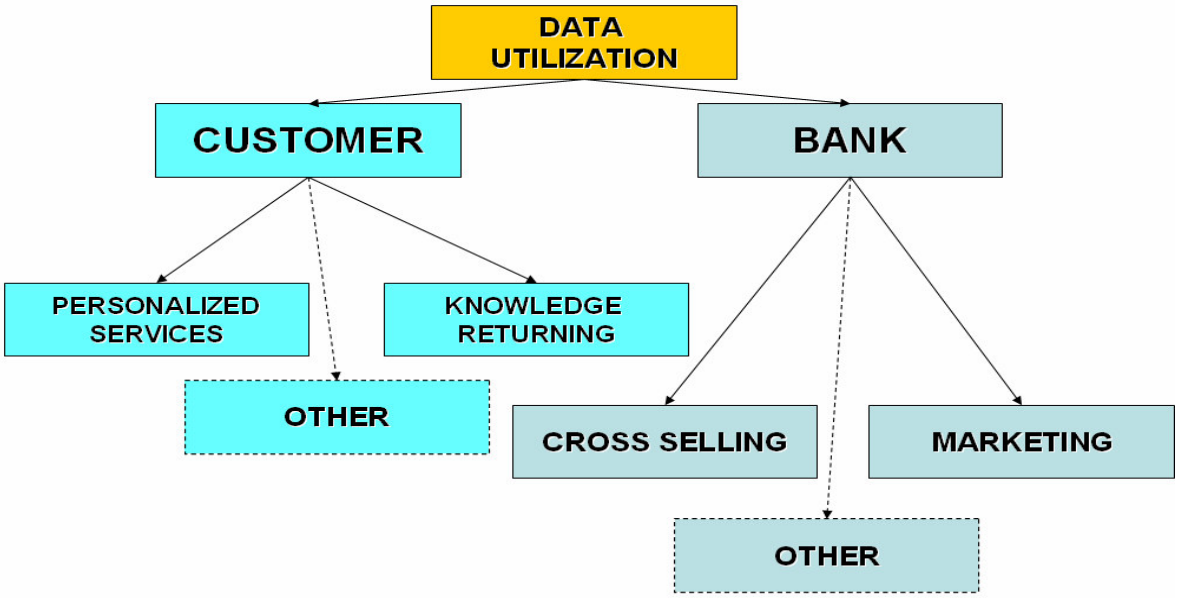

FIGURE 1 – System's Dual Goal

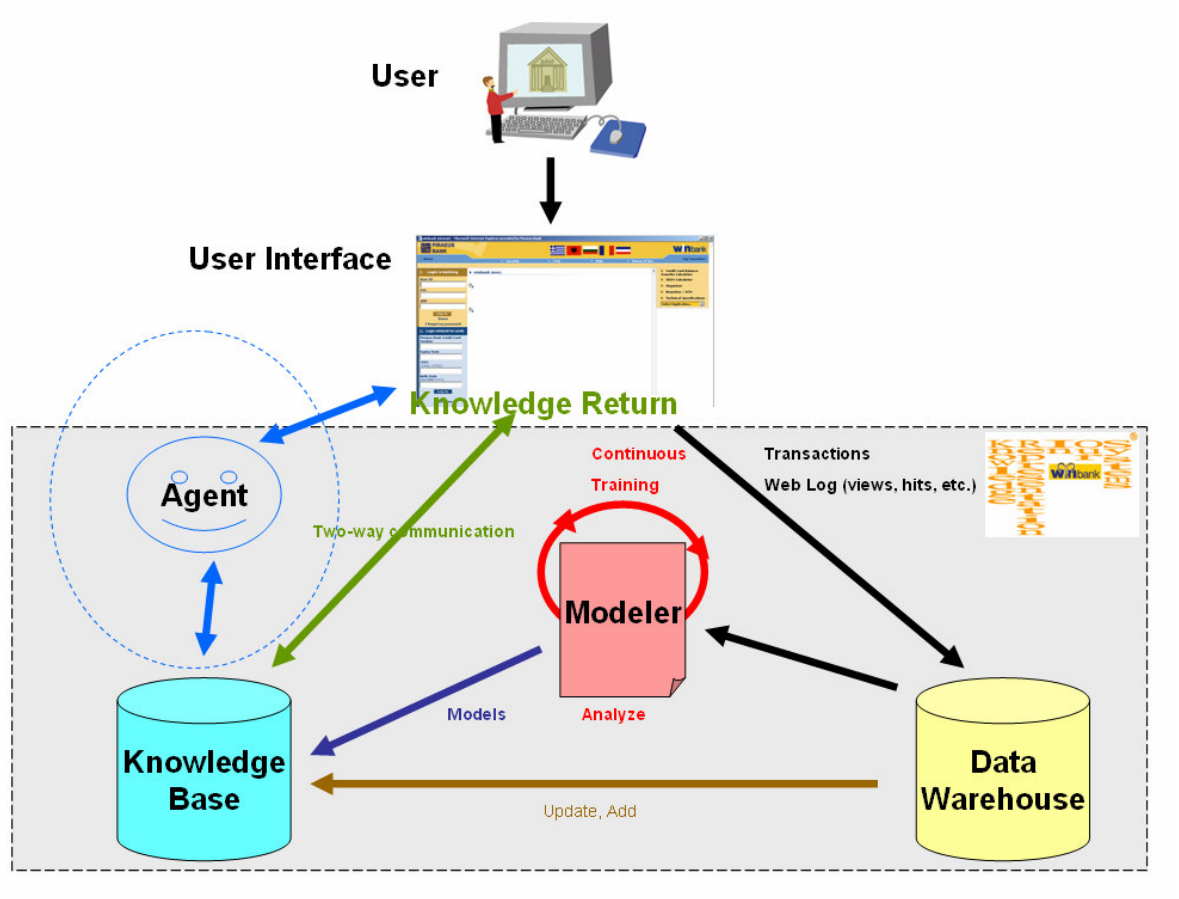

FIGURE 2 – WINBANK K.R.I.O.S.

System is offline because of its database update. New data are imported in database in constant time frames, not in real time. For time being there is no immediate need to upgrade system in online mode.

Analysis, design and implementation of the system took part in-house. Due to the bank's data sensitivity, one of the prerequisites was in-house set up and function of such system. Data mining [8] and predictive analytics tools contributed in all phases of project and they are part of the system.

Pilot operation period proved system's reliability, accuracy and success. Moreover pilot period helped bank scanning system's bugs, faults and defects. After that period, fraud detection system began to operate in production environment.

Figure 3 shows the fraud detection daily process

Suspect transactions are graduated. Accordingly to their risk, they are signed as high, medium and low risk (Figure 4). Probability of fraud is very low, less than 1% [7]. So the great majority of suspect transactions are not fraudulent. Nevertheless, bank obligates to search all suspect transactions (Figure 5).

Apparently the final target is the online implementation of above described system.

IV. IMPACTS

K.R.I.O.S. [3] offers advantages as the following:

- Good knowledge of the relationships [4, 13] between different types of electronic transactions.
- Description and establishment of most popular internet transactions
- The electronic services become more easily familiar to the public since specific groups of customers are approached, that uses specific payment manners.
- Customer approach is well designed with higher possibility of successful engagement.
- The improvement of already offered bank services is classified as to those used more frequently.
- Redesign internet transaction structures for those which used rarely
- Reconsidering of the usefulness of products exhibiting little or no contribution to the rules.
- Personalized menus through preference mining
- Customer views returning information via internet banking site

In the other hand, offline internet banking fraud detection system [2] offers many benefits to both bank and customers.

- Fraud detection system gives added value to e-banking. Especially, nowadays, where fraudsters' attacks are increased considerably in our country, such system differentiate bank owner from other bank competitors.
- Bank takes lead. Such in-house system implementations, which are set up for customer benefit, are infrequent in local market.
- Fraud detection system indicates quality of e-banking services. Quality depends on user friendly interface, on a full of electronic transactions portfolio, but also depends on user protection and guarantee.
- A significant number of users have the sense of care and protection from their bank. This sense helps customer loyalty escalation.
- Official fraud victims informed from the bank itself as soon as fraud detected. Customers feel that their bank stands by them and that fact strengthens mutual relation.

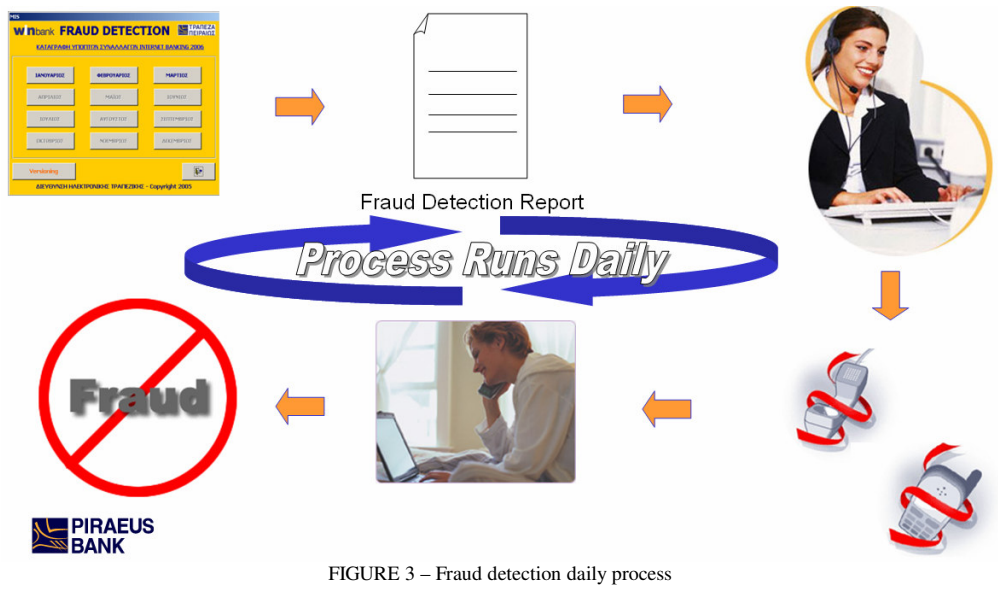

FIGURE 3 – Fraud detection daily process

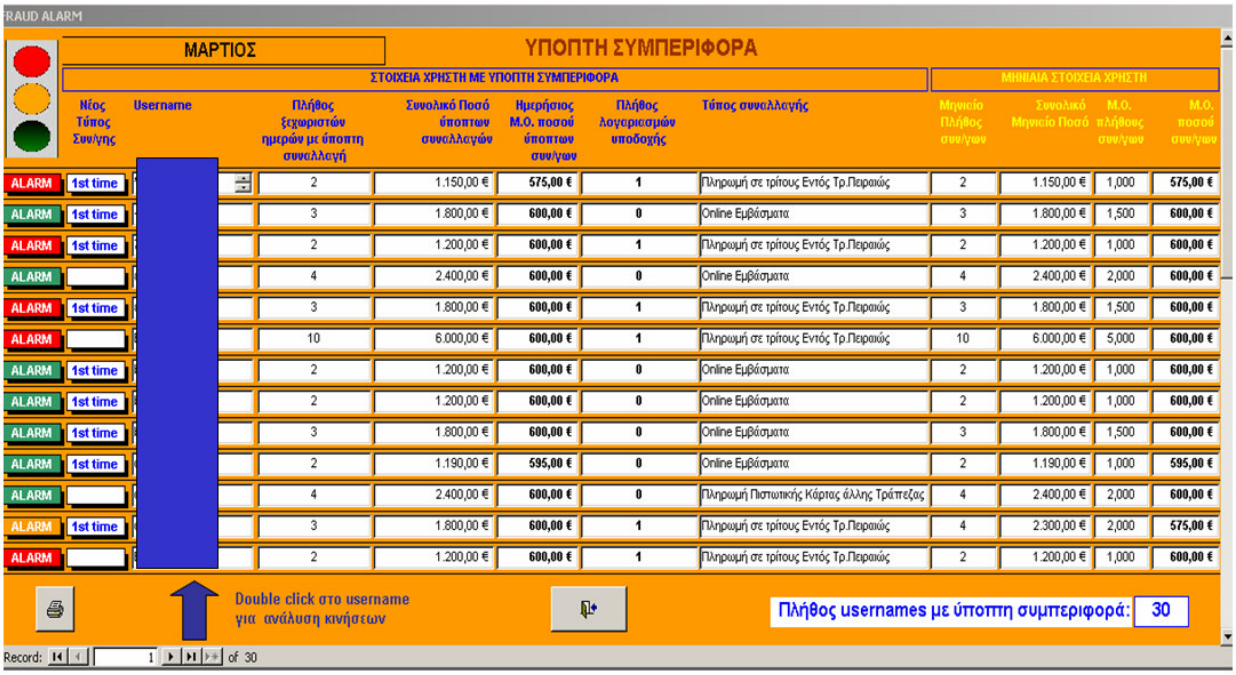

FIGURE 4 – Main fraud detection report

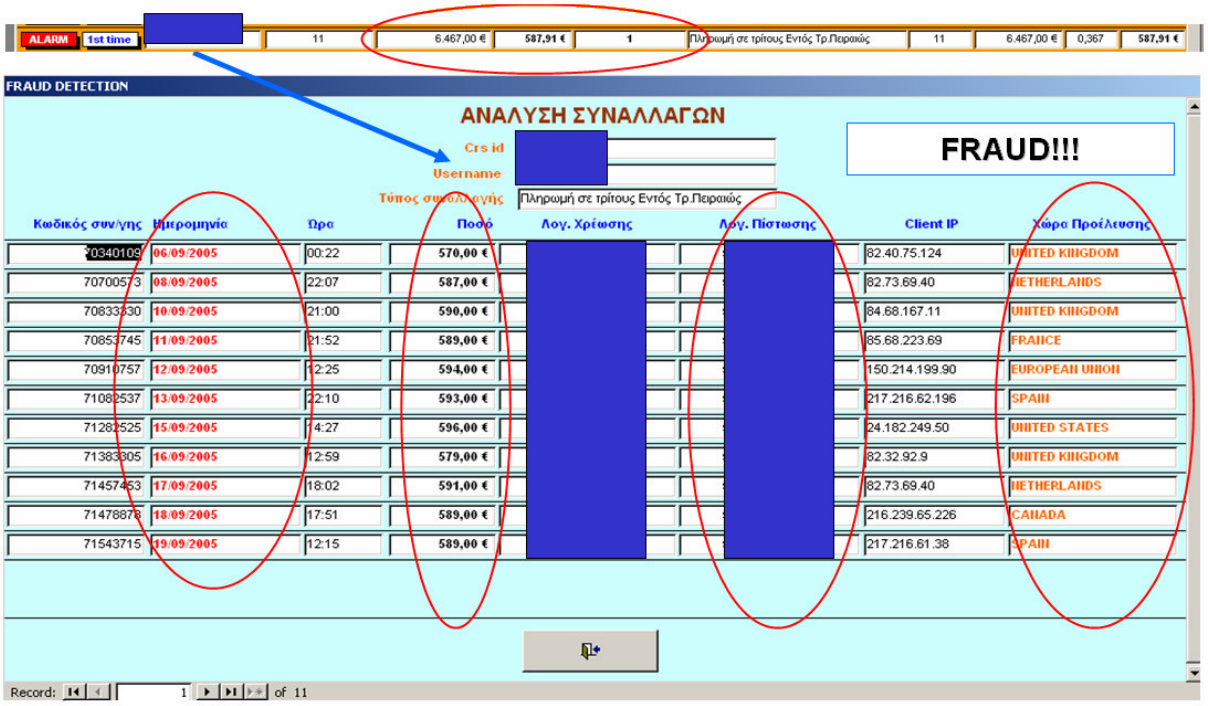

FIGURE 5 – Fraud detection specific report

REFERENCES

[1] V. Aggelis, *The e-banking bible*, New Technologies Publications, Athens, Greece, 2005.

[2] V. Aggelis, "Offline Internet Banking Fraud Detection", 1st International Conference on Availability, Reliability and Security (ARES 2006), IEEE Press 2006, pp.904-905.

[3] V. Aggelis, " A Smart Knowledge Returning System", 2nd International Conference on Business Management and Economics, 2006.

[4] V. Aggelis, "e-Trans Association Rules Re-visited", 4th International Multiconference on Computer Science and Information Technology, 2006.
[5] V. Aggelis, and D Christodoulakis, "Association Rules and Predictive Models for e-Banking Services" – 1st Balkan Conference on Informatics 2003, Salonica, Greece.
[6] V. Aggelis, "Data Mining for Decision Support in e-banking area (II)" – 1st International Conference on Knowledge Engineering and Decision Support 2004, Porto, Portugal.
[7] R. Brause, T. Langsdorf and M. Hepp, "Neural Data Mining for Credit card Fraud Detection", *IEEE International Conference on Tools with Artificial Intelligence ICTAI-99*, IEEE Press 1999, pp. 103-106.
[8] *Using data mining to detect fraud*, SPSS technical report, 2000.
[9] C. Phua, V. Lee, K. Smith, and R. Gayler, "A Comprehensive Survey of Data Mining-based Fraud detection Research", *Artificial Intelligence Review*, 2005.
[10] M.J.Zaki, S. Parthasarathy, W. Li, and M. Ogihara. "Evaluation of Sampling for Data Mining of Association Rules", 7th Workshop Research Iss. Data Engg., 1997
[11] R. Agrawal, H. Mannila, R. Srikant, H. Toivonen, and A.I. Verkamo. "Fast discovery of associations rules", Advances in Knowledge Discovery and Data Mining, 1996
[12] *Clementine 7.0 Users's Guide*. Integral solutions Limited, 2002.
[13] S. Brin, R. Motwani, and C. Silverstein. "Beyond Market Baskets: Generalizing Association Rules to Correlations", Proceedings ACM SIGMOD Conf. on Management of Data, 1997
[14] M. Chen, J. Han, and P. Yu. "Data Mining: An Overview from Database Perspective", Ieee Trans. On Knowledge And Data Engineering, 1997
[15] R. Hilderman, and H. Hmailton. "Knowledge Discovery and Interestingness Measures: A Survey", Technical Report CS 99-04, Department of Computer Science, University of Regina ,1999
[16] H. Toivonen. "Discovery of Frequent Patterns in Large Data Collections", Technical Report A-1996-5, Department of Computer Science, University of Helsinki, 1996