Chapter XII
Early Warning System for SMEs as a Financial Risk Detector

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ABSTRACT

This chapter introduces an early warning system for SMEs (SEWS) as a financial risk detector which is based on data mining. In this study, the objective is to compose a system in which qualitative and quantitative data about the requirements of enterprises are taken into consideration, during the development of an early warning system. Furthermore, during the formation of system; an easy to understand, easy to interpret and easy to apply utilitarian model that is far from the requirement of theoretical background is targeted by the discovery of the implicit relationships between the data and the identification of effect level of every factor. Using the system, SME managers could easily reach financial management, risk management knowledge without any prior knowledge and expertise. In other words, experts share their knowledge with the help of data mining based and automated EWS.

INTRODUCTION

The enormous computers of 1950's are now small enough to fit your hand, and are able to assist with the organization of work and daily activities. From the beginning of 1980's, great amounts of data have been accumulated with the usage of the database for computers in everywhere. Information grows when it is shared, therefore, researchers men- tion information particles before the 1980's, but nowadays they talk about information dews. In another words, the most important contribution of information technology (IT) can be summarized as information accessibility. On the other hand, the prevention of accessibility problem caused another problem—information accuracy. Therefore, the actual problem is accurately reading information from large amounts of information.

In addition, one of the basic insistences of IT is time concept. In the past, time cost meant almost nothing, but today the time is one of the most important factors mostly because of the multispeed processors. At that point, time cost for accessibility of the accurate information became an important factor because of data or information actuality.

Errors, subjectivity, and uncertainty in performance arised from human factors joined with the acceleration arised from IT; it almost took out the human factor in business processes. Intelligent systems began to take part in procedures, transactions, and processes instead of the human factor. As a result, computations done by humans turns into IT-based automated systems.

IT had a rapid improvement in the 1990's and removed almost all borders and distances on the globe in the early 2000's. The concept of "technology" became insufficient to describe that situation. Therefore, the term "knowledge age" was used for description. Another concept associated with knowledge age is "knowledge society." To reach accurate, objective, and useful knowledge in an easy way were it became basic requirements of knowledge society.

Another phenomenon associated with knowledge age is data mining. Towards the end of the 1990's, the idea of strategical usage for great amounts of data led to a fast achievement and popularity in every area that computers have been used for data mining. Data mining is the core of knowledge discovery process, which is mainly based on statistics, machine learning, and artificial intelligence. Generally, data mining discovers hidden and useful patterns in a very large amount of data. But it is difficult to make definitive statements about an evolving area and surely data mining is an area in very quick evolution. Therefore, there is no one single definition of data mining that would be met with universal approval. On the other hand, the following definition is generally acceptable: Data mining is the process of extracting previously unknown, valid and actionable information from large databases and then using the information to make crucial business decisions (Cabena, Hadjinian, Stadler, Verhees & Zanasi, 1997, p. 12).

Data mining is the most realistic method to responds with basic requirements of knowledge society, which are to reach accurate, objective, and useful knowledge in a simplified way. Another concept which is necessary for providing accurate, objective, and useful knowledge is "expertise." It is impossible to provide enough expertise for the entire society, but it is possible to provide "expert knowledge" via IT.

It is possible to provide expert knowledge to nonexperts in every field—business management and economics as well. However, from the business point of view, the firms that mostly need the information are small and medium industrial enterprises (SMEs); they have a great importance with regards to economy. Although SMEs have made an important contribution to the world's rapid economic growth and the fast industrialization process, to enlighten SMEs' managers for overcoming difficulties and improving strategies is critically important. These reasons were what motivated the authors of this chapter to select SMEs as an application area.

SMEs are thrown in financial distress and bankruptcy risk by financial issues. Many SMEs are closed because of this financial distress. These issues of SMEs were grown out of the lack of information and could not use the information in decision-making process. By this approach, SMEs need an early warning system which should give decision support that is easy to understand, easy to interpret, and easy to apply for the decision makers of SMEs. Consequently, the structure of the early warning system:

- Does not require expertise for the calculation and interpretation of the financial and administrative indicators

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