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**ITB9730**

## **Chapter IV**

# **Financial Markets in the Internet Age**

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## **ABSTRACT**

*The chapter reviews how the financial markets historically have been affected by new technologies and shows that, time and again, technological advances have impacted the very workflow of the financial market processes including the available financial instruments. Present technologies are discussed leading to a framework for how they form the basis for building intelligent agent systems. An overview of multi-agent systems is provided followed by several examples of multi-agent systems supporting investors in financial markets.*

## **INTRODUCTION**

The age of networked intelligence along with the Internet has played a major role in formulating the financial markets of today. Dramatically increased distribution of all forms of information and near instantaneous transactions across the globe have created the opportunity for radically greater access to

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financial markets for all interested participants. This has led to new types of markets with greater global access to financial markets, and has allowed entirely new financial products to be offered.

Throughout history, technology has driven advances in the efficiency and liquidity of financial markets. This has led to wave after wave of innovation in the types of securities traded, the “reach” of the market participants, the distribution of news and information, and the type of market exchange auction. This chapter will show that the financial markets have been heavily influenced by Internet technology.

The chapter provides a background of how financial markets have functioned throughout history. Also, it shows that, time and again, technological advances have impacted the very workflow of the financial market processes including the availability of information, the potential for ever increasing participation, the timeliness of executing transactions and the overall increase in the efficiency and liquidity of the financial markets. As the main topic, the chapter shows the important results of Internet technologies on the financial markets in just seven years since the Internet became a commercial resource and a rapid trend toward more intelligent systems for automated transaction processing, order execution, and information filtering.

Financial markets exist to facilitate the buying and selling of financial instruments. These have traditionally consisted of stocks (equity ownership stake), options (a contract to buy or sell a financial instrument by a set date at a set price), bonds (debt obligations) and futures contracts for commodities and financial instruments. Financial markets are made up of many players, both active and passive. These include issuers of financial instruments (initial sellers), secondary buyers and sellers of financial instruments, the providers of the marketplace (exchanges and auctions), the regulators and information providers. Each of these groups can be further subdivided. For example, buyers and sellers may consist of large institutions, smaller financial organizations, professional traders and individual investors.

Technology-driven changes to the infrastructure of the financial markets have resulted in a complex, fast changing environment for the investor whether professional or amateur. Examples of such changes include instant availability of wide-ranging information, standards for financial transaction formats, online financial transaction servers ready to receive transactions over the Internet, and ever more complex hybrid financial instruments with numerous trading and investment strategies. To manage one’s investments, there is a trend toward the use of a new form of expert system known as intelligent agents. By building a collection of the software intelligent agents with varying roles and specialties, it is possible to develop a coordinated team of these software experts to respond to the dynamics of the financial markets and provide the investor with balanced guidance in the management of portfolios.

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