# Chapter 8.3
# The Dynamics and Rationality of Collective Behavior within a Global Information System

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## ABSTRACT

The scope of interests in the area of information systems (IS) has focused mainly on technological aspects so far. If the human component were taken into account, it has been analyzed from the level of an individual. So have all new concepts of rationality. This chapter argues that collective behavior, which is a basic determinant of the global IS dynamics, does not proceed in a planned manner, but is adaptive and follows certain patterns found in nature. It follows that this behavior can be expressed in a model form, which enables to structure it. A model exemplification of a global information system is a modern, electronic, stock exchange. The identification of quantitative attributes of a social subsystem can provide substantial theoretical and methodological premises for the extension of the optimizing and individualistic notion of rationality by the social and adaptive aspects.

## INTRODUCTION

### General Perspective

One of the main issues, both in the theory and practice, of social and economic sciences is the question of integration, that is, how actions and interactions of individuals lead to the emergence of phenomena that characterize social entireties. This topic acquires particular importance in light of the dynamic integration processes of societies, for example, the recent enlargement of the European Union, when, in 2004, 15 new member states joined this commonwealth. The integration processes, aided with the most recent achievements in information technology (IT), harmonize with globalization and virtualization of human activity, from social to political to a business one.

The outlined issue is the background of two basic research threads proposed in this chapter.

The first part refers to the question of human behavior within an information system (IS). A fully integrated society of the future will make a fundamental, subjective element of a global information system. That global IS will be either a ubiquitous and wireless Internet, or some totally different, unknown yet, technological platform. And it is crucial that so far interests in the area of IS have concentrated mainly on technological aspects. The issue of human behavior within an IS has been generally omitted as one belonging to other disciplines. Admittedly, since the mid-1990s we have observed some growth of interest in the domain of social aspects of the IS development (Avison & Fitzgerald, 2003), but those interests have concentrated on the specificity of individual behavior. However, the nature of global phenomena and the features of dispersed collectivities denote a necessity of a new perspective on the society and organization. No longer can we perceive the human component of an IS as independent individuals. The users of local, regional and global telecommunications networks create a specific form of a *virtual crowd*, accessing the same sources of information and reacting to the same sets of stimuli. These users, through their interactions, compose the phenomenon of an IS dynamics. The dynamics not understood as one referring to the flow of energy (e.g., electrical impulses), but dynamics based on the collective information processes, reflected in collective actions. A phenomenon that was called by Simon (1955) "a collective mind."

And here we find the other research thread of this chapter: the issue of human rationality. The Western organizational culture still is based on three main determinants: individualism, competition, and a mechanistic-reductionist perspective. As a result, the essential body of scientific achievements in the area of human behavior concerns individuals (Nelson & Quick, 2005), and this is reflected in the paradigm of rationality. This depiction, known as rational choice theory (Alingham, 2006), assumes that individuals are perfectly rational, with clearly defined preferences, and optimizing their behavior at all levels of a decision-making process. Reductionism, which is related to it, postulates that collective behavior is composed of the sum of rational behavior of all individuals. Since this *sum* is purely theoretical and abstract, it generally is accepted that all phenomena concerning a collectivity are exclusively qualitative and cannot be structured.

The deficiencies of the traditional, idealistic approach to rationality have been known and discussed for a long time. Admittedly, since Simon's idea of "bounded rationality" it has been allowed that human actions can be more "satisficing" than "optimizing," but all new concepts of rationality still refer only to individual behavior (Halpern & Stern, 1998). At the same time, it has been emphasized that there is a need for such a formulation of the rationality principle so that it can take into account the specificity of collective behavior, so different from the individual one.

This chapter tries to briefly explore the existing possibilities of an effective modeling of collective information processes, and of structuring this phenomenon through the identification of its quantitative dimension. The potential findings should help formulate a new, wider, approach to rationality, which could respond to the integration and globalization trends of modern societies.

## Objectives

The main objective of this chapter is a presentation of an innovative approach to the analysis and modeling of collective information processes and the mechanisms of collective behavior within a model global IS. This is the first such attempt in relation to the above-mentioned social aspects of information systems. Extensive literature studies helped formulate the following research questions:

1. Are information processes of collectivity and the resulting collective behavior, which