

Chapter 7.1

Applying an Organizational Uncertainty Principle: Semantic Web–Based Metrics

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ABSTRACT

The theory of bistable perceptions in the interaction indicates the existence of an uncertainty principle with effects amplified at the organizational level. Traditional theory of the interaction, organizational theory, and the justification for an organizational uncertainty principle are reviewed. The organizational uncertainty principle predicts counterintuitive effects that can be exploited with the Semantic Web to formulate a set of metrics for organizational performance.

As a preliminary test of the principle, metrics derived from it are applied to two case studies, both works in progress, with the first as an ongoing large system-wide application of web-based metrics for organizational performance and the second as a case study of a small college where web-based metrics are being considered and constructed. In preparation for the possibility of machine-based real-time metrics afforded by the Semantic Web, the results demonstrate a successful theory and application in the field of an uncertainty principle for organizations.

INTRODUCTION

Overview. No theory of organizations is widely accepted today (Pfeffer & Fing, 2005). In this chapter, we provide a brief discussion of the problems with traditional organizational theory and, focusing on fundamentals, a classical (quantum) alternative model that accounts for predictions from traditional theory and at the same time its supposedly spurious but ultimately disconfirming findings. With its focus on the individual, traditional theory, also known as methodological individualism, encompasses social learning theory (SLT) and game theory. SLT includes classical or Pavlovian conditioning, operant or Skinnerian reinforcement, and modeling (for a revised version and summary, see Bandura, 1989). In contrast to SLT, game theory focuses on the interaction between two or more individuals (Von Neuman & Morgenstern, 1953), but like SLT, it is static; an attempt to make game theory dynamic employs repeated presentations of static game matrices. But the need for the classical (quantum) alternative is inherently based on the fundamental questions raised by the traditional focus on the individual.

In addition to theory, we review field data and the application of the organizational uncertainty principle in the form of performance metrics to two case studies, one of an ongoing, long-term nature and the other incipient. Both case studies are web-based. We include a review of the future semantic web and its implications for the two case studies. Finally, we discuss future prospects with the semantic web for theory, tests and computational models of the organizational uncertainty principle, and a path forward for the two case studies.

From the perspective of the Semantic web, our objectives are to review traditional social learning and game theory for organizations and the alternative organizational uncertainty principle. Our objective for the organizational uncertainty principle is to justify its formulation based on

evidence and to review two case studies that use metrics to exploit the organizational uncertainty principle. Our final objective is to provide a path forward with automatic machine-based data generating real-time online metrics for future research with the semantic web.

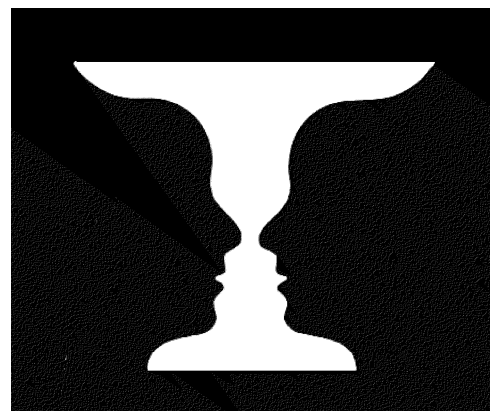
BACKGROUND

Definitions

In the Background, we define bistability, the organizational uncertainty principle, SLT, game theory, organizational theory, and Semantic web. In addition, after each term is defined, we provide a brief literature review for each term. At the end of the references, we summarize these key terms.

Bistability. Bistability is best explained with an example of an illusion (see Figure 1). It occurs when one data set can produce two mutually exclusive interpretations. While the entire data set is processed cognitively by an individual, both interpretations of a bistable illusion cannot be held in awareness simultaneously (Cacioppo et al., 1996). According to Bohr (1955), multiple interpretations support the existence of different cultures. Further, given the importance of feed-

Figure 1. An example of bistability



In this very simple two-faces vase illusion, an observer is incapable of observing both aspects of this single picture at the same time.

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