KNOWLEDGE, ETHICS, QUALITY, AND VALUE IN HUMAN ORGANIZATIONS: A SYSTEM DYNAMICS APPROACH

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Abstract

A work in progress is described that uses system dynamics to model the flow of knowledge in human organizations. The concept of the knowledge unit is proposed for simulation. The interest is to the study of the flows of knowledge for product and service processes, and relate them to quality factors and value that can bring greater weight to societal ethicality and worth rather than solely monetary profitability.

Introduction

We have been applying system dynamics to construct a model of the flow of knowledge within the human organization to consider (1) consequences and ethicality of business practices, and (2) quality and value of the organization in its utilization of knowledge in the production of products and services that indirectly contribute to its worth for society. The purpose of our paper is to provide a report of our progress.

Human organizations in their societal and environmental contexts consume resources to provide products and services. These activities are typically described in terms of the raw materials and information required. Increasingly, the knowledge involved to engage in these activities is coming into the foreground as the main focus [2], in order to know how to engage continuously and complete successfully these activities in a highly competitive, fast-paced, rapidly changing global market. Consequently, we have chosen to center our paper on knowledge as the chief construct for modeling some elementary flows in a system dynamics model.

Our model, termed the Organization Value and Knowledge (OVK) model, is built upon the idea that knowledge can be conceptualized much like other substances that comprise the flows in system dynamics models and simulations, such as information, material, money, and time [1, 3, 4]. The basic unit of flow is termed the Knowledge Unit (K). Although knowledge is best understood in reference to that which is known by a single person, it may be meaningfully represented at the collective level of a group of persons, specifically in reference to such constructs as human organization, human activity system, and organizational learning. For the purposes of modeling, various parameters for simulation appear in K terms. Further, a construct yielded in simulation is the Value (V) of an organization, not in terms of profit and financial net worth, but value to clients, society, humanity, and future generations.

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The Model

The connections among levels and variables of the model are shown in Figure 1. The traditional depiction of the production of products and services is represented by the SO-TK-KP feedback loop. We have used this loop as perhaps the easiest reference point for elaborating the model. A second loop emphasizes the ethical use of knowledge in the traditional production process, and OVK enhances and diminishes the resultant V according to expected ethical business practices in the production process. Two additional loops represent the quality dimension. We have attempted to recognize the superior production that should yield higher Vs, and also appropriate consideration of environmental and human impact of products and services.

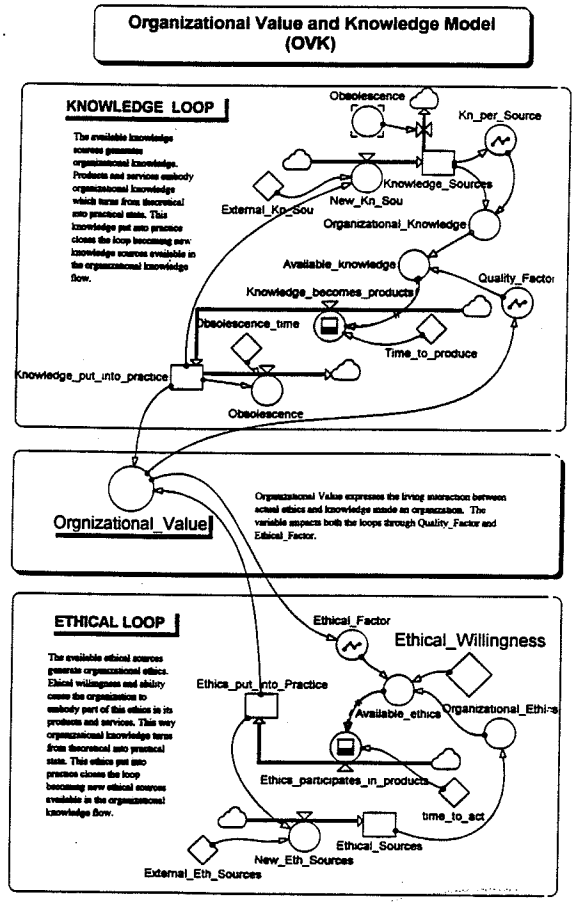

Figure 1. OVK: a system dynamics model.

However, the flows are Ks rather than materials and information. To apply OVK, all inputs, throughputs, and outputs must be expressed in quantitative Ks. This operationalization of constructs in the exercise of modeling is both an advantage and disadvantage. While it helps to concretize, simulate, and assess the constructs and outputs of the model (some advantages), it may not be the mode in which the constructs are communicated, understood, and evaluated by human beings in organizational settings (some disadvantages). In this model the worth of an organization to society becomes an inference based on Vs generated under varying conditions.

Simulation Strategies and Potentialities for Further Research

Some preliminary examples of our model simulations are presented in Figures 2 and 3. Figure 2 depicts V over time at three levels of Ethicality (E). Figure 3 depicts the relationship of K, V, and E over time.

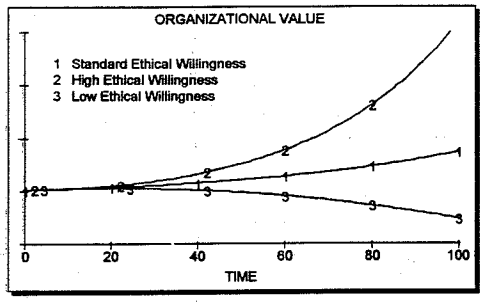

Figure 2. OVK to generate V at three levels of E.

From our initial formulation of OVK, several directions are suggested for further testing, refinement, and development of the model. These directions also suggest to us potential applications of OVK, given a specific set of parameters and a specific human organization. Some directions are (1) V as a function of growth in K, (2) enhancing W through ethical practices that increase V, and (3) combinations of quality, ethicality, and practical knowledge that increase V.

OVK may be used to simulate the flows of knowledge in the production of products and services. OVK highlights three aspects of human organizations not traditionally considered essential to production: quality, ethicality, and value. Moreover, the contemporary context dictates that these aspects be placed more on a par with such traditional aspects as functionability, quantity, and profitability [2].

Although abstract and user-defined at this point, we hope that through simulation development, OVK can become increasingly more meaningful to those who use it. K and V import more emphasis on the idea that an organization can have worth to society in other terms than monetary, which can fluctuate, depending on several factors inclusive of K and V in simulation. It is one challenge of the model to discover the sets of K that bear critical relations to V in a particular human organization as well as among a set of competing/cooperating organizations.

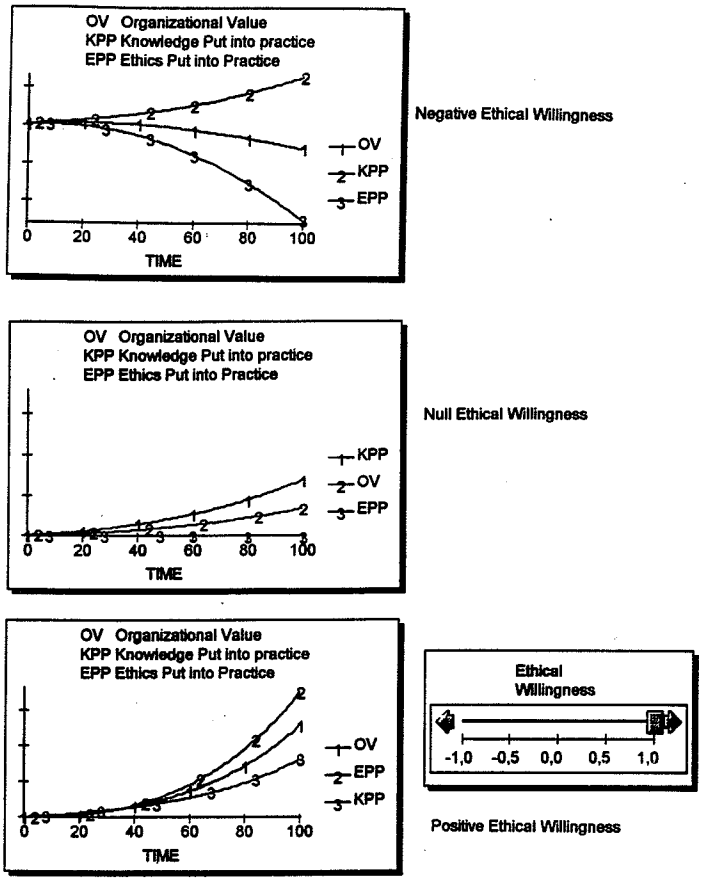

Figure 3. The relationship of K, V, and E over time.

References

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