**“The Effect of Personnel Selection Schemes on Knowledge Transfer”**

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## Extended Abstract

Many factors affect organizations' success in achieving competitive advantage. Some of those factors are tangible assets such as production technologies or economies of scale, and others factors are intangible assets such as knowledge. Nevertheless, for knowledge to be advantageous for the organization, it needs to be shared. Many times the knowledge embedded in individuals might be difficult to articulate. Then, understanding the conditions under which individuals would be more likely to share their knowledge with other individuals becomes important. The purpose of this research project was twofold. First, explore how breadth of skills, task experience, and group experience affects knowledge transfer within organization and among organizations. The second objective was to explore how certain environmental attributes facilitate or hinder knowledge transfer among different organizations operating in the same environment.

A simulation model based on constructural theory (Carley, 1990, 1991) was implemented. It also draws on concepts and ideas from previous simulation models (Carley, 1992, Lin, 1994). The proposed model has two major contributions. First, the integration of a more complex knowledge representation, the organizational members' interactions, and new forms of learning into commonly used organizational design and task models. Second, a model of the environmental properties not previously implemented, to the best of our knowledge, such as a knowledge-based operationalization of competition and location of the actors within the environment.

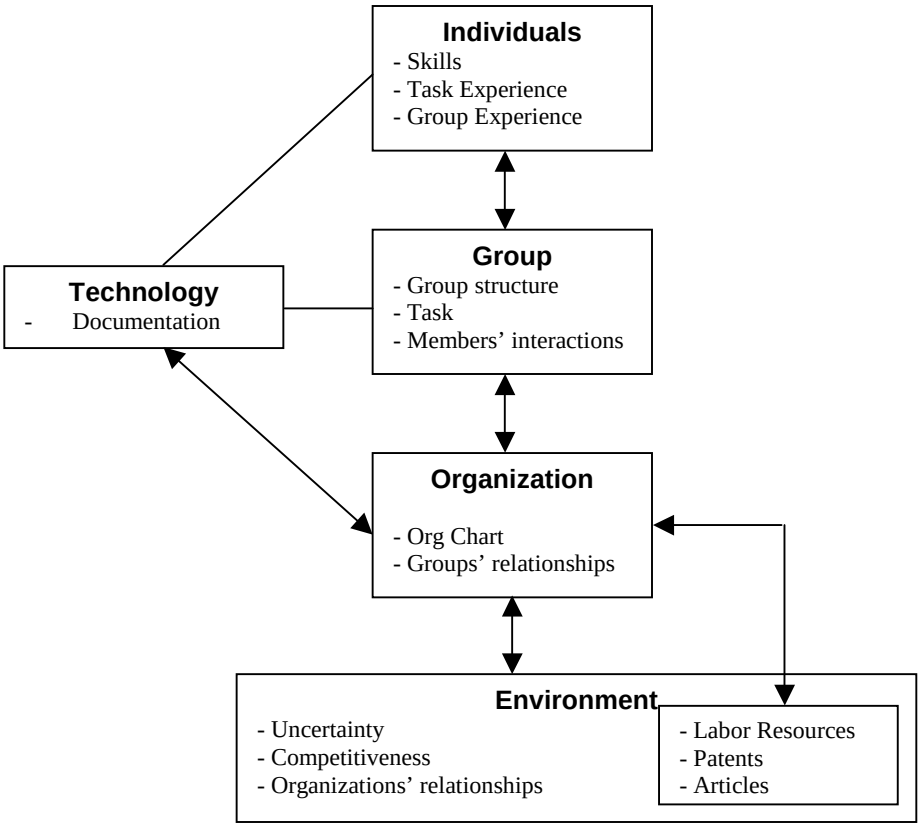

**Figure 1: Component diagram of the model**

A schema of the components of the model implemented in this research project with their relationships is shown in Figure 1. As Argote (1999) indicated, knowledge is embedded in the individuals, the technology, and in the structure of an organization. Therefore, these three elements represent the basis for the proposed model.

The first component is the environment in which the organizations operate. The general characteristics of the environment are defined by two attributes: uncertainty and competitiveness. In addition, there is a collection of organizations with relationships among them, a representation of labor resources, and patents and articles repositories.

The second component is the organization. It consists of a collection of groups, an organizational structure, a relationship matrix that represents the opportunities of interaction among the groups, and a documentation system that the organization's members can access. Individuals might leave an organization or move among groups. Turnover is modeled using a Poisson process and the outgoing individuals are immediately replaced with new individuals with skills and experience consistent with corresponding experimental condition.

The third component is the group. A group is composed of a collection of individuals, a group structure, and a relationship matrix that represents the opportunities of interaction among the group members. Groups perform one of three different types of tasks available in the model.

Finally, individuals are modeled as agents with a memory consisting of three different kinds of knowledge: general, task, and group knowledge. Knowledge is operationalized a collection of pieces of information, consistent with the constructural theory (Carley, 1990, 1991). The memory is initialized accordingly to the experimental conditions to represent individuals with particular characteristics: general or specific skills, task experience or no task experience, and group experience or no group experience.

In this model, knowledge can be transferred through various mechanisms. At the organizational level, interactions among individuals, documentation, and transferring individuals among the groups serve as alternative knowledge transfer mechanisms. In the environment, knowledge transfer could occur by transferring individuals between two organizations and through generation or acquisition of articles and patents. In order to understand the effect of the independent variables on the knowledge transfer, various measures were collected. Examples of these measures are the total number of pieces of information shared, the total number of new pieces of information shared, the total number of pieces of each type of knowledge shared, the number of individuals transferred between organizations, and the total number of transactions performed by the environmental actors.

The results showed a significant effect of organizational structure on the amount of total knowledge transferred with and without turnover, with the fully-connected structure as the most beneficial for transferring knowledge, while the hierarchical structure was the most restrictive. Organizations mostly composed of generalist individuals shared more knowledge

than those organizations with mostly specialist members. However, over time the effects of breadth of skills diminished while task and group experience took active roles in how knowledge is transferred. The more task and group experience the individuals had, the higher the number of pieces of information that were shared. Finally, there was a strong statistically significant effect of the set of activities and content of interaction in the total amounts of general knowledge transferred, of task knowledge transferred, and of group knowledge transferred.

In addition, the results showed that the two main attributes of the environment, uncertainty and competitiveness, had a statistically significant effect on the amount of articles published and retrieved as well as the amount of patents published and retrieved. The higher the uncertainty, the lower the number of people transferred among organizations. Competition also affected positively the total number of transactions performed by the organizations. The data suggested that organizations with mostly generalist individuals retrieved more articles from the environment than organizations with specialists. Conversely, organizations with mostly generalist individuals are more likely to retrieve fewer patents from the environment and transfer fewer individuals between environmental actors than organization with mostly specialists.

The model implemented the concept of location importance as a factor for determining interaction probabilities among the environmental actors. The results showed no significant effects of location importance, of the number of clusters of organizations in the environment, and no location importance X number of clusters interaction effects on any of the measures. However, a detailed analysis of the data revealed a strong effect of location importance and the number of clusters on the number of interactions among organizations.

**References**


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