

**The Lure of the Incompetency Trap:
Experimentation and Innovation in Organizational Life¹**
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Abstract

A model is presented in which individuals in an organization choose between experimenting with an emerging organizational routine or exploiting an existing one. The decision of whether to spend their slack time experimenting reflects the amount of local slack available, the inherent productivity of the existing and emerging routines, and the perception—optimistic or realistic—of the emerging routine. The productivities (returns/resources) of the existing and emerging routines draw from a distribution around a position along each routine's inherent learning curve, a position that moves as a result of the organization's combined experiences with each routine. By following the asymptotic arc of the learning curve, variance in productivity narrows as experience with that routine increases. The tried and true routine thus initially offers greater productivity and greater predictability than the emerging routine, though the latter offers a steeper initial decline and lower ultimate costs. A series of computational experiments explore the impacts of the various model parameters.

Introduction

This paper considers the relationship between individual experimentation and organizational adaptation. Considerable attention has been focused on the managerial allocation of organizational resources towards exploiting current skills or exploring new ones (March, 1991; Cohen and Levinthal, 1990). However, at the heart of organizational actions such as learning lies individual choices between experimentation and performance, and there is consistent evidence that such individual activities occur outside the bounds of managerial control (e.g., Kerr, 1975; Morison, 1988). Thus it is possible that organizational adaptation and change results from—and perhaps depends upon—undirected individual experimentation. We present a model of organizational life in which individuals face the option of experimenting with new routines or perpetuating old ones. We consider the costs and benefits, to both individuals and the organization, for individual differences in search strategies and for heterogeneous populations of such individuals.

The realities of organizational life result in individuals facing conditions best described as “local slack,” when the inability of large organizations to coordinate tasks with perfect efficiency results in individuals facing more time to complete their tasks than they require given the routines and resources at their disposal. They can spend their slack resources

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by relaxing around the water cooler or by experimenting with an emerging routine that promises greater productivity but, initially, delivers less. Local slack provides the resources for experimenting without committing because a point exists within each task when the experimenter may decide whether to continue with the experiment or abandon it in favor of doing things the old way.

Variables of interest include the rate of diffusion of the emerging routine across differing populations of realistic and optimistic individuals in organizations; the rewards and costs to individuals of their choices to experiment or not; and the rewards to organizations, in terms of shifting aspirations, as new routines are experimented with and ultimately adopted. We show that under certain conditions, the continuous lure of new routines (and hence continuous experimentation) can lead to maladaptive organizational propensities called the Incompetency Trap, where diffusion of knowledge of current routine is attenuated.

A simulation model of individual experimentation and organizational adaptation

Consider a simple model for individual experimentation with and adoption of organizational routines. There are four key features to the model:

1. There is an external environment which periodically produces new alternative routines. Each new routine possesses an inherent learning curve with a common slope and marginally superior returns relative to prior technologies. For any experiment with a routine, the experienced return reflects the organization's current position along the learning curve of this routine and some variance surrounding that position.
2. The organizations acting within this environment have a series of "quasi-interdependent" tasks to complete, a population of agents to complete them, and a dominant routine to set aspiration levels. The time allotted to each task is determined by the organizations aspiration levels, as a function of the current performance of the dominant routine, plus slack time resulting from the inability to perfectly coordinate tasks.
3. Agents attempt to complete a series of tasks, and may choose from the set of currently available technologies to do so. Because each task has been allotted some slack time based on the current routine, agents may use that slack time to experiment with a potentially better technological alternative or to "hang around the water cooler." The risks of experimentation are minimal because this slack time provides experimenting agents with a second decision point within each task, when they may choose to adopt the new routine or cut and run with the old one—which remains a relatively safe alternative for completing the task. Agents differ in their decision rules for experimentation and adoption of the technologies available.

4. The outcomes of this model exist at both the individual and organizational levels, as costs (measured by time allocated to completion of tasks) and performance (measured as percentage of tasks completed).

Within this system, organizational agents experiment with and *adopt* routines (or technologies). The result of this collective adoption process defines a form of organizational *adaptation*. The organizational models used in the simulation are defined in terms of how they adjust their aspiration levels with respect to the expected performance of the agents' routines.

Thus, there are no organizational "rules" that specify what routines their agents should adopt; rather, the organization reacts to specific performances of the agents in the context of the organization's aspiration level. How, and how rapidly, the aspiration level changes, alters how (or if) agents adopt routines and, ultimately, how (or if) organizations adapt. The reason is that the organization aspiration level for the current project defines both the expected performance level for an agent and the amount of local slack available for experimentation.

The agent models used in this simulation are the following:

Pure Explorative Agents. These agents are very quick to experiment and will immediately abandon their current routine and adopt a new routine based on its promise (asymptotic behavior). These agents are not influenced by organizational aspiration level.

Pure Exploitative Agents. These agents will not abandon a current routine based on a new routine's promise or performance. These agents are not influenced by organizational aspiration level.

Cut-and-Run Explorative Agents. These agents use slack time to experiment with new routines; however, they will experiment only if the promise (asymptotic behavior) of the new routine is more efficient than the current routine's performance. These agents are influenced by organizational aspiration level, as the aspiration level defines the slack time available for experimentation.

Cut-and-Run Exploitative Agents. These agents use slack time to experiment with new routines; however, they will experiment only if the promise and the current performance of the new routine is more efficient than the current routine's performance. These agents are influenced by organizational aspiration level, as the aspiration level defines the slack time available for experimentation.

Preliminary Results

The results of an initial set of trials varying the populations of agents within an organization reveal an interesting set of interactions between the explorative agents and

the more conservative exploitative agents. The incompetency trap emerges within organizations as the percentage of purely explorative agents increases—measured as the percentage of tasks completed. Yet the absence of such explorers reduces the likelihood that others in the organization will experiment with emerging routines. Within this model, exploratory agents in large numbers represent a threat to firm performance but, in small numbers, invest the necessarily inefficient efforts that make it possible for the majority of more conservative agents to experiment and adopt emerging routines.

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