

Abstract

Evolving the Product Development Process

By

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The fact that organizations change as they grow is no great discovery. Intuitively it makes sense that leadership, structure, incentives, culture and even goals should change as the firm evolves on its way to maturity. Yet, even knowing this, the majority of firms are not able to endure the growing pains and die prematurely. This study examines the evolution of a typical small company that primarily sells R&D engineering services, but has an increasing desire to harness its technological creativity to develop marketable products. The leadership realizes that to do this some changes will have to be made to its structure and policies so that the dynamics of growth can be accommodated and the evolution of its product development process supported. The question is: How does the company architect itself so that it will be able to deal with the mechanics of growth while permitting a stable and effective product development process to evolve?

The theory of organizational evolution as defined by Hines and House [2001]¹, represents a new approach to the study of the evolution of policies and ideas within an organization by drawing parallels between the evolution of policies and biological evolution. In their work, optimal policy values are static and once consensus is reached, growth is linear. While I agree with their definition of the mechanics of the evolution process, I believe that the theory needs to be extended to incorporate the effect of changes brought about by the growth of the firm. I contend that the optimal values of policies are not static, but change over time to suit the new structures and management methods required to deal with growth.

An evolutionary system dynamics model is proposed which places the evolution of policies and ideas within the framework of a maturing company to study the effect of

¹ Hines, J., House, J., "The source of poor policy: controlling learning drift and premature consensus in human organizations," *System Dynamics Review*, Vol. 17, No. 1, pp 3-32, Spring 2001

changing optimal policy values on policy evolution. Understanding this relationship permits the institution of a policy architecture that supports process evolution while being flexible enough to deal with growth. Such an architecture places policies that support the setting of project priorities, assignment of responsibility, incentives, requirements for cross-project communication, and process framework design at the firm level but leaves freedom to decide on execution methods at the process level. A key feature of this architecture is that it discourages formal recording of know how in order to promote its evolution, but records it by disseminating it. The lessons learned are applied to the design of a real policy architecture and corresponding company structure to promote the growth and evolution of a robust product development process for the company.

Principles of system architecture were used to design a company structure and policy architecture that supports the goal of promoting evolutionary process improvement. In this approach, management policies were abstracted into business system functions at different hierarchical levels, designed to meet two primary goals. The first goal, at the firm level, is to promote process evolution. The second, at the process level, is to promote effective process execution. The resulting architecture is flexible and scaleable with growth.

The product development process is perhaps the most important part of a company's competence, regardless of whether the product is a good or a service. Success depends on how well the overall process is executed and, therefore, companies strive for effective process management coupled to superior technical know how. It is not enough to understand business principles to manage a product development process effectively. A fundamental understanding of the nature of technical development, technical risk, and, more specifically, the difficulties presented by new product development is required. The engineering content of this study is embodied, not only in the understanding of technical development methods, but in understanding the flexibility required to deal with unexpected problems endemic to new product development that make these methods iterative by nature and a challenge to manage. An engineering background is required to understand which portions of the process can be guided by firm level policy, and which should allow the engineer the autonomy in execution that is crucial to ensuring the emergence of an efficient process to support the development of engineering based products. Understanding the types of processes, specific technical methods and tactics used in traditional product engineering is crucial to understanding which levers one can act upon to guide the mechanics of the process and its development.