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Cybernetics and the Agility Question

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Abstract

The ability to sense and respond effectively to fluctuations in an environment is the fundamental problem addressed by cybernetics. When applied to the context of the organizational IT function, agility denotes the capacity of the IT function to perceive "signals" from its internal and external environments, to interpret these, and respond appropriately. The processing of such signals requires the selection and filtering of information to drive decision-making for response in a timely way. The challenge for the IT function is processing an overwhelming collection of signals, in un-standardized formats, and from overlapping sources, that tends to overload decision-makers. Informed by a cybernetic model, we studied how the IT function enables agility. We found evidence (1) that the more mature the policy processes of the IT function, the more the IT function will create agility in information systems; (2) The more mature the intelligence processes of the IT function to look outside the organization, the more the IT function will create agility in information systems and; (3) The more mature the control processes of the IT function that focus on the current use of information systems, the more the IT function will create agility in information systems.

Keywords: Cybernetics, Agility, IT Function

Cybernetics and the Agility question

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The ability to sense and respond effectively to fluctuations in an environment (Overby et al., 2006) is the fundamental problem addressed by cybernetics (Ashby, 1956, Beer, 1984). When applied to the context of the organizational IT function, agility denotes the capacity of the IT function to perceive "signals" from its internal and external environments, to interpret these, and respond appropriately. The processing of such signals requires the selection and filtering of information to drive decision-making for response in a timely way. The challenge for the IT function is processing an overwhelming collection of signals, in un-standardized formats, and from overlapping sources, that tends to overload decision-makers (Seo and La Paz, 2008). From an agility perspective, this signal overload problem (typical of complex IT environments), must be dealt with effectively. Cybernetic theory, in particular the law of requisite variety (Ashby, 1956, Conant and Ashby, 1970), offers some insights in this regard. The law of requisite variety recognizes that the external environment inherently contains more variety than the IT function can absorb and therefore demands approaches and procedures to attenuate environmental variety to what is requisite to manage the function effectively. Second, cybernetic theory acknowledges that the controller of a system cannot know all the details of the system's internal processes and must have this internal variety attenuated as well to manage the system effectively. Therefore, theoretical perspectives on agility of the IT function imply a requisite knowledge base to manage and deal with signal complexity from the environment and internal processes to respond effectively, e.g. through adaptations of existing IT and work processes (Desouza, 2006).

We contend that cybernetics offers a useful grand theory (Gregor, 2006) to adapt and inform agility of the IT function. For example, technology forecasting, scenario planning, etc., can be understood as necessary activities of an IT function to anticipate environmental fluctuations; similarly, internally focused interventions, such as monitoring and promoting effective use of systems (Desouza, 2006, Galliers, 2006, Peppard and Ward, 2004) also have an underpinning cybernetic rationale. From an industry perspective, the COBIT framework can also be understood through the cybernetic lens. In COBIT, "Control is defined as the policies, procedures, practices and organizational structures designed to provide reasonable assurance that business objectives will be achieved and undesired events will be prevented or detected and corrected" (IT Governance Institute, 2007 p. 13).

Informed by a cybernetic model (Beer 1984), we studied how the IT function enables agility (Hobbs 2010). We found evidence (1) that the more mature the policy processes of the IT function, the more the IT function will create agility in information systems; (2) The more mature the intelligence processes of the IT function to look outside the organization, the more the IT function will create agility in information systems and; (3) The more mature the control processes of the IT function that focus on the current use of information systems, the more the IT function will create agility in information systems.

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