
Based on a presentation by Jim Wetherbe, Texas Tech University

The high performing, information-based, networked organization requires an IT function that allows employees to have access to critical information for decision-making. Dr. Jim Wetherbe, the Bobby G. Stevenson Chair in Information Technology at Texas Tech University, discussed the structure of the IT function, arguing that the episodic nature of knowledge work presents unique challenges to IT, specifically in three areas: IT architecture, the management of subordinates, and in the formulation of teams. Dr. Wetherbe offered a number of practical suggestions to IT managers that can allow IT to enable firms to become high performing and market leading companies of the 21st century.

Introduction and Overview

Information technology (IT) can play a critical role in enabling an organization to achieve high performance. Yet, to accomplish this objective, IT needs to be governed in a way that allows management within firms to have access to critical information that is timely and accurate. Thus, IT governance is a critical issue for a successful organization.

IT governance involves two decisions: design and structure. IT governance design involves decisions about roles and responsibilities. In October, the ISRC welcomed Michael Vitale, who discussed governing IT on Internet time. Dr. Vitale argued that a holistic approach to governance was needed, with a combination of decentralization and centralization mechanisms that permits companies to be flexible and responsive, yet also efficient. In contrast, IT governance structure is not focused upon roles and responsibilities, but instead looks at techniques IT management can use to maximize the design within the daily life of the organization. In the November ISRC session, Dr. Wetherbe offers a number of suggestions for management to efficiently structure the IT function.

Structure and Design: The Nature of IT

During the October ISRC event, Dr. Vitale argued that IT governance design decisions could be broken down into 3 broad categories:

- 1) IT infrastructure management, or handling problems associated with hardware and software platforms, annual enhancements to these platforms, the nature of network and data architectures, and the corporate standards for procurement and deployment of IT assets
- 2) IT use management, or addressing applications prioritization and planning, budgeting, and the day-to-day delivery of operations and services
- 3) Project management, or blending knowledge of IT infrastructure capabilities and capacities with knowledge associated with knowledge associated for the conceptualization, acquisition, development, and deployment of IS applications

In the discussion, Dr. Vitale discussed each of these areas and the decisions regarding to the design of the IT organization. Now, we will turn to a discussion of structure of each of these areas.

IT Infrastructure Management*The Structure of Work: Looking Into the Past*

To examine how to configure the infrastructure of the IT function, Dr. Wetherbe first suggests that we need to look to how work has changed over the years. Through the history of man, there have been four dominant occupations:

- 1) Hunter-gatherer. From the beginning of the history of mankind until 200-300 years ago, hunter-gatherers attempted to use the technology of the day to hunt animals and gather food. Advancements in machinery made the hunter-gatherer a minor occupation.
- 2) Farmer. 200-300 years ago, approximately 95% of the population was farmers, who tilled the land and bartered and sold their products to other farmers. Now, less than 3% of the population is farmers.
- 3) Factory worker. In 1950, 65% of all employees worked in factories. For approximately 50 years, the factory worker was the dominant occupation, resulting in higher wages and higher social standing. For example, in 1980, the average salary for an employee with a bachelor's degree was \$12,000, for a MBA degree, \$18,000, and for a factory worker, \$25,000. Yet, by the most recent statistics, 12% of all employees are factory workers, with the dominant employee now being the knowledge worker.
- 4) Knowledge worker. As of today, the knowledge workers are the dominant occupation.

As work has changed, companies have been attempting to make their employees more productive. With hunter-gatherers, better knives were built; with farmers, better tillers were manufactured; with factory workers, more efficient automation techniques and machines were used. So, what can the IT function do to enable knowledge workers in their firms to be more productive? Ultimately, increasing productivity requires an appropriate structure. Yet, before this can be investigated further, the nature of the productivity challenge needs to be understood; a problem that can be accomplished by first addressing differences between factory and knowledge work.

The Structure of Work: Factory versus Knowledge Work

In the past 20 years, there has been a shift from factory work to knowledge work. This shift has had implications for areas that are crucial to firm performance. Some of the areas where there are major differences include: the nature, location, and hours of the work and the difference between top and bottom performers. The table below depicts the differences between factory and knowledge work.

	<i>Factory Work</i>	<i>Knowledge Work</i>
<i>Nature of work</i>	Observable, physically intensive work	Non-observable, mentally intensive work
<i>Location of work</i>	On-site	Everywhere
<i>Hours of work</i>	8-5	24/7
<i>Difference between top and bottom performers</i>	Low ratio of difference between best and worst performer	High ratio of difference between best and worst performer

The implications of these differences is that IT must support factory and knowledge work differently. IT must support knowledge workers so that they can work everywhere, 24/7, with mentally intensive work. But what technology approaches that firms use for their systems?

The Structure of Technology

Just as there is an old dominant occupation (factory work) and a new dominant occupation (knowledge work), there is an old dominant computing approach (centralized computing) and a new dominant computing approach (distributed computing). The table below reveals a brief description of the differences between the two computing paradigms.

	<i>Centralized Computing</i>	<i>Distributed Computing</i>
<i>Technology type</i>	Mainframe with dummy terminals	Client/server with smart terminals
<i>Node of processing</i>	One location	Many locations
<i>Processing</i>	One place	In each place

Technology and Work

Now, if the dominant occupations are examined along with the technology approaches, a 2-by-2 matrix can be seen. The table below reveals the 4 situations. Factory work, as explained earlier,

Occupation	Knowledge	Questionable match	Natural Match
	Factory	Natural Match	Questionable match
		Centralized	Decentralized
		Computing Approach	

is best supported by a centralized computing approach and knowledge work is best supported by a decentralized computing approach. Thus, one possible explanation for the productivity problem is that the computing approach does not match the nature of the job. While this does not necessarily assume that all firms that have knowledge workers should use centralized computing, the implication is that the approach must match the nature of work. Thus, while

governance design focused on how to make the decisions for hardware and software issues, the structure encourages IT to look at how knowledge workers do their jobs and ensure that they are properly supported.

IT Use Management

In the day-to-day operations of the IT organization, the design of the governance dictates the “manager” and the “subordinate.” Dr. Wetherbe asks, what happens when the subordinate is smarter than the manager? The result is that:

- There is a power shift. Now, the subordinate has more power
- Given the power shift, the desire to be a member of management is decreased
- It is difficult to reward people, for there is no shared metric

To overcome these problems, managers must:

- Manage to the outcome, realizing that they know the desired outcome, but do not know how to get there and
- Increase collaboration and build a tradition of trust with subordinates

Project Management

While project management from a design point of view examines the how projects are completed (such as the waterfall method is used), the structure perspective looks at project management from the people side: how do people come together and build the new system. One of the changes in business now is that relationships are episodic: a group of employees (or firms) come together, do the work, and disband. Now, IT project management must also examine teamwork from an episodic viewpoint as well.

Formulating Effective Teams

To create high performing teams, Dr. Wetherbe suggests a number of guidelines:

- Collaborative learning is the number one predictor of a successful team. Teams must be willing to learn from others in order to achieve synergy. Allow individuals to pick the members of their team, since the employees know whom they respect and can learn from.
- Peers play an important element in teams. In addition to allowing individuals to pick their own members of their team, also enable them to eliminate members that are not doing their work. Using peer evaluation and peer pressure results in high achieving teams.
- Continuously train individuals. The more information is available and provided to employees, the more likely they are to perform to their potential.

Conclusions

Taken together, the keys to IT governance structure success are:

- 1) IT architecture structure: does the computing approach match the nature of the work?
- 2) IT use management: are employees empowered instead of suppressed, even if they have more skills than management?
- 3) IT projects management: are teams coming together with all relevant information and training?

If the design of the governance is appropriate (see last month's discussion) and these three elements are present in the structure, then IT governance can be deemed "successful." With successful governance, IT will play a critical role in enabling an organization to achieve high performance.