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The IT Value Hierarchy: Using Maslow's Hierarchy of Needs as a Metaphor for Gauging the Maturity Level of Information Technology Use within Competitive Organizations

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Abstract *The purpose of this paper is to present a hierarchy of progressive IT maturity using Maslow's Hierarchy of Needs as a metaphor for articulating the increasing value that can be derived by the application of Information Technology within competitive organizations. The authors refer to this maturity model as the IT Value Hierarchy. Each level of the IT Value Hierarchy is described using examples and comparisons to Maslow's Hierarchy. The model can be used by IT executives as a framework for better explaining and discussing the value of increasingly sophisticated Information Technology use within the enterprise.*

Keywords   IT Value, IT Leadership, IT Value Hierarchy, Strategic Use of IT, Maturity Model

Introduction

Over the past twenty years, there has been an explosion in the application of information technology (IT) within organizations of all types. Companies providing hardware, software, networking, and consulting services have been created and have flourished, the number of IT professionals has increased exponentially, and billions of dollars have been spent by organizations in the quest to become and remain IT-enabled by the standards of the day. Despite the ongoing cost and reach of information technology enablement within their organizations, many executives still struggle to clearly articulate the value that is being derived from information technology.

In 2003, Nicolas Carr raised the ire of many IT leaders by suggesting that the use of information technology no longer provides any significant advantage to companies. In his Harvard Business Review article, *IT Doesn't Matter* (Carr, 2003), Carr argues that information technology has become a commodity of sorts and therefore does not offer any competitive advantage to companies. To leading IT executives, Carr's argument is without merit. Although information technology products and services may be equally available, the innovative use of IT to create competitive differentiation has clearly been achieved

by many organizations. What IT executives often lack is a contextual framework in which to explain the path to increasing value for their firms. The authors believe that this framework can be explained through the use of a needs hierarchy based on a comparison to the human psychological needs hierarchy described by Abraham Maslow more than sixty years ago.

Maslow first suggested the needs hierarchy in his article entitled: *A theory of human motivation* (Maslow, 1943). The hierarchy is a model that is used as a means to depict the psychological maturity levels of humans through the satisfaction of progressive needs. At the foundation of the model are basic physiological requirements for survival such as air, water and food. These are followed progressively by needs for personal safety, needs for belonging, needs for esteem, and finally, self-actualization.

The purpose of this paper is to present a hierarchy of progressive IT maturity using Maslow's Hierarchy of Needs as a metaphor for articulating the increasing value that can be derived by the application of IT within competitive organizations.

Maslow's Hierarchy

Abraham Maslow's hierarchy is a five-level model depicting the progression of an individual's pursuit to meet personal needs. In his widely published book, *Motivation and Personality* (Maslow, 1954), Maslow explains that the

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most basic human needs must be satisfied before higher-level human needs are generally pursued. When the needs at each level are met, individuals naturally progress to the next level. When a lower level need is denied, however, the individual's attention may quickly shift to the denied need as the most important priority (See Figure 1).

Physiological Needs

The most basic needs in Maslow's hierarchy are biological needs. Humans require oxygen, food, water, and warmth in order to survive. If one or more of these basic needs is lost, the priorities of a person immediately shift to satisfying the missing need.

Safety Needs

Once physiological needs are met, the need for personal safety and security becomes apparent. This need can manifest itself in a variety of ways depending on environmental conditions. At the most basic level, the protection from physical endangerment becomes paramount when the state of personal security is threatened. Meeting physiological and safety needs provides the basis for personal stability necessary to advance in the needs hierarchy.

Social Needs

As comfort and safety needs are satisfied, individuals may then feel the need to belong to a social structure. The satisfaction of the need to be affiliated with a group

Figure 1. Maslow's Hierarchy of Needs.

or groups with which the person identifies provides a sense of belonging and validation. Belonging needs can be met through relationships with single individuals or a larger collection of individuals with whom the person can identify. Comfortable interaction with other individuals and the exchange of emotions, feelings, and thoughts can satisfy the need for belonging and create a sense of societal inclusion.

Self-Esteem Needs

A person who has met the needs for comfort, individual stability, and a sense of inclusion within certain groups often then strives to achieve a comfortable level of self-confidence. The degree to which an individual feels content with his or her achievement, confidence level, respect, and status within the group or groups to which he or she identifies are key factors in meeting the overall need for self-esteem.

Self-Actualization Needs

Beyond the need to meet self-esteem needs is the need to reach self-actualization. At this level in the hierarchy, individuals are attaining all of what they feel they are capable of becoming. From a self-worth standpoint, they have reached the pinnacle of their potential.

The IT Value Hierarchy

As executives contemplate the value of IT to their respective organizations, a needs hierarchy similar to that developed by Maslow can be derived. This model may help create context for understanding, comparing, and articulating the progressive value of IT to competitive organizations. The authors refer to the framework as the "IT Value Hierarchy." (See Figure 2).

The building blocks of the IT Value Hierarchy are not dissimilar to those of Maslow's Hierarchy. At the most basic level, mid-to-large sized companies need IT infrastructure and connectivity in order to survive. Upon meeting this need, they seek stability and security of the technology infrastructure. As they achieve acceptable levels of security and stability, the need for integrated information systems to provide accurate and consistent information with which to make sound business decisions becomes the focus. In general, many organizations feel reasonably satisfied reaching this level of maturity. In many cases, however, companies can achieve a higher level of maturity by using information technology to attain competitive differentiation or even as a means
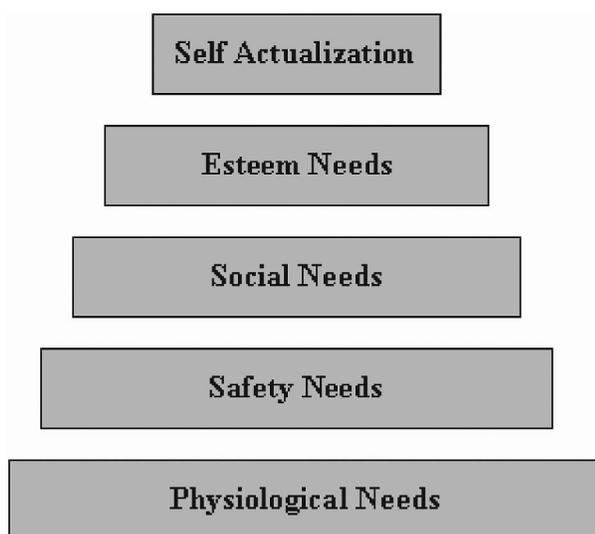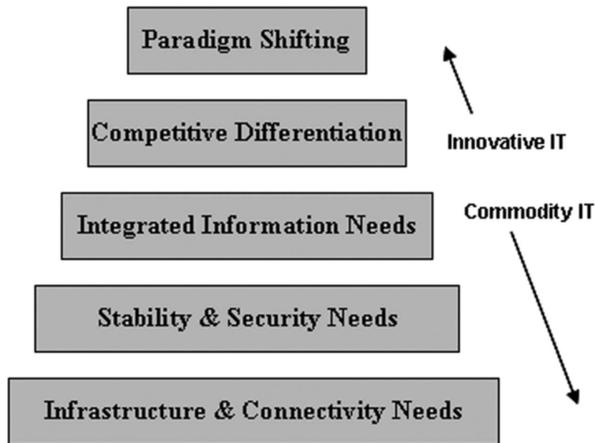
Figure 2. The IT Value Hierarchy.

to fundamentally change consumer behavior and expectations.

It is important to understand that not all organizations need to strive for the highest level of maturity in the IT Value Hierarchy. Just as with human needs, any level of maturity may be appropriate depending on environmental conditions. The intention of the model is to provide a framework for understanding, categorizing, and describing the value derived by the increasingly sophisticated use of information technology within competitive organizations.

Using the IT Value Hierarchy as a framework, executives will be able to more readily explain the importance of meeting and attending to the basic IT needs of the organization with an eye on the more sophisticated or innovative applications that may provide competitive advantage. They will also be better equipped to explain the difference between commodity IT investments and those aimed at providing differentiation in the marketplace. Each phase of the IT Value Hierarchy is described in detail below.

Infrastructure and Connectivity Needs

At the foundation of the IT Value Hierarchy, is the need for basic infrastructure and connectivity. At this level, employees have access to networked PCs and functional departments have likely deployed simple applications for conducting business such as accounting and payroll systems. There are very few standards in place for the purchase and configuration of hardware and software and little or no policy regarding computer and information use. IT support is generally provided upon user request or when technology failure occurs. Proactive IT support actions related to ensuring the health and currency of the infrastructure are rare.

The IT environment can generally be summarized as follows:

- networked PC/Laptops are in place;
- internet access and email are available;
- simple departmental applications have been deployed;
- little if any IT standardization is in place;
- few if any IT policies have been stated; and
- dedicated IT resources provide reactive technical support.

Within smaller and more centralized organizations, this level of maturity may very well satisfy the needs of the employees and other stakeholders. The relatively small number of employees who make up the company may be in close enough proximity to one another that the communication of critical information and knowledge is more easily passed between parties without the enablement of sophisticated IT systems.

In these organizations, management generally views the function of the IT department as simply providing support resources for deployed infrastructure such as PCs, peripherals, and network devices. Many of the departmental applications installed may be maintained directly by the user community and may be surrounded by "supporting" technology, such as complex spreadsheets, to bridge gaps in application functionality.

The presence of basic infrastructure and connectivity is the foundation for an organization's advancement through the IT Value Hierarchy. Just as the absence of basic physiological conditions tends to trivialize the higher social needs of Maslow's hierarchy, the absence of basic infrastructure and connectivity can cripple an organization's ability to derive the higher values from the more advanced application of information technology.

Stability and Security Needs

As an organization grows, the dependence on a more stable and secure IT infrastructure becomes increasingly apparent. Systems and infrastructure must be available in a much more consistent and predictable manner as the absence or interruption of basic IT services is now recognized as having negative impact on the productivity of the workforce. As such, IT standards, controls, policies, and procedures regarding the selection, deployment, and management of infrastructure are in place in order to provide a framework for overall systems stability. The focus of IT at this level is on ensuring that the technology infrastructure and IT operational processes enabling the business are optimized.

Characteristics of a stable and secure IT infrastructure may include the presence of:

- change management policies and processes;
- standards for hardware, software, and production control;
- controlled access to systems, data, and infrastructure;
- predictable system availability and support levels; and
- dedicated IT resources that provide deep *infrastructure enablement* expertise to the organization.

Upon meeting this need, departmental systems are available reliably and information is protected sufficiently. Business disruption caused by technology failure is considered a rarity. Management recognizes the critical nature of the organization's use of information technology as an enabler to successful business operations.

IT organizations in companies at this level have become proficient in the *operational aspects* of the IT discipline. The IT maturity level in the *business applications aspects* of IT, however, may be lacking substantially. The primary difference is that the former focus is on ensuring that deployed systems are stable and available. The latter and more mature focus is on ensuring that the *right* applications are being deployed in ways that best benefit the business. Although the IT organization at the safety and security level may have responsibility for maintaining installed business applications, the IT function is not viewed as a knowledgeable resource for business process enablement or improvement within the company. Business applications are often selected by departmental managers without regard for cross-departmental process flow or integration. Accounting systems are chosen by Accounting departments, Human Resource Management Systems are chosen by HR departments and Sales systems are chosen by Sales departments. The results may be a silo-like environment of business applications that provide very limited views of information to those outside of the primary department's domain.

Integrated Information Needs

Companies that are operating with stable but silo-based business applications often desire that more integrated systems be implemented in order to fully realize the power of information across the company. To accomplish this, IT and business units must work in an integrated fashion. IT becomes the facilitation point for cross-functional technology solutions and a catalyst for business process improvements within the company at large. To address the need for integrated information, robust systems must be deployed that cross departmental boundaries. ERP, CRM, Intranet, and a Web site with eCommerce and Customer Self-Service

capabilities may be in place. Employee self-service systems may also be in place.

Organizations meeting the need for integrated information can generally be characterized as follows:

- The portfolio of Business Applications is viewed as an ecosystem.
- Departments have access to relevant cross-functional organizational information.
- Departments are able to influence and react to each other in pursuit of goals.
- Departments are able to model various decision outcomes.
- Dedicated IT resources are assigned to core business functions to provide deep *applications enablement* expertise.

At the integration level of maturity, organizations move out of a silo-based view of departmental information. Not only is relevant departmental information able to be viewed by other departments, but the business management process is tightly integrated across business units as well.

Many organizations would be quite satisfied to reach this level of maturity on a broad basis. As organizations move to the higher value levels, they typically require a much higher level of inspired thinking from organizational executives as well as a culture that fosters technology-enabled innovation in operations. It is very difficult for IT executives to drive innovation without this partnership and shared vision. It is the authors' opinion that advancement beyond the integration level is the distinction between organizations who enjoy the use of "commodity IT" versus those who strive to experience "innovative IT."

Competitive Differentiation

At the first level of innovative IT, organizations achieve a recognized level of competitive differentiation and advantage through the use of information technology. IT becomes an integral part of the organization's strategic planning process not only as an enabler of a more efficient entity, but also as a means of leap-frogging the competition. The IT role moves from the back-office into the forefront of the organizational strategy and often extends directly into the enablement of unique products or services.

To realize differentiation, proprietary IT solutions may be developed and deployed in order to achieve a unique competitive advantage that sets the organization apart from its peers. Consider the introduction of online banking and online brokerage services to the operations of established financial institutions. Consumers may

choose one institution over another due to the convenience, breadth and depth of online service offerings. Other examples include the logistical systems that enabled FedEx to define the overnight delivery business and the supply-chain systems that enable Wal-Mart to consistently dominate the retail industry. In these examples, Information Technology is by no means a back office function. IT enablement is woven into the fabric of the organization and considered an enabler of every phase of the business process.

Paradigm Shifting

In rare cases, organizations can go beyond achieving competitive advantage through the use of information technology. Completely new paradigms can be developed through the unique use of IT that can fundamentally change a generally accepted business model. Consider Amazon's impact on the book selling business, Travelocity's impact on the travel business, or Netflix' impact on the DVD rental business. The "product" is not new or unique, yet the application of information technology to the customer interaction process has fundamentally changed consumer buying behavior and the expectations of others in the competitive space.

Another example of a paradigm shifting use of IT is Apple's integration of the iTunes service with the iPod device. By integrating the music browsing, acquisition, and playing experience, Apple has penetrated new markets, created a loyal and growing customer base, and has enjoyed significant gains in revenue and market capitalization.

Within competitive organizations operating at this level of maturity, the IT enablement function may be somewhat bifurcated. "Traditional" IT may be separated from the product-focused technology enablement function due to differences in core mission. Regardless of organization design, however, technology visionaries are the inherent drivers of corporate strategy in enterprises that truly experience the pinnacle of success within the IT Value Hierarchy.

Applications of the IT Value Hierarchy

Using the IT Value Hierarchy as a framework to assess needs within the organization can help the IT executive create a sense of understanding among other organizational leaders as to why the maintenance of each building block of the hierarchy is important. As IT executives urge advancement through the hierarchy, the framework can be used as context for discussions of how other organizations have used IT to achieve higher levels of value and to help inspire organizational peers to action.

In applying the IT Value Hierarchy, it is essential to understand that all preceding levels must be considered regardless of the level that the organization is striving to break through. The absence of performance at any preceding level draws attention to that level and can cause reduced confidence in IT capabilities. Executives should therefore consider each level in the IT Value Hierarchy as a channel when developing information technology strategies and initiatives within the organization.

As the more innovative applications of information technology are contemplated, the culture of the organization and technological sophistication of the organization's management team must be strongly considered. Those organizations that achieve the highest levels of IT value are those that generally have a higher level of technology savvy and a culture of operational innovation reaching all levels. IT executives cannot achieve the more innovative levels of the IT Value Hierarchy on their own. Success at these levels requires a very strong partnership with other organizational leaders and a common vision for creative information technology enablement within the enterprise.

Conclusions

The broad categorizations and generalizations offered in the description of the IT Value Hierarchy are designed to be a framework for the discussion of organizational maturity through the increasingly broad and sophisticated application of information technology. The model, however, is not intended to be a tool for predicting organizational success.

The relevance of the Hierarchy in determining the success of an organization is likely dependent on several other variables including (but not limited to):

- organization size;
- organizational complexity;
- organizational culture;
- competitive landscape;
- IT's ability to innovate;
- management's technical sophistication and vision;
- management's risk tolerance; and
- organizational synchronization with IT

A first step in future research directions would be to operationalize the definitions of each step in the IT Value Hierarchy. Such an operationalization would consist of a list of definitive characteristics of each step. A next step would include case studies which document IT and business characteristics within competitive organizations operating at various levels within the model and the experiences of organizations who have climbed the maturity hierarchy. These case studies would provide

further context for the discussion of the value of information technology within competitive organizations. Additionally, the authors suggest more quantitative research to determine whether there is a correlation between IT cost, maturity, and corporate performance within and across industries.

Author Bios

Robert Urwiler is a 20-year veteran of corporate information technology and currently Senior Vice President and CIO at Vail Resorts, Inc. in Broomfield, Colorado. Vail Resorts, Inc. is the leading mountain resort operator in the United States. The Company's subsidiaries operate the mountain resorts of Vail, Beaver Creek, Breckenridge and Keystone in Colorado, Heavenly in California and Nevada, and the Grand Teton Lodge Company in Jackson Hole, Wyo. The Company's subsidiary, RockResorts, a luxury resort hotel company, manages casually elegant properties across the United States. Vail Resorts Development Company is the real estate planning, development and construction subsidiary of Vail Resorts, Inc. Vail Resorts is a publicly held company traded on the New York Stock Exchange (NYSE: MTN).

Prior to Vail, Robert served as SVP and CIO of Macromedia in San Francisco where he was responsible for driving all aspects of corporate information technology enablement as well as leading the company's global Customer Care organization.

Robert holds a Ph.D. in Information Systems from Nova Southeastern University's School of Computer and Information Sciences. He is a member of the CIO Collective, the CIO Executive Council, CXO, and the Council of Communications Advisors. Robert has been published in journals such as the *Journal of Strategic Information Systems*, the *Journal of Systems Management*, *Information and Software Technology*, and *Information & Management*.

Dr. Mark N. Frolick is a Professor of MIS in the Williams College of Business at Xavier University and the holder of the Western & Southern Chair in Management Information Systems. Dr. Frolick is considered a leading authority on business intelligence. His specialties include business performance management, business intelligence, data warehousing, executive information systems, e-business, cycle time reduction, and the diffusion of information technology in organizations.

Dr. Frolick has authored over 100 articles. His research has appeared in such prestigious journals as *MIS Quarterly, Decision Sciences, Journal of Management Information Systems, Decision Support Systems, and Information & Management*. He also worked with Dr. James Wetherbe on the book *Systems Analysis and Design: Best Practices* (West Publishing, 1994). This book was ranked by Computing Newsletter as the top textbook on the topic. Additionally, Dr. Frolick serves as a consulting editor for several publishing companies.

Dr. Frolick has over 20 years experience in the information systems field. In addition to working for The Southern Company and Georgia Power, he has worked as a consultant for numerous Fortune 500 companies including FedEx, Ford, Hewlett Packard, Medtronic, and Texas Instruments. He received his Ph.D. from the Terry School of Business at the University of Georgia.

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