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A Model for Information Industries Systems Management Success: Lessons from the Past

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Abstract

An important issue in the area of the rapidly developing information industries is the still unresolved problem of determining “best practices” by which to successfully manage systems for these newly emerging business types. Indeed, recent practitioner literature suggests that the information industries have such seemingly unusual economic characteristics that it is tempting to abandon all prior research in MIS theory about effective information systems management. This paper discusses three key points: 1) the paper will first define the boundaries of the information industries; 2) the paper will briefly explore the unique systems management challenges which arise from the unusual dynamics found in the information industries; and 3) the paper will conclude by describing a conceptual model based in traditional MIS theory that may contribute to successful management of the MIS function for information industry firms in the future. The underlying premise of the model is the proposition that, although the information industries have unique economic drivers which cause these firms to appear to have different systems business practices needs on the surface, the bedrock MIS management theories are still quite applicable and relevant to successful information industry firm performance.

Introduction

There are many articles in the information systems literature, as well as in the recent trade press, which point to challenges faced by managers in the new information industries (e.g., Mendelson and Pillai 1998; Talmor and Wallace 1998; Slywotzki 1999). Some researchers argue that the information industries follow the classic rules of economics, only differ by operating at a remarkably faster product cycle time which is tied to the speed of technological change (Shapiro and Varian 1999). It is generally agreed that the information industries function at a faster “clockspeed” than other industries, and experience a more rapid rate of change of both information product development as well as information technology applications turnover (Mendelson and Kraemer 1998). Some researchers call this the “eat their own dog food” phenomenon, in reference to the idea that information industries not only produce information, but utilize the very products which they produce to accelerate into the next new product cycle (Cusumano and Yoffee 1998). It is thought that new information product development is best for these firms when it is done almost in parallel to current product development (Shapiro and Varian 1999).

As has been common over the last thirty years of information systems technology development, new technological breakthroughs of large social magnitude, such as the Internet, invariably result in new prescriptions from MIS thinking. We are now facing an unprecedented growth in the information technology industries in the US (Margherio 1998). Despite the historical relationships between the advent of new technologies and the introduction of new theories of MIS management, all of the MIS tradition must and should not be abandoned because of the current accelerated speed of technological change, particularly as evidenced by the burgeoning growth of information industry firms in the late 1990s. Indeed, classic MIS theory has much to offer to the practitioner in the information industries sector. Systems management in information industries does not require an entirely new approach from MIS thinking, but rather, the formal application of well established concepts.

The study of information industry systems management is a central and interesting problem for MIS researchers. Exploring successful information industry systems strategies is to also approach the heart of the production and operations in those same industries. The chief production tools of the information industries are information technology and information systems. Further, the information industries segment of the US economy has risen from about a 6 percent contribution to US economic growth to a 14 percent contribution to growth between 1995 and 1998 (Margherio 1998).

What are the Information Industries?

To the purist, information industries are strictly those firms which produce intangible information that can be digitized, as compared to non-information industries, which produce only concrete, physical goods. However, the US Department of Census North American Industry Classification System (NAICS) defines the “information sector” as including both information goods and information technology hardware manufacture. The
official NAICS definition of the information industries is applied in this paper, although it will be pointed out in the next paragraph that theoretical complexity results from including hardware in the same grouping as information goods. Many researchers follow this governmentally sanctioned direction and conceptualize the information industries as those which produce information, and also the physical aspects of information goods production, such as hardware, switches or integrated circuit chips (e.g., Jarvenpaa and Leidner 1998; Mendelson and Pillai 1998). Others distinguish between bits and atoms as the differentiating line for the information goods industries (Negroponte 1995). Barlow defines information property as "liquid commerce," where information products are "fluid and adaptable," requiring "containers" for delivery such as CD-ROMs or floppies, but an information good does not appear in a physical form like hardware (Barlow 1994).

There is an important, specific reason why the information industries should not be defined as encompassing both information goods producers (diagnoses, books, ideas, songs) as well as information technology producers (switches, integrated chips, hardware, telecommunications equipment). A strong theoretical distinction can easily made between information goods and information technology goods. Information goods are subject to unique economic rules, which are associated with the unusual market behavioral aspects of intellectual property and the economics of information. In contrast, information technology products (made of "atoms") follow the same economic rules as every other kind of business, only the production of information technology causes these firms operate at much faster clockspeeds.

This theoretical difference is the key to why this paper argues that the information industries will benefit from the application of traditional MIS theory. When information industries are defined as inclusive of both the information goods and information technology hardware products such as found in the NAICS definition, Jarvenpaa and Leidner (1998), or Mendelson and Pillai (1998), application of the classic MIS management models continues to be useful and appropriate for improving the management of information systems.

Why Might Information Industries Require Different MIS Management Strategies?

Information economics guides the sometimes unusual behavior of the information industry firms which operate at the extreme of only information goods production. Information can be easily replicated, and it can exist in two places at the same time without damaging the worth of either piece of information (Boulding 1966). In economics, this type of product is called a non-rival good (De Long and Froomkin 1998). The market pricing of non-rival goods is unlike rival goods because of the lack of contention for scarce resources. Thus, a browser may be given away for free in an attempt to gain market share. Yet, information has different values dependent upon the user, and that value may not be constant. If someone has very large personal investments, it may be worth it to that person to spend a high fee on a financial report from Bloomberg each month. Interestingly, information value may degrade over time, such as a stock tip. Some kinds of information may be worth more if it is kept secret, or exclusive, such as insider trading information. Just as with trade secrets, however, it is difficult to maintain the exclusivity of some kinds of information. On the other hand, people are not always willing to share information if it is associated with one's job security (Constant, et al., 1994).

The unusual features of information carry over to information as a good for sale by firms that are members of the information industries. It may not take a large investment to replicate a piece of information, and economics dictates that the price of a piece of information should be at the point where marginal cost equals marginal revenue. The marginal cost of the $i$th piece of information produced is zero, which implies that information products should be priced very low. But, if information holds more value if it is kept exclusive, then it should be priced high. If information is easily replicated, then property rights and ownership issues challenge the competitive advantage of the firm that originally developed the information. Cheap and easy replication of information goods threatens the recovery of the high start up costs which may be necessary to generate that information good, such as in a software development firm or with a pharmaceutical house.

Classic MIS Theory Continues to be Relevant

Because the information industries are a mix of pure information goods as well as information technology hard goods production, MIS theory has much to offer in terms of systems business practices for these kinds of firms. The mythical lure of electronic commerce may be based on a misinterpretation of the unusual economics of information goods production (Shapiro and Varian 1998), when its implementation should be more firmly rooted in traditional MIS information technology implementation strategies. Strategic planning, applying the value chain model and first mover advantage strategies are examples of appropriate tools for information industry systems management. Strategic MIS planning which maps to the
overarching information firm plan will encourage the development of systems that support the firm strategy.

Some of the questions, which an MIS grounded systems approach would suggest addressing are: Are information good products or information technology products at the core of the business? Does the firm use technology for purposes of information goods product manufacture (a possible entrée for increasing returns to scale), or information technology good distribution, supplier relations, customer education or marketing (an old fashioned value chain application)? Does the firm hold on to strategic, competitive advantage through the use of information technology at the firm itself (in effect, “eating its own dog food”), or in terms of how product is sold (classic use of IT)? Has MIS management applied the Porter and Millar value chain model to determine the best uses of the new distribution technologies of the Internet? In fact, the cost of marketing and distribution of products via the information technology intensive Internet may be as high as 65 percent of sales (Grover 1999). Is there a first mover advantage to giving away an information good product for free, such as the web browser from Netscape? One wonders if this form of first mover advantage strategy is any different than Sabre and Baxter gaining advantage through free customer accessibility long before web browsers were invented.

Other MIS implementation strategies which are appropriate for information firm systems guidance are the use of interorganizational networks for improving access to firm resources (Dyer and Singh 1998), traditional implementation planning, or using suitable MIS organizational structures for good management response in the face of accelerated change.

A Conceptual Model for Information Industries MIS Management

Thus, despite the peculiarities of information as an economic good, a case has been made that the following conceptual model is useful for the management of information industry systems:

(Refer to Figure 1)

**Concluding Comments and Future Research**

The information industries are both fascinating and complex because of the combination of information goods products accelerated by information technology applications within the same companies. This paper has argued that information goods economics cause information-producing firms to behave in unusual ways. However, the remarkable economic drivers associated with information goods tend to obscure the nature of information industries systems management. The management of information systems for information industry firms should remain on familiar MIS theoretical territory. It is incorrect for MIS researchers to completely abandon our previous work when many ideas in traditional MIS thinking remain applicable for guidance of the best business practices in information industry firms.

**Bibliography**

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**Figure 1: A Conceptual Model for Information Industries Systems Management Success**