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# Building Relationships between the Management Information Systems Area and Other Academic Disciplines: An Introduction

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## Abstract

Relatively speaking, the field of information systems is still young, developing into a coherent field. This introduction to the minitrack is organized into the following four sections. The first section discusses three prerequisite conditions for MIS to become a coherent field of a study, as suggested by Keen (1980).

- 1.1 Clarifying reference disciplines
- 1.2 Building a cumulative research tradition
- 1.3 Defining the dependent variables

The second section is concerned with the process by which an academic discipline becomes establishment. Once the prerequisite conditions for becoming a classic field of study have been met, a review of the major works of Kuhn (1970), Kaplan (1964), and Cushing (1990) describes the process by which an academic discipline becomes establishment in terms of the following steps:

- 2.1 Consensus building
- 2.2 Empirical studies
- 2.3 Articulation of Theories
- 2.4 Paradigm Building

The third section overviews the current state of MIS research in terms of the prerequisite conditions and the process as described above. The last section reaches several conclusions and suggests some future research directions.

**KEYWORDS AND PHRASES:** Reference Disciplines, Cumulative Research Tradition, Intellectual Structure, Intellectual Development, Empirical research; Building Relationships with Practice, Building Relationships across the global community, Diffusion of research, reference disciplines, Building Relationships with Other Academic Disciplines.

## Introduction: Three necessary conditions for becoming a coherent field of study

In 1980, Peter Keen identified and discussed three main necessary conditions for the field of management

information systems to become a coherent research field (Keen, 1980). They were (1) clarification of reference disciplines, (2) definition of the dependent variable, and (3) building a cumulative tradition. The MIS area has many *assumed* references, such as micro-economic theory, cognitive psychology, applied psychology, behavioral decision theory, computer science, information theory, information economics, political and administrative sciences, human factors and ergonomics, management science, etc. Studying the reference disciplines improves MIS research as researchers adopt their theories as well as assess what these theories imply for MIS research. Defining the reference disciplines is one way of introducing quality control since information systems research grounded in coherent reference disciplines is less likely to issue a new contingency theory/framework (Keen, 1980).

To reflect the relevance and importance of the track topic, the conference theme of the 1997 International Conference on Information Systems was building relationships. The theme of building relationships has two purposes. The first was to present a third view of information systems recognizing information systems and information technology as mechanisms for enabling the cooperation among organizations. The second was to reflect upon three key issues facing the information systems disciplines -- (1) examining relationships between IS disciplines and IS practice, (2) examining relationships between IS disciplines and IS reference disciplines, (3) examining relationships among IS discipline researchers across the global community (Kumar, 1997).

## The process by which an academic discipline becomes establishment

A review of the major works of Kuhn (1970), Kaplan (1964), and Cushing (1990) describes the process by which an academic discipline becomes establishment in terms of four steps:

- (1) Consensus building among a group of scientists about the existence of a body of phenomena that is worthy of scientific studies (Kuhn, 1970);
- (2) Empirical study of the phenomena to establish a particular fact or a generalization (Kaplan, 1964);
- (3) Articulation of theories to provide a unified explanation of established empirical facts and

generalizations (Kuhn 1970); and  
(4) Paradigm building to reach a consensus on the set of elements possessed in common by practitioners of a discipline such as shared commitments, shared values, and shared examples (exemplars) (Kuhn, 1970).

The MIS research frameworks of Mason and Mitroff (1973) and Ives, Hamilton, and Davis (1980) have played important roles in facilitating and solidifying the consensus building process on the body of phenomena that is worthy of scientific study by MIS scholars. Previous studies have attempted to determine the degree to which the other steps have been achieved. Culnan (1986, 1987) and Cushing (1990) conducted examinations of the intellectual evolution and development of the MIS area. These studies concluded that significant progress had been made toward a cumulative research tradition in MIS and identified several groups of MIS research subfields.

## Current State

### Clarifying reference disciplines and building a cumulative research tradition

Over past several decades, the IS community has accepted good ideas and adopted theories, methodologies, philosophical bases and assumptions from the reference disciplines to solidify its domain and demarcate its reference disciplines. Information and decision-making have been a universal subject of research in many academic disciplines both within the business school and outside the business school. Many theories and ideas originated from cognitive science, psychology, management science, systems science, communication science, organizational science, information science/library science, and computer science have positively contributed to the emergence of new research area of information systems.

To build relationships with academic disciplines, it is necessary to identify the accurate picture of the current state of relationships between management information systems and other academic disciplines.

*Mapping the Intellectual structure of MIS Research (1970-1985)*(Culnan 1985, 1987): To address the first and second issues raised by Keen, Culnan (1986, 1987) and Culnan and Swanson (1986) conducted an examination of the intellectual evolution and development of the MIS area using a cocitation analysis of published MIS research. In her landmark research, Culnan discusses the importance of the study of the intellectual development of a field of study (1986, p. 156):

Researchers in any academic discipline tend to cluster into informal networks, or "invisible colleges," which focus on common problems in common ways (Price, 1963). Within these networks, one researcher's concepts and findings are soon picked up by another to be extended, tested and refined, and in this way, each person's work builds on that of another. The history of exchanges between members of these subgroups in a discipline describes the intellectual history of the field. ....

Researchers can benefit by understanding this process and its outcomes because it reveals the vitality and the evolution of thought in a discipline and because it gives a sense of its future. In a relatively new field such as MIS, this understanding is even more beneficial because it identifies the basic commitments that will serve as the foundations of the field as it matures....

Culnan's study, based on a factor analysis of author cocitation pattern, results in the identification of the following nine groups of MIS research subfields (1-5) and contributing disciplines (6-7).

- (1) Foundations/Management Theory
- (2) Computing Impacts/Local Government
- (3) Implementation (MIS/DSS)
- (4) Individual Difference
- (5) Computer Conferencing
- (6) Human Factors
- (7) Systems Science
- (8-9) Others (two clusters unnamed)

Out of nine subspecialties, it was suggested that MIS/DSS implementation and foundations needed further investigations. Building on the results of Culnan's study, several studies examined the existence of cumulative tradition of the MIS area. The term MIS used in Culnan's research includes various subsets of computer-based information systems including management information systems, decision support systems, executive information systems, expert systems, etc.

*Mapping the Intellectual structure of DSS Research (1970-1999)*(Eom, 1995, 1996, 1997, 1998a, 1998b, forthcoming; Eom and Farris, 1996; Eom and Min, 1992, 1999; Eom et al., 1993).

There has been a growing amount of research in the area of DSS over the past three decades (1970s -1990s). For example, Elam, Huber, and Hurt (1986) examined the DSS literature published from 1975 through 1985. Their study presented an overall picture of the DSS area and provided a valuable source of knowledge concerning the

type of DSS research (research vs. practice oriented) for academicians and practitioners in the DSS area. A study by Farhoomand (1987) reports that DSS has been one of the five top research themes and has shown steadily increasing acceptance among information systems based decision support systems and multiple criteria decision

Eom and his colleague initiated a series of studies to investigate the existence of cumulative tradition in DSS, to identify the various subfields (as listed below) of DSS research and the contributing disciplines of DSS within the business school and outside the business school, which have influenced the development of specific DSS.

#### DSS Research Subspecialties

- (1) Foundations
- (2) DSS Implementation
- (3) DSS Design
- (4) DSS Evaluation
- (5) User-Interface/Individual differences
- (6) Model Management
- (7) Multiple Criteria Decision Support systems
- (8) Group Support Systems

#### Contributing Disciplines - Outside of the Business Schools

- (9) Systems Science
- (10) Cognitive Science
- (11) Artificial Intelligence
- (12) Communication Science
- (13) Social Psychology
- (14) Computer Science

#### Contributing Disciplines - Within the Business Schools

- (15) Accounting
- (16) Economics
- (17) Management Science
- (18) Strategic Management

Their research has recognized that DSS research stems from the work of many disciplines within the business school, including organization science, MCDM and management science, accounting, and strategic management, as well as many disciplines outside the business school such as AI, systems science, psychology, cognitive science, computer science, communication theory, etc. A thorough examination of the intellectual relationships between DSS research subspecialties and contributing disciplines have uncovered several patterns of positive and constructive interactions between these two areas. First, the ideas, concepts, and terms such as "electronic meeting," "groupware," and "teleconferencing," are coined by the researchers in many diverse academic disciplines. Second, research findings in reference disciplines such as AI and MCDM have been

support systems, etc.) researchers in the last nine years (1977-1985). A survey, based on perceptions of a sample of MIS researchers, reported that almost one third of respondents were doing DSS research (Teng and Galleta, 1990).

applied to forge new research subspecialties (knowledge-based decision support systems and multiple criteria decision support systems, etc.) Third, reference disciplines such as database management have been applied and extended in the management of models in DSS to build a theory of models. Research based on the well-established reference disciplines with abundant theories is most likely to lead to the development of new theories. However, there is also a danger in extending ideas from other disciplines. More than a decade of intense research on cognitive styles and individual difference research, extending the ideas/works of Newell and Simon (1972) to derive operational information systems design principles appears to have come to an end. Huber (1983) concluded that the accumulated research findings as well as further cognitive style research are unlikely to lead to operational guidelines for DSS designs. Many ideas developed from psychologists, communication theorists, organization scientists, and computer scientists have positively contributed to the emergence of new research area of GDSS.

### The dependent variables

The definition of the dependent variable has been recently examined by DeLone and McLean (1992), based on the review of 180 empirical studies that have attempted to measure some aspects of "MIS success." Their study presents a more integrated view of the concept of information systems (I/S) success. A more comprehensive model of information systems success is formulated. The main thrust of their conclusion is as follows (DeLone and McLean, 1992, p.88).

As an examination of the literature on I/S success makes clear, there is not one success measure but many. However, on more careful examination, these many measures fall into six major categories--SYSTEM QUALITY, INFORMATION QUALITY, USE, USER SATISFACTION, INDIVIDUAL IMPACT, and ORGANIZATIONAL IMPACT. Moreover, these categories or components are interrelated and interdependent, forming an I/S success model, as well as the components themselves, a clear picture emerges as to what constitutes information systems success.

## Conclusion and Discussion

Over the past several decades, the information systems community has conducted numerous researches to elucidate the intellectual bases of information systems research through the identification of the reference disciplines and their impact on the development of information systems research subspecialties. We have examined the issues addressed by Peter Keen (1980): What are the reference disciplines for MIS? Have we built a cumulative MIS research tradition? MIS research subspecialties and contributing disciplines uncovered by many researchers imply that a cumulative research tradition has emerged in MIS research and the MIS area is in the process of solidifying its domain and demarcating its reference disciplines. DeLone and McLean (1992) introduced a comprehensive taxonomy that posits six dimensions of information systems success measures (the dependent variables). Consequently, the necessary conditions for MIS to become a classical and coherent discipline appear to have been met.

Although the MIS community has made meaningful progress over the past several decades toward solidifying its domain and to demarcating its reference disciplines, many challenges await us. The boundaries of the MIS area can be shaped by the development of its own well-grounded theories for supporting practitioners in the integrated process of design, implementation, and evaluation of MIS. Several previous research points to several positive signs that imply that we have made significant progress toward the development of MIS theories that can be applied in practice to improve individual, group, and organizational performance. Nevertheless, the considerable amount of empirical research in GDSS, user interface/individual differences, and implementation has produced conflicting, inconsistent results due to methodological problems, lack of a commonly accepted causal model, different measures of dependent variables, hardware and software designed under different philosophies, etc. Numerous seemingly conflicting results of empirical research are now being (or have been) reinterpreted/ reviewed to organize a confusing body of research into a coherent whole through the use of cumulative research techniques such as meta-analysis, cumulative experimental approach, etc. For example, a theory of cognitive fit has been presented (Vessey, 1991) to explain the role and performance of graphs and tables -- a longstanding controversy (DeSanctis, 1984). We are adjusting the focus of our attention from the enumeration of the factors influencing implementation success to the effective management of important factors.

As Keen (1980, p.18) states, "Building a rich, meaningful field of study involves more than just 'doing' research. There is a need for reflection on the field, its roots, relations with other disciplines and historical

context." This research focused on identifying the roots of DSS research and investigating the relationship between the DSS subspecialties and the reference disciplines to provide groundwork for future scientific inquiry and aims to facilitate the development of articulated theory in the field.

We are now in a better position to address the following issues: what should the MIS community do to facilitate the transition from the pre- to post-paradigm period, who should do it, and how should it be done? A group of influential and responsible MIS researchers who represent major forces that have charted and perhaps will chart the future directions for MIS research and redirect MIS research efforts toward a common paradigm. "Any study of paradigm-directed or of paradigm-shattering research must begin by locating the responsible group or groups" (Kuhn, 1970, p. 242.).

MIS research will not make significant contributions unless we find common ground between researchers and practitioners. To quote Schneyman, et al. (1991, p.5), developing MIS/DSS theory for practice depends on "maintaining a constructive tension between the immediate needs of managers and the research interests of professors." But researchers have often ignored this simple truth. If we cannot develop our own articulated MIS theory for practice, we will face a serious dilemma. Only *articulated MIS theories* will provide the DSS community with its *raison d'etre*

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