Cross-Fertilization of Knowledge: The Case of MIS and its Reference Disciplines

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This study examines the characteristics of cross-fertilization of knowledge of MIS and its related disciplines. The examination is conducted from the perspective of two significantly different models of scientific development. These are the internalist model and the externalist model. Citation data is used to develop a cross-fertilization network of scientific disciplines. The patterns of knowledge-sharing among the disciplines are studied. MIS and its reference disciplines are analyzed in terms of the degree to which they remain open to the ideas of other fields. Results indicate that the patterns of cross-fertilization vary greatly among these scientific fields. This suggests that no one model of scientific development serves to describe adequately MIS and its related disciplines. The status of MIS as a scientific discipline is discussed. The authors argue that the multifaceted nature of MIS should be re-conceptualized as progress from multiple directions.

Whether a discipline is viewed as a rather tightly knit “community of scientists” (Kuhnian view) [Kuhn, 1970], or as a more diffuse “intellectual community” (as enunciated by Whitley) [Whitley, 1984], what seems certain is that scientists communicate and share ideas among themselves. This communication may occur within a single discipline, between different disciplines, or both. The evolution of a scientific discipline can be studied in terms of the pattern and nature of communication, or the cross-fertilization of knowledge that occurs among scientists. The purpose of this study is to examine the characteristics of cross-fertilization of intellectual product of MIS and its related disciplines. The cross-fertilization network developed herein should provide researchers and scholars with a clear picture of the uses and sources of intellectual product in their discipline, which in turn may affect the future development of these disciplines.

Theoretical Background

Traditionally, two major models of cross-fertilization have been dominant in philosophy of science and sociology of knowledge literature. They are the so-called “internalist” model and the “externalist” model. Kuhn [1970], Hagstrom [1965], Cole & Cole [1973], and other internalists view the scientific consensus as relatively autonomous and independent of external factors.¹ To them, the mode of change in science derives from within rather than from without a discipline.

Scientists within a discipline are likely to be
unconcerned about the existence or development of a paradigm, if they even accept the notion of a paradigm. They are primarily interested in examining the nature of interaction among researchers, whatever their background disciplines might be.

To externalists, it is unnecessary for scientists to agree upon one dominant consensus which guides their scientific activities. Internalists, on the other hand, demand conformity. If the internalist view of science is seen as monistic, then the externalist view can be characterized as pluralistic.

Research Questions

The above discussion gives rise to several questions concerning the nature and extent of the interaction among groups of researchers. To what extent are the efforts and energies of scientists in a discipline driven by the work of colleagues in the same field? To what extent are they influenced by activities in other (reference) disciplines? Which fields engage in cross-fertilization of knowledge, and how does this cross-fertilization form a knowledge-sharing network structure? This same line of inquiry can be raised with respect to the discipline of MIS — the focus of the present study.

This paper addresses the following research questions:

1. What are the reference disciplines of MIS, and what, in turn, are their reference disciplines?
2. What are the characteristics of cross-fertilization of knowledge among this set of disciplines? In other words, what is the structure of the knowledge-sharing network in which MIS exists?
3. Which of the two models of cross-fertilization of knowledge (internalist or externalist) provides a better description of MIS and its reference disciplines?

Citation data provide a means for investigating the nature of formal communication among scientists. Consequently, citation data are utilized to shed insight into these questions.

Citation Data for Studying Formal Communication Among Scientists

Citation analysis has emerged as an important technique for studying science in the past thirty years. This bibliometric analysis became feasible with the inception of the Institute for Scientific Information in 1989.
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