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Meta Disciplines, Meta Questions: How have we changed?

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ABSTRACT

There is a growing debate about whether Management Information Systems (MIS) as a discipline has lost its focus. This debate has recently questioned the discipline's fundamental research questions and direction. Some have suggested that the MIS discipline might have lost its way and hence a need to refocus is needed. As a matter of fact, the meta questions (MQ) MIS research asks has remained relatively constant although the density of research within each MQ has shifted significantly. Similarly, while the meta reference disciplines (MRD) employed to answer the MQs have not changed, their density of use has shifted. These changes are largely in response to the evolution of information technology (IT) and its application in society. So, although we largely ask the same questions, we are finding some questions more interesting than others and although we can answer in the same way we are utilizing a more diverse perspective.

Keywords

Reference Discipline, Core, Meta, Interdisciplinary

INTRODUCTION

MIS as an academic field has often made itself the focus of its own intellectual lens. This self-examination is largely two fold. First, the discipline has often questioned its uniqueness since the MIS field evolved out of the more established academic fields (Management, Computer Science, Economics and Organization Behavior) that originally formed the intellectual core of the nascent discipline. Second, being an applied discipline, the field is constantly assessing its relevance to practitioners.

Today, despite the acceptance of MIS as a full member in the behavioral sciences, as evident from the Editor's note in MISQ (Weber, 2002), the need remains to constantly redefine the scope and purpose of the field as the technology it studies and the way it interacts with organizations and users constantly changes (DeLone and McLean, 2003, Benbasat and Zmud, 2003). Since inception, the field has struggled with who and what it is and will be. These struggles have come to the forefront and then recede waiting to be taken up again. They have variously focused on the diversity of research topics and methods as well as the need for academic research to remain relevant to the practitioner community in the face of academic demands. Our diverse reliance on different reference disciplines for analytical theories has sometimes made some MIS articles illegible to MIS researchers addressing the same topic but from a different research tradition. The effects of this diversity are exacerbated by the lack of fundamental and unique IS theories. Most recently, these issues have come to the fore in both the academic literature (Orlikowski and Iacono), (Benbasat and Zmud, 2003) CAIS Special Volume 6 on and MISQ Volume 23 Issue 1 and conference topics (Karahanna and Watson, 2002).

Some have expressed the need to more clearly define the core of the discipline through an increased focus on the IT artifact and its associated nomological net in IS research (Benbasat and Zmud, 2003). Others have focused on the underlying causes of our 'fragmented adhocracy' and argue for improved communication leading toward the development of an IS Body of Knowledge that would define our discipline (Hirschheim and Klein, 2003). While others have focused externally on defining and limiting the dependent variable (DeLone and McLean, 1992)(DeLone and McLean, 2003).

In this paper, we review the basis of these arguments as a stage for the current discussion. We then analyze IS research over a nineteen year period across our top journals to identify the research density transition that has occurred over this time period in the meta questions (MQs) we ask and meta reference disciplines (MRDs) we utilize to answer these questions. We note coalescence around specific MQs that serve to shape the boundaries of IS research. We additionally point out areas of increasing density of interdisciplinary research as well as areas where interdisciplinary research is not significantly conducted. We conclude with comments about the underlying forces motivating the noted trends and their impacts on future research.

THE CURRENT DEBATE

The question of what is or what should be at the heart of academic MIS is a discussion with a long history. This debate was initiated publicly by Peter Keen at the first International Conference on Information Systems (ICIS) in 1980 where he argued that IS was an applied discipline drawing upon other more mature reference disciplines (Keen, 1980). This statement implies two questions which are still discussed today, specifically the questions of MIS's relationship to industry and MIS's central identity.

Growing out of practice and thus defined from the beginning as an applied discipline, relevance is a central tenant of MIS research or is supposed to be. Our top journals have attempted to cultivate academic as well as industry readership and have requirements that articles demonstrate relevance to executives (Zmud, 1996). However, differences between what IS executives considered important and what was academically researched quickly developed (Grover and Sabherwal, 1989).

This divergence has been ascribed to diversity in research topics and methodology (Benbasat and Weber, 1996) (Robey, 1996), rapid technological change, academic publishing and tenure track requirements (Benbasat and Zmud, 1999), differing world views (Heart and Pliskin, 2001) and the lack of a critical mass of IS researchers with long term research perspectives (Lyytinen, 1999). Others have argued that IS research is relevant, but is either communicated poorly or targeted to the wrong audience (Alter, 2001), or that relevance has not truly been measured and thus IS research may be as relevant as research in other disciplines (Lee, 1999).

Informing this ongoing debate about the need for relevance in MIS is a related discussion focused on identifying and limiting the core of the discipline. This idea of a core could also be referred to as a paradigm which best defined by Ritzer when he writes "A paradigm... serves to define what should be studied, what questions should be asked, and what rules should be followed in interpreting the answers obtained. The paradigm is the broadest unit of consensus within a science and serves to differentiate one scientific community from another"(Ritzer, 1975) The first ICIS conference in 1980 made it explicit that varied disciplines contributed to the research fueling MIS. These contributing disciplines became known as reference disciplines. As Peter Keen pointed out "MIS is a fusion of behavioral, technical and managerial issues" no single body of knowledge underwrote the growing field (Keen, 1980). Keen argued that IS researchers could pull theoretical foundations and methods from various reference disciplines as the MIS field grew. As classification schemes developed to help organize and categorize MIS research, the idea of reference disciplines were incorporated. The classification scheme in use by MISQ includes sixteen such reference disciplines (Barki et al., 1993, Barki, 1988).

As the level of MIS research grew and new and varied disciplines were incorporate under the MIS banner, some called for the establishment of a dominate paradigm (Weber, 1987) (Farhoomand, 1987) that would limit the field. However, this idea was seen as inappropriate for a field created by scientists from various disciplines. The level of pluralism permissible for the development of a scientific field was addressed by researchers examining the development of Organizational Science and was then generalized to apply to MIS development. Jeffery Pfeffer believed in order for scientific and community advancement, general consensus was necessary regarding;

- 1) "The substantive research questions that are considered to be important..." and
- 2) "The set of rules to winnow the measures, methods, and theories..."(Pfeffer, 1993 pgs 10 and 11)

More recently, this idea of consensus around research agenda was taken up as a primary problem for the field by Benbasat & Zmud who write that "topical diversity can, and has become problematic in the absence of a set of core properties..." The core properties proposed were a firm linkage to the IT artifacts and its immediate nomological net. (Benbasat and Zmud, 2003)

It is specifically Pfeffer's first requirement and Benbasat & Zmud's topical diversity we address here through a literature survey designed to identify the MRDs, being used to answer, and the MQs, being asked, in our top journals.

METHODOLOGY

Choice of Research Material

The study focused on what are generally regarded as the top MIS journals: MISQ, ISR, and JMIS. These are typically regarded as the highest impact MIS journals for information management scholars (Mylonopoulos, 2001 and Gillenson, 1991) and as such are most suited for the study of the major topics of high impact MIS research. All articles, published between June 1998 and March 2003 in these journals were reviewed creating a five-year sample. This is considered the recent period. In aggregate, a total of 390 articles were reviewed and coded in this "Recent" period. In order to provide a comparison to an earlier period in the research literature, a random sample of 50% of the all publications in MISQ and JMIS

between approximately March 1984 and December 1985 were selected encompassing a two-year period. After eliminating editorial comments from the selected group, a total of 42 articles were reviewed and coded in this “Early” period. No articles from ISR were included in this period since it is prior to the initial publication of the journal.

	Review Period			
	Early		Recent	
	n	%	n	%
MIS Quarterly	19	45%	104	27%
Journal of MIS	23	55%	115	29%
ISR	n/a	n/a	171	44%
Total	42		390	

Table 1: Number of reviewed articles by period and journal

Classification Scheme and Process

Review and classification of MIS articles has primarily been conducted by topic, research methodology or reference discipline. Classification methodologies have been developed to categorize articles in each of these areas (Barki et al., 1993, Vessey et al., , Barki, 1988, ACM, 1988) Literature survey’s have used these classification methodologies to identify general trends in research. (Palvia et al., 2003, Alavi and Carlson, , Claver et al., , Vessey et al., , Farhoomand and Drury, 1999) Although topic as a classification category will identify the area of the work, it does not sufficiently identify the MQ that the research is addressing or the MRD used to answer the MQ. To allow the body of MIS research to speak for itself, this review was begun without use of any of the traditional topic, research methodology or reference discipline, classification systems as they did not appropriately fit the intent of the research. Largely, this process followed an intuitive clustering methodology presented in Qualitative Data Analysis (Miles and Huberman, 1984).

The review and classification of the articles themselves was initially performed based upon the article abstract. Where the MQ and MRD could not be identified through the abstract, the body of the article was reviewed. Articles could usually be identified with a single MQ. However, a subset of articles addressed more than one meta-question. In such an instance, the article would be classified as handling all the meta-questions that it addressed. The MRDs are viewed slightly differently in that MIS is naturally a multi and inter disciplinary field. The potential interrelationships between the MRD were defined and each article was assigned to a single area.

To give a clearer picture of this process and outcome, two articles are compared which address the same MQ, one from the early and one from the late periods noted above.

The article, “A Database Architecture for Supporting Business Transactions” by Matthias Jarke and Jacob Shalev (JMIS V1, I1) was taken from the early period. From the abstract:

“The central hypothesis of this paper is that database design and systems design in general can be simplified considerably by tailoring the design methods to a suitable range of applications. Domain-specific knowledge can be incorporated into a specialized database architecture ... we propose such an architecture for the domain of business transaction processing.”

The article “Information technology development creativity: A case study of attempted radical change” by Randolph Cooper (MISQ v24 I2) was taken from the late period. From the abstract:

“...this paper attempts to better understand creativity during IT requirements and logical design phases Insight resulting from this exercise is offered to help managers and researchers identify important variables and relationships in the IT development creativity management process.”

Both articles address the same MQ of “How do we improve IT Development?” However, each article takes a different perspective. The Jarke article approaches the MQ from a systems design/modeling perspective and therefore approaches the article from a MRD that deals with IT as technology where the Cooper article approaches the MQ from a MRD with a human factors perspective. If at this point, we were to address Jeffrey Pfeffer question regarding “The substantive research questions that are considered to be important...”, the answer would be the MQ that both articles ask and not necessarily the perspectives of the individual articles.

META REFERENCE DISCIPLINES AND META QUESTIONS

Returning for a moment to the foundation of MIS as an interdisciplinary development, we posit that fundamentally, MIS can be viewed as encapsulated by one or more of the following broadly defined MRD categories.

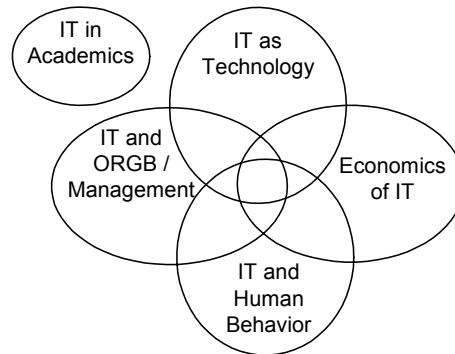


Figure 1: The Meta Reference Disciplines and potential interrelationships

To give a better sense of the broad categories applied here, the majority of the reference discipline classifications, identified by Barki would be included as subsets of each broad category as follows:

IT in Academics

Research

IT as Technology

Computer Science, Decision Theory, Information Theory, Systems Theory, Artificial Intelligence

IT and Organizational Behavior and Management

Organizational Theory, Management Theory, Management Science

Economics of IT

Economic Theory

IT and Human Behavior

Behavioral Science, Social Science, Psychology

Logically, each discipline is seeking to answer questions within an IT context that relate to that discipline's underlying interest. Identification of the MRDs will help us ascertain and understand the changes in the professional literature.

Five MQs strongly evolved from this review. These five MQs are:

- What impact does IT have?
- How do we improve IT development?
- How do we improve IT management?
- How do we improve IT implementation?
- Are we doing the right things as an academic community?

Although relatively self explanatory, a brief definition of each MQ will help dissipate potential confusion.

What Impact Does IT Have?

Questions regarding IT impact aggregated into two broad categories; Human Factors and Firm Factors. Human factors represents the impact of IT systems on human related issues. This included relationships, interpersonal communication and

work process. Firm Factors represent the impact of the IT systems on firm related issues. This included concepts of firm value, size and strategic position.

How Do We Improve IT Development?

Questions regarding IT Development divided into two broad categories largely categorized as Firmware/Software factors and Human factors. Firmware/Software issues included concepts such as model development, software development/cost and error estimation and software optimization. Development questions focused on Human Factors included items such as elicitation of user requirements and team performance.

How Do We Improve IT Management?

Questions regarding IT management largely divided into two broad categories, Firm management and Human management. The Firm Management category included issues similar to corporate wide strategy and corporate wide adoption and assimilation. The Human management category excluded issues where IT Development was a MQ of the article and instead focused on issues where personnel management was of primary concern. Issues that clustered in this category included items such as work attitudes, turnover and individual adoption and assimilation.

How Do We Improve IT Implementation?

The IT implementation category conceptually includes items such as Success/Failure analysis and user acceptance articles.

Are We Doing the Right Things as an Academic Community?

This category includes self reflective discussions such as Relevance, Reference Disciplines and Instrument validation.

ANALYSIS

How Have our Meta Questions Changed?

The MQs MIS asked in the early period are largely the same questions asked in the recent period. Fully 90% of articles in the recent period were classified into one of the original five MQs. However, within these original MQs, the relative article density has shifted away from “How do we improve IT Development?” with a 28% (Test of difference in proportion; Z=3.55, P=0.000) decline in article density and toward “What impact does IT have?” with a 14% (Z=-3.00, P=0.003) increase in article density. These important shifts will be examined in greater detail. The other three original MQs, “How do we improve IT Management?, How do we improve IT implementation?, and Are we doing the right things as an academic community?” remained relatively stable (Z=-.42 P=.676).

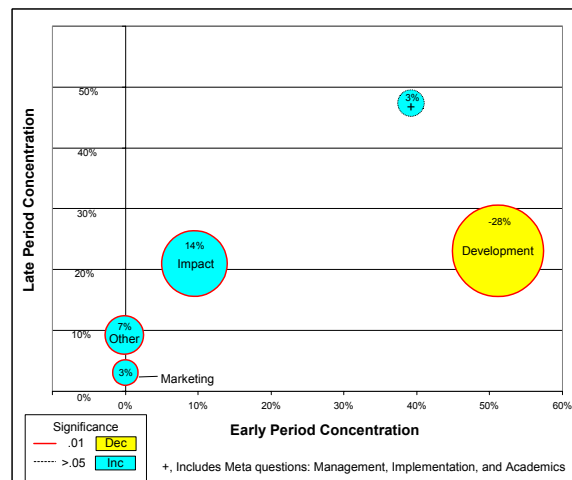


Figure 2: Early to Late Period MQ Concentration Changes

In the recent period, 10% of the articles did not classify into one of the five MQs identified in the early period. Only one new MQ “How do we market IT?” accounted for a significant concentration at 3%. Approximately 7% of articles in the recent

period were classified outside the identified MQs and were grouped into an “Other category”. Although this “Other” category itself is a concentration, no grouping within this category obtained an individual concentration greater than 1%.

IT Development

Since the MQ IT development encompassed a large portion of the early period and declined significantly (See Figure 2), this change should be further explored. The decrease in MQ density identified for IT Development can be further understood by applying the MRD analysis. To accomplish this, only articles belonging to each MQ category are analyzed for changes in MRD density between the early and late periods. By applying this method to the IT Development MQ, we can see that not only has the MQ declined in overall density but its composition has changed. As can be seen in Figure 3, within the MQ ‘IT Development’ the MRD technology decreased in concentration by 34% ($Z=3.03$ $p=0.002$) while the MRDs Management/Organizational Behavior and Human Behavior increased by a grouped 26%. Although this increase is important, the lack of density in these MRD areas in the early period precludes drawing a statistical conclusion regarding the relative change in proportion. In order to better understand this shift in concentration, examples of IT Development topic concentrations from the early period would include; DB Architecture, query languages, systems design, DSS topics and development language choice. A similar selection from the recent period would include; requirements elicitation, software project escalation, development team performance, software project risks and creativity development/enhancement.

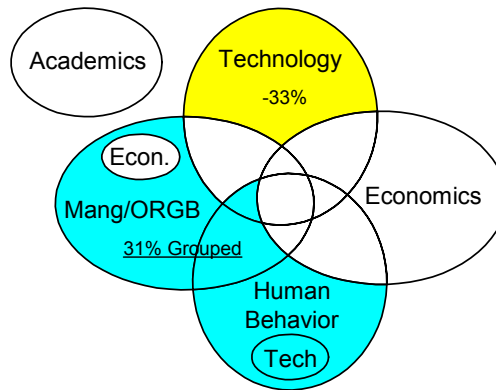


Figure 3: Changes in MRD within MQ IT Development

IT Impact

The other MQ which changed density significantly was IT Impact, increasing from 10% to 24% ($Z=-3.00$, $P=0.003$) of the early to recent samples, respectively. A Chi-Square statistic of 54.1 $p<.0001$ indicates that the MRD concentrations are not uniform. Analyzing the IT Impact MRD concentrations focused on the recent period sample in order to understand the growth concentrations. As can be seen in Figure 4, the MQ IT Impact is primarily answered through the use of three MRDs, Management/Organizational Behavior, Economics and Human Behavior. Additionally, an inter-disciplinary concentration between MRD Technology and Management/Organizational Behavior was important at an 11% concentration.

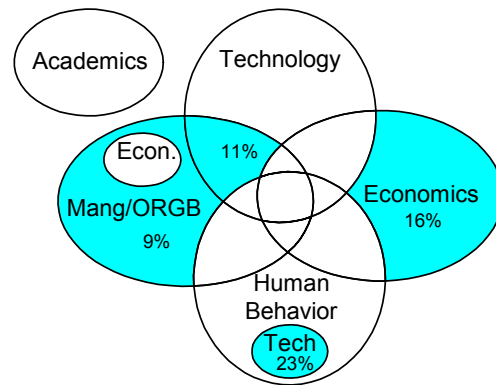


Figure 4: Concentration of MRD within MQ IT Impact

IT Management

The MQ “How do we improve IT management?”, did not change density significantly between the periods. Therefore, the recent period was examined to see how this MQ is generally being answered. A Chi-Square statistic of 47.6 $p < .0001$ indicates that the MRD concentrations are not uniform. As can be seen in Figure 5 the MQ “How do we improve IT management?” was largely answered by using the MRD focused on Management and Organizational Behavior at a 26% concentration. Additionally, an intra discipline concentration between Human Behavior and Management/Organizational behavior was noted at 15%.

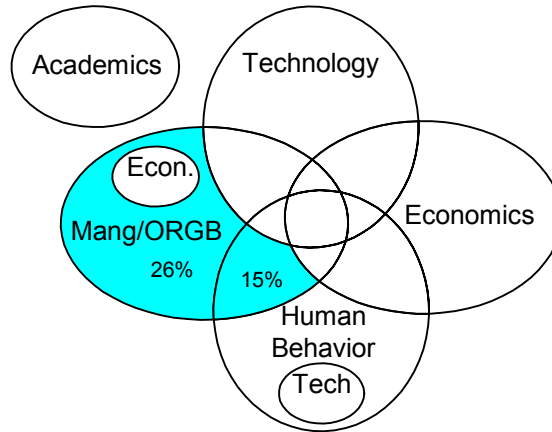


Figure 5: Concentration of MRD within MQ IT Management

IT Implementation

The MQ “How do we improve IT Implementation?” also did not change significantly in density between the periods. Therefore, the late period MRD densities were examined to see how the MQ is currently being answered. A Chi-Square statistic of 19.24 $p = .023$ indicates that the MRD concentrations are not uniform at 5% significance. Two areas of focus were identified Human Behavior and Human Behavior as influenced by a specific technology. In essence, questions regarding IT implementation are addressed more densely at the individual level than at the organizational level although this too is being addressed.

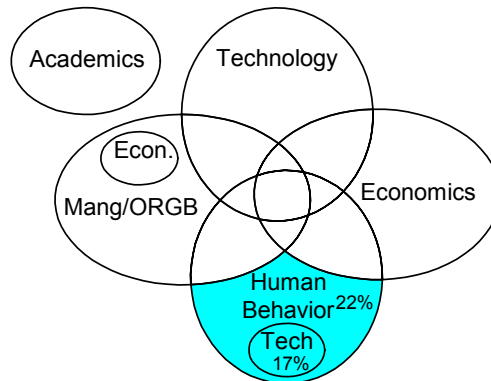


Figure 6: Concentration of MRD within MQ IT Implementation

The number of original MQs have largely remained the same with the introduction of only one new MQ of significance, focusing on marketing. However, MIS has shifted away from an early concentration on questions regarding IT development and toward questions of IT impact. Furthermore, the way we are answering some of our important questions has changed. The early focus of IT Development questions was upon technology specific issues while MIS’s recent focus for answering IT Development issues has shifted away from technology specific answers and toward the broader issues of organizational, management and human behavior.

HOW HAVE OUR META REFERENCE DISCIPLINES CHANGED?

In addition to the MRD analysis adding depth to the MQ analysis, the MRD can be examined at an aggregate level for trends in MIS research. Logically, the underlying shift in MIS research identified by the changing concentrations in the MQ would also be seen in concentration changes in the MRD. In fact, this shift is pronounced. The MRD Technology was compared against the other major MRDs of Magement/Organizational Behavior, Human Behavior and Economics. The 32% decline in the MRD Technology was significant ($Z=4.19$ $P=0.00$) as was the 25% increase in the grouped MRDs ($Z=3.69$ $P=0.00$). However, the 2% concentration increase in the MRD Management/Organizational Behavior is not significant by itself ($Z=.11$ $P=.456$) indicating that the significance is due to the concentration changes in the MRDs Economics and Human Behavior.

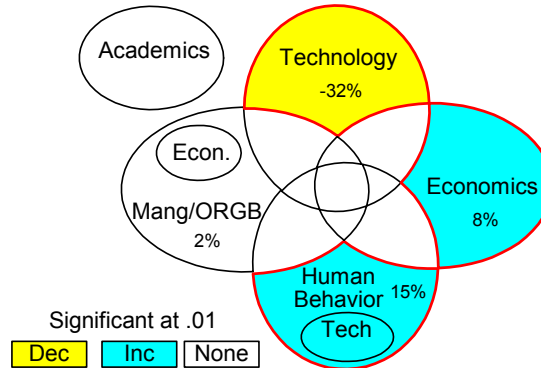


Figure 7: Concentration changes in MRD from early to late periods

The MRD analysis deepens our understanding of the shift identified by the MQ analysis. As MIS has decreased concentration on questions of technology development it has broadened into questions of technology impact largely focused on issues of economics and human behavior.

The increasing importance of IT on business and society is noted in MIS research which has increasingly focused on IT impacts. It is logical that these impacts are across disciplines. For example, an ERP implementation will have profound effects on a firm’s economics, management, employees, work behavior, etc... often with significant interaction effects. In essence, an ERP implementation will impact all the MRD as they act within a company except for MIS Academics. Since, IT impacts are cross disciplinary, it is also logical that MIS research would increasingly become more cross disciplinary. This was tested by dividing the classifications in the Venn diagram into an inner group representing cross-disciplinary MRD studies and an outer group representing studies with a single MRD. Interestingly, the inner group increased in concentration by only 5.4% ($Z = -0.77$ $P\text{-Value} = 0.440$), see Figure 8. Indicating that MIS research over the nineteen year review period has largely not increased the interdisciplinary nature of its research.

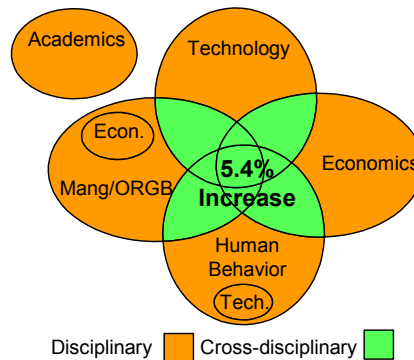


Figure 8: Concentration changes in inter-disciplinary MRD

Although there is no significant increase in inter disciplinary research from the early period to the late period, within this inter-disciplinary group there is a concentration difference worth noting. Specifically with regard to the late period, the intersection of the MRDs Technology, Mang/ORGB and Human Behavior represented 65% of the interdisciplinary sample

where the intersection of the MRDs Technology, Economics and Human Behavior represented only 17% of the inter-disciplinary sample, see Figure 9.

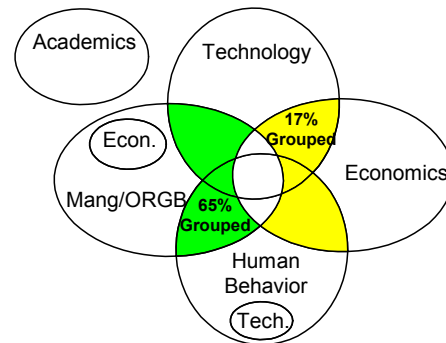


Figure 9: Relative concentration within the Cross-disciplinary groups

CONCLUSION

This paper sought to inform from a meta perspective the diversity of the substantive research questions and topics in MIS. This classification of the meta questions and meta reference disciplines evolved out of the literature and encompassed a 19 year period. From this broad perspective, an evolutionary sweep in MIS becomes apparent and conclusions can be drawn about where we were and where we are.

As IT has become more distributed, moving from the backroom to the desktop to the back pocket, its development, use and impact has evolved from a specific technical group into the general population. It is logical that MIS's research has followed this trend. While MIS's early work was largely concentrated on the MQ of IT Development and was technically focused, therefore concentrated on a specific population, our current work has followed the technology and broadened its focus into the general population. This has meant a pronounced increase in focus on the MQ of IT impact and a shift in the MQ of IT Development toward issues of human and organizational behavior, acknowledging of the importance of human and organizational behavior in the effective development of IT systems.

However, questions of impact are rarely easily answered in isolation. The increasing distribution and importance of IT in business and society argues for a multi and cross disciplinary analysis of IT MQs. For instance, in order to understand the economic impact of a specific technology on an organization it would be important to understand the human factors in the development, implementation and management of the system as well as the economic advantages and the degree of system integration. While MIS research does demonstrate areas of cross disciplinary analysis MIS research has not delved deeply, maintaining approximately the same level of cross disciplinary research over the nineteen year sample period. However, the cross disciplinary impacts argue for increased cross disciplinary analysis. There is any number of plausible explanations for this lack of cross disciplinary work; the increase in complexity, knowledge within a specific research discipline, the lack of rigor implied by case type analysis, etc... The specific reasons for a lack of increased cross disciplinary research is an area for further investigation.

It is realistic that IT will penetrate further into the fabric of society and that MIS research will largely follow this penetration, evolving along with the changes in the technology and society. It is likely that additional meta questions will arise in this evolution. For example, questions of IT Security were identified in the recent period but did not reach a concentration density necessary to break out of the 'Other' category. It is probable that new MQs could will researched from a technical, organizational, individual, and economic or cross disciplinary perspective. These changes are a natural consequence to the evolution of the technology itself and its integration into the fabric of society.

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