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Is information systems a discipline? Foucauldian and Toulminian insights

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Abstract

Following the Kleinian spirit, this study takes a critical view of the existing orthodoxy within information systems (IS) and reframes the ongoing discussion concerning the intellectual core, identity and disciplinary status of IS using the disciplinary analysis of Michel Foucault and Stephen Toulmin. Instead of limiting the discussion to specific paradigms, topics, subjects or content, it focuses on the characteristics, rules and goals of IS as an academic field. A disciplinary lens is used to frame what it means to be a field, discipline and science, and in the process the study uncovers four doxas that have shaped the development of the IS field: (1) the IS research community sees no difference between fields, disciplines or sciences; (2) IT changes so rapidly, and thus the IS field needs to change to remain relevant; (3) disciplines are by definition rigid, inflexible and uni-theoretical and (4) because IS is pluralistic, IS should not become a discipline. This study's analyses of the IS field's discursive formation and intellectual ideals offer novel perspectives that allow for the integration of the IS field's plurality and diversity. To transform the IS field from its multimodal existence into a vibrant, diverse, academically and socially relevant and influential discipline, the study proposes actionable strategies that include (1) agreeing on the intellectual ideals for IS, (2) focusing on conceptual formation, (3) focusing on theory construction, (4) erecting genealogical boundaries and (5) fostering the development of professional bodies.
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Introduction

> For a discipline to exist, there must be a possibility of formulating – and of doing so ad infinitum – fresh propositions.
>
> ~ Michel Foucault, The Archaeology of Knowledge, p. 223
>
> … one of the best indications that a new science has arrived at a clear definition of its intellectual goals, and achieved a proper disciplinary status, is the eventual enthronement of an agreed set of fundamental concepts and selection-criteria.
>
> ~ Stephen Toulmin, Human Understanding, p. 381

Following the Kleinian Hellenic and critical spirit of not accepting without question what is given (Klein & Hirschheim, 2008), this study challenges the existing orthodoxy within the information systems (IS) field and reframes the ongoing debates concerning the intellectual core of IS using the lens of

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disciplinary analysis. The intellectual and disciplinary concerns of the IS field have always been the hallmark of the Kleinian tradition. Heinz Klein & Kalle Lyytinen (1985) were among the first to raise concerns about the hegemony of positivism over IS research. The following years saw an emergence of alternative paradigms enriching the IS field, primarily as a result of the efforts from the growing community who shared the Kleinian view of IS (Nissen *et al.*, 1991). Even as the IS field continues to struggle with issues of relevancy and legitimacy, the Kleinian tradition provided a scholarly framework for the field to 'step back' and examine its historical development and future vision (Hirschheim & Klein, 2003; Klein & Hirschheim, 2006; Klein & Hirschheim, 2008).

This study continues the Kleinian tradition by approaching the question of IS disciplinarity from a post-functionalist *meta-critical* perspective (Cecez-Kecmanovic *et al.*, 2008) focusing on the intellectual structures of the IS field. The disciplinary analysis undertaken in this study reveals how certain discursive structures dominate the research discourse within the IS field thus preventing it from establishing its own unique identity. In keeping with the spirit of the Kleinian view of IS, the goal of this study is to uncover and analyse the underlying assumptions preventing the establishment of an IS field that is vibrant and diverse, academically and socially relevant and influential (Hirschheim *et al.*, 1996), distinctive (Iivari *et al.*, 2004), and capable of developing its own community of practice and knowledge creation (Klein & Hirschheim, 2008).

Every branch of study, including IS, passes through various thresholds of development – starting with its emergence, to the laying of its foundations, to possibly becoming a dominant discipline. How far has IS progressed within these disciplinary stages? Is IS an independent field of its own, or is it a sub-field of more established disciplines such as management or computer science? What kind of expertise can other allied computing-related fields expect from the body of knowledge of IS? What subject areas in IS can be considered canonical and should be an integral part of an IS apprentice's textbook? This paper employs the disciplinary theories and insights from philosophers Michel Foucault and Stephen Toulmin to begin addressing these questions and offer recommendations towards enhancing the intellectual structure of the IS field. It starts by examining the notion of disciplinarity within the IS community: Can the terms 'field', 'discipline' and 'science' be used interchangeably to refer to IS?

The illusion of disciplinarity

The notion of disciplinarity within the IS community is confusing. The IS community entertains conflicting expectations of what becoming a field, discipline or science implies. Some insist on certain 'core' properties that characterize the ideal discipline. Keen (1991) emphasizes the unique content that characterizes disciplines, and because IS offers nothing unique in terms of topics, theory or methodology Keen (1991) considers IS neither a field nor a discipline. Focusing on the high level of agreement expected of disciplinary content, Stowell & Mingers (1997) find instead in IS 'no agreed domain, not even an agreement about the nature of "information" itself' (pp. 7–8) and problematic 'focus, methods, norms, language and standards' (p. 34). Jones (1997) considers IS as a weaker form of discipline because it does not have a common perspective and few distinctive characteristics. Benbasat & Zmud (2003) envision disciplinarity of IS in a core set of properties associated with information technology (IT) and a set of unique topics that create an identity for IS.

On the other side of the divide, authors who view a unified IS in contradistinction to diversity and pluralism find strength and richness in the eclectic and diverse nature of IS (Banville & Landry, 1989; Klein *et al.*, 1991; Landry & Banville, 1992; Robey, 1996). This group of authors proposes several alternative models of disciplinarity that encourage a more pluralistic view. Landry & Banville (1992), and Robey (1996) propose a pragmatic middle-ground form they call 'disciplined pluralism'. DeSanctis (2003) proposes viewing IS not as a 'thing' or domain, but as an activity in the form of a community of practice with boundaries that are continually expanding. Galliers (2003) proposes a trans-disciplinary approach that is capable of adjusting to growing societal and cross-cultural considerations. King and Lyytinen (2004) and Lyytinen & King (2004) find the legitimacy of IS in a 'market of ideas', dynamic and adaptable within a constantly changing environment.

While some may consider all this 'anxiety discourse' unwarranted and overstated (Alter, 2003a; Holland, 2003), most can agree that maintaining IS as a 'fragmented adhocracy' (Whitley, 1984) is not to the advantage of the field. The 'crisis' is felt on both sides of the Atlantic (Lange, 2005a, b; King & Lyytinen, 2006; Schauer, 2007), and is also reflected in the gap between research and practice in IS (Moody, 2000; Kaplan *et al.*, 2004). Without details as to how IS can overcome this gap, the differing paradigms and perceptions of its nature serve to worsen the IS field's already significant communication deficit (Klein & Hirschheim, 2008) and contribute to a loss of legitimacy (Benbasat & Zmud, 2003) if not its demise (Markus, 1999). These different arguments have manifested themselves into a variety of discourses including heated debates on what should be the 'core' of the field (Alter, 2003b; Galliers, 2003; Gray, 2003; Hirschheim & Klein, 2003), whether or not a core is necessary (Lyytinen & King, 2004; Weber, 2006), as well as whether the IS field genuinely impacts other fields (Grover *et al.*, 2006; Nerur *et al.*, 2006; Wade *et al.*, 2006).

The validity of each argument concerning the nature of IS depends on what one means by 'discipline' and what disciplinarity offers the IS field. Unfortunately, very little research in IS critically appraises what disciplinarity entails. The crux of these debates can be traced to several unclear assumptions or orthodoxies that establish themselves within the IS field often as the result of

Table 1 Orthodoxies in the information systems research community

Doxa#1	The IS community sees no difference between fields, disciplines or sciences
Doxa#2	IT changes so rapidly, so the IS field needs to change to remain relevant
Doxa#3	Disciplines are by definition rigid, inflexible and uni-theoretical
Doxa#4	Because IS is pluralistic and not rigid, IS should not become a discipline

unquestioned suppositions or published opinions. These unquestioned assumptions are introduced forthwith as 'doxas' (Table 1) to provide a skeletal adumbrating framework for the in-depth Foucauldian and Toulminian disciplinary analyses.

Doxa#1 The IS community sees no differences between fields, disciplines and sciences

The public rarely distinguishes a field from a discipline or a discipline from a science. With a few notable exceptions, the same indifference can be found in the IS field. IS authors use the terms 'field', 'discipline' and 'science' interchangeably with little caution for their implications. For example, in discussing IS disciplinarity, Banville & Landry (1989, p. 48) note that '[I]ndeed, members of any *scientific field*, and particularly those belonging to *fields* struggling for recognition such as MIS, have to worry about the social and *scientific* status of their *discipline*' (emphasis added). Here 'field', 'discipline' and 'science' are used synonymously in a rather perfunctory manner. As Galliers notes (2003), the title of Benbasat & Zmud's (2003) classic article ('The Identity Crisis within the IS *Discipline*: Defining and Communicating the *Discipline*'s Core Properties') assumes IS's disciplinary status without much scrutiny as to whether it actually qualifies as one. Out of the 26 articles (Table 2) that responded to Benbasat & Zmud (2003), twenty-one articles referred to IS as both a field and a discipline and only two articles (Galliers, 2003; Mason, 2006) specifically addressed the distinction between them.

Such indifference is excusable if these terms are peripheral to the subject matter of the study. However, studies on the disciplinarity of IS should be sensitive to the different connotations implied by these terms because they reflect the different types and quality of knowledge produced. The types and quality of knowledge have serious ramifications for its distribution and the success of its associated fields (Machlup, 1980). The indifference in the IS field towards these different terms betrays a sense of ambivalence concerning knowledge and hence the related doxa that it matters not whether a branch of learning is a field, discipline or science. As an academic field, it is important to distinguish science from pseudo-science (Popper, 1959) because such indifference exposes the field to knowledge that is of less than disciplinary quality.

Doxa #2 IT changes so rapidly, and thus IS needs to constantly change to remain relevant

The rapid technological environment that characterizes IS is often mentioned as the reason why it is struggling with the issue of relevance. Owing to long publication cycles made more complicated by the demands for rigour, IS research is unable to keep up with the rapid changes in IT, resulting in a persistent relevance gap between practitioners and researchers (Benbasat & Zmud, 1999; Davenport & Markus, 1999). There is pressure on IS researchers to be current in terms of technology, which leads to the unquestioned belief that because it is essentially an 'applied' field technology is what drives research. This relevance gap contributes indirectly to the 'crisis of identity' in IS as can be seen in the following responses to Benbasat & Zmud (2003): 'As technologies change, the IS field also needs to change to remain relevant' (Robey, 2003, pp. 353–354). 'IS is a fast-moving field … [T]rying to adopt a narrow focus for IS research makes it difficult, and perhaps even counter-productive to attain our goal of relevancy' (McCubbrey, 2003, p. 554). 'Given technology in organizations is still defining and redefining work, it seems the breadth of coverage also makes us adaptable to the technological changes that the future surely holds … [G]iven the massive changes in computer technology within the last three years, the core is still evolving' (Guthrie, 2003, pp. 558–559).

El Sawy (2003), DeSanctis (2003) and Galliers (2003) were correct in saying that focusing exclusively on IT as the core will only result in emphasizing IT at the expense or exclusion of other concerns of IS. The opposite perspective of moving away from IT is equally flawed. The IS community appears forced to choose between focusing on the IT artefact or on its other concerns. Herein lies the doxa. If such was the case, then other fields of study that focus nearly exclusively on rapidly changing technology would suffer from the problem of relevance more than IS. What is obscured in this doxa is the existence of two different dimensions in the disciplinary process of knowledge creation, the theoretical or academic dimension, and the professional dimension. The former takes an abstract view of the discipline, while the latter the more practical. Both are necessary to engender relevance and *neither is forced to choose between focusing and not focusing on technology.*

Take the case of computer science, which has in its name the technology itself. It does not appear to be suffering from any problem of legitimacy despite its youth relative to other more established disciplines. The number of members in the Association for Computing Machinery (ACM) greatly outnumbers the number of members in the AIS. The academic dimension of computer science is seamlessly related to its more practical dimensions of software and computer engineering. And its relevance is clearly shown by the close relationship the field has with its practitioners. The same can be said about other established disciplines that have a large technical component such as the many engineering

Table 2 Responses to Benbasat & Zmud (2003) and handling of disciplinarity

Journals	*Articles calling IS as both field and discipline*	*Articles differentiating field from discipline*
MIS Quarterly	Weber (2003), Sidorova *et al.* (2008), Agarwal & Lucas (2005)	
Journal of the AIS	Hirschheim & Klein (2003), DeSanctis (2003), Robey (2003), Lyytinen & King (2004), Weber (2006) Ives *et al.* (2004), Lyytinen & King (2006)	Galliers (2003), Mason (2006)
Communications of the AIS	14 articles	

fields, medicine and molecular biology. *If rapidly changing technologies were the driving force of these fields, then none of these technology-related fields would ever find any stable identity!* But each one of them does maintain a stable identity and at the same time distinguishes itself from other fields and disciplines.

In other words, the applied, transitory technological component of a field does not characterize the nature and stable identity of the academic field. The technological component remains a core concern, as are all the other core concerns, but it is just one of many objects that is studied by the field. An example in the case of the clinical medicine illustrates this character of academic fields. As a field of study and practice, clinical medicine has not changed since the time the Hippocratic oath was articulated some 2500 years ago. Despite the increased complexity in technology and the environment of health care, the character of clinical medicine, the observation and close examination of the human body, has remained the same.

Doxa#3 Disciplines are by definition rigid, inflexible and uni-theoretical

This third doxa can be traced back to Banville & Landry's (1989) recommendations for IS not to become a discipline, a recommendation that is supported by IS authors (Robey, 1996; Myers, 2003). This doxa usually takes the form of a critique of the model of Kuhnian science, stating that Kuhn's model is monistic and uni-theoretical and therefore not suitable for a rich and diverse field such as IS. Banville & Landry (1989), following Whitley (1984) claim that Kuhn's version of scientific progress is deterministic and rationalistic, and using this model for assessing progress in IS will lead IS to becoming rigid and restrictive. Kuhn's model, which Banville & Landry (1989) say is based along the lines of the progress of physics and other natural sciences, will result in breaking up the IS field into 'hermetic factions' and ultimately a 'consequent loss of creativity' (p. 51). Notwithstanding the misplaced implication that physics is in any way uncreative, Banville & Landry (1989) analogize Kuhn's 'normal science' to the state of being disciplined, and by association, disciplined fields like physics, are necessarily rigid and restrictive.

Contrary to Banville & Landry's (1989) and Whitley's (1984) assertions, there is nothing in Kuhn's writings that suggests a deterministic and rationalistic process at work in the development of knowledge. As Kuhn considers truth to be perceived only in relation to a framework (paradigm), his critics actually accused him of relativism not determinism as claimed by Whitley (1984). As a historian, Kuhn supports the view that scientific progress is historically contingent. Kuhn's (1970) thesis for writing *The Structure of Scientific Revolutions* was based on answering questions such as 'When was oxygen discovered?' and 'Who first conceived of energy conservation' (p. 2), two very sociologically and historically contingent questions.

Related to the notion of the mistaken monistic and restrictive nature of disciplines is the notion that disciplines must operate under a single dominating paradigm or grand theory, which sparked the debate about the 'core' of the IS 'discipline'. Mainly caused by a particular interpretation of Kuhn's concept of normal science and paradigm incommensurability, many authors, including IS authors, assume that a disciplined field is one that is governed by a single paradigm or a grand theory. Kuhn's opponents, including Banville & Landry (1989), often repeat Masterman's (1970) peculiar interpretation of Kuhn's progress of science. Masterman (1970) interprets Kuhn's concept of paradigm as one that 'triumphs over the rest, so that advanced scientific work can set in, with only one total paradigm' (p. 74) or that 'a total new science with one vast paradigm' is how disciplines are established. This view of a total dominating paradigm is rejected by Kuhn (1970) himself:

> What has been said so far may have seemed to imply that normal science is a single monolithic and unified enterprise that must stand or fall with any one of its paradigms as well as with all of them together. But science is obviously seldom or never like that (p. 47).

Although Kuhn accepts the possibility of dominant paradigms, he also concedes that multiple paradigms can exist coextensively ('with all of them together'), and clearly admits that science, much less disciplines, is never a single paradigm or single grand theory activity.

Doxa#4 Because IS is pluralistic, it should not become a discipline

A direct implication of the second and third doxas is the recommendation for IS not to become a discipline. This conclusion is surprising because the history of knowledge attests to the struggle all fields take towards becoming disciplines (Toulmin, 1972; Shumway & Messer-Davidow,

1991). Appealing to the layman's negative connotations of 'discipline', the IS community has come to accept Banville & Landry's (1989) interpretation of 'academic discipline' as an enterprise that is restrictive and controlling, the antithesis of academic freedom. On the contrary, academic history reflects many positive connotations of the term 'discipline'. Closely related to the term 'faculty', which means 'ability with knowledge' (Harper, 2001), 'discipline' as a concept and as an institution is perceived as the producers and guardians of knowledge working to ensure that the knowledge it produces is justified and reliable (Hackhausen, 1972; Preziosi, 1993). Early English literature during the middle ages refers to the 'higher faculties' of theology, medicine and the arts in universities as 'disciplines'. To refer to a field as a discipline implies that the field's authority is based not merely on doctrine but on generally accepted methods and 'truths' (Hoskin & Macve, 1986; Klein, 1990; Shumway & Messer-Davidow, 1991).

The benefits of becoming a discipline can be categorized into the following: (1) legitimacy, (2) internal coherency, (3) oversight and (4) social authority.

Legitimacy Disciplinarity carries with it the connotations of rigour and respectability (Shumway & Messer-Davidow, 1991). During the early beginnings of modern Western knowledge, legitimacy was commonly derived from the scholar or *author-figure* of the field (Foucault, 1972). The *author-figure* made certain propositions significant and became a measure of their truthfulness. Since the seventeenth century, 'disciplines', taking the form of whole strata of practices such as teaching and pedagogies, laboratories, publishing, libraries and learned societies, have replaced this *author-figure* function (Kristeller, 1951) and provided disciplines with their requisite legitimacy. This more enduring constellation of practices ensures a discipline's survival. By the nineteenth century, 'disciplines' became synonymous with 'divisions of knowledge', and took the physical form of university departments within the oldest universities in Europe and the United States (Flexner, 1979). The university gave these disciplines a kind of 'cognitive exclusiveness' and socio-political legitimacy over their area of study. As a historian of research universities noted, '[A] discipline is, above all, a community based on inquiry and centred on *competent* [emphasis added] investigators. It consists of individuals who associate in order to facilitate intercommunications, and to establish some degree of authority over the standards of their inquiry' (Geiger, 1986, p. 29).

Internal coherency Far from limiting the field, disciplinary activity provides the guidelines within which discourse and knowledge can grow and still remain relevant to its subject matter. With the help of these guidelines, members in the discipline, including gatekeepers such as journal editors, recognize in relation to their body of knowledge, old or novel approaches, strong or weak propositions, and mainstream or peripheral categories (Messer-Davidow *et al.*, 1993). Consequently, researchers within a specific discipline will have clear directions as to pitfalls to avoid, novel sub-areas to study and ultimately areas that will contribute to the maturity of their discipline. As the result of disciplinary work, members of the discipline can recognize what does and does not qualify as disciplinary knowledge. This sense of clarity and coherency convinces society of the discipline's capabilities (Preziosi, 1993).

Oversight The philosophers of knowledge and science have repeatedly emphasized the contextually and historically contingent nature of knowledge. Even an 'objective' and detached search may not produce the knowledge and results sought (Dilthey, 1883/1989; Hempel, 1956; Kuhn, 1970). As Popper (1962) observes, in the past such 'objective' approaches are also the bases for much abuse. For example, phrenology is considered a discipline by its proponents, but its pseudo-disciplinary claims were appropriated to justify fanatical ideologies (Davies, 1955). This abuse became possible because pseudo-disciplinarity impairs the reinterpretation and reaffirmation required for knowledge to be validated. Lack of disciplinarity invites its own kind of relativism. Disciplinarity plays the role of guide that prevents such oversight and incongruities and provides the standard framework for scholars to test their provisional and contextual claims in their process of discovery.

Social authority Many real-life social and business practices derive their authority from academic disciplines. The industrial and chemical revolution and modern clinical practices derive their power and authority from the natural sciences. The insights gained from the Hawthorne experiments and Taylor's writings are exemplified in real-life business structures (Gillespie, 1991). The formal authority of the Penal Code is derived from sociological, psychological, medical and psychiatric knowledge based in academic practice (Foucault, 1972). Disciplines exert authority within various spheres of society, allowing the discipline to spread its knowledge and 'truths'.

An example of a field that resisted developing into a discipline and consequently was absorbed into other fields is Operations Research (OR). After the Second World War, the OR field emerged as a dominant field as a result of the success of management techniques and methods applied during the war. However, as early as 1954, concerns were raised about how OR lacked communication with business and industry, a consistent description of what the field was about, and lacked a repertory of professional standards (Rinehart, 1954). Finally, in 1991, a policy change in the AACSB accreditation standards left out OR as a requirement for business schools. The OR field never recovered from this policy change. Many universities dismantled their OR departments from their colleges of business (Grossman, 2003),

and as a branch of study OR found itself absorbed into other fields such as management, information systems, transportation and engineering (Corbett & van Wassenhoff, 1993; Fildes & Ranyard, 1997). Similar problems may overtake IS if its community resists the necessity for it to become a discipline.

To tie these doxas back to the disciplinarity of IS, the study proceeds as follows: First, the evolutionary stages that fields, disciplines and sciences undergo are examined in detail using the disciplinary theories of Michel Foucault and Stephen Toulmin. These philosophers describe how disciplines integrate plurality and diversity into a vibrant unity without the limitations of a 'theoretical core'. The criteria for disciplinarity are described in detail and are used to evaluate where IS falls in relation to Foucault and Toulmin's disciplinary stages. Finally, actionable strategies for IS to move forward are proposed.

Michel Foucault and Stephen Toulmin on fields, disciplines and sciences

How does a branch of study qualify to become an autonomous field, a discipline or a science? And what makes a discipline different from a field or a science? As knowledge cannot be expected to explain how it itself came to be discovered, a special study of disciplinarity – a study of studies – becomes necessary (Foucault, 1972; Shumway & Messer-Davidow, 1991). Two contemporary philosophers who left a lasting legacy in the study of disciplines are Michel Foucault and Stephen Toulmin. Although Foucauldian and Toulminian analyses are by no means the only two approaches available for studying disciplinarity, their analyses are most relevant to the kinds of issues troubling the IS field and are offered in this paper.

As of the legacy of Banville & Landry (1989), IS researchers have become sensitive to measures of academic progress modelled after the natural sciences. Foucault offers an alternative model of progress based on the human sciences. Foucault is especially relevant to IS because he combines the human sciences with the philosophy of technology (Ihde, 1991; Gerrie, 2003). Very few philosophers can claim to bridge the human sciences with the technological domain. Foucault calls his version of this genre of studies the 'archaeology of knowledge', a historical 'dig of sorts' of the nature and creation of knowledge. His theories summarized in *The Order of Things: An Archaeology of the Human Sciences (*Foucault, 1970*)* and *The Archaeology of Knowledge (*Foucault, 1972*)* cover the gamut of the human sciences including biology, economics, philology, medicine, criminology and psychiatry.

Stephen Toulmin, more famous for his work on rhetorical arguments, was also a historian of science, and was one of the earliest to write on the logic behind the formation of disciplinary institutions (which he terms 'the rational enterprise'). Stephen Toulmin's (1972) *Human Understanding: The Collective Use and Evolution of Concepts* traces the development of the intellectual content of disciplines and proposes a theory of conceptual change that is very similar to that of Foucault's. In this text, Toulmin (1972) sought to answer questions such as, 'What defines the limits of an intellectual discipline, and why are there distinct disciplines at all? What is the nature of conceptual variation, and how does the current pool of conceptual variants provide the material for disciplinary change?' (p. 143) In addition to his treatise on the conceptual development of disciplinary institutions, he also offers an argumentative model (Toulmin, 1958) that is employed by this study. These two philosophers offer novel views on the possible conditions for the emergence of academic disciplines.

Integrating unity and diversity

The depth of their analysis can be demonstrated by examining how they both describe the paradoxical manner by which fields and disciplines integrate plurality and diversity into a vibrant unity. They both began their analyses by speculating that specific theories, concepts and objects of study characterize and provide the identity for fields and disciplines. However, they both agreed that unity based on such a 'theoretical core' was untenable. Both Foucault and Toulmin came to the conclusion that something else was holding all of these rational enterprises together as they evolved into independent areas of study. Instead of viewing fields and disciplines as single-dimensional entities that offer content, they distinguish between the objects that are studied from the *character of the discourse* that performs the study. The character of the discourse, which Foucault (1972) calls the 'discursive formation', operates rules that make the field or discipline possible and govern how the field or discipline views the object of study. Hence, IS views IT with a socio-technical lens, whereas computer science views IT with a symbol-processing lens. This 'discursive formation' establishes various relations that operate within the statements enunciated by that field, which will be very different from the relations enunciated by another field. As a result of these rules, the statements become part of a specific discourse such that it is possible to recognize economic discourse from psychological discourse, biological discourse from medical discourse, and computer science from IS discourse.

Toulmin (1972) uses different terms to describe similar intellectual structures. He views disciplines as having a 'professional attitude' (p. 150), a 'collective ideal' and 'communal goal' (p. 151) that address not so much the same unchanging questions, but rather a 'genealogy of problems' (p. 149) which may be all different. Disciplines, according to Toulmin, are based on unique 'intellectual ideals' (p. 153) that exist beyond any specific period of time and are not owned by any particular scholar. Both agree that this kind of atheoretical core demonstrated by fields and disciplines extends beyond the work of specific scholars or their *oeuvres*. The same author may write on different topics, and different authors in many different works may discuss the same topic.

This analysis highlights an important distinction ignored by many IS authors, that the objects of study and concepts are not synonymous with the stable, unchanging character of the field, which is its real 'core'. Toulmin (1972) describes how concepts, because of their very nature, are transmitted, handed on, and learnt, within the processes by which a field or disciplines maintains its existence beyond the lifetime of its original creator or beyond its original home field. This is the same process that brought many of the founders of the IS field from different other fields and disciplines to create a new discourse called 'information systems', and to cause others to become, as Toulmin (1972) describes, 'enculturated' (p. 159) into the communal procedures of this new fledgling field. Ideally, each field would like their members to apply these intellectual concepts and values critically and make them their own, perhaps even changing them. The distinction between the objects of study and the character of discourse is critical because by adopting it fields become free to study any objects, adopt any concepts, as long as they apply their lens and their discursive formation to those objects of study. Management is an established discipline that studies many objects including people, the organizational unit, and organizational resources including even IT, but its discursive formation has not changed since its inception and is well known within and from outside the discipline. Similarly, economic discourse is well known among economists and the general public. It applies its rules and enunciative functions on different objects of study in the past including the concepts of supply and demand, prices, value and trade. More recently, economics has taken an interest in information, in the form of information economics (Stigler, 1961), and may take an interest in other objects of study in the future. However, this does not mean that economics is encroaching into information systems or information sciences. Its character of discourse has not changed since its inception in the 18th century. It has and will continue in the foreseeable future to apply the rules surrounding human needs, wants and how they are satisfied (Samuelson & Temin, 1976). As Kuhn notes:

> It may, for example, be significant that economists argue less about whether their field is a science than do practitioners of other fields of social science. Is that because economists know what science is? Or is it rather economics about which they agree? (1970, p. 161)

Scholars of economics agree on the nature of their field and on what they do as economists, yet such a consensus does not imply they have to agree on all areas of their study, techniques or methods.

In conclusion, the source of the unity, the 'core' of fields and disciplines lies *not with the author or the text, or even the homogeneity of the concepts being studied*, but with the dynamic and often unconscious formation that sets up rules defining the constellation of objects and concepts to be studied. They may be called 'discursive formations' (Foucault, 1972) or intellectual ideals (Toulmin, 1972), but they establish various relations that operate to define the nature and essence of the field. As rules are not the same as objects or concepts of study, these rules of formation enable the inclusion of diverse objects and concepts.

The stages of disciplinary development

Both Foucault and Toulmin propose stage models describing how fields develop into disciplines. Foucault's stage model (Figure 1) begins with a group of people engaging in a *discourse* on a subject or branch of study. The discourse may include different topics and subjects. What makes that discourse unique is when it begins to create and enunciate relationships between objects it is studying in different ways from those in existing discourses. That unique discourse becomes the precondition for what might later become a discovery or an item of knowledge, or alternatively, be exposed as hoax or a falsity. For example, the group of people associated with the Apollo mission in the 1960s was engaged in a study of how to land man on the moon. The Apollo mission successfully brought together engineering, physics, geology, material science, aeronautics, chemistry and biology. The study could have been named 'Lunar Studies'. But bringing together all those disciplines and naming the study does not make it a field. This branch of study needs to coalesce into an independent form before it can function as a field.

Toulmin's stage model (Figure 2) examines the nature of the field (which he calls the rational activity or enterprise). The rational activity is judged according to its potential to share its fundamental concepts. If the questions or issues surrounding the rational activity is unknown or complex, subjective or personal, it is unlikely that the rational activity will be able to coalesce into an semi-organized or diffused activity, much less a discipline.

Becoming an Independent Field

For Foucault (1972), the stage at which the branch of study transforms into a field is when it operates its own

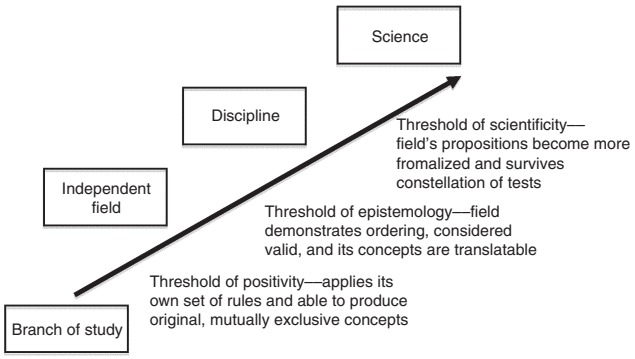

Figure 1 Foucault's disciplinary stage model.

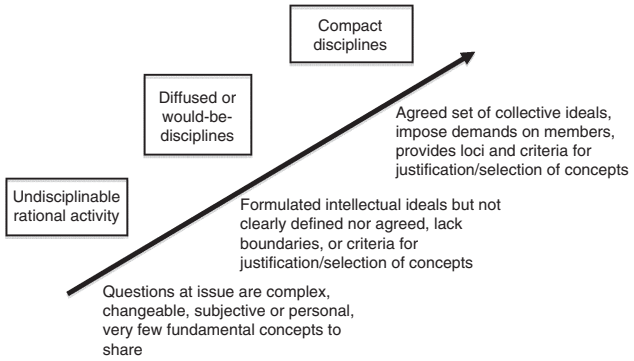

Figure 2 Toulmin's disciplinary stage model.

unique discursive formation. Once the rules take shape, the branch of study passes what Foucault calls the 'threshold of positivity' (p. 186). At that point, a 'field' is established and without changing its unique character, this field is capable of autonomously producing original and mutually exclusive concepts, which did not previously exist (Figure 1).

The term 'field' should not be confused with the formal 'material disciplines' exemplified by the division of teaching in universities. For example, in North American universities *management and organizational behaviour* are located in business schools, whereas *industrial and organizational psychology and organization development* reside in other collegiate units. All four branches of study reference many of the same authors and *oeuvres* and share many common characters of discourse even though they are located in different departments. Political discourse is evident in history as is biological discourse in medicine. But all four branches of study have evolved into their own disciplines. Similarly, many IS faculty are housed in the accounting department, or the computer science department, but IS discourse is neither accounting nor computer science. Administrative convenience within academic institutions does not reflect the discursive formation of the field.

Toulmin (1972) did not specify an actual threshold when his 'rational activity' transforms into a field. However, he refers to the collections of rational enterprises that are not disciplines as 'diffused' or 'would-be-disciplines'. This collection of enterprises lie along a large spectrum of rational enterprises from the ones that are close to undisciplinable such as ethics and philosophy to fine arts and literature, which are not yet fully disciplined (Figure 2).

Becoming a discipline

Being autonomous is necessary but not sufficient for a branch of study to qualify as a discipline. As the first doxa suggests, IS authors often assume that fields are the same as disciplines. If that were the case, the study of astrology, occultism, parapsychology and phrenology, all of which are independent fields with their own autonomous discourses, would qualify as disciplines. This transformation from field to discipline can be demonstrated in the case of economics. After economics discourse established itself as an autonomous field in the 17th century, at the turn of the 18th century, economic discourse began exerting an influence on knowledge and non-discursive practices as a result of the work of its scholars. Foucault (1972, pp. 187–188) describes this stage as 'the threshold of epistemologization', the stage the field claims to validate norms of verification and coherence, and exercises a dominant function over knowledge. This study infers on the basis of Foucault's definition for the term 'discipline', that the threshold of epistemologization is the stage that the field qualifies as a discipline. This stage is reached when the field demonstrates a level of coherency that enables it to formulate, *ad infinitum*, fresh propositions. With the help of scholars such as Adam Smith (1776) and Ricardo (1817), new economic concepts and objects of study including 'division of labour', 'circulation of money' and 'modes of production' that were developed when economics was a field were beginning to influence public policy.

Foucault (1972, p. 56–63) suggests that for a field to be coherent and make possible its transformation into a discipline, the discourses of the field need to be: (1) ordered, (2) considered valid and (3) translatable. Toulmin (1972) talks about the need for fields to have a 'repertory of concepts and explanatory procedures' and proposes five criteria for a field to qualify as a discipline, which are as follows: (1) agreed collective ideals, (2) requirements for membership in the field, (3) a loci for the production of justificatory arguments, (4) forums for the acceptance of novel procedures and (5) criteria of adequacy in support of innovations. All of these criteria will be described in detail in the following sections.

Statements and concepts are ordered Fields are considered coherent when their content is ordered. Ordering demands that the field's content be ordered according to some kind of pre-conceptual schema. For example, in early biology, its system of ordering depended on four variables – the form of the living beings and its parts, the quantity of those elements, their configuration in relation to one another, and the relative sizes of each element – all falling within the new set of rules within early biology called *structure* (Foucault, 1972). The ordering within each discipline (Table 3) enables a student to recognize what is not obvious, allows that student to study each concept in greater detail, and relates each object and concept to other objects and concepts in the discipline. The discipline of economics developed a similar ordering of concepts. Each concept in economics, value, price, exchange and money is ordered in its units, and each concept is explained by and related to another concept in a coherent manner.

Concepts are considered valid Concepts in discourse are coherent when they are perceived as valid. For example,

Table 3 Ordering in early biology and economics

Early biology		*Economics*	
Concepts	*Ordering*	*Concepts*	*Ordering*
Structure	The nomination of visible forms in terms of form, quantity and manner they are distributed, and magnitude (e.g. In describing the reproductive organs of a plant, the geometrical form of the stamen and pistil, their number, position and size)	Value	The value (high or low) of certain objects explains how they are introduced into a system of exchanges
Character	Naming each part so as to describe their function and relationship to other parts. This process results in a set of characteristics, identities and differences for the objects being studied	Exchange	The order (equivalence and volume of) of exchange determines the price of an object and required the need for money.
Genus and species	The grid for the entire plant and animal kingdom, each recognized based on its essential character and structure.	Money	The quantity of money (high or low) signifies value and the possibility of exchange.

early statements and concepts in biology surrounding disease-causing microbes were validated first by cosmology and analogy, and with the invention of the microscope by observation. With this newfound validity, it became possible to discuss the truth-value of any biological proposition. These more or less permanent concepts should not be confused with how they are applied in rapidly changing applications and contexts. As the second doxa suggests, IS scholars have often given the excuse that it is not possible to discipline the IS field because rapid changes in technology will invalidate earlier findings. The medical discipline finds and treats new diseases probably as often as changes in technology, but the different diseases seldom invalidate long-held medical concepts. If the so-called concepts in IS are invalidated too often, *they are probably not valid disciplinary concepts*.

Concepts are translatable In addition to the ordering of the concepts and statements, and its assumed validity, the coherency of the concepts is also reflected by what Foucault (1972) calls 'procedures of intervention' (p. 58). These procedures include the rewriting, translating and transcribing of the concepts and statements into different forms or into other discourses. The ability to perform this translation enhances the communicative nature of the concepts, refines their exactitude and circumscribes the domain of validity of the concepts, all of which increase the coherency of the statements and concepts. Several procedures of intervention used in early biology remain in use today. For example, Tournefort (1694, pp. 1–2) was one of the earliest to relate the character of an element to its name. This scheme was later developed by Linnaeus (1737) into the now famous binomial scientific naming system.

Repertory of concepts and explanatory procedures Similar to Foucault's ordering, validating and translating structures, Toulmin (1972) proposed that conceptual formation in disciplines take the same of a 'repertory of concepts and explanatory procedures'. Zuckerman & Merton (1973) call such structures the 'codification of scientific knowledge' (p. 506) and define codification as 'the consolidation of empirical knowledge into succinct and interdependent theoretical formulation (p. 507). Toulmin (1972) defines a discipline as follows:

> A collective human enterprise takes the form of a rationally developing 'discipline,' in those cases where men's shared commitment to a sufficiently agreed set of ideals to the development of an isolable and self-defining repertory of procedures; and where those procedures are open to further modifications, so as to deal with problems arising from the incomplete fulfilment of those disciplinary ideals. (p. 359)

This repertory of explanatory procedures can only exist if the field sustains the following five interconnecting structures:

Agreed collective ideals In characterizing any discipline, Toulmin (1972) suggests that neither the scientists, the professional society, textbooks, theories nor concepts will give it its disciplinary unity and continuity. The core of the discipline is the shared commitment to the proper concerns of the discipline – the collective ideal that every single member agrees with. Thus, in the case of atomic physics, a discipline that emerged out from physics itself, its terminologies, theoretical models and concepts underwent many changes since the early days under J. J. Thomson and Ernest Rutherford, the 'father of nuclear physics', at the turn of the 20th century. By the time Heisenberg and Bohr took over, the atomic structure was completely different, but what remained stable was the 'genealogy of problems' which all of them shared.

Requirements for membership in the field As the field matures and the members struggle with the profusion of

propositions and information from their intellectual and practical activities, and 'what to make out of it', the members will need to get 'caught on to' the relevant theories, concepts and procedures of their research programme. Toulmin (1972) suggests that this process takes the shape of an 'apprenticeship' where the new members acquire the necessary knowledge and skills to recognize sense-datum belonging to the field among other irrelevant details. The minimal knowledge and skills explain how new members gain entrance into the discipline. Typically, such collective concepts are found in the discipline's classic textbooks that 'expound the body of accepted theory, [and] illustrate many or all of its successful applications' (Kuhn, 1970, p. 10). All members of that discourse are burdened with these requirements, and they need to acquire some level of competency before they can engage in any discourse within the discipline.

Loci for justificatory arguments This criterion for disciplinary activity reflects the communal nature of the discipline. It is not enough for anyone to claim to have developed new concepts just by announcing it. A discipline provides the loci for such novel suggestions to be worth considering, experimenting or testing. The loci are typically problem areas that need solving and the discipline provides for the opportunity for the member to apply the innovation and demonstrate its effectiveness. The importance of such loci can be demonstrated by the lack of certain disciplinary activities in China's history. Needham (1965) suggests that the reason why the Chinese civilization, despite its advances in the practical sciences of silk and paper production, porcelain glazing and gunpowder, never advanced in planetary theory was because, unlike the Greeks and the astronomers in the West, or the Muslim civilization in the Middle East, for them there was never a loci of problems to be solved or a research programme with regard to the celestial bodies. The Muslim civilization on the other hand required solutions to their scheduling needs and availed themselves to astronomy leaving a legacy of excellence in the astronomical sciences. The existence of these loci is sustained by the existence of the next criterion for disciplines, professional forums.

Forums for the acceptance of novel procedures Forums provide the opportunities and continued longevity for serious conceptual and methodological development and debate. They may take the form of formal channels of communication such as journals and conferences, or may take the form of informal groups of scholars working on a shared family of problems, which Price (1963) calls the 'invisible colleges'. Regardless of the form they take, they extend the life of ideas and concepts beyond the original author and provide the necessary medium for the application of certain criteria of adequacy to develop the coherency of the field.

Criteria of adequacy Among the members of the discipline, there must be general agreement about the character of outstanding problems and the adequacy of novel solution such that it becomes possible to add to the explanatory power of the conceptual framework. The selection criteria for judging conceptual novelties become an integral part of the discipline such that the conceptual innovations become 'relevant' specifically to the discipline and applicable in general. One way of determining their adequacy is how much they compete against rival concepts and theories, and in Foucault's (1972) terms how original research is always 'active' and not 'passive'.

Becoming a science

Foucault (1972) defines another stage selected fields undergo called the 'threshold of scientificity'. At this stage, in addition to operating on its own discursive formation and demonstrating a high level of internal coherency, the field's propositions become more formalized and survive the constellation of tests administered by its scholars. This is the stage the field becomes a science. According to Churchman & Ackoff (1950), science is an enquiry that differs from other kinds of enquiry by virtue of what it enquires into, and how it enquires. Science is controlled enquiry. Although respectable in themselves, the disciplines of the arts and literature are not considered sciences because there is little control in the nature of their enquiry and their assertions cannot be tested or falsified.

On the basis of the notion of 'professional ideals', Toulmin (1972) considers many professional activities 'disciplined' but are not necessarily sciences. For example, certain professions are directed towards artistic, craftsmanship, technical, or legal ideals instead of scientific ideals. These professions are disciplined because the apprentice to these professions needs to undergo extensive training and conditioning in order to demonstrate a grasp of the profession's ideals, procedures and techniques before becoming a member of the profession. Even clinical medicine, with its own medical universities, professional associations, pedagogy, legal infrastructure, and scholars is not a science according to Foucault (1972, 1973). Clinical medicine demonstrates a high level of coherency and its knowledge is clearly influential but its propositions lack a formal structure and are not amicable to formal tests. That is why clinical medicine is struggling to transform itself into a more 'scientific' discipline using approaches such as evidence-based medicine (Guyatt *et al.*, 1992). Although many disciplines are not sciences, their 'un-scientific' nature does not take away any of their legitimacy as respected disciplines.

Cross-disciplinary activities

Foucault's (1972) and Toulmin's (1972) analyses also describe the development of cross-disciplinary activities. Multidisciplinary fields such as molecular biology,

biochemistry and nanotechnology do not appear to be undergoing any identity crises. What disciplinary characteristics transformed these fields from their early fragmentary beginnings into more 'compact' fields? Foucault's analysis suggests that scholars of these fields have successfully synthesized the differing multidisciplinary foundations of the field into an independent and autonomous unity. In Foucault's (1972) terms, the scholars of these unified multidisciplinary fields have reconciled all 'extrinsic contradictions' (p. 153) threatening to split the field into different discursive formations.

Molecular biology emerged as a result of the consistent application of technical and cognitive problem-solving techniques from physics within biology (Klein, 1990). In the case of biochemistry, what was thought to be diametrically opposed discourses concerning life (biology) and non-life (chemistry) elements were synthesized to form a cohesive field (Wöhler, 1828). Similarly, nanotechnology is the synthesis of biology, physics, chemistry and engineering (Feynman, 1959; Taniguchi, 1974). Any contradictions between parent disciplines are localized within the same discursive formation and become intrinsic to the new field. This synthesis enables the child field to contribute to its parent disciplines. Hence, nanotechnology not only thrives as an independent field, but also contributes new concepts to biology, physics, chemistry and engineering.

The ability of a field to synthesize different discursive formations is related to the nature of borrowing taking place from the parent disciplines. A branch of study may simply be borrowing from its parents without necessarily creating anything new. Taking the case of 'Lunar Studies' again, the Apollo mission may have put to bear multiple disciplines to land man on the moon, and extensive amounts of knowledge were created within each discipline, but *no new fields or disciplines* emerged at the end of the process. The scholars who worked on that project went back to their own disciplines once the project was completed. The Apollo mission is an example of a *cross-disciplinary effort* that did not coalesce into an *interdisciplinary field* (Hackhausen, 1972).

Cross-disciplinary efforts can be categorized into many levels of interaction (Hackhausen, 1972): (1) indiscriminate interdisciplinarity (efforts that combine several fields according to the goals of the efforts), (2) pseudo-interdisciplinarity (efforts that use the same models, tools or techniques across different fields), (3) auxiliary interdisciplinarity (an enduring use of common models, tools or techniques), (4) composite interdisciplinarity (the consistent application of problem-solving methods from different disciplines to accomplish a major historical task), (5) supplementary interdisciplinarity (a correspondence at the theory level between different disciplines) and (6) unifying interdisciplinarity (theoretical integration between different disciplines). The terms 'cross-disciplinary', 'multidisciplinary', and 'interdisciplinary' are often used interchangeably. Hackhausen's analysis enables us to distinguish between them. Any activity that crosses disciplinary boundaries can be characterized as cross disciplinary. On the basis of the level of interaction, the term 'multidisciplinary' reflects low levels of synthesis, whereas the term 'interdisciplinary' reflects higher levels of synthesis. Higher forms of cross-disciplinary interaction results in a specific *interdisciplinary* form, whereas lower forms of interaction remain *multidisciplinary*.

The fields of social work and environmental studies are examples of fields that are more multidisciplinary rather than interdisciplinary. Social work, borrowing from sociology, social psychology, psychopathology and labour economics, emerged as a field in the late 19th century to resolve societal issues (Lubove, 1965). In 1915, Alfred Flexner, the architect of modern medical education, observes the following concerning the social work field:

> Professions would fall short of attaining intellectuality if they employed mainly or even largely knowledge and experience that is generally accessible, – if they drew, that is, only on the usually available sources of information … I have made the point that all the established and recognized professions have definite and specific ends: medicine, law, architecture, engineering – one can draw a clear line of demarcation about their respective fields. This is not true of social work. It appears not so much a definite field as an aspect of work in many fields. (p. 597)

Social work continues to struggle nearly a hundred years after Flexner's evaluation (Crouch, 1979; Gibelman, 1999). In Europe, the largest funder of social science research in the U.K., the Economic and Social Research Council (ESRC) remains unreceptive to social work research because the institution perceives social work as lacking disciplinary qualities (Shaw *et al.*, 2006).

Environmental studies also suffers from similar problems including lack of a unique identity, a clear definition of curricular content and clear educational objectives (Klein, 1990). Extrinsic contradictions within its foundations in the natural sciences and social criticism threaten to pull the field apart. Its undergraduates suffer from the lack of depth in the field's curricular content. Exposed to only superficial knowledge from any of its contributing fields, they are considered neither biologists nor social critics (Soulé & Press, 1998). In terms of its legitimacy, the objectivity and neutrality of its propositions have somewhat lost their credibility because of the field's association with social criticism. This state of affairs makes it difficult for stakeholders of environmental studies to differentiate between reliable or unreliable claims concerning the environment (Saarikoski, 2007).

On the other hand, the field of molecular biology emerged as a new *interdiscipline* as a result of biology borrowing techniques from physics to solve its own specific problems. Not only is molecular biology recognized as a distinct discipline from traditional biology, it has become more prominent (Klein, 1990). Such unifying

disciplinarity is not limited to the natural sciences. In sociology, Carey (1859/1963) and Herbert Spencer (1897) applied the laws of physics and biology to found their own sociological concepts. The manner in which fields constitute themselves will determine their cogency. The interdisciplinary fields of molecular biology, biochemistry and nanotechnology were forged in a productive and creative way, whereas the two multidisciplinary fields of social work and environmental studies remain highly dependent on their parent disciplines. Notwithstanding what has been said about the importance of higher-level interaction between fields, cross-disciplinary activity is an essential and critical component of the creation of knowledge. Also called 'boundary-work' (Gieryn, 1983; Klein, 1993), cross-disciplinary activity are often the most interesting topics to research and may offer the highest payback.

Implications for IS

Using both Foucauldian and Toulminian insights described earlier, the status of IS as a field, discipline and science is examined. For each type of rational enterprise – field, discipline and science – the evidence and warrants, or lack thereof, for the claim that IS qualifies is provided in this section. Implications for the IS field drawing from the Foucauldian and Toulminian frameworks are also discussed.

The status of IS as a field

In addressing Doxa#1, does IS qualify as a field in its own right? Or is it just a subfield of an established discipline? The answer to this question depends on whether IS has passed the Foucauldian 'threshold of positivity' and is operating its own discursive formation, or has at least one or more of the five criteria Toulmin specified for disciplinarity (Table 4).

Although not clearly articulated, discourse that addresses questions on how businesses can harness the power of computers, how organizations can persuade their employees to adopt computers – all characterized the new ideals for IS in the early 1950s (Osborn, 1954). These genealogies of problems appear at the intersection of meaningful social action and computer-based technology. Evidence that IS indeed addresses such problems or at least is capable of addressing such problems is appearing. Sidorova *et al*. (2008) performed a latent semantic analysis of three top IS research journals – *MIS Quarterly, Information Systems Research*, and the *Journal of Management Information Systems* – and identified core content focus areas of the IS field. These areas include how IT systems are developed and how individuals, groups, organizations and markets interact with IT. Such areas of study represent a unique set not addressed by other fields. Arguably, in the same way that economics fulfilled a societal need in the seventeenth century, IS fulfils society's need to benefit from information generated by the ongoing computer and information revolution.

The question is, 'Can this societal need for technological information carry its own discursive formation?' Many scholars tend to agree that this societal need is unique and has no precedence (Machlup, 1962; Bell, 1973; Castells, 1996). Ever since scholars began writing about how computers have ushered a new information age, the management of the information created by such a revolution was appropriated by several different fields of study ranging from computer science to information science. Even the computer science field admits that the landscape of information and its technological enablers has created new problems for their field such that the concerns surrounding them have become philosophically 'virgin territory' (Floridi, 2003). New conceptual problems, unprecedented issues, novel theories and ideas are increasingly demanding new approaches. This virgin territory is not exclusively a computing issue, nor is it exclusively a management issue. This void opens up the possibility for a unique discursive formation. The IS field offers a complementary 'non-mechanistic' lens to computer science that views information in the way Floridi (2003) describes as 'demiurgic' (a creational power) making 'possible the construction, conceptualization, semanticization and finally the moral stewardship of reality, both natural and artificial' (p. 465).

The second set of evidence for IS to qualify as an autonomous field lies in its ability to produce original and mutually exclusive concepts that did not previously exist. All mature fields have contributed to the body

Table 4 Is information systems an independent field?

Question	*Evidence*	*Warrant*	*Claim/conclusion*
Is IS an independent field?	Applying its own set of rules – rules around the intersection of meaningful social action and technological capabilities Able to produce original, mutually exclusive concepts Requirements for membership – undergraduate and masters level curriculum Loci for justificatory arguments – many problems involving IT and social action exists No agreed set of intellectual ideals No agreed set of criteria for adequacy	Foucauldian threshold of positivity Toulminian criteria for disciplinarity	IS qualifies as a field but only as a multimodal field

of modern knowledge through this process of conceptual development. IS also demonstrated such a process, although not nearly as prolific as other mature fields. About two decades after IS discourse started appearing in popular media, IS authors began developing unique concepts that were not addressed by other fields. Churchman's (1971) recasting of Western epistemological theories into organizational learning and information processing terms, and Gorry & Scott Morton's (1971) categorization of decision making into 'structured' and 'unstructured' decision-making concepts introduced new IS concepts to other fields. Decision-support system concepts (Dickson, 1981) and their extension in the form of executive support systems (Rockart & DeLong, 1988) offered a unique body of knowledge that was eventually implemented in the form of multi-million dollar software applications. Some of these unique concepts, for example, early cognitive style research (Huber, 1983), did not survive the test of time but nevertheless formed the historical archive of the unique IS field.

Although these early concepts can be safely categorized as being 'original', what remains illusive to the IS field is the construction of theories from original concepts. Oft-cited IS theories such as the Technology Acceptance Model (TAM) and structuration theory are constructed by borrowing from other disciplines without much adaptation and change (Davis, 1989; Orlikowski & Robey, 1991). Even though they can be considered 'IS theories' because they were published by IS authors in IS journals, their theoretical foundations are borrowed and did not originate from the IS field's endogenous conceptual work. The original component of TAM was the concept that technology will be more accepted if it was both useful and easy to use. However, the concepts of 'usefulness' and 'ease-of-use' came from the fields of operations research, behavioural sciences, cognitive psychology, social psychology, marketing and communications (Davis, 1989). Similarly, the various flavours of structuration models in IS (Orlikowski & Robey, 1991; DeSanctis & Poole, 1994) were borrowed from Giddens' sociology (Giddens, 1984).

Out of the Toulminian criteria for disciplinarity, IS fulfils three out of the five criteria. IS currently maintains a curriculum for both its undergraduate and masters-level students, which qualifies as a form of requirements for membership into the field. Many problems involving the implementation and effective use of IT within the social context continue to exist, providing the locus for IS to apply its intellectual and practical concepts. Although in the beginning, there were few formal channels for communications in the IS field, that is no longer a problem. Many IS-specific journals and conferences, as well as special interest groups now provide adequate forums for the acceptance of novel procedures.

What IS lacks is an agreed set of collective ideals, which contributes to the lack of a standard criteria for what is considered adequate for IS. As an example, the field continues to allow 'extrinsic contradictions' to guide its disciplinary activities. The continuing struggle between the 'technical' and the 'behavioural' is an example of such extrinsic contradictions. As Keen (1987) notes, there is 'no tidy source of ideas that integrates the behavioural and the technical' (p. 5). This struggle goes beyond paradigm battles (Checkland & Holwell, 1998; Goles & Hirschheim, 2000) or diversity in research methods (Klein *et al.*, 1991). This struggle takes place at the pre-conceptual level to define the nature of the field. When cross-disciplinary efforts do not reach higher interdisciplinary levels of interaction, and the efforts continue to excessively borrow from its parent disciplines, a cogent interdiscipline does not emerge; instead, the combined efforts become *multimodal*, a state where the members of the field disagree as to what should constitute its intellectual ideals and struggle to dominate the field.

A symptom of this lack of clarity in its intellectual ideal is the excessive borrowing within the IS field. Excessive borrowing increases the *burden of comprehension* for the members in that emerging field. Not only do the scholars of the field need to be familiar with the theories from contributing disciplines as they themselves evolved, the context, history, and status of other fields also become the burden of multimodal field; and this burden increases further as the topical agenda expands. The lack of loyalty among the researchers in the field (as researchers move in and out across its boundaries) makes it difficult for the field to reach *organizational and intellectual critical mass*.

Although the IS field may have reached organizational critical mass as judged by the increasing number of attendance at IS conferences, *intellectual critical mass* (Sjölander, 1985; Klein, 1990) deserves careful consideration. Sjölander (1985) suggests that this process of reaching *intellectual critical mass* undergoes 10 stages (Table 5), starting with the first stage, when the contributing scholars from different disciplines present their discipline's work and solutions, to the final stage, when the in-depth knowledge of contributing disciplines are appreciated and the group embarks on a 'real beginning' that produces results at an accelerated rate. The final stage is when *intellectual critical mass* is reached and an interdisciplinary effort actually takes shape. Sjölander's (1985) description of the process of synthesis is similar to Keen's (1980) notion of cumulative tradition.

Perhaps the beneficiaries of IS who stand to lose the most from the lack of intellectual ideals and intellectual critical mass are students of the field, in particular its undergraduates. IS scholars risk promoting what Swedish social scientist Torsten Husén calls 'multidisciplinary illiteracy', a situation where, because of the multimodality of IS, undergraduate students of the field hold only superficial knowledge of the field's contributing fields and are unable to perform well either in their careers or in graduate schools (Husén, 1991). If the undergraduate programme lacks necessary depth, IS students will graduate as shallow 'generalists' instead of 'specialists'. What needs to take place in the IS field is a synthesis of the discourses of its parent disciplines that creates an

Table 5 Reaching intellectual critical mass adapted from Sjölander (1985)

Stage	*Description*
1. Preliminary introductions	Presenting own discipline's work to others – generally unfruitful
2. Finding ignorance	Listening to what is offered from other disciplines. Discovering inability of others to grasp basic concepts.
3. Retreating into abstractions	Resort to abstractions to find mutual agreement
4. Laying down foundations-definitions	Development of local terminology for discussions
5. Jumping the tussocks	Focus on specific fruitful discussion areas albeit disparate and disconnected
6. Creating a skeletal framework	A new framework or structure begins to take shape – the glass bead game
7. Failure sets in	Some project may fail after participants realize lack of results
8. Internal changes	Participants become advocates of other disciplines
9. Serious familiarization	Specialists of other disciplines are developed
10. The real beginning	New insights, knowledge and motivation are realized – manifested in the publication of interdisciplinary textbooks

autonomous discourse in the same way that other unified interdisciplines have emerged with their own unique communal goals.

The status of IS as a discipline

Assuming that Doxa#3 and Doxa#4 have been satisfactorily addressed, and it is agreed that disciplines are not uni-theoretical and rigid, and that all fields ultimately aspire to become disciplines in their own right, how does IS fare as a discipline? Struggling as a field, the road towards IS becoming a discipline in its own right becomes even more challenging. The criteria offered by Foucault and Toulmin measure the potential for a field to exert influence over knowledge. According to Foucault, a discipline exerts influence and control when it demonstrates coherence and is accepted as valid. As far as Foucault's criteria for coherence (Table 6), the IS field minimally fulfils the three criteria for ordering, considered valid and translatable.

The historical development of the IS field did not reflect any manner of ordering of statements and concepts until at least two decades after the emergence of IS ideals in the early 1950s. Gorry & Scott Morton's (1971) categorization of IS decision making into 'structured' and 'unstructured' decision-making concepts is an example of ordering. Besides research in computational and formal ontology (Wand & Weber, 1988; Wand & Weber, 1990; Kishore *et al.*, 2004), which appear to be limited to knowledge engineering and conceptual modelling, very little ordering of the main distinguishing features of the IS field is forthcoming. Although there have been several calls for theorizing the core concepts (Weber, 2003) as well as several notable attempts to order these concepts (Falkenberg *et al.*, 1998; Alter, 1999; Orlikowski & Iacono, 2001; Benbasat & Zmud, 2003), they have not generated the level of interest that would advance the IS field's own ordering schema.

Several theories which can be claimed to originate from the IS field contain endogenous IS concepts that fulfil Foucault's second and third criteria for coherency. Gorry & Scott Morton's (1971) original concepts on the taxonomy of decision making and Alter's (1977) taxonomy of generic decision support system (DSS) operations laid the groundwork for the development of various DSS software. These same concepts were also appropriated and translated into other domains such as group decision support systems (GDSS) (DeSanctis & Gallupe, 1987) and executive information systems (Rockart, 1979). Media richness theory (Daft & Lengel, 1986), developed from Galbraith's information processing theory (Galbraith, 1973), introduced concepts such as feedback, multiple cues, language variety, and personal focus, was widely discussed internally, however, except for limited use in mass media and communication, did not appear to exert any influence outside the allied computing fields. Task-technology fit theory (Goodhue & Thompson, 1995), also originated from IS and was inspired by other theories such as TAM, but like media richness theory, never gained currency outside the allied computing fields. Scientometrics provide some evidence for this observation. Although *MIS Quarterly* receives one of the highest journal impact factors among allied computing fields, it does not exert much influence over other disciplines such as Finance, Economics, Accounting and other sciences (Nerur *et al.*, 2005; Wade *et al.*, 2006).

What is surprising are recent calls towards building an intellectual tradition in IS that is void of theories. In trying to consolidate the IS field despite its lack of theory, they argue that theory development ('theoretical core') is not a necessary condition for the legitimacy of IS. The classics, German literature, accounting, history (Lyytinen & King, 2004) and English (King & Lyytinen, 2004) were given as examples of established and legitimate fields that do not have any theoretic core. Using the definition of theories (Gregor, 2006) as statements that analyse, explain, predict or prescribe, it can be shown that all established disciplines propose theories, although as the responses to the aforementioned doxas explain, theories do not necessarily characterize the discipline.

Table 6 Is information systems a discipline?

Question	*Evidence*	*Warrant*	*Claim/ Conclusion*
Is IS a discipline?	Validates norms of verification and coherence-Ordered Considered valid Translatable No agreed set of intellectual ideals No agreed set of criteria for adequacy	Foucauldian threshold of epistemologization – demonstrates influence over other fields Toulminian criteria for disciplinarity	IS does not qualify as a discipline

History is the oldest discipline dating back to the ancient Greeks. As a discipline it is unlike the sciences because by its nature it is intricately interwoven with the development of the sciences. For example, the sciences can study its own history, and at the same time, history studies the sciences. In order to perform the study of history, the discipline has developed its own philosophy and theories. For example, Oswald Spengler's (1926) and Arnold Toynbee's (1947) theories that history is cyclical and not linear, that history is not concerned with the movements of nations, states, races or events, but of 'high cultures' with its own distinguishing features, that these high cultures are 'living' things that must pass through the stages of birth-development-death-decay-death, all help guide and describe various historicities of civilizations and the world. The classics is a special kind of historical discipline combining the disciplines of Greek and Latin literature, philosophy, art and archaeology, philology and linguistics in order to study great or 'classic' achievements of Graeco-Roman and surrounding civilizations (Kristeller, 1955). Two major scholars that systemized the discipline of the classics were the art historian and archaeologist J. J. Winkelmann (1717–68), and his follower philologist F.A. Wolf (1759–1824), who coined the theory of *Altertumswissenschaft* (antiquity science). Their theories and approach improved the study of classics over earlier British approaches (Pfeiffer, 1976).

Both counter examples of German Literature and English in Lyytinen & King (2004) and in King & Lyytinen (2004) may not be sciences but they both were developed on solid pre-conceptual schemata and theoretical bases common in all language studies. English for example teaches the arts of interpretation, analysis, critical understanding, and communication, all of which are based on solid theories. Foucault (1972) defines four pre-conceptual schemata that define languages–attribution, articulation, designation and derivation. These schemata contain coherent rules as to how the verb succeeds the noun, and how the adjective succeeds the earlier two elements, and how these elements in the original language survive in subsequent transformations of that language. Using these theories, linguists conclude that Basque, Coptic and Native American languages are closest to Chinese because they use separable elements as a means of connecting syllables and words. Celtic is similar to Arabic and Aramaic because they are all inflectional languages. These concepts in linguistics are used to trace origins and inter-relationships of languages, to study their internal variations, and ultimately, to teach students of language. Such coherency demonstrates the ability of a discourse to explain and predict phenomena and to produce value for the society.

Related to the production of what is valuable to society is the need for a field to engender a practical dimension, what Foucault calls the 'domain of actuality'. Abstract concepts and theories will only provide value when it is actualized in real life and this is where the professional bodies related to the field play a critical role in transforming a field into a discipline.

IS as a science

Based on Foucault's criteria for scientificity, a field needs to demonstrate a certain level of coherency before its knowledge claims can be formalized into testable propositions. Not qualifying as a discipline makes it difficult for IS to qualify as a science. It is not that IS researchers don't practice the scientific method; the question is, 'Which science are they practicing?' Top IS journals publish articles based on theory and test countless hypotheses from these theories. What is unclear is, which of these theories actually belong to the IS field? In order for a theory to belong to a field, the statements making up that theory needs to belong to the field's discursive formation. For instance, the statement, 'a person's attitude toward some object constitutes a predisposition on his part to respond to the object in a consistently favourable or unfavourable manner' (Ajzen & Fishbein, 1973, p. 41) belongs to the field of social psychology. Substituting the term 'object' in the statement to 'IT' does not create a new statement belong to IS discourse. The 'Theory of Reasoned Action' from which this statement is part of, does explain how people react to IT, but because nothing is offered to the discourse itself by substituting 'IT' into the statement, the theory remains within the discursive formation of social psychology.

Although IS does not yet qualify as a science, efforts can be undertaken to enhance its intellectual structure to qualify as one. The question is, 'Should IS become a natural or social science?' The answer to this questions determines in many ways which other fields and disciplines can be expected to work closely with IS and its efforts towards scientificity, and how IS is viewed by

other fields. Foucault (1970) categorizes scientific enquiry into two broad categories, the natural sciences and the 'human' sciences. The natural sciences are empirical studies of objects *outside* of man, whereas, the 'human sciences' take man as the empirical object. The 'human sciences' were created as a result of problems faced by man; whether they were new norms imposed by a newly industrialized society, or problems caused by social and political imbalance. Unlike the natural sciences, where man as the subject studies the natural objects of science; in human science, man is *both* the subject *and* the object of science. This situation creates a paradox for all human sciences. They cannot be found along the formal dimensions of mathematics and physics, or the dimension of language, or the dimension of philosophy. Instead, the human sciences exist within the spaces between the three dimensions, which renders them so difficult to situate, to define, and gives their meta-epistemological positioning a sense of precariousness. These human sciences are not formal sciences, but can have, at one level or another, mathematical formalization. They are not strictly the science of life like biology, or physical and neurological activities as in chemistry and psychiatry, but depend on and borrow from these life sciences. These human sciences are sometimes considered a threat to other fields, because they seem to continually intrude into the boundaries of these other fields.

Foucault's (1970) description of the human sciences fits exactly with the IS situation. Based on this picture of the human sciences interlocking within the epistemological regions of life, language and labour, the IS field can be situated. This precarious meta-epistemological positioning of the IS field is the reason why previous research has struggled to define the nature of IS.

Actionable strategies for the IS field

As with any other fields of knowledge, the path for IS toward becoming a discipline in its own right is fraught with complex issues and problems. These challenges can be categorized into those related to the field's internal disciplinary content and those related to the field's external sociological position. The latter category is addressed by studies in the sociology of knowledge. A generalized list of strategies for improving the field's sociological position can be found in Hambrick & Chen (2008). This essay is concerned primarily with the former category of issues that affect the IS field's internal disciplinary structure. Three actionable strategies are proposed: (1) agree on the intellectual ideals for IS, (2) focus on conceptual formation, (3) focus on theory construction, (4) erect genealogical boundaries, and (5) foster professional bodies.

Agree on the intellectual ideals for IS

The members of the IS community need to agree on the intellectual ideals of the field. What is the IS field about? In collaboration with other disciplines, in what areas can IS contribute? For example, scholars of linguistics concern themselves with the rules surrounding the structure of languages; psychology scholars represent the set of rules governing the representations of the mind in the form of an individual's mental processes, behaviour, and attitudes; and sociology scholars deploy the same set of rules as psychology, but extend their study to groups of individuals. If IS researchers are invited to join this group of linguists, psychologists and sociologists, what would be their contribution to the collaborative effort?

Throughout the history of the IS field, authors have different opinions about what IS is about. Drucker once commented to Markus (1999, pp. 200–201), 'The problem with your field, is that you haven't figured out that it's about information, not about technology'. Drucker has since conceded that technology also plays a major role (Markus, 2005). Other scholars view IS as organizational control (Dearden, 1964), decision-making mechanism (Dickson, 1968), adaptable man-machine systems (Emery, 1973), information support given to management (Ives *et al.*, 1980; Keen, 1987), and as IT created and implemented in social environments (Benbasat & Zmud, 2003). All of these opinions are correct in suggesting the core concerns of the IS field. But what are missing are the *rules surrounding the relationships between these core concerns* – the field's discursive formation that ties all these concerns together.

Focus on conceptual formation

In the IS field, borrowing is unfortunately the *de facto* method of legitimization. IS researchers continue to appropriate concepts and theories, especially from the organization science disciplines, often without adding substantive content to these concepts. What needs to take place in the IS field is the construction and development of endogenous concepts and theories from these borrowed concepts, not more borrowing and testing of other disciplines' concepts and theories. This lack of endogenous development is the reason why the IS field has not substantially contributed to other fields.

Conceptual formation begins with the identification of objects to be studied within the field. Throughout the history of the IS field, its scholars have already identified several of these objects (e.g. information, computers, decisions, control, management, external environment). From the landscape upon which these objects exist, a coherent conceptual system needs to be constructed. Some of these concepts may be adapted from other disciplines, but they are redefined in the IS field in ways that agree with its intellectual ideals. Other concepts may be formulated from empirical studies or simply invented by the intuitive genius of IS scholars. Whatever shape the concepts take, they actively populate coherent statements that enunciate originality. These statements establish coherent relationships between objects of study and the original concepts of the IS field.

Focus on theory construction

These coherent statements and concepts enable the field to develop theories. Foucault (1972) describes this activity of choosing a specific set of concepts for theory building as the 'the formation of strategies' (p. 64) within the field. The field makes a choice in terms of strategies to reconstruct and simplify the overwhelmingly complex reality of its subject matter. By doing so, the field can understand, explain, and predict phenomena and events involving the object of study. Sometimes more than one strategy can exist at any one time and this allows for diversity to thrive within the field.

The elaborate process of theory construction itself is beyond the scope of this paper. Briefly, it involves the process of choosing the strategy with the highest probability of fecundity, and organizing a specific combination of objects and concepts that would achieve a level of coherency they would not be able to achieve using any other objects and concepts. When the level of formality is low within a certain strategy, Foucault refers to this choice as a 'theme' (p. 64), whereas when its level of formality is high, it becomes a 'theory' (p. 64). Thus in biology, in order to understand and better explain the sudden gaps in the taxonomic table of living beings, an evolutionary theme was deployed. As a result of Darwin's efforts, it has since matured into a 'theory'. This theory offers an alternative explanation to the vitalist or mechanistic themes that existed at that time within the discourse of biology. This work of inventing concepts, formulating statements and developing theories signals the beginnings of conceptual formation, one that the *MIS Quarterly* journal has made a major objective of its 'Theory and Review' section.

Erect genealogical boundaries

Genealogical boundaries circumscribe the 'kind' of areas that discourses within a discipline belong to, areas within which the discourse performs its fundamental activity and produces a distinct identity. Such boundary-work assists members of a discipline in becoming more effective when studying its objects and concepts, and helps other disciplines recognize and appreciate the content and fundamental activity of that discipline (Gieryn, 1983). The combination of coherency and theory development in a discourse imposes a certain control over how the discourse treats any proposition or a collection of concepts. All members of that discourse are burdened with these requirements, and they need to acquire some level of competency before they can engage in any discourse within the discipline.

This level of competency represents the boundaries surrounding the discipline such that any attempt to create any statements within a discourse will require that it fulfil the conditions of considerable prior technical training before it can be considered as part of that discipline. This type of coherency maintains the rules of formation of statements for that discourse and controls the circumstances in which the members of the discipline display their expertise. The existence of these boundaries adds to the field's credibility and objectivity.

Foster professional bodies

The more practical and applied dimension of a discipline represents the intellectual channel by which the discipline engenders its relevance to society. This practical dimension is where the 'professional attitude', 'collective ideals', and 'communal goals' (Toulmin, 1972) that characterize a discipline are manifested in reality. It represents what Foucault (1972, p. 61) calls the field's *domain of actuality*, where the field demonstrates its ability to define society's problems and provide solutions for them. Much of this work is performed within professional bodies, either in the form of guilds, as was the case with physics, metallurgy, and engineering disciplines, or as accrediting organizations that formalize the canonical body of knowledge agreed by experts in the field. The professional body distils what is most useful and most fruitful for practical ends and although the professional bodies may act autonomously from the academic discipline, they are intimately interdependent. The IS field lacks such professional bodies. Examples from the software engineering and project management fields (Wideman, 1986; Bourque & Dupuis, 2004) that fostered such professional bodies in a relatively short period of time are instructive for the IS field.

Conclusion

Following the Kleinian critical spirit that was first embodied in Immanuel Kant's *Critique of Pure Reason* (Kant, 1978) and *Critique of Practical Reason* (Kant, 1956), this study deploys the disciplinary theories of Michel Foucault and Stephen Toulmin to contribute to the ongoing debates surrounding the disciplinarity of IS. The Kleinian view of IS demands that the field overcome its crisis of legitimacy (Hirschheim & Klein, 2003), build its own distinctive identity (Iivari *et al.*, 2004) and free itself from the domination of its parent disciplines to form its own community of practice and knowledge (Klein & Hirschheim, 2008). As a branch of study, IS has been fortunate because its subject matter – the space that exists between the technical and the social, the human and the machine – has remained compelling ever since computers ushered in the information age. The discourse associated with this new information age is naturally eclectic because it fluctuates between the human and the technical domains and assumes the character of that discourse on where it settles. What is clear is that IS is unique in the sense that it is neither exclusively computer science, nor is it exclusively organizational science; it is neither exclusively the life sciences (psychology, sociology or political science) nor is it exclusively engineering. Despite its precarious nature, IS does apply its own rules of discourse and is therefore capable of existing autonomously and not merely as a subfield of other established disciplines. However, the rules of discourse of this fledgling field are not clearly articulated.

IS remains multimodal and has not completely synthesized the differing discourses of its parent disciplines. The lack of an agreed set of intellectual ideals, criteria of adequacy, and endogenous concepts combined with a tradition of excessive borrowing prevent IS from qualifying as a discipline in its own right.

As a field, its repertory of ordered concepts and statements are wanting, and although its publications are beginning to exert influence its intellectual tradition has yet to capture society's imagination. Even so, what IS offers other fields is profound. IS not only offers the illusive knowledge that is situated between the natural and the social sciences, but also bridges between the two, providing the link between the silent technology and the human spirit. As the knowledge of the human sciences overlaps that of the natural sciences, the field of IS is capable of encompassing both. Its relevance lies not in its ability to use the concepts and theories of other disciplines in a technological context, but in its ability to offer what escapes other disciplines. Following this enlightened Kleinian view of IS, the challenging task ahead for IS researchers is the realization of Immanuel Kant's (1963) motto for enlightenment, 'Sapere aude!' Have courage to use your own reason!

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