Is Supply Chain Management a Discipline?

A Comparative Content Analysis of Academic and Practitioner Knowledge to Determine Disciplinary Identity

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Abstract

This thesis holds in tension two perspectives on the conceptual framing of supply chain management (SCM): one as a discipline, the other as a domain of practice. It provides a unique appraisal into the conflict existing within SCM by addressing gaps in previous studies, through employing knowledge management (KM) to inform both academic and practitioner conceptualisations of SCM. Application of the core assumptions and deliberations of Fabian's disciplinary analysis criteria (coherence, knowledge, and quality) combined with Kuhn's theory of disciplinary evolution permits examination of academic and practitioner conceptualisations of SCM. The analysis aims to challenge the assumption within previous studies that SCM's disciplinary identity is ascertainable via one conceptualisation (academia) and through only two of Fabian's criteria (coherence and quality). This thesis contributes to both theoretical development and analytical methodology by elucidating SCM's body of knowledge to provide insight into its disciplinary identity through employing content analysis from a pragmatist's perspective.

This research is conducted through content analysis of an archive of 1,371 articles extracted from four representative academic and practitioner publications covering the period from 1998 to 2008. The selected texts represent core developments of SCM knowledge, providing insight into theoretical and practical development over this timeframe from both academic and practitioner perspectives. This approach is unique, as the influence of practice on a discipline's identity is overlooked in the literature. Subsequently, new opportunities of investigatory scope extend the dialogue on SCM's disciplinary identity.

Fabian's three criteria form the basis for the disciplinary analysis framework employed within this thesis, examining whether sufficient indicators of these criteria exist within the texts to signify that SCM is a discipline. Specifically, analysis of academic and practitioner conceptualisations as to the degree of coherence, the existence of a unified body of knowledge, and the degree of quality within SCM indicate a fragmented discourse. Academic and practitioner conceptualisations of SCM indicate that highly informative divergent discourses exist, representing a discipline in crisis and a domain of practice that is strategically mature. The potential effects of such divergent conceptualisations are acknowledged as they serve as a warning of the impending disintegration of SCM as a researchable entity.

Although SCM is argued to be effectively ‘dead’ as a discipline, future developments in the overall operations field enable opportunities for development, both conceptually and within practice. In reflecting on the research this thesis concludes on an optimistic note, for the potential exists to re-weave the tapestry of ideas represented by the term ‘SCM’ into a new form able to manifest the interests of both academia and practice. Thus, the re-weaving of operations management to be more representative of reality is required to ensure its sustainability. In conclusion, the lesson to be learned from this research is that integration of academic and practitioner conceptualisations through their respective discursive practices is essential for the legitimacy and longevity of a discipline.

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This thesis is dedicated to the memory of

My father,	*My father-in-law,*
Raymond Harold Davies	*Michael Kevin Dwyer*
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Notice of Publication of Related Work

It has not been my intention to focus on the extensive publishing of material during the research process, but to publish afterwards. However, various findings described in this thesis have undergone peer review and been presented at (or at the date of this printing will have been presented at) conferences. Thus, certain parts of the material presented here have already been described in the literature, and therefore are subject to copyright by myself outside of this manuscript. Co-authors are in all instances my supervisors.

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List of Abbreviations

CLM	Council of Logistics Management
DS	Decision Sciences
GSCF	Global Supply Chain Forum
IJLM	International Journal of Logistics Management
IJOPM	International Journal of Operations and Production Management
IJPDLM	International Journal of Physical Distribution and Logistics Management
IJPE	International Journal of Production Economics
IJPM	International Journal of Production Research
IMM	Industrial Marketing Management
JBL	Journal of Business Logistics
JOM	Journal of Operations Management
JPMM	Journal of Purchasing and Materials Management
JSCM	Journal of Supply Chain Management
LS	Logistics Spectrum
MS	Management Science
POM	Productions and Operations Management
PPC	Production Planning and Control
SCMR	Supply Chain Management Review

Chapter One: Introduction

> Whether or not a field may be said to be a discipline will affect research effort, academic and professional definition and identity, policy-making, and related investment (Harland et al., 2006, p. 731).

1.1 Background to the Research

In recent years, there has been a marked increase in dialogue regarding the theoretical underpinnings and consequent disciplinary nature of the field known as supply chain management (SCM) (Carter, Sanders, & Dong, 2008; Gibson, Mentzer, & Cook, 2005). These discussions can be traced back to the initial calls for robust theoretical development within the general operations management (OM) field (see Amundson, 1998; Gupta, Verma, & Victorino, 2006; Lewis, 1998; Melnyk & Handfield, 1998), in conjunction with research into OM's own disciplinary nature (Heineke & Davis, 2007; Kirby, 2007; Pilkington & Liston-Heyes, 1999; Pilkington & Meredith, 2009; Rainbird, 2004b). SCM is readily accepted as a complex domain formed through the interactions of human practice and technological developments; accordingly, SCM is global in nature and archetypal as a phenomenon. This raises the issue of whether it is more appropriate to frame SCM conceptually as a discipline, as a domain of practice, or as an entity combining the two.

As a multi-layered, multi-dimensional phenomenon, SCM is of interest not only to academics but also to practitioners. Diverse views jostle for acknowledgement as *the* view of SCM, resulting in a plethora of multi-disciplinary frames, theories and methodologies describing and explaining its characteristics. A consequence of which is poor integration both conceptually and in practice. Subsequently, the introductory quotation by Harland et al. (2006) succinctly illustrates the prime motivator grounding this research into SCM's conceptual framing, namely that without a distinct disciplinary identity, academic stature and professional capacity are limited through poor integration of their core constituents.

This thesis contends that the confusion surrounding the disciplinary identity of SCM is due to its rapid rate of development and the multiple (but non-integrated) contributions from a broad disciplinary base, each utilising their own theoretical lens (Croom, Romano, & Giannakis, 2000). These factors are argued to contribute to an academic discourse that tends to focus not on undertaking substantial theory advancement, but instead on discussing empirical research on the functional areas within organisations along with intensive reviews of the literature. For instance, there is evidence to suggest that research within the field is undertaken via functional-process approaches and using a predominantly functionalist paradigm; holistic approaches are overlooked (Svensson, 2003). As a consequence one functional area – purchasing and supply – is argued to be overrepresented in the body of SCM literature (Chen & Paulraj, 2004; Kauffman, 2002; Larson & Halldorsson, 2002; Lummus & Vokurka, 1999a). Furthermore, there is ongoing debate as to what actually constitutes SCM or even whether the domain should be called SCM at all (Burgess, Singh, & Koroglu, 2006; Nassimbeni, 2004).

This thesis suggests that such function-orientated research has resulted in a binary approach to developing SCM. First, there is a concentration on exploring how a single organisation (or industry) operates and manages its supply chain with a predominant focus on performance-related outcomes, and second, there is a strong emphasis in reiterating the normative position of what organisations ought to be doing. Overall, it is argued that there has been little regard given to conceptualising a distinct disciplinary identity for SCM.

1.2 Research Problem and Core Research Questions

There is value in pausing from time to time and engaging in retrospective analysis of a domain to ascertain the entire tapestry of its development. Such analysis enables the intellectual core to be explored and the multiple contributions that weave together to facilitate forming its future direction to be distilled. Consequently, the value of retrospective analysis is in bringing a sense of order to the chaos of threads that form the tapestry, enabling questions to be asked of its intellectual core. In terms of SCM, there is ongoing debate as to what constitutes its intellectual core and therefore what the tapestry should be depicting (SCM framed as a discipline, as a domain of practice or as a combined entity).

A canvassing of the academic literature indicates that although there is a ready acceptance of SCM being denoted as a discipline few studies actually seek to determine whether it in fact is or not. Those that seek such a distinction temper their assumptions by stating that SCM is still in the process of maturing and, as such, has a way to go before it can be classed as a ‘true’ discipline (Giannakis & Croom, 2004; Ho, Au, & Newton, 2002; Mentzer et al., 2001). Others argue that SCM can only be regarded as ‘emerging’ as there is insufficient theoretical development underpinning the domain (Babber & Prasad, 1998; Carter & Ellram, 2003; Harland et al., 2006; Kouvelis, Chambers, & Wang, 2006; Wolf, 2008). A common thread pervades such studies as they find that SCM is at a crossroads in terms of theoretical development. The field can either continue the narrow focus applied currently to research, or new approaches can be embraced through expansion of research frameworks to allow for new paths of enlightenment (Burgess et al., 2006; Giunipero, Hooker, Joseph-Matthews, Yoon, & Brudvig, 2008; Spens & Kovacs, 2006). Overall, the literature provides very few indications as to how far SCM must travel, or how much time must pass before 'true' disciplinary identity is achievable.

In general, similar themes (or threads) inform these studies into SCM's disciplinary identity: investigation as to an SCM definition; determination of the dominant paradigm; establishment of the data analysis techniques utilised; identification of the 'thought-leaders'; and determining whether a 'discipline debate' exists at all in the literature. Such popular themes are evidence of a predominance of interest into investigating issues equating to the level of coherence in the field and the quality of published research. Furthermore, the main data collection method utilised in such studies is either citation analysis or content analysis of academic publications only.

Critical across the aforementioned studies is an underlying belief that investigating SCM's body of knowledge would result in the production of a variety of miscellaneous categories, rather than binding the various streams of thought into a unified discipline (Harland et al., 2006). The argument is advanced that as vast arrays of philosophical and realistic approaches underlie investigations into 'knowledge', difficulties can arise when determining its breadth and depth within a domain. This thesis queries whether the vastness of a topical domain like 'knowledge' is a valid motive for a failure to investigate SCM's body of knowledge. Hence, it is argued that the difficulty in conceptualising what 'knowledge' constitutes is a hindrance in the conceptualisation of SCM. Thus, a self-limiting dialogue surrounds SCM's framing as a discipline, as a domain of practice or as a holistic entity.

Studies that analyse whether a field fulfils the criteria of a discipline tend to concentrate solely on what academics think and write; the practitioner literature detailing the thoughts of the actual users is ignored. Such an oversight begs the question: Do practitioners not also contribute to the disciplinary identity (of SCM, in this case) through implementation of its concepts and consequent discussion on aspects of its implementation? Consequently, this research offers a unique perspective as to the disciplinary identity of SCM, as it utilises the previously un-researched practitioner conceptualisations to enable comparison with academic conceptualisations. Overall, such questions indicate that further exploration is required in order to provide a full portrayal of SCM's disciplinary identity from the perspectives of both academia and practice. To mitigate confusion, academics are defined as those affiliated with an educational and/or research institution such as a college or university, while practitioners are defined as not being affiliated with such institutions due to their active engagement in the practice of SCM.

One of the core aspects within any research culture is to hold in tension contradictory assumptions. The consequent creative tension provides boundless opportunities for ongoing dialogue within a discipline, and arguably is the root cause of a discipline's downfall (Kuhn, 1970). This research seeks to refine the academic and practitioner conceptualisations of SCM to determine its disciplinary identity. To put it bluntly, creative tension is all very well and good for academics furthering their individual careers but it is severely limiting and ultimately confusing for the domain of practice.

The situational conditions and questions discussed above provide the grounds for this inquiry into the framing of SCM as a discipline, as a domain of practice, or as a holistic entity. The core objective of this research is to resolve the tension between academia and practice regarding SCM. To allow substantive changes to be observed, data will be collected from an 11-year period. The research objective is formulated as:

- To determine the degree to which academics and practitioners differ in their conceptualisation of SCM, and how these conceptualisations have evolved over time.

Critical within this objective is investigation into the SCM body of knowledge, an area previously unexamined within the literature. Consequently, in order to characterise SCM, specific criteria require investigation from the perspectives of academia and practice; this approach results in three core research questions:

- RQ(1): Are there sufficient indicators of coherence in the SCM literature to signify it is a discipline?
- RQ(2): Are there sufficient indicators of a unified body of knowledge in the SCM literature to signify it is a discipline?
- RQ(3): Are there sufficient indicators of quality in the SCM literature to signify it is a discipline?

Further development of these core research questions occurs in Chapter Three.

In summary, this research utilises a retrospective approach (longitudinal study) to examine both academic and practitioner thought over an 11-year period. A map of SCM's characteristics over the 11 years from the perspectives of academics and practitioners is therefore attainable. Overall, there is great potential for contributing to, and delineating the boundaries of, SCM thought and extending the debate as to whether SCM can be conceptually framed as a discipline, as a domain of practice or as a holistic entity.

1.3 Perspectives on Analysing a Discipline

The central issue underlying this research is whether SCM should be regarded as a discipline or as a domain of practice. As the quotation by Harland et al. at the beginning of this chapter indicates, determining whether a field is identifiable as a discipline affects both academia and practice in terms of their individual identity, research efforts, and investment. Consequently, a structure is required to provide framing for analysing whether SCM constitutes a discipline.

Frances Fabian's (2000) much-vaunted article regarding the disciplinary controversy in the overall management field provides a suitable foundation from which to start when evaluating SCM. Built on the passionate debate that raged between Jeffrey Pfeffer and John Van Maanen regarding paradigm development and the direction of organisational science (Pfeffer, 1993, 1995; Van Maanen, 1995a, 1995b), Fabian captures the inherent nature of a discipline through a detailed explanation of the differences between the terms 'paradigm' and 'discipline'.

Anchoring the discussion with the proviso that a paradigm "holds multiple meanings, ranging from theoretical world views to methods to metaphors" (2000, p. 351), Fabian observed that the term 'theory', as broadly defined by Gioia and Pitre (1990, p. 587), represents "any coherent description or explanation of observed or experienced phenomena". The term 'paradigm', by contrast, describes the more acceptable beliefs and assumptions that researchers could hold for generating theories about a phenomenon under study (Fabian, 2000).

Researchers could operate from various paradigmatic stances, but disagree on the ontological nature and epistemological approaches utilised. For Fabian (2000), a 'discipline' is the common focus of researchers operating within a particular field who utilise these varied paradigms and theoretical perspectives. Hence, a 'disciplinary approach' is the system preferred by researchers for locating and legitimating their research within a supporting framework or community identity. Fabian (2000, pp. 351-352) provides a marvellous analogy of the differences between ‘theory’, ‘paradigm’ and ‘discipline’, comparing them to the running of a government:

> Conflicting theories are like debates over whether clean water standards should be imposed by market trading of allotments or by tax incentive… A paradigm debate then resembles more of an argument over the relative merits of private companies or public monopolies for water distribution… A disciplinary approach debate, however, is akin to an argument over whether these decisions should be made through democratic vote, republican vote, military decree, anarchy, or revolutionary war.

Other world-renowned scholars have sought to establish the boundaries of what makes a discipline a discipline, and how one would go about analysing it. Karl Popper (1959) argued that knowledge (irrespective of type) is hypothetical in character. In the form of a hypothesis knowledge can be developed, tested, refuted, refined, and then further tested in an ongoing spiral of trial and error that constitutes scientific enquiry. Hence, through the evolutionary process of learning and challenging that learning, individuals refine their theories, which are then tested and found to need further refinement. In other words, an individual’s knowledge of reality is refined over time through challenging the status quo.

Imre Lakatos (1970) introduced a distinction between the ‘hard core’ of a discipline (those concepts that make the discipline what it is) and its ‘protection belt’ (the concepts that support the hard core). Lakatos argued that within any research programme there are rules that inform researchers as to which paths of research they should avoid (the ‘negative heuristic’), and those they should follow (the ‘positive heuristic’). The negative heuristic cannot examine the hard core directly; it can however, examine the protection belt via the development of supporting hypotheses. The protection belt of a discipline therefore undergoes constant testing and retesting, resulting in either adjustments or complete replacement; the hard core remains defended. A progressive problem shift within the discipline occurs if the constant ‘attacks’ lead to theoretical development, as new theories emerge to explain identified phenomena and forecast the emergence of new phenomena (the opposite is deemed a degenerating problem shift). Accordingly, a discipline is legitimate even though there may be competing theories sharing the same hard core.

Thomas Kuhn (1970) argued that science and knowledge of reality develop along revolutionary means via paradigms. For Kuhn a discipline has various stages of development beginning with the pre-paradigmatic period where various theoretical interpretations of the object of interest or unit of analysis exist simultaneously. Next is the normal science period where research attains structure through clear patterns and methods of investigation; hence, the discipline matures via a clear establishment as to the boundaries of what is and is not studied. Finally, the crisis period sees the discipline founder as researchers run into problems surrounding the solving of various issues and topics. Subsequently, revolution occurs as the dominant paradigm is overthrown and the process begins anew with a pre-paradigmatic period revolving around a new conceptual frame. In other words, Kuhn was describing a cyclical event of ongoing revolutions into scientific enquiry, and hence ongoing knowledge development through evolutionary means.

In an attempt to mitigate the tension existing within the management field as to its disciplinary identity, Fabian (2000) developed a typology of disciplinary approaches based on three criteria. This typology is an attempt to differentiate the confusion surrounding the debates as to disciplinary identity from debates surrounding paradigm and theory utilisation. In providing such a typology, Fabian was not advocating a tool for the specific purpose of evaluating whether or not a domain is a discipline as per her typology. Instead, the three criteria epitomise a discipline's *characteristics*; as such, they provide guidance on evaluating SCM regarding its disciplinary identity. Criterion (a) seeks to determine the degree of emphasis toward paradigm inclusion (determining the degree of coherence); criterion (b) examines the impetus for new research (determining the body of knowledge); while criterion (c) examines the system of validation within the domain (determining the quality of the research). Utilised together these criteria enable a flexible, yet comprehensive analysis structure to be applied to SCM; accordingly, this research advances the discussion of whether there are sufficient indicators within SCM to signify it is a discipline.

The main argument of this research is that it is time for enlightenment, synthesis and the establishment of a distinct disciplinary identity for SCM, for as Tsoukas and Cummings (1997, p. 675) write,

> Extending the boundaries of management theory beyond what the self-image of the field has historically allowed, will enable us to examine alternative thought systems and thus challenge and potentially transform our own self-understandings.

To facilitate that transformation this research employs Fabian's three criteria and Kuhn's theory of disciplinary evolution to determine the disciplinary identity of SCM. As the theoretical foundation behind this research, their interaction is discussed in Chapter Three.

1.4 Significance of this Research

Although there has been increasing research into SCM by academics, confusion remains as to what advice should be passed to practitioners in terms of implementing SCM concepts and integrative aspects. This leads to the suggestion put forward by this thesis that there is a gap between the knowledge that academics use, and that which practitioners use when discussing, researching, and implementing SCM. Consequently, it is argued that academics may have unknowingly limited themselves to a narrow body of knowledge for researching and interpreting SCM and thus unintentionally overlooked the messy reality of practice (Dubois, Hulthen, & Pedersen, 2004).

First, this research offers solutions to the above knowledge gap through challenging the synthetic reality under which academics operate, for as long as a disparity exists between academic and practitioner knowledge the legitimacy of SCM as a discipline in its own right is questionable. Put another way, how can SCM be regarded as a legitimate discipline if the two communities intimately involved with it are moving along divergent paths of thought? Consequently, from the perspective of academics, the articulation of their body of knowledge enables an acknowledgement and understanding as to what concepts frame their research. Additionally, through understanding the practitioner body of knowledge, alternative conceptualisations of SCM are developed and utilised to inform theoretical development. Such an understanding of the concepts informing the disciplinary identity of SCM enables academics to determine new research questions and areas of future investigation. Thus, this research facilitates the further maturing of SCM as an individual body of thought within the greater OM domain.

Second, as Harland et al. stated at the beginning of this chapter, a lack of disciplinary identity affects research directions, definitional constructs, and hence academic and practitioner identity. This research contributes to the emerging debate on the disciplinary identity of SCM primarily through ascertaining the SCM body of knowledge within which both the academic and practitioner communities operate. It enables comparisons employing all three of Fabian's disciplinary analysis criteria (not just coherence and quality) from the perspectives of both academics and practitioners. Although there have been several studies devoted to two of Fabian's disciplinary analysis criteria ((a) – coherence and (c) – quality), no studies have been identified that utilised criterion (b) – knowledge – to examine SCM. Finally, this research utilises an 11-year longitudinal study of SCM's development, enabling the evolutionary path of SCM to be ascertained via Kuhn's deliberations.

Third, a unique view of SCM is attained via the perspective of practitioners. Full awareness of their body of knowledge enables them as a community to stamp their perceptions and experiences onto SCM from an operational position. Awareness of the academic body of knowledge and understanding the justifications behind research facilitates open communication, thus enabling practitioners to guide and focus academics into areas of practitioner interest. Thus, practitioners can facilitate the development of SCM through a full conceptualisation of its implementable constructs.

Finally, this research offers an alternative lens for examination of the dialogue revolving around the disciplinary nature of SCM. First, via extensive utilisation of the 'knowledge' domain in Chapter Two to enable framing SCM conceptually, and second, via the methodological approach employed in this thesis. Although Chapter Four provides a comprehensive discussion on the paradigm of pragmatism and the use of the content analysis data collection method within this thesis, it would be remiss to avoid acknowledging their significance.

The philosophical nature of pragmatism holds at its core a common-sense approach built upon a strong methodological foundation stretching back to Aristotle and his work on phronesis. As such, pragmatism endorses a creed that advocates employing quantitative and qualitative assumptions as required, rather than an orientation around one to the exclusion or diminution of the other. The result is that a scholar operates from an outcome-orientated position that approaches the entire research process from a holistic perspective, including its operationalisation. Thus, the investigative potential of the chosen data collection method increases through an empowering of its abilities via the combined perceptual nature of the quantitative and qualitative assumptions. Consequently, this research is the most comprehensive example of content analysis application to the SCM context to date.

Throughout this thesis, the lens of pragmatism has influenced and empowered the overall research direction; Chapter Four provides a comprehensive discussion and justification of its application. The significance of such a lens lies in its ability to enable alternative thought patterns to be applied in a manner that increases both academic and practitioner understandings, and ultimately opens SCM to new and potentially informative paths of enlightenment.

1.5 Outline of this Thesis

Chapter One constitutes an introduction to the overall arguments and ethos driving this research into SCM. It identified the research problem and core objective, posed the main research questions, and presented the disciplinary analysis criteria of Fabian along with Kuhn's theory of disciplinary evolution. It also provided the justifications behind this research.

Chapter Two presents the two literature frameworks underpinning this research; it is interdisciplinary in nature as it combines the schools of thought encompassing SCM and KM. Section 2.1 is dedicated to the core underpinning framework of this research, the foundational constructs behind the development of SCM. This section reveals the commonly accepted discourse of SCM via a contextual background and discussion of the practical forces driving the evolution of the 'supply chain' into the strategic concept of 'supply chain management'. Through this, the normative orthodoxy that pervades SCM deliberations is presented; this normative approach is at the core of the debate surrounding SCM's disciplinary identity. Sections 2.2 and 2.3 provide the second underpinning framework of this chapter and are dedicated to examining the inherent complexities existing within the nature of 'knowledge'; addressing this school of thought mitigates several issues. Concerns as to the ability to determine and examine a body of knowledge are addressed through detailing the complexity of the 'knowledge' domain (Section 2.2), while justifications as to the specific aspects of 'knowledge' utilised and examined in this research are presented (Section 2.3). Overall, these two sections enable a complete conceptualisation of the determinants behind Fabian's criterion (b) – knowledge.

Chapter Three constitutes a major component of this thesis as it theorises the disciplinary analysis framework that informs this research. Section 3.1 presents the core assumptions and deliberations of Fabian and Kuhn in the development of the disciplinary analysis framework. First, the core assumptions of Fabian's three disciplinary analysis criteria (coherence, knowledge and quality) are discussed to mitigate a lack of in-depth substantiation of each criterion and to position them so their influences and interactions are ascertainable. Second, the core assumptions of Kuhn's theory of disciplinary evolution are discussed. The evolutionary process is deemed dramatic for its effect on a discipline's scholars, for they undergo an ideological and political conversion as their discipline evolves. Consequently, application of Kuhn's theories to Fabian's criteria enables the mapping of SCM's core characteristics to provide vital insights into the field's evolution over time and enables this research to explore and expose the implications and limitations of SCM within the bounds of a discipline. Sections 3.2 to 3.4 constitute a pre-test for consistency within the purposes of this research of Fabian's three criteria, permitting further development of the core research questions into sub-research questions.

Chapter Four is dedicated to the research methodology and processes behind this research. The chapter begins by discussing the philosophical and practical implications of the 'paradigm wars' (Section 4.1). Section 4.2 elucidates the lens of pragmatism informing the research process, as it is through enumeration of pragmatism's ontological and epistemological positioning that the research design is conceptualised. Section 4.3 presents the method of data collection utilised in this research with a discussion of content analysis, focusing on its origins, principles, criticisms, and procedural relationship with pragmatism. Section 4.4 discusses pertinent aspects of carrying out the research with details as to the phases undertaken; from identification of relevant publications, designation of the unit of analysis and category specification, and coding scheme generation, to pilot testing. The process of data collection, the legitimisation of the research via the ensuring of validity and reliability, and the specific analyses undertaken on the data are also discussed.

Chapter Five constitutes the second major component of this thesis as it presents the results of the data analysis process. The chapter begins by exploring the distribution of the 1,371 articles over the 11-year period to differentiate distinct periods of article activity (Section 5.1). This process enables specific periods of disciplinary evolution (as per Kuhn's conceptualisations) to be identified and then utilised as the basis for subsequent data analysis. The quantitative and qualitative data gained through the content analysis process enables the exploration and portrayal of SCM's characterisation by academia and practice in determination of SCM's disciplinary identity. Specifically, Fabian's three criteria are analysed in Sections 5.2 through to 5.4 in determination of whether sufficient indicators of coherence, a unified body of knowledge, and quality exist within the texts. Overall, SCM's disciplinary identity is characterised and formulated over time via distinct periods of evolution.

Chapter Six constitutes the final chapter of this thesis with major findings being summarised. The chapter begins by reflecting on the research in terms of the contributions of academia and practice to SCM's conceptualisation through answering the three core research questions developed in Chapter 1 (Section 6.1), while the benefits and contributions (for academia and practice) of undertaking this research are also discussed (Section 6.2). Following these sections, a critical discussion of the limitations of this thesis in terms of its research approach, data collection technique and analysis procedures occurs (Section 6.3). Finally, closing comments revolving around the future direction for SCM specifically, and OM in general, are discussed (Section 6.4). Figure 1.1 depicts the overall structure of the thesis.

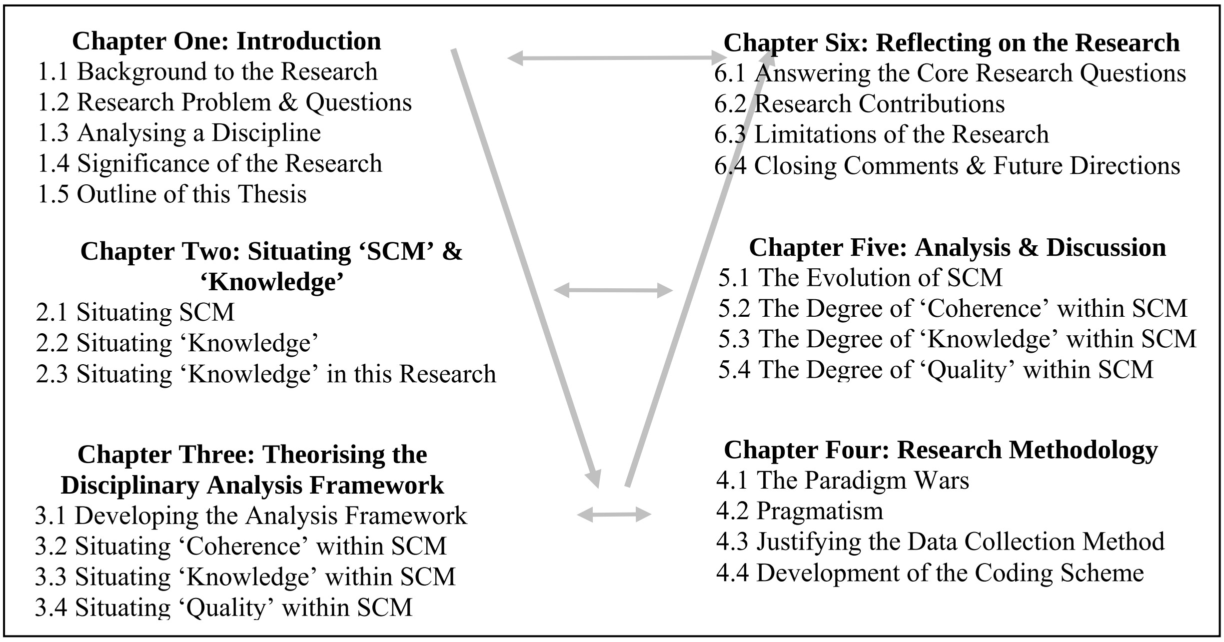

Figure 1.1: *Structure of the Thesis*[1]

(Source: adapted from the 'V' model developed by Sheffield, 2004)

[1] Where relevant the source of the Figure or Table is stated below the title. Where no source is provided the Figure and Table is the author's own work.

Chapter Two: Situating 'Supply Chain Management' and 'Knowledge'

Having established the background and scope of this research, the emphasis now moves to reviewing pertinent literature pertaining to the two frameworks that underpin it. The first literature framework underpinning this research reveals the commonly accepted discourse existing within academic literature through presenting the foundational issues that have influenced the direction of SCM. Acknowledging the various influences that have created a fractured domain provides necessary grounding in the debates surrounding the myriad attempts of SCM to align itself as a discipline. From these foundational issues the arguments as to the normative orthodoxy existing within SCM are presented.

The second literature framework establishes the nature of knowledge and its inherent complexities, providing an appreciation as to why 'knowledge' is a difficult domain to conceptualise and thus utilise as a basis for investigation. Fabian (2000) drew heavily upon Tsoukas (1994) to develop an understanding of the concept of knowledge, although her subsequent discussion featured only limited in-depth analysis. The primary architect of Tsoukas's argument was in turn Stephen C. Pepper, who in 1942 published '*World Hypotheses: A Study in Evidence*'. The 'root metaphor method' conceived by Pepper formed the basis for Tsoukas's framework for reducing and categorising the various types of knowledge produced in management studies. This research contends that using a technique such as reductionism to diminish the inherent complexity of knowledge to an austere four-box framework fails to address the richness of its abstract nature. Knowledge is a social process built upon the transferability of concepts via multiple channels; being a social process, it is conceptualised from multiple philosophical perspectives (Ahmed, Kok, & Loh, 2002). Subsequently, Section 2.2 acknowledges this inherent complexity through providing an examination of its development, while Section 2.3 situates knowledge within the bounds of this research.

Overall, Chapter Two reflects the interdisciplinary nature of this thesis as it combines the core assumptions from SCM and KM to provide a platform for the theorised disciplinary framework presented in Chapter Three (see Figure 2.1).

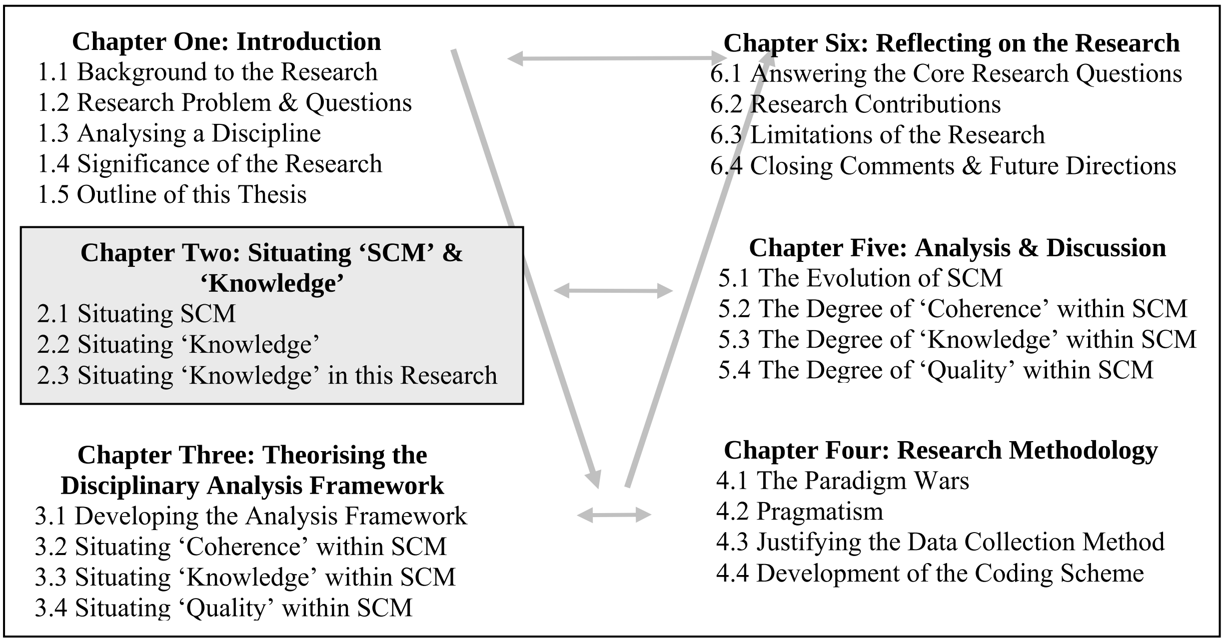

Figure 2.1: *Structure of the Thesis Featuring Chapter Two*

2.1 Situating 'Supply Chain Management'

> Supply chain management is *far too important* to be considered either a temporary fad or a parochial arena for a guild of specialist researchers… my concern is not with methodology per se, but with the problem of defining the conceptual boundaries of supply chain management as a field of study. This issue is important because it determines the type of questions that may be posed, the type of methodologies that are applied and the fundamental purpose of the research (New, 1997, p. 15. italics in original).

As a holistic and integrative approach, SCM provides practical and strategic applications for generating competitive advantage (Hobbs, 1996; Lambert, Cooper, & Pagh, 1998; Larson & Rogers, 1998; Min & Mentzer, 2000; Skjoett-Larsen, 2000). However, it is maintained that SCM has a generic status for a philosophy whose specific goal is to increase profitability and competitive advantage via the implementation of systematic processes (Svensson, 2002b). Consequently, the literature has evolved in a multitude of directions; it has been argued that the current concept may merely be an attempt at reunification of earlier concepts (Gripsrud, Jahre, & Persson, 2006). As such, evident within the literature are streams of thought pertaining to the ambiguities and contradictions inherent within the SCM concept.

In keeping with New's sentiments, this section addresses the second literature framework of this research through situating SCM contextually. In doing so, the historical motives that have influenced SCM's direction and contributed to the tension evident within the literature are highlighted. Furthermore, the ideology (and accompanying discourse) that pervades SCM is questioned for the role it plays in the ongoing debate surrounding SCM’s disciplinary identity. This section investigates how SCM evolved from the foundational concept of the ‘supply chain’ (Section 2.1.1), details the debate surrounding reification of the ‘supply chain’ definition (Section 2.1.2), and discusses the normative orthodoxy pervading an SCM conceptualisation (Section 2.1.3).

2.1.1 The Evolving Supply Chain

According to Ballou (2007) there is no documented historical record that can withstand scientific scrutiny to enable validation as to what occurred, why and when. Nevertheless, examination of the literature suggests several phases of development of the supply chain from its humble beginnings as a motivator for the movement of local farm produce, through to its current day operational focus (see Leenders & Fearon, 2008 for a detailed discussion). It is not the place of this research to offer a full historical record of human development; hence, the following discussion bases itself around those issues pertaining to the immediate development of the supply chain concept as it enables insight into the founding ideologies that culminate in a SCM conceptualisation.

The first phase, commonly agreed to be pre-1950s, sees the field revolving around two streams of thought. The first utilises militaristic thinking with a focus on the material and personnel required for a well-run facility (Ballou, 2007), while the second is orientated around the movement of farm produce from gate to plate (Kent & Flint, 1997). Kent and Flint (1997) state that these two streams should be regarded as separate eras of development, with agriculture preceding military influences. However, they overlook the fact that human history is littered with stories regarding military campaigns across vast distances, and also that since time immemorial agricultural produce moved around the world carried by traders and explorers (albeit slowly relative to today’s terms). Hence, it is more logical to regard the first phase as a combination of both military and agricultural influences. Nevertheless, in the opinion of Gripsrud et al. (2006) the pre-1950s were dormant years as there was no strategic orientation to logistics; subsequently there was little reason to research such a time-period. Nonetheless, this thinking is flawed, as it is illogical to conclude that developments within the militaristic and agricultural spheres over the past centuries have not influenced the direction and strategic benefits of operational logistics. Thus, it is suggested that the supply chain during this phase was orientated around the physical processes undertaken in moving goods in a timely manner.

Irrespective of when the first phase began, the decade between 1950 and 1960 is accepted as the second phase of development. It was a period where manufacturers followed mass production strategies with the focus being to minimise per unit cost. Touted as the main operations strategy to follow, the goal was on building competitive advantage; there was very little focus on either product or process flexibility (Tan, 2001). Subsequently, the mass production strategies resulted in new product development (NPD) being slow and undertaken exclusively in-house with whatever level of technology, technological skill and capacity the organisation had at the time. Inventory was utilised heavily to cushion bottlenecks and quality-related issues, resulting in a massive dollar investment in work-in-progress (WIP) for the organisation (Slack, Chambers, & Johnston, 2007). The strategic considerations of organisations revolved around adversarial encounters and lowering of costs; subsequently, the purchasing department served the needs of production with marketing focused on pushing inventory (Farmer, 1997). Consequently, the term 'physical distribution' gained acceptance due to the desire to keep costs low (Gripsrud et al., 2006), which generated interest amongst academics as the total cost perspective came to dominate thought (Ballou, 2007). Thus, a cost perspective is added to the physical movement of goods and further develops our conceptualisation of the supply chain.

The third phase (1960s to mid-1970s) moved the total cost focus to one of a systems perspective (New, 1997). By now the term 'business logistics' was gaining popularity and was seen as a simple way of distinguishing between military and business approaches to logistics strategy (Ballou, 2007). The systems perspective allowed organisations to focus on integrating the traditionally isolated areas of an organisation with the focus of lowering associated costs, the outward movement of products being the prime motivator (Simchi-Levi, Kaminsky, & Simchi-Levi, 2003). Management began to observe the financial constraints placed on the organisation by the cost of inventory and the impact of WIP on manufacturing costs. Subsequently, materials requirement planning (MRP) was introduced resulting in lower costs, increased quality, faster NPD and delivery lead-times (Singhal, Singhal, & Starr, 2007; Slack et al., 2007). Therefore, an integrative perspective (albeit internal to the organisation) was added to the conceptualisation of the supply chain.

Seeing in the dawn of SCM, the final phase of supply chain development occurred in the 1980s. Increased global competition forced organisations to offer low-cost, high-quality, high-reliability products requiring greater design flexibility within product and manufacturing processes (Singhal et al., 2007). MRPII (manufacturing resource planning) was introduced to improve overall organisation performance and enable effective competition. Other processes such as JIT (just-in-time), TQM (total quality management), kanban, and lean manufacturing were becoming popular and pioneered improved manufacturing efficiency and cycle times (Slack et al., 2007). With the introduction of JIT, the manufacturing environment became fast-paced and required closer relationships with suppliers for success, for as inventory levels decreased there was nothing to cushion production, scheduling or quality problems. The end result was the realisation of the potential benefits of strategic collaboration with suppliers (Bowersox, Closs, & Cooper, 2002; Simchi-Levi et al., 2003). Subsequently, the professionalisation of purchasing to procurement occurred with related experts in logistics, transportation and warehousing merging to form one profession that incorporated physical distribution and transportation functions (for example integrated logistics providers known as 3PL) (Bowersox et al., 2002; Simchi-Levi et al., 2003). Therefore, the final element added to our conceptualisation of the supply chain is that of external integration with immediate suppliers.

Overall, the supply chain has transitioned from a transporter of products to a more sophisticated and integrated concept within the organisation. As the organisation's goal is to develop processes to gain competitive advantage in an increasingly global marketplace (Porter, 1985), the developments within the supply chain concept have pioneered the utilisation of information technologies to enable integration (Lancioni, Smith, & Schau, 2003b). Consequently, it is logical to argue that these developments occurred via external sources orientated around the practitioner sphere of operation, rather than the academic sphere. Thus, the following section investigates the issues surrounding academics' attempts to define this practitioner-orientated concept.

2.1.2 Reification of the Supply Chain

The developments occurring within practice heightened the interests of academia, with debate centred on the exact wording of a 'supply chain' definition. Although this section could proffer a range of definitions, with one selected as being 'the definition' that covers all eventualities, this section instead examines the debate behind the forming of an academic supply chain definition, for it is this debate that ultimately provides insight into the problematic issues surrounding the disciplinary identity of SCM.

A canvassing of the literature indicates that Mentzer et al. (2001) are regarded as being the definitive guide to supply chain definitions. Their article suggests that during the 1990s it was easy to identify definitions of the 'supply chain', as authors discussed the merits of focusing on the physical movement of products through nodes of interconnected organisations. However, New (2004) has argued that the concept of the 'supply chain' is more than that of being something that is socially constructed (also see New, 1997). Instead, he asks, "What interests are being served? What function does the concept fulfil? Why take what could be treated as a series of independent commercial relationships, and construe it as a 'supply chain' entity?" (New, 2004, p. 70).

By deconstructing our assumptions New challenges our inbuilt belief that there is a 'right' supply chain definition (and hence the rest are obviously flawed), and shifts the focus to one of questioning why the concept is so popular amongst practitioners and academics in the first place. Subsequently, New draws upon arguments based in the social sciences regarding 'socially constructed' reality, to offer the argument that reification has occurred in regards to the concept of the 'supply chain' (briefly, reification is the act of considering abstract thought as concrete or material). New argues that his claim is easily evident within the literature. For instance, there are three structures commonly touted as modelling the 'supply chain' (see Mentzer et al., 2001). According to New (2004), the mere act of representing such structures via a visual depiction (see Figure 2.2) or linguistics, creates a 'virtualism' of what the world ought to be, not what it is. Therefore, what begins as an attempt to represent simplistically what may be occurring is taken as reality:

> …what may begin as a tentative and simplified abstraction for the conceptual convenience of academics can rapidly translate into a normative trope; mediated by the way 'knowledge' is represented in academics papers, textbooks (and maybe policy papers and newspapers editorials), a speculative model can rapidly make the transition between 'might be' to 'ought' (New, 2004, p. 72).

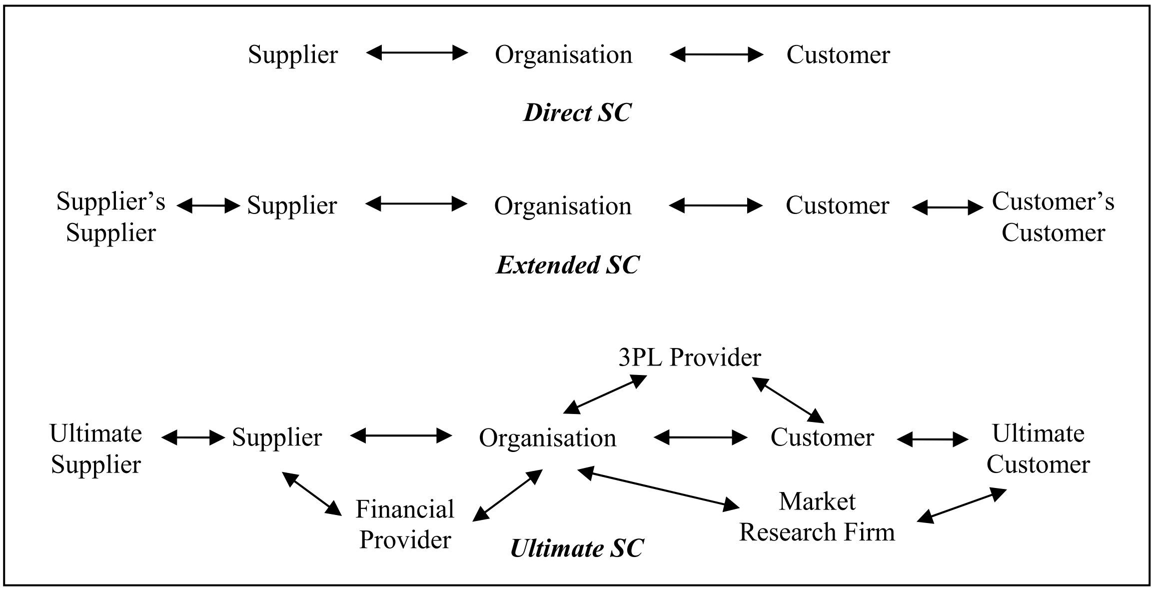

Figure 2.2: *Types of Supply Chain Relationships*

(Source: adapted from Mentzer et al., 2001)

Within the literature every organisation is argued to have or be part of a supply chain, whether it wants to manage it or not. Knowing the structural make-up of the chain that your organisation belongs to is hyped as being both strategically and operationally sound. Consequently, definitions abound describing the dynamics of the linkages binding organisations together into a single entity (see Table 2.1 for a sample of supply chain definitions). However, it is through examination of these definitions that the point that New was communicating regarding a normative view is evident. For instance, through the use of metaphor we have such words as 'chain', 'node', 'link', and 'channel' moulding our perceptions of what is actually occurring, and like blinkers on a horse, blinding us to the inherent complexities of the process through a tunnel-vision approach of the way ahead.

Table 2.1: *Concepts Covered within a Supply Chain Definition*

a network of organisations from upstream suppliers to downstream customers, that focus on providing value at each linkage in the form of products or services until it reaches the ultimate end consumer (Christopher, 1992, p. 12).
With the new information technologies impacting on the 'supply chain' concept, the modern definition is one that must now encompass the virtual ether, as the traditional supplier driven concept moves into the market driven environment enabled by IT (Christopher, 2004, p. 51).
a network of entities that started with the suppliers supplier and ended with the customers customer (Lee & Ng, 1997, p. 94).
a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer (Mentzer et al., 2001, p. 4).
the chain linking each element of the production and supply process from raw materials through to end customer (Scott & Westbrook, 1991, p. 23).
The supply chain is a system, the constituent parts of which include suppliers, production facilities, distribution services, customers linked together via the feed-forward flow of materials and the feedback of information (Towill, Naim, & Wikner, 1992, p. 3).

The consequence of having such metaphorical definitions is that crucial to the process of understanding are the unquestioned assumptions (both academic and practitioner) that we all operate within. Unknowingly colouring our perceptions of a definition, such assumptions serve to legitimise the concept-loaded terminology utilised (New, 2004). For instance, the term 'chain' brings to mind a linear length of strong oval shaped links; however, our understanding of reality is that organisations operate from a more interconnected position, linked to a multitude of other organisations or individuals via formal and informal relationships. Even the term 'integrated' has its own connotations, with New (2004, p. 82) stating that it is implicitly understood to be something 'good', and hence not integrating is perceived to be 'bad' (see also Mouritsen, Skjoett-Larsen, & Kotzab, 2003):

> The words are seductive: it seems obvious that an integrated system must be more efficient than a fragmented one. Who can be against 'integration', or for disintegration of boundaries? The language of the supply chain is appealing both for what it promises and what it seems to be against.

Although the terminology may be enthralling, the term 'supply chain' operates from a pivotal point in the literature, seeking to portray simply a concept that in reality can be complex.

Overall, the arguments presented from New indicate that perceiving an abstract concept such as the 'supply chain' as being something of material existence results in a normative orthodoxy. Through this normative perception, what a supply chain ought to be dominates thinking and overrides what is actually occurring in reality. Subsequently, it is the contention of this research that the same has transpired within SCM, ultimately resulting in questions as to its disciplinary identity. Hence, the next section presents how SCM evolved from the supply chain concept and brought with it the problematic issues of a normative tension and ultimately the issue of reification.

2.1.3 The Normative Orthodoxy Operating within Supply Chain Management

Most researchers contributing to the body of work surrounding SCM take the position that as a strategic entity SCM has logically evolved from the supply chain; consequently, there are accepted paths of evolution. It is commonly agreed that Oliver and Webber (1982) first coined the term ‘supply chain management’. However, the fundamental principles of SCM can be identified within Systems Integration theory, the significant changes that occurred within industrial operations, and in the developments within logistics and channel research (Dubois et al., 2004; Svensson, 2002b). Overall, there is one goal: To integrate all elements of the supply chain for ease of managerial oversight.

It is readily accepted that SCM is advocated to be a complex philosophy focusing on value-adding rather than cost-adding activities (Cavinato, 1992; Harland, Lamming, & Cousins, 1999; Lamming, 1996; Mohanty & Deshmukh, 2000; Wisner & Tan, 2000). Various influences converge to form an environment ripe for developing the ‘supply chain’ concept in the direction of a strategic entity (Tan, 2001; Zokaei & Hines, 2007). Consequently, the new millennium saw in the next phase of SCM development as there was a drive by management to increase the efficiency and value-added processes of the entire chain, not just that of an individual organisation. Resulting in seamless integration of an organisation’s systems with suppliers’ and distributors’ systems, information technology was in its element as the prime driving force behind such integration with a focus on serving the needs of the ultimate end consumer (Lummus & Vokurka, 1999a). Managerial oversight thus dictated the high degree of administrative control necessary for success.

Nonetheless, just like the supply chain concept, reification and normative orthodoxy dominate SCM thinking. Figure 2.3 provides a visual representation of the commonly accepted traditional SCM model. SCM is represented as a network of interconnected or related organisational systems. Collaboration between partners is regarded as essential to co-ordinating and managing all activities throughout the supply chain.

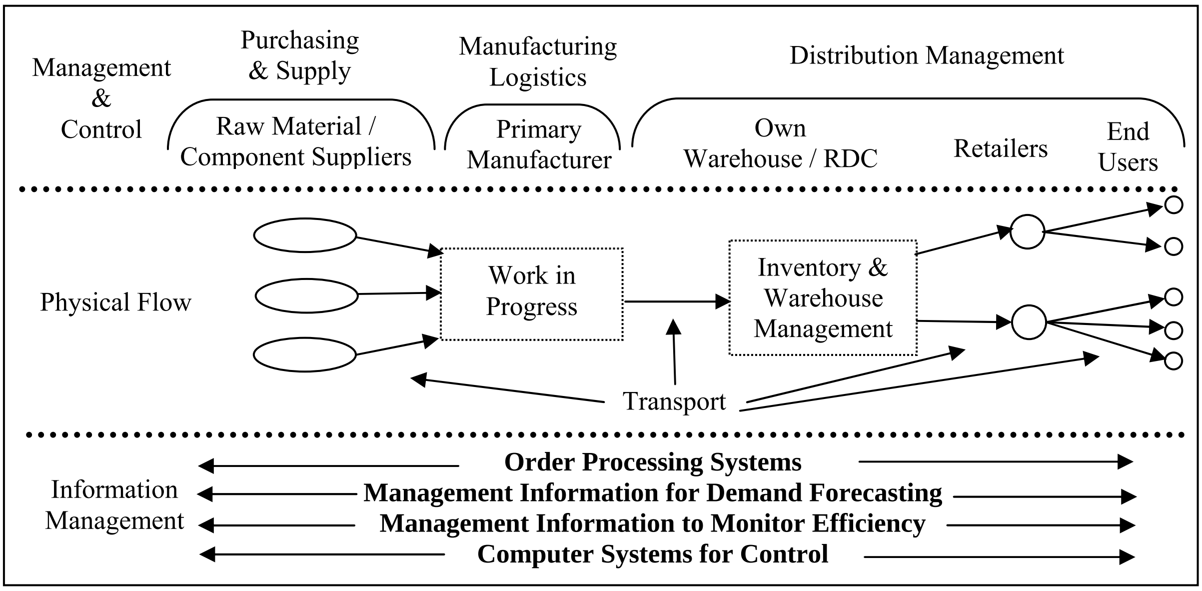

Figure 2.3: *Taylor's Representative Model of SCM*

(Source: adapted from Taylor, 1997)

Information technology has literally reinvented the practicalities of SCM, with the new networking technologies enabling the required collaboration via real-time communications (Lancioni et al., 2003b). There is a belief that in the context of SCM, organisations must adopt and adapt to the advancements in information technology to benefit fully from efficient and timely information transfer. Failure to do so is regarded as isolationist. Consequently, leveraging information technologies is argued to gain competitive advantages through a revolution in the very nature of an organisation's products and services, as well as via the means in which they are marketed, purchased and transported (La Londe & Powers, 1993).

The normative view holds that SCM has transformed from a traditional transaction-based orientation to an alliance-based orientation. Long-term mutually beneficial relationships rather than short-term profit or cost-orientated relationships between businesses are argued to be the key to future success (Christopher & Ryals, 1999). A high degree of information sharing is required between both buyer and supplier for the relationship to flourish beneficially. Ultimately, the goal is the development of collaborative advantage, not just competitive advantage (Chen & Paulraj, 2004; Storey, Emberson, Godsell, & Harrison, 2006).

Consequently, the scope of management activities increases as traditional operational processes give way to new strategic visions and alliances. It is argued that business goals shift from departmental efficiencies to encompassing the entire supply chain (Ross, 1998). Procedural improvements move from a focus on reducing internal costs to ensuring the entire supply chain progresses through cooperation on product development, as well as alignment of organisational objectives and strategies.

Developments in management scope and the change in how suppliers are viewed occurs due to a realisation and improved understanding at the executive level as to the increasing strategic significance of SCM (Bechetel & Jayaram, 1997). In particular, there is a need for organisations to improve relationships, from adversarial dealings to more congenial collaborative affairs that benefit all. The increasing power of the customer's 'voice' forces organisations to listen and respond instantly if they are to compete successfully (Ross, 1998). Accordingly, the popularity of SCM amongst executives has resulted in increased levels of research (Carter, Carter, Monczka, Slaight, & Swan, 2000; Ellram, Zsidisin, Siferd, & Stanly, 2002; Lummus, Vokurka, & Alber, 1998; Mentzer et al., 2001; Shah & Singh, 2001).

It is the view of this author that it is difficult to argue with such a utopia. Although the evolution of SCM shows a logical sequence of events, it can be argued that it is too ideal, too much of a perfect panacea for the issues organisations face in today's globally competitive marketplace. Subsequently, within the academic literature there is a degree of 'this is what organisations ought to do' to achieve competitiveness, rather than what they are actually doing. As such, New's (2004) concerns surrounding a supply chain definition and the normative orthodoxy advocated are also similar within the evolution of SCM. Nevertheless, a key query is whether this nirvana is challengeable. In answer, it is the goal of this thesis to challenge the status quo and its synthetic reality to ascertain a true account of SCM's conceptualisation from an academic and practitioner perspective.

In summary, this section situates SCM contextually through addressing the ideological stance that exists within the literature. The common belief is that through applying SCM, organisations should be able to utilise newly-developed methods of governance and information technologies to meet customer demands quickly and accurately in real-time (Cousins, Lawson, & Squire, 2006; Tan, 2002; Thomas & Griffin, 1996). This normative orthodoxy has continued relatively unchallenged for over 20 years. Nevertheless, arguments from New (2004) suggest that failure (by academics) to fit into the accepted prescription of SCM is strategically unsound and isolationist; he holds that reification has occurred. So how does this affect the SCM body of knowledge?

As individuals, people know that they know 'knowledge' (in this instance, knowledge of SCM), but how do they transfer that knowledge to other individuals? This question drives the remaining two sections of this chapter, because neither organisations nor industries can transfer knowledge, while publications are merely storage mechanisms. Accordingly, knowledge is transferred amongst individuals discussing ideas with colleagues; reading books, articles, and manuals; internalising what they have heard and seen; and through this process of internalisation employ a dialogue bounded by their own conceptual lenses. It is necessary to therefore digress at this stage and examine the conceptualisations surrounding 'knowledge' before returning to its application within this research.

2.2 Situating 'Knowledge'

Throughout the plethora of literature surrounding knowledge (and its management), the concept is quickly reduced to its practical implications. It has been argued that addressing the concept in detail is an unnecessary condition for research (Grant, 1996b). However, this thesis dismisses Grant's claim as erroneous because 'knowledge' is inherently complex due to the variety of philosophical and practical approaches competing to dominate its conceptualisation.

Embracing a wide-ranging brief, this section spans both the academic-practitioner orientation and the philosophical-managerial orientation toward metaknowledge. It presents a logical progression from understanding knowledge in its abstract form through to illustrating the social processes behind knowledge at work. An understanding as to the diversity of the domain and the inherent problems associated with discussing a body of knowledge is proposed. This section explores the philosophical underpinnings of knowledge (Section 2.2.1), introduces its modern understandings (Section 2.2.2), reveals its boundaries (Section 2.2.3), and evaluates the implications of treating knowledge as a resource versus as a process (Section 2.2.4).

2.2.1 A Philosophical Perspective

Many philosophers through the years have attempted to answer the question 'What is knowledge?' It is not the place of this research to reiterate the full enormity of the historical philosophical arguments. Instead, a platform from which the broader domain of knowledge can be understood through the diverse notions that exist, and have existed, within society and ourselves is intended. In doing so, this research seeks to challenge the inherent assumptions as to what it is individuals believe constitutes knowledge and to provide a basis for understanding how these assumptions have dominated society, moulded perceptions and beliefs, and dictated the paradigms individuals utilise. This section also seeks to address a fundamental flaw that became evident upon investigating the KM domain: That of a general failure to address the basic precepts of what constitutes 'knowledge' before embarking on discussions on how it can be managed, exploited, enhanced, created or transferred.

As evidenced throughout human history, individuals in various societies have constantly asked the question 'What is knowledge?' and 'How do we know what we know?', and from that what does it mean when an individual says 'they know something'. These seemingly innocent statements have philosophically altered an individual's perceptions, beliefs and justifications of themselves, and the world around them, to the extent that there is no one answer. Instead, throughout the ages multiple interpretations have been proffered, building on the thoughts of previous thinkers and philosophers, with believers and detractors adding to the breadth and depth of the topic via generational debates. As a result, a systematic progression is evident throughout history as to what actually constitutes 'knowledge', how individuals acquire it, and what they then do with that knowledge once acquired.

Before examining the philosophy behind historical and modern thought on the concept of 'knowledge', it is useful to ascertain the various views held. A search of any dictionary illustrates the diverse explanations utilised to define the term 'knowledge'. The Wordsworth Dictionary offers several facets, namely that it is 'assured belief', 'that which is known', 'instruction', 'enlightenment', 'learning', 'practical skill' and 'acquaintance'; while to be knowledgeable is to 'possess knowledge' and be 'intelligent'. The Oxford English Dictionary meanwhile offers a comprehensive list ranging from 'the facet of recognizing', 'to notice and observe', 'state of being aware', through to 'perception of fact or truth'.

It is not just in dictionaries where differences are observed, as various languages offer alternative means of defining knowledge. For instance, the Greeks have three concepts: *Episteme* refers to universal scientific knowledge; *techne* refers to skills and practical rationality – it is pragmatic and context-dependent and orientated towards production; while *phronesis* is commonly referred to as practical reason, common-sense or wisdom and the ability to apply such knowledge in any given situation (Aristotle, 1998; Habermas, 1971; Spender, 1996b; Styhre, 2003b, 2004; Townley, 1999; Tsoukas & Cummings, 1997). Foucault (1972) writes that the French word *connaissance* refers to expert knowledge within a specific field, while Styhre (2003b, p. 51) adds that it is "specialized, discursive knowledge that is continuously being developed". Both indicate that *savoir* refers to knowledge that is more abstract and as such is similar to the Greek *episteme*. The German language also perceives a difference, with *konnen* referring to "the capacity of doing certain things and being aware of practical concerns", and *wissen* being more directed towards "scientific, proposition-based knowledge" (Styhre, 2003b, p. 51; see also The Oxford English Dictionary).

What these linguistic interpretations offer that the English language does not is an acknowledgement of the variations inherent within the concept of 'knowledge', such as our skills, experiences, beliefs and general expertise. As such, these other languages offer analytical tools to enable distinctions to be made between abstract and practice-based aspects of knowledge, although Styhre (2003b) states that the distinctions should be between the ontological, epistemological and scientific aspects of knowledge. Nonetheless, irrespective of any linguistic interpretations, there are inherent assumptions behind the arguments surrounding what should constitute 'knowledge' philosophically.

Pick up any philosophy text on knowledge and the same issues are presented, usually with a distinction provided between classical and contemporary sources. Multitudes of influential thinkers are heralded as evidence of the vastness of the topic at hand and the debates that have raged over the centuries. The term 'knowledge' has quite a few different linguistic nuances to it, however philosophical distinctions are more attuned to addressing such questions as 'How do we know anything?', 'What is human knowledge?' and 'What are the sources or origins of human knowledge?' (Lehrer, 2000; Moser, Mulder, & Trout, 1998; Moser & Vander Nat, 2003). Furthermore, de Saussure's (1959) work in linguistics offers a logical system for examination of the concept of 'knowledge' along two axes. Synchronically depicts the static state of the concept viewed from one perspective, while diachronically is everything that has to do with the concepts evolution, or as Styhre (2003b) argues, through a historical analysis of its development.

Basic distinctions of knowledge are usually made along several evolutionary lines, with philosophers adopting various stances within each area (Craig, 1998; Lehrer, 2000; Morton, 2003; Moser et al., 1998; Moser & Vander Nat, 2003). Empirical (or a posteriori) knowledge depends on sensory experience for its justification or evidence. Empiricists believe that sensory experience is the source of an individual's knowledge regarding reality, whether that is through direct sensory experience of simple concepts (i.e. cat, dog, curved, or house) or indirect sensory experience of a complex concept (i.e. electricity, star, government, or atom)

(Morton, 2003; Moser & Vander Nat, 2003). Aristotle for instance argued that *phronesis* or practical reason as he called it, was therefore the most important source of knowledge an individual could utilise (Aristotle, 1998).

Non-empirical (or *a priori*) knowledge depends on what is termed 'pure reason' or 'pure understanding', for instance knowledge of mathematical or logical truths, and is predominantly based on Kant's work. According to Morton (2003) this type of knowledge is known in advance of evidence. Rationalists therefore believe that non-empirical reason is the source of all our knowledge; for example, Plato believed that the knowledge an individual has is based on the recollection of ideas, and thus everything that is learnt is based on various forms of recollection (Moser & Vander Nat, 2003). This is illustrated in Plato's *Meno* with Socrates asking a slave boy a series of questions regarding mathematics. The slave boy had no formal instruction and yet was easily able to answer correctly, leading Socrates to conclude that the slave boy's knowledge was innate, not empirically learned (Moser et al., 1998; Moser & Vander Nat, 2003; Styhre, 2003b).

Knowledge by description (propositional knowledge) is essentially knowledge of a truth, or in other words knowledge that 'something is the case' (Craig, 1998). Ryle (1949) proffered the term *know-that* for this ability to acquire information about the world, while Moser et al. (1998) state that it is justified true belief and as such is expressed as a declarative statement. Therefore, belief is seen as a necessary condition for knowing something; for example, "It would be odd indeed for you to claim to know something but deny believing what you allegedly know" (Moser et al., 1998, p. 15).

Knowledge by acquaintance (non-propositional knowledge) is regarded as being based on awareness of a 'thing', and does not necessarily involve a truth (Craig, 1998). According to Bertrand Russell (2003, p. 241), non-propositional knowledge is "anything of which we are directly aware, without the intermediary of any process of inference or any knowledge of truths".

Knowledge of how to do something, according to Ryle (1949, p. 41, italics in original) can be simply termed *know-how* and is characterised as: "We learn *how* by practice, schooled indeed by criticism and example, but often quite unaided by any lessons in theory". Ryle provides the example of children playing a game, and believes that knowledge of *how* to play is illustrated in the moves made, avoided, or conceded…even if children cannot articulate the rules of the game, they still know *how*.

The philosophical issue that has generated numerous debates within the distinctions above revolves around the key concept of how an individual can have *a priori* knowledge without sensory experience. Philosophers argue that there are several conditions – known as the tripartite analysis of knowledge (Lehrer, 2000; Moser, 1987; Moser et al., 1998) – that must be met when discussing 'knowledge', with the first being the *belief* condition. Moser and Vander Nat (2003, p.2) state "Knowledge requires belief, but belief does not require knowledge". They offer the example that an individual can know that there are nine planets in the solar system[2], but not actually believe it. They state that "people [can] believe things that they do not know or that are even false" (Moser & Vander Nat, 2003, p. 2), leading to the two other necessary conditions that of the *truth* of what is believed and the *justification* or evidence for what is believed. The question then becomes one of justifying the belief of that knowledge, independent of any sensory input, through asking can that justification be true. Hence, the term 'justified true belief'.

An alternative philosophical perspective originates from the works of William James, Charles Pierce and the *American Pragmatist School of Thought*. To pragmatists, knowledge encompasses all that which is of practical use (James, 1931), rather than a formulated reality based on propositions (Styhre, 2003b). Cook and Seely-Brown (1999) extend this view by adding that pragmatists are more concerned with knowing, which they understand to be dynamic human action, rather than a static abstraction. According to Goodman (1995), pragmatists regard theorists as oversimplifying concepts via reductionism, with the view that any abstract conception misleads rather than enlightens. Therefore, to a pragmatist, individuals who know a subject via their skills and expertise enjoy a more intimate relationship with the peculiarities and particulars of the subject than a theorist ever can.

Philosophically it is evident that these debates on what constitutes knowledge have raged unresolved for centuries. However, developments within information and communication technologies have put their own spin on what it now constitutes. There is a growing belief that

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[2] On the 24th August 2006 the International Astronomical Union (IAU) collectively agreed to a new definition of what constitutes a planet. The result was a new class of dwarf plant called 'Plutoids' after Pluto. As of 2009, there are eight planets and five plutoids in the Solar System.

knowledge can be managed and controlled in the modern sense for strategic gain and be of value to both individuals and organisations alike. Thus, the following three sections of this contextual background provide insight into modern deliberations.

2.2.2 A Modern Perspective

Scholars from economics, organisational theory, social psychology, and philosophy, to name but a few disciplines, have studied 'knowledge' extensively and in the process created a multifaceted phenomenon with a modern twist (Easterby-Smith & Lyles, 2003; Kakabadse, Kakabadse, & Kouzmin, 2003; Thompson, Warhurst, & Callaghan, 2001). Accordingly, Patriotta (2003a, p. 15) acknowledges that as a result it is difficult to "trace a genealogy of existing knowledge theories" amongst the mainstream influences.

Irrespective of this difficulty, there is a prevailing need to understand both the *characteristics* of knowledge, and the *role* it plays within an organisation, for KM encompasses various divergent trains of thought (Huysman & De Wit, 2002). One perspective considers KM to be the realm of the information and communication technology manager (Ahmed et al., 2002); a second deems it to be simply a human resource issue; while a third maintains that knowledge is intellectual capital and as such has strategic value (Huysman & De Wit, 2002). These perspectives are predominantly based on Western values and paradigms (Takeuchi, 2001). In contrast, Eastern perspectives perceive knowledge as a process and focus on evolving knowledge rather than its management (Takeuchi, 2001). Nevertheless, the key distinction between 'knowledge' and KM is that 'knowledge' is about exploration and attaining understanding, whilst KM is about exploiting and garnering value (Kakabadse et al., 2003).

As a relatively new field in organisational studies, KM has great potential for altering organisational behaviour and strategy on a massive scale. Although there is no universally agreed definition (Ahmed et al., 2002; Alvesson, 2001; Lehaney, Clarke, Coakes, & Jack, 2004), researchers concede that there are fundamental characteristics that any definition should have: a mention of business processes (Firestone & McElroy, 2005; Kakabadse et al., 2003); information technologies (Eschenfelder, Heckman, & Sawyer, 1998); knowledge repositories (Gorelick & Tantawy-Monsou, 2005); and individual behaviours (Lytras, Pouloudi, & Poulymenakou, 2002; Styhre, 2003a).

Like any new field, definitions range from the simplistic to the complex. Simplistic offerings lack specific details on what is critical and how knowledge transforms to be of benefit to the organisation or individual. KM has been defined as a "practice that finds valuable information and transforms it into necessary knowledge critical to decision-making and action" (Van Beveren, 2002, p. 18), or a "set of processes that seeks to change the organization's present pattern of knowledge-processing to enhance both it and its outcomes" (Firestone & McElroy, 2005, p. 191). Meanwhile complex definitions offer greater depth of detail:

> A framework for applying structures and processes at the individual, group, team, and organizational levels so that the organization can learn from what it knows (and acquire new knowledge if required) to create value for its customers and communities. This Knowledge Management framework integrates people, processes, and technology to ensure performance and learning for sustainable growth (Gorelick & Tantawy-Monsou, 2005, p. 126).

KM is therefore all about capturing and sharing knowledge, optimising its access from the individual to the team level, and finally making the knowledge actionable.

As has been implied, knowledge can be a difficult asset to manage, although as Gorelick and Tantawy-Monsou (2005, p. 127) point out,

> many of the other intangible corporate assets – such as reputation, brand, customer loyalty, safety and so on – are already being actively managed, with positive results. Why not knowledge?

At the very least, they suggest that the pathways (for instance information technology systems) along which knowledge flows can be managed. Hence, Styhre (2003a, p. 33) maintains KM is "a box of tools that can be used when examining the process of turning knowledge into action". However, Mason and Pauleen (2003, p. 39) believe that there can be only two approaches to KM:

- A focus on the 'hard' characteristics, namely the deployment and use of appropriate technology, or
- A focus on the 'soft' characteristics, namely the capture and transformation of knowledge into a corporate asset via the management of people and processes.

Their view is a very simplistic rendition of what many agree is a complex process.

Although understanding modern approaches facilitates the belief that knowledge holds value, the question remains as to its exact boundary. The following section therefore furthers insight into 'knowledge' through elucidating some common misconceptions.

2.2.3 The 'Knowledge' Boundary

Acknowledgement has been made by numerous authors that before knowledge can be managed its nuances, nature and characteristics must be understood (Kalling & Styhre, 2003; Lehaney et al., 2004; Styhre, 2003b; Tsoukas & Vladimirou, 2001). As knowledge is a multifaceted construct with a complex philosophical boundary, a common starting point is to specify its practical boundary through distinguishing between 'data', 'information', 'knowledge' and 'wisdom'.

Ahmed et al. (2002) define data as meaningless outputs that are symbolic representations of numbers, letters or facts. Bierly, Kessler, and Christensen (2000) agree, adding that meaning is attained via utilisation of a system of symbols and language. However, Roberts (2000) states that data has no meaning in its own right; it simply provides the raw material utilised for forming information. Subsequently, Davenport and Prusak (2000, p. 2) state that data is a set of discrete facts about various events and is usually described as "structured records of transactions". As such, data merely represents what has occurred in a specific situation or transaction; it cannot tell why that transaction occurred. However, Sanchez (2001) argues that not all aspects of an event may be recorded. As such data is "greatly influenced by the interpretive frameworks…that determine which events are noticed and how those events are represented" (Sanchez, 2001, p. 5). In other words, data is subjective and selective, with individuals and organisations interpreting data based on their own conceptual frameworks.

Sanchez (2001) argues that information is attained through the process of comparing one set of data with other sets of data, or in other words that data requires meaning to be attributed to it before it can be deemed information. Thus, individuals apply their own interpretive framework to enable comparisons and provide meaning, resulting in information that either confirms their worldview or changes it. Ahmed et al. (2002, p. 9) succinctly state that "Information is data arranged in meaningful patterns", and as such can either be complex or simple, produced quickly or slowly, be gained or lost over time, and there can also be either a small or large amount of it (Firestone & McElroy, 2005). As a result information is transferable between individuals or organisations with its meaning being determined via the receiver's existing knowledge base (Bierly et al., 2000; Bolisani & Scarso, 2000; Davenport & Prusak, 2000).

It is well-known that the distinction between information and knowledge is difficult to distinguish at times as the terms are often used interchangeably (Boisot, 1998; Kakabadse et al., 2003; Kalling & Styhre, 2003; Nonaka, 1994; Sanchez, 2001; Styhre, 2003b). Simply put knowledge is individuals interpreting information through a combination of their skills, experience, ideas, judgement, and intuition (Ahmed et al., 2002; Bhatt, 2000; Bolisani & Scarso, 2000; Roberts, 2000). Sanchez (2001) adds that knowledge can be regarded as a set of beliefs that we hold regarding casual relationships in the environment around us. These relationships must have meaning for "Without meaning, knowledge is inert and static. It is disorganized information" (Bhatt, 2000, p.90).

Boisot (1998) offers the following distinction between the three concepts of data, information and knowledge, with a further expansion into the role of the user, or agent, in a passage worthy of citing at length:

> Knowledge builds on information that is extracted from data… Data is discrimination between physical states – black, white, heavy, light, etc. – that may or may not convey information to an agent. Whether it does so or not depends on an agent's prior stock of knowledge… whereas data can be characterized as a property of *things*, knowledge is a property of *agents* predisposing them to act in particular circumstances. Information is that subset of the data residing in things that activate an agent – it is filtered from the data by the agent's perceptual or conceptual apparatus… Information, in effect, establishes a relationship between things and agents. Knowledge can be conceptualized as a set of probability distributions held by an agent and orienting his or her actions. These either consolidate or undergo modification with the arrival of new information. In contrast to information, knowledge cannot be directly observed. Its existence can only be inferred from the action of agents (p. 12).

To Boisot (1998) data is a thing, a mere observation of an occurrence that is filtered and interpreted via an individual's perceptual system, becomes information which is then utilised and acted upon and eventually becomes part of that individual's knowledge. On the other hand, Davenport and Prusak (2000, p. 5) focus on several key characteristics of knowledge:

> Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms.

Bierly et al. (2000) evolve the concept of knowledge further than that of Boisot and the others through the addition of the concept of 'wisdom' (see Table 2.2). The reasoning behind a higher-level distinction they argue is that having knowledge of an issue or a situation does not equate to acting in the best possible manner, which is why Kakabadse et al. (2003) have added several stages in furtherance of Bierly et al.'s (2000) thoughts and regard knowledge as a 'chain of knowledge flow' from data to information to realisation to action-reflection and finally wisdom. For organisations, the difference between knowledge and wisdom is the difference between achieving and sustaining competitive advantage.

Table 2.2: *The Distinctions between Data, Information, Knowledge and Wisdom*

Level	***Definition***	***Learning Process***	***Outcome***
Data	Raw facts	Accumulating truths	Memorization (data bank)
Information	Meaningful, useful data	Giving form and functionality	Comprehension (information bank)
Knowledge	Clear understanding of information	Analysis and synthesis	Understanding (knowledge bank)
Wisdom	Using knowledge to establish and achieve goals	Discerning judgements and taking appropriate action	Better living/success (wisdom bank)

(Source: Bierly et al. 2000, p. 598)

In contrast, Fuller (2002) argues that the terms information and knowledge have reversed meaning when being defined within the context of KM. He argues that traditionally within the philosophical field information was defined as "the process by which forms were transferred (or 'communicated') from one material thing to another" (p. 16), while knowledge was the minds interpretation of this process. To facilitate knowledge acquisition, individuals (or agents) need to remove the obstacles of false ideas and prejudices from their thoughts (Fuller, 2002). It is imperative to note that a key difference between Fuller's distinction and those defined and assumed within the KM field is that the traditional philosophical definitions of information and knowledge lack any deliberate action involved in acquiring that information or knowledge, whereas the modern distinction assumes that the action of acquisition is inherent in the definition.

A new way of examining these distinctions turns the traditional understandings on their head through utilising alternative terminology to the traditional 'data', 'information' and 'knowledge', with the corresponding terms being 'facts', 'influences' and 'solutions' (Hicks, Dattero, & Galup, 2006). Hicks et al. further argue that individuals create, use, and maintain knowledge and as a result, the bulk of knowledge within an organisation will lie within the individual. Encompassing the entire hierarchy is the concept of 'innovation' as "it integrates all of the other tiers, using strategy to exploit both personal and codified knowledge assets" (Hicks et al., 2006, p. 22). Their justification for such a novel approach is that their hierarchy offers practitioners a realistic method for analysing and understanding knowledge along with its transfer systems, within the organisation. Thus, knowledge transfers out of the realm of the academic through embracing its practical orientations.

Irrespective of which definition is utilised, the advent and continued development of technology to collect and manage 'data', 'information', 'knowledge' and 'wisdom' refines and moulds an individual's perceptions in this modern age. According to Munro (2001, p. 199), it has "become commonplace to suggest we live in an information society", and as such individuals become integrated through various forms of electronic media. Images, text and sound are digitally reproduced for consumption; however, Munro (2001) believes that this integration is simulated, as data must be stored (usually separately from the system used for analysis) before it can be called upon as information and finally interpreted by the user or agent into knowledge.

Earlier, Davenport and Prusak (2000) touched on the issue that knowledge is embedded in documents or repositories within an organisation as well as in the organisational routines and practices. According to Blackler (1995, pp. 1023-1026) there are various characteristics of knowledge existing: Embrained, embodied, encultured, embedded and encoded. The first three distinctions are internal to the individual and relate to conceptual skills (embrained), sensory experience (embodied) and cultural meaning systems (encultured). The final two relate to knowledge residing in external systems such as formal procedures and systematic routines (embedded), and texts such as articles, manuals and codes of practice (encoded).

According to Styhre (2003b), scholars have a tendency to regard knowledge in a light-hearted manner, although he does not advocate that the concept should be a privileged one and only the domain of the philosopher. Instead, Styhre offers the opinion that knowledge is a complex notion with multiple facets that require clear delineation before delving into any possible management. Hence, it is common to see reference to the tangible and intangible aspects of knowledge employed for strategic gain.

2.2.4 Knowledge as an Asset versus Knowledge as a Process

Thus far, this chapter has presented a conceptual background to conceptualising knowledge through providing philosophical arguments, introducing KM as the modern day equivalent, and then providing a boundary to its practical aspects. This last section of the situational background addresses the perception that knowledge is either a resource or a process.

Knowledge as a resource (resource based value – RBVK) equates to a static commodity that can be used, traded and exploited (Grant, 1996a, 1996b; Liebeskind, 1996; Suddaby & Greenwood, 2001), whereas *knowledge as a process* (process based value – PBVK) is the outcome of socially constructed beliefs and interactions between individuals during normal day-to-day relationships (Ahmed et al., 2002; Bhatt, 2000; Choo, 1998; Hansen, Nohira, & Tierney, 1999; Seely-Brown & Duguid, 2000). Orlikowski (2002) regards these two perspectives as taxonomic (knowledge as a set of discrete elements that can be classified) and integrated (knowledge as a process that naturally occurs between individuals).

RBVK is heavily based on the strategic management literature and its view of resources (Earl, 2001; Kalling & Styhre, 2003; Lowendahl, Revang, & Fosstenlokken, 2001; Mowery, Oxley, & Silverman, 1996; Nonaka & Takeuchi, 1995; Spender, 1996b). RBVK emphasises that knowledge should be regarded as an asset within an organisation or industry, and like any asset must be identified so that mechanisms and routines can be implemented for its effective management (Davenport & Prusak, 2000; Empson, 2001). Most theorists that adopt the RBVK perspective utilise effective management principles to argue that it is the organisations themselves (not the individual) that are the mechanisms for the creation and utilisation of knowledge (Barney, 1991; Conner & Prahalad, 1996; Grant, 1996a).

RBVK lends itself to the observation that knowledge is a commodity that is objectively definable (Empson, 2001), and as a result exchanges of knowledge by individuals can be regulated through an internal market (Davenport & Prusak, 2000; Szulanski, 1996). RBVK is orientated around the organisation (or industry) being the organism that transfers knowledge capabilities, renews the knowledge base after the exchange, and measures the knowledge assets that are held via a high investment in IT (Alvesson, 2001; Hansen et al., 1999; Spring, 2003; Swan & Newell, 2000). According to Hansen et al. (1999) RBVK equates with their view of a 'codification strategy', in which knowledge resides within IT systems and databases, resulting in easy dissemination amongst a multitude of individuals. Overall, it can be argued that RBVK holds true to its economic foundations, adopting a functionalist approach that places the organisation as the core area of interest.

The alternative view, PBVK, emphasises that knowledge is a process that cannot be viewed or analysed as an objective reality. Instead, researchers operating within this paradigm argue that knowledge is a social construct which can only be developed, transferred and maintained in a social setting (Alvesson, 2001; Berger & Luckman, 1967; Bhatt, 2000; Blackler, 1995;

Empson, 2001; Tsoukas, 1996). Individuals situated within organisations seek to demonstrate their expertise and knowledge in a topical area via this social setting, enabling them to achieve acknowledgement via public legitimatisation of their unique knowledge (Alvesson, 2001).

The objective of PBVK is to focus and understand the ways and means behind knowledge creation, articulation, transfer and legitimisation between individuals. Emphasis is placed upon the actual process of interaction between individuals and the role this plays in the creation and dissemination of knowledge (Alvesson & Karreman, 2001; Seely-Brown & Duguid, 1991). Overall PBVK holds with its sociological foundations and has an interpretive approach to investigating knowledge. The individual is central to the operating context of the social and organisational environment (Bhatt, 2000; Choo, 1998; Empson, 2001).

Although it is simple to understand the differences between the two perspectives that exist (see Table 2.3), researchers differ on what each may mean in regards to an overall theory on knowledge. As a result, combining the two perspectives into one overarching *knowledge-based theoretical view* (KBV) and thereby sidestepping any debate that is occurring between the two perspectives is common (Conner & Prahalad, 1996; Grant, 1996b; Kogut & Zander, 1992; Styhre, 2003b). Thus, it is normal to identify both perspectives in any discussion on knowledge, although it is argued that they are one combined entity.

Table 2.3: *Knowledge as an Asset versus Knowledge as a Process*

	Knowledge as an Asset (Resource-based view)	***Knowledge as a Process (Process-based view)***
Purpose of Research	Normative To identify valuable knowledge and to develop effective mechanisms for managing that knowledge within organizations.	Descriptive. To understand how knowledge is created, articulated, disseminated, and legitimised within organizations.
Disciplinary Foundations	Economics	Sociology
Underlying Paradigm	Functionalist	Interpretive
Epistemological Assumptions	Knowledge as an objectively definable commodity.	Knowledge as a social construct.
Models of Knowledge Transmission	Exchanges of knowledge among individuals are governed by an implicit internal market within organizations.	Knowledge is disseminated and legitimated within organizations through an ongoing process of interaction among individuals.
Main Levels of Analysis	Organization and its knowledge base.	Individual in social context.

(Source: Empson, 2001, p. 813)

Nevertheless, it is widely claimed that as a resource an organisation's knowledge is now considered to be as important as, if not more important than, the traditional resources of land, labour and capital towards gaining competitive advantage (Grant, 1996b; Patriotta, 2003a; Thompson et al., 2001). Knowledge, taken from an organisational perspective (the knowledge situated within the domain of the organisation), rather than the relational perspective (the relationships that the individual creates with their knowledge, both within and without an organisation) (Huysman & De Wit, 2002), is argued to be a commodity in its own right able to be stored, traded, redefined and enhanced (Spender, 1996b; Styhre, 2003b). However, Styhre (2003b, p. 11) argues that this modern and extremely popular perspective "may cause more harm than good" through the simplistic view adopted for a concept that in actuality is a complex construct. As such, the KBV is an attempt to encompass all strands of thought on 'knowledge' into one perspective. Although dominated by aspects of RBVK it suggests that both perspectives (RBVK and PBVK) are required to depict the complexity that is inherent within 'knowledge' conceptualisations.

In summary, Grant (1996b) argued that understanding the full richness of knowledge was not essential for research; instead, utilising a narrow conceptualisation was sufficient. However, as the preceding discussions in this section have shown, knowledge has an inherent complexity and richness to it that requires acknowledgment before any application can be entertained. Philosophically, knowledge is a diverse concept with a rich history built upon generational debates. In practice, knowledge is characterised as an object able to be managed either as an asset or as part of a process. Most researchers contributing to the field of metaknowledge adopt the position that any conclusive conceptualisation as to what constitutes knowledge is likely to fail, for disagreement abounds due to the variety of philosophical and lexical traditions competing to dominate its development. As Section 2.2 has illustrated, the multitude of diverse elements that contribute to our understandings of knowledge is not easily captured in a succinct set of statements. However, failure to engage in the full enormity of the concept limits researchers to a mediocre comprehension. Subsequently, in answer to Grant (1996b), it is the position of this thesis that there is a fundamental requirement to understand and perceive the full richness and depth of knowledge before ascertaining its influence and impact in a study.

This section has addressed the weakness in Fabian's deliberations surrounding criterion (b) – knowledge. Building upon this contextual account, the following section addresses specific aspects of knowledge that inform this research into SCM, thereby further facilitating construction of a platform for the theorised disciplinary analysis framework discussed in Chapter Three.

2.3 Situating 'Knowledge' within this Research

It is argued that conceptual lenses are not formed in isolation, as discursive practices ensure compliance through articulation of the correct norms of behaviour. Harre and Gillett (1994, pp. 28-29) write that a discursive practice "is the use of a sign system, for which there are norms of right and wrong use, and the signs concern or are directed at various things". Consequently, knowledge is what it is by virtue of its particular context. The knowledge that individuals know and the form that it takes are intimately related to the context; ultimately, knowledge is built upon the discourses in which individuals participate.

According to Tsoukas (1996), it is through socialisation that individuals learn discursive practices. However, as this section will show, all discursive practices have articulated and non-articulated elements. This section builds on the contextualisation of knowledge developed in the preceding section to address elements of knowledge that pertain directly to this research. Specifically, this section explores the depth of knowledge held by individuals through tacit and explicit forms (Section 2.3.1), examines how that knowledge is transferred (Section 2.3.2), and then reflects on the core issue of this research, namely the discursive practices employed by academics and practitioners, first, through addressing perceptual differences and then via addressing SCM directly (Section 2.3.3).

2.3.1 Tacit and Explicit Forms of Knowledge

Situated within any discursive practice are two elements of discourse; the tacit and the explicit. Michael Polanyi is commonly agreed to have been the first to coin the term 'tacit knowledge'. Tacit knowledge is not easily visible or expressible, is highly personal to the individual and as such is hard to formalise (Nonaka & Takeuchi, 1995). Consequently, tacit knowledge is difficult to communicate and hence is limited in its ability to be shared with others (Nonaka, Toyama, & Konno, 2000). Choo (1998, p.111) adds that it is "hard to verbalize because it is expressed through action-based skills and cannot be reduced to rules and recipes". Basing his argument on riding a bicycle, Polanyi illustrated how an individual has an ability to undertake complex tasks but an inability to fully express to others how they achieve them (Mooradin, 2005; Polanyi, 1958, 1966; Polanyi & Prosch, 1975).

Most researchers contributing to this body of work take the position that tacit knowledge is learned through the physical process of undertaking and experiencing a task (Bhardwaj & Monin, 2006; Kakabadse et al., 2003; Patriotta, 2003a). The more experience individuals have with a task and the more familiar it is to them, the greater the likelihood that the outcome will be successful. Thus, the individual can make intuitive judgments regarding the successful completion of the task or activity (Choo, 1998). Consequently, it has been argued that tacit knowledge is very biased towards and deeply rooted in an individual's belief system, as it is formed on the backbone of previously held personal knowledge and experience (Roberts, 2000). Craig (1998) accordingly argues that tacit knowledge is fundamental to an individual's ability to know something; as a result Polanyi (1969) believed that all knowledge was inherently tacit in nature, which harks back to his oft-quoted statement "*we can know more than we can tell*" (Polanyi, 1966, p. 4, italics in original).

The school of thought surrounding tacit knowledge defines it as knowledge that is unable to be codified, formulated or expressed in a manner which another individual can follow, understand, and utilise to repeat the task or activity (Bhardwaj & Monin, 2006; Boiral, 2002; Bolisani & Scarso, 2000; Hislop, 2002; Lam, 2000; Nonaka et al., 2000; Patriotta, 2003a; Spender, 1996a; Tsoukas, 2003; Williams, 2006). However, there is lively debate surrounding the exact boundary of tacit knowledge (Boisot, 1998; Nonaka & Takeuchi, 1995; Styhre, 2003a, 2003b, 2004; Takeuchi & Nonaka, 2004). According to Boisot (1998, p. 57, italics in original) there are three distinct variants of tacit knowledge:

- Things that are not said because *everybody* understands them and takes them for granted, knowledge of them has been consciously or unconsciously internalized over the years.
- Things that are not said because *nobody* fully understands them, they remain elusive and inarticulate.
- Things that are not said because while some people can understand them, they cannot costlessly articulate them.

Boisot (1998) argues that Polanyi dealt primarily with the second type of tacit knowledge, while Nonaka and Takeuchi argue for the third type. Subsequently, Nonaka and Konno (1998, p. 42) offer an alternative with only two dimensions to tacit knowledge:

- The technical dimension, which encompasses all types of informal personal skills or crafts and is often referred to as 'know-how'.

- The cognitive dimension, which consists of beliefs, ideals, values, schemata, and mental models which are deeply ingrained in us and which we take for granted.

Due to the disparity regarding the exact boundary it can be argued that tacit knowledge can best be understood not as per the variations above, but by simply appreciating that there is a difference between an object or task and the subsequent description of that object or task (Stenmark, 2002). When individuals say that they cannot describe an object or task, they are really meaning that to describe it sufficiently requires that the listener is as familiar with the concepts that they use to describe it, as they are themselves. The second requirement is that the listener or receiver needs to understand fully the context surrounding the object or task, or as Choo (1998, p. 117) writes, "the social and physical dimensions of the setting".

The counterpart to tacit knowledge is explicit knowledge. Deemed to be formal and systematic, explicit knowledge is expressed in words and numbers and is thus easily transferred via the vehicle of articles, books and manuals (Bhardwaj & Monin, 2006; Bolisani & Scarso, 2000; Nonaka & Takeuchi, 1995; Nonaka et al., 2000; Patriotta, 2003a; Takeuchi & Nonaka, 2004; Williams, 2006). According to Choo (1998, p. 112) there are two variations of explicit knowledge:

> It is object based when the knowledge is codified in strings of symbols (words, numbers, formulas) or in physical objects (equipment, documents, models)…[It] is rule based when the knowledge is codified into rules, routines, or standard operating procedures.

Stenmark (2002) furthers Choo's thoughts by stating that explicit knowledge is that knowledge which can be made manifest. As such, explicit knowledge is knowledge that is easily disseminated to a much wider audience than tacit knowledge could ever be.

Research into explicit knowledge usually adopts a systematic view, with faster response times and a lowering of the knowledge transaction price being the main objectives (Keskin, 2005). Of importance is the issue of individuals and organisations easily accessing this knowledge with a focus on the utilisation of information technology to reduce the complexity of access and allow multiple and simultaneous use. Hence, an individual's efficiency is increased through effective and efficient use of readily available explicit knowledge (Markus, 2001).

Irrespective of the various views on tacit and explicit forms of knowledge, it is how they interrelate that is of interest to this research, with two schools of thought dominating the extant thinking. Most researchers contributing to the first body of work take the position that they are categories with their own distinct features (see Table 2.4), while researchers contributing to the second body of work hold the position that they merely exist along a continuum, and thus an individual can use elements of both to varying degrees.

Table 2.4: *Features of Tacit and Explicit Knowledge*

Features	*Tacit Knowledge*	*Explicit Knowledge*
Content	Non-codified	Codified
Articulation	Difficult	Easy
Location	Human Brains	Computers, Artefacts
Communication	Difficult	Easy
Media	Face to Face Contact, Story Telling	Information Technology
Storage	Difficult	Easy
Strategy	Personalisation	Impersonalisation
Ownership	Organisation and its Members	Organisation Only

(Source: adapted from Jasimuddin, Klein, & Connell, 2005)

Although extremely popular amongst researchers (Jasimuddin et al., 2005) the *category perspective* is argued to be based on convenience, nothing more (Leonard-Barton & Sensiper, 1998). Cook and Seely-Brown (1999, p. 384) argue that although tacit and explicit knowledge are separate types of knowledge, each "does work the other cannot; and that one form cannot be made out of or changed into another". Thus, researchers adopting a *category perspective* seek to identify the interplay between tacit and explicit knowledge (Hedlund, 1994; Nonaka, 1994; Nonaka & Takeuchi, 1995), how an individual's tacit abilities facilitates the attainment of competitive advantage (Spender, 1996a), and how tacit knowledge is transferred from one individual to another (Roberts, 2000).

The second school of thought is the *continuum perspective*, which perceives tacit and explicit knowledge as merely being degrees of knowledge ranging from highly personal and internal to the individual, to knowledge that is codified, structured, and therefore easily available to a multitude (Boiral, 2002; Lam, 1997; Lehaney et al., 2004; Leonard-Barton & Sensiper, 1998). Kogut and Zander (1992) have argued that to move through the continuum requires an understanding as to the degree of codifiability of the particular piece of knowledge being discussed. Hall and Andriani (2003) identified several stages of understanding: From tacit knowledge, to generalisations, to taxonomies, to metaphors and analogies, and finally through to explicit knowledge.

Both perspectives have their supporters and detractors; for instance Hislop (2002), in his work on the role of information technology in knowledge-sharing processes, critiques the *category perspective* or what he calls the 'objectivist perspective' for the dichotomy it specifies between tacit and explicit knowledge, while Takeuchi and Nonaka (2004, p. 4, italics in original) proffer an interesting notion on the *continuum perspective*, by stating that "Knowledge is not *either* explicit or tacit. Knowledge is *both* explicit and tacit. Knowledge is inherently paradoxical, since it is made up of what appears to be two opposites". They further this view by stating that each requires the other before understanding is achieved; therefore, to understand tacit knowledge requires an understanding of explicit knowledge and vice versa. They are interdependent, not polar opposites.

Combining both schools of thought and moving full circle back to Polanyi's original thoughts, Leonard-Barton and Sensiper (1998) offer the view that tacit and explicit knowledge exist along a continuum, but with the further comment that there is a degree of tacit knowledge that can never be communicated (see also Mooradin, 2005). They offer the argument that an individual will always know more than they can ever say; in fact they state that people will always know more than they actually realise. This is not to say that tacit knowledge cannot be codified but rather that there is a degree of tacit knowledge that cannot yet be explicated by the individual. The process of trying to communicate this deeply personal tacit knowledge will in fact be counterproductive, as the individual will ultimately fail:

> Researchers stimulating implicit learning found, in fact, that forcing individuals to describe what they thought they understood about implicitly learned processes often resulted in poorer performance than if the individuals were allowed to utilize their tacit knowledge without explicit explanation (Leonard-Barton & Sensiper, 1998, p. 114).

Scharmer (2000) uses the phrases *embodied tacit* and *not-yet-embodied tacit* to describe the communicable and non-communicable elements of tacit knowledge (see Table 2.5). *Not-yet-embodied tacit* knowledge is a form of knowledge that is deeply personal and is, in his opinion, the embryonic stage of innovation; individuals cannot communicate it but can reflect upon it internally and thus, enhance or change their action, whereas *embodied tacit* knowledge is relatively easy to communicate via transference into explicit knowledge.

Table 2.5: *Explicit, Embodied Tacit and Not-Yet-Embodied Tacit*

	Explicit	***Embodied Tacit***	***Not-Yet-Embodied Tacit***
Form of knowledge	Knowledge about things	Knowledge about doing things	Knowing about originating sources for doing things
Data	External reality	Enacted reality	Not-yet-enacted reality
Action-reflection ratio	Reflection without action	Reflection on action	Reflection in action
Truth	Matching reality	Producing reality	Presencing reality
How do you know that you know?	Can you observe it?	Can you do it?	Can you tap into its field of emergence?
Perspective	External – view as objective reality	Internal – view as enacted reality	Both internal and external – view as not-yet-enacted reality
Subject-object relationship	Separation	Unity (after action)	Unity (in action)

(Source: adapted from Scharmer, 2000, p. 39)

Overall, it is the contention of this research that individuals are socialised into a discursive practice through forming an understanding as to the object or task being described by other individuals (their tacit knowledge), through use of language and then the reinforcement of that description via written forms of knowledge. Yet, there will always be an element of tacit knowledge that cannot be communicated in any form due to its deeply personal nature, Scharmer's *not-yet-embodied tacit* knowledge. In support of this claim, Tsoukas (1996, p. 16) states:

> For the dialogue to be meaningful to the participants and intelligible to outsiders, one needs to know the meaning of certain utterances as they tend to be used in a particular discourse over time.

Misunderstandings can occur due to a lack of common background between speaker and listener (Tsoukas, 1996), with the result being that full and complete articulation of the background and context is required for explanation to others, and for knowledge transfer to occur successfully. Accordingly, the arrow in Table 2.5 indicates that transfer of *embodied tacit* to explicit knowledge is a relatively simple process, whereas transfer of *not-yet-embodied tacit* to *embodied tacit* is reliant upon an individual's ability to articulate clearly within the discursive practice they socialise and operate within. The following section addresses how transforming embodied tacit knowledge enables successful transference and furthers understandings of the role 'knowledge' plays in Fabian's deliberations.

2.3.2 The Process of Transferring Knowledge

If there are elements of an individual's knowledge that can never be communicated to another, then the question must be asked as to how an individual transfers what they do know. As has been evident, knowledge is not formed in isolation, but rather through the interactions of individuals going about their everyday lives. This social interaction results in knowledge being deemed 'situational' as an individual's particular viewpoint provides the context for understanding. Knowledge serves to establish relationships that are never value-neutral but instead are dependent upon the situation (Kalling & Styhre, 2003; Lam, 1997; Sole & Edmondson, 2002) and the discursive practice the individual operates within, for instance a discipline or a domain of practice.

Knowledge is pervasive. Within the context of an organisation it is situated within the minds of employees and documentation such as files and reports (Hedberg & Holmqvist, 2001). It is also situated within the daily routines and operating procedures that individuals undertake. As a result, mechanisms for identifying and managing knowledge are required to enable its effective and accurate transfer between individuals, departments, or divisions. Major and Cordey-Hayes (2000, p. 413) advocate a four-stage process to work through:

- Awareness – search and scan for that which is new
- Association – recognise the potential benefits by associating it with organisational (or industry) needs and capabilities
- Assimilation – communicate these to and assimilate them within the organisation (or industry)
- Application – apply them for competitive advantage

The literature abounds with studies examining mechanisms that either enable or hinder effective knowledge transfer. Mechanisms orientated around successful transfer include having specific physical places for communicating (Nonaka et al., 2000); knowledge brokers (Hargadon, 1998); and leadership practices (Crawford, 2005; Guldenberg & Konrath, 2006; Hansen & Von Oetinger, 2001). Mechanisms that build barriers include the degree of stickiness (Szulanski, 1996, 2000; von Hippel, 1998); resource absorption capacity (Cohen & Levinthal, 1990; Van den Bosch, Volberda, & de Boer, 1999); structural ambiguities (Ravasi & Verona, 2001); translation ability (Gherardi & Nicolini, 2002); knowledge systems (Abdullah, Kimble, Benest, & Paige, 2006); cultural barriers (de Long & Fahey, 2000; Goh, 2002; Gold, Malhorta, & Segras, 2001; Lucas & Ogilvie, 2006); trust (Politis, 2003); degree of knowledge known (Baumard, 2002; Foos, Schum, & Rothenberg, 2006; Kreiner, 2002);

and motivation levels (Ardichvili, Page, & Wentling, 2003; Gupta & Govindarajan, 2000). Furthermore, individuals encounter continuous knowledge transfer through partaking in group activities (see Table 2.6).

Table 2.6: *Characteristics of an Individual's Knowledge Transfer*

Group	***Characteristics and Studies***
Communities of Practice	- Espouses an informal approach to sharing knowledge amongst members - Membership is not restricted to the traditional boundaries of the organisation; instead, members are drawn together via common interests. They are self-managed groups (Gammelgaard & Ritter, 2005; Gottschalk, 1999; Kakabadse et al., 2003; Kimble & Hildreth, 2005; Lave & Wenger, 1991; Pavlin, 2006; Wenger, 1998; Wenger, McDermott, & Snyder, 2002; Zarraga-Oberty & De Saa-Perez, 2006)
Departments	- The flow of knowledge within a department is usually higher than between departments - Technology is utilised to enhance effective communication - Cross-functionality provides a platform for leveraging internal knowledge to solve problems and make decisions (Bontis, Fearon, & Hishon, 2003; Dixon, 2000; Mohamed, Stankosky, & Murray, 2004; Swan & Newell, 1995)
Networks	- Are constructed from individuals, groups or even collectives of organisations and communities - Their purpose is to create and disseminate new knowledge. Requires development of a common language, a set of working assumptions and the building of trust amongst dissimilar people - Networks can be intentional or emergent - Positive aspects relate to improved knowledge transfer, while negative aspects revolve around network size – larger networks have difficulty with communication efficiency, developing a common language, and building social ties (Augier & Vendelo, 1999; Beesley, 2004; Brusoni & Prencipe, 2001; Clark, 1999; Dyer & Nobeoka, 2000; Echeverri-Carroll, 1999; Kogut, 2000; Schonstrom, 2005; Seufert, Back, & von Krogh, 2006; Seufert, Von Krogh, & Bach, 1999; Spencer, 2003; Spring, 2003)
Teams	- Can range from virtual teams to inter-organisational teams to geographically dispersed teams - Time barriers to effective communication between team members require unique solutions such as video documentation to ensure that knowledge is available over the lifecycle of the project - Teams require a shared identity and language for effective communication and information exchange. - Success is not the successful completion of the project, but the successful transfer of knowledge gained during the process to another team or for use in another project (Bennett & Gabriel, 1999; Gruenfeld, Martorana, & Fan, 2000; Malhotra & Majchrzak, 2004; Malik, 2004; Paulus & Yang, 2000; Postrel, 2002; Zarraga & Garcia-Falcon, 2003; Zender, Schwehm, & Wilke, 2006)

(Source: the author's own)

Effective knowledge transfer enables the creation of core competencies and competitive advantage within an organisation (Argote & Ingram, 2000; Argote, Ingram, Levine, & Moreland, 2000; Bou-Llusar & Segarra-Cipres, 2006; Leonard-Barton, 1995). Mohamed, Stankosky and Murray (2004, p. 128) write, "It is well established that knowledge in general does not obey the law of diminishing returns; the more it is dispersed and shared the more productive and effective it becomes". In regards to an individual, effective knowledge transfer offers opportunities in moving between discursive practices through both receiving and providing knowledge.

The extant literature has shown that knowledge exists in either a codified (explicit) or un-codified (tacit) state (Davenport & Prusak, 2000), although alternative terms are used (see Table 2.7). To Sanchez they are the *organisational knowledge approach* and the *personal knowledge approach* (2006), while Kalling and Styhre (2003) simplify with *practices of writing* and *practices of communication* respectively. In this research into SCM's disciplinary identity, the school of thought surrounding Kalling and Styhre's conceptualisations is of interest for its ability to articulate the transfer of knowledge accurately between individuals as diverse as academics and practitioners.

Table 2.7: *Basic Assumptions of Codified and Un-codified Knowledge*

Codified Knowledge	***Un-codified Knowledge***
Knowledge can be articulated and codified to create organisational knowledge assets.	Knowledge is personal in nature and very difficult to extract from people.
Knowledge can be disseminated (using information technology) in the form of documents, drawings, best practice models and so on.	Knowledge must be transferred by moving people within or between organisations.
Learning processes can be designed to remedy knowledge deficiencies through structured, managed scientific processes.	Learning can only be encouraged by bringing the right people together under the right circumstances.

(Source: adapted from Sanchez, 2006)

The first framework, *practices of writing*, conceives knowledge to be historical memory. It is transferable to a wider range of individuals via the ability to both write things down and break knowledge into specific categorical contexts. Through the ability to write, individuals transcend their own personal knowledge and are able to draw upon historical accounts from others. Subsequently, time and distance are no longer a barrier to the transfer of knowledge (Kalling & Styhre, 2003). Callon (2002, p. 191) states that the ability to write and codify data and information has enabled individuals to deal with complexity, for "Without tools for collecting, constructing, processing, and calculating information, agents would be unable to plan, decide or control". Hence, Kallinikos (1996) specifies two types of written knowledge that can be utilised:

- Speech-forms: Writing that represents a written transformation of speech and,

- Alphanumerical techniques: Writing that is based around words and numbers, and is utilised for recording information.

Overall, the *practices of writing* perspective advocated by Kalling and Styhre suggests that an individual's knowledge becomes universal and generalised via the codification process.

The second framework, *practices of communication*, focuses on how deeply personal tacit knowledge of a topic, subject, or area can be effectively transferred. Kalling and Styhre (2003, p. 66) write,

> Speech performance capabilities are unevenly distributed across a population. Some people may be able to give very detailed and adequate accounts of their experiences while others may be incapable of saying a lot about what they experience. Thus, tacit knowledge is a function of individual eloquence.

They further add that where the tacit element of knowledge is vital it may be extremely difficult and complicated to code and decode. Hence, they reiterate and support the thoughts of Scharmer (2000) as to the distinction between *embodied tacit* and *not-yet-embodied tacit* knowledge. Thus, this framework is supported by and extends the works of Leonard-Barton and Sensiper (1998), Spender (1996a) and Scharmer (2000).

Kalling and Styhre's frameworks are not without their detractors. Sanchez (2006) argues that the transfer of un-codified knowledge is only possible through the physical relocation of an individual with particular knowledge to the location of those who are requiring that knowledge. Consequently, although narratives such as the method of storytelling can be utilised to transfer highly personal tacit knowledge via realistic examples, the method offers not just the opportunity to add new facts and enhance the story, but also the possibility of continuing misunderstanding between colleagues. Thus, Gabriel (2000) found in his research into the use of narratives that the message played a dual role: It made sense when communicated in an oral manner, but the message was being simultaneously destroyed by the process. Consequently, Darr and Kurtzburg (2000) state that success is dependent upon the transferred verbal knowledge actually being used, not just amassed and stored. However, Patriotta (2003b) found that colleagues continue to share solutions to problems via informal networks, thereby enabling knowledge to be communicated to a larger audience in a manner easily comprehended. However, the effectiveness of the narration is reliant on the individual's ability to articulate the key issues.

In summary, it is the contention of this research that individuals perform at different articulation levels when attempting to communicate their tacit knowledge (see Figure 2.4). As a result, effective communication of tacit knowledge relies on an individual having a high articulacy level. This assertion is supported by the research of Hinds and Pfeffer (2003) who found that experts are sometimes unable to 'bridge the gap' and explain the tacit component of a task to novices. Subsequently, this thesis combines the thoughts of Scharmer's *embodied* and *not-yet-embodied tacit* knowledge, with Kalling and Styhre's *practices of writing* and *practices of communication* to develop an understanding as to the processes behind knowledge transfer. Insight into Fabian's criterion (b) on knowledge, and academic and practitioner knowledge transfer, is enabled. This thesis argues that individuals who articulate effectively have a higher chance of communicating their tacit knowledge to others, while those who cannot will always know more than they can ever effectively communicate. There is no use having knowledge if it cannot be transferred or shared with other individuals, irrespective of geographical distance or group affiliation (Becker, 2001).

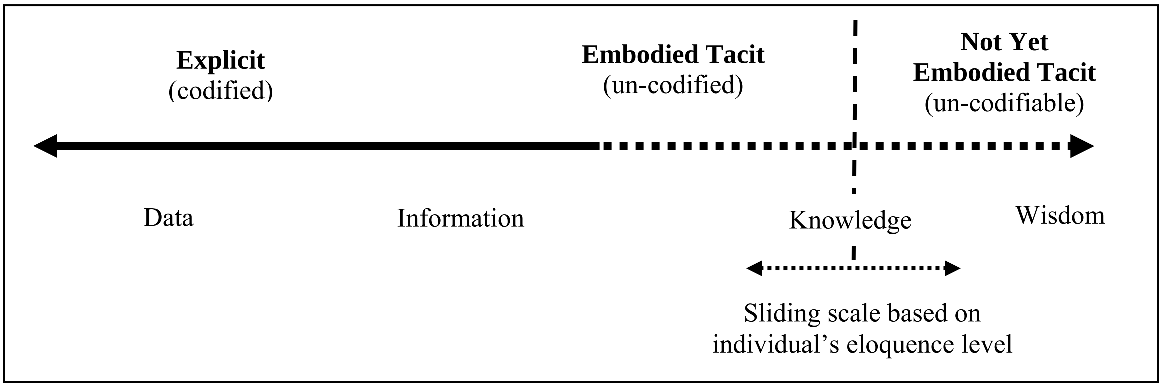

Figure 2.4: *Articulation Dependency in Effectively Communicating Tacit Knowledge*

(Source: the author's own)

Consequently, this thesis argues that to achieve full and comprehensive understanding requires that all parties in the communication process share a common conceptual framework and metaphorical language of the discursive practice. This shared discourse orientates around the codified knowledge (written forms) embedded and encoded within the discursive practice. Consequently in the context of this research, querying individuals as to their conceptualisations of SCM and changes over time would be problematic due to varying articulation levels. However, codified knowledge in the form of documents such as articles would mitigate the problematic issue of articulacy, for they must meet certain standards for publication that ensure the effective communication of the knowledge contained within.

The following section explores the ramifications of the inherent differences between academics and practitioners within a SCM context, thereby beginning the process of amalgamating the core assumptions and deliberations of the two grounding disciplines (KM and SCM) within the context of this research.

2.3.3 Academic and Practitioner Perspectives on Knowledge

As has been argued, successful transference of an individual's tacit knowledge is dependent upon their level of articulation, although it is accepted that there will always be a degree of tacit knowledge unable to be codified. Furthermore, individuals as part of discursive practices share discourses on elements of mutual interest; thus, individuals of the same community have a greater degree of success in transferring knowledge via the written form between themselves based on their shared frameworks. This section examines the various perspectives that academics and practitioners hold in regards to developing a body of knowledge within the context of SCM.

Most researchers contributing to this body of work take the position that academics and practitioners utilise different key concepts to develop a body of knowledge (Baldridge, Floyd, & Markoczy, 2004; Ho, 2000; Starkey, Hatchuel, & Tempest, 2009). Academics focus heavily on defining and classifying a concept to unearth its complexities and reduce it to a measurable state, while practitioners focus on the pragmatic outcomes of leveraging a concept for competitive advantage (see Ahmed et al., 2002; Argyris & Schon, 1996; Baldridge et al., 2004; Tsoukas & Cummings, 1997). The result is that knowledge of a particular concept diverges depending on the focus of the communicator, the type of message being transferred and in response to the views of the audience. Tsoukas (2003, p. 412) provides a possible explanation for this:

> …as common experience can verify, the knowledge people use in organizations is so practical and deeply familiar to them that when people are asked to describe how they do what they do, they often find it hard to express it in words.

It can be postulated then, that academics base their research on knowledge from individuals who have difficulty in conceptualising and verbalising the knowledge they have due to the innate nature of that knowledge (see Fuller, 2002). Naturally, several questions arise in relation to this phenomenon: What is it about practitioner knowledge that makes it hard to describe to academics? Why is practitioner knowledge conceptualised differently to academic knowledge? How do the two communities communicate if both find it difficult to actually say what they do and explain it to the other?

To further understanding, Tsoukas and Cummings (1997) provide a possible explanation. They write that the formal-cum-abstract knowledge of academia is regarded as being more privileged than that of the knowledge held by practitioners (see also Baldridge et al., 2004; Spender, 1996b). Tsoukas and Cummings (1997) base their argument on the fact that evident within many organisational studies has been an increasing awareness that the formal-cum-abstract knowledge of academia is of limited utility to practitioners (see also Argyris & Schon, 1996; Baldridge et al., 2004; Nonaka, 1994; Seely-Brown & Duguid, 1991; Starkey et al., 2009; Weick & Browning, 1986). The argument utilised to back up this incompatibility is that historically organisational studies have been shaped through an aspiration by theorists to conceive of it as a science, with an underlying order to the variety of issues witnessed within an organisation. Organisations are seen as abstract systems with sets of rules that operate under the norms of rationality (Argyris & Schon, 1996; Baldridge et al., 2004). As Tsoukas and Cummings (1997, p. 664) state,

> The promise was seductive: peel away the contingent, historical, context-influenced, and time-dependent features of organizations and you will grasp their pure, intrinsic properties.

Throughout this scientific focus validity was established and regularities were codified, with the emphasis (and assumption) being that practitioners could use such filtered rules with confidence. Through it all the decontextualized ideal was upheld, and formal-cum-abstract knowledge was perceived as being more privileged (in regards to practical knowledge), with the result being that practical knowledge was discounted (Argyris & Schon, 1996; Baldridge et al., 2004; Starkey et al., 2009; Tsoukas & Cummings, 1997).

Consequently, Kreiner and Schultz (1993) identify that collaboration between academics and practitioners is successful when communication is informal, rather than formal. Furthermore, Seely-Brown and Duguid (1998, p. 102) write that although it is relatively easy to transfer "knowledge among groups with similar practices and overlapping memberships", it is a completely different issue to attempt to transfer it between heterogeneous parties. Their research indicates that success depends upon the degree of formality in the lines of communication between members of these parties. Social networks play a key role in this success, as they are easier to establish and maintain, whereas formal lines of inquiry require substantive negotiation and ongoing maintenance to be successful communicators and transferors of knowledge.

It was Lave and Wenger who first coined the term *communities of practice* in regards to this social ability of individuals to transfer and diffuse knowledge amongst other like-minded individuals (Lave & Wenger, 1991; Wenger, 1998; Wenger et al., 2002). The phrase has come to identify any groupings of individuals who come together to exchange ideas and brainstorm issues and problems typical to their fields of expertise. As such, these communities transcend traditional boundaries. Approaches to these *communities of practice* are evident as industry associations for practitioners, and conferences for academics. Both use publications such as trade journals and academic journals for the documentation and communication of information and practices, resulting in the further dissemination and transfer of knowledge to a much wider community.

Nevertheless, although there is evidence to suggest the potential for knowledge transference between academia and practice, current arguments indicate otherwise. The *European Business Review* attempted to address the 'gap' between theory and practice in the overall management domain (Brennan, 2008; Brownlie, Hewer, Wagner, & Svensson, 2008). They found that the rhetoric surrounding the two terms created a perception that 'theory' and 'practice' were somehow different, and hence bore no resemblance to each other. Although academics would write stating their research was of interest to practice, reality dictated otherwise.

Specifically within the SCM domain, JSCM held a special forum on the gap between research and practice. The focus was to draw attention to this issue and provide tangible suggestions as to how the identified chasm could be closed (Carter, 2008a). Acknowledged thought-leaders contributed with three main themes emerging. First, both methodological rigour and practical relevance were required for research to be considered 'good' (Mentzer, 2008); second, an emphasis was to be placed on the communicative issues facing academic-practitioner interactions (Flynn, 2008; Hutt, 2008); and finally the practical implementation of research findings be addressed seriously, rather than in a superficial cavalier manner (Dess & Markoczy, 2008). Such themes are indicative of the incompatibility of applying the formal-cum-abstract knowledge of academia to the real world requirements of practice.

In furtherance to understanding why there was a gap, Carter (2008b) discussed how it might be due to two issues: Knowledge production, and knowledge transfer. It being a new domain Carter argues that SCM scholars desire to be perceived as legitimate, and hence adopt and follow criteria as defined by fields that are more scientific. Knowledge production within SCM therefore involves meeting the scientific criteria as established by older more established and reputable disciplines. This thesis argues that knowledge transfer is positioned within the context of interactions between SCM-orientated scholars only, with practitioners being excluded from the dialogue. This results in closed-loop research systems that self perpetuate the status quo of a gap between academic and practice (see Vermeulen, 2007).

The underlying insinuation from such studies into the gap is that academics must maintain rigour at all costs; although there is acknowledgement that relevance (possibly by utilising practitioners for the development of research questions) will enhance the domain. This thesis argues that such short-term thinking by academics is flawed, as having a closed-loop research system perpetuates self-interest, bias, and narrow thinking via a failure to acknowledge the actual messy realities of practice. Hence, it is the aim of this research to examine both academic and practitioner thought on SCM knowledge via publications, and through that combined knowledge resolve SCM's disciplinary identity.

In summary, this section situates knowledge within the bounds of this research through addressing specific elements of interest. Through combining the deliberations of Scharmer with those of Kalling and Styhre, it is the contention of this research that individuals have varying degrees of articulation levels, which influence the degree of success with regard to knowledge transfer. According to Harre and Gillett (1994), the extent of what an individual knows can be understood through realising that they are part of a discursive practice. Hence, all that they know is formed within the bounds of the discourse in which they are part of, as they conform to its behavioural norms. Subsequently, it is evident that academics and practitioners operate from differing perceptual camps when approaching knowledge. Application to the area of interest within this research, SCM, illustrates that there is considerable debate and dialogue from academia on how to achieve union. The argument presented by this thesis is that perpetuating a closed-loop research system is self-limiting to academics and of no realistic benefit to practitioners. This research holds the position that as both academics and practitioners contribute to the development of SCM, both communities' thoughts (collected within their publications) require accessing to enable the formation of a holistic body of knowledge, and in doing so determine SCM's disciplinary identity.

2.4 Summary

This chapter establishes the two underpinning frameworks of this research through reviewing the foundational constructs behind SCM along with pertinent literature surrounding the concept of 'knowledge'; as such, this thesis is interdisciplinary in nature. Thoughts and arguments from key scholars highlight several significant aspects existing within both frameworks. The first literature framework addressed the evolutionary processes behind SCM through examination of its development from the operational concept of the 'supply chain'. Thus, Section 2.1 situates SCM within a contextual background in preparation for investigation within the bounds of this research. Specifically, it is apparent that a normative orthodoxy pervades the SCM academic literature, with what 'ought' to be occurring dominating literary discussions, providing a panacea for any organisation's ills.

Section 2.2 answers Grant's (1996b) contention that it is not essential to address the full inherent complexity of knowledge. Arguing that it is only through acknowledging and accepting the richness that contributes to our individual and societal perceptions on 'knowledge', Section 2.2 holds the position that there is a fundamental requirement for any research utilising the domain for investigatory purposes to address its full range of contextual complexities before implementing a research program. Section 2.3 provides the second element of this framework via situating 'knowledge' within the realm of this research. Through combining Scharmer's conceptualisations on the explicit and tacit mix with Kalling and Styhre's thoughts as to the process of knowledge transfer, it is suggested that individuals have varying degrees of articulation ability that influence the success of knowledge transfer. The domain of SCM is utilised to illustrate that the discursive practice that individuals are part of underlies what they know. As such, academics and practitioners approach 'knowledge' via an orientation around their own particular discourse.

In conclusion, it is the belief of this author that advancing a topic requires constant challenging of existing assumptions. To that end, the following chapter develops the theoretical foundation behind this research through providing insight into the disciplinary analysis framework utilised to enable a challenging of the status quo.

Chapter Three: Theorising the Disciplinary Analysis Framework

> When the discipline converges too far or fast on a single perspective, empirical results become narrower and conflicting; each new set of results gives little new light on the scientific "so what?" of management research and becomes meaningless if it seems increasingly disconnected with experienced reality. In contrast, a proliferation of theoretical perspectives without any cohesion leaves researchers unable to discern the pragmatic "what's what?" Theory again turns meaningless when constantly contradicted, disparaged, or upstaged by vying theories and paradigms.… Although the debate is complex and, yes, can be tiresome, we need to take the debate personally, because in the end it is as personal as it can be: it is our science and our profession (Fabian, 2000, pp. 366-367).

Attention now turns to discussing the theoretical foundation that informs this research through theorising on the disciplinary analysis framework. As the quotation by Fabian indicates, debates as to disciplinary identity need to be taken personally, due primarily to the threat of disconnect between theoretical assumptions and experienced reality. Acknowledgement as to the power of such debates is required as their positive influence facilitates development of meaningful research. The objective of this research is to gain insights into SCM's disciplinary identity by ascertaining the core conceptualisations of SCM; this may be accomplished through analytically mapping their evolution.

Chapter One presented the perspectives of seminal contributors to the dialogue surrounding the analysis of a discipline. Popper suggests that knowledge can only be developed via a falsification process; thus, knowledge with its hypothetical characteristics must be tested, refuted, refined, and further tested in an ongoing spiral of challenge (Popper, 1959). Lakatos suggests a differentiation between the 'hard core' and the 'protection belt' of a discipline, informing scholars via specific rules as to which paths of research should be avoided (the negative heuristic) and which to follow (the positive heuristic), maintaining protection of the hard core of the domain (Lakatos, 1970).

While Popper's focus is on the activities surrounding research and Lakatos' on a discipline's research programmes, it is the offerings from Fabian and Kuhn that are of particular relevance to this research. Fabian provides insight into the characteristics that epitomise the essence of a discipline, while Kuhn theorises on its evolution; combining their approaches produces a suitable basis for developing a disciplinary analysis framework.

As this framework's core elements derive from the work of Fabian and Kuhn, a profound review of their core assumptions and deliberations is mandatory. Section 3.1 discusses Fabian's thoughts surrounding the three criteria for ascertaining a discipline's characteristics, followed by Kuhn's thoughts on the evolution of a discipline over time. These seminal works are then combined to ground the disciplinary analysis framework utilised in this research.

Further refinement of the framework occurs in Sections 3.2 through 3.4, as each of Fabian's criteria are situated within the context of SCM thought, providing a pre-test for consistency within the purposes of this research. Section 3.2 refines criterion (a) – coherence – through examining the debates surrounding SCM's definition, its terminology, and its theoretical development. Section 3.3 provides insight into criterion (b) – knowledge – through asking what constitutes SCM's breadth of knowledge, the elements that constitute its depth and its conceptual framing. Finally, Section 3.4 addresses criterion (c) – quality – through asking whether articles are addressing rigour or relevance, and then whether academics and practitioners can mitigate these influences through publishing in each other's publications.

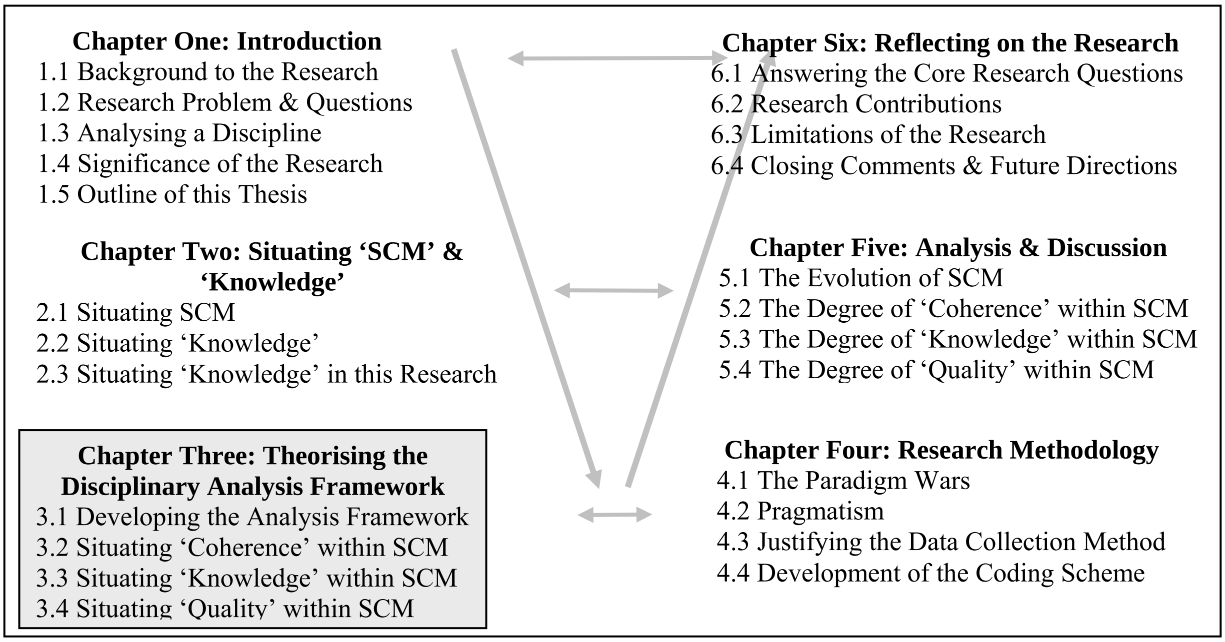

Figure 3.1: *Structure of Thesis Featuring Chapter Three*

3.1 Developing the Disciplinary Analysis Framework

This section provides an analysis of the core assumptions of Fabian and Kuhn. As such, it proposes the theoretical foundation of this research through the development of a disciplinary analysis framework, which is utilised to explore and expose the implications and limitations of a failure to frame SCM within the identity and bounds of a discipline. The first section presents Fabian's thoughts as to the elements unique to a discipline through discussing her conceptualisations surrounding the characteristics of coherence, knowledge and quality (Section 3.1.1). Fabian's thoughts are extended through application of Kuhn's theories on the evolutionary nature of a discipline and the forces that act upon a discipline to cause change (Section 3.1.2). Finally, the key deliberations and interactions of Fabian and Kuhn are offered via a graphic depiction of the disciplinary analysis framework employed in this research (Section 3.1.3).

3.1.1 Fabian's Criteria for Ascertaining a Discipline

In her acclaimed article, *Keeping the Tension: Pressures to Keep the Controversy in the Management Discipline*, Fabian suggests that arguments surrounding what research actually is are confused with arguments surrounding what is productive or unproductive research (Fabian, 2000). Within any domain, there is ongoing debate between issues of a disciplinary nature and those of a paradigmatic nature. Arguably, this ongoing debate reflects that scholars lack criteria for differentiating between the various discipline types that exist, as well as being ignorant as to why these different types continually arise (Fabian, 2000).

In addressing the debate as to whether researchers are disagreeing as to discipline, paradigm or even theoretical progress, Fabian formulates a typology of approaches orientated around three specific criteria; namely, the degree of coherence, knowledge and quality evident within a domain. However, Fabian imposes a limiting factor through a failure to provide any in-depth discussion surrounding the substantiation of these criteria. Instead, she acknowledges that their generation occurred after reviewing over 30 articles where the aforementioned arguments repeatedly arose. Consequently, although central to the typology of approaches the three criteria that characterise a discipline are unsubstantiated to any degree.

According to Fabian (2000) criterion (a) examines the degree of coherence within a discipline and can be differentiated via three elements: solidarity (an emphasis towards a unified single paradigm); integration (some coherence via a few paradigms); and segregation (no dominant paradigms at all – complete fragmentation). As a spectrum, criterion (a) is firmly positioned by Fabian within the debates that raged as to the benefits and detrimental effects of measuring and ascertaining 'coherence' within a domain. Subsequently, the well-documented debate between Pfeffer and Van Maanen on coherence within the broader management domain captures Fabian's thoughts (Pfeffer, 1993, 1995; Van Maanen, 1995a, 1995b). Pfeffer argues that the proliferation of theory and paradigms results in a diversity of ideas that culminates in a domain having a 'weed patch' versus a 'well-tended garden' or in other words segregation versus solidarity. Consequently, Pfeffer contends that such diversity is only of use if consolidation occurs at some point; otherwise, the ongoing fragmentation is detrimental to a domain. However, Van Maanen disagrees stating that there are merits of holding and utilising a variety of paradigms or theories (the weed patch), as this plurality is a more typical representation of the research arena. For Van Maanen, sympathy lies with Fabian's integration level in regards to the degree of coherence.

Pinder and Moore (1980), deliberating on the matter, found that overall debates as to the degree of coherence required within a domain are beneficial for the development of 'normal science'. Thomas and Pruett (1993) therefore believe that diverse views should be applauded for opening a domain to new thoughts and views, and hence change. Furthermore, Pilkington and Liston-Hayes (1999), studying whether production and operations management was a legitimate academic discipline or not, concluded that although a certain degree of coherence may indicate its status, disagreement at the margins indicates a healthy domain looking forward. Overall, Frost (1995) states that the debate between Pfeffer and Van Maanen enables clarification of the issues surrounding paradigm development and the level of coherence required within a domain for it to be called a discipline (see also Harland et al., 2006).

The second criterion pertains to the degree of knowledge and the purpose behind scientific research. Asking whether it is to develop the breadth or the depth of the body of knowledge, Fabian argues the pressure, either scientific (favours proliferation) or pragmatic (favours consensus) that a researcher is under, influences a discipline's body of knowledge. According to Harland et al. (2006) it is difficult to determine the value of investigating whether a domain has either a broader or deeper knowledge base as 'knowledge' is deemed an inconclusive indicator of disciplinary identity. However, a canvassing of the extant literature highlights several studies that investigate knowledge depth versus breadth to provide insight into a domain's identity. Such instances include studies exploring the nature of strategic management (Tsoukas, 1994), the required level of analysis for theory building (Klein, Dansereau, & Hall, 1994), logistics research (Stock, 1997), construction economics (Ofori,

1994) and the shaping of new research areas (March, 1996). Overall, the determination throughout these studies is that although extending the boundaries via increasing breadth is healthy for future developments, investigating concepts in a deeper manner allows for fuller theoretical advancements and conceptual understandings. (Fabian's lack of an in-depth discussion into criterion (b) leads this author to the belief that it was positioned within a limited conceptualisation of 'knowledge' – an issue that is also evident amongst other organisational studies. Chapter Two has therefore provided the prerequisite development of a full conceptualisation as to what 'knowledge' entails contextually, thereby enabling this research to determine its extent within the bounds of SCM.)

Finally, criterion (c) examines the degree of quality evident, specifically the standards taken to validate research. Fabian (2000) notes that quality can be differentiated on universal (a single standard of quality utilised to compare research) or multiple standards (a variety of standards utilised to compare different kinds of research). Examining the 'quality debate' in the broader literature provides evidence of several threads of concern, namely, the quality of the research methodologies and the quality of the publications utilised. Several studies show that academics rate methodological rigour of greater importance as an indicator of quality than relevance to the field, for instance, the quality of POM journals (Barman, Hanna, & LaForge, 2001), the value of SCM journals (Menachof, Gibson, Hanna, & Whiteing, 2009), and the evaluation criteria of purchasing and supply journals (Zsidisin, Smith, McNally, & Kull, 2007). Such discussions point towards the impact quality has on the development of theory and practice within a domain (see Harland et al., 2006).

Beliefs regarding the quality of research are reinforced by editorial boards that favour multiple method utilisation as a sign of a rigour, and justify that such triangulation equates to a (perceived) quality article for their quality journal (Boyer & Swink, 2008). In response, Singhal, Flynn, Ward, Roth and Gaur (2008) argue that it is more important to acknowledge both rigour and relevance, as such a balanced approach enables a researcher to address managerially important issues. They argue that research should serve the needs of the end user (the manager) not the academic. Meanwhile Svensson, Slatten and Tronvoll (2008) add to this debate by finding that within the logistics domain there is a range of journals that provide for both rigour and/or relevance. Thus, quality is determinable from a balanced approach. However, the arguments and justifications as to why research should provide a high degree of relevance is under threat, for Carter et al. (2008) caution that the SCM field is at a 'tipping point' and argue that leading scholars have a responsibility to maintain the status quo, and in their minds the integrity of the domain via rigour.

Through combining these criteria, Fabian formed the basis for her typology of disciplinary approaches. Specific elements (solidarity, integration and segregation) operating within the context of one criterion (coherence) were utilised as the decisive guiding factor in the typologies development. These elements dominate discussions and arguably unduly influence the direction of any consequent discussion of a particular disciplinary approach.

To Fabian the determination of a typology of disciplinary approaches is as important as addressing the reasons for ongoing debate surrounding these approaches. In stating that,

> …we as academics struggle with the awareness that the unknown and disputed are enormously more voluminous than the known in management, but, pragmatically, we are charged with teaching, advising, and interacting as scholars on what is known or believed…

Fabian (2000, pp. 350-351) is arguing that although these valid needs require meeting, they are not able to be met simultaneously. Subsequently, the nine disciplinary approaches fluctuate between those that fulfil scientific concerns and those that fulfil pragmatic concerns. Consequently, they depict the tension within a domain such as SCM as to whether it should be framed as a discipline or as a domain of practice.

Table 3.1 summarises Fabian's typology (see Appendix 1 for more detail), of note is the prevalence of approaches where knowledge breadth is a core focus, begging the question, 'Should not researchers within a discipline be more proactive in determining the full extent of their domain, rather than encroaching into other disciplines through forcing their boundary outwards?' This is not to say that disciplines should be islands of research, rather that knowing your own patch intimately is more likely to provide that subsequent breadth through legitimate development opening up new potential research areas.

Table 3.1: *Fabian's Matrix of Disciplinary Approaches*

		Emphasis Towards Paradigm Inclusion (Degree of Coherence)					
		Solidarity		Integration		Segregation	
Standard of Validation (Quality Standards)	Universal	Back to basics	Dis-confirmation	Middle-range theories	Interactionism		Anything goes
	Multiple		Subordination		Multi-paradigmatic	Isolationism	Restructuring
		Depth	Breadth	Depth	Breadth	Depth	Breadth
		Impetus for New Research (Degree of Knowledge)					

(Source: adapted from Fabian, 2000, p. 354)

While there is no valid reason as to why there is a variety of disciplinary approaches existing, there are indications of a dichotomy of focus on either proliferation or consensus. Arguing that scientific and pragmatic pressures are the root cause, Fabian believes that the priority that researchers place on accommodating either pressure results in the variety of disciplinary approaches. Moreover, Fabian argues that researchers addressing scientific pressures emphasise theory generation and testing, whereas those addressing more pragmatic concerns emphasise the development of viable systems for managing that theory. Subsequently, tension is created between scholars of a scientific orientation (theory-paradigm proliferation) and those of a pragmatic orientation (theory-paradigm consensus). Accordingly, scholars contributing to a discipline either accept or reject various paradigms and in doing so facilitate a discipline's direction. Thus, it is argued that an environment where there is a lack of focus on attaining a level of consensus is detrimental to the cumulative nature of knowledge production (De Cock & Jeanes, 2006), while a discipline's ability to demonstrate a credible level of science is also negatively impacted (Tadajewski, 2009).

The quotation at the beginning of this chapter sums up the sentiment of this thesis's author both as a scholar and as a pragmatist. First, Fabian acknowledges that as a discipline converges, diversity is lost, resulting in meaningless research disconnected from reality. Alternatively, a proliferation of perspectives that lack cohesion results in meaningless research, as important issues are lost in the multitude of thoughts. Subsequently, Fabian argues that although it is complex (and perceived as tiresome by some), as scholars we need to take the debate as to what constitutes discipline seriously as it is our science and profession at stake. This author would add that it is also the legitimacy of our position as keepers of knowledge that is at risk, for how can we efficiently pass on our cumulative knowledge if we continuously argue amongst ourselves as to its form and function? It is therefore a contention of this research that the proliferation of debate surrounding SCM damages the overall concept, and thus contributes to a divergence of academic and practitioner deliberations on what should constitute SCM.

It has been a goal of this section to address a shortcoming in Fabian's deliberations through providing a dialogue on the constituent elements of each criterion, and thus mitigate the dominance of the coherence criterion in the formation of the typology of disciplinary approaches. Such dialogue enables understanding as to the role each criterion plays within the typology. This section presents one facet of the development of the disciplinary analysis framework utilised in this research. The following section investigates longitudinal implications through providing discussions as to Kuhn's theories of disciplinary evolution.

3.1.2 Kuhn's Theories of Disciplinary Evolution

The main objective of this research is to ascertain the core elements of SCM through mapping their evolution and thus enabling insights into SCM's disciplinary identity. Subsequently, the framework of Kuhn based on his seminal work *The Structure of Scientific Revolutions* provides a basis for understanding the significance surrounding how and why a discipline evolves through various stages. At the core of disciplinary evolution is Kuhn's conception of the paradigm, suggesting that a paradigm is an exemplar of scientific practice embodying a combination of application and instrumentation to enable coherent scientific research (Kuhn, 1970). Thus, a paradigm assumes a boundary-setting function through determining avenues of inquiry via the formulation of questions and relevant areas of research.

Paradigms, however, are not static. Kuhn suggested that there are three stages of evolution for a paradigm beginning with the 'pre-paradigmatic period'. Identified via a range of different or loosely coupled schools of thought, the pre-paradigmatic period is where various theoretical interpretations of the concept (be it the object of interest or unit of analysis) exist simultaneously. Subsequently, researchers operate in a confused state in regards to what it is they are studying and to what purpose. There is overwhelming disagreement as to suitable research questions, avenues of inquiry, methods and techniques. Eventually, however, there comes a point where wider acceptance of a model occurs, thus agreement begins to emerge and the next phase in the paradigm's evolution occurs.

For Kuhn (1970) the next stage, the 'normal science period', is where universal acceptance of the paradigm occurs resulting in research that attains structure through clear patterns and methods of investigation. Accordingly, there becomes an accepted way of "posing problems, conducting investigations, designing experiments and considering solutions" (Bailey, 2006, p. 10). Of note is that the discipline matures via clear establishment as to the boundaries of what is and is not studied, along with how research is actually undertaken. As the paradigm becomes established it is deemed successful when it can attract scholars interested in tackling its posed problems. However, the paradigm must also be sufficiently open-ended to allow new scholars to be attracted to its unresolved problems (Bailey, 2006; Kuhn, 1970). Overall, this settled period of intense research and investigation into issues of interest lulls researchers into a false sense of security, as the dogma surrounding the normal science period in regards to its fundamental presuppositions is unquestionable. Ultimately, scholars cease to be explorers of the unknown (Kuhn, 1970).

Nonetheless, anomalies inevitably do develop resulting in scholars doubting the dominant paradigm, and hence there is movement of the paradigm into its final stage of evolution, the 'crisis period'. For Kuhn the 'crisis period' is where the discipline begins to founder as researchers run into problems surrounding the solving of various issues and topics pertaining to its research. Thus, Kuhn believes that the paradigm that has gained dominance and becomes the common approach to investigation in the discipline is solely to blame for this crisis, as competing paradigms develop in an attempt to resolve the anomalies. Researchers consequently suffer from a loss of professional identity as they fail to agree on what constitutes the boundaries and core of the discipline. Subsequently, revolution occurs as the dominant paradigm is overthrown and the process begins anew with a 'pre-paradigmatic period' revolving around a new conceptual frame.

The revolution Kuhn describes during the 'crisis period' is due to the new paradigm being incommensurable with the previous one. Thus according to Kuhn as the new paradigm necessitates the redefinition of the previous one, and as the standards for evaluating a paradigm are internal to the paradigm, the move from the old paradigm to the new cannot be based on some neutral criteria. It is suggested that as the two paradigms are incommensurable with each other the process of the new paradigm displacing the old is not that of a logical or gradual process:

> The differences between advocates of competing paradigms at the time of crisis will be so great that they are unlikely to agree on what would constitute good

> grounds for preferring one to the other, since the criteria for those preferences are internal to the different paradigms (Bailey, 2006, p. 12).

Accordingly, a scholar will not easily transition from the old paradigm to the new; instead, revolution will occur as the scholar moves through an ideological and political conversion.

Figure 3.2 illustrates the ideal progression of a discipline from the pre-paradigmatic period, through the normal science period and culminating in the crisis period. In answering any anomalies the crisis period would evolve into a new pre-paradigmatic period and the curve depicted would rise again. Thus, the life of a discipline is one of an ongoing cyclical evolution.

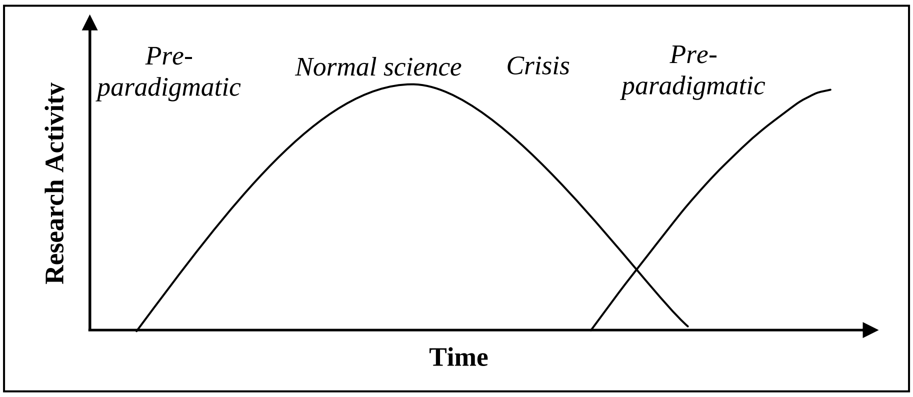

Figure 3.2: *Kuhn's Evolution of a Discipline*

(Source: diagram based on text by Kuhn (1970))

The incommensurability of paradigms is the most controversial concept of Kuhn's thinking:

> The proponents of competing paradigms practice their trades in different worlds… Practicing in different worlds, the two groups of scientists see different things when they look from the same point in the same direction. Again, that is not to say that they can see anything they please. Both are looking at the world, and what they look at has not changed. But in some areas they see different things, and they see them in different relations one to the other (Kuhn, 1970, p. 150).

As the two groups operate in different worlds they cannot perceive the world the same way, thus communication between the two groups is doomed to fail, as any communication is inevitably partial to each group's own worldview. To switch from one worldview to another worldview is like entering an entirely new world full of wondrous elements:

> [Paradigmatic crises] are terminated, not by deliberation and interpretation, but by a relatively sudden and unstructured event like the gestalt switch. Scientists then often speak of the 'scales falling from the eyes', or of the 'lightning flash' that 'inundates' a previously obscure puzzle, enabling its components to be seen in a new way that for the first time permits its solution (Kuhn, 1970, p. 122).

Hence, to Kuhn "Like the gestalt switch, it must occur all at once (though not necessarily in an instant) or not at all" (1970, p. 150).

This controversial approach of scholars moving via drastic change from one paradigm to another has been criticised. According to Wendel (2008), Kuhn holds that paradigms are community-defining exemplars of practice and as such this model of scientific practice is shared and accepted by members of the community; those who reject the paradigm are not members of the community. Subsequently, the paradigm becomes a public entity in itself. However, Wendel further adds that although a public entity, a paradigm has private consequences for scholars as acceptance or rejection of the paradigm determines how scholars perceive the world. Thus, Wendel conceives a paradigm as having a personal, individualistic aspect to it. This builds on Halloun's (2004) thoughts regarding paradigms as private individual affairs:

> No two people can ever share the same paradigm, whatever the nature of the paradigm or the profession that the two people might have in common, and this, because of biological and cultural differences in people's history (pp. 14-15).

In furtherance of this individualistic nature of paradigms, Halloun conceives of a difference between paradigms within the academic community and those within the practitioner community. Arguing that there are significant differences between the two he writes, "For paradigms of a particular nature, differences are significantly more pronounced within the lay community than within a professional community guided by such paradigms" (Halloun, 2004, p. 15). In other words, like DNA or fingerprints, no two paradigms are exactly alike. Further, if paradigms were likened to members of a family although there would be similarities due to a shared parentage (for instance hair or eye colour), closer examination would highlight significant differences such as personalities or abilities (either mental or learned skills). Thus, a paradigm to Halloun is one of shared traits where scholars can be grouped according to the similarity of their paradigms.

Consequently, Halloun's account of a paradigm contrasts sharply with Kuhn's thoughts, for whereas Kuhn conceives of a paradigm as an external concept that guides a scholar in scientific pursuits, Halloun suggests that a paradigm instead is an internal trait; thus, there is the breaking of "a single paradigm shared by many scientists into many personal paradigms which overlap to varying degrees" (Wendel, 2008, p. 135). Further, Halloun suggests that a scholar's membership of a community is not a question of an individual merely participating in the paradigm; instead, the scholar shares degrees of similarity along a continuum. Hence, it can be argued that Halloun has completely inverted Kuhn's concept of a paradigm.

Nevertheless, why is this critical? If we return to Kuhn's thoughts on how paradigm change occurs, we see that Kuhn utilised a gestalt switch metaphor, and as such the image raises the argument that like any switch one can move back and forth between perceptions (for instance between light and dark by turning a light on or off). Yet by Kuhn's argument, the switch (scientific revolution) is one way, there is no going back to the old paradigm; hence, the incommensurability of paradigms. However, under Halloun's account of a paradigm being internal and personal to the scholar, there can be peaceful coexistence of incommensurable paradigms within the one person. It is a maturation process where the scholar learns to employ diverse paradigms as required in various situations:

> Halloun has reduced the vision-altering, community-defining character of the Kuhnian paradigm to a matter of choosing the appropriate paradigm for the situation at hand. Instead of a crisis over how scientists see the world, we have an epistemological supermarket (Wendel, 2008, p. 136).

Nonetheless, Halloun's gradual transformation approach to paradigm change overlooks the fact that the term 'paradigm' in itself has been criticised for its imprecision of key issues (Caneva, 2000; Matthews, 2004). In addition, Kuhn has been criticised for his inadequate explanation as to how a gestalt switch can occur over a period of time (see for instance Lakatos & Musgrave, 1970). Therefore, it is argued that Halloun has merely adopted a flawed concept and transformed it into a concept of use, if it were not for the fact that Halloun has utilised an essentially Kuhnian definition of 'paradigm':

> We thus define a *scientific paradigm* as a natural paradigm shared by members of a particular scientific community, of well-defined scope in the real world, and consisting of…(Halloun, 2004, p. 16, emphasis in original).

In the extensive definition that follows this statement there is no hint of the gradual transformative position that Halloun later adopts in his thoughts. Further, Halloun utilises Kuhn extensively in the development of his ideas and perhaps unconsciously and unknowingly, Halloun adopts Kuhn's conceptualisations of a paradigm, although attempting to state otherwise.

Although there are suggestions that Halloun's concept of a paradigm is evolutionary and Kuhn's is not (Halloun, 2004; Wendel, 2008), there is considerable dialogue in the literature suggesting that Kuhn's thoughts are highly accepted amongst researchers, irrespective of disciplinary background. For instance, Kuhn's concept of a paradigm has been employed by various disciplines in regards to investigating their own stage of disciplinary development: information systems (Wernick & Hall, 2004); science education (Bailey, 2006; Chalmers, 1994); and marketing (Hunt, 1994). Subsequently, although Halloun calls for a gradual transformation from one paradigm to another, it is the arguments of Kuhn regarding the evolution of a discipline via revolutionary means that this thesis employs.

3.1.3 The Developed Disciplinary Analysis Framework

This section described the development of this research's disciplinary analysis framework through an analysis of the core assumptions and deliberations of Fabian's characterisations of a discipline and Kuhn's stages of disciplinary evolution. Analysis of Fabian's conceptualisations positions each criterion within the extant literature to enable its substantiation. Kuhn's perspective on the evolution of a discipline via revolution of its paradigm(s) holds that there are core influences affecting the passage of a paradigm from the pre-paradigmatic period to the normal science period and finally to the crisis period. Criticisms indicate that Kuhn's conceptualisation is weak; however, the alternatives draw heavily upon Kuhn's thoughts, indicating broad acceptance. Kuhn's revolutionary approach to the evolution of a discipline has been utilised by those seeking to establish their own respective domain's stage along such an evolutionary path.

Application of Kuhn's thoughts to Fabian's criteria shows that a discipline moving from the pre-paradigmatic to the normal science period would see an increased level of coherence, knowledge consolidating around specific schools of thought, and greater adherence to quality norms. Thus, there would be a move from fragmentation to consolidation as one paradigm begins to gain dominance. Subsequently, a discipline moving through the normal science period into the crisis period would fragment under the onslaught of anomalies and a new paradigm(s) would arise to challenge the status quo; thus, the cycle would begin again. Knowledge would broaden around multiple schools of thought as 'answers' to the anomalies were sought, while quality norms would fragment as new standards are established. Figure 3.3 depicts the analysis framework that will be utilised to explore and expose the implications and limitations of the disciplinary identity of SCM.

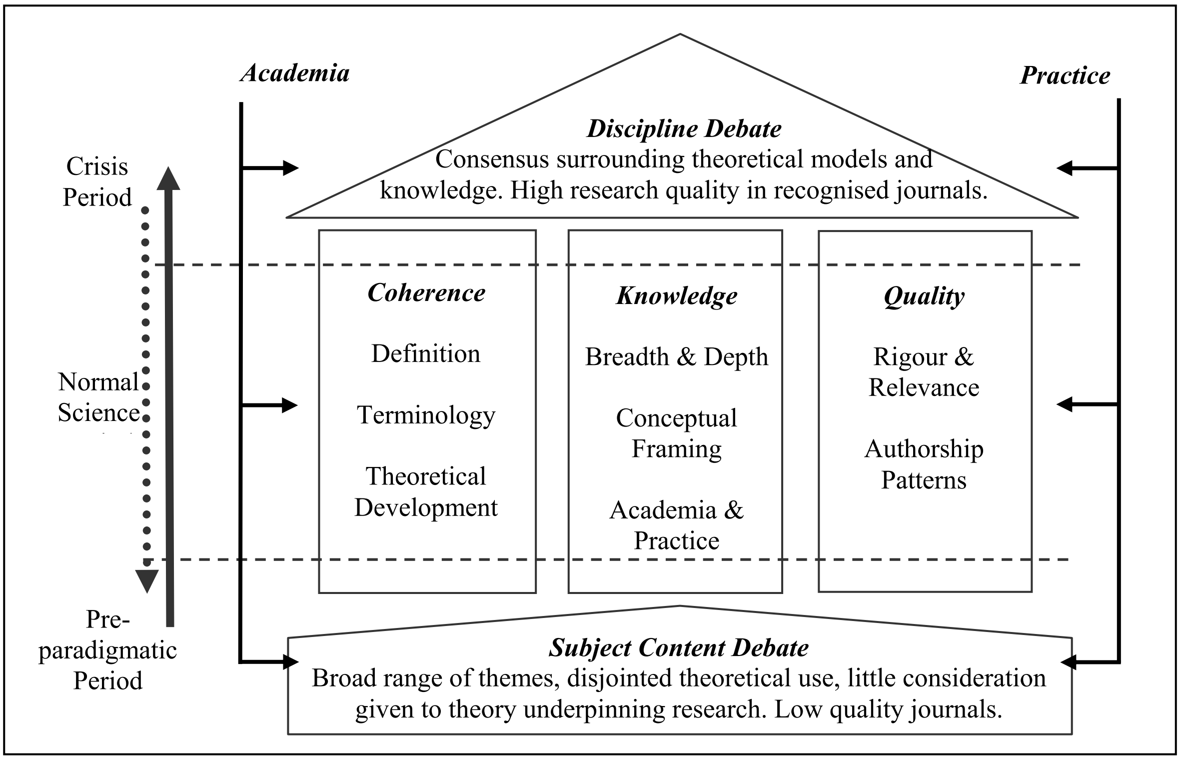

Figure 3.3: *The Disciplinary Analysis Framework of this Research*

(Source: the author's own, based on merging Fabian and Kuhn)

Overall, Figure 3.3 illustrates that a discipline continuously evolves from the pre-paradigmatic period where debate surrounding the subject's content occurs, through to the normal science period where consolidation orientated around coherence, knowledge, and quality occurs. The final stage of that evolution is the crisis period where unresolved anomalies force debate centred on whether the so-called discipline is a discipline or not. In answering the crisis, the discipline evolves into a new form that then progresses through its own pre-paradigmatic, normal science, and crisis periods; the evolution of a discipline is thus cyclical in nature (as indicated by the revolving arrow).

Sections 3.2 to 3.4 situate SCM within the bounds of Fabian's criteria, providing a pre-test for consistency within the purposes of this research. Development of the three core research questions into research sub-questions occurs in each section.

3.2 Situating 'Coherence' within Supply Chain Management

According to Pfeffer (1993), coherence can be determined through utilisation of various standards; chief amongst these being the efficiency of communication involved in defining terms and explaining concepts amongst members (see also Locke & Golden-Biddle, 1997). Domains that lack coherence tend to import ideas and theoretical concepts from more coherent fields resulting in disciplines where there is constant debate, boundary maintenance, and a high degree of definitional angst. Coherence is therefore a prerequisite to scientific advancement within a domain. The first core research question therefore asks:

- RQ(1): Are there sufficient indicators of coherence in the SCM literature to signify it is a discipline?

In determining an answer, Fabian's (2000) first criterion pertaining to the degree of coherence within SCM is ascertainable via three areas. First, whether there is an established and agreed upon definition being actively used within SCM (Section 3.2.1); second, whether there is an agreed upon terminology for SCM (Section 3.2.2); and third, whether there is coherent theoretical development occurring within SCM (Section 3.2.3).

3.2.1 Definition

The purpose of a definition is to convey the fundamental character of that which is being defined through the removal of misunderstanding and obscurity (Gibson et al., 2005). Wacker (2004) suggests that well-articulated definitions lead to fuller conceptual characteristics and subsequently more meaningful research; failure to articulate a domain's definition formally, causes the subsequent research to be suspect. Thus to Wacker, the development of a clear conceptual definition should be undertaken on the basis of adherence to specific rules (see Table 3.2) orientated around the concise articulation of specific concepts, rather than the more common-sense approach evident within the extant literature. Although Wacker (2004) is writing for the overall OM domain, his thoughts are entirely relevant for the sub-domain of SCM. Examination of the SCM literature[3] shows considerable debate surrounding the wording of a SCM definition, with arguments built upon debate surrounding the exact boundaries of SCM.

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[3] The literature utilised for this discussion concerns academic conceptualisations only. Definitions from practice will be discussed in Chapter Five.

Table 3.2: *Wacker's Rules for Formal Conceptual Definitions*

Rule 1: Definitions should be formally defined using primitive and derived terms. Formal conceptual definitions should differentiate between formal concepts and non-formal measurable terms. All definitions should follow the 'rule of replacement'.
Rule 2: Each concept should be uniquely defined. It should exclude (as many as possible) shared terms with other definitions to reduce confusion with related concepts. This rule means that the formal conceptual definitions denotation matches as closely as possible its connotation.
Rule 3: Definitions should include only unambiguous and clear terms. Put another way, do not use vague or ambiguous terms.
Rule 4: Definitions should have as few as possible terms in the conceptual definitions to avoid violating the parsimony virtue of 'good' theory.
Rule 5: Definitions should be consistent within the production/operations management field. That is, formal conceptual definitions should be as similar as possible between studies.
Rule 6: Definitions should not make any term broader. New definitions should not expand the concept to make it broader and less exclusive.
Rule 7: New hypotheses cannot be introduced in the definitions. In production/operations management, the definitions should not include instances where only 'good' events happen.
Rule 8: Statistical tests for content validity must be performed after the terms are formally defined. These empirical tests are not tests of the conceptual validity of a concept but rather are used to test if the formally defined concepts sample the conceptual domain.

(Source: Wacker, 2004, p. 638)

New (1997) proffers the opinion that too tight a definition creates circumstances that limit constructive avenues of development, whereas too loose a definition creates the opposite scenario and endorses the investigation of everything and anything in an unstructured manner. Combined with the confusion surrounding the exact boundary between the concept of 'supply chain' with its focus on the physical movement of products and materials, and the concept of SCM with its managerial focus for strategic gain, disagreement abounds as to a SCM definition. Table 3.3 provides a representative sample of SCM definitions.

Table 3.3: *A Sample of SCM Definitions*

…the strategic, transparent integration and achievement of an organization's social, environmental, and economic goals in the systemic coordination of key interorganizational business processes for improving the long-term economic performance of the individual company and its supply chains (Carter & Rogers, 2008, p. 367).
Supply chain management is an approach whereby the entire network – from suppliers through to the ultimate customers, is analyzed and managed in order to achieve the 'best' outcome for the whole system (Cooper & Ellram, 1993, p. 13).
…is the integration of business processes from end user through original suppliers that provides products, services and information that add value for customers (Cooper, Lambert, & Pagh, 1997, p. 2).
…all the activities involved in delivering a product from raw material through to the customer including sourcing raw materials and parts, manufacturing and assembly, warehousing and inventory tracking, order entry and order management, distribution across all channels, delivery to the customer, and the information systems necessary to monitor all of these activities. Supply chain management coordinates and integrates all of these activities into a seamless process. It links all of the partners in the chain including departments within an organization and the external partners including suppliers, carriers, third-party companies, and information systems providers (Lummus & Vokurka, 1999a, pp. 11-12).
…the systematic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole (Mentzer et al., 2001, p. 18).

(Source: the author's own)

A canvassing of the literature indicates that there are elements that have found favour at various stages of SCM development and thus contribute to the confusion. For instance, Scott and Westbrook (1991) focus on the linkages between supplier and buyer with an emphasis on the cross-border relationships between organisations, Lee and Billington (1992) on the coordination activities required for successful management, while Cavinato (1992) presents the view that a total cost-value strategy should dominate managerial thinking. Logistics flows (Svensson, 2002a), customer order management (Lummus, Krumwlede, & Vokurka, 2001), integrated production processes (Chandra & Kumar, 2000), integrated information systems (Giannakis & Croom, 2004), business profitability (Chandra & Kumar, 2000; Lambert et al., 1998), stronger inter-firm relationships (Kauffman, 2002; Mentzer et al., 2001), sustainable supply chains (Carter & Rogers, 2008), and the realisation that all organisations are partners in serving the needs of the end customer (Ballou, 2007; Mentzer et al., 2001; Svensson, 2003) are all prominent elements in SCM definitions.

Consequently, such ambiguity results in Mentzer et al. (2001) arguing that academics have been trying to combine two categories – 'supply chain management' and a 'supply chain orientation' (SCO) – within the one term. Their research indicates that three views jostle for dominance in defining SCM: classifying it in simple operational terms; classifying it from the view of a philosophy that provides guidelines for management to follow; and classifying it as a set of management processes. However, Tan (2001) proffers an alternative opinion: that SCM is merely a handy synonym for discussing the purchasing and supply activities of manufacturers, describing their transportation activities and the strategic activities undertaken in adding value from suppliers through to end users.

As evident, even attempts to reconcile why there is ambiguity and confusion surrounding a SCM definition indicate a lack of consensus. Hence Lambert and Cooper (2000) suggest an alternative approach by asking practitioners how they define the concept. Utilising the following definition as laid out by the Global Supply Chain Forum (GSCF), that of,

> Supply Chain Management is the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and stakeholders (p. 66),

they argue that such a definition is of more value and versatility to practitioners and as such should form the basis of an academic definition.

In furtherance of Wacker's (2004) thoughts on developing a well-articulated definition, Stock and Boyer (2009, p. 691) suggest that it is "difficult for researchers to develop supply chain theory, define and test relationships between components of SCM, and develop a consistent stream of research". Although their sentiments are correct, they unfortunately make the classic mistake of confusing the 'supply chain' and 'SCM'. Consequently, they interchange the two terms to the extent that definitions presented as defining SCM and analysed as such, are under close examination actually discussing the concept of the supply chain. In addition, none of the examples they provide are explicitly stated as SCM definitions; rather, the definitions are implied via broad discussions of the SCM concept, thus, raising concerns as to subjectively generated inference on their part. Although Stock and Boyer capture the sentiments as to the problematic issues surrounding the articulation of an SCM definition, they fail to address the fundamental differences between the two concepts.

To summarise, irrespective of the various definitions circulating over the decade, the incontrovertible fact is that ongoing ambiguity results in a vast range of definitions for academics and practitioners to draw upon in their argument as to what SCM is, and is not. This lack of scholarly consensus and clarity creates ongoing tension in the literature, as each champions its own perspective based around its own particular understanding and vision. Subsequently, this limits managerial understanding of the strategic benefits and practical application of SCM. A decade on and with the domain still without a clearly defined definition of SCM, it is logical to assume that practitioners have developed their own definition based around their own terminological values. Hence, RQ(1a) asks how both groups have defined SCM and to what degree there has been change over time:

- RQ(1a): To what extent are there differences in the SCM definitions used by academics and practitioners for each disciplinary period?

3.2.2 Terminology

The second area of interest in determining the degree of coherence within SCM is related to definitional issues. It is acknowledged that if a definition presupposes a terrain or theoretical framework, in essence providing sense to the term being defined, then via our linguistic practices the terminology sets the boundaries as to what is included and excluded within that domain (de Saussure, 1959). In other words, the terminology used sets the boundaries of its own definition. Furthermore, Lyons (1968) states that language is something that we take for granted; as such, our intuitive familiarity with it tends to obscure any objective examination of the actual ‘words’ that we use. Thus, determining the terminology utilised facilitates an understanding of the problematic definitional issues discussed previously.

New (1996) offers the opinion that the term SCM is an attempt to “re-badge established prescriptive material under an attractive new logo” (p. 20). Fawcett and Magnan (2002) agree, finding that the rhetoric surrounding the term SCM results in practitioners merely adding the term to their vocabulary without actually changing existing practices; thus, SCM is merely a new buzzword added to the lexicon of executives. Consequently, the definitional issues identified earlier are extended when contemplating the vast array of terminology that exists, as the two are intimately intertwined.

Evident in the literature is a plethora of terms advocated by academics who argue that their term is different from SCM and therefore in need of inquiry: for instance, integrated purchasing strategy (Burt, 1984), integrated supply chain management (Ellram & Cooper, 1993; Monczka & Morgan, 1997), supplier integration (Dyer, Cho, & Chu, 1998), buyer-supplier partnership (Lamming, 1993), strategic supplier alliances (Lewis, Naim, & Towill, 1997), value-added chain (Lee & Billington, 1992), value chain management (Al-Mudimigh, Zairi, & Ahmed, 2004; Barber, 2008; Porter, 1985), network supply chain (Nassimbeni, 1998), supply chain synchronisation (Tan, Kannan, & Handfield, 1998), purchasing and supply management (Ellram, 2000), sustainable supply chain management (Carter & Rogers, 2008), demand chain management (Langabeer & Rose, 2001; Seetharaman, Khatibi, & Ting,

2004) and demand-driven supply networks (Rainbird, 2004a). Furthermore, there are variations of the aforementioned terms, which are discussed in terms of their descriptive purposes; for instance, 'value streams', 'demand pipelines', and 'strategic supply management'.

Irrespective of the arguments presented by authors claiming that their term is 'new', close examination of the boundaries indicates that the new term is merely an exercise in rebranding SCM. Many utilise a narrow definition of SCM (or as in the majority of cases, no definition at all) to argue for the justification behind their particular term. In the instances where no definition is utilised then the subsequent discussion on 'what SCM is' (and hence why their new term is necessary), is predominately light on detail and targets a very narrow conceptualisation of SCM. For instance, Al-Mudimigh et al. (2004, p. 312) wrote that SCM failed to capture the 'future user's needs' and as such failed organisations. They argued for a new term – value chain management – as it is concerned with:

> …managing integrated information about product flow, all the way from suppliers to end-users. In order to reduce defects in inventories, speed the process, achieve time to market and improve customer satisfaction.

Such an explanation illustrates the narrow view held by Al-Mudimigh et al., as any researcher holding a broad (but detailed) view of SCM would argue that 'SCM' intuitively encompasses what they regard to be VCM. Hence, the views of de Saussure and Lyon are supported.

It is interesting to note that the alternative terminology seen in the literature falls into one of three perspectives. The first perspective utilises terminology that focuses the reader on the supply side, the second on the demand side, and the third straddles the two and focuses on the integrative aspects of merging both supply and demand type issues. Therefore, it can be argued that researchers are not advocating something new; instead, they are merely placing a particular emphasis on one aspect of the overall concept of SCM. In support of this contention, Larson and Halldorsson (2004) found in their survey of international experts that those with the highest experience of SCM rated the sub-area of logistics as of 'minor importance', whereas those with the least experience rated it as of 'significant importance'; implying that those experienced with SCM knew that logistical issues were merely a sub-set of SCM. Additionally, Svensson (2002a) argued that SCM was a business philosophy that re-integrated the disciplines of logistics and marketing, whereas Rogers and Leuschner (2004) later showed how there had been a paradigm shift from the term 'logistics' to that of 'SCM'[4]. However, Kauffman (2002) has argued for the era of terminological change to end, as the lack of unanimity hinders future growth.

In summary, it is argued that terminology consensus enables improved communications between academics and practitioners, improved understanding as to SCM concepts, improved abilities to market SCM concepts to practitioners, an improved teaching and research ability and finally an "improved ability to defend our profession against attempts to claim our 'territory' by other professions" (Kauffman, 2002, p. 50). RQ(1b) therefore seeks to determine the extent of alternative terminological utilisation with SCM:

- RQ(1b): To what extent are there differences in the SCM terminology used by academics and practitioners for each disciplinary period?

3.2.3 Theoretical Development

According to Ho et al. (2002), before addressing the higher order strategies of theoretical validation and refinement, it is crucial to address the initial stages of theory building. Theoretical development can only occur if built upon a solid platform of clear and concise definitional and terminological conceptualisation (Wacker, 2008). Consequently, examining the theoretical development of a discipline can tell much about its direction over time, along with future avenues of interest. One of the claims of this research is that there is a lack of consensus within the literature as to the theoretical development and positioning of SCM. A common practice within SCM is the borrowing of theories from other disciplines to facilitate understanding of various SCM processes and issues (see for instance Essig & Arnold, 2001; Zsidisin & Siferd, 2001); as this section will reveal, such borrowing results in a fragmented theoretical foundation.

During the 1990s, SCM grew its theoretical boundary through encompassing, rather than refining, theory (Lakatos refers to such a process as expanding the protection belt). Stock (1997) has argued that learning from the experience of other disciplines advances a scholar's conceptualisation of SCM, whereas Skjoett-Larsen (1999) advocates the use of alternative theory to replace the 'tunnel vision' approach of the dominant paradigm. However, the belief that borrowed theory is of benefit to the SCM domain is contentious. Borrowing theory that

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[4] Such a 'paradigm shift' would explain the name change undertaken in 2004 by the Council of Logistics Management (CLM) to that of the Council of Supply Chain Management Professionals (CSCMP).

has developed to address another discipline's criteria can at best only provide a snapshot of understanding; the SCM domain would still be calling for its own holistic theory. Subsequently, although there is a ready acceptance of hijacking another discipline's theory to explain some new aspect of SCM, internally developed theory encapsulating the entirety of SCM is essential (though not all claims at such a holistic theory are successful).

Larson and Halldorsson (2002) illustrate how SCM is aligned with the sourcing side of operations, and can rightfully be argued to be purchasing, albeit with a new name. Svensson (2002b) then compares the generic theoretical leanings of SCM with Alderson's functionalist theory of marketing, as both are centred around the holistic considerations to strategic and tactical business activities. In doing so Svensson points out that all aspects of SCM are identifiable in Alderson's theory, with both sharing attributes such as time, relationship, and functional dependencies. Svensson argues that SCM is still in its theoretical infancy and although underpinned and derived from Alderson's theory, it still needs to re-define its theoretical boundaries.

Subsequently, Arlbjørn and Halldorsson (2002) revisit the call for an alternative to the dominant positivistic paradigm via an in-depth examination of logistics knowledge creation. Their paper provides the most detailed discussion to date regarding the predominance of positivism as the overriding paradigm for investigation. Arguing that SCM is merely an example of a logistics concept with a focus on inter-organisational issues, they reason that SCM falls under the 'generating a new concept' category of their knowledge creation model. As such, concepts such as SCM reflect aspects of reality but are not in themselves a complete theory. Furthermore, they argue that such terminology reflects a tautology: "Do these concepts really contribute to a new understanding, or do they just re-label an already existing practice?" (Arlbjørn & Halldorsson, 2002, p.30).

Utilising Lakatos' thoughts, Arlbjørn and Halldorsson (2002) proffer the notion that researchers must go beyond the obvious characteristics stated in definitions and seek the actual essence (the hard core) of the field. The protection belt then supports this hard core; however, as they note anything and everything can be studied, resulting in a protection belt that cannot be characterised easily. Further, the plethora of cross-disciplinary research exacerbates the issue, for as they stipulate it is "difficult to determine how loose the belt can be tightened" (Arlbjørn & Halldorsson, 2002, p.26). As a result, the disjointed and jargon-filled nature of the logistics/SCM field is evidence of a domain that is extending its boundaries to include more and more concepts. Hence, they question whether logistics/SCM is becoming a 'hollow' discipline with no core, but an increasingly bloated protection belt.

These views are supported by Ho et al. (2002) who identify that there are major weaknesses in the extant literature on the conceptualisation, operationalisation and modelling of SCM. These issues are exacerbated by the prevalence of attaching multiple labels to essentially the same concept being investigated, along with a general failure to adequately define the construct. Such limitations stem from the inadequate explication of SCM's core elements and boundaries; as such, they argue that it is time for researchers to pay more attention to the initial steps of the theory-building process. This view is supported by Svensson (2003) who argues that the current theory generation in SCM is atomistic and requires a more holistic approach utilising cross-disciplinary perspectives.

Min and Mentzer (2004) answer Ho et al.'s calls for the development of sound measurement scales of SCM-related concepts. Their conceptualisation of SCM enables the first steps at 'confining' SCM within a measured boundary, although further refinement would strengthen the robustness of the measurement scales. On the other hand, Chen and Paulraj (2004) answer the calls for a comprehensive conceptualisation of SCM through developing a set of operational measurements, something they argue is essential and at the core of theory building. Cigolini, Cozzi and Perona (2004) conceptualise SCM from the view of management, resulting in a normative tool for practical use. Their contingency model and demand-supply matrix enable the practical and tangible demarcation of the SCM boundary based on the actual user's requirements, not on what academics decide those needs should be. Their approach is revolutionary in its adherence to relevancy over rigour.

Giannakis and Croom (2004) meanwhile ask whether it is even possible to develop a SCM discipline, based on the disparate themes existing under a SCM umbrella. They provide a paradigmatic framework based around the '3S' model (synthesis, synergy and synchronisation) proposing that such a model enables the articulation of the antecedents and constructs, and serves as a basis for discerning meta-themes within SCM. Meanwhile Gammelgaard (2004) utilises Arbnor and Bjerke's (1997) framework of the analytical, systems and actors approach to examination of the research paradigms existing within logistics and SCM. Gammelgaard found prominent examples of the analytical and systems approaches but not of the actors approach, indicating only two schools of thought are underpinning theoretical discussions.

In 2006, the *International Journal of Operations and Production Management* (IJOPM) dedicated a special issue to the question of whether SCM constituted a discipline or not (Cousins et al., 2006). With the aim of stimulating debate, rather than providing a definitive answer, the editors acknowledge that the fragmented literature limits the emergence of a unifying theory of SCM. For instance, Harland et al. (2006) (utilising Fabian's criteria 'a' and 'c') find limited coherence and a lack of quality within SCM. Harland et al.'s findings are limited by the very low number of articles (n=41) utilised for analysis, and raise the question as to whether these findings can be generalised across the entire SCM domain. Meanwhile Storey et al. (2006) critically assess the theoretical foundations of SCM, finding that even though SCM theory advocates holistic managerial practices, there is little evidence in support. They identify considerable misalignment between theory and practice, especially around 'managing' the supply chain. Consequently, their study raises serious questions as to whether SCM can ever truly be a discipline or whether it should be relegated to the role of a management fad. Finally, Burgess et al. (2006) find that the dominant paradigm within SCM is limiting investigatory scope and that SCM has become unworthy of attention if the status quo of rigour over relevance is to be continuously defended by scholars. Overall, the articles within IJOPM conclude that due to the fragmented theoretical nature of SCM it can only be classed as an emerging discipline.

In answer, Halldorsson, Kotzab, Mikkola, and Skjoett-Larsen (2007) utilise three theoretical perspectives (socio-economic, economic and strategic) that when combined contribute to an understanding of SCM in practice. Finding that there can be no unified theory of SCM due to the circumstantial situations surrounding application of such a theory, they state that it is more appropriate to choose one as the dominant theory for explanatory reasons, and support it with the other theoretical perspectives dependent upon circumstances. However, based on their arguments a vital question must be asked: Can SCM ever be regarded as a discipline if there is no overriding theory?

Ballou (2007) drawing upon his personal experiences over 45 years examines the evolution and future of logistics and SCM – concepts he regards as one and the same thing. Such a unique perspective lends credibility to the arguments made that lessons can be learned from the evolution of logistics for understanding what SCM is in today's context. However, without empirical data to back up his findings, Ballou's thoughts as to the three dimensions attributable to SCM – activity and process administration, inter-functional coordination, and inter-organisational coordination – are suspect.

Finally, Wolf (2008) utilises the 'scientific discipline' criteria established by Kuhn and van Gigch in examination of the nature of SCM research. Finding that positivism still dominates research, she argues that challenges to the status quo are emerging from critical theorists. Taken in conjunction with her findings on the disintegration of the field, evidenced by the growing arguments as to what SCM actually is, her contention is that SCM is going through a 'scientific revolution', and hence opportunities abound for scholars to establish SCM as a entirely new discipline. However, although Wolf covers a large timeframe (1990 to 2006), her sample size is relatively small (n=282), thus opening her research to serious questions as to whether such results can be generalised across the entirety of the domain.

Overall, these studies depict a fragmented theoretical development. Ho et al. (2002) suggest it is crucial to address the initial stages of theory building before attempting to address the higher order strategies of theory validation and refinement. Such fractured approaches indicate a lack of overall coherence in regards to the conceptualisation and articulation of SCM definition and terminology (Wacker, 2008). Overall, it is argued that basing theoretical constructs on an unknown body of knowledge is detrimental to the theoretical development of SCM. However, although academics indicate a fractured theoretical discourse, the question remains as to whether practitioners also operate from a fractured position:

- RQ(1c): To what extent are there differences in the approaches to theoretical development by academics and practitioners for each disciplinary period?

In summary, Section 3.2 has shown that a domain that lacks coherence tends to place a great deal of effort into boundary maintenance and debating definitions, according to Pfeffer (1993). Taken to the extreme, such domains can simply disappear as a more developed and coherently stronger domain takes over. Within SCM, the lack of consensus in regards to definition, terminology, and theoretical development is indication of a fragmented discourse. According to Lakatos (1970), such fragmentation is evidence of a bloated protection belt and a hard core under threat. Hence, if the status of SCM were to be determined based solely on its consensus-building ability the argument put forward by various authors that SCM can only be classed as an emerging discipline would be valid (see for instance, Burgess et al., 2006; Gibson et al., 2005; Giunipero et al., 2008; Storey et al., 2006). However, Gibson et al. (2005, p. 23) temper the debate and call for restraint from academics, and active participation from practitioners, in developing SCM: "Only through adding their experiences to the body of SCM knowledge can the discipline as a whole consider what SCM is and is not".

3.3 Situating 'Knowledge' within Supply Chain Management

As has been previously stated, there is an underlying belief that investigating SCM's body of knowledge will result in the development of a variety of miscellaneous categories rather than the binding of the various streams of thought into a unified SCM discipline. Such sentiments are evidence of the lack of coherence within SCM. Investigating the degree of knowledge within a domain, in particular its breadth and depth, is argued to be an inconclusive indicator of disciplinary identity (Harland et al., 2006). Nonetheless, although it is acknowledged that the domain of SCM lacks agreement as to what constructs and concepts form the basis of an SCM body of knowledge (Chen & Paulraj, 2004; Min & Mentzer, 2004), it is suggested that a body of knowledge does exist and is determinable through analyses of various aspects (Burgess et al., 2006).

Section 2.3 situated the concept of 'knowledge' within the bounds of this research to show that knowledge is what it is by virtue of its surroundings. The arguments of Harre and Gillett (1994) indicate that we are all part of discursive practices that ensure compliance via conformation to accepted behavioural norms. What we know and the form it takes are therefore built upon the discourses that we participate in. Tsoukas (1996) suggests that the socialisation process that we undertake is where we learn the discourse of the discursive practice; our knowledge of SCM is built upon all that we read, discuss and do. Consequently, the second core research question asks:

- RQ(2): Are there sufficient indicators of an integrated body of knowledge in the SCM literature to signify it is a discipline?

To ascertain an answer, three highly integrated areas are investigated: establishing parameters for an SCM body of knowledge (Section 3.3.1); examining the depth of the SCM body of knowledge through various construct lists (Section 3.3.2); and determining the extent of the conceptual framing of SCM knowledge (Section 3.3.3).

3.3.1 Breadth of Supply Chain Management Knowledge

There is strong disagreement as to what SCM covers conceptually, with the boundaries appearing fluid. As such, it is common to associate SCM with various functional areas and argue that it is merely an extension of that particular area rather than a domain in its own right (Chen & Paulraj, 2004; Ho et al., 2002). Thus, the discursive practice of each functional area operates in a manner that self perpetuates at the expense of the overall SCM domain.

Therefore, it is not surprising that considerable confusion surrounds an exact conceptualisation of SCM.

Through undertaking a canvassing of the extant literature, four functional areas are identified as covering the breadth of the SCM body of knowledge: a purchasing and supply orientated function (Tan, 2001); a logistics and transportation orientated function (Thomas & Griffin, 1996); and a set of integrated operational activities (Frohlich & Westbrook, 2001). The impact of information technology on these three functional areas has been well documented (Lancioni, 2000).

Within the *'Purchasing & Supply'* function the nature of the activities have altered, from simple mundane functions to complex value-added strategies (Carter & Narasimhan, 1996; Ellram et al., 2002). The focus of contemporary purchasing is on enhancing the efficiency of the information transaction via the utilisation of IT (Neef, 2001). The key to success is to employ a proactive approach to the entire activity. This is evident in some of the most fundamental changes surrounding the interaction with the supplier, the advent of collaborative relationships and a constant monitoring and review of supplier performance (Janda & Seshadri, 2001; Simpson, Siguaw, & White, 2002; Smeltzer, 1997). Procurement agents focus on the strategic tasks of developing collaborative relationships, supplier capabilities, and monitoring supplier performance to improve the organisation' competitive advantages. The emphasis of procurement is on vendor management, the development of long-term contracts, and a proactive approach to facilitating corporate strategy (Harland et al., 1999; Pooley & Dunn, 1994). As such, procurement agents have evolved the skill-base and knowledge they draw upon to that of the corporate strategic level. Overall, the process has moved away from a reactive tactical short-term focus to one that actively seeks out strategic benefits for the organisation (Leek, Turnbull, & Naude, 2003; Trent & Monczka, 1998; Vokurka, 1998).

Over the past decade, the *'Logistics & Transportation'* function has witnessed major changes to an organisation's logistics requirements, due either to an inability in-house to undertake such tasks, or to an increasing focus on cost-minimisation, resulting in a lack of incentive to build up the appropriate knowledge and skill set (Fawcett, Calantone, & Roath, 2000). As a result, the logistics function is increasingly seen as an activity ripe for outsourcing to third-party providers (3PL) (Halldorsson & Skjoett-Larsen, 2004; Lai, Li, Wang, & Zhao, 2008; Sohal, 2002). A willingness to utilise the 3PL's IT capability to generate competitive advantage via integrated information systems is critical in the decision to outsource to specialists (Lewis & Talalayevsky, 2000; Sohal, 2002), and thereby enable the organisation to focus on its core business. Furthermore, there has been an increasing awareness of climate change and 'green' approaches demanded by customers; issues such as reverse logistics and waste minimisation strategies dominate corporate boardrooms (Hanafi, Kara, & Kaebernick, 2008; Tibben-Lembke, 2002). This then flows into improvements in the actual transportation network and technology, the overall goal being one of seamless integration of the flow of material and products between organisations (Gimenez & Lourenco, 2008; Pfohl & Buse, 2000; Richardson, 2000).

The *'Integration of Business Activities across the Supply Chain and within the Organisation'* function encompasses leadership, production, and operational issues. Seeking the ideal of 'end to end transparency' is oft-quoted as the motivation behind implementation; however, as studies show, many organisations fail to reach such lofty heights, instead settling for integration between themselves and their immediate supplier and customer (Choi & Kim, 2008; Mouritsen et al., 2003; Stank, Daugherty, & Autry, 1999). Integration via IT is seen to be of strategic benefit to the organisation, although alignment comes at a price, as power imbalances between the focal firm and the integrating organisation dictate the depth of integration. Benefits are largely skewed to the advantage of the focal firm (Lummus & Vokurka, 1999b; Sanders, 2005). An increasing awareness of ecological and environmental issues by consumers results in 'green supply chain' practices that require greater communication, integration and linkage between suppliers and customers (Vachon & Klassen, 2006). As a result, operational practices within organisations adjust to meet the needs of customers and to reduce such issues as demand amplification (Bolton, 1998; Fransoo & Wouters, 2000; Taylor, 2000; Zokaei & Hines, 2007). Although the benefits touted from 'integration' of the organisations involved in producing and moving a product to the end consumer are sought, it is evident that in practice such close relationships are not readily nor easily attained (Choi & Kim, 2008).

As the fourth functional area, *'Information Technology'*, has the ability to transform not just processes within the organisation, but also the organisation itself (Winter & Taylor, 2001). The ongoing developments over the past 20 to 30 years have positively influenced the organisation, its strategic direction and its vision (Gimenez & Lourenco, 2008; Mason-Jones & Towill, 1997). The move towards leaner and highly flexible organisations is an example of the need to adapt to the rapidly changing technologies and their associated processes (Wigand, 1997). Operations are downsized and reorganised, creating a more diffuse boundary through which the necessary technical skills and expertise required at any given time can flow, finding that it is no longer necessary to complete all operational tasks and functions in-house, or even in the same geographical location, as IT provides an easy vehicle for communication (Targett, 2001). Joyner and Onken (2002) add that IT is a key driver for the diffusion of knowledge both within the organisation and society. Knowledge diffusion provides the organisation with greater competitive advantages, increased flexibility through the efficient application of knowledge, and increased financial benefits as a result (Garcia-Dastugue & Lambert, 2003; Lancioni, Schau, & Smith, 2003a). Overall, it is evident that the evolution of IT has positively influenced and diffused throughout an organisation's processes, from production, to the lines of communication with suppliers, through to how each organisation communicates with the ultimate end consumer.

In summary, the four functions cover the breadth of the SCM body of knowledge, indicating that there is still adherence to and influence from, the historical motivations of OM philosophies and techniques. The preponderance of studies into the 'supply' area is further indication that the definitional and terminological problems discussed in Section 3.2 may be a symptom of this overabundance. Subsequently, RQ(2a) is formulated as:

- RQ(2a): To what extent are there differences in the breadth of SCM knowledge between academics and practitioners for each disciplinary period?

3.3.2 Depth of Supply Chain Management Knowledge

It has been argued that investigating the depth of knowledge within SCM would result in a variety of miscellaneous categories (Harland et al., 2006). However, this section seeks to determine just how deep and varied the elements studied within the functional areas identified in the previous section are, and thus how extensive a list of constructs could be.

It has been acknowledged that there are severe weaknesses in the conceptualisation of SCM, resulting in its narrow perception within the extant literature (Ho et al., 2002). According to Burgess et al. (2006), the fragmented nature of SCM lends itself to the development of construct lists that enable investigation into these varied conceptualisations. As such, it is a contention of this research that these constructs can be determined along two classification schemes: The first is orientated around the constructs of SCM that unintentionally limit content areas, and the second on determining the exact extent of the sub-elements that form the content of SCM.

A canvassing of the literature indicates the existence of various lists of constructs that, this research argues, limit studies into the content of SCM. Close examination reveals strong differences in these constructs, with Ho et al. (2004) arguing that any constructs developed are framed around the functional areas of either 'purchasing and supply management' or 'logistics and transportation management'. Further, they suggest that the problem of developing a logical set of constructs is exacerbated by the problem of utilising multiple labels to define one construct, while focusing on the practice-performance relationship. Subsequently, agreement as to a common and unifying set of SCM constructs is lacking.

Table 3.4 provides a sample of the various lists of constructs existing within the literature. As is evident, the range and number of the constructs argued to be representative of the content of SCM vary widely. Consequently, it is suggested that such diversity of constructs structuring SCM results in an increasing difficulty in mapping the domain, owing to the inadequate specification of the scope of the construct. Thus, limits are placed on the examinable content of SCM.

Table 3.4: *Various Lists of Constructs Structuring SCM*

SCM Constructs
Leadership, Intra-organisational relationships, Inter-organisational relationships, Logistics, Process improvement orientation, Information systems, Business results & outcomes (Burgess et al., 2006)
Environmental uncertainty, Customer focus, Top management support, Strategic purchasing, Competitive priorities, Information technology, Supply network structure, Buyer-Supplier Relationships (supplier base reduction, long term relationships, communication, cross-functional teams, supplier involvement), Logistics integration, Supplier performance, Buyer performance (Chen & Paulraj, 2004)
Management components, Business processes, Supply chain structure (Cooper et al., 1997)
Supply chain orientation, Supply chain management performance (Min & Mentzer, 2004)
Environment, Quality management, Supply base management, Customer relations, Performance (Tan & Kannan, 1999)
Technology, Internal relationships, External relationships, Product development, Transportation, Inventory management, Production efficiency, Product delivery, Response to demand, Product quality, Competitive pricing, Performance (Tracey, Fite, & Sutton, 2004)

(Source: the author's own)

Interestingly, of all the constructs structuring SCM content depicted in Table 3.4, only Burgess et al. (2006) develop their set through synthesising constructs proposed by other studies (the purpose of such formulation was to enable in-depth analysis of definitions as well as the research methodologies utilised within SCM). Consequently, their list consolidates various perspectives of SCM irrespective of the original research intentions. Further refinement occurs as their list emphasises a difference between the 'soft' people-centric constructs that manage all social relationships (leadership, intra- and inter-organisational relationships) and the 'hard' system-centric constructs that manage all technological and infrastructural issues (logistics, process improvement, information systems and business results).

Through application of their list, Burgess et al. found there is a dominance of the system-centric constructs; very few people-centric constructs have been the focus of investigation by researchers. This is surprising given that many writers on SCM emphasise the critical nature of building relationships and the need to collaborate across the entire supply chain. As such, questions are raised as to whether their small sample size (n=100) was a contributing factor in a failure to capture a more informative way of construing SCM.

In answer to some of these criticisms, a recent study attempts to formulate a more extensive list of the sub-elements comprising SCM, although it was limited to merely 21 sub-elements. According to Wolf (2008), due to disagreement amongst similar studies there is a requirement for a more comprehensive list that accurately reflects the research being undertaken. As such, she developed a construct list that covers a wide range of research content from environmental factors to human resources, inventory management and performance measurement, through to supply chain design, risk management, logistics and purchasing, to name but a few. However, a key issue with such a list is not just the overlap between elements, but also the extensiveness. Very few of the 21 elements are operationalised in isolation; instead, they would benefit from further refining of their core aspects.

Based on the confusion surrounding SCM constructs, it is the intention of this research to develop an exhaustive list of constructs that are more appropriate for ascertaining a full conceptualisation of the true depth of SCM knowledge; for whether it is appropriate or not to investigate the depth of SCM knowledge is at the core of several debates (Burgess et al., 2006; Harland et al., 2006; Ho et al., 2002). As has been discussed, even where depth of knowledge via a set of constructs has been examined, there is still considerable dialogue in terms of the variety and number of constructs deemed to be a true indication of the content of SCM. Hence, this research seeks to query how deeply a researcher should delve in determining the content of SCM's body of knowledge. To enable an appropriate level of depth (knowledge) to be determined the synthesised construct list of Burgess et al. (2006) will be utilised first as a test of this research's assumptions. Second, an exhaustive list of sub-elements will be developed from the four core elements to enable an accurate account of SCM knowledge depth to be ascertained. RQ(2b) is formulated as:

- RQ(2b) To what extent are there differences in the depth of SCM knowledge between academics and practitioners for each disciplinary period?

3.3.3 Conceptual Framing of Supply Chain Management Knowledge

The findings of Burgess et al. (2006) raise questions surrounding the conceptual framing of SCM in regards to an organisation's relationships with buyers and suppliers. According to Harland (1996) and Croom et al. (2000) there are four levels of relationship activity:

- Internal: activity related to the internal flow of materials and information from the inbound to outbound ends of the business.
- Dyadic: activity related to the management of two party relationships with the immediate suppliers or buyers.
- Chain: activity related to the management of several organisations from the supplier, the supplier's supplier through to the customer and the customer's customer.
- Network: activity related to the management of the interconnected operations of several organisations.

It is logical to assume that investigation of these four levels requires that the people-centric constructs are implicit to the level identified. Consequently, the more external the level of relationship the more vital would be the people-centric constructs.

Interestingly, Burgess et al. utilises only three levels of conceptual framing: activity (encompassing both 'internal' and 'dyadic'); process (equating to 'chain'); and system (equating to 'network'). Their fourth level 'other' reflects a desire to investigate philosophical aspects of SCM – this level will not be utilised in this research. Although their findings indicate a predominance of activity at the 'process' level, it is interesting to note that this level of framing is at odds with the people-centric constructs, as any degree of external management of and with other organisations implies a high degree of inter-organisational relationships. Thus, it can be argued that the 'relationships' may not be entirely developed on the back of building actual interpersonal relationships; instead, they may merely reflect the historical development of SCM from OM philosophies and techniques. As such, it is suggested that system-centric aspects dominate any interactions between organisations irrespective of whether they are suppliers or buyers.

The combination of the various lists of constructs and the three levels of conceptual framing it is suggested, inhibits the body of knowledge surrounding SCM. Tension between the ideal views of SCM being predominantly about building close relationships is at odds with the technocratic system-centric aspects indicated. Thus, the findings of Burgess et al. imply an alternative perspective of SCM to that discussed in Section 2.1.3. Hence, this research asks similar questions and seeks to identify whether there has been a change over time in the conceptual framing of SCM:

- RQ(2c): To what extent are there differences in the conceptual framing of SCM knowledge between academics and practitioners for each disciplinary period?

In summary, Section 3.3 has responded to Harland et al. (2006) who suggested that the degree of knowledge within a domain, in particular its breadth and depth, is an inconclusive indicator of disciplinary identity. Furthermore, there has been acknowledgement as to a lack of consensus regarding the constructs and concepts that form the basis of an SCM body of knowledge (Burgess et al., 2006; Chen & Paulraj, 2004; Min & Mentzer, 2004). However, as this section has shown, an SCM body of knowledge is ascertainable via various means; thus, this section responds to the suggestions put forward by Burgess et al (2006). This thesis argues that by utilising a combination of factors (breadth, depth, and conceptual framing), the degree of SCM knowledge is ascertainable. Accordingly, application of these factors within the confines of this research provides an answer as to whether SCM will devolve into a variety of miscellaneous categories or be bound into unifying streams of thought signifying a discipline.

3.4 Situating 'Quality' within Supply Chain Management

Boyer and Swink (2008) advise that there is a tendency to discount arguments and findings from studies conducted utilising methods alternative to those with which researchers feel comfortable. Thus, they argue that there are benefits in setting aside biases that limit understandings as to the potential of alternative methods. To that end, Rungtusanatham, Choi, Hollingworth, Wu, and Forza (2003) argue that disciplines should periodically go through self-reviews asking whether the status quo approach of the time is still appropriate to current investigations. These views are tempered by the proviso that no one research approach or methodology is generically better than another, nor do the merits of one invalidate the other (Singhal et al., 2008). Multiple approaches to investigating SCM enable a holistic understanding to be attained that facilitates a balanced conceptualisation of SCM.

Nevertheless, the threat of a dogmatic response surrounding the question of how a domain maintains quality standards creates conditions where advocating and justifying the status quo inhibit disciplinary development. Entrenched approaches to quality standards endanger scientific advancement within a domain. Once saturation of one method occurs, another becomes the 'method of choice', implying that research approaches have a lifecycle from slow acceptance to maturity through to decline. The growing debate surrounding quality issues within SCM leads to the third core research question:

- RQ(3): Are there sufficient indicators of quality in the SCM literature to signify it is a discipline?

Fabian's (2000) third criterion pertaining to the standard of quality in regards to research is examinable via two aspects: First, articles have a perceived quality, but does that quality reflect adherence to standards ensuring rigour or relevance, and what are the implications of such (Section 3.4.1); second, can authors mitigate the rigour versus relevance divide (Section 3.4.2)?

3.4.1 Rigour versus Relevance

Throughout SCM's development, there have been numerous studies that seek to determine where exactly it has been (and how), and hence where it may be heading. This section pertains solely to those studies that have examined SCM-orientated literature to provide an answer as to whether past research has followed rigour or relevance issues. The question must be asked as to whose needs are being met through publishing – academics or practitioners?

A study by Williams and Oumlil (1987) enlightens the debate. Their investigation of *Journal of Purchasing and Materials Management* (JPMM) (1965 to 1986, n=472) found an adherence to relevance rather than rigour, implying that from 1965 to 1986 the pursuit of practical and managerially relevant issues was a key determinant of publication. However, these findings must be tempered by the fact that 65% of their articles were rated as normative; although relevance was high on the agenda for article quality, such articles were written from the view of what *should* be done, not what was *actually* occurring.

Rungtusanatham, et al. (2003) undertook a larger study over a 21-year period (1980 to 2000, n=285) of *Decision Sciences* (DS), *Journal of Operations Management* (JOM), *Management Science* (MS), IJOPM, *International Journal of Production Research* (IJPM), and *Production and Operations Management* (POM). The focus of their research was to engage in 'trend and pattern' analysis of the evolution of surveys via the establishing of specific standards for their quality. Their findings indicate a move away from the conceptually based articles of the past with an increase in utilisation of the survey methodology. Consequently, their study indicates a movement within SCM away from relevance towards aspects of quality that ensure rigour. However, caution is required as this study only examines one methodological approach; other approaches may address aspects that lean towards relevance.

A later set of studies covering a combined period from 1992 to 2005 also examines whether academic articles adhere to rigour or relevance: Gupta et al. (2006) from 1992 to 2005 (n=399, in POM), and Spens and Kovacs (2006) from 1998 to 2002 (n=378, in *International Journal of Logistics Management* (IJLM), *International Journal of Physical Distribution and Logistics Management* (IJPDLM), and JBL). Gupta et al. (2006) sought to assess how many authors met the journals' stated objectives towards empirical research, finding that only 153 were classed as empirical, and of those, survey-based research (27%) was the predominant method. The implication of this study is that utilising survey-based methodology fulfils the requirements of rigour, thus a scholar's understanding of rigour is through formulation of an understanding of survey methodology. Spens and Kovacs meanwhile sought to identify between high quality studies with sophisticated data analysis techniques and low quality studies with simplistic data analysis techniques. They found that not all employed sophisticated mathematical/statistical data analysis techniques (however no percentages were given as justification for this finding). Overall, both studies called for 'rigour' of research design, method and data analysis techniques to be the prime motivator behind research and publication, implying that such standards of quality are lacking in SCM.

Taken together these studies indicate that the predominant research method is that of surveys orientated within a functionalist paradigm. This thesis argues that such strong adherence to one method for data collection limits the type of research questions asked, and therefore limits any advancements of SCM. However, there have been recent calls to defend the status quo as Carter et al. (2008) fear that a paradigm shift away from the 'accepted' methodologies of SCM (surveys) may occur, resulting in a methodological shift they believe challenges the integrity of SCM. Thus, they advocate that multiple complementary methodologies be utilised, as a collective strengthening of SCM's theoretical foundations would then occur, and hence they believe that disciplinary identity would be established.

The pattern of thought across such studies reveals that academia equate quality with adherence to sophisticated data analysis techniques of specific methodological approaches. It is logical to conclude that 'rigour' of an article is of far greater importance to an academic author than 'relevance' to practical considerations, even though there is an expectation to state the implications of the study's findings for practitioners at the end of an article. This is not surprising given that an individual's success within academia is dependent upon their publishing activities within prestigious journals; providing insight for practitioners is of secondary importance.

Yet, the findings of Williams and Oumlil (1987) indicate that at one time in SCM's historical development, relevance to practical applications had been a vital criteria to ensure publication. The inference behind this disconnect is a serious one, as it suggests that although academics advocate research to benefit both academia and practice, they instead address aspects that ensure publication within academic outlets, thereby endorsing their continued employment through fulfilling criteria related to tenure and promotion.

It would be easy to argue that it is extremely obvious that academic publications would adhere to issues of rigour while practitioner publications would adhere to issues of relevance, and therefore there is no point in investigating Fabian's quality criterion. However, Section 2.2.3 provides insight into why this criterion is worthy of investigation, through presenting arguments as to the academic and practitioner approaches to developing knowledge. It is argued that academics operate a closed-loop research system that perpetuates self-interest and bias towards maintaining the status-quo; such narrow thinking is suggested to be a failure to acknowledge the actual messy realities of practice. In terms of addressing quality issues pertaining to rigour or relevance, the same argument is made – that academic output is at risk of being labelled irrelevant if it fails to address the real-world needs of practitioners. Taken to the extreme, obsolescence is possible. Subsequently, RQ(3a) asks:

- RQ(3a): To what extent are there differences in observance to rigour or relevance criteria by academics and practitioners For each disciplinary period?

3.4.2 Can Authors Mitigate the Rigour-Relevance Divide?

Related to the above rigour versus relevance discussion is the role that authors play in mitigating the rigour-relevance divide. It is argued that academic and practitioner publications play a strategic role in the development, dissemination and historical analysis of knowledge within a discipline (Fawcett, Vellenga, & Truitt, 1995). Numerous studies seeking to identify the leading journals have been conducted in various disciplines such as marketing, economics and psychology (Barman et al., 2001), while few exist that examine SCM's related areas such as operations and logistics (Svensson et al., 2008; Zsidisin et al., 2007). Studies have utilised internationally recognised rankings such as the 'Journal Quality List' and the 'Classification of Academic Journals in the Field of Business and Management Studies' to establish quality (Harland et al., 2006), while others have surveyed academics as to how they evaluate and rate various journals on their ability to extend the field (Menachof et al., 2009; Zsidisin et al., 2007).

Barman et al. (2001) argue that the concept of 'quality' is nebulous when it comes to determining journal standards. A major criticism of journal-ranking studies is that there is a lack of appropriate definitions in regards to the key words of 'quality' and what constitutes rigour or relevance (Soteriou, Hadjinicola, & Patsia, 1999). In addition, Barman et al. (2001) argue that there is an indication that some researchers may equate methodological rigour with analytical content, implying that quality only exists in an article employing sophisticated statistical and mathematical analysis models.

Zsidisin et al. (2007) created a detailed multi-item measure to enable purchasing and supply management (PSM) researchers to identify leading journals for their publications. (It is interesting to note that although they utilise the term SCM interchangeably with PSM, they hold the view that PSM is something different, and hence worthy of a new term. For the purposes of the following discussion, their term is utilised, as it is an integral part of their multi-item measure, although the view of this author is that they are in fact discussing SCM.) They target four areas of concern:

- Journal Quality: qualified reviewers, review process is double blind, respected editorial board and reviewers, articles well written and of consistently high quality, and the journal has a diverse readership.
- Journal Reputation: authors have good reputations, large circulation, sponsored by a respected organisation, and article acceptance rate is low.
- PSM Practitioner Relevance: useful information for teaching, issues of current concern to businesses addressed, articles are relevant to managers, and articles provide insight to the practice of PSM.
- PSM Research Relevance: journal is useful research tool, articles provide insight into theory of PSM, other PSM scholars read this journal, research methods are

rigorous, articles relevant to academics, and research methods are appropriate for the research objectives.

Zsidisin et al. (2007) found 'PSM Research Relevance' contained the most important criteria in determining journal rankings as it was deemed vital for the dissemination of knowledge. Closely related was the factor of 'Journal Quality'; seeing that it is more related to the processes and outcomes of submitting articles they suggest that academics do indeed regard rigour and relevance as separate issues. The third factor of importance is that of 'PSM Practitioner Relevance', finding that although journals are responsible for disseminating knowledge to managers, a negative correlation to the other three factors exists. In analysing why, Zsidisin et al. determine that academic relevance and practitioner relevance are separate issues. Relevance is determined by who you are. Academic relevance is orientated around theory development and the creation of new knowledge, which is only relevant to other academics and hence disseminated via publications that academics read, whereas practitioner relevance is orientated around improving practice and finding solutions to implementation issues, hence knowledge of such solutions is disseminated via trade publications.

A recent study by Menachof et al. (2009) into SCM journal rankings identifies several issues of interest. First, five publications hold international recognition as being of high quality (JBL, *Harvard Business Review* (HBR), IJPDLM, IJLM, and *Supply Chain Management Review* (SCMR)). Second, there was an absence of previously high-ranked SCM orientated journals, leading the authors to believe that holding a narrow focus of the discipline is detrimental to a journal and may threaten its survival. Although the study did not address practitioner relevance directly, they did attempt to bring in a 'practice' element by evaluating journals based on 'teaching and outreach' usefulness. JBL, SCMR and HBR were identified as the leading journals for this, an interesting finding as they were also part of the internationally recognised group for having high quality in relation to academic writings.

Overall, the study by Zsidisin et al. (2007) supports two studies into the quality of SCM-orientated publications. Fawcett et al. (1995) identified that for a journal to achieve 'high status' (i.e. high quality) it had to fulfil several criteria: articles needed to be of high quality, impact on the discipline, be relevant to practitioners, be readable, have current topics, and finally provide both theoretical and practical orientations. Meanwhile practitioner trade publications had a very different set of criteria: articles to be readable, current topics to be addressed, and topics to be wide-ranging. Updating the earlier study Rutner and Fawcett

(2005) found that JBL, SCMR and IJPDLM were the top three publications for academics, while practitioners identified SCMR and JSCM as the leading publications.

It can be argued that the importance of the rankings of publications is determined by who you are and how relevant the article/publication is to you. However, does this then mean that knowledge by and for academics should never 'mix' with knowledge by and for practitioners? Should authors, irrespective of whether they are academics or practitioners attempt to publish in each other's publications, and through doing so pass on their knowledge? Subsequently, this research question queries whether authors crossover and publish in both sets of publications thus seeking to cross the rigour-relevance divide and is formulated as:

- RQ(3b): To what extent are there differences in the author publishing activities by academics and practitioners for each disciplinary period?

In summary, Section 3.4 illustrates that entrenched approaches to quality standards in relation to research jeopardise scientific advancement within a discipline. It is evident that from a methodological view surveys dominate, while academic journals risk losing not only their high quality status if too narrow a scope is applied, but also their very survival. Although there have been calls to maintain the status quo within SCM research (Carter et al., 2008), this section provides evidence as to how risky a proposition that is in terms of disciplinary development; hence, SCM risks retrenching from a valid disciplinary base to that of a soon-to-be-passing management fad.

3.5 Summary

This chapter theorises the disciplinary analysis framework employed within this research through reviewing the core assumptions of Fabian and Kuhn as to the characteristics that constitute a discipline as well as its evolution. As such, it mitigates the threat of disconnect between theoretical assumptions and experienced reality suggested by Fabian's quotation at the beginning of this chapter. The theorised disciplinary analysis framework addresses the core objective of this research, which is to gain insight into the disciplinary identity of SCM through ascertaining its core characteristics whilst mapping their evolution.

To reiterate, at the core of the disciplinary analysis framework are Fabian's thoughts as to the characterisations of a discipline via three specific criteria: coherence, knowledge, and quality. The ensuing discussion in Section 3.1 mitigated the weakness in Fabian's dialogue of a lack of in-depth substantiation of each criterion, positioning each criterion to enable its influences and interactions to be ascertained. Influencing the disciplinary analysis framework are Kuhn's theories as to disciplinary evolution. The critique surrounding the pre-paradigmatic, normal science, and crisis periods illustrates that a domain is under constant pressure from various external and internal forces that direct its development. As such, the process of disciplinary evolution is a cyclical one that has at its core, revolution. Although Kuhn's conceptualisation of a paradigm is considered weak, alternatives draw heavily upon Kuhn, thus indicating broad acceptance within the literature.

Application of Kuhn to Fabian provides this research with a robust disciplinary analysis framework (depicted in Figure 3.2) to address the core objective of this research. Sections 3.2 to 3.4 provided a pre-test of the assumptions of the three criteria, enabling a test for consistency within the purposes of this research. Through this pre-test process, the core research questions were refined (see Table 3.5; the following page).

The body of work surrounding the disciplinary identity of SCM indicates an increasing level of discontent, as academics seek through their research to question the very boundaries of the domain (for example, Carter, Leuschner, & Rogers, 2007; Croom et al., 2000; Giannakis & Croom, 2004; Harland et al., 2006; Miles & Snow, 2007). Several researchers even advocate that debate surrounding disciplinary identity indicates the potential for further evolutionary development (Harland et al., 2006; Wolf, 2008). However, the question must be asked for whom are these disciplinary identity debates of importance, for they serve no purpose to practitioners, who are more concerned with implementable tactics and strategies.

Observations by Gripsrud et al. (2006) that SCM is merely an attempt at reunification of various strands of theoretical thought may be legitimate. This chapter has challenged current SCM thought and found it wanting. As has been shown, the core assumptions of SCM revolve around a synthetic reality that limits advancement of the topical area. Rather than being a prisoner to mediocrity, this thesis seeks to challenge the pre-existing assumptions evident within the literature by applying a purpose-developed disciplinary analysis framework. The following chapter presents the philosophical underpinnings and the methodological processes behind this research to enable such a challenge to be undertaken systematically.

Table 3.5: *The Research Questions*

RO: To determine the degree to which academics and practitioners differ in their conceptualisation of SCM, and how these conceptualisations have evolved over time.

RQ(1): Are there sufficient indicators of coherence in the SCM literature to signify it is a discipline?
RQ1a: To what extent are there differences in the SCM definitions used by academics and practitioners for each disciplinary period?
RQ1b: To what extent are there differences in the SCM terminology used by academics and practitioners for each disciplinary period?
RQ1c: To what extent are there differences in the approaches to theoretical development by academics and practitioners for each disciplinary period?

RQ(2): Are there sufficient indicators of a unified body of knowledge in the SCM literature to signify it is a discipline?
RQ2a: To what extent are there differences in the breadth of SCM knowledge between academics and practitioners for each disciplinary period?
RQ2b: To what extent are there differences in the depth of SCM knowledge between academics and practitioners for each disciplinary period?
RQ2c: To what extent are there differences in the conceptual framing of SCM knowledge between academics and practitioners for each disciplinary period?

RQ(3): Are there sufficient indicators of quality in the SCM literature to signify it is a discipline?
RQ3a: To what extent are there differences in observance to rigour or relevance criteria by academics and practitioners for each disciplinary period?
RQ3b: To what extent are there differences in the author publishing activities by academics and practitioners for each disciplinary period?

(Source: the author’s own)

Chapter Four: Research Methodology

> By having a positive attitude towards both techniques, pragmatist researchers are in a better position to use qualitative research to inform the quantitative portion of research studies, and vice versa… Armed with a bi-focal lens, rather than a single lens, pragmatist researchers will be able to *zoom in* to microscopic detail or to *zoom out* to indefinite scope (Onwuegbuzie & Leech, 2005b, p. 291, italics in original).

This research has presented arguments regarding the disciplinary identity crisis facing SCM: Chapter Two through a systematic critique of the conceptualisations that frame SCM and 'knowledge', and Chapter Three through theorising the proposed disciplinary analysis framework. The objective of this research is to ascertain the degree to which academia and practice differ in their conceptualisations of SCM, and to map their evolution.

Such an investigatory scope requires a research methodology able to provide a philosophical and practical framework to answer the posed research questions. The quotation by Onwuegbuzie and Leech (2005b) succinctly expounds on the methodological foundation of this research, the paradigm of pragmatism. They regard pragmatism as the ultimate triangulative methodological approach, due to its inherent mixing of quantitative and qualitative assumptions throughout a study's life. Pragmatism, by employing a bi-focal lens as the basis of its investigatory methodology, enables microscopic as well as macroscopic details to be ascertained simultaneously.

As elucidated by Charles Pierce, William James, and many others, pragmatism espouses a worldview based around a rich tradition that endorses no one simple creed. Instead, pragmatism is a movement that advocates freedom of choice to draw from both quantitative and qualitative assumptions as required. A practical, common-sense approach combines with the researcher's purpose of facilitating understanding through incorporation of both sets of assumptions to endorse a pragmatic approach to the research design (Creswell, 2009).

This chapter expounds on the underlying processes and principles behind the methodology of this research (see Figure 4.1). Section 4.1 presents the historical context of pragmatism and its development from the paradigm wars. Section 4.2 anchors pragmatism from its epistemological and ontological conceptualisations and conceives the research design, while Section 4.3 details and justifies the method of data collection utilised. Section 4.4 details the phases of this research from data selection, category specification, and generation of the coding scheme through to the addressing of issues surrounding legitimacy via the implementation of actions that ensure reliability and validity.

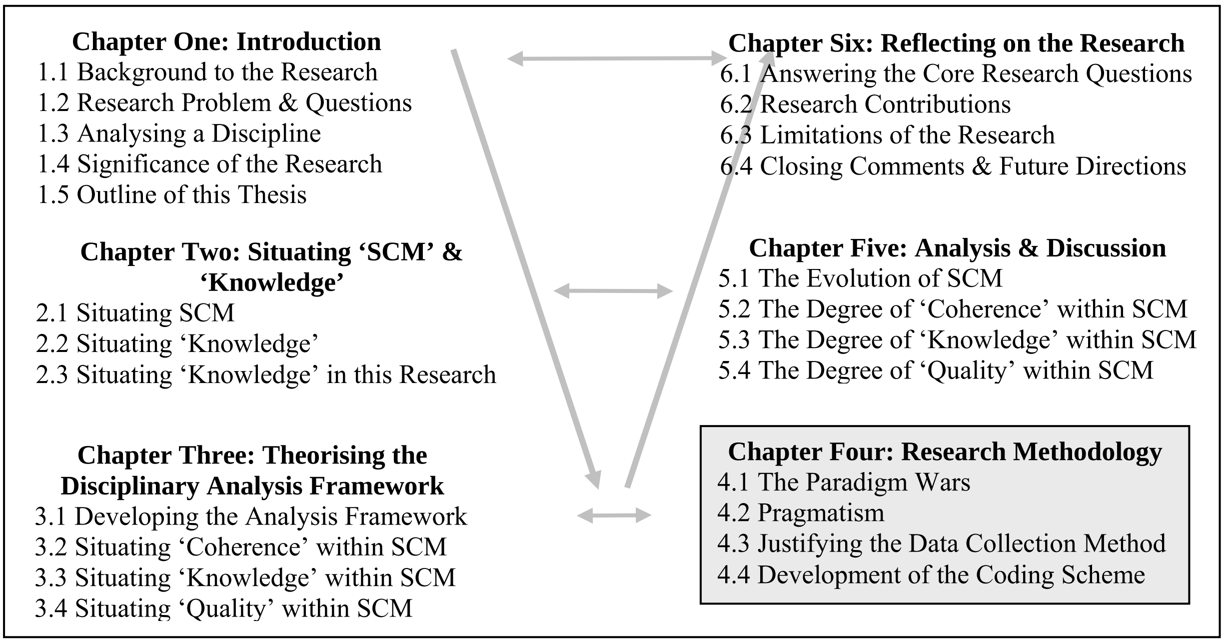

Figure 4.1: *Structure of Thesis Featuring Chapter Four*

4.1 The Paradigm Wars

It is widely acknowledged that the 'paradigm wars' (circa 1975 to 1995) polarised the positivist[5] and interpretivist[6] camps to such a degree that staunch advocates of each still believe that only their worldview is valid (Onwuegbuzie & Leech, 2005b; Teddlie & Tashakkori, 2009). Positivism, with its focus on objective verification, touts a narrow view of science, which advocates that researchers should remain emotionally detached from the object of their study, eliminate bias, and empirically justify research (Johnson & Onwuegbuzie, 2004; Onwuegbuzie & Leech, 2005a). With its formal writing style, positivism promotes the use of an impersonal and passive 'voice' that maintains that it is possible to achieve time and context-free generalisations. Such a narrow view of science caused rebellion as researchers pointed out that many decisions, made throughout the research process, precede objective verification decisions. The new paradigm offered – interpretivism – therefore advocated that research be value-bound, subjective, and flow from the specific to the general. Characterised by a dislike of the formal, detached and passive writing style of the positivists, interpretivists

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[5] For the sake of consistency, the term 'positivism' will be used to denote all paradigms orientated around the quantitative perspective.

[6] For the sake of consistency, the term 'interpretivism' will be used to denote all paradigms orientated around the qualitative perspective.

adopt instead a style that promotes a detailed, rich and thick description of events (Johnson & Onwuegbuzie, 2004).

The debates that rage between such purist positions have given rise to paradigm contrast tables that dichotomise the inherent differences of the two competing scientific worldviews along various philosophical and methodological themes, such as ontological, epistemological and axiological values (Guba & Lincoln, 1994; Teddlie & Tashakkori, 2009). The central tenet of these contrast tables is the 'Incompatibility Thesis', which states that research methods are associated in a one-to-one correspondence with their respective quantitative and qualitative orientations. Hence, it has been argued that it is inappropriate to combine methods from one paradigm with methods from the other (Lincoln & Guba, 1985; Teddlie & Tashakkori, 2009).

The emergence of the pragmatist paradigm is a direct challenge to the purists' positions. Advocating that quantitative and qualitative orientations are not mutually exclusive, pragmatists espouse a worldview centred on the 'Compatibility Thesis' (Onwuegbuzie & Leech, 2005b; Teddlie & Tashakkori, 2003). Within this view, the assertion is that the relationship between the quantitative (positivist) and qualitative (interpretivist) orientations is not that of a dichotomy; rather, it can be more accurately described as a continuum. Furthermore, Onwuegbuzie and Leech (2005b) state that issues surrounding such facets as realism vs. idealism, objective vs. subjective, deductive vs. inductive, rationalism vs. naturalism, reductionism vs. holism, numbers vs. words, and generalisation vs. uniqueness can be reconceptualised away from the either/or stance advocated by the purists. Instead, researchers are objective and subjective at various stages of research, use both deductive and inductive reasoning, use numbers and words for analysis, and both generalise and specify as required. Such reconceptualisations require alternative epistemological and ontological thinking to that advocated by the purists.

4.2 Pragmatism

As a philosophical doctrine, pragmatism is regarded to be in its infancy, with questions still being asked of its principal contentions, central arguments and major themes (Talisse & Aikin, 2008). Pragmatism is not shackled by the perception of being a historical relic; instead, its first 100 years have been marked through lively debate surrounding its exact nature, characterisations and definitional boundary. As a methodology, three distinct orientations are identifiable: Peirce touts the logical and metaphysical aspects; James focuses on psychology and personal experience; while Dewey emphasizes the biological and functional structures within both the individual and society (Maxcy, 2003; Talisse & Aikin, 2008). Irrespective of the philosophical orientation followed, pragmatists share a basic precept that links action and truth with a belief that ideas (for instance theories) are not for mere contemplation purposes. Rather, advocates state that ideas must be 'made to work' and hence champion a return to common-sense in the true Aristotelian sense of phronesis (an attribute that is at the core of all three orientations).

Pragmatism is, however, more than a philosophical movement. Maxcy (2003) provides commentary on how pragmatism is in itself a method of inquiry in regards to social research, with various terms having been used to distinguish it from purely quantitative or qualitative leanings: multi-method, convergence, integrated, synthesis, combined, or mixed methodology. Adherents to pragmatism have established norms that promote and enforce legitimacy, thereby enabling researchers to utilise the paradigm as a valid research tool. This section situates pragmatism as the method of inquiry of this research via its epistemological and ontological positioning and its influence on the research design of this thesis.

4.2.1 Epistemological and Ontological Positioning of Pragmatism

Burrell and Morgan are commonly credited with providing researchers with a paradigmatic classification framework that enables easy identification of the purists' positions (Goles & Hirschheim, 2000; Pruyt, 2006). However, the Burrell-Morgan framework is acknowledged as being extreme for it fails to allow intermediate positions, thereby creating a dichotomy between the approaches investigating the nature of science (Pruyt, 2006). Challenging these extreme views are those who ascertain that more intermediate positions are attainable through the use of pragmatism as the underpinning philosophical school of thought (Denscombe, 2008), as it provides a set of assumptions regarding knowledge and inquiry that enable distinction from the purists' positions. Thus, pragmatism enables a fusion of approaches that challenge the sterile and unproductive dualism of the purists' positions (Maxcy, 2003; Tashakkori & Teddlie, 1998), and provides a basis for legitimising mixed-methods research as the third alternative to the two purist's positions (Johnson, Onwuegbuzie, & Turner, 2007). Furthermore, as a new orthodoxy pragmatism advocates that it is not only allowable but desirable to mix methods from differing paradigms, as such it is a common-sense approach that derives from 'expediency' (Denscombe, 2008; Johnson et al., 2007).

In reality, the above issues overlap rather than being mutually exclusive. Subsequently, pragmatism has yet to attain an agreed vision or operate from a unitary position. However, that is not to say that pragmatism should be discounted, for it offers insight into analytical procedures that produce superior results:

> …it offers a practical and outcome-orientated method of inquiry that is based on action and leads, iteratively, to further action and the elimination of doubt; and it offers a method of selecting methodological mixes that can help researchers better answer many of their research questions (Johnson & Onwuegbuzie, 2004, p. 17).

Consequently, it is readily acknowledged that pragmatism provides strengths that offset and overcome the inherent weaknesses surrounding purely qualitative and quantitative orientations (Creswell & Plano Clark, 2007).

Ontologically, pragmatism holds both a realist and relativist position. There is acceptance of one universal external truth (or reality) but denial that one universal truth (or reality) can be determined; hence, pragmatists do not accept that one explanation of reality is better than the other. Consequently, selection of theory is based on what will best produce the desired outcomes, although Pruyt (2006) states that selection of theory can also be based on the researcher's own personal value system. Epistemologically, pragmatists exist on a continuum when it comes to the objective-subjective positioning, fluctuating between each position depending on the phase of research. Tashakkori and Teddlie (1998) add that at various stages the knower and the known must be interactive, at others the knower may stand apart from that which is being studied. Table 4.1 presents details as to the positioning of pragmatism between the purists' positions.

Table 4.1: *The Ontology, Epistemology and Axiology of Pragmatism*

	Positivism	***Pragmatism***	***Interpretivism***
Ontology	Single external reality that can be known	Acceptance of one external reality, but choice of explanations that best produce desired outcomes (pragmatist realism)	Multiple socially constructed realities
Epistemology	Objective – knower and known are independent	Objective and subjective	Subjective – knower and known are inseparable
Axiology	Inquiry is value-free	Aware but not concerned by value-ladenness of choice of research, of the inquiry and of the interpretation	Inquiry is value-bound
Method(ologie)s	Purely quantitative	Quantitative and qualitative	Purely qualitative
Logic	Deductive – from general to particular	Deductive and inductive	Inductive – from the particular to the general
Causality	Knowable real causes which are temporarily precedent or simultaneous with effects	There may be causal relationships, but we will never be able to completely pin down the exact 'real' causal relations	Causes and effects are indistinguishable because all entities are simultaneously shaping each other

(Source: adapted from Pruyt, 2006, p.10; Tashakkori & Teddlie, 1998, p.23)

Subsequently, to the pragmatist researcher the 'research question' is of vital importance, both in directing the search for a suitable data collection method, and in developing a research design (Maxwell & Loomis, 2003; Onwuegbuzie & Leech, 2005a; Teddlie & Tashakkori, 2009). The main criterion according to Pruyt (2006) is to search for and utilise fully 'what will work best' in answering those research questions. In terms of this research, the three core research questions (including sub-questions) enable both quantitative and qualitative data collection and analyses.

Overall, the central premise of positioning pragmatism between positivism and interpretivism enables a more complete conceptualisation of the phenomenon under study than either of the purists' positions can. Evidence is captured that enables these conceptualisations to be communicated, utilising both words and numbers (Creswell & Plano Clark, 2007). Consequently, a pragmatist methodology enables the development of a research design that accurately portrays the actual process a researcher goes through when conducting research.

4.2.2 Informing a Research Design from Pragmatism

Pragmatists reject the dogmatic either/or choice posited by purists of positivism and interpretivism, and instead search for practical answers to queries (Talisse & Aikin, 2008; Teddlie & Tashakkori, 2009). That is not to say that 'anything goes' in the pursuit of truth within a pragmatist research design. Instead, pragmatism mixes the 'techne' (technical processes of research) with 'phronesis' (the interests and know-how of researchers) and with 'praxis' (the mechanisms of decision making) (Maxcy, 2003). The result is a method of inquiry that utilises aspects of the quantitative *and* qualitative paradigms *as required* to investigate problematic situations. As Maxcy (2003, p. 85) states eloquently,

> What is healthy about a pragmatic social science of mixed and multiple methods is the fact that this effort has opened up the languages of social science. It allows a number of projects to be undertaken without the need to identify invariant prior knowledges, laws, or rules governing what is recognized as 'true' or 'valid'. Only results count! Nor do we require a single foundational discourse of 'research methodology' to warrant our activities. 'Rationality' need not be affixed to a single overarching method of inquiry, nor do we require that belief in any method or mixture of methods requires 'justification' for the pragmatic interest to win out.

Due to the developing nature of pragmatism both as a methodology and as a method of inquiry, a multitude of taxonomic frameworks illustrating potential research designs exists within the literature (Morse, 2003; Newman, Ridenour, Newman, & DeMarco, 2003; Teddlie & Tashakkori, 2009). Although such typologies are valuable in that they provide an indication as to the dominance of each orientation, or the sequencing order if conducting a study utilising both quantitative and qualitative orientations, they do have limitations. Tashakkori and Teddlie (1998) acknowledge that no typology can encompass the diversity of potential designs available, especially when paradigms are situated under such broad headings as 'quantitative' or 'qualitative'.

Tashakkori and Teddlie (2003) present 35 mixed-method research designs that cover sequential (a quantitative mini-study followed by a qualitative mini-study, and vice versa) to concurrent (quantitative and qualitative mini-studies undertaken together; one orientation could be more dominant than the other). Furthermore, they acknowledge that the 35 designs are in no way exhaustive of all the potential possibilities. Maxwell and Loomis (2003) further that argument by stating that the plethora of 'linear-style' approaches fails to address such critical components as the purpose of the research and the conceptual framework; consequently, a more interactive model is advocated.

Specific developments over the past few decades towards integrative methods have been in direct response to the purists' positions. Terminology has developed that seeks to frame the pragmatist's position; for example, the term 'multiple operationalism' (Campbell & Fiske, 1959) has been acknowledged as the first instance where 'triangulation' was formalised as part of a study's validation process (Johnson et al., 2007). Although 'triangulation' has been legitimised (Jick, 1979; Morse, 1991) as a means of constructing superior explanations in regards to the observed phenomenon within a study, pragmatism encompasses more than can be circumscribed by that single term. Pragmatism enables movement away from the traditional linear approach to research design, towards a design that applies a more holistic perspective and operationalisation (Creswell, 2009) in the integration of both quantitative and qualitative forms of data.

Subsequently, Maxwell and Loomis (2003) argue for synthesis, stating that the two orientations can be productively combined into one holistic research design. Onwuegbuzie and Leech (2005a) reinforce this view of synthesis by advocating that the strengths inherent within the quantitative and qualitative orientations should be capitalised on, rather than relying on one orientation to dominate with its associated weaknesses. A good research design therefore is one in which the components of the design work together effectively to promote an efficient and successful interaction.

According to Maxwell and Loomis (2003), five core components represent the integral elements of a study (see Figure 4.2); as such, they represent the researcher's actions and decision-making processes from research design conception through to implementation. Within an interactive design, the research questions play a central and critical role through informing and being responsive to the other components. 'Quantitatively', the focus is on the measurement of variables, whereas 'qualitatively' the focus is on seeking meaning behind the event, phenomenon or process. This critical role of the research question is supported by Johnson and Onwuegbuzie (2004) who write that the central tenet of a pragmatic research design is that researchers should create a design that effectively answers their research questions. This is in stark contrast to that advocated by the purists, who in some cases select the method first from a 'grab-bag' of possibilities and later develop research questions to fit (Johnson & Onwuegbuzie, 2004).

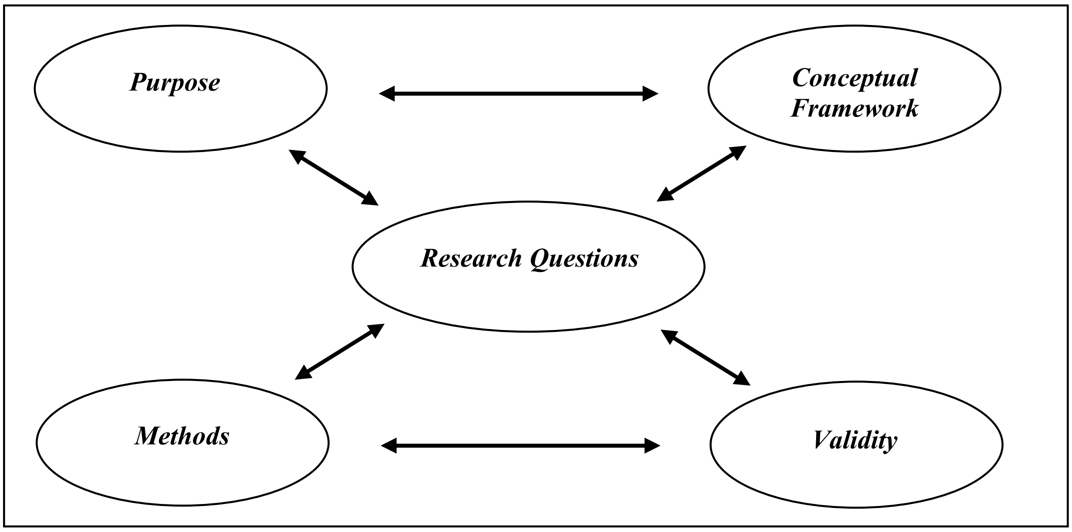

Figure 4.2: *Pragmatism's Interactive Model for a Research Design*
(Source: Maxwell & Loomis, 2003, p. 246)

An interactive study is informed from the objectives of the pragmatist researcher (Creswell, 2009). The conceptual framework is crucial as any mismatch between it and the research questions can potentially create tension (Maxwell & Loomis, 2003). As such, it is vital that the study be informed from both variance (quantitative) and process (qualitative) theories/orientations. The process of research (data collection, analysis, transformation and integration) can then be undertaken (Johnson & Onwuegbuzie, 2004). Data collected must adhere to the validation requirements of the relevant orientation for analysis. Quantitative data can be converted into narrative data (termed 'qualitised'), while qualitative data can be converted into numerical codes (termed 'quantitised') (Johnson & Onwuegbuzie, 2004; Tashakkori & Teddlie, 1998). Overall, interactive research design is consistent with that currently employed by the fields of architecture and engineering (Maxwell & Loomis, 2003) and the research designs used in early 20th century anthropological and sociological fieldwork (Johnson et al., 2007). A pragmatist-informed interactive research design is therefore a return to the more 'traditional' approach to research, which prevailed before the purists' positions gained prominence. Consequently, the challenge for any pragmatist researcher is in developing an optimal research design for the particulars of their study. Figure 4.3 illustrates the process undertaken in this research.

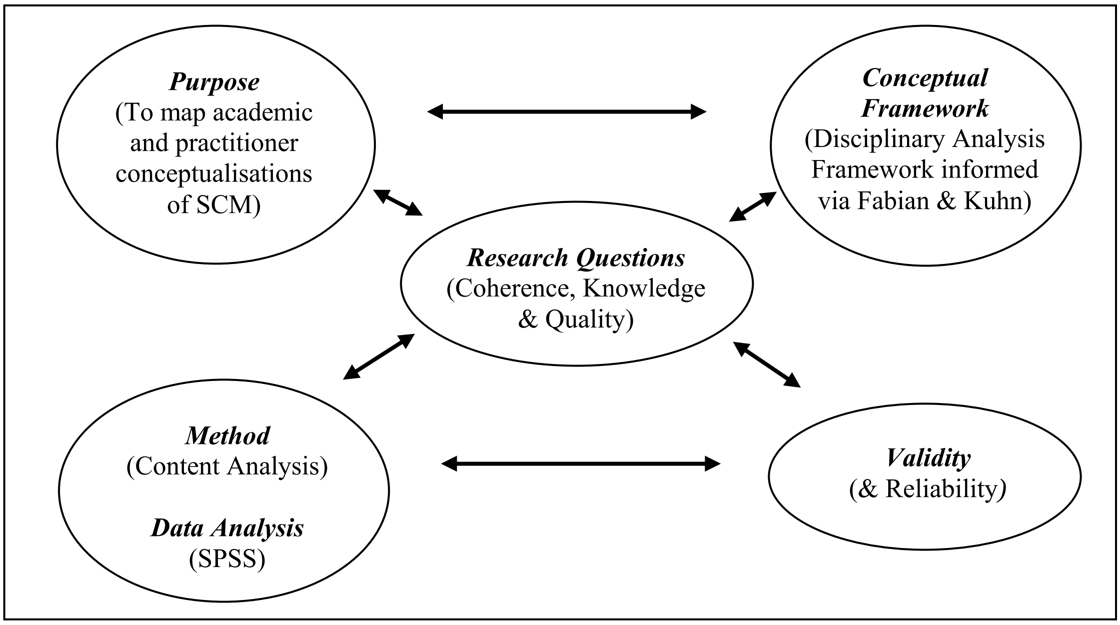

Figure 4.3: *The Interactive Research Design Utilised within this Research*

(Source: the author's own, based on Maxwell & Loomis, 2003, p. 246)

Onwuegbuzie and Leech (2005b) in their quotation at the beginning of this chapter indicate that an interactive research design enables in-depth investigation via utilisation of a bi-focal lens. For a pragmatist, all decision-making processes are guided by the core research questions, thus their answering requires a versatile data collection method capable of capturing and extracting both quantitative and qualitative data simultaneously for analysis. The following section provides details as to the method selected for data extraction.

4.3 Justifying the Data Collection Method

The core objective of this research is to map the evolution of SCM from the conceptualisations of academia and practice. Data collection techniques that revolve around contemporary events (such as interviews, case studies, surveys, and experiments) have a limited ability to track and capture data concerning historical events (Neuman, 2000). However, techniques that revolve around historical accounts or retrospective analysis (such as citation analysis and content analysis) are of greater value for their ability to track and capture data on the linkages occurring within a particular period (Neuman, 2000).

Citation analysis is concerned solely with the association between references made to or received from documents (Pilkington & Liston-Heyes, 1999; Pilkington & Meredith, 2009); as such, it has limited utility in mapping the core characteristics of SCM and their evolution. Consequently, citation analysis is not utilised in this research. However, the related technique of content analysis is cross-disciplinary and enables the examination of texts irrespective of when they were written, or whom they were written by or for. As a retrospective analysis technique, content analysis provides for the investigation of the core characteristics of SCM, their mapping, and their evolution in an objective and systematic manner. This technique is therefore appropriate for fulfilling the objective of this research.

4.3.1 Content Analysis: Origins and Principles

Holsti (1969) writes that "communication is the most basic form of human interaction" and in support of this view cites Kuhn that "communication is at the heart of civilisation" (Kuhn, 1963, p. 151 cited in Holsti, 1969, p. 1). Indeed, it is believed that without the ability to communicate and through the process transfer knowledge, groups as diverse as civilisations, organisations, and institutions could cease to exist, for it is deemed a crucial and central aspect of social interaction (Berelson, 1952; Holsti, 1969; Weber, 1985). As such, communication in any form has always been subject to analysis, with the message's characteristics examined for meaning, both manifest and latent.

Currently an increase in the digitalisation of all kinds of data (verbal, written, pictorial, and symbolic) has led to an increase in the use of content analysis by researchers. Krippendorff (2004) provides a comprehensive historical overview of the reasons behind the rise in use of content analysis for examining society's modes of communication, especially knowledge dissemination (see Figure 4.4). Throughout the evolutionary track, a growing awareness of scientific norms is evident resulting in the legitimisation of the method within scientific research and across disciplines (see also Berelson, 1952; Berg, 1998; Carley, 1994; Carney, 1972; Gunter, 2000; Neuendorf, 2002).

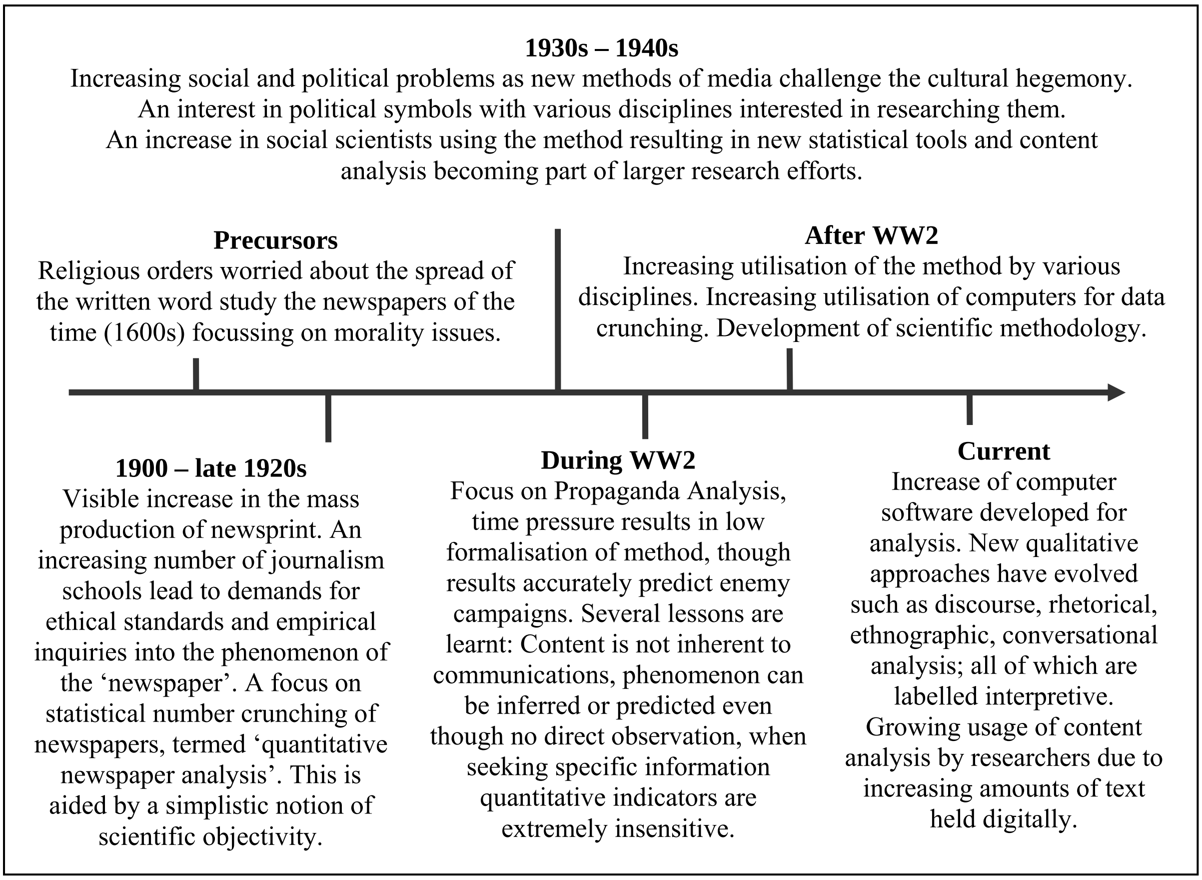

Figure 4.4: *The Historical Development of Content Analysis*

(Source: adapted from discussions in Krippendorff, 2004)

4.3.2 Justifying the Use of Content Analysis

Content analysis provides a systematic and analytical process for scrutinising bulk complex communications of knowledge such as the publications employed by academics and practitioners (Berelson, 1952; Carley, 1994; Carney, 1972; Gunter, 2000; Holsti, 1969; Krippendorff, 2004; Neuendorf, 2002; Neuman, 2000; Weber, 1985). It has been successfully employed in the examination of subject matter and the research methodologies utilised within a discipline (Inkpen & Beamish, 1994; Kent & Flint, 1997; Miyazaki, Phillips, & Phillips, 1999), the research contributions of authors and their academic affiliations to identify the 'thought-leaders' and 'key contributors' in a field (Floyd, Schroeder, & Finn, 1994; Gentry, Allen, & Vellenga, 1995; Inkpen & Beamish, 1994; Phillips & Phillips, 1998), the quality of survey research in OM (Rungtusanatham et al., 2003), the determination of a distinct Nordic paradigm to SCM (Arlbjørn, Jonsson, & Johansen, 2008); and the borrowing of theory to explain logistics (Stock, 1997).

The use of content analysis in the domain of SCM in particular and OM research in general is not new. In the OM arena, content analysis has been successfully employed to identify past trends and new directions for investigation in several leading journals: JBL (Mentzer & Kahn, 1995; Miyazaki et al., 1999), JIBS (Inkpen & Beamish, 1994), IJOPM (Taylor & Taylor, 2009), IJPDLM (Phillips & Phillips, 1998), and the *Transportation Journal* (Gentry et al., 1995). JSCM has had several studies conducted on its articles, the first by Williams and Oumlil (1987) when the journal was entitled '*Journal of Purchasing and Materials Management'*, along with two later studies (Carter & Ellram, 2003; Giunipero et al., 2008). Figure 4.5 extends the disciplinary analysis framework through situating various studies that have utilised the method to investigate SCM. However, Fabian's criteria have not been utilised holistically, while the examined studies focused exclusively on content in academic publications.

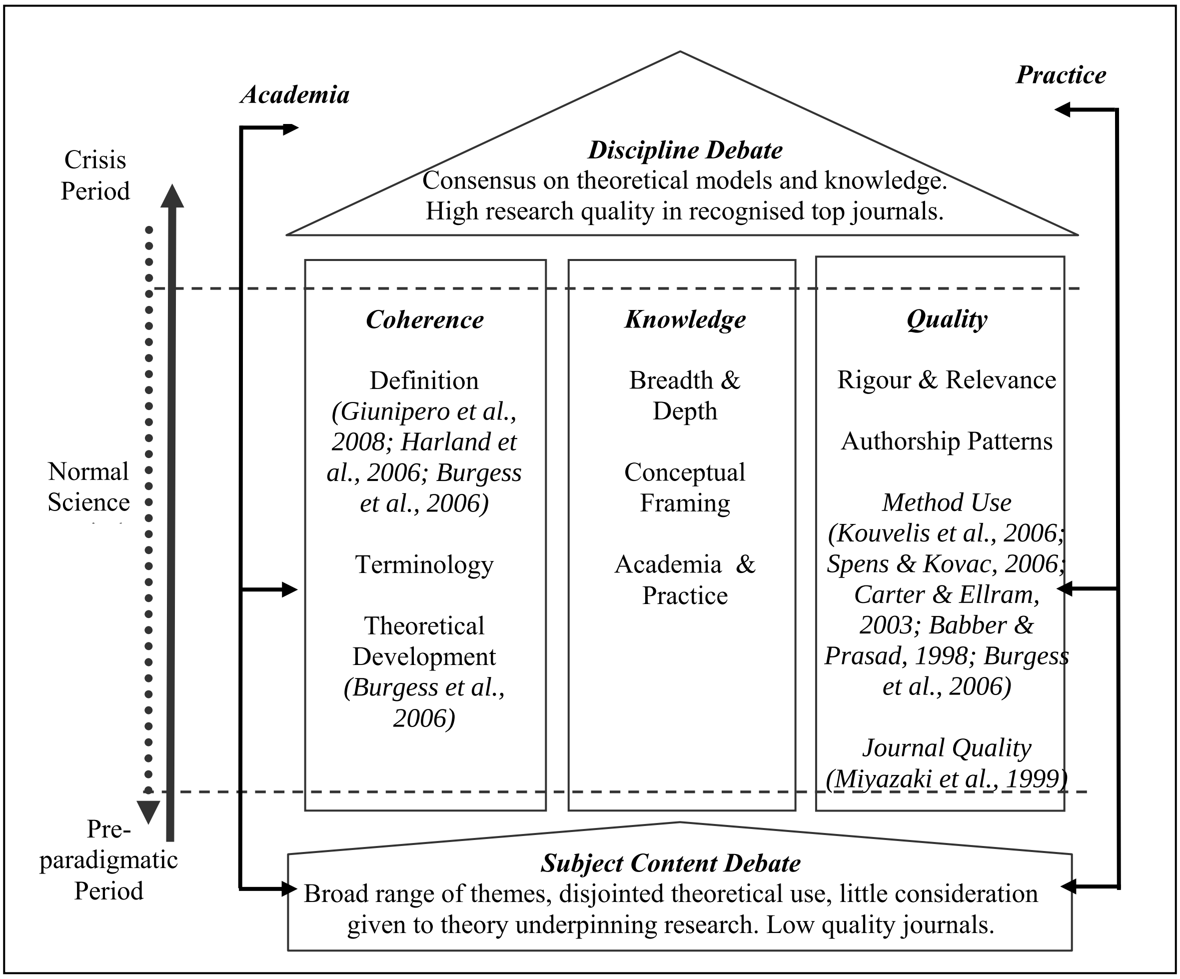

Figure 4.5: *The Disciplinary Analysis Framework – Justifying its Investigatory Scope*

(Source: the author's own)

4.3.3 Criticisms of Content Analysis

Criticism of content analysis comes from the interpretivist position as an argument that texts are open to interpretation by various researchers and consequently are not purely objective (Berg, 1998; Carney, 1972; Gunter, 2000; Holsti, 1969; Krippendorff, 2004; Neuendorf, 2002; Neuman, 2000). Berger and Luckman (1967) argue that research using content analysis cannot be purely objective as "reality is socially constructed" (p. 13), while Macnamara (2003) adds that "even the most scientific methods of social research cannot produce totally objective results" (pp. 2-3). To Shoemaker and Reece (1996), objectivity is an elusive concept that researchers persist in trying to achieve. "All of us use our experiences, personalities, and knowledge to interpret what we see", and as a result they conclude that "there is no such thing as an objective observer of reality" (Shoemaker & Reese, 1996, p. 4).

A second criticism concerns investigation of manifest and/or latent content. Holsti (1969) defines manifest content as the "surface meaning of text" (p. 12), while Berg (1998) defines it as "those elements that are physically present and countable" (p. 225). Latent content is defined as "consisting of unobserved concept(s)" or those elements that cannot be measured directly, but are evident via other indicators (Neuendorf, 2002, p. 23). In an attempt to distinguish the two, Berg wrote that "manifest content is comparable to the *surface structure* present in the message, and latent content is the *deep structural* meaning conveyed by the message" (1998, p. 226, italics in original).

The issue is that if only manifest content is analysed then "sources, receivers, and content analysts have different interpretations of the same message" (Krippendorff, 2004, p. 20). Consequently, Thomas (1994, p. 689) writes that it is the "manifest descriptor [that] is at the heart of much of the criticism addressed to content analysis", and in an attempt to defuse that criticism there is a call to 'blend' the two strategies (Berg, 1998) to overcome the inherent limitations of each. In other words, critics advocate that content analysis should follow the methodological approach of pragmatism:

> It is worth noting in conclusion that for scientific research the advantages to be gained by some type of quantification continue to be important. But asking the right question of the data is even more important than the system of enumeration used to present the findings (Holsti, 1969, p. 12).

This view is supported by de Sola Pool (1959, p. 192) who writes,

> It should not be assumed that qualitative methods are insightful, and quantitative ones merely mechanical methods for checking hypotheses. The relationship is a circular one; each provides new insights on which the other can feed.

4.3.4 Content Analysis Procedures and Pragmatism

In brief, content analysis has developed significantly along approved scientific grounds from the simplistic journalistic readings done historically to that of a modern method with a strong procedural base. Its purpose is to summarise textual matter into relevant and manageable portions of data via specified procedures (Neuendorf, 2002; Tangpong, 2010). It is a systematic process that utilises a rigorously predefined coding scheme to draw data out for analysis by either quantitative or qualitative means (Krippendorff, 2004). The pursuit of answers (to research questions) grounds content analysis empirically; researchers read texts for a purpose, not for what an author may intend to lead them to think (Krippendorff, 2004). Content analysis is situated at the intersection of the positivist and interpretivist orientations, thereby combining readily with the pragmatist methodology to enable valid inferences to be formed from published text.

Within the paradigm of pragmatism, Krippendorff (2004) states that content analysis examines "data, printed matter, images, or sounds – texts – in order to understand what they mean to people, what they enable or prevent, and what the information conveyed by them does" (p. xviii). Consequently, three distinguishing characteristics are evident: First, it is an empirically grounded method that is exploratory in process; second, it transcends the traditional notions of what content consists of; and third, it has a scientifically developed foundation that enables the planning, execution, communication, reproduction, and critical evaluation of texts (Berg, 1998; Carney, 1972; Gunter, 2000; Holsti, 1969; Krippendorff, 2004; Macnamara, 2003; Neuendorf, 2002; Neuman, 2000; Sepstrup, 1981; Tangpong, 2010).

Procedurally, content analysis reduces textual information via categories under the premise that units (such as individual words, sentences, or paragraphs) can be meaningfully analysed. The predefined coding scheme plays a vital role as the quality of the data collected, and ultimately the results, are determined by the development, definition, and rigour of its classificatory elements (Krippendorff, 2004; Neuendorf, 2002; Shoemaker & Reese, 1996; Tangpong, 2010). Such a strong scientific foundation provides specific advantages. First, it can be applied to a broad range of studies while enabling analytical flexibility as data from both orientations can be collected, transformed, and analysed simultaneously (Krippendorff, 2004). Second, researcher bias is mitigated if applied to text rather than interviews or open-ended responses in surveys; hence, content analysis is non-obtrusive. Finally, retrospective analysis via longitudinal studies can be undertaken due to the availability and ease of access of a vast amount of stored texts (Krippendorff, 2004).

In summary, content analysis combines with pragmatism to enable in-depth analysis of vast amounts of textual material via a common-sense ethos, and is therefore ideally suited for the present study. Within the bounds of this research, content analysis is utilised to investigate both academic literature and the previously unexamined practitioner literature. The goal is to utilise these publications to establish the body of knowledge of both communities via the disciplinary analysis framework and in doing so determine the evolution of SCM's disciplinary identity over time. Development of the coding scheme to capture the data requisite to this analysis is presented in the following sections.

4.4 Development of the Coding Scheme

The framework of Lasswell (1948, cited in Shoemaker & Reese, 1996, p. 12),

Who - Says What - Through Which Channel - To Whom - With What Effect

is commonly employed by content analysts as a starting point to illustrate the elements that are researched. The holistic nature of a pragmatist research design is therefore further refined into three distinct phases of research:

- Phase 1: Development of the Research Foundation – covers literature review, research objectives, research questions, and theoretical foundation (Chapters One to Three).
- Phase 2: Development of Method(ology) – covers methodology, method of data collection, validity/legitimisation issues (Chapter Four).
- Phase 3: Data Analysis – covers data interpretation and conclusions in relation to the research questions (Chapters Five and Six).

Information regarding the development of the research foundation (the first phase) was discussed in Chapters One, Two and Three. This chapter has so far presented the reasoning behind the methodology and data collection method employed within this research (phase two); the particulars of the actual coding scheme form the remainder of this chapter.

4.4.1 Identifying Relevant Publications

The first major decision is to select relevant publications for analysis. It was deemed problematic to examine articles from publications not pertaining directly to SCM; thus, publications were selected based solely on their ability to facilitate determination of an SCM body of knowledge (the criteria of primary interest in this research). A preliminary search of potential publications indicated that there are diverse publications that publish studies on SCM-related topics (for example purchasing and logistics), although few are specifically dedicated to SCM. Hence, a selection strategy was required to apply to potential publications.

Similar studies have employed various tactics in an effort to reduce the vast number of potential articles to a manageable data set. Instances of these include searching via key word criteria such as ‘supply chain’, ‘SCM’, ‘supply chain management’, ‘discipline’, or ‘theory’ (Harland et al., 2006; Wolf, 2008), while others have employed tactics related to the quality aspects of the article and/or journal (Burgess et al., 2006; Giunipero et al., 2008). Selection criteria based around specifically addressing the disciplinary analysis framework were utilised. Those publications short-listed had to publish at least 10 articles in a year that addressed SCM from a holistic and all-encompassing perspective to enable the body of knowledge to be determined. Through application of such criteria a list of 12 academic and seven practitioner publications was developed (see Appendix 2 for more details).

Examination of the number of articles per issue published each year provides a minimum and maximum number of potential articles to code. For the seven practitioner publications, there was the potential to code between 8,114 minimum and 12,346 maximum articles, while there were 3,105 minimum and 5,584 maximum articles for the 12 academic publications. Such a vast number of articles are deemed beyond the scope of this research, especially as other studies using content analysis have coded between 41 and 882 articles (see Appendix 3). Therefore, it was necessary to reduce the significant volume of potential articles to a more manageable data set.

Appraising other studies reveals that publication selection criteria revolve around the status and quality of the publication, and the perception by authors that the publication leads the field (Harland et al., 2006; Pilkington & Liston-Heyes, 1999; Pilkington & Meredith, 2009). Hence, articles within these leading publications are deemed to be representative of SCM knowledge from an academic stance. However, there is no indication of similar studies for leading practitioner publications as they have yet to be analysed in such a manner by academics. Thorough examination of the seven practitioner publications available provided evidence as to their target audiences, purpose of publication and editorial emphasis. Such information enabled this author to determine which publications met similar criteria to the academic publications. Subsequently, two academic publications – *Journal of Supply Chain Management (JSCM)* and the *International Journal of Physical Distribution & Logistics Management (IJPDLM)* – and two practitioner publications – *Supply Chain Management Review (SCMR)* and *Logistics Spectrum (LS)* – were selected for coding.

Furthermore, to ensure these were high-quality publications the rankings of each publication were identified via two means. Various survey-based studies ask participants to rank various publications, although normally these are restricted to those of an academic orientation (Gibson & Hanna, 2003; Gibson, Hanna, & Menachof, 2001; Rutner & Fawcett, 2005; Van Fleet, McWilliams, & Siegel, 2000; Zsidisin et al., 2007); citation-based studies indicate similar rankings (Pilkington & Fitzgerald, 2006; Pilkington & Meredith, 2009). Overall, the findings of such studies show that JSCM and IJPDLM are regarded highly and thus are deemed of high quality in regards to article content. Further, SCMR is acknowledged amongst academics as a leading practitioner publication to publish articles in (Menachof et al., 2009). Unfortunately, at the time of selection no such ranking could be identified for LS.

Further selection pressure was then applied to the individual articles to code. In line with previous studies, articles that were in fact 'letters from the editor', 'letters to the editor', and 'book reviews' were not coded (Harland et al., 2006; Wolf, 2008). Table 4.2 provides the total number of articles requiring coding over the four publications. At 1,371 articles, this research is the largest study of the SCM literature to date.

Table 4.2: *Synopsis of the Coded Articles*

Publication		***Rank****			***Number of Articles per Publication***	***Total Number of Articles Coded***	
		ADL	***M***	***Z***			
Academic	JSCM	B	Leading	Leading	240	694	50.6%
	IJPDLM	C	Leading	Supporting	454		
Practitioner	SCMR	N/A	Leading	Supporting	544	677	49.4%
	LS	N/A	N/A	N/A	133		
						1371	100%

** ADL= Australian Business Deans Council – Journal Ratings List; M=Menachof et al. (2009); Z=Zsidisin et al. (2007)*

4.4.2 Specifying the Unit of Analysis

Analysis of text requires that the unit, or identifiable message to be analysed, be operationalised in a manner conducive to answering the research questions. Units can be coded along several criteria:

- Word – coding the individual word
- Sentence or phrase – coding of an entire sentence where individual words or a phrase occur close together
- Paragraph – coding the paragraph as positive, negative or neutral to the theme

- Document – coding an entire text as a category in itself (Holsti, 1969; Insch, Moore, & Murphy, 1997; Krippendorff, 2004; Neuendorf, 2002).

According to Krippendorff (2004), the nature of the research questions determines the unit of analysis; consistency between the unit and the research question is imperative. Narrow questions direct a study towards coding and analysing at the level of the individual word or phrase, while broader studies necessitate the use of larger units such as the entire document to capture all relevant aspects (Insch et al., 1997). The research questions developed in Chapter Three are directed towards ascertaining the disciplinary identity of SCM through application of the disciplinary analysis framework. The enormity of such an objective is difficult to capture via the individual word or paragraph, consequently the entire document is selected as the unit of analysis. This is in keeping with the arguments and approaches taken by other researchers examining disciplinary debates (Harland et al., 2006; Miyazaki et al., 1999).

An implication from selecting the entire document to be the unit of analysis is the question of human coding versus computer-aided coding. Arguments for and against both approaches to coding are rife, with valid reasoning provided both for and against (see Krippendorff, 2004). For instance, human coding is regarded as time consuming, whereas computer-aided coding is regarded as relatively fast. However, computer-aided coding can suffer from the 'misreading' of texts, as no computer program can 'read' as humans can (for example, latent content) (Krippendorff, 2004). It must also be noted that computers are only as good as their programming, hence human coding is regarded to be of higher reliability than computer-aided coding. Therefore, although the coding process may be more time consuming in the examination of the document as the unit of analysis, reliability and validity increase via the use of human coders (Krippendorff, 2004; Neuendorf, 2002).

4.4.3 Category Specification

It is at this stage of the research process that the category specification needs to be operationalised. Category specification entails the specifying of the characteristics that the text must have to be classified into a particular category. Thus, the process ensures that only those texts displaying the same characteristics (meaning) are classified together (Neuendorf, 2002). Development of categories occurs as the result of two essential decisions. The first decision is whether the categories will be informed from the research questions and theoretical foundation, and hence are developed deductively prior to examination of the text. Within this decision, there are two choices:

- *assumed* categories that ensure a high degree of reliability but can suffer through restricting results as unknown phenomena are 'overlooked' (Krippendorff, 2004).
- *inference* categories that emerge inductively from the text yielding new categories, but risk reliability through the generation of a multitude of individualistic categories (Krippendorff, 2004).

Furthermore, it is necessary when developing assumed categories to utilise a process to ensure validity, reliability, and comprehensiveness. Hence, a number of actions are taken to ensure certainty between category and context:

- The previous success or failure of other pre-defined categories – these relate to functional correspondences between construct and context
- Expert knowledge; structural correspondences between construct and context
- Established theories about a context to argue for structural correspondences between construct and context
- Embodied practices, sampled from a context, to argue for the representative nature of the inferences obtained from these practices (Krippendorff, 2004, pp. 173-187)

Within this research, all were utilised to achieve certainty in the category specifications.

The second essential decision is to ascertain whether the category is of a *single* classification (the unit can be assigned to only one characteristic within a category) or *multiple* classifications (the unit can be assigned to more than one characteristic within a category) (Insch et al., 1997). Within this research, a mix of single and multiple categorisation schemes is utilised and developed via the assumed categorisation strategy. Utilisation of the inferred strategy occurred in the pre-test phase of the coding form and was undertaken only after in-depth consultation with the co-coder to ensure validity.

Overall, it is the purpose of this stage of the content analysis process to develop categories for the elements of interest. To that end, and wherever possible, the categories have been those that have been utilised successfully in previous studies. Nonetheless, in some instances there have been no prior content analysis studies to draw upon. In those instances, category development has been informed from existing SCM theories, models and frameworks. Furthermore, as this research also examines the practitioner literature, some of the categorisations have required adaptation to ensure practitioner articles can be coded successfully. Although within some categories academic specifications are highly detailed, such extensive details are counterproductive to determination for a practitioner article.

(Adaptations and refined definitions of categories were instigated after the pre-test of the initial coding form in consultation with the co-coder.) The task now is to develop the classifications for the categories with the following sections providing these details.

4.4.3.1 General Information

Specific details pertaining to general information enable tracking of each article thereby enabling comparisons between years. As such, the first section asks for those details.

Publication: record the publication number:

1. Journal of Supply Chain Management (JSCM)
2. International Journal of Physical Distribution & Logistics Management (IJPDLM)
3. Supply Chain Management Review (SCMR)
4. Logistics Spectrum (LS)

Article ID: record the unique article ID (Journal-Year-Author[first 3 letters]Volume-Issue-Page number, e.g. 1-07-ELL43-2-23

Year: Record the year that the article was published.

4.4.3.2 Coherence within Supply Chain Management

In this section, the categories for the degree of coherence classifications are determined. Several aspects require consideration with the first and easiest technique being to ascertain SCM's definition; however, as was evident in Chapter Three, a definitive definition of SCM has yet to be developed. Therefore, additional factors are required to determine the degree of coherence within SCM.

If there are no agreements as to how SCM should be defined then how do we know what academics and practitioners are discussing and communicating? Hence, the additional factor of investigating the terminology of SCM will be used to provide insight into the dominant term used by both academics and practitioners. Furthermore, the theoretical development underlying the article can be determined via application of a specific scheme designed to determine the level of theoretical development irrespective of any explicit discussion.

Definition: The fundamental purpose behind utilising a definition is to convey the character and relationships of a concept through removal of misunderstanding and obscurity (Gibson et al., 2005). As previously discussed in Section 3.2.1 there is a considerable lack of consensus in regards to a SCM definition. Hence, there is considerable obfuscation surrounding the exact nature of SCM. Thus, the degree of coherence within SCM may vary considerably depending upon each author's perspective as to SCM's definitional boundary.

It was imperative therefore to code articles in terms of the SCM definition that they employed. Four categories were utilised to track whether an article employed a definition through either developing its own unique definition or using an existing one, or whether an article assumed the reader would understand the implied definition after reading a discussion surrounding SCM:

- New = new definition explicitly stated (e.g. 'SCM is defined as…', 'we define SCM as…').
- Existing = existing definition explicitly stated (e.g. within quotation marks, record citation and definition).
- Implied = no definition explicitly stated, but implied based on discussion.
- None = no definition explicitly stated or implied from discussion.

Articles were coded a '1' if the article fitted the category and '0' if the article did not fit the category. No article could have multiple entries, only one entry.

As previous studies have done (for example Burgess et al., 2006) a definition to be coded into the 'new' or 'existing' classification needed to have the definition stated *explicitly*. Utilising such a conservative approach is argued to mitigate any subjectively imposed inference from coders, thus enabling the author's true thoughts as to SCM definition to be determined. Therefore, articles were presumed not to have utilised a definition if there was no clear explicit statement of one; these articles were then classified as to whether the ensuing discussion served as the author's 'implied' definition or not. Furthermore, in cases where a new or existing definition was employed, the citation and definition were recorded to enable the most-used definitions to be identified and the evolution of definitions over time to be determined, thus permitting a qualitative analysis to be performed on these definitions.

Terminology: In conjunction with the above definition issues is that pertaining to the term utilised. As Section 3.2.2 suggested, consensus as to the terminology of SCM would enable improved communication amongst academics and practitioners. However, as identified there are those who go beyond merely attempting to rebrand SCM, seeking instead to develop an entirely new concept. Hence, this area of investigation seeks to determine whether the article was using the SCM term or not, if the article was attempting to rebrand SCM into something new, or whether the article only used the term 'supply chain' to denote the SCM concept:

- Existing = new name for SCM, but still SCM being discussed (record name).
- New = new name for SCM, and something completely different (record name).
- SC = does not use ‘SCM’ or ‘supply chain management’ directly, instead uses ‘supply chain’ but implies ‘SCM’ concept.
- SCM = uses ‘SCM’ or ‘supply chain management’ directly.

Articles were coded a ‘1’ if the article fitted the category and ‘0’ if the article did not fit the category. No article could have multiple entries, only one entry.

Theoretical Development: Irrespective of the questions asked, articles reflect the utilisation of either an implicit or explicit theoretical framework through the research strategy utilised by the author(s) (Handfield & Melnyk, 1998). Thus, an indication as to the level of theoretical development within any given article can be determined via examination of its research strategy as particular research strategies reflect certain levels of theoretical development.

To determine the theoretical foundation of practitioner articles required the utilisation of a model that was able to ascertain the underlying stage of theoretical development implicit within the article, irrespective of what theory (borrowed or developed) was being advocated. Handfield and Melnyk (1998) developed a categorisation scheme for determining the strategy of research employed by an academic article. As such, their scheme allows for the determination of the underlying theoretical framework of the article. The definitions of the categories were adapted to better align with the practitioner publications due to these articles having a less obviously defined ‘research’ strategy:

- Discover = uncover areas for study and (theory) development (asks, “What is going on here, is there something interesting to justify further investigation?”)
- Describe = explore territory (asks, “What is there, what are the key issues, and what is happening?”)
- Map = draw maps of the territory (asks, “What are the key variables, themes, patterns, categories evident?”)
- Links = improve the maps by identifying the linkages between relationships (asks, “What are the patterns of linkages, is there an order, why do the relationships exist?”)
- Validate = predict future outcomes via theory validation (asks, “Do we get a certain behaviour that was predicted by theory?”)

- Extend = expand the map via theory extension/refinement, provide better understanding of the structure (asks, "Where does our existing theory apply or not apply?")

Articles were coded a '1' if the article fitted the category and '0' if the article did not fit the category. No article could have multiple entries, only one entry.

4.4.3.3 Knowledge within Supply Chain Management

This section pertains to the development of the classifications within Fabian's criterion (b) – the body of knowledge, in determining the disciplinary identity of SCM.

Breadth of Knowledge: The first area of interest is in establishing the breadth of SCM. Investigation of the literature and refinement of overlapping categories resulted in five functional areas that were deemed to represent the core elements of SCM:

- Supply = Purchasing and Supply
- Logistics = Logistics and Transportation
- Integrate = Integrate Business Activity across Supply Chain and within Organisation
- IT = Information Technology
- Theory = Building Theory

Articles were coded a '1' if the article fitted the category and '0' if the article did not fit the category. No article could have multiple entries, only one entry.

Depth of Knowledge: To date, the true depth of the SCM body of knowledge has yet to be determined formally, although various construct lists have been developed in attempts to ascertain the core elements of SCM. To determine whether a highly refined list of sub-constructs will degenerate the domain into miscellaneous categories or not (see Harland et al., 2006), the concise construct list as formulated by Burgess et al. (2006) is utilised as a test of the extensive construct list developed by this author.

<u>Concise Construct List (CCL):</u> Frequently, the literature implies that a list of constructs is tantamount to examining the content of an article. However, these investigations are not seeking to ascertain the knowledge of SCM. What typically occurs is that the list of constructs is found to be at odds with other studies' lists, and hence no consensus as to what constitutes SCM can be determined (Burgess et al., 2006). For instance, some authors emphasise the strategic management and leadership roles (Min & Mentzer, 2004), and others the

implementation of SCM activities into practice (Cooper & Ellram, 1993). This research employs the list as developed by Burgess et al. (2006) (which was formulated in an attempt to 'go beyond' the functional areas) as it is enables the examination of both the people-centric and system-centric aspects of SCM, thus it is a test of the developed extensive construct list:

- Leadership (top management support, strategic issues of importance)
- Intra-organisational relationships (focus on internal relationships)
- Inter-organisational relationships (focus on external relationships e.g. the buyer/supplier dyad)
- Logistics (physical movement of products)
- Process improvement (improving technological processes i.e. sharing IT systems)
- Information system utilisation (adopting software/investment in IT systems)
- Business financial performance (focus on strategic issues or competitive advantage)
- Building theory only (i.e. may cover multiple aspects above but is solely conceptual and the focus is on building theory)

Articles were coded a '1' if the article fitted the category and '0' if the article did not fit the category. The article could have multiple entries and hence, codes were not mutually exclusive. Of note is that as multiple entries are recordable a violation of basic statistical assumptions for some statistical techniques occurs.

<u>Extensive Construct List (ECL):</u> The refined categories were developed on the basis of previous SCM categories but further developed through the emergence of categories during the initial testing of the coding scheme. The classification scheme was in the nature of a decision scheme, in that the coder identified the main area and then refined down each level until the depth of SCM had been reached. Articles could be coded into more than the one area; hence, it was imperative that the coder seek the latent content existing within the text:

1 - Purchasing and Supply Issues

1A: Supplier

- Development, Integration, Evaluation (or selection), Reduction (to reduce numbers of suppliers), Involvement in supply risk management

1B: Outsourcing Decision

- Make or Buy Decision, Strategic considerations to outsourcing decision

1C: Buyer / Supplier relationships

- Trust issues, Power issues, Commitment issues, Strategic considerations, Performance outcomes, Size difference issues, Communication issues (includes negotiating skills), Buyer Satisfaction

1D: Electronic Procurement

- Web-based procurement, EDI, Auctions (sometimes called 'reverse'), Training/guidance/support by Supplier to Buyer

1E: Strategic Considerations

- Ethical considerations (i.e. close relationships with suppliers), Strategic sourcing issues (strategic reputation, international/globalisation issues, quality issues), Environmental issues to consider when purchasing, Purchasing/Procurement history and development

2 - Logistics and Transportation Issues

2A: Logistics Integration

- 3PL, 4PL, Strategic considerations to integration, Preferred transporter issues, Global Logistics Service providers

2B: Reverse Logistics / 'Waste' management issues

- Based on environmental concerns only, Based on cost concerns only, Both 1 & 2 considered (i.e. it's a strategic activity)

2C: Transportation Network

- Domestic focus only, International focus only, Both 1 & 2 considered, Performance issues

2D: Transportation Technology

- IT systems (developing, utilising i.e. tracking packages/shipments), 'Clean and Green' Aspects (i.e. environmental concerns)

2E: Compliance Costs

- Security issues (physical, IT related, terrorism), Compliance issues (legal etc), Cost considerations, Strategic considerations to implementing logistics (i.e. integrating with providers)

3 - Integration of Business Activity (across supply chain and within organisation)

3A: Leadership issues

- Strategy (includes Corporate strategy), Social Responsibility, Environmental concerns, Profitability, return on investment and best practice issues (includes employee incentives, cost cutting measures), Importance of culture, Negotiation skills

3B: Information Technology integration and use

- Purchasing Department (or similar name) ownership of software and support, IT department ownership of software and support, Supplier acquires IT ability (software/hardware upgrades) as cost of doing business with buyer, EDI – electronic data interchange, SC integration software (design, implementation and utilisation of; importance of, leveraging for financial gain), SC profitability built upon IT issues (hardware and software implementation), Strategic benefits to IT integration

3C: Production / Operational issues

- Warehousing / Distribution centres (location of, size issues, IT systems), Inventory management (critical need to manage to all stages of SC, as well as within organisation), New Product Development, Demand Planning issues (includes managing demand issues, demand visibility and demand amplification), New Process Development (includes management systems)

4 - General (issues that do not pertain to one of the above core areas)

- SC Performance issues (such as planning for and building in flexibility/agility, increasing SC financial performance, barriers to implementation), SCM Professionals' Skill Level (ongoing training and learning, regarded as a profession and strategic contributor to organisation, wage levels, educational programmes), SC Risk mitigation strategies (includes global SC considerations), SC security (i.e. from the risk of terrorism), Legislation (i.e. Government trade barriers, SCM legal issues/services offered, environmental concerns), Theory Building of SCM (i.e. focus on rigour vs. relevance, conceptual paper on SCM development, trends and developments in SCM, methodology use within SCM)

Articles were coded a '1' if the article fitted the category and '0' if the article did not fit the category. The article could have multiple entries and hence, codes were not mutually exclusive. Of note is that as multiple entries could be recorded a violation of basic statistical assumptions for some statistical techniques occurs.

Conceptual Framing: Throughout the discussions in Section 3.3 there is an assumption that the objective of SCM is to employ a holistic network perspective. In conjunction with the SCM definition and terminology used is the level of the relationship between an organisation and their perception of SCM. Such a framing of the relationship explains the lack of consensus in regards to a SCM definition; as how SCM is represented relates to the nature of SCM as the article's author perceives it. Such categories also imply the expectations of the article's author; for instance, as an individual activity SCM is operationalised to a minor function, whereas as a system, SCM is an all-encompassing management framework enabling long-term strategic benefits (Croom et al., 2000; Harland, 1996).

Four categories are used to determine whether SCM is perceived as merely an individual activity, as a process of related activities, as a system of related networks or even if there was an acknowledgement as to any degree of relationship:

- Activity = SCM as an Individual activity
- Process = SCM as a Process (or chain of related activities)
- System = SCM as a System (or series of related processes or related networks)
- None = No level of relationship identified (implied or alluded to)

Articles were coded a '1' if the article fitted the category and '0' if the article did not fit the category. No article could have multiple entries, only one entry.

4.4.3.4 Quality within Supply Chain Management

This third section seeks to determine the degree of quality through investigating the rigour versus relevance focus of the article, and the author publication activities as a determinant of publication quality. To enable the capturing of relevant data the categories focus on the latent content of the article, while the classification scheme is informed from the literature; adaptation was required to ensure that practitioner publications could be coded.

Rigour or Relevance: Studies examining this element of interest tend to examine academic articles only; as such, they apply vigorous standards to determining the activities and instruments utilised within an article (these depict the methodological rigour of the article). As this research seeks to examine practitioner publications as well, it was necessary to adapt these categories and provide a broader range of standards; otherwise, practitioner articles would have been limited for selection choice in terms of a relevant category. Subsequently, the following categories were developed to meet the needs of both academics and practitioners:

- Literature review – solely a review of previous literature that summarises knowledge in a topical area, and utilises either statistical techniques or narratives to map that body of knowledge
- Research-theory/model – empirical or conceptual research (either quantitative, qualitative or a mix) that reflects the fact-finding procedures undertaken in the research process and provides theory or models to aid explanation
- Research only – empirical or conceptual research (either quantitative, qualitative or a mix) that reflects the fact-finding procedures undertaken in the research process; no theory or model is offered in explanation
- Conceptual paper – does not rely on data (either field collected or artificially collected via a laboratory setting) to develop new perspectives on topical areas
- Advertising – pertains to those articles that are advertising services, support or software
- Case study – presents real-world examples, including contextual background, of a phenomenon such as information pertaining to a company or industry
- Interview – data and findings are based on open-ended question and answer style that encourages conversation

Articles were coded a ‘1’ if the article fitted the category and ‘0’ if the article did not fit the category. No article could have multiple entries, only one entry.

Authorship: In regards to authorship of articles, the last name and initials of each author are recorded to enable comparisons between academic and practitioner publications to be undertaken. Hence, authors could be tracked over time and their publishing activity determined between academic and practitioners’ publications. Furthermore, each author’s affiliation to either academia or practice was recorded enabling insight into how many academics publish in practitioner publications and how many practitioners publish in academic publications.

4.4.4 Generation of the Coding Scheme

This phase of the process entails the generation of the codebook and coding form from the category specification information and classification rules discussed previously. The summarised information presented in the codebook and coding form supported the work of the main coder and co-coder. The codebook also specified information pertaining to specific processes such as the data language (or codes utilised) (Krippendorff, 2004).

The process of coding articles requires values to be assigned into different categories. As there is an extensive list of categories it is appropriate to reduce the data language (codes used) to simple ‘yes’ and ‘no’ values. If an article met the criteria of a category then the value of ‘1’ represented ‘yes’ that article met the criteria of that specific category, whereas the value of ‘0’ represented ‘no’ the article did not meet the criteria of that specific category. Assigning such values meant that in some categories where multiple coding was possible an article might have several values allocated to it.

In conjunction with development of the codebook was the need for a coding form for the co-coder for the initial development and pre-test phases. The primary coder coded directly into a pre-designed Excel spreadsheet, whereas the co-coder required coding forms (see Appendix 4), the data from which were then transferred into the Excel spreadsheet by the primary coder.

4.4.5 Pilot Test of the Coding Scheme

It is at this stage that a pilot test of the coding scheme is required as it serves to test the categories and coding instructions and is a crucial phase in developing a robust coding scheme (Insch et al., 1997; Krippendorff, 2004; Neuendorf, 2002). The result is to ensure that the categories are exhaustive, clear and appropriate to what is being sought and that the coding instructions communicate that to the co-coder. In this research, a pre-test of 77 articles (not from the target year range) was coded and data entered into a pre-designed Microsoft Excel spreadsheet. As a result, and through discussions between the two coders, some category definitions were revised and redefined. In addition, the overall coding form and coding instructions were revised and amended to provide additional clarity (see Appendix 5).

4.4.6 Data Collection

Once the categories and coding instructions have been clarified and the unit of analysis established, the actual data collection phase can begin. For the purposes of this research, all 1,371 articles were classified into all categories through assigning either the value of ‘1’ (for yes, the article fitted that category), or ‘0’ (for no, the article did not fit that category). This coding is undertaken directly into the pre-defined Microsoft Excel spreadsheet, (the co-coder’s coding forms were entered after her coding had occurred at the end of the pre-test phase). This data collection spreadsheet enables the calculation of sums for each element of interest thereby ensuring that each element has at least the sum of ‘1’. This supports the data collection process through easily depicting that each article has been coded. In addition, general information such as the year of publication, publication number, and a unique coding number for each article is collected on the data collection spreadsheet.

Primarily it was this author (due to time constraints on the co-coder) who undertook all coding of the articles; this was accomplished in December 2008, January and February 2009. The co-coder was utilised at two distinct steps: first, during the initial stages of designing the coding frame with the author and in the initial testing of the coding scheme; and second, utilised to code a representative sample of articles taken from each publication over the time period to ensure inter-coder reliability. In those instances where the main coder was unsure of the correct classification of an article into a category, communication with the co-coder ensued. This two-way process enabled agreement on the final classification of an article.

4.4.7 Legitimisation via Reliability and Validity

Content analysis is a research technique that analyses large amounts of text to enable replicable and valid inferences to be ascertained. As such, reliability and validity are critical elements of its legitimacy (Neuendorf, 2002). Reliability implies that the research procedure can obtain the same results over repeated trials, whereas validity is the extent to which the measurement procedure measures what it is intended to measure (Neuendorf, 2002; Neuman, 2000). This section describes the processes that ensure a high degree of reliability and validity throughout this research.

Reliability: According to Krippendorff (2004, pp. 214-216) reliability can be differentiated via three elements:

- Stability – the degree to which a process is unchanging over time
- Reproducibility – the degree to which a process can be replicated by different analysts working under varying conditions, at different locations, or using different but functionally equivalent measuring instruments
- Accuracy – the degree to which a process conforms to its specifications and yields what it is designed to yield

Table 4.3 depicts the three reliability elements, the proposed processes that this research employs to ensure a high degree of reliability, and a sample of successful content analysis studies that utilised similar processes.

Table 4.3: *Ensuring Reliability*

Reliability	***Proposed Process***	***Successfully Used By***
Stability	R1) The concise specification and clear categorisation of the coding schemes and decision rules	Burgess et al. (2006); Carter & Ellram (2003); Spens & Kovac (2006)
	R2) Required coder qualifications	Burgess et al. (2006); Wolf (2008)
	R3) Test-retest of a sample of texts	Spens & Kovac (2006), Wolf (2008)
Reproducibility	R4) Coders are capable of understanding the decision rules and can apply them consistently	Carter & Ellram (2003); Giunipero et al. (2008)
	R5) Reliability of coding instrument	Giunipero et al. (2008); Spens & Kovac (2006)
Accuracy	R6) Reliability of coded data set through the use of multiple coders	Giunipero et al. (2008); Carter & Ellram (2003)
	R7) Report and analyse discrepancies between coders	Giunipero et al. (2008); Harland et al. (2006)
	R8) Assess the coding consistency and stability of process	Spens & Kovac (2006), Wolf (2008)

(Source: the author's own)

As is evident, the three types of reliability and the eight proposed processes can be easily portrayed within three areas of interest: Reliability of the coding instrument (R1 and R5), reliability of the coder (R2, R4, and R6), and reliability of the coding process through consistency (R3, R7, and R8).

Krippendorff (2004) states that there must be clear specification of the syntax and semantics of the data language, decision rules and overall procedures which coders follow and apply when coding. Furthermore, the codebook facilitates replication of the study, provides full and precise definitions of the categories, and specifies the data language (codes) used to classify the articles. In regards to the coding instrument (R1 and R5), the codebook was developed in a manner that ensured consistency throughout the coding process. Specific details were delineated to enable ease of decision making when assigning an article to a category.

The second area of interest pertains to the reliability of the coders themselves (R2, R4, and R6). Krippendorff (2004) acknowledges that coders must have the cognitive ability to code consistently and the background to be familiar with the material to enable consistent and replicable coding. As the main objective of this research pertains to determining SCM's disciplinary identity via academic and practitioner literature, the research requires that coders have a strong background in 'reading' both types of material. In addition, familiarity with SCM (its principles and terminology for instance) enables consistent application of the coding instructions. In regards to this research, coding was undertaken by the main coder, this author (who has a Masters degree in SCM as well as a practical background in logistics), with the co-coder utilised to assist in the development of the codebook and pre-testing.

The coder is the key element in content analysis, with coder inconsistencies occurring due to distractions, difficulty in comprehending the written instructions, or performance lags due to tiredness. Hence, it was imperative that both coders had the required cognitive and background characteristics. Krippendorff recommends coder training to ensure that coders have the required level of ability. Within this research, three sessions, each of two-hour duration, were utilised. In the first, the coders discussed each item in the codebook in detail and then analysed the same article discussing their perceptions and clarifying any changes to the codebook. This was followed by two further sessions where extensive discussions of the codebook and coding form occurred, via the analysis and coding of four sample articles (two academic and two practitioner), ending with a clarification as to perceptual differences. Seventy-seven articles were pre-tested by the coders and compared for consistency.

Multiple coders are typically utilised within content analysis, although there is no clear consensus in the literature as to the optimal number, hence, it is quite normal to have only two (Krippendorff, 2004; Neuendorf, 2002). In this research, a number of actions have been instigated to ensure reliability of the coding scheme irrespective of the number of coders. These actions are supported by Milne and Adler (1999) who state that the number of coders can be reduced if suitable measures and actions are put in place. Constraints as to time and finance meant that the author coded all 1,371 articles, with the co-coder being utilised in the design of the coding scheme and its pre-test stages. Hence, the other actions to ensure reliability mitigate the constraint of having only one primary coder.

The third and final area of interest surrounds coding consistency (R3, R7, and R8). The main coding took place over three months (December 2008, January and February 2009). Six months after the end of the main coding process, a random sample of articles was cross-coded. According to Krippendorff (2004), such test-retest procedures provide information as to coder inconsistencies and ensure a measure of reliability through measuring variations in the performance of the coder. In order to perform a test-retest procedure a random sample of 200 articles (50 articles randomly selected from each publication) was drawn from the original sample with the main coder recoding all of these to enable comparison to the original classification.

Deviations from the original classification were measured by means of two values; the first measured the rate of agreement (between original classification and retest classification), while the second referred to Krippendorff's α (2004). During the coding process one of two values was assigned to each article: the code of '1' (for yes, the article fitted that category), or the code of '0' (for no, the article did not fit that category). The rate of agreement reflects the percentage of agreements of the codes that the article received for one category under investigation. For the purposes of this research, the rate of agreement was set at 80% (as based on Krippendorff's accepted level of reliability).

$$\alpha = 1 - \frac{D_o}{D_e}$$

Krippendorff's α (2004) was designed to be a general agreement measure within content analysis to ensure appropriate reliability interpretations. Accordingly, α describes "*the extent to which the proportion of the differences that are in error deviates from perfect agreement*, α = 1 always being its largest value" (Krippendorff, 2004, p. 223, italics in original). Hence, α compares the observed disagreement with the disagreement that is expected when chance prevails (Krippendorff, 2004) (for a complete description of the calculation of Krippendorff's α see Krippendorff, 2004, pp. 221-227).

According to Krippendorff, coding differences in the test-retest procedure are considered severe if below the threshold of 0.6, tentative if between 0.6 and 0.8 and reliable if above 0.8. Hence, in this study the rate of agreement was required to be 0.8 (80%). Appendix 6 provides a complete overview of the results for the percentage rate of agreement and Krippendorff's α calculation. The test-retest procedure revealed that there were no substantial differences and reliability of the coding process was confirmed.

As the 1,371 articles were coded solely by the main coder (with the co-coder being utilised in the initial stages), it is impossible to determine the rate of agreement and Krippendorff's α for inter-coder reliability. However, the extensive communication process between the two coders is unlikely to have resulted in substantial discrepancies as such intensive interaction and discussion enabled the generation of a common understanding in relation to the coding scheme. Further, coding consistency according to Krippendorff (2004) is about ensuring that the coding process conforms to its specifications and yields what it is designed to. To that end, coding consistency within this research was ensured through three actions:

- The development of clear and precise definitions within the coding scheme in a manner conducive to ensuring consistent classification of articles

- The pre-test of the coding scheme which led to the development of precise categories through reformulation where appropriate
- The test-retest stage enabling the rate of agreement to be determined

Overall, reliability has been ensured via the implementation of a number of actions, thereby ensuring a high degree of reliability. It should be noted however, that – as in almost any other type of research – content analysis is vulnerable to distortions (intentional or otherwise) and hence, requires precautions to enable confidence (Krippendorff, 2004). The next section discusses issues relating to validity.

Validity: According to Krippendorff (2004), validity of a measuring instrument is based on its ability to measure what its user claims it measures, while Neuman (2000) goes further and adds that validity refers to how well a researcher's ideas about reality 'fit' with actual reality. Subsequently, how well validity is measured relies on how well the conceptual and operational definitions of a construct (i.e. category) mesh with each other. Hence, Neuman (2000) states that there can never be absolute confidence about validity, but there can be measures that are more valid than others. Within content analysis, validity is differentiated along the following core types:

- Face validity – refers to 'common-sense' with respect to the researcher's definitions of the categories measuring what they are supposed to measure
- Empirical validity – is the degree to which available evidence and established theory support various stages of a research process
- Content validity – the extent to which all features that define the concept are measured
- Construct validity – the extent to which a measure is correlated with other measures of the same construct (Krippendorff, 2004, pp. 314-318; Neuendorf, 2002, pp. 114-118)

Table 4.4 depicts the types of validity, the proposed processes that this research employs to ensure a high degree of validity, and a sample of previously successful content analysis studies that utilised similar processes. Construct validity was not assessed in this research owing to the fact that the use of nominal categories and mutually exclusive constructs i.e. an article, would either be in a category or not. As is evident, the three types of validity along with their respective processes differentiate along two aspects: Validity of the coding process (V2) and validity of the category specifications (V1, V3, and V4).

Table 4.4: *Ensuring Validity*

Validity	*Proposed Process*	*Successfully Used By*
Face validity	V1) Fine-tuning of category development during coding process	Harland et al. (2006); Spens & Kovacs (2006)
	V2) Use of human coders rather than computer programs	Burgess et al. (2006); Harland et al. (2006)
Empirical validity	V3) Utilisation of theoretical frameworks for development and definition of categories	Giunipero et al. (2008); Spens & Kovacs (2006)
Content validity	V4) Ensuring exhaustiveness of all categories	Giunipero et al. (2008); Spens & Kovacs (2006)

(Source: the author's own)

In regards to the type of coders used (V2), this research utilised human coding rather than computerised coding. Krippendorff (2004) acknowledges that although there has been an increase in the development of specific computer programs aimed at content analysis, such programs have limitations. It is readily accepted that computers circumvent the tedium of the coding process, can code in a fraction of the time taken by human coders, and virtually eliminate the issue of unreliable coding (Krippendorff, 2004; Neuendorf, 2002). However, it is also acknowledged that programming the software in the first place is also a tedious task fraught with peril as any computer program is only as good, or as efficient, as its human programmer programs it to be.

Krippendorff (2004) provides the example of the word 'right' as an example of the inherent differences between human coders and computer-aided coding. An investigation into the term 'human rights' could bring up the term 'left-right'; a computer would code it correctly inasmuch as the word 'right' was present, whereas a human coder would be less susceptible to such an error. Of secondary importance, and as has been mentioned before, computers can only code for manifest content, not latent, whereas human coders can account for, interpret and as such code for both types of content. Hence, within the context of this research there is higher validity in using human coders rather than using computer-aided coding.

The second area of interest is in regards to category development (V1, V3, and V4). Fine-tuning of the categories occurred during the development stage as a result of intense discussion between the two coders. The objective of fine-tuning is to ensure that the categories measure what they are supposed to measure through being exhaustive and precise in definition. Two actions contributed to the fine-tuning of the coding scheme; first, a pre-test was undertaken to assess the ability of the initial categories with adjustments being made as required; second, as coding began it became apparent that the 'other' category for each area of interest was being used in places to record the same type of 'other'. As a result, additional categories were added after consultation with the co-coder to ascertain whether this new category could be expected in the rest of the articles or was relevant to that particular publications issue.

Development of the categories via existing theoretical frameworks enhances the category and accounts for greater exhaustiveness and hence, success of the category (Krippendorff, 2004). Accordingly, it was imperative that throughout the development phase of the coding scheme referral back to the theoretical foundation and SCM literature occurred. This reliance on existing theory then led to exhaustive categories. However, as has been stated, the initial development and pre-test phases enhanced the categories through highlighting the need for new categories in places.

4.4.8 Data Analysis

The purpose of content analysis is to gather data in a format that enables researchers to represent the results in a manner conducive to recognising patterns and answering research questions (Krippendorff, 2004). Further, data must be summarised to enable inferences to be interpreted in conjunction with theoretical models; for patterns and relationships to be discovered; and overall, for the large body of data collected to be reduced via summarisation to a manageable and interpretable data set. Subsequently, several data summarisation techniques are of benefit to content analysts from contingency analysis, correlations, bivariate and multivariate techniques, through to factor analysis, clustering (Krippendorff, 2004) and timeline depictions. The goal is to present findings in a manner that directly addresses the research questions (Neuendorf, 2002).

Data analysed in this research utilised both exploratory and confirmatory analysis techniques. The extensive nature of the list of categories required that the data language utilised was reduced to simple 'yes' and 'no' values. If an article met the criteria of a category then the value of '1' represented 'yes', whereas the value of '0' represented 'no' the article did not meet the criteria. Subsequently, the data collected is in the form of categorical-nominal data, and thus appropriate bivariate statistical and thematic tests apply.

A Microsoft Excel spreadsheet was utilised to record all coding data. The statistical package of SPSS version 17 was utilised for analysis purposes.

4.5 Summary

This chapter presents the philosophical underpinnings and methodological processes of this research, thereby providing a systematic process for challenging current SCM discourse. To reiterate, the central objective of this research is to map the core conceptualisations of SCM and their evolution over time, and in doing so provide insight into SCM's disciplinary identity. Building upon the interdisciplinary nature of this research via the two underpinning literature frameworks of KM and SCM, and theorising the disciplinary analysis framework through combining the core assumptions of Fabian and Kuhn, this chapter verbalises the lived lens of pragmatism thereby enabling this alternative perspective to address the central objective.

The arguments and ethos of pragmatism indicate that although it is considered a relatively young field, a strong methodological foundation exists. At the core is a basic precept that links action and truth with the firm belief that theoretical models are not for mere contemplation purposes (only); instead, theory must be made to work, with advocates of pragmatism championing a return to Aristotle's phronesis. Thus, decision-making occurs within the bounds of common-sense. Furthermore, pragmatism renounces the purists' position as to the incompatibility of methodological orientations, instead embracing the 'Compatibility Thesis', which espouses a worldview that visualises the relationship between the quantitative (positivist) and the qualitative (interpretivist) orientations as a continuum. Subsequently, the epistemological and ontological positioning is one of fusion rather than division. Utilisation of such an alternative paradigm requires a system of research designed around employing both quantitative and qualitative aspects to enable the addressing of the central research objective as well as the research questions. Thus, an interactive research design is employed in this research.

The method of content analysis was tasked as the vehicle of data collection, with its origins, principles and procedures articulated in the context of various studies. As evident, the development of content analysis has been influenced by the paradigm wars that gave rise to pragmatism. Subsequently, the method is grounded in a common-sense approach that pursues the collecting of data that will answer research questions in a manner that ensures legitimisation via established norms of validity and reliability. It is thus situated at the intersection of the two purists' positions, and combines readily with the lens of pragmatism. Attention now turns to data interpretation, analysis and discussion.

Chapter Five: Analysis and Discussion

> There may be disagreements, there may be mavericks, but it is through a process of communal involvement, including all the controversies, that a body of knowledge is developed (Wenger et al., 2002, p. 6).

The previous chapter detailed the methodology applied to this research. As discussed, articles were classified into specific categories with the result being to generate quantitative data from the qualitative content. The collection of qualitative data enables the conceptualisation of specific areas such as definition, terminology and authorship. Consequently, the process of quantisizing qualitative content resulted in the generation of a large amount of data, collected via the use of an Excel spreadsheet and then imported into a SPSS file to enable and facilitate data analysis. Attention now turns to the process of data analysis (see Figure 5.1) to generate answers to the research questions formulated throughout Chapter 3.

As Wenger et al. (2009) state, it is through the process of involvement of all parties that a body of knowledge is developed. Hence, the overall objective of this research has been to address SCM's conceptualisation from academia and practice. Accordingly, the utilisation of Fabian's disciplinary analysis criteria to frame data collection over an 11-year period (1998 to 2008) combined with Kuhn's theories of disciplinary evolution, addresses the research objective and core research questions:

- To determine the degree to which academics and practitioners differ in their conceptualisation of SCM, and how these conceptualisations have evolved over time.
- RQ(1): Are there sufficient indicators of coherence in the SCM literature to signify it is a discipline?
- RQ(2): Are there sufficient indicators of a unified body of knowledge in the SCM literature to signify it is a discipline?
- RQ(3): Are there sufficient indicators of quality in the SCM literature to signify it is a discipline?

To answer these research questions (plus their sub questions), requires a systematic process beginning with the vital first step of differentiating the major periods of SCM's disciplinary evolution (Section 5.1). These periods then form the basis for data analysis in the consequent sections. Hence, particulars pertaining to Fabian's three criteria (Sections 5.2 to 5.4) are ascertained over time, with each analysis built upon both quantitative and qualitative data.

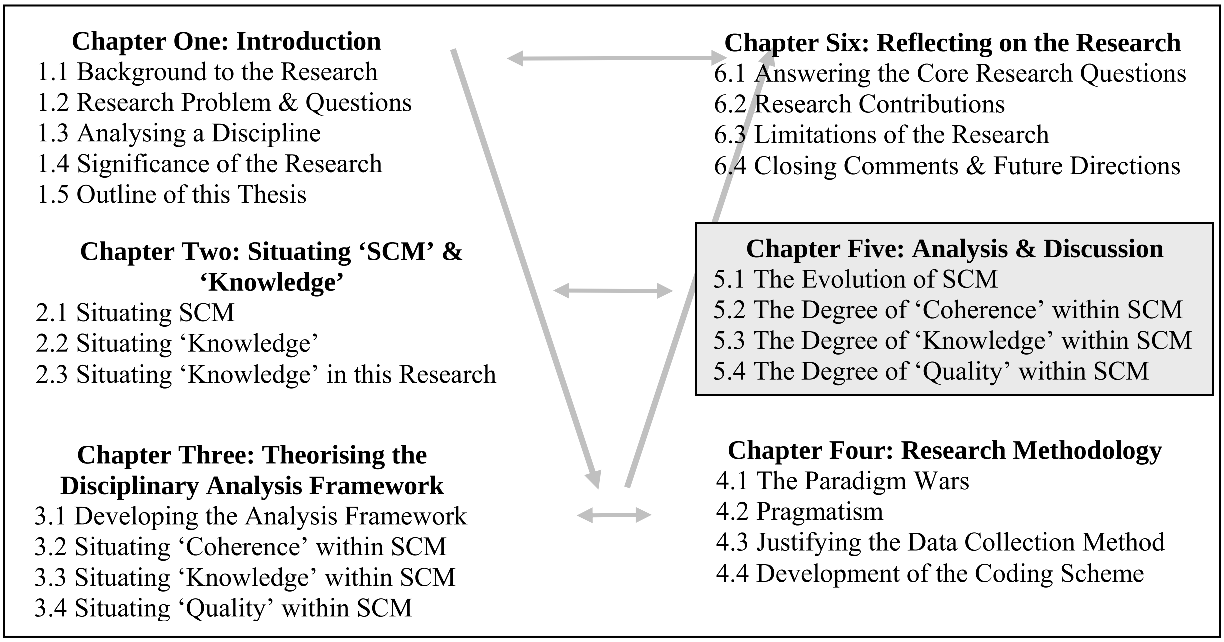

Figure 5.1: *Structure of Thesis Featuring Chapter Five*

5.1 The Evolution of Supply Chain Management

This section does not discuss results pertaining to the content analysis process directly, but does provide an overview of the distribution of the 1,371 articles over the 11-year period. Through undertaking this process, insight into the overall evolution of publication activity and the subsequent development of SCM is achievable (Section 5.1.1). These insights then enable segmentation of the articles into specific periods of disciplinary evolution (Section 5.1.2).

5.1.1 Synopsis of Publication Activity

Table 5.1 depicts the distribution of article activity amongst the four selected publications and across time. As is evident, academic articles contribute 50.6% of the entire sample, while practitioner articles contribute 49.4%. The almost 1:1 ratio indicates the importance both academics and practitioners place on communicating SCM knowledge to other members within their community. It also enables comparisons between the two communities to be undertaken with a high degree of confidence and certainty. Specifically, there is dominance by the academic publication IJPDLM and the practitioner publication SCMR, with 454 and 544 articles published respectively over the 11-year period.

Table 5.1: *Total Distribution of Articles over Publications and Years*

Publication		***Year***											***Total***
		1998	***1999***	***2000***	***2001***	***2002***	***2003***	***2004***	***2005***	***2006***	***2007***	***2008***	
Academic	*JSCM*	20	27	25	27	25	16	19	20	20	17	24	240
	IJPDLM	43	32	45	40	42	42	44	41	43	41	41	454
	Total	***63***	***59***	***70***	***67***	***67***	***58***	***63***	***61***	***63***	***58***	***65***	***694***
Practitioner	*SCMR*	13	13	52	64	45	47	60	73	73	50	54	544
	LS	7	10	15	16	14	13	17	9	6	13	13	133
	Total	***20***	***23***	***67***	***80***	***59***	***60***	***77***	***82***	***79***	***63***	***67***	***677***
∑		***83***	***82***	***137***	***147***	***126***	***118***	***140***	***143***	***142***	***121***	***132***	***1371***
% change between years			***-1.2***	***67.0***	***7.3***	***-14.3***	***-6.4***	***18.6***	***2.1***	***-0.7***	***-14.8***	***9.0***	

In terms of frequency of academic articles, 1998 and 1999 have a lower number of articles than 2000 with an 18.6% increase in activity between 1999 and 2000, indicating the increased interest by academics towards SCM concepts. This sharp rise in activity equates to the increased interest of the supply chain concept evolving into the more strategically orientated SCM as discussed in Section 2.3. The peak of academic articles published over the 11-year period occurred in 2000, fluctuating gradually but trending downwards, with 2008 witnessing only 65 articles published, a 7.2% decrease in activity. The lowest rate of academic activity is evident in the years 2003 and 2007 with 58 articles published in each year, a drop of 17.2% from the peak.

In particular, IJPDLM dominates with 65.4% of the total academic articles in this research. Its peak occurs in 2000 (n=45), while its lowest activity occurs in 1999 (n= 32). Hence, there is an increase of article activity by 40.6% between 1999 and 2000. From 2000, activity fluctuates with a decline between 2000 and 2008 by 8.9%. JSCM, with 34.6% of the academic articles, has a double peak in 1999 and 2001 (n=27 in each), with its lowest activity rate being in 2003 (n=16). Similar to IJPDLM, JSCM has a fluctuation in activity rates from its peak in 2001 through to 2008, with an overall decline in article activity throughout this period of 11.1%. This is surprising given that the JSCM changed its name from the *Journal of Purchasing and Materials Management* (JPMM) in 1999. Such a change was heralded by the editors at the time as reflecting the importance of SCM as a new paradigm for research (Carter, 1999). Based on such sentiments an increase in article activity rates (to reflect the importance of the new paradigm), rather than a steady decline over the decade would have been expected.

In terms of frequency, for practitioner articles 1998 and 1999 have a lower activity rate than 2000 with an increase of 191.3%. This substantial increase in activity is indicative of the increased strategic importance the SCM concept has for practitioners, especially as there is a further increase of 19.4% to 2001. However, between 2001 and 2002 there is a drop in activity by 26.3%, before steadily increasing to the peak of activity in 2005 (n=82), an increase of 38.9%. While from 2005 through to 2008, there is a steady decline in activity by 18.2%. Hence, the trend evidenced within the academic publications is evident within practitioner publications as well.

The practitioner publication SCMR dominates practitioner activity with 80.4% of the total articles published. In both 1998 and 1999 only 13 articles were published, before an increase in 2000 (n=52), an escalation in activity by 300%. A further increase of 23% occurs between 2000 and 2001. This increasing level of activity in the first four years indicates the increasing awareness of SCM as a strategic entity to practitioners, especially as SCMR was first published in 1997. This suggests that SCMR has become of vital importance as a means of communicating SCM concepts between practitioners. However, although the years 2005 and 2006 indicate the true peak of activity over the entire 11 years analysed with 73 articles each, there is a decline in activity by 26.1% for the following years of 2007 (n=50) and 2008 (n= 54). This suggests that SCM may no longer be the vital strategic entity it once was, thus raising the question of what concept might have superseded it during these years. Examination of the second practitioner publication may hold a clue.

In comparison to SCMR, LS contributes only 19.6% of the total practitioner articles; although this is a much smaller sample, overall the increase in activity from 1998 and 1999 to 2000 (an increase of 150%) follows the trend observed in SCMR, with 2001 indicating a further rise by 10.6%. The peak for LS is evident within 2004 (n=17), while there is a decline in 2005 (n=9) and 2006 (n=6) before rising in 2007 (n=13) and 2008 (n=13). Subsequently, the activity rate in LS indicates that articles orientated around the subfield of logistics were of less interest to practitioners during the 2005 to 2006 period (SCMR indicates growth during these same years). While the rise in activity evident within 2007 and 2008 suggests that the subfield of logistics became of greater importance to practitioners. Overall, for practitioners there is evidence to suggest that the core concept of SCM was of interest in 2005 and 2006, but was superseded by the subfield of logistics in 2007 and 2008.

In regards to all 1,371 articles, the last two rows of Table 5.1 provide the total number of articles published each year and across all four publications along with the percentage change from year to year. It is obvious that SCM was of low importance in regard to communicating the concept to peers as 1998 (n=83) and 1999 (n=82) have the lowest activity rates across the entire 11-year period. However, there is a rise by 67% in 2000 (n=137) with a further increase of 7.3% to the peak in 2001 (n=147) indicating a rapid increase in interest amongst both users and researchers. This corresponds with the evolution of the tactical supply chain concept to the more strategically orientated SCM concept discussed in Section 2.3. Nonetheless, from the peak in 2001 activity fluctuates with an initial decline by 14.3% in 2002 and a further 6.4% in 2003, before a slight rise by 18.6% in 2004. Overall, from the peak in 2001 there is a trend of decline by 10.2% to 2008 (n=132). These figures suggest that SCM has undergone an evolution over time. The question is whether specific periods as indicated by Kuhn are determinable in regards to this evolution and thus, enable the research questions pertaining to SCM's disciplinary identity to be answered.

Figure 5.2 facilitates analyses of this SCM evolution through a comparison of the total number of academic articles per year, compared with the total number of practitioner articles per year. The two trend lines each represent a function of fourth degree that indicate the paths of the academic (dark grey columns and trend line) and practitioner (light grey columns and trend line) publications. As evident, pre-2001 is a period of growth, moderate for academics and intense for practitioners. The two communities then diverge in 2001 as academic interest slowly declines while practitioner interest continues to mature before declining. By 2008, both communities converge again, with the academic activity rate reflecting a slight increase in interest while the practitioner rate continues to decline.

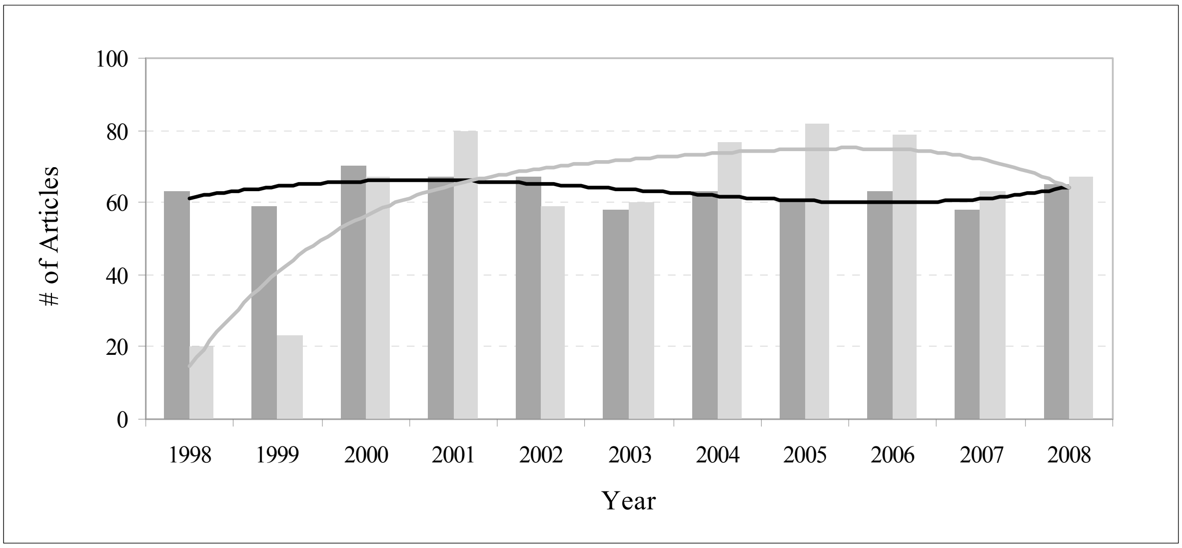

Figure 5.2: *Comparison of Academic and Practitioner Articles over the 11-year Period*

The difference in trend lines indicates an evolution of SCM over the 11-year period. Academics are showing the classic signs of a domain evolving then reacting to threats as theorised by Kuhn. Thus, the growing interest in a new area brings in more researchers, interest wanes as there is a perception that there is nothing left to research, so attention is turned to other areas. Interest grows again as competing paradigmatic stances attract researchers either to defend the status quo or argue for a new world order. For practitioners the evolution is similar, albeit for different reasons: There is increasing interest in a new area that may potentially provide competitive advantage or cost savings, maturity is reached as SCM becomes established in the psyche of the corporate domain, whilst a decline occurs as organisations look for the next new strategic approach to provide competitive advantage. Hence, distinct stages are identifiable: a period of growth from 1998 to 2001; maturity from 2002 to 2006; and the beginning of a decline in SCM activity from 2007.

At this stage of the analysis, the question must be asked as to whether these findings truly constitute an evolution over time of SCM or merely reflect normal fluctuations in the number of articles published each year due to editorial policies. Keeping in mind that the four publications were selected solely on the basis of addressing SCM via Fabian's three criteria (especially its body of knowledge), it is suggested that the fluctuations witnessed may merely be in response to editorial decisions; such as special issues where more articles would be published than normal or where an editor increases the number of articles published per issue. To ascertain whether the broader SCM domain registered similar fluctuations over the 11-year period, several procedures were undertaken to ensure legitimacy of the subsequent analysis in this chapter and provide further insight into an evolution of SCM.

First, an acclaimed leading OM publication, *Journal of Operations Management* (JOM) (ranked A* in the Australian Business Deans Council Journal Quality List) was analysed from 1990 through to 2009 to enable a very clear depiction of SCM over its formative years to be ascertained. The same selection criteria as this research was utilised to determine SCM articles to be included (for instance, letters to the editor and editorials were not included). Hence, the procedures used to identify the SCM orientated articles within JOM were the same used for the primary data collection of JSCM, IJPDLM, SCMR, and LS in this research. The objective of this process was to examine whether articles pertaining to SCM published in JOM (irrespective of the actual number of articles published in JOM each year[7]) followed the same fluctuating trend observed within the four publications utilised in this research. As such, utilisation of JOM constitutes a test of generality within the bounds of this research.

Figure 5.3 indicates that there is a clear infancy period for SCM-orientated topics. Notably few of these articles address SCM as a holistic concept; instead, it is common to see discussion surrounding logistics or supply issues. The rise and maturity of SCM between 1998 and 2006 is clear with the same pattern of fluctuations in activity rates being evident as was observed in the four publications of this research. The drop in article activity from 2007 onwards depicts SCM's decline in JOM, reflecting that from 2007 onwards other OM topics take precedence for publication. The trend line represents a function of fourth degree. Overall, the fluctuations observed in JOM indicate that there is a clear evolution of SCM over time.

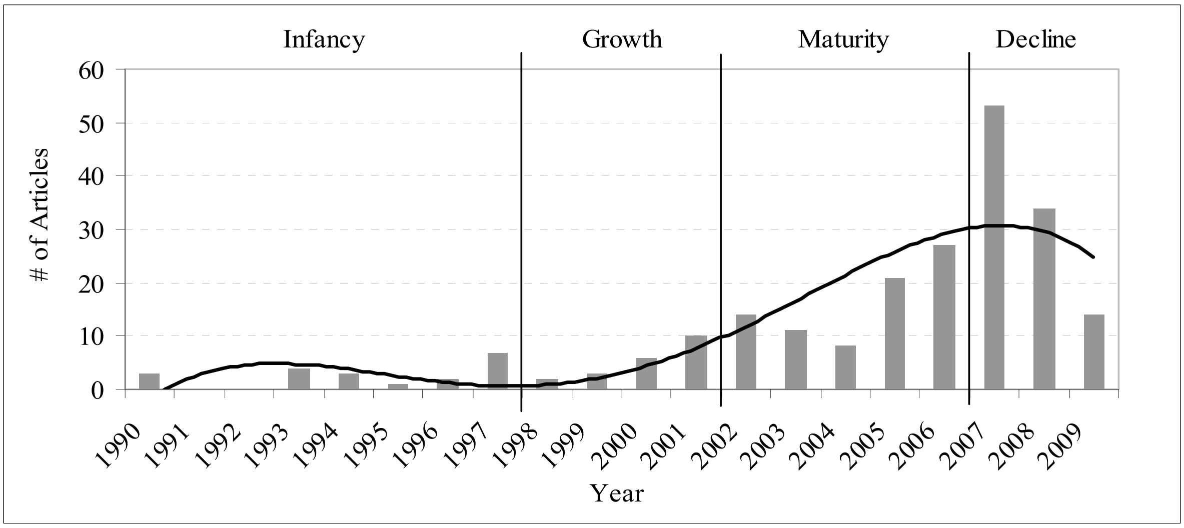

Figure 5.3: *Distribution of SCM Articles in JOM*

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[7] An editorial policy change was instigated in 2007 to tighten publication standards and focus JOM on raising the Thomson/ISI impact factor. From 2008 only 35-45 high quality articles are to be published each year.

To ensure that this observation of evolution is legitimate a second validation technique was utilised. The proceedings from the conference series offered by the *Decision Sciences Institute* (DSI) were analysed to further inform the development of SCM over time. This conference series provides both academic and practitioner participants with a vehicle for dialogue as to a variety of current topical issues. Again, this constitutes a test to the broader environment of the assumptions made to date. Unlike JOM, DSI conferences have no arbitrarily set limit as to the number of papers accepted or published. Thus, a more accurate portrayal as to the focus of researchers and practitioners is attainable. Figure 5.4 depicts the articles presented at DSI conferences from 2000 through to 2009; data for 1998 and 1999 were unfortunately not obtainable. As evident, the data from DSI supports the findings of JOM of an SCM evolution.

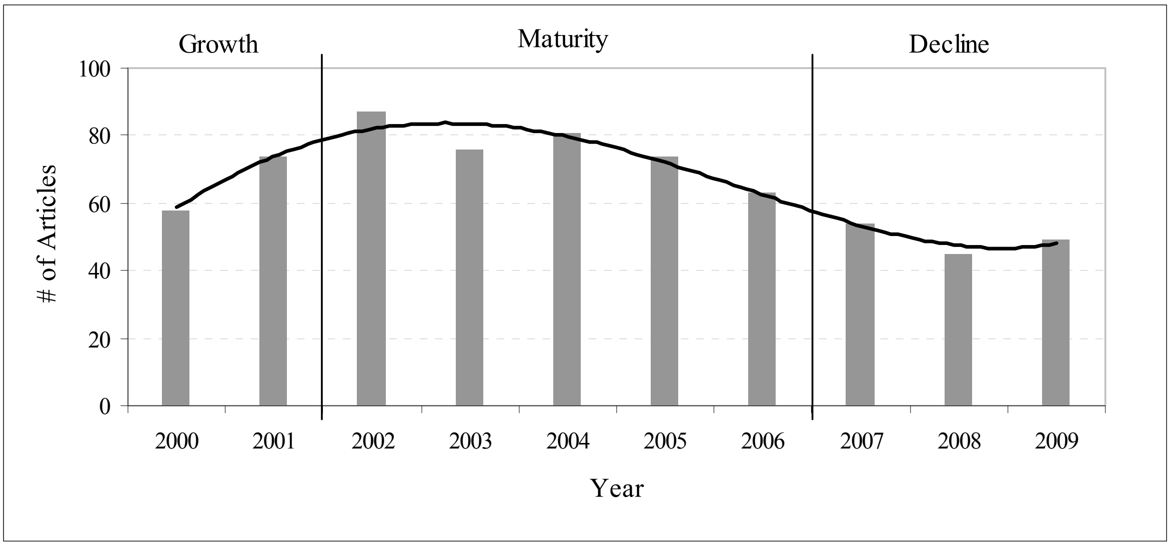

Figure 5.4: *Distribution of SCM Articles in DSI*

In summary, the four publications utilised in this research were selected on the basis of targeting solely SCM-orientated articles to enable the determination of an SCM body of knowledge. The legitimisation techniques employed[8] facilitate depiction of a clear progression over time of SCM. As such, the findings of JOM and DSI reinforce an evolutionary progression by SCM.

[8] The purpose of these legitimisation techniques has been to provide indication of a growth-maturity-decline lifecycle of SCM; thus, they constitute a perfectly adequate explanation. Statistical testing of such a lifecycle, while desirable, is not possible as the analysis is not about hypothesis testing of the said lifecycle. However, the investigation into probable statistical tests has provided indications as to innovative research areas suitable for further exploration.

5.1.2 Characterisation of Supply Chain Management's Disciplinary Periods

Figure 5.5 provides evidence as to three distinct periods in SCM's evolution: growth (1998 to 2001), maturity (2002 to 2006) and then decline (2007 to 2008). These three periods correspond to Kuhn's theories as to a discipline's evolutionary progress over time as discussed in Section 3.1.2. Hence, the three periods can be labelled as (1) pre-paradigmatic from 1998 to 2001, (2) normal science from 2002 to 2006, and (3) the beginnings of a crisis period in 2007 and 2008. This section discusses the characterisations of these three periods to enable the evolution of SCM to be conceptualised and thus form the basis for the examination of Fabian's three criteria (coherence, knowledge, and quality) via the conceptualisations of academics and practitioners.

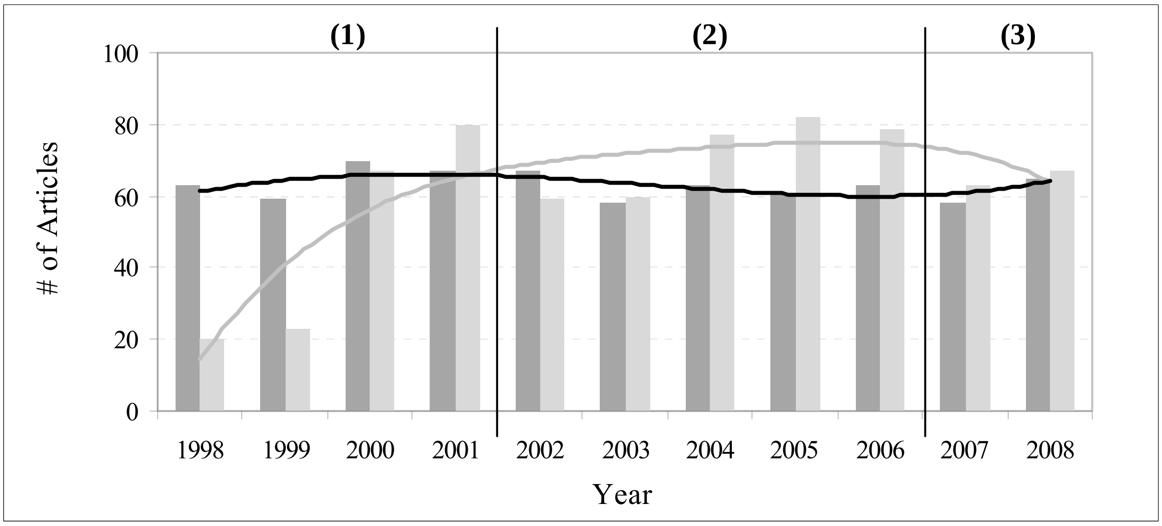

Figure 5.5: *Characterisation of Disciplinary Periods*

(1) Pre-Paradigmatic Period: The first evolutionary period occurs from 1998 to 2001. According to Kuhn if a domain is of interest, more and more researchers will participate in its development. Hence, the domain becomes accepted although researched from a varied discourse. Researchers take on the persona of explorers interested in a variety of methods, techniques, and questions.

As is evident in Figure 5.5, practitioner interest jumped between 1999 and 2000, although academic articles dominated overall. Significantly, the bulk of the articles can be found in IJPDLM and SCMR, indicating that both journals had identified the importance of SCM and were seeking to communicate its concepts. Thus, the name change that occurred in JSCM is a reflection of this increased academic interest, while the increase in practitioner articles reflects the increasing interest of the actual users of SCM.

Notably, Kuhn does not distinguish between varied rates of activity in the pre-paradigmatic period. Although there is a noteworthy demarcation between 1999 and 2000, indicating the significant jump in interest by practitioners and the moderate jump by academics, Kuhn regards the levels of 1998 and 1999 as being equal to the higher levels portrayed in 2000 and 2001. However, Figure 5.5 provides evidence to suggest that there should be such a distinction between moderate and accelerated growth. Hence, it is proposed to separate this period into an acceptance phase (1a – covering 1998 and 1999) and a growth phase (1b – covering 2000 and 2001) to enable the evolution of SCM as a discipline to be more concisely conceptualised. Subsequently, academics dominate phase (1a) with 73.9% of the article activity, compared with practitioners 26.1%. Whereas phase (1b) shows a shift with practitioners edging out academics with 51.8% of the activity compared to academics 48.2%, a drop for academics of 25.7%. Overall, these finer distinctions enable Fabian's three criteria to be analysed via two distinct phases during the pre-paradigmatic period.

(2) Normal Science Period: The second period covers the years 2002 through to 2006. According to Kuhn, the normal science period is where a domain matures via adherence to norms of behaviour, for instance surrounding research methods, techniques and posed research questions. These norms of behaviour are unquestioned and unchallenged as the official dogma rules. Researchers become encultured into the dominant paradigm; hence, it is common for some researchers to turn to other pursuits due to a perception of 'boredom' (i.e. nothing new or exciting requires investigation) (Kuhn, 1970). Furthermore, Kuhn argues that towards the end of the normal science period researchers start to question and thus challenge the status quo and established dogma. Kuhn suggests that this is due to a rise in anomalies and circumstances where the accepted paradigm fails to provide a basis for a logical answer.

Examination of the findings indicates that the suggestions by Kuhn are evident within this period. Whereas the previous period (1b) was characterised by high growth rates, this period is characterised by the expected stagnation as SCM matures, although 2002 and 2003 indicate an overall decrease in activity by 14.3% from 2001. Consequently, these two years mark the beginnings of a new period in SCM evolution after strong growth in the latter stage of the pre-paradigmatic period. There is evidence to suggest that researchers and users of SCM turned to other pursuits due to a perception that there was nothing new to learn or research within the bounds of SCM.

The subsequent increase in overall activity in 2004 (up 18.6%, n=140) is followed by modest gains in 2005 (up a further 2.1%, n=143) and a slight shift in 2006 (down 0.7%, n=142). This is argued to be evidence of Kuhn's suggestions that the status quo of the concept is being challenged and in response ignites a flurry of activity. Overall, this period is the largest covering five years and 669 articles. Practitioners dominate academics with 53.4% of the article activity, reflecting the importance of SCM to the business community during this time.

(3) Crisis Period: The third period covers 2007 and 2008. According to Kuhn, it is during the crisis period that researchers seriously question the status quo by re-examining the dominant research questions, techniques and methods of the normal science period under guidance from alternative paradigms. However, Kuhn (in his early work) states that the crisis period is not a slow process but a catastrophic event that entails a sudden shift in thinking. Thus, according to Kuhn's view there should be an abrupt end to article activity. However, this is not indicated in the overall SCM article activity. In comparison, Halloun provides an indication as to what is being observed, as being a gradualist he maintains that shifts can occur through a transition from the previously dominant dogma to the new comer. Accordingly, Kuhn adapted his thoughts to promote the view that change could occur gradually.

Taken together both Kuhn and Halloun's thoughts on the crisis period, in conjunction with human nature not to drop abruptly what you have spent years maintaining, indicate that considerable debate will occur between the old dominant dogma and new challengers. Within this research and based on overall article activity rates there is evidence of an initial decline in activity in 2007 by 14.8% that is then followed by a slight increase in 2008 by 9.0%; thus indicating that debate on the established paradigm is increasing. The drop in activity by practitioners is potentially the first sign that SCM is in crisis, as the actual users of SCM re-examine its benefits. It is interesting to note that SCMR had a drop in activity by 3.5% between the normal science period and the crisis period, whereas LS increased by 1.5% indicating that practitioners may be indicating a return to a logistics orientation (in other words the more tactical supply chain orientation), rather than a SCM orientation. However, academic activity increases slightly on the previous period. Thus, we see evidence that academics are questioning issues surrounding the problematic fundamentals of SCM, whereas practitioners are indicating a move away from a business concept that no longer provides them with new avenues for competitive advantage and/or cost saving measures.

Interim Summary: Table 5.2 provides details as to the three periods discussed, including comparisons between academic and practitioner publications in absolute figures (pure counts) and relative percentage terms (percentages expressed relative to the totals of each column). Due to the large volume of texts that content analysts typically examine, cross-tabulations are a common technique utilised to render large volumes of data comprehensible. Each column specifies a total for academics and practitioners (in bold) with the total sum of each column along the bottom row. In addition, the last column portrays the differences between disciplinary periods calculated as a percentage, in terms of occurrence in a particular period less the percentage of the anterior period. To enable ease of comparison tables throughout this analysis chapter are structured similarly. Appendix 7 provides further demarcation of each publication, per year and across the disciplinary periods.

Table 5.2: *Distribution of Articles across the Disciplinary Periods*

	Pre-Paradigmatic Period				*Normal Science Period*		*Crisis Period*		*Total*		*% Difference Between Periods*		
	(1a) 1998-1999		*(1b) 2000-2001*		*(2) 2002-2006*		*(3) 2007-2008*						
	n=	*%*	*n=*	*%*	*n=*	*%*	*n=*	*%*	*n=*	*%*	*1a-1b*	*1b-2*	*2-3*
Academic													
JSCM	47	28.5	52	18.3	100	14.9	41	16.2	240	17.5	-10.2	-3.4	1.3
IJPDLM	75	45.4	85	29.9	212	31.7	82	32.4	454	33.1	-15.5	1.8	0.7
Total	***122***	***73.9***	***137***	***48.2***	***312***	***46.6***	***123***	***48.6***	***694***	***50.6***	***-25.7***	***-1.6***	***2.0***
Practitioner													
SCMR	26	15.8	116	40.9	298	44.6	104	41.1	544	39.7	25.1	3.6	-3.5
LS	17	10.3	31	10.9	59	8.8	26	10.3	133	9.7	0.6	-2.1	1.5
Total	***43***	***26.1***	***147***	***51.8***	***357***	***53.4***	***130***	***51.4***	***677***	***49.4***	***25.7***	***1.6***	***-2.0***
∑	***165***	***100***	***284***	***100***	***669***	***100***	***253***	***100***	***1371***	***100***			

5.1.3 Interim Summary

This section has provided a synopsis of the distribution of the 1,371 articles over the 11-year period from 1998 through to 2008. The fluctuations in academic and practitioner article activity enable insights into the evolution of SCM. Legitimacy is ensured through testing the greater OM domain for insight into SCM's evolution. Findings indicate that academics and practitioners have progressed through similar growth, maturity, and decline phases. Hence, application of Kuhn's specific periods of disciplinary evolution enables insight into how SCM has evolved over the 11 years. The three periods are *pre-paradigmatic* (1a – *acceptance*: 1998-1999, and 1b – *growth*: 2000-2001), *normal science* (2002-2006) and *crisis* (2007-2008).

In summary, it is through differentiation of SCM over 11 years that a platform is characterised based on article activity rates, which then enables analysis of the rest of the data under legitimate guidance. Nevertheless, although the objective of this research is to ascertain SCM's disciplinary identity as conceptualised by academics and practitioners over time, basing an answer on mere article activity rates would be ignorant of the content of those articles, and hence a limiting factor in determining an answer. Subsequently, Kuhn's distinct periods of evolution, although providing a legitimate foundation for further analyses into SCM's disciplinary identity in the subsequent sections, are not in themselves an indication of SCM fulfilling the criteria of a discipline, albeit one that is now indicated to be in decline. Nonetheless, they do enable in-depth analysis via legitimate periods of segmentation. Consequently, Fabian's three criteria (coherence, knowledge and quality) are analysable via a foundation of specific periods of change in the following sections.

5.2 The Degree of 'Coherence' within Supply Chain Management

Disciplines that lack coherence tend to place a high degree of emphasis on boundary maintenance via debates as to a suitable definition, terminology and theoretical foundation (Pfeffer, 1993). Fabian proposed that the degree of coherence within a discipline could range from solidarity through to complete fragmentation. Subsequently, examination of key areas such as definition, terminology and theoretical development enable the degree of coherence to be determined. This section addresses the core research question of:

- RQ(1): Are there sufficient indicators of coherence in the SCM literature to signify it is a discipline?

In addressing RQ(1) this section ascertains the degree of coherence within SCM from both an academic and practitioner perspective along with changes over time. Answers to RQ(1a) and an SCM definition (Section 5.2.1), RQ(1b) and SCM terminology (Section 5.2.2), and RQ(1c) SCM's theoretical development (Section 5.2.3) are presented.

5.2.1 Definitions

The fundamental purpose of a definition is to convey the essential character of a discipline, delineate its relationships and above all eliminate misunderstanding and obscurity (Gibson et al., 2005). Subsequently, specific rules should be followed in the development of 'good' formal conceptual definitions (Wacker, 2004). It is argued that the lack of clear formal conceptual definitions within SCM results in ambiguity, confusion and vague definitions that fail to adequately capture the true nature of that being defined. Due to a lack of an agreed definition, considerable ambiguity is inherent within the academic literature. Such lack of scholarly consensus limits managerial understanding as to the entirety, strategic benefits and practical application of SCM. Hence, the first research question asks:

- RQ(1a): To what extent are there differences in the SCM definitions used by academics and practitioners for each disciplinary period?

To facilitate obtaining an answer each of the 1,371 articles were categorised according to one of the following criteria:

- New = new definition explicitly stated, (e.g. 'SCM is defined as…', 'we define SCM as…', 'Supply chain management is…').
- Existing = existing definition explicitly stated, (e.g. within quotation marks: 'SCM is defined as…', 'We define SCM as…', 'Supply chain management is…'; record citation and definition).
- Implied = no definition explicitly stated, but implied based on discussion.
- None = no definition explicitly stated or implied from discussion.

To be categorised as 'new' or 'existing' a definition had to be explicitly stated. Such a conservative approach mitigates any subjectively imposed inference on behalf of the coder (Burgess et al., 2006) enabling the true thoughts as to SCM definition to be determined.

Figure 5.6 illustrates that there is a large number of articles across all disciplinary periods that utilise no definition, with a total of 32.4% for academics (the dark grey columns) and 26.8% for practitioners (the light grey columns). When combined with their respective 'implied' definition categories across all disciplinary periods, academics and practitioners show a surprising lack of articulation of a SCM definition. Consequently, both communities have nearly 97% of their respective articles lacking a formal articulation of SCM.

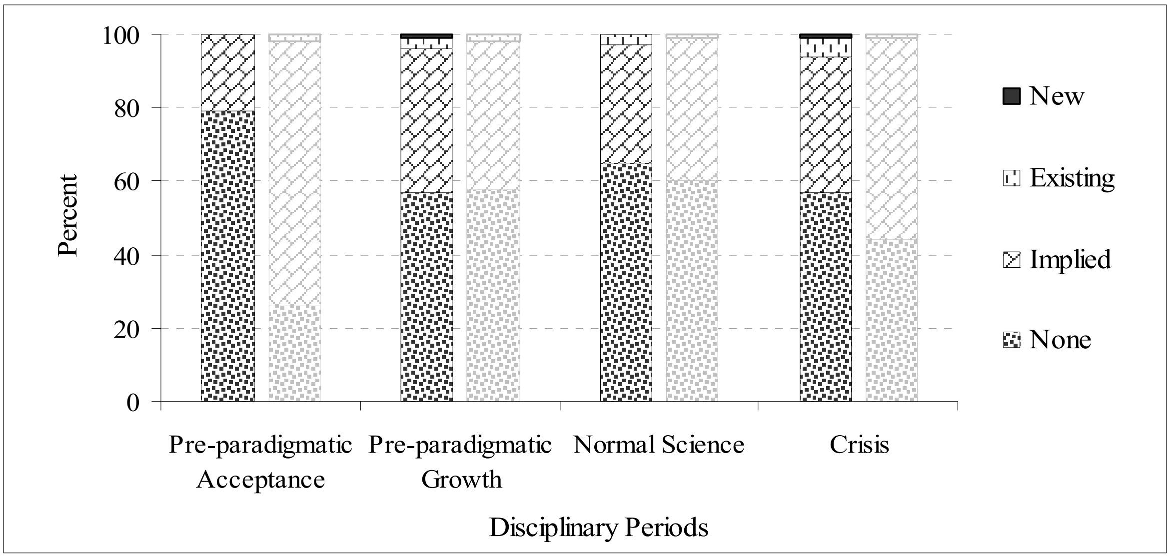

Figure 5.6: *Utilisation of SCM Definitions across the Disciplinary Periods*

Wacker (2004) has written that before theoretical development can occur all concepts must be clearly and fully defined, especially the broader domain. It is logical to expect therefore, that authors writing on SCM would define the concept formally to enable accurate articulation of any consequent discussion. However, as the evidence in Figure 5.6 suggests, this has not been the case. There might be several reasons for this, with possible explanations orientated around the purpose behind communication for both academics and practitioners.

There are underlying fundamentals to both academic and practitioner knowledge communication that are dependent upon the focus of the communicator, the message to be imparted and the audience being written for. Discussions on the processes underlying knowledge communication indicate that academics adhere to scientific norms orientated around 'rigour' while practitioners orientate around 'relevance'. Therefore, in regards to academic articles, there is a worrying indication in Figure 5.6 that nearly all the research undertaken over the 11-year period failed to be conducted along approved scientific grounds. Such a finding is of concern, for as Wacker (2004) states lack of conceptualisation of a formal definition before undertaking traditional statistical empirical tests raises questions as to the validity of those results; how can authors (and their readers) know precisely what they are measuring, testing and then discussing if the concept is imprecisely defined?

Concurrently with regard to practitioners, such a lack of a formal SCM definition suggests that managers may be talking at cross-purposes with their counterparts. This raises concerns about such issues as the benchmarking of SCM processes and the uptake of SCM concepts, which arguably may severely limit strategic gains from integrated supply chain solutions with suppliers and buyers. Overall, the worry is that articles depicting research and those depicting practical elements of SCM are orientating their arguments around a fuzzy unformed personal belief as to what they as individuals (rather than the domain) believe SCM to be. Such orientations hinder efficient and effective communication of SCM knowledge, not just between members of the same community (for instance between academics), but also between the two communities (for instance between practitioners and academics).

Further potential reasons for failure to articulate a formal definition of SCM surround the possible belief (by the author) that it is an unnecessary exercise. Authors may be so focused on their specific area of SCM that they tend to define the narrow sub-area rather than the broader domain. However, to argue that defining the entirety of SCM as an initial first step places unnecessary restrictions on the scope of a study or discussion, is a self-limiting argument. The entirety of a domain requires defining to enable all contributors to begin their studies or discussions from a uniform platform of agreement.

According to Kuhn, as a discipline evolves from *pre-paradigmatic* to *normal science* then through to the *crisis* period there should be fragmentation, a move towards consensus, and then further fragmentation. Hence, there would be an expectation that as SCM evolved through the disciplinary periods there would be a marked increase in the application of SCM definitions, first due to consensus, and then due to fragmentation causing authors to articulate their position clearly. As Table 5.3 indicates, academics across the disciplinary periods and in regard to ‘new’ and ‘existing’ SCM definitions have a marked increase between the *pre-paradigmatic* period (n=6) and the *normal science* period (n=11) before decreasing in the *crisis* period (n=7). On the other hand, practitioners have no ‘new’ SCM definitions in any disciplinary period, and in regard to ‘existing’ SCM definitions decrease between the *pre-paradigmatic* period (n=4) and the *normal science* period (n=2) before a further decrease in the *crisis* period (n=1). Consequently, academics follow Kuhn’s thoughts and increase definitions as they move from *pre-paradigmatic* to *normal science*, but fail when moving into the *crisis* period. Practitioners indicate a gradual decline throughout.

Table 5.3: *Synopsis of SCM Definitions across the Disciplinary Periods*

	Pre-Paradigmatic Period				***Normal Science Period***		***Crisis Period***		***Total***		***% Difference Between Periods***		
	(1a) 1998-1999		***(1b) 2000-2001***		***(2) 2002-2006***		***(3) 2007-2008***						
	n=	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***	***1a-1b***	***1b-2***	***2-3***
Academic													
New	0	0.0	2	0.7	1	0.2	1	0.4	4	0.3	0.7	-0.5	0.2
Existing	0	0.0	4	1.4	10	1.5	6	2.3	20	1.5	1.4	0.1	0.8
Implied	26	15.8	53	18.7	100	14.9	46	18.2	225	16.4	2.9	-3.8	3.3
None	96	58.1	78	27.4	201	30.0	70	27.7	445	32.4	-30.7	2.6	-2.3
Total	***122***	***73.9***	***137***	***48.2***	***312***	***46.6***	***123***	***48.6***	***694***	***50.6***	***-25.7***	***-1.6***	***2.0***
Practitioner													
New	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0
Existing	1	0.6	3	1.1	2	0.3	1	0.4	7	0.5	0.5	-0.8	0.1
Implied	31	18.8	59	20.8	141	21.1	72	28.5	303	22.1	2.0	0.3	7.4
None	11	6.7	85	29.9	214	32.0	57	22.5	367	26.8	23.2	2.1	-9.5
Total	***43***	***26.1***	***147***	***51.8***	***357***	***53.4***	***130***	***51.4***	***677***	***49.4***	***25.7***	***1.6***	***-2.0***
$\sum$	***165***	***100***	***284***	***100***	***669***	***100***	***253***	***100***	***1371***	***100***			

Nevertheless, is this significant? Due to the data being categorical-nominal, a chi-square test was utilised with four 2x4 chi-square analyses being performed for each disciplinary period to assess if differences were significant in regards to SCM definition utilisation between academics and practitioners. To operate correctly a chi-square test utilises data generated from random samples of multinomial mutually exclusive distribution (Field, 2009). Furthermore, to qualify as significant expected frequencies for each cell must be greater than five (Field, 2009).

For the *pre-paradigmatic acceptance* period, results of the chi-square were significant, χ^2 (2) = 40.40, p < .001, where the majority of academics tended to utilise no ('none') SCM definitions (n=96, 78.7%). Conversely, the majority of practitioners (n=31, 72.1%) tended to use 'implied' SCM definitions. For the *pre-paradigmatic growth* period, results of the chi-square were not significant, χ^2 (3) = 2.416, p = .491. For the *normal science* period, results of the chi-square were significant, χ^2 (3) = 10.74, p = .013, where academics tended to use no ('none') SCM definitions (n=201, 64.4%) or 'implied' SCM definitions (n=100, 32.1%). Practitioners tended to use no ('none') SCM definitions (n=214, 59.9%) or 'existing' SCM definitions (n=141, 39.5%). Finally, for the *crisis* period, results of the chi-square were significant, χ^2 (3) = 11.45, p = .010, where academics tended to use no ('none') SCM definitions (n=70, 56.9%) or 'implied' SCM definitions (n=107, 37.4%). The majority of practitioners used 'implied' SCM definitions (n=72, 55.4%) or no ('none') SCM definition (n=57, 43.8%). Table 5.4 presents the results of the chi-square analysis.

Table 5.4: *Results of the Chi-square Analysis for SCM Definitions*

	Pre-Paradigmatic Period				***Normal Science Period***		***Crisis Period***	
	(1a) 1998-1999		***(1b) 2000-2001***		***(2) 2002-2006***		***(3) 2007-2008***	
	n=	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***
Academic								
New	0	0.0	2	1.5	1	0.3	1	0.8
Existing	0	0.0	4	2.9	10	3.2	6	4.9
Implied	26	21.3	53	38.7	100	32.1	46	37.4
None	96	78.7	78	56.9	201	64.4	70	56.9
Total	***122***	***100***	***137***	***100***	***312***	***100***	***123***	***100***
Practitioner								
New	0	0.0	0	0.0	0	0.0	0	0.0
Existing	1	2.3	3	2.1	2	0.6	1	0.8
Implied	31	72.1	59	40.1	141	39.5	72	55.4
None	11	25.6	85	57.8	214	59.9	57	43.8
Total	***43***	***100***	***147***	***100***	***357***	***100***	***130***	***100***
	χ^2 ***(2) = 40.40,*** **p < .001**		χ^2 ***(3) = 2.416,*** **p = .491**		χ^2 ***(3) = 10.74,*** **p = .013**		χ^2 ***(3) = 11.45,*** **p = .010**	

Although providing an informative discussion, examination of the frequencies of the academic and practitioner SCM definitions across all four categories and over the disciplinary periods is not sufficient in itself for charting the evolution of SCM definitions over time; nor is undertaking a chi-square test for significance able to ascertain whether the actual definitions utilised are in themselves noteworthy. Subsequently, an in-depth examination of the qualitative data captured from the articles is required. Hence, the definitions recorded under the two categories 'new' and 'existing' will be extracted from the data and examined according to the disciplinary period within which they occur. Through this, and due to the fact that authors tend to cite definitions from sources deemed to be established and reputable, an understanding as to the generally accepted view held by academics and practitioners of SCM during a particular disciplinary period is ascertainable.

(1a) Pre-Paradigmatic Acceptance Period: Within this disciplinary period, academics utilise no definitions in either the 'new' or the 'existing' categories. Practitioners utilise no definitions in the 'new' category with only one in the 'existing' category. Table 5.5 provides details as to the publication that the definition was in and the year published, duplicates the definition (along with the source citation that the definition was based on), and details the definition's properties. As is evident, this sole definition of practitioner origin was sourced from 1973, which raises questions as to how relevant such a definition would be several decades later in 1999. Noticeably, the definition specifies 'the movement of goods' and consequently is firmly entrenched within the logistics sub-area of SCM. Furthermore, there is the suggestion that coordination is a vital part of the process and that there should be multiple levels of integration between organisations. This practitioner definition is firmly entrenching SCM as logistics, or in other words within the *acceptance* phase of the pre-paradigmatic period, 'SCM' is merely another name for a logistics process that organisations undertake as part of daily activities.

Table 5.5: *Existing Definitions in the Pre-Paradigmatic (Acceptance) Period*

Definition	***Properties suggested***
Practitioner	
LS - 1999 SCM is defined as the movement of goods and the coordination of demand and supply not necessarily as activities carried on by or for one firm, but by and for firms at two or more levels in a channel of logistics (Heskett, Glaskowsky, & Ivie, 1973).	Logistics channel Coordination of activities

(1b) Pre-Paradigmatic Growth Period: Kuhn argued that if a domain were of sufficient interest more individuals would participate in its development, and hence under the persona of being an explorer would examine a multitude of avenues such as SCM definitions. Evident in the *growth* phase of the *pre-paradigmatic* period is an increase in the articulation of SCM and hence the utilisation of SCM definitions. It is also during this stage that 'new' definitions of SCM are evident.

Table 5.6 provides the first 'new' definitions with both coming from IJPDLM in 2000. The first adopts a very shallow perspective through stating that SCM covers production to consumption with a focus on a logistics orientation. Also specified is that the movement and handling of goods requires enhancement, although there are no details as to what this enhancement might be or what it might do. Thus, the definition is simplistic in nature as it specifies that SCM is a physical process that somehow enhances the flow of goods from production to customer. The second definition is more complex with SCM being a network of organisations and individuals (customers); however, there is no detail as to what the purpose of such a network is for in regard to outcomes. The view that SCM is merely a management technique provides insight, especially as the definition specifies that information processing is crucial for effective SCM. However, no indication is provided as to what information is processed, whose it is and what then occurs with this information. Overall, these two new definitions of SCM indicate considerable variance in how SCM is being conceptualised.

Table 5.6: *New Definitions in the Pre-Paradigmatic (Growth) Period*

Definition	***Properties suggested***
Academic	
IJPDLM - 2000 Supply-chain management can be defined as: all processes concerned with the enhancement of movement and handling of goods from point of production (supply) to point of consumption (demand).	Process chain Logistics flow
IJPDLM - 2000 We define supply chain management as a network of suppliers, manufacturers, distributors and customers. As with any management techniques, information processing is a crucial component for effective SCM.	System of networks Management technique Information flow

With regard to the utilisation of definitions categorised as ‘existing’ during this *growth* phase (see Table 5.7), all four of the academic definitions come from IJPDLM in 2000 and 2001, while the practitioner definitions come from both SCMR (one in 2000) and LS (two in 2001).

Table 5.7: *Existing Definitions in the Pre-Paradigmatic (Growth) Period*

Definition	***Properties suggested***
Academic	
IJPDLM - 2000 (occurs twice) Supply chain management has been defined as the integration of business processes from end user through original suppliers that provide products, services and information that add value for customers (Cooper, Lambert & Pagh, 1997).	Process chain Integration Value adding for customers
IJPDLM - 2001 According to the US Council of Logistics Management, supply chain management is the process of planning, implementing and controlling the efficient, cost-effective flow and storage of raw materials, in-process inventory, finished goods and related information from point-of-origin to point-of-final-consumption for the purpose of conforming to customer requirements (Taylor, 1997).	Global network Coordination Logistics flow Information flow Cost effectiveness Conform to customer requirements
IJPDLM - 2001 SCM can be defined as all activities associated with the flow and transformation of goods from the raw material stage (extraction), through to the end user as well as all information flows (Handfield & Nichols, 1999).	Logistics chain Integration of activities
Practitioner	
SCMR - 2000 SCM is the global network used to deliver products and services from raw materials to the end-customer through engineered flows of information, physical distribution, and cash (Alber & Walker, 1999).	Global network Products and services Logistics flow Information flow
LS - 2001 (occurs twice) According to the Council of Logistics Management, global supply chain management is the process of planning, implementing and controlling the efficient, cost effective flow and storage of raw materials, in-process inventory, finished goods and related information from point of origin to point of consumption for the purpose of conforming to customer requirements (Council of Logistics Management).	Global network Coordination Logistics flow Information flow Cost effectiveness Conform to customer requirements

IJPDLM in 2000 (and interestingly twice by the same authors) conceptualises SCM as the integration of business processes across organisations. A key objective mentioned for the first time is that of value, although no specifications are provided as to what ‘value’ entails for customers and stakeholders. Also of note is the articulation of ‘services’ although no details are mentioned. It is argued that these three authors capture the essence of SCM from an academic perspective during this disciplinary period. Additionally, IJPDLM in 2001 has the first instance where an academic cites the views of a practitioner organisation (the US Council of Logistics Management), thereby implying that during this *growth* phase academics were looking to practitioners for an articulation of SCM.

In comparison, the two practitioner definitions reflect a more complex conceptualisation of SCM. The definitions are quite extensive in detail, covering implementation of SCM processes from planning through to control, plus specifying that SCM covers raw materials, in-process inventory and finished goods. Also articulated for the first time is that an efficient cost-effective SCM should conform to customer requirements, not the organisations. Hence, these definitions seek to place the end customer as the final determinant of SCM success.

Overall, the *pre-paradigmatic growth* period sees practitioner definitions as being more sophisticated in their conceptualisations of SCM than academic definitions. Academics have a focus on SCM as a process chain that integrates the activities of organisations to add value for customers (though there is no indication as to what ‘value’ means), while practitioners utilise a global network that is planned, implemented and coordinated around the effective flow of goods and information to conform to customer requirements.

Nonetheless, irrespective of what the definitions cover, Kuhn’s thoughts on the *pre-paradigmatic* period are such that there should have been evidence of a greater number and variety of SCM definitions utilised. There is no such evidence, suggesting that the conservative approach of requiring explicitly stated definitions may have had a limiting factor on what was considered as a definition. However, as Wacker (2004) argued the lack of clear formal conceptual definitions results in domain ambiguity, confusion, and hampers formal theoretical development; thus, vague definitions fail to adequately capture the true nature of that being defined. As such, it was considered entirely appropriate to identify definitions that were explicitly stated as being definitions for the purposes of this research.

(2) Normal Science Period: In comparison to the *pre-paradigmatic* period, the *normal science* period to Kuhn is one of consolidation, where the norms of the domain are firmly established and researchers are encultured into the dominant thought patterns. Hence, there is only one ‘new’ definition provided, that from JSCM in 2004 (see Table 5.8). The definition specifies that SCM is a management technique utilised for the control of funds, goods and processes from earliest supplier through to the ultimate end customer. Although such a definition is alluding to a chain of organisations being involved, it fails to provide sufficient depth of detail as to how many organisations and the resultant benefit of involvement. Simultaneously, specifying that SCM is a management technique implies that SCM is a simplistic ‘tick-the-box’ technique, easily able to be implemented and applied.

Table 5.8: *New Definitions in the Normal Science Period*

Definition	***Properties suggested***
Academic JSCM - 2004 Supply chain management is the management of information, processes, goods and funds from the earliest supplier to the ultimate customer.	Management technique Logistics chain

In regard to the utilisation of 'existing' SCM definitions academics had n=10, while practitioners had n=2 (see Table 5.9). Within the academic publications, two articles utilised the Lambert (2006) definition and two utilised the Lambert et al. (1998) definition. Hence, as in the *pre-paradigmatic growth* period these three authors (Lambert, Cooper and Pagh) are acknowledged as capturing the essence of SCM (process chain, a degree of integration and value adding activities) through a higher utilisation of their definition throughout the *normal science* period.

Table 5.9 depicts an increase from the previous period in the overall number of definitions utilised. Further, there are characteristics exhibited in these definitions that were not present in the previous period. Evidence suggests that academics are becoming increasingly aware of the levels of complexity within SCM and are suggesting multiple characteristics as a result. For instance, the definition from Mentzer et al. (2001) specified that the management of the relationships amongst member organisations of the supply chain was a vital activity. Also specified was an indication of the numerous linkages between organisations, with SCM having an increasing focus on control from the ultimate supplier through to the ultimate customer, hence, SCM was argued to be a system of networks. Furthermore, there has been increased emphasis placed on information flow and the creation of value through efficiencies.

Table 5.9: *Existing Definitions in the Normal Science Period*

Definition	***Properties suggested***
Academic	
JSCM - 2006 SCM is the planning and coordination of activities, from procurement to production, through…distribution (Arunachalam, Sadeh, Eriksson, Finne, & Janson, 2003).	Management technique Logistics chain
IJPDLM - 2006 (occurs twice) SCM is the integration of key business processes from end-user through original suppliers, that provides products, services, and information that add value for customers and other stakeholders (Lambert, 2006).	Process chain Integration Value adding for customers
JSCM - 2005 SCM is the design and management of seamless, value-added processes across organizational boundaries to meet the real needs of the end customer. The development and integration of people and technological resources are critical to successful supply chain integration (Institute for Supply Management).	Design and management Value adding processes Meet customer needs Seamless integration
JSCM - 2004 & IJPDLM - 2002 Supply Chain Management is the integration of key business processes from end user through original suppliers that provides products, services and information that add value for customers and other stakeholders (Lambert, Cooper, & Pagh 1998).	Process chain Integration Value adding for customers
IJPDLM - 2003 SCM is considered to be composed of the actors in these networks which vertically work together to add value to customers, and is defined as the processes linking supplier and user companies, from the initial raw materials to the ultimate consumption of the finished product (Omta, Trienekens, & Beers, 2001).	System of networks Value added Logistics chain
IJPDLM - 2003 SCM can be defined as the processes from initial raw materials to the ultimate consumption of the finished product linking across supplier user companies; and the functions within and outside a company that enables the value chain to make products and provide services to the customer (Cox, 1995).	Process chain Value added
JSCM - 2002 SCM can be defined as a network of interacting organizations whose objective is to deliver a product or service to an end user, by integrating and coordinating the activities associated with the flow of goods from raw materials to the delivery of the finished product, through effective combinations of resources and skills contributing to the creation and delivery of value (Ellram 1991; Frayer & Monczka 1997).	System of networks Management technique Integration Value creation
IJPDLM - 2002 A supply chain can be defined as three or more organizations directly linked by one or more of the flows of products, services, finances, and information from a source to a customer. Management of the supply chain is essentially management of the relationships and activities among the member organizations (Mentzer et al., 2001).	Process chain Management technique Relationships vital Information-finance flow Logistics-services flow
Practitioner	
SCMR - 2004 Supply chain management is the integration of key business processes from end user through original suppliers that provides projects, services, and information that add value for customers and other stakeholders (Global Supply Chain Forum)	Integration of key business processes Information flow Value adding
SCMR - 2003 SCM is an approach whereby the entire network, from suppliers through the ultimate customer, is analyzed and managed in order to achieve the 'best' outcome for the whole system (Ellram & Cooper, 1993).	System of networks Management technique

Nonetheless, the most sophisticated definition within the academic publications comes from the Institute for Supply Management's (ISM) and was utilised in JSCM in 2005. This is the second instance where a practitioner definition has been advocated by academics. The level of detail offered is argued to reflect a truer account as to the complexities inherent within SCM implementation. Hence, this is the first instance where the *design* of the supply chain is as important as *managing* the processes that occur amongst member organisations. Simultaneously, the definition alludes to a seamless interaction, implying that close ties across organisational boundaries are vital and that these ties should not contribute to cost. Furthermore, this definition clearly articulates the requirement of meeting the 'real' needs of the end customer, thus indicating a growing awareness as to the different needs customers have (though these needs are not articulated). Finally, the ISM definition provides details as to how to achieve successful SCM, stating that the development and integration of both people and technology are critical to success. It is surprising therefore, that it has not been utilised within the practitioner publications. Overall, this practitioner definition captures a level of understanding as to SCM's core functions that academic definitions lack, although the Mentzer et al. definition comes close with its mention of the importance of relationships.

In comparison, it is interesting that of the two definitions utilised within the practitioner publications during this period one is from a practitioner source while the other utilises an academic's perspective. The definition from the Global Supply Chain Forum (GSCF) specifies that value be added for the benefit of the customer and other stakeholders, whereas Ellram and Cooper merely offer that the 'best' outcome should be achieved for the entire system. This raises the question as to why if the GSCF definition has a greater depth of detail, authors (writing for practitioners) utilise a definition that lacks similar depth. The answer may be a simple one, with the author emphasising that the entire network of organisations must also benefit from the SCM relationship, not just the end customer.

Overall, the *normal science* period sees academics unable to agree as to a definition of SCM with new characteristics exhibited throughout the period, while the two practitioner definitions are at a lower level in terms of detail than those utilised in the *pre-paradigmatic (growth)* period. Hence, within this period we would expect to see consolidation as stipulated by Kuhn, but there is evidence of activity that is more akin to the *pre-paradigmatic* periods. However, Kuhn does note that fragmentation may begin to occur as the status quo of the established dogma is challenged due to an increase in observed anomalies, although it would be expected that this would be witnessed towards the end of the *normal science* period, and as such mark the transition into the next disciplinary period. Evidence indicates that this fragmentation has occurred throughout the *normal science* period, and thus raises the question as to whether consensus of definition was ever attainable.

(3) Crisis Period: Unlike the *normal science* period where consolidation is expected, the *crisis* period is one of fragmentation as new challengers compete for recognition. It is interesting then that only one new definition is offered by academia (see Table 5.10) and that this definition although conceptualised in 2007, is remarkably similar to those from the *pre-paradigmatic* periods. For instance, it stipulates that SCM should orientate around a logistics flow and that efficiency and effectiveness are desired. An interesting aspect of this definition is that the focus on managing the entire network of organisations involved, from ultimate supplier through to the ultimate end customer, has been eliminated. Instead, the definition stipulates that an organisation should focus on its relationships with immediate suppliers and customers in regards to information and goods. It therefore indicates a return to a more simplistic conceptualisation of SCM.

Table 5.10: *New Definitions in the Crisis Period*

Definition	***Properties suggested***
Academic	
IJPDLM - 2007 In this paper, SCM refers to the practices and processes aiming for effective and efficient flow of materials and information between a company and its immediate suppliers and customers.	Logistics chain Efficiency Information flow

This is a significant turning point in the conceptualisation of SCM, especially when the new definition is compared with the existing definitions that were utilised during this period (see Table 5.11). The majority of definitions have been conceptualised in either the *pre-paradigmatic growth* period or the *normal science* period although now greater depth of articulation is apparent. Interestingly, there are indications of a clear differentiation between a supply chain and the management of its logistics flow, with clear emphasis that an organisation should focus primarily on its immediate suppliers and customers. Through such a focus on value, depicted as a lowering of costs and improved long-term financial performance, the organisation will achieve not just benefits for themselves but also other connected organisations.

Table 5.11: *Existing Definitions in the Crisis Period*

Definition	*Properties suggested*
Academic	
JSCM - 2008 Thus whereas the Council of Logistics Management (1998) defined logistics as that part of the supply chain process that plans, implements, and controls the efficient flow and storage of goods, services, and related information from the point of origin to the point of consumption in order to meet customers' requirements the scope of SCM goes further to include planning and control, work structure, organization structure, product flow facility structure, information flow facility structure, product structure, management methods, power and leadership structure, risk and reversal structure, culture and attitude (Cooper, Lambert, & Pagh, 1997; Council of Logistics Management).	Integration Value adding for customers Differentiation between logistics (supply chain) and SCM (management of supply chain)
JSCM - 2008 Supply chain is a network of connected and interdependent organizations mutually and co-operatively working together to control, manage and improve the flow of materials and information from suppliers to end users… Supply chain management is the management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole (Handfield & Nichols, 1999).	Network Information flow Logistics flow Relationship managing Cost minimisation
JSCM - 2008 SCM can be defined as the systematic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within a supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole (Mentzer et al. 2001).	Process chain Management technique Relationships vital Information-finance flow Logistics-services flow
IJPDLM - 2008 … defines supply chain management as the integration of key business processes, from original supplier to end-user, to provide products, services and information. (Global Supply Chain Forum)	Integration of process chain
IJPDLM - 2008 SCM can be defined as encompassing the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. It also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers (Council of Logistics Management).	Process chain Activity management Logistics management Coordination
IJPDLM - 2007 SCM is defined as the efficient management of the end-to-end process, which starts with the design of the product or service and ends with the time when it has been sold, consumed, and finally, discarded by the consumer (Swaminathan & Tayur, 2003).	Process chain Management efficiency
Practitioner LS - 2008 SCM is defined as the integral, integrated, and consumer-orientated planning, design, scheduling and optimization of intra- and inter-company material and related information flows to achieve an optimum in the value creation network, which stretches from the raw material supplier through the individual production stages to the final consumer (Staberhofer & Rohrhofer, 2007).	Integrated network Optimisation of value Consumer orientation for planning, design, and scheduling flow of information and goods

In comparison, there is only one practitioner definition utilised, which provides a significant level of depth akin to the depth of detail provided in the *pre-paradigmatic* periods. Specifically, this definition provides a clear conceptualisation as to the reason behind SCM implementation: to be consumer orientated to enable value creation optimisation via the integrated network, focusing on the planning, design and scheduling of materials and information at both the inter- and intra-organisation level.

Overall, the *crisis* period indicates some noteworthy changes occurring within the articulation of SCM definitions. For academics, there are indications that the supply chain and SCM are separate aspects and hence, require different management techniques to optimise value. Simultaneously, academics advocate a focus on the immediate suppliers and customers rather than attempting to coordinate along the entire network of organisations involved; hence, there are suggestions of an emergence of a more simplistic rendition of SCM. This is not the case when examining the practitioner definition, which provides a highly detailed account of SCM orientated around the consumer at every level from design to coordination activities.

Interim Summary: Wacker (2004) wrote on the serious implications for a discipline if definitions were not formally articulated, as any subsequent research would be suspect. Gibson et al. (2005) stated that the fundamental purpose of a definition was to convey in a clear concise manner the essential character of the discipline, delineate its relationships and overall eliminate misunderstanding and obscurity. This section indicates that across all disciplinary periods there is a struggle to form consensus and provide an accurate portrayal of SCM. It is evident that academics have struggled with a conceptualisation of SCM with the *pre-paradigmatic* periods indicating simplistic articulations; the *normal science* period reflecting attempts at consensus on the elements required, while the *crisis* period depicts a return to the simplistic version, but through a re-differentiation between the supply chain and its managerial aspects (SCM). In comparison, the practitioner experience has been the opposite, with the *pre-paradigmatic* periods indicating complexity, the *normal science* period indicating simplicity, before a return to a complex articulation of SCM in the *crisis* period.

The reversal of approach between academics and practitioners provides a valuable initial insight into how the two communities have attempted to conceptualise SCM over 11 years. However, as Wacker argues, questions must be raised as to the validity of academic research over this time as the data indicates a clear lack of a concise conceptualisation of SCM. Hence, on this basis and from an academic perspective can SCM be deemed a discipline? In conjunction, the findings from the *normal science* period imply that the academic boundaries are purely subjective and expose SCM to the risk of potential integration with other more established disciplines. This finding reinforces Wacker's concerns and provides legitimacy to his arguments regarding the requirement of formal conceptual definitions before attempting research.

The issues and problems inherent within the academic attempts at a conceptualisation of SCM are not evident within practitioner attempts. Academics utilise a greater number of diverse SCM definitions than practitioners across all disciplinary periods, and is thus cause for concern. If academics are operating from a fractured conceptualisation of SCM, while practitioners are not, the question must be asked as to the implications for the long-term survival of SCM as a relevant business practice and research platform. Furthermore, to what degree can SCM be deemed an integrated and coherent discipline, for as the findings have shown academic literature is fragmented, while the practitioner literature is leaning towards a coherent conceptualisation.

5.2.2 Terminology

In addition to analysing definition utilisation, evaluation as to the degree of coherence can be determined through the identification of the term utilised to depict 'SCM'. De Saussure (1959) states that the terminology utilised by individuals sets the boundaries as to what is included or excluded in a domain or definition; hence, determining the term that both communities utilise when discussing 'SCM' facilitates an understanding of the reasons behind the definitional issues identified in the previous section. It also contributes to our understanding as to the degree of coherence within the domain. Lyons (1968) argues that our intuitive familiarity of language obscures any objective examination of the words (terminology) that we use. Hence, by taking language for granted there is the tendency to be subjective in the use of particular words or terms. (Through the processes put in place in regards to content analysis, this research enables the objective examination of the term utilised by academics and practitioners when they discuss 'SCM'.)

New (1996) argues that the term 'SCM' is a mere rebadging of earlier concepts, while Fawcett and Magnan (2002) believe that practitioners would adopt the term but not change their underlying practices. Hence, this research question determines the extent of any differences in the terminology utilised by academics and practitioners:

- RQ(1b): To what extent are there differences in the SCM terminology used by academics and practitioners for each disciplinary period?

To ascertain an answer each of the 1,371 articles was categorised according to one of the following criteria:

- Existing = new name for SCM, but still SCM being discussed (record name).
- New = new name for SCM, and something completely different being discussed (record name).
- SC = does not use 'SCM' or 'supply chain management' directly, instead uses 'supply chain' but implies 'SCM' concept.
- SCM = uses 'SCM' or 'supply chain management' directly.

Figure 5.7 depicts the usage of SCM terminology by academics (dark grey columns) and practitioners (light grey columns) across all disciplinary periods. As is evident, the term 'supply chain' (SC) dominates both academic and practitioner articles, while the term 'supply chain management' (SCM) is of secondary importance to academics and practitioners. Given the findings of the previous section on the lack of consensus as to a SCM definition, it is not surprising that authors prefer to utilise a term perceived as being more universally accepted.

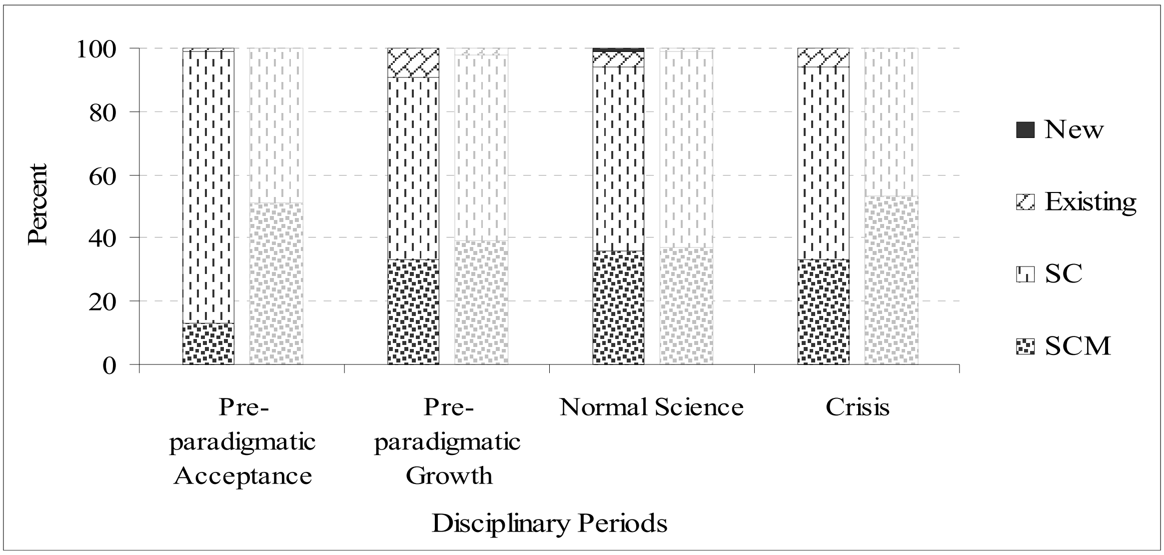

Figure 5.7: *Utilisation of SCM Terminology across the Disciplinary Periods*

De Saussure argues that the terminology utilised by an individual or group depicts the boundaries of what is included or excluded in any discussion. Hence, it is reasonable to presume that the term used by either academics or practitioners is indicative of their perceptions and construal of SCM. As Figure 5.7 illustrates, there is a clear emphasis on the term SC rather than SCM across all disciplinary periods. As Fawcett and Magnan (2002) state, SCM is deemed to be synonymous with 'collaboration'. Hence, it is logical to argue that through utilising the term SC the focus by academics and practitioners is on the basic processes that are undertaken, rather than on its (SCM) capabilities as a collaborative management technique or strategy.

Section 2.1.2 discussed the debate surrounding an exact definition of the supply chain concept. Combined with the problematic issues detailed in the previous section on SCM, it is reasonable to presume that authors may be utilising what they perceive to be a simpler, more accepted, term when using SC. As such, in authors' minds the term SC may now be synonymous with that of SCM. Hence, the argument by New (1996) that SCM may be merely a rebadging of an earlier concept rings true. Table 5.12 depicts the findings in absolute figures and relative percentages across the disciplinary periods.

Table 5.12: *Synopsis of SCM Terminology across the Disciplinary Periods*

	Pre-Paradigmatic Period				***Normal Science Period***		***Crisis Period***		***Total***		***% Difference Between Periods***		
	(1a) 1998-1999		***(1b) 2000-2001***		***(2) 2002-2006***		***(3) 2007-2008***						
	n=	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***	***1a-1b***	***1b-2***	***2-3***
Academic													
Existing	1	0.6	12	4.2	17	2.5	7	2.8	37	2.7	3.6	-1.7	0.3
New	0	0.0	0	0.0	2	0.3	0	0.0	2	0.2	0.0	0.3	-0.3
SC	105	63.6	80	28.2	182	27.2	75	29.6	442	32.2	-35.4	-1.0	2.4
SCM	16	9.7	45	15.8	111	16.6	41	16.2	213	15.5	6.1	0.8	-0.4
Total	***122***	***73.9***	***137***	***48.2***	***312***	***46.6***	***123***	***48.6***	***694***	***50.6***	***-25.7***	***-1.6***	***2.0***
Practitioner													
Existing	0	0.0	3	1.1	3	0.5	0	0.0	6	0.5	1.1	-0.6	-0.5
New	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0
SC	21	12.7	86	30.3	220	32.9	61	24.1	388	28.3	17.6	2.6	-8.8
SCM	22	13.4	58	20.4	134	20.0	69	27.3	283	20.6	7.0	-0.4	7.3
Total	***43***	***26.1***	***147***	***51.8***	***357***	***53.4***	***130***	***51.4***	***677***	***49.4***	***25.7***	***1.6***	***-2.0***
∑	***165***	***100***	***284***	***100***	***669***	***100***	***253***	***100***	***1371***	***100***			

To facilitate determining the significance of the terminology utilised, four 2x4 chi-square analyses were performed. For the *pre-paradigmatic acceptance* period, results of the chi-square were significant, χ^2 (2) = 26.11, p < .001, where the majority of academics tended to use 'SC' (n=105, 86.1%). Practitioners tended to use 'SCM' (n=22, 51.2%) or 'SC' (n=21, 41.8%). For the *pre-paradigmatic growth* period, results of the chi-square were significant, χ^2 (2) = 6.91, p = .032, where academics tended to use 'SC' (n=80, 58.4%) or 'SCM' (n=45, 32.8%). Practitioners tended to use 'SC' (n=86, 58.5%) or 'SCM' (n=58, 39.5%). Academics used 'existing' SCM terminology more than did practitioners. For the *normal science* period, results of the chi-square were significant, χ^2 (3) = 14.59, p = .002, where academics tended to use 'SC' (n=182, 58.3%) or 'SCM' (n=111, 35.6%). Practitioners tended to use 'SC' (n=220, 61.6%) or 'SCM' (n=134, 37.5%). Academics used 'existing' SCM terminology more than did practitioners. For the *crisis* period, results of the chi-square were significant, χ^2 (2) = 15.39, $p < .001$, where academics tended to use 'SC' (n=75, 61.0%) or 'SCM' (n=41, 33.3%). Practitioners tended to use 'SCM' (n=69, 53.1%) or 'SC' (n=61, 46.9%). Academics used 'existing' SCM names more than did practitioners. Table 5.13 presents the results of the chi-square analysis.

Table 5.13: *Results of the Chi-square Analysis for SCM Terminology*

	Pre-Paradigmatic Period				***Normal Science Period***		***Crisis Period***	
	(1a) 1998-1999		***(1b) 2000-2001***		***(2) 2002-2006***		***(3) 2007-2008***	
	n=	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***
Academic								
Existing	1	0.8	12	8.7	17	5.4	7	5.7
New	0	0.0	0	0.0	2	0.7	0	0.0
SC	105	86.1	80	58.5	182	58.3	75	61.0
SCM	16	13.1	45	32.8	111	35.6	41	33.3
Total	***122***	***100***	***137***	***100***	***312***	***100***	***123***	***100***
Practitioner								
Existing	0	0.0	3	2.0	3	0.9	0	0.0
New	0	0.0	0	0.0	0	0.0	0	0.0
SC	21	41.8	86	58.5	220	61.6	61	46.9
SCM	22	51.2	58	39.5	134	37.5	69	53.1
Total	***43***	***100***	***147***	***100***	***357***	***100***	***130***	***100***
	χ^2 ***(2) = 26.11,*** **p** ***< .001***		χ^2 ***(2) = 6.91,*** **p** ***= .032***		χ^2 ***(3) = 14.59,*** **p** ***= .002***		χ^2 ***(2) = 15.39,*** **p** ***< .001***	

Examination as to the frequency of use between academics and practitioners over the disciplinary periods while interesting, is insufficient in itself for charting the evolution of SCM terminology over time; nor is undertaking a chi-square test for significance able to extol fully the diversity of terminology utilisation. An in-depth investigation of the qualitative data captured from the articles is required to determine an answer. Hence, the next sections will discuss the actual terminology utilised by academics and practitioners. Although alternative terminology use is low, an indication as to the sub-areas of interest is attainable, and combined with the core definitional elements ascertained in Section 5.2.1 strengthens our insight into academic and practitioner conceptualisations of SCM over time. Table 5.14

provides a breakdown of the terminology utilised (both new and existing) by both communities; the terms SC and SCM are included for ease of comparison.

Table 5.14: *Breakdown of Utilised Terminology across the Disciplinary Periods*

Term	Pre-Paradigmatic Period (1a) 1998-1999		Pre-Paradigmatic Period (1b) 2000-2001		Normal Science Period (2) 2002-2006		Crisis Period (3) 2007-2008		Total	
	A	*P*	*A*	*P*	*A*	*P*	*A*	*P*	*A*	*P*
Demand Chain Management	-	-	-	-	1	-	1	-	2	-
Demand Driven Supply Network	-	-	-	-	-	1	-	-	-	1
Integrated Supply Chain Management	1	-	5	-	1	1	-	-	7	1
Logistics Management	-	-	-	-	-	1	-	-	-	1
Procurement	-	-	1	-	1	-	1	-	3	-
Purchasing & Supply Management	-	-	2	-	3*	-	-	-	5	-
Strategic Sourcing & Supply	-	-	1	-	-	-	-	-	1	-
Strategic Supply Management	-	-	-	-	1	-	1	-	2	-
Supply Management	-	-	2	-	10*	-	1	-	13	
Sustainable Supply Chain Management	-	-	-	-	-	-	1	-	1	-
Value Chain Management	-	-	1	2	2	-	2	-	5	2
Value net	-	-	-	1	-	-	-	-	-	1
Total	***1***	***0***	***12***	***3***	***19***	***3***	***7***	***0***	***39***	***6***
SC	105	21	80	86	182	220	75	61	442	388
SCM	16	22	45	58	111	134	41	69	213	283
∑	***165***		***284***		***669***		***253***		***1371***	

* - 'New' term for SCM (i.e. implying a different concept) utilised in this period

(1a) Pre-Paradigmatic Acceptance Period: The *pre-paradigmatic acceptance* period for academics is dominated by the term 'SC' (n=105) rather than 'SCM' (n=16), thus academics are seen to entrench the concept of SCM firmly within its base concept of SC. However, there is one instance of the term 'integrated supply chain management' being used, which is interesting as the term is a redundant one; SCM's core emphasis is on integration. In regards to the practitioner articles, there is no alternative term utilised for SCM; however, there is an almost even spread between 'SC' use (n=21) and 'SCM' use (n=22). This may indicate that practitioners have a slightly greater degree of acceptance of the SCM term and are conceptualising the domain as such.

It is interesting to note that in the previous section there was no formal SCM definition utilised by academics within this period. Thus, the dominance of the SC concept provides an indication that academics perceive SCM to be a process-based approach. This is supported through use of the term 'integrated supply chain management'. Although there is only the one instance of its use, its reiteration as a core element suggests a certain degree of confusion may exist during this period as to what SCM actually entails. Meanwhile, the sole practitioner definition utilised specifies coordination of logistics channel activities suggesting a focus on the SC concept, thus supporting the almost 50-50 split between use of the terms 'SC' and 'SCM' by practitioners. If the word 'coordination' is taken to imply the establishment of a certain level of integration between members along the logistics channel, then it can be argued that practitioners, while focusing on the process-based approach of SC, were simultaneously attempting to implement SCM, albeit only within the logistics sub-area.

(1b) Pre-Paradigmatic Growth Period: Unlike the previous period, the *pre-paradigmatic growth* period signals an increase in utilisation of other terminology from both communities. Academics again utilise the term 'integrated supply chain management' (a fivefold increase from the previous period), with one instance where the term 'value chain management' is mentioned. Utilisation of these terms is argued to be examples of tautology and thus emphasise needless repetition by academics as to the core issues of SCM. In conjunction, there are six instances where terms orientated around supply issues are utilised (for instance 'procurement', 'strategic sourcing and supply', and 'supply management'), thus suggesting a preference by academics to focus solely on the supply sub-area of SCM during this period. Irrespective of the alternative terms presented, the term 'SC' (n=80) still dominates, although there has been a decrease from the previous period. Surprisingly, there has been an increase in the usage of the term 'SCM' (n=45) from the previous period. Therefore, it can be suggested that in combination with the reiteration of SCM's core aspects (integration and value) academics were moving SCM to a more holistic concept, although the 'holism' is seen to be situated firmly around supply characteristics.

In comparison, practitioners increase their utilisation of the term 'SC' (n=86) and 'SCM' (n=58) with the term 'SC' dominating. Although this period covers a greater number of articles, the gap between 'SC' and 'SCM' use is considerable compared to the previous period, and as such indicates that practitioners orientate the SCM domain around the process of logistics. Also evident during this period is the use of two alternative terms for SCM, 'value chain management' (n=2) and 'value net' (n=1). Thus, there is a higher emphasis on value from practitioners than there is from academics. Combined with the increase in the SC concept, this emphasis on 'value' may indicate that practitioners are seeking to derive value from the actual physical processes involved.

With regard to SCM definition in the same *pre-paradigmatic growth* period, it is interesting to note that the core elements of the academic definition orientate around the integration of business processes to add value. This may explain the increase in usage of the term 'integrated supply chain management' from the previous period. Furthermore, there is an emphasis from academics on terms orientated around 'supply' which combined with the definition suggests that the business processes being integrated are upstream ones, rather than across every organisation involved. Although there is only one instance where 'value' is mentioned in the terminology, the definition implies that 'value' is of greater importance during this disciplinary period than is suggested. Subsequently, the definition combined with the increase in use of the term 'SCM' along with the supply orientation, implies that academics during this period perceived SCM to be of value to the purchasing organisation. Hence, the 'business processes' mentioned in the definition can be argued to be those orientated around the purchase order (for instance the lowering of costs through using IT to transmit and process an order).

In contrast, the core elements of the practitioner definition specify the integration of global networks to conform to customer requirements. Combined with the substantial increase in the use of the term 'SC', there is evidence to suggest that the focus for practitioners was on the global supply chain, specifically the logistics network during this period. The definition also states that the customer is the central focus; hence, combined with the term 'value' it implies that the supply chain (with a logistics orientation) is to benefit that customer (for instance in regard to time or cost considerations in moving products).

Overall, the terminology utilised during the *pre-paradigmatic growth* period by academics and practitioners, combined with their respective definitions from the previous section, illustrates the impossibility of achieving consensus between the two communities at this time. Consequently, it is not surprising that the evidence (both definition and terminology) conforms to Kuhn's views of fragmentation; however, the question is whether consensus is attainable during the next disciplinary period.

(2) Normal Science Period: According to Kuhn, the *normal science* period is where consensus forms. Yet, evidence shows that there is considerable diversity in terminology utilisation, suggesting that fragmentation is still rife. For instance, during this period academics' usage of the term 'integrated supply chain management' has dropped by 80%. This suggests that 'integration' as a concept has become firmly entrenched within the psyche of academia and requires no further reiteration. As such, this acceptance of 'integration' facilitates explanation as to why there has been a 146.7% increase in the usage of the term 'SCM' from the last period. However, a substantial increase of supply-orientated terms by 150% indicates that there is still an orientation towards process-based approaches. This is supported by the 127.5% increase in the use of the term 'SC' after a drop in use between the *pre-paradigmatic acceptance* and *growth* periods. (It must be acknowledged that the *normal crisis* period covers the largest number of years, therefore the percentage increases may merely reflect the greater number of articles involved.)

It is during this period that the only instances of 'new' terminology (defined as being something completely different to SCM) were observed; both terms were situated within the academic publications. The terms ('supply management' and 'purchasing and supply management') were determined by this author to be instances where the discussion surrounding the term was something completely new and thus not a discussion on an aspect of SCM; discussions with the co-coder confirmed this finding. The argument can be made that having instances where authors were advocating something completely new, but utilising terms normally associated with the concept SCM (or even SC) is problematic. Confusion as to what exactly SCM encompasses would result, and thus readers would be left with a myriad of questions regarding the exact terminology and boundaries (including definition) of what they deemed to be SCM.

For practitioners the increased utilisation evident in the previous period of 'SC' and 'SCM' terminology has continued with 'SC' utilisation increasing 155.8%, while 'SCM' increases 131%. Although both increase during this period, the term 'SC' still dominates. Subsequently, it is evident that practitioners still firmly orientate the SCM domain around its physical capabilities. In conjunction, a substantial shift in alternative terminology has occurred. The emphasis on 'value' has been replaced by singular instances of 'demand-driven supply network', 'integrated supply chain management' and 'logistics management'. The first two terms indicate a focus on the customer, the former through an emphasis on a demand driven supply (i.e. the customer drives the demand for re-supply) and the latter through implementing a level of integration (i.e. potentially through using information technology). The third term is interesting in that it indicates a return to the original progenitor of the SC and SCM concepts, logistics. Hence, it suggests that during the *normal science* period practitioners agreed with New (1996) that the SCM term was merely rebadged logistics.

Analysis via comparison with definitions utilised during the *normal science* period reveals that academics have no discernable definition for SCM as multiple characteristics are advocated. Consequently, these characteristics indicate fragmentation, rather than consolidation of the SCM concept. Terminology usage during this period strengthens this finding for although there is an indication that 'integration' is now firmly entrenched, the inconsistencies evident via the increase of both 'SCM' and 'SC' usage, plus the increased focus on a supply orientation, suggest otherwise.

In contrast, practitioners tend towards consensus with the core elements of their definition orientating around the integration of key business processes coordinated to provide value for the end customer. Thus, combined with the dominance of the 'SC' term during this period strengthens the view that practitioners firmly orientate SCM around its physical processes and capabilities. Interestingly the definition advocates value for the end customer, whereas the terminology implies that although the customer is of focus, quantifiable value is not. Hence, both the definition and the terminology utilised suggest that practitioners regard the concept known as 'SCM' as a mere rebadging of the core elements of the logistics concept.

Overall, the terminology utilised during the *normal science* period by academics and practitioners, combined with their respective definitions from the previous section, illustrates the continued impossibility of achieving consensus between the two communities. Surprisingly, academics are seen to continue their fractured discourse through a failure to consolidate around a core term, although it can be argued that the continued dominance of the 'SC' concept may indicate this necessary consensus. Subsequently, it is not surprising that the evidence fails to conform to Kuhn's views of consolidation.

(3) Crisis Period: Unlike the previous period, the *crisis* period in the evolution of a discipline expects fragmentation and discord. Thus, there should be evidence of an increasing debate as to the boundaries of the SCM term. In regard to academics, there is a sizeable drop in utilisation of supply-orientated terminology, with a greater variety of terms such as ‘demand’, ‘sustainability’, strategy’, and ‘value’ being evident; however, the term ‘SC’ still dominates ‘SCM’ by 55% suggesting that academics continue to orientate around process driven aspects of the supply chain.

Surprisingly, practitioners utilise no alternative terminology for the SCM concept during this period, which goes against Kuhn’s theories. Also of significance is that the term ‘SCM’ dominates the ‘SC’ term. Hence, for practitioners the term ‘SCM’, for the first time since the *pre-paradigmatic acceptance* period, out-rates the ‘SC’ concept, thus indicating an understanding that it is not just logistics, it is instead a holistic focus. Overall, where Kuhn suggests fragmentation we see consolidation from academics orientated around a diminished application of SCM to its non-strategic supply chain concept, while for practitioners there is consolidation of the strategic aspects of SCM.

Furthermore, in regard to the SCM definitions within the *crisis* period, academics are seen to disconnect the SC from its managerial aspects and retrench the SCM concept to managing just the immediate suppliers and customers, rather than the entire network of organisations involved. This is evident in the focus on SCM aspects that draw most of their appeal from close intimate relationships. Meanwhile the practitioners consolidate their highly detailed definition and orientated around the consumer at every level, which is evident by the dominance of the SCM terminology.

Interim Summary: De Saussure (1959) argues that the terminology utilised by individuals frames the concept being discussed, hence the boundary dictates what is included and excluded. Lyons (1968) argues that our familiarity with language means that we are not able to be objective in its use. As rational individuals, we are purely subjective as to what terminology (and in the general sense, words) we use. For academics, although variations have been tried, the base concept of the supply chain dominates thinking, suggesting that ‘SCM’ is merely one more buzzword for the ‘SC’. Furthermore, Fawcett and Magnan (2002) argue that practitioners would not change their underlying practices although they would adopt the new term of SCM. This is evident across all but two periods. It can be suggested therefore that practitioner evolution in regard to terminology shows strong support for the base concept of the supply chain.

The surprising and enduring strength of the SC concept through the disciplinary periods is interesting. Although touted as a tactical process-orientated concept it obviously has an enduring appeal throughout all periods and in both communities. Does this indicate that the term 'SCM' is merely a fancied up term for the base concept? According to New (1996) this would be correct, as he argued that SCM was merely rebadging earlier concepts. The findings in this research suggest that in this instance SCM is merely a new buzzword for the concept of logistics.

5.2.3 Theoretical Development

Evaluation as to the degree of coherence within SCM has so far examined definition and terminology utilisation by academics and practitioners. Coherence can also be determined through identification of the level of theoretical development within an article. Ho et al. (2002) argue it is crucial to address the initial stages in the theory-building process before attempting to progress to the latter stages of theory validation and refinement. Further, they suggest that the proliferation of definitions and terminology causes increasing difficulty in mapping the theoretical boundaries of SCM. Consequently, Wacker (2008) advocates the requirement of developing clear and concise conceptualisations (for example definition and terminology) before refinement of a theory can be undertaken.

The findings of the previous two sections identified a considerable range of definitions and terminology in use within each disciplinary period. Thus, it is suggested that based on the thoughts of Ho et al. and Wacker this section's findings will most likely reinforce the perception of a non-coherent domain through identifying a fragmented theoretical base in use; it is the severity of this fragmentation that is of interest, with RQ(1c) asking:

- RQ(1c): To what extent are there differences in the approaches to theoretical development by academics and practitioners for each disciplinary period?

To ascertain an answer required the use of a framework that was able to capture both the explicit and implicit theoretical assumptions within an article. The model developed by Handfield and Melnyk fit these requirements.

Arguing that without theory it is impossible to generate meaning from data, Handfield and Melnyk (1998) state that irrespective of the questions asked, articles reflect the impact of an explicit or implicit theoretical framework via the research strategy employed. Hence, the true level of theoretical development is ascertainable. As explicit frameworks (such as the methodology utilised and specific research questions to answer) are easily identified within academic publications, the strength of the Handfield and Melnyk model is in its ability to identify implicit theoretical frameworks. Accordingly, their model determines the stage the article is at in terms of the theory building process and is therefore appropriate for ascertaining the underlying theoretical foundation of not just academic articles but also practitioner articles.

To facilitate ascertaining an answer each of the 1,371 articles was categorised according to one of the following criteria in Handfield and Melnyk's model:

- Discover = uncover areas for study and (theory) development (asks, "What is going on here, is there something interesting to justify further investigation?")
- Describe = explore territory (asks, "What is there, what are the key issues, and what is happening?")
- Map = draw maps of the territory (asks, "What are the key variables, themes, patterns, categories evident?")
- Links = improve the maps by identifying the linkages between relationships (asks, "What are the patterns of linkages, is there an order, why do the relationships exist?")
- Validate = predict future outcomes via theory validation (asks, "Do we get a certain behaviour that was predicted by theory?")
- Extend = expand the map via theory extension/refinement, provide better understanding of the structure (asks, "Where does our existing theory apply or not apply?")

Table 5.15 provides a synopsis of the data in absolute figures and relative percentages across the disciplinary periods along with the percentage difference between periods.

Table 5.15: *Synopsis of the Theoretical Development across the Disciplinary Periods*

	Pre-Paradigmatic Period				***Normal Science Period***		***Crisis Period***		***Total***		***% Difference Between Periods***		
	(1a) 1998-1999		***(1b) 2000-2001***		***(2) 2002-2006***		***(3) 2007-2008***						
	n=	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***	***1a-1b***	***1b-2***	***2-3***
Academic													
Discover	6	3.6	2	0.7	15	2.2	9	3.6	32	2.3	-2.9	1.5	1.4
Describe	66	40.0	71	25.0	195	29.2	56	22.1	388	28.3	-15.0	4.2	-7.1
Map	36	21.8	55	19.4	83	12.4	39	15.4	213	15.6	-2.4	-7.0	3.0
Links	13	7.9	7	2.4	15	2.2	8	3.2	43	3.1	-5.5	-0.2	1.0
Validate	1	0.6	2	0.7	4	0.6	11	4.3	18	1.3	0.1	-0.1	3.7
Extend	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0
Total	***122***	***73.9***	***137***	***48.2***	***312***	***46.6***	***123***	***48.6***	***694***	***50.6***	***-25.7***	***-1.6***	***2.0***
Practitioner													
Discover	2	1.2	6	2.1	14	2.1	10	3.9	32	2.3	0.9	0.0	1.8
Describe	24	14.6	90	31.7	292	43.6	95	37.6	501	36.6	17.1	11.9	-6.0
Map	14	8.5	43	15.2	48	7.2	22	8.7	127	9.3	6.7	-8.0	1.5
Links	3	1.8	8	2.8	3	0.5	3	1.2	17	1.2	1.0	-2.3	0.7
Validate	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0
Extend	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0
Total	***43***	***26.1***	***147***	***51.8***	***357***	***53.4***	***130***	***51.4***	***677***	***49.4***	***25.7***	***1.6***	***-2.0***
$\sum$	***165***	***100***	***284***	***100***	***669***	***100***	***253***	***100***	***1371***	***100***			

Further differentiation and analysis is enabled via reducing the six distinct categories into pairs: Lower order strategies (discover and describe), middle order strategies (map and link) and higher order strategies (validate and extend). Figure 5.8 illustrates that the lower order strategies have been utilised heavily over all disciplinary periods (academics are the dark grey columns and practitioners the light grey).

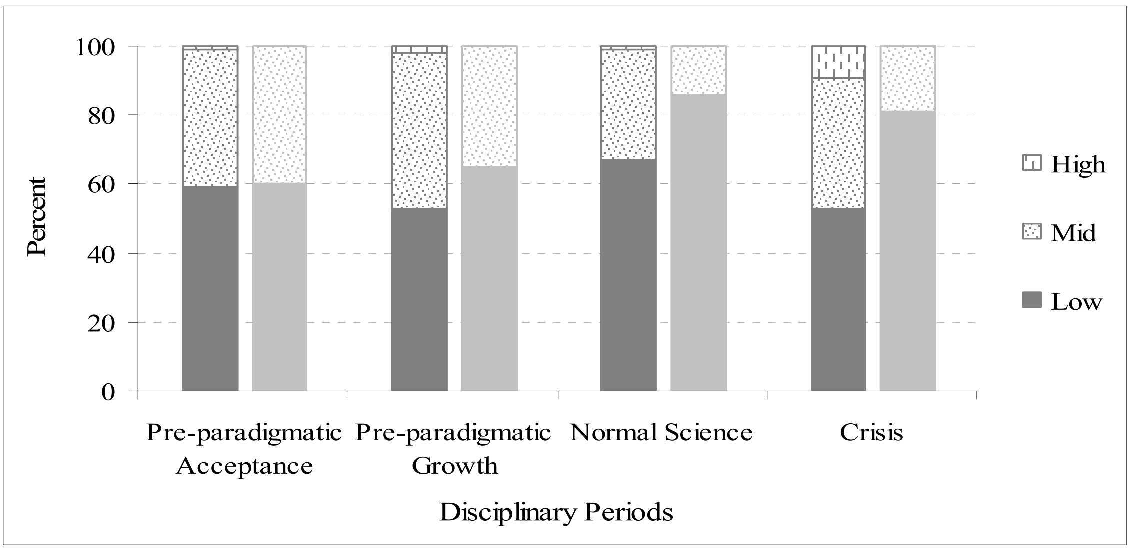

Figure 5.8: *Theoretical Development across the Disciplinary Periods*

Handfield and Melnyk (1998) stipulate that although the process of theory building is not sequential, it would always begin with discovery and culminate with theory validation and refinement. Ho et al. (2002) and Wacker (2008) both argue that theory validation and refinement cannot occur without development of the earlier stages providing a solid grounding for the theory. Application of the Handfield and Melnyk (1998) model to the domain of OM in the late 1990s identified SCM as being firmly entrenched within the lower order strategies of discovery and description. As Figure 5.8 and Table 5.15 indicate a decade on and this is still the case.

Nevertheless, the question must be asked as to why? It is logical to presume that after a decade the theoretical base of SCM would have evolved away from the 'simplistic' avenues of discovering and describing the SCM domain to employing more sophisticated theory validation techniques. Closer examination of the data reveals that there is a focus by academics and practitioners on the lower order strategy of 'describe' and the middle order strategy of 'map' across all disciplinary periods, thus indicating a slight movement towards more sophisticated SCM theory. However, of immediate interest in Table 5.15 is that across all disciplinary periods neither academics or practitioners utilise the higher order strategy of 'extend'. It would be presumed that academics by their very nature of testing and refuting concepts would have utilised this strategy at some time, but no articles were identified that met the criteria. Thus, the argument from Ho et al. and Wacker that theory validation and refinement cannot occur without the earlier stages providing a solid grounding is supported.

Several reasons can be suggested as to possible explanations for why there is an ongoing dominance of the lower to middle order strategies. Section 3.2.3 provides evidence of the fractured discourse surrounding the theoretical development of SCM. One of the key issues evident was the overwhelming reliance on theory developed in another discipline being applied to SCM (or its sub-areas). It is proposed that external theories applied to areas of SCM have 'skipped' the initial development stages within the context of SCM. Support for this proposition (that theory is developed within a specific contextual environment and thus developed to fit a particular domain) is evident within several studies (Handfield & Melnyk, 1998; Ho et al., 2002; Schmenner, 2009; Schmenner & Swink, 1998). Consequently, externally developed theory applied to SCM requires considerable adaptation to fit it to the purposes of SCM. Furthermore, it is argued that adaptations will only occur within the bounds of a researcher's particular (and in most cases individualistic) conceptualisation of SCM.

The findings suggest that the majority of the problems surrounding the lack of coherence within SCM are caused in part by the entirety of SCM remaining un-theorised; no amount of adaptation of an external theory developed within an alternative discourse can be satisfactorily applied to the particulars of SCM. Hence, without a holistic theory of SCM providing guidance as to research direction and questions, the domain focuses on the lower order strategies in a scattergun approach to theoretical development. However, it must be noted that the scattergun approach has varying types of ammunition at its disposal (evident by the variety of definitions and terminology existing in use); thus, successful theoretical development within SCM is argued to be very much a hit and miss affair.

In determining the significance of the strategy utilised, and thus the stage of theoretical development, four 2x5 chi-square analyses were performed. For the *pre-paradigmatic acceptance* period results of the chi-square were not significant, χ^2 (4) = 0.92, p = .922. For the *pre-paradigmatic growth* period results of the chi-square were not significant, χ^2 (4) = 7.44, p = .115. For the *normal science* period, results of the chi-square were significant, χ^2 (4) = 37.85, $p < .001$, where academics tended to use 'describe' (n=195, 62.5%) or 'map' (n=83, 26.6%), while the majority of practitioners tended to use 'describe' (n=292, 81.8%). For the *crisis* period, results of the chi-square were significant, χ^2 (4) = 27.96, $p < .001$, where academics tended to use 'describe' (n=56, 45.5%) or 'map' (n=39, 31.7%), while the majority of practitioners tended to use 'describe' (n=95, 73.1%). Table 5.16 depicts the result of the chi-square analysis.

Table 5.16: *Results of the Chi-square Analysis for SCM Theoretical Development*

	Pre-Paradigmatic Period				*Normal Science Period*		*Crisis Period*	
	(1a) 1998-1999		*(1b) 2000-2001*		*(2) 2002-2006*		*(3) 2007-2008*	
	n=	*%*	*n=*	*%*	*n=*	*%*	*n=*	*%*
Academic								
Discover	6	4.9	2	1.5	15	4.8	9	7.3
Describe	66	54.1	71	51.8	195	62.5	56	45.5
Map	36	29.5	55	40.1	83	26.6	39	31.7
Links	13	10.7	7	5.1	15	4.8	8	6.6
Validate	1	0.8	2	1.5	4	1.3	11	8.9
Extend	0	0.0	0	0.0	0	0.0	0	0.0
Total	***122***	***100***	***137***	***100***	***312***	***100***	***123***	***100***
Practitioner								
Discover	2	4.7	6	4.1	14	3.9	10	7.7
Describe	24	55.8	90	61.2	292	81.8	95	73.1
Map	14	32.6	43	29.3	48	13.4	22	16.9
Links	3	7.0	8	5.4	3	0.9	3	2.3
Validate	0	0.0	0	0.0	0	0.0	0	0.0
Extend	0	0.0	0	0.0	0	0.0	0	0.0
Total	***43***	***100***	***147***	***100***	***357***	***100***	***130***	***100***
	χ^2 *(4) = 0.92,* p *= .922*		χ^2 *(4) = 7.44,* p *= .115*		χ^2 *(4) = 37.85,* p *< .001*		χ^2 *(4) = 27.96,* p *< .001*	

The data from each disciplinary period indicates adherence to describing and mapping the terrain of SCM from a simplistic theoretical perception. In particular, the growth between the *pre-paradigmatic acceptance* and *growth* periods matches Kuhn's thoughts regarding the increasing interest shown by researchers during this time, although the fragmentation is not as extreme as was witnessed within the definition and terminology discussion. Furthermore, the *normal science* period although indicating growth of the middle order strategies may merely reflect the fact that this period covers the greatest amount of time of five years and thus has the highest proportion of articles. The dominance of the lower order strategy of 'describe' does however reflect the lack of coherence within the SCM domain, thus it is argued that consolidation during this phase has not occurred as Kuhn suggested that it would. Further, the findings of the *crisis* period reflect commonality with the *pre-paradigmatic* periods rather than a discipline in distress, thus overall it can be argued that in terms of theoretical development SCM has not progressed beyond the *pre-paradigmatic growth* period.

In summary, Ho et al. (2002) has argued that the initial stages of theoretical development must be addressed before progression to theory validation and extension. Wacker (2008) supports this view by arguing that clear and concise conceptualisations of the foundational aspects of definition and terminology are required to enable a solid theoretical platform to be established. Thus, the findings in Sections 5.2.1 and 5.2.2 as to the proliferation of definitions and terminology abounding within the literature were suggested to limit any theoretical development of SCM, which would then reinforce the perception of an incoherent domain. Overall, this section indicates that the theoretical development of SCM is fragmented and undertaken from a simplistic approach to theorising 'what is there'.

5.2.4 Interim Summary

Data analysis in this section was concerned with identifying the degree of coherence within SCM from an academic and practitioner perception. Three different areas were analysed to provide a comprehensive understanding as to coherence within SCM: definitions, terminology and theoretical development. Thus, this section addressed the core research question of:

- RQ(1): Are there sufficient indicators of coherence in the SCM literature to signify it is a discipline?

Essentially, it was found that there is the existence of a growing fragmented discourse within SCM with academics and practitioners reflecting the differing perceptual approaches to knowledge production over the 11-year period.

Pfeffer (1993) has argued that disciplines that lack coherence exhibit characteristics that focus on boundary maintenance procedures. The findings indicate that there is considerable debate throughout all disciplinary periods as to what SCM constitutes and can thus be operationalised as, with fundamental differences evident between academics and practitioners. Does this then constitute an evolution of SCM over time? In one word, no. The term 'evolution' implies movement of a concept in a positive manner to enable mitigation of external influences. What this section has identified is a continuous pattern of change in regards to SCM definitions, alternative terminology and a theoretical discourse entrenched firmly in describing and mapping the extent of SCM. Overall, fragmentation rather than consolidation abounds.

Given that SCM is targeted at integration, the activities discussed portray disintegration and fragmentation, especially within the academic realm. Consequently, the developments portrayed in this section constitute a warning as to the determination of a SCM boundary along with its differentiation from other disciplines. Thus, there is a necessary requirement for discussion and research into SCM to consolidate around a core set of characteristics thereby allowing the concept to evolve and develop from a platform of consensus. The findings suggest that practitioners are developing such a core.

Overall, in regards to providing an answer to the core research question of this section it is argued that there are insufficient indicators of coherence evident within the combined academic and practitioner literature to suggest that SCM is a discipline. The findings of this section of the analysis are summarised in Table 5.17.

Table 5.17: *Summary of Findings on the Degree of Coherence within SCM*

Element	***Pre-Paradigmatic Period***		***Normal Science Period***	***Crisis Period***
	Acceptance	***Growth***		
Definition				
Academic	N/A	Integration of business processes	Not easily discernable, multiple characteristics advocated	Integration and management of immediate logistics chain to add value
Practitioner	Coordination of logistics channel activities	Integration of global networks coordinated around efficiency to conform to customer requirements	Integration of key business processes coordinated to add value for the end customer	Consumer orientation of key elements in the integrated network of organisations that focuses on value creation optimisation
Terminology				
Academic	Dominance of SC	Dominance of SC, orientation around supply issues	Dominance of SC, but usage of SCM increasing; orientation around supply issues	Dominance of SC, supply orientation decreasing.
Practitioner	Equal emphasis on SC and SCM	Dominance of SC, orientation around value	Dominance of SC, orientation around the customer	Dominance of SCM over SC
Theoretical Development				
Academic	Emphasis on ‘describing’ SCM	Emphasis on ‘describing’ SCM	Emphasis on ‘describing’ SCM but also beginning to ‘map’ SCM	Emphasis on ‘describing’ and ‘mapping’ SCM
Practitioner	Emphasis on ‘describing’ SCM	Emphasis on ‘describing’ SCM	Emphasis on ‘describing’ SCM	Emphasis on ‘describing’ SCM

5.3 The Degree of 'Knowledge' within Supply Chain Management

Harland et al. (2006) suggests that determining the breadth or depth of SCM knowledge is an inconclusive means to determining its disciplinary identity. Furthermore, prevalent within academia is an underlying belief that investigating the body of knowledge encapsulating SCM will result in the development of a variety of miscellaneous categories rather than binding the various streams of thought into a unified discipline. Nonetheless, this research argues that a body of knowledge can be determined for SCM, and that a cohesive stream of thought can be identified through utilisation of several techniques.

This section draws upon the discussions in Chapter Two as to why knowledge is what it is by virtue of its surroundings. The deliberations of Harre and Gillett (1994) and Tsoukas (1996) inform our understandings as to how we develop our knowledge; for what we know is built upon the discourses that we participate in and ultimately the discursive practice that we conform to. Thus, this section addresses the core research question of:

- RQ(2): Are there sufficient indicators of an integrated body of knowledge in the SCM literature to signify it is a discipline?

Answers are formulated for RQ(2a) and the breadth of the SCM body of knowledge (Section 5.3.1), for RQ(2b) and the depth of the SCM body of knowledge (Section 5.3.2) and RQ(2c) and the conceptual framing of SCM (Section 5.3.3).

5.3.1 Breadth of Supply Chain Management Knowledge

Chen and Paulraj (2004) argue that it is common practice to associate SCM with various functional areas. Furthermore, Ho et al. (2002) state that through associating SCM with a functional area SCM becomes in fact merely an extension of that function, rather than a discipline in its own right. There is the suggestion that SCM has been conceptualised from multiple approaches depending on the functional area that dominates the thinking of the time.

This research is interested in the functional areas that dominate the literature and influence the conceptualisation of SCM. Four core functional areas comprising the breadth of the SCM body of knowledge have been identified. Further differentiation was enabled through adding in a fifth functional area that of 'building theory', thereby allowing those articles that covered the entirety of SCM from a theoretical stance to be analysed in context. Of interest to this research is identifying where academics and practitioners situate SCM:

- RQ(2a): To what extent are there differences in the breadth of SCM knowledge between academics and practitioners for each disciplinary period?

To facilitate obtaining an answer each of the 1,371 articles were categorised according to one of the following criteria:

- Supply = Purchasing and Supply
- Logistics = Logistics and Transportation
- Integrate = Integration of Business Activity across the Supply Chain and within the Organisation
- IT = Information Technology
- Theory = Building Theory

Figure 5.9 illustrates that academics (dark grey columns) are tending towards the 'supply' function area with logistics as a supporting role. This supports the contention of Ho et al. (2004) that there is a predominant focus on the 'purchasing and supply' and 'logistics and transportation' functional areas within the academic literature, while practitioners (light grey columns) show a clear preference for the functional area of 'integration'.

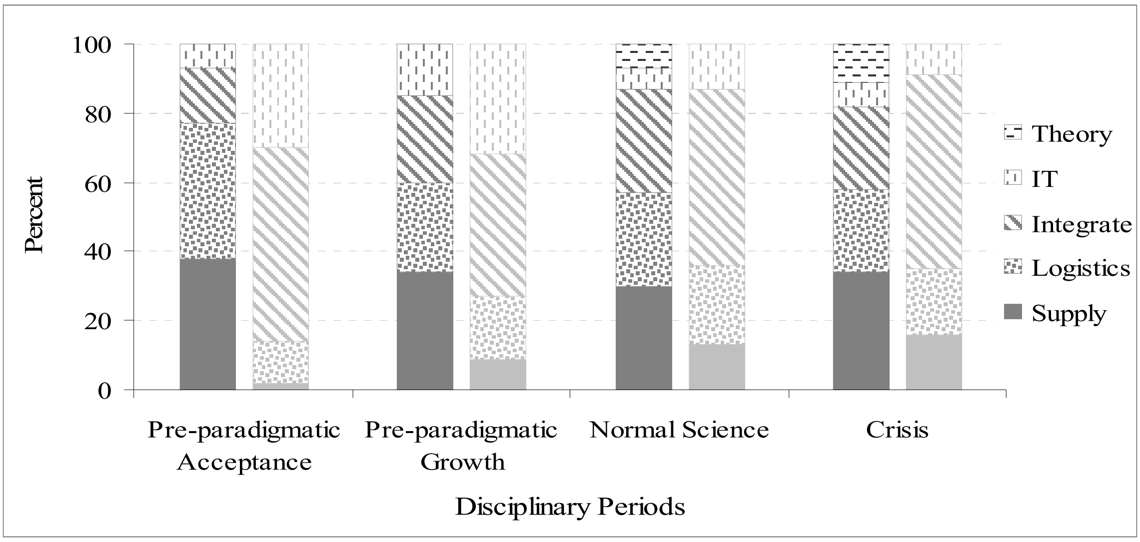

Figure 5.9: *Breadth of SCM Knowledge across the Disciplinary Periods*

Table 5.18 depicts the findings in absolute figures and relative percentages across the disciplinary periods. Each column specifies a total for academics and practitioners in bold, with the sum of each column along the bottom row. In addition, the last column portrays the percentage differences across the disciplinary periods thereby indicating the rate of change.

Table 5.18: *Synopsis of the Breadth of SCM Knowledge across the Disciplinary Periods*

	Pre-Paradigmatic Period ***(1a) 1998-1999***		***(1b) 2000-2001***		***Normal Science Period (2) 2002-2006***		***Crisis Period (3) 2007-2008***		***Total***		***% Difference Between Periods***		
	n=	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***	***1a-1b***	***1b-2***	***2-3***
Academic													
Supply	46	27.8	47	16.6	94	14.1	42	16.6	229	16.7	-11.2	-2.5	2.5
Logistics	47	28.5	35	12.3	85	12.7	30	11.9	197	14.4	-16.2	0.4	-0.8
Integrate	19	11.5	34	12.0	94	14.1	29	11.5	176	12.8	0.5	2.1	-2.6
IT	9	5.5	20	7.0	18	2.6	8	3.1	55	4.0	1.5	-4.4	0.5
Theory	1	0.6	1	0.3	21	3.1	14	5.5	37	2.7	-0.3	2.8	2.4
Total	***122***	***73.9***	***137***	***48.2***	***312***	***46.6***	***123***	***48.6***	***694***	***50.6***	***-25.7***	***-1.6***	***2.0***
Practitioner													
Supply	1	0.6	13	4.6	45	6.8	20	7.9	79	5.8	4.0	2.2	1.1
Logistics	5	3.0	27	9.5	83	12.4	25	9.9	140	10.2	6.5	2.9	-2.5
Integrate	24	14.6	60	21.1	182	27.2	73	28.9	339	24.7	6.5	6.1	1.7
IT	13	7.9	47	16.6	47	7.0	12	4.7	119	8.7	8.7	-9.6	-2.3
Theory	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0
Total	***43***	***26.1***	***147***	***51.8***	***357***	***53.4***	***130***	***51.4***	***677***	***49.4***	***25.7***	***1.6***	***-2.0***
$\sum$	***165***	***100***	***284***	***100***	***669***	***100***	***253***	***100***	***1371***	***100***			

To determine the significance of each of the functional areas for academics and practitioners, four 2x5 chi-square analyses were performed. For the *pre-paradigmatic acceptance* period, results of the chi-square were significant, χ^2 (4) = 53.83, p < .001, where academics tended toward 'supply' (n=46, 37.7%) or 'logistics' (n=47, 38.5%). Practitioners tended toward 'integrate' (n=24, 55.8%) or 'IT' (n=13, 30.2%). For the *pre-paradigmatic growth* period, results of the chi-square were significant, χ^2 (4) = 39.07, p < .001, where academics were distributed between 'supply' (n=47, 34.3%), 'logistics' (n=35, 25.5%), and 'integrate' (n=34, 24.8%). Practitioners tended toward 'integrate' (n=60, 40.8%) or 'IT' (n=47, 32.0%). For the *normal science* period, results of the chi-square were significant, χ^2 (4) = 76.61, p < .001, where academics were distributed between 'supply' (n=94, 30.1%), 'integrate' (n=94, 30.1%), and 'logistics' (n=85, 27.2%). Practitioners tended toward 'integrate' (n=182, 51.0%) or 'logistics' (n=83, 23.2%). Finally, for the *crisis* period, results of the chi-square were significant, χ^2 (4) = 41.88, p < .001, where academics were distributed between 'supply' (n=42, 34.1%), 'logistics' (n=30, 24.4%), and 'integrate' (n=29, 23.6%). The majority of practitioners tended to use 'integrate' (n=73, 56.2%). Table 5.19 depicts the results of the chi-square analysis.

Table 5.19: *Results of the Chi-square Analysis for Breadth of SCM Knowledge*

	Pre-Paradigmatic Period				***Normal Science Period***		***Crisis Period***	
	(1a) 1998-1999		***(1b) 2000-2001***		***(2) 2002-2006***		***(3) 2007-2008***	
	n=	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***
Academic								
Supply	46	37.7	47	34.3	94	30.1	42	34.1
Logistics	47	38.5	35	25.5	85	27.2	30	24.4
Integrate	19	15.6	34	24.8	94	30.1	29	23.6
IT	9	7.4	20	14.6	18	5.8	8	6.5
Theory	1	0.8	1	0.8	21	6.8	14	11.4
Total	***122***	***100***	***137***	***100***	***312***	***100***	***123***	***100***
Practitioner								
Supply	1	2.4	13	8.8	45	12.6	20	15.4
Logistics	5	11.6	27	18.4	83	23.2	25	19.2
Integrate	24	55.8	60	40.8	182	51.0	73	56.2
IT	13	30.2	47	32.0	47	13.2	12	9.2
Theory	0	0.0	0	0.0	0	0.0	0	0.0
Total	***43***	***100***	***147***	***100***	***357***	***100***	***130***	***100***
	χ^2 *(4) = 53.83*, **p < *.001***		χ^2 *(4) = 39.07*, **p < *.001***		χ^2 *(4) = 76.61*, **p < *.001***		χ^2 *(4) = 41.88*, **p < *.001***	

While interesting, examination as to frequency of use and a chi-square analysis for significance is insufficient for charting and comprehending the evolution of the breadth of SCM knowledge over time. The following sections analyse the breadth of SCM knowledge in comparison to the previous findings to enable insight into academic and practitioner conceptualisations of SCM over time.

(1a) Pre-Paradigmatic Acceptance Period: During this period academics focus on the functional areas of 'logistics' (n=47) and 'supply' (n=46) to a much greater degree than the areas of 'integrate' (n=19), 'IT' (n=9) or 'theory' (n=1). There are no definitions utilised within this period to provide insight, however in regards to terminology utilisation academics predominantly employ the term 'SC'. As such, during this phase academics are clearly showing signs of entrenching SCM within its supply chain origins. Thus, academics are situating the breadth of the SCM body of knowledge around the movement of products.

Findings from the practitioner data reflect an alternative mindset with this period depicting a clear focus on the functional areas of 'integration' (n=24) and 'IT' (n=13). Interestingly, practitioners orientated around a logistics conceptualisation in terms of a SCM definition, while there was an even spread between SC and SCM terminology. Thus, it is argued that practitioners are integrating SCM concepts although these are firmly fixated in the logistics sub-field. Consequently, the functional area of 'integration' in these findings may represent the dominant thinking of the time, that of coordinating activities utilising information technology as the vehicle of that integration within the sub-filed of logistics. In terms of definition and terminology, although there are suggestions of a supply chain focus, the findings on the functional area (which dictates the breadth of the body of knowledge) indicate that 'integration' is recognised as being a vital aspect of SCM during this time.

(1b) Pre-Paradigmatic Growth Period: By this period, greater fragmentation is evident within the academic sphere through the addition of 'integrate' and 'IT', while 'logistics' and 'supply' indicate a considerable drop in influence (by -16.2% and -11.2% respectively) although they still dominate overall. Thus, the findings from this phase reflect Kuhn's deliberations as to new disciplines being fragmented initially due to all the new avenues able to be explored. However, in terms of the functional area dominating thinking during this period (and in terms of a definition), there is evidence of integrative aspects orientated around coordination activities of logistics processes. Furthermore, in regards to terminology utilisation there is clear evidence of the reduction in 'SC' use in preference to 'SCM'. Thus, these findings support and are supported by the findings on the functional area of a mind-shift within academia towards a more integrated conceptualisation of SCM. Albeit, one that is more orientated around the supply sub-area.

In regards to practitioners during this period, further fragmentation is evident with a considerable increase in the 'IT' area by 8.7% on the previous period, while 'integrate' and 'logistics' only show a 6.5% change between periods. Furthermore, unlike academics the functional area of 'supply' is minor in both pre-paradigmatic periods, indicating that although there is dominance of both the 'SC' and 'SCM' terminology in the coherence section, practitioners attribute more elements than just 'supply' to the terms 'SC' and 'SCM'. Subsequently, analysis of the definitions and terminology utilised by practitioners during this period indicates an orientation around the integration of activities in a network to reap value for the customer, thus the physical process of moving products in a coordinated fashion dominates. Consequently, practitioners are developing a body of knowledge orientated around IT as it forms the necessary networks of coordination in the movement of products.

Overall, the pre-paradigmatic periods indicate fragmentation as conceived by Kuhn. Examination of the findings of the academic and practitioner breadth of knowledge provides insight that these two groups are in fact consolidating around concepts of importance to them, rather than a unified SCM conceptualisation.

(2) Normal Science Period: It is expected that the *normal science* period will reflect consolidation as per Kuhn's deliberations; however, for academics there is as wide a fragmentation evident within this period as there was in the previous *growth* period. The functional areas of 'supply' (n=94) and 'integration' (n=94) dominate this period. As the function dictates to the discipline its conceptual boundaries then it is argued that the originating concept of the supply chain is dominating the perceptions of academics. Which is an interesting observation given that there was a plethora of characteristics advocated when developing a SCM definition thereby resulting in ongoing disagreement during this period as to what SCM should be defined as. Furthermore, in regards to the terminology of SCM it was argued that integrative elements were so entrenched within SCM it was no longer required to call it 'integrative SCM'. Thus, under these conditions it is obvious that the dominance of the 'integrate' functional area in conjunction with the ongoing dominance of the 'supply' function cements academics firmly around an integrated supply chain conceptualisation.

In comparison, practitioners also show a clear preference for the 'integrate' functional area during the *normal science* period while the 'IT' function drastically drops (-9.6%). Unlike the previous *growth* period the functional area of 'logistics' increases indicating greater fragmentation rather than the expected consolidation. In terms of the definitions and terminology utilised by practitioners the observation is that of a preference towards physical processes and capabilities. As such, for practitioners there is a clear association between the functional area utilised during this period and the findings of the previous section.

(3) Crisis Period: During the *crisis* period, academics are still firmly orientated around the functional area of 'supply', with consolidation being evident via the drop in emphasis as to knowledge developed around 'logistics' and 'integration'. This suggests that where there is expected to be fragmentation in this period as researchers challenge the status quo by advocating new areas to research, instead there is evidence to suggest consolidation around the functional area of 'supply'. Comparing these findings with those from the coherence section shows that of the definitions offered, the majority were developed during the previous disciplinary period thus they orient around differing criteria. Furthermore, the sole new definition during this period offers indications of a perceptual change towards logistic-based processes and thus is the first indication of a movement by academics towards the practitioner conceptualisations.

For practitioners during this period 'integration' clearly dominates with 'logistics' providing support. In comparison to the previous disciplinary periods, a major observation is that in the early periods business integration is formed and enabled by information technology utilisation; hence, the general advancements in information technology during these years are evident as an external environmental influence on the operations of an organisation. From the *normal science* period, 'information technology' (being firmly entrenched in the operations of the organisation) takes a back seat to 'logistics'. Thereby implying that integration in terms of the movement of product, services and/or information is now of importance in the *crisis* period. Subsequently, analysis of the definitions and terminology utilised indicates this clear preference for integrative characteristics dominating the conceptualisation of SCM.

Interim Summary: Comparing the breadth of the SCM body of knowledge via its dominant functional areas with the conceptualisations of SCM definition and terminology provides valuable insight into the development of the SCM concept. In terms of an answer there are extensive differences between academic and practitioner approaches, however, the *crisis* period indicates movement by academics towards the practitioner conceptualisation.

5.3.2 Depth of Supply Chain Management Knowledge

Harland et al. (2006) argues that to investigate the depth of the SCM body of knowledge is an inconclusive measure of a discipline, further that the development of wide-ranging miscellaneous categories would result. In contrast, Ho et al. (2004) argues that the narrow perception of SCM creates severe weaknesses as to its conceptualisation. Thus, Burgess et al. (2006) supports Ho et al. by stating that a more balanced measure of its conceptualisation is required, for failure is common due to the issue of using multiple labels to define one construct. Hence, disagreement is exacerbated amongst researchers as to what SCM actually entails in terms of its body of knowledge.

This section addresses the extent of the depth of the SCM body of knowledge to achieve the balanced conceptualisation called for, by asking:

- RQ(2b): To what extent are there differences in the depth of SCM knowledge between academics and practitioners for each disciplinary period?

The CCL[9] utilises the Burgess et al. (2006) list, as their list was synthesized from various other lists and therefore acts as a test of the extent of SCM knowledge under a recognised authority. The ECL[10] is in part a test of the claims into whether the SCM body of knowledge would degenerate into a variety of miscellaneous categories or whether a unified stream of thought would be evident. Subsequently, utilisation of both construct lists addresses the concerns of Harland et al. (2006) in determining a disciplinary identity for SCM.

To facilitate obtaining an answer for the CCL each of the 1,371 articles were categorised according to specific criteria, with articles able to be categorised into more than one category:

- Leadership (top management support, strategic issues of importance)
- Intra-organisational relationships (focus on internal relationships)
- Inter-organisational relationships (focus on external relationships e.g. the buyer/supplier dyad)
- Logistics (physical movement of products)
- Process improvement (improving technological processes i.e. sharing IT systems)
- Information system utilisation (adopting software/investment in IT systems)
- Business financial performance (focus on strategic issues or competitive advantage)
- Building theory only (i.e. may cover multiple aspects above but is solely conceptual and the focus is on building theory)

In obtaining an answer for the ECL each of the 1,371 articles were categorised accordingly with articles able to be categorised into more than one category. Due to the length of the ECL, it will not be repeated again here (see Section 4.4.3.3).

5.3.2.1 Concise Construct List

Table 5.20 depicts the findings for the CCL in absolute figures and relative percentages across the disciplinary periods. As articles could be categorised into more than one category the total (1,950) exceeds the number of analysed articles (1,371). Interestingly (and if the category 'theory' is not taken into account), both academics and practitioners have a minimal use of 'intra-organisational relationships' and 'process improvement' across all disciplinary periods. Thus, indicating that successful SCM does not develop on the basis of building internal relationships, nor is developing and improving internal processes a critical task of SCM.

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[9] CCL = Concise construct list
[10] ECL = Extensive construct list

Table 5.20: *Synopsis of the CCL across the Disciplinary Periods*

	Pre-Paradigmatic Period (1a) 1998-1999		(1b) 2000-2001		*Normal Science Period* (2) 2002-2006		*Crisis Period* (3) 2007-2008		*Total*		*% Difference Between Periods*		
	n=	*%*	*n=*	*%*	*n=*	*%*	*n=*	*%*	*n=*	*%*	*1a-1b*	*1b-2*	*2-3*
Academic													
Leader-ship	16	6.5	14	3.4	59	6.5	12	3.4	101	5.2	-3.1	3.1	-3.1
Intra Relations	2	0.8	3	0.7	18	1.9	1	0.3	24	1.2	-0.1	1.2	-1.6
Inter Relations	42	16.9	44	10.5	100	10.7	40	11.3	226	11.6	-6.4	0.2	0.6
Logistics	49	19.7	39	9.3	95	10.2	31	8.7	214	11.0	-10.4	0.9	-1.5
Process	4	1.6	9	2.2	10	1.0	6	1.7	29	1.5	0.6	-1.2	0.7
IT	18	7.2	28	6.7	38	4.1	16	4.5	100	5.1	-0.5	-2.6	0.4
Perform	43	17.3	55	13.2	126	13.6	39	10.9	263	13.5	-4.1	0.4	-2.7
Theory	0	0.0	1	0.2	27	2.9	17	4.8	45	2.3	0.2	2.7	1.9
Total	***174***	***70.0***	***193***	***46.2***	***473***	***50.9***	***162***	***45.6***	***1002***	***51.4***	***-23.8***	***4.7***	***-5.3***
Practitioner													
Leader-ship	19	7.6	33	7.9	103	11.1	42	11.8	197	10.1	0.3	3.2	0.7
Intra Relations	3	1.3	5	1.2	3	0.3	4	1.1	15	0.8	-0.1	-0.9	0.8
Inter Relations	4	1.6	31	7.4	49	5.3	24	6.8	108	5.5	5.8	-2.1	1.5
Logistics	6	2.4	30	7.1	89	9.6	32	9.0	157	8.0	4.7	2.5	-0.6
Process	3	1.3	10	2.4	3	0.3	2	0.6	18	1.0	1.1	-2.1	0.3
IT	16	6.5	70	16.8	60	6.5	22	6.2	168	8.6	10.3	-10.3	-0.3
Perform	23	9.3	46	11.0	148	15.9	66	18.6	283	14.5	1.7	4.9	2.7
Theory	0	0.0	0	0.0	1	0.1	1	0.3	2	0.1	0.0	0.1	0.2
Total	***74***	***30.0***	***225***	***53.8***	***456***	***49.1***	***193***	***54.4***	***948***	***48.6***	***23.8***	***-4.7***	***5.3***
∑	***248***	***100***	***418***	***100***	***929***	***100***	***355***	***100***	***1950***	***100***			

For academics, three constructs dominate across all disciplinary periods. In the *pre-paradigmatic acceptance* period ‘logistics’ (28.2%) dominates with ‘business performance’ (24.7%) and ‘inter-organisational relationships’ (24.1%) providing supporting roles. During the *pre-paradigmatic growth* period, a change occurs with ‘business performance’ (28.5%) dominating and ‘inter-organisational relationships’ (22.8%) and ‘logistics’ (20.2%) supporting, this is continued in the *normal science* period with ‘business performance’ (26.6%) dominating and ‘inter-organisational relationships’ (21.1%) and ‘logistics’ (20%) supporting. By the *crisis* period ‘inter-organisational relationships’ (24.7%) just edges out ‘business performance’ (24%), with ‘logistics’ (19.1%) third. Interestingly, logistics is only dominant in the *acceptance* phase, thus indicating the supply chain origins to SCM.

The ongoing dominance of these three constructs across all disciplinary periods indicates that academics perceive SCM as being firmly embedded in developing and/or maintaining the performance of a business, investigating the movement of product and services and developing and/or maintaining relationships external to the organisation. This is a very limited conceptualisation in regards to the body of SCM knowledge over an 11-year period. The question must be asked as to why?

The previous section examining the degree of coherence within SCM may provide indications as to why such a limited view exists. In regards to definition and terminology development academics focus primarily on managing the supply chain with the integration of business processes to add value. Subsequently, 'adding value' is comparable to developing knowledge around SCM's influence on the performance of the business, while a 'supply chain' orientation is evident within developing knowledge on logistics related issues along with its management via building inter-organisational relationships. Thus, the findings from the previous section support the findings as to a limited depth of academic knowledge. Furthermore, the findings as to the breadth of SCM knowledge also support this analysis as the dominant functional area of 'supply' covers relationships although no distinction between internal and external relationships are made.

For practitioners Table 5.20 depicts a fundamentally different approach to the depth of knowledge. Within the *pre-paradigmatic acceptance* period 'business performance' (31%) dominates with 'leadership' (25.7%) and 'IT' (21.6%) providing support, while interestingly, by the *pre-paradigmatic growth* period the construct of 'IT' dominates with 31.1% with 'business performance' (20.4%) and 'leadership' (14.7%) supporting. Both the *normal science* and *crisis* periods indicate the dominance of the 'business performance' construct (32.4% and 34.1% respectively) followed by 'leadership' (22.6% and 21.7% respectively) and 'logistics' (19.5% and 16.6% respectively).

Unlike academics, the findings as to the practitioner body of knowledge suggest development in relation to external stimuli. The change in the IT construct between the *pre-paradigmatic acceptance* and *growth* periods reflects the increasing impact of external developments in information technology on an organisation's ability to develop aspects of a SCM strategy. Furthermore, as information technology becomes firmly embedded within the organisation via processes and actual technological systems it withdraws to a more supporting role. In other words, information technology is so fundamentally inherent to successful SCM it no longer requires specific articulation beyond the early 2000s.

Examination of the *normal science* and *crisis* periods indicates that from the early 2000s practitioners are developing their knowledge around aspects that reflect and ensure successful SCM. Thus, the focus is on performance indicators, leadership and the movement of product and services. Could it be that practitioners are fundamentally aware that the success of SCM is dependent upon a constant focus of its influence on the organisation's performance, that leadership is required to enable swift adaptation of SCM as required and that when it is all said and done logistics-orientated supply chains are what 'supply chain management' is all about? The findings indicate support for this line of reasoning.

5.3.2.2 Extensive Construct List

The CCL is limited in its ability to capture the full extent of the depth of knowledge that exists within the academic and practitioner literature. Subsequently, the ECL was developed to enable a close examination of the depth of the SCM body of knowledge. Due to the data covering 65 sub-elements, only totals for the central areas of those sub-elements (n=14) are listed in Table 5.21 with a full version of the table replicated in Appendix 8. Table 5.21 depicts the summarised findings for the ECL in absolute figures and relative percentages across the disciplinary periods. As articles could be categorised into more than one category the total (3,021) exceeds the number of analysed articles (1,371).

Table 5.21: *Summarised Findings for the ECL across the Disciplinary Periods*

	Pre-Paradigmatic Period (1a) 1998-1999		(1b) 2000-2001		***Normal Science Period*** (2) 2002-2006		***Crisis Period*** (3) 2007-2008		***Total***		***% Difference Between Periods***		
	n=	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***	***1a-1b***	***1b-2***	***2-3***
Academic													
Supplier	29	6.7	12	2.0	60	4.3	22	3.7	123	4.0	-4.7	2.3	-0.6
Source	9	2.1	3	0.5	7	0.5	5	0.9	24	0.8	-1.6	0.0	-0.4
B/S Rel	68	15.7	94	15.4	243	17.5	118	19.9	523	17.3	-0.3	2.1	2.4
E-Proc	2	0.5	14	2.3	10	0.7	10	1.8	36	1.1	1.8	-1.6	1.1
Strategy	17	4.0	17	2.7	22	1.6	9	1.5	65	2.2	-1.3	-1.1	-0.1
LogInte	6	1.4	13	2.1	35	2.5	6	1.0	60	2.0	0.7	0.4	-1.5
RLog	0	0.0	2	0.3	9	0.7	3	0.5	14	0.4	0.3	0.4	-0.2
TranNet	24	5.5	19	3.1	26	1.7	20	3.4	89	2.9	-2.4	-1.4	1.7
TranTec	4	0.9	2	0.3	4	0.3	4	0.7	14	0.4	-0.6	0.0	0.4
Comply	15	3.5	12	2.0	40	2.9	9	1.5	76	2.5	-1.5	0.9	-1.4
Leader	17	4.0	12	2.0	61	4.4	22	3.7	112	3.7	-2.0	2.4	-0.7
ITInte	13	3.0	35	5.7	43	3.1	25	4.2	116	3.8	2.7	-2.6	1.1
Ops	20	4.6	10	1.6	37	2.6	13	2.2	80	2.6	-3.0	1.0	-0.4
General	51	12.0	60	9.8	167	12.1	67	11.3	347	11.5	-2.2	2.3	-0.8
Total	***275***	***64.1***	***305***	***49.8***	***764***	***55.1***	***333***	***56.3***	***1679***	***55.5***	***-14.1***	***5.3***	***1.2***
Practitioner													
Supplier	0	0.0	4	0.7	5	0.5	11	1.8	20	0.6	0.7	-0.2	1.3
Source	0	0.0	4	0.7	13	0.9	3	0.5	20	0.6	0.7	0.2	-0.4
B/S Rel	24	5.5	67	10.9	102	7.3	45	7.6	238	7.9	5.4	-3.6	0.3
E-Proc	8	1.9	33	5.3	4	0.3	6	1.0	51	1.7	3.4	-5.0	0.7
Strategy	8	1.9	4	0.7	12	0.9	8	1.4	32	1.0	-1.2	0.2	0.5
LogInte	4	0.9	9	1.5	22	1.6	7	1.2	42	1.4	0.6	0.1	-0.4
RLog	1	0.2	1	0.2	4	0.3	6	1.0	12	0.4	0.0	0.1	0.7
TranNet	1	0.2	13	2.1	49	3.5	14	2.4	77	2.6	1.9	1.4	-1.1
TranTec	1	0.2	12	2.0	14	1.0	13	2.2	40	1.3	0.0	-1.0	1.2
Comply	5	1.2	10	1.6	31	2.2	9	1.5	55	1.9	0.4	0.6	-0.7
Leader	19	4.4	23	3.8	100	7.2	52	8.8	195	6.4	0.6	3.4	1.6
ITInte	35	8.1	71	11.6	64	4.6	16	2.7	186	6.1	3.5	-7.0	1.9
Ops	6	1.4	8	1.3	30	2.2	9	1.5	55	1.9	-0.1	0.9	-0.7
General	42	9.8	48	7.8	173	12.5	60	10.2	325	10.7	-2.4	4.6	-2.2
Total	***154***	***35.9***	***307***	***50.2***	***623***	***44.9***	***259***	***43.7***	***1346***	***44.5***	***14.1***	***-5.3***	***-1.2***
∑	***429***	***100***	***612***	***100***	***1387***	***100***	***592***	***100***	***3021***	***100***			

Key: Purchasing & Supply: *Supplier = supplier development. Source = Outsourcing decision. B/S Rel = buyer-supplier relationships. E-Proc = e-procurement. Strategy = Strategic considerations to purchasing & supply decisions.* ***Logistics & Transportation:*** *LogInte = logistics integration. RLog – reverse logistics. TranNet = transportation network. TranTec = transportation technology. Comply = compliance costs associated with Logistics and Transportation decision.* ***Integration of Business Activity:*** *Leader = Leadership. ITInte = information technology integration. Ops = operational issues. General = general issues such as skill level and SCM performance.*

To enable a comprehensive picture to emerge from the ECL it was deemed of interest to distinguish between the core constructs of SCM and those that play a supporting role. To enable a valid distinction to be made an artificial threshold of 70% was applied to the entire ECL. Thus, only those constructs that account for 70% of all constructs are considered as core to SCM within each disciplinary period and in total. In some instances where several constructs share the same percentage the total is higher than the arbitrarily selected 70%, totals are tallied for both academics and practitioners. The threshold enables distinction between core constructs and supporting constructs thus providing a less fragmented view of the elements that combine to form the core of a SCM body of knowledge. Table 5.22 depicts the results across all disciplinary periods and between academics and practitioners.

(1a) Pre-Paradigmatic Acceptance Period: In regards to the evolution of these core constructs over time, Table 5.22 indicates that for academics the *pre-paradigmatic acceptance* period depicts a dominance of the construct ‘SC performance’ (11.6%) with the logistics construct of ‘transportation network performance’ (7.2%) second. A major observation is that 65% of these core constructs are situated with the ‘purchasing and supply’ function, with 47% being orientated around the ‘buyer-supplier relationships’ constructs. Interestingly academics have a high utilisation of the construct ‘professional skill levels’ thus it is suggested that they are attempting to develop understanding as to what skills are required by professionals to implement and maintain successful SCM practices. Overall, it is observed that the constructs that depict the *pre-paradigmatic acceptance* period are strategic in nature thus providing insight into the focus of academics as to the strategic value and benefits of SCM implementation.

Interestingly within the *acceptance* period, the data for practitioners emulates that of academics with 17 core constructs and ‘SC performance’ clearly dominating with 19.2%, while three constructs share 8.2%: ‘leadership-strategy’ and ‘IT integration: SC software and its profitability to the organisation. Furthermore, there is also indication of the dominance of the ‘purchasing and supply’ function with 53% of the core constructs originating from this area with 47% also being orientated around the ‘buyer-supplier relationships’ constructs.

Table 5.22: *The Core Constructs that Form the SCM Body of Knowledge across the Disciplinary Periods*

Pre-Paradigmatic Period ***Acceptance 1998-1999***		***Growth 2000-2001***		***Normal Science Period 2002-2006***		***Crisis Period 2007-2008***		***Total Constructs***	
Academic									
G = SC performance	11.6	G = SC performance	11.5	G = SC performance	12.8	G = SC performance	9.9	G = SC performance	11.8
L = Transportation Network - performance	7.2	I = IT integration - SC integration software	6.2	S = B-S relationship - communication	4.4	G = Theory building only	7.5	L = Transportation Network - performance	4.4
I = Leadership - strategy	5.1	S = Strategic sourcing	5.2	I = Leadership - strategy	4.4	L = Transportation Network - performance	5.7	S = B-S relationship - communication	4.2
S = Strategic sourcing	4.7	G = SCM professional's skills	5.2	S = B-S relationship - performance outcomes	4.2	S = B-S relationship - communication	5.1	S = B-S relationship - performance outcomes	4.1
G = SCM professional's skills	4.7	I = IT integration – SC profitability	5.2	S = B-S relationship - strategic considerations	4.1	S = B-S relationship - performance outcomes	4.8	S = B-S relationship - trust	4.1
L = Compliance costs - strategic considerations	4.0	L = Transportation Network - performance	4.9	S = B-S relationship - trust	4.1	S = B-S relationship - trust	4.5	S = B-S relationship - strategic considerations	4.1
S = B-S relationship - trust	3.6	S = B-S relationship - power	4.9	S = B-S relationship - power	3.9	S = B-S relationship - strategic considerations	4.2	S = B-S relationship - power	4.0
S = B-S relationship - strategic considerations	3.3	S = B-S relationship - strategic considerations	4.9	L = Compliance costs - strategic considerations	3.9	S = B-S relationship - power	4.2	G = Theory building only	3.9
S = B-S relationship - communication	3.3	S = B-S relationship - trust	3.9	G = Theory building only	3.9	S = B-S relationship – firm size differences	4.2	I = IT integration - SC integration software	3.7
S = Supplier - Evaluation	2.9	S = B-S relationship - performance outcomes	3.9	S = B-S relationship – firm size differences	3.8	S = B-S relationship - commitment	4.2	I = Leadership - strategy	3.7
S = Outsourcing - strategic considerations	2.9	S = B-S relationship - communication	3.6	S = B-S relationship - commitment	3.7	S = B-S relationship - buyer satisfaction	4.2	S = B-S relationship – firm size differences	3.6
S = B-S relationship - power	2.9	L = Compliance costs - strategic considerations	3.3	S = B-S relationship - buyer satisfaction	3.7	I = IT integration - SC integration software	3.6	S = B-S relationship - commitment	3.6
S = B-S relationship - commitment	2.9	S = B-S relationship - commitment	3.3	I = IT integration - SC integration software	3.1	S = Strategic sourcing	2.4	S = B-S relationship - buyer satisfaction	3.6
S = B-S relationship - performance outcomes	2.9	S = B-S relationship – firm size differences	3.3	G = SC risk mitigation strategies	3.1	I = IT integration – SC profitability	2.4	L = Compliance costs - strategic considerations	3.4

Pre-Paradigmatic Period				***Normal Science Period***		***Crisis Period***		***Total Constructs***	
Acceptance 1998-1999		***Growth 2000-2001***		***2002-2006***		***2007-2008***			
S = B-S relationship – firm size differences	2.9	S = B-S relationship - buyer satisfaction	3.3	L = Transportation Network - performance	2.6	I = Leadership - strategy	2.1	S = Strategic sourcing	3.3
S = B-S Relationship - buyer satisfaction	2.9			S = Strategic sourcing	2.5	G = SC risk mitigation strategies	2.1	G = SCM professional's skills	2.7
I = Info Tech integration - SC integration software	2.5			L = Logistics Integration - 3PL	2.4	S = Supplier - Evaluation	2.1	S = Supplier - Evaluation	2.3
						I = Leadership - profitability	2.1		
n=17	**70.3**	**n=15**	**72.5**	**n=17**	**70.6**	**n=18**	**75.4**	**n=17**	**70.3**
Practitioner									
G = SC performance	19.2	I = IT integration - SC integration software	11.7	G = SC performance	20.7	G = SC performance	12.7	G = SC performance	16.9
I = Leadership - strategy	8.3	G = SC performance	11.4	I = Leadership - strategy	11.7	I = Leadership - strategy	9.3	I = Leadership - strategy	9.6
I = IT integration - SC integration software	8.3	S = E-procurement - web-based	7.2	I = IT integration - SC integration software	8.8	G = SC risk mitigation strategies	5.4	I = IT integration - SC integration software	8.5
I = IT integration – SC profitability	8.3	I = Leadership - strategy	6.2	L = Transportation Network - performance	7.2	L = Transportation Network - performance	5.0	L = Transportation Network - performance	4.8
G = SCM professional's skills	7.1	I = IT integration - SC profitability	4.2	G = SCM professional's skills	3.9	I = IT integration - SC integration software	4.2	G = SCM professional's skills	3.8
I = IT integration - strategic benefits	5.8	L = Transportation Tech - IT systems	3.9	L = Compliance costs - strategic considerations	3.0	I = Leadership – environmental concerns	3.5	L = Compliance costs - strategic considerations	3.0
S = Strategic sourcing	4.5	L = Compliance costs - strategic considerations	3.3	S = B-S relationship - performance outcomes	3.0	S = B-S relationship - strategic considerations	3.1	I = IT integration - SC profitability	2.9
L = Compliance costs - strategic considerations	3.2	S = B-S relationship - strategic considerations	3.3	I = Operations - demand planning	2.9	L = Transportation Tech - IT systems	3.1	S = B-S relationship - performance outcomes	2.6
S = B-S relationship - trust	1.9	G = SCM professional's skills	2.9	S = B-S relationship - trust	2.2	I = Leadership - profitability	3.1	S = B-S relationship - strategic considerations	2.5
S = B-S relationship - power	1.9	S = B-S relationship - buyer satisfaction	2.9	S = B-S relationship - strategic considerations	2.1	G = SCM professional's skills	2.7	L = Transportation Tech - IT systems	2.5

Pre-Paradigmatic Period				***Normal Science Period***		***Crisis Period***		***Total Constructs***	
Acceptance 1998-1999		***Growth 2000-2001***		***2002-2006***		***2007-2008***			
S = B-S relationship - commitment	1.9	S = B-S relationship - trust	2.6	L = Transportation Tech - IT systems	1.9	L = Compliance costs - strategic considerations	2.7	I = Operations - demand planning	2.3
S = B-S relationship - strategic considerations	1.9	S = B-S relationship - power	2.6	S = B-S relationship - buyer satisfaction	1.9	I = Operations - demand planning	2.7	S = B-S relationship - trust	2.3
S = B-S relationship - performance outcomes	1.9	S = B-S relationship - commitment	2.6	S = B-S relationship - power	1.8	S = B-S relationship - trust	2.3	S = E-procurement - web-based	2.3
S = B-S relationship – firm size differences	1.9	S = B-S relationship - performance outcomes	2.6	S = B-S relationship - commitment	1.8	S = B-S relationship - buyer satisfaction	2.3	S = B-S relationship - buyer satisfaction	2.2
S = B-S relationship - communication	1.9	S = B-S relationship – firm size differences	2.6	S = B-S relationship – firm size differences	1.8	S = Strategic sourcing	2.3	S = Strategic sourcing	2.1
S = B-S relationship - buyer satisfaction	1.9	S = B-S relationship - communication	2.6	S = B-S relationship - communication	1.8	S = B-S relationship - performance outcomes	1.9	S = B-S relationship - power	2.0
L = Logistics Integration - 3PL	1.9			S = Strategic sourcing	1.8	L = Transportation Tech - environmental concerns	1.9	S = B-S relationship - commitment	2.0
				S = Outsourcing - strategic considerations	1.8	S = B-S relationship - power	1.9	S = B-S relationship – firm size differences	2.0
				L = Logistics Integration - 3PL	1.8	S = B-S relationship - commitment	1.9	S = B-S relationship - communication	2.0
				G = SC risk mitigation strategies	1.8	S = B-S relationship – firm size differences	1.9		
				L = Compliance costs – security issues	1.8	S = B-S relationship - communication	1.9		
n=17	**81.8**	**n=16**	**72.6**	**n=21**	**85.7**	**n=21**	**76.1**	**n=19**	**76.4**

Key: *S = Purchasing & Supply, L = Logistics & Transportation, I = Integration of Business Activity across SC and within Organisation, G = General issues*

(1b) Pre-Paradigmatic Growth Period: An observation of the *pre-paradigmatic growth* period is that for academics there is a drop in the number of constructs regarded as core (n=15) although the construct ‘SC performance’ (11.5%) still dominates. Interestingly, the influence of the information technology developments occurring in the wider external environment during this time are reflected in the fact that two of the top five constructs are IT related, while only one construct is related to sourcing issues. A major observation is that a dominant construct from the previous period (leadership-strategy) is missing in this period indicating that academics may be moving away from SCM in its strategic capacity to focus on tactical areas of SCM. Interestingly, constructs orientated around the ‘buyer-supplier relationships’ constructs still dominate (53%).

For practitioners this period indicates the influence of the information technology developments occurring within organisations. The dominant core construct is that of ‘IT integration-SC integration software’ (11.7%) with three of the top five constructs being IT related. Furthermore, unlike academics, practitioners acknowledge the importance of the ‘leadership-strategy’ construct indicating that SCM requires the top echelons in an organisation to provide leadership support and drive to ensure successful implementation.

(2) Normal Science Period: Within this period, academics are increasingly focusing on constructs orientated around ‘buyer-supplier relationships’, although there is still an ongoing dominance of the ‘SC performance’ (12.8%) construct. Interestingly, where the previous period indicated the absence of the ‘leadership-strategy’ construct this period sees its return, being second equal with the communication element of buyer-supplier relationships. A major observation is that in terms of theoretical development the construct of ‘theory building’ (3.9%) is raised, thus indicating that academics are attempting to develop their SCM body of knowledge from a holistic theoretical stance (though interestingly no holistic SCM theory is actually developed). Of note, the introduction to the core list of the construct ‘SC risk mitigation strategies’ (3.1%) is argued to be as a direct result of the security issues required after the terrorist attacks of 9/11 for the movement of products domestically and globally.

In comparison, practitioners during this period focus on developing knowledge around the ‘SC performance’ (20.7%) construct, with ‘leadership-strategy’ (11.7%) second. An interesting observation is that developing the skill set of a SCM professional is of importance and rates fifth. Thus, if these findings are combined we see that there is a clear evidence of a structured approach to developing SCM that builds on each element to develop an organisation's competitive capabilities. Hence, related to this it is not surprising that there has been a drop in the focus of the information technology orientated constructs (only one in the top five) indicating that IT is no longer a special area of interest. Indeed, it can be argued that adopting and adapting to the IT changes coming from the external environment is merely part of the process of participation in the wider business environment. Hence, it no longer requires to be of special focus, although its integrative capabilities still rate highly.

(3) Crisis Period: Table 5.22 indicates that during this period there is ongoing dominance of the 'SC performance' (9.9%) construct by academics. Interestingly, academics are also continuing to develop a body of knowledge surrounding the 'theory building' construct as it has dramatically strengthened from the previous period. However, findings from Section 5.2.3 as to the level of theoretical development evident indicate that these attempts are unsophisticated at best.

In comparison, for practitioners the *crisis* period is one in which the construct 'SC performance' (12.7%) again dominates with 'leadership-strategy' supporting. Thus, there is an ongoing development of the SCM body of knowledge for practitioners orientated around performance outcomes and strategies to continue performance gains. An interesting observation is that 'SC risk mitigation strategies' which was of minor importance in the previous period now rates highly; suggesting that practitioners are responding to the increased threats to their supply chains.

Interim Summary: Overall, the last column of Table 5.22 indicates that for academics the depth of the SCM body of knowledge is orientated around supply chain-logistics constructs; evident by the performance of the supply chain dominating and the transportation network performance second. Nonetheless, there is a strong supply flavour overall, evident in the number of constructs focused on 'buyer-supplier relationships'. Meanwhile for practitioners the last column also indicates the dominance of the 'SC performance' construct and the importance of leadership strategies to facilitating that performance. The emphasis on integration being a key aspect of SCM is indicated by the importance that IT integration software has played over the 11-years.

Analysis of the core constructs facilitates the rendering of a large degree of information into analysable elements. The question is whether this then constitutes the development of miscellaneous categories as has been argued (Harland et al., 2006). The process undertaken in analysing the ECL provides a comprehensive understanding as to how the SCM body of knowledge has developed over time holistically and within the academic and practitioner spheres of influence. It is argued that although there are 65 constructs they are not miscellaneous categories but instead represent the core elements that both communities have developed their body of knowledge around, along with indications as to those constructs that play a supportive role. As such, the ECL surpasses the CCL and provides a construct list firmly entrenched within both communities interests, thereby enabling a more precise conceptualisation of SCM.

Finally, although both academics and practitioners rate 'SC performance' the highest, both orientate their core elements around different aspects. For instance, analysis of the top ten core elements indicates that academics have a heavy focus on buyer-supplier relationships while practitioners utilise a more diverse set that orientate around performance issues, integration (of software and the supply chain), cost considerations and technology. For practitioners the only buyer-supplier relationship constructs are those that examine performance outcomes and strategic considerations to the relationship. Overall, the depth of the SCM body of knowledge for academics is reflecting the dominance of the supply functional areas (identified in the breadth of SCM knowledge) while for practitioners it reflects the focus on integrative aspects (identified in the breadth of SCM knowledge).

5.3.2.3 Comparing 'People-centric' and 'System-centric' Constructs

The CCL was developed by Burgess et al. (2006) to investigate and understand SCM definitions and research methodologies. Further refinement occurred via a distinction between 'soft' people-centric constructs (those constructs that manage social relationships) and 'hard' system-centric constructs (those constructs that manage technological and infrastructural issues). Although no research question was formally developed to investigate this area, the findings to date suggest a fundamental disconnect between what SCM is believed to be and what occurs in reality. Given that this research (n=1,371) is more extensive in nature than the Burgess et al. study (n=100) it is a question of this author as to whether similar would be identified when comparing academic and practitioner literature. Subsequently, this section compares the CCL with the ECL in terms of the 'soft' and 'hard' constructs to determine the overall focus of academics and practitioners as to whether they orientate SCM around people-centric constructs or system-centric constructs. This section facilitates development of a fuller conceptualisation as to the depth of SCM knowledge within academic and practitioner literature.

The ECL was analysed to distinguish between those constructs categorised as people-centric (n=24) and system-centric (n=41) (being theoretical in nature two constructs from the general section were deemed 'not-applicable' to this analyses). The findings for academics are compared with the constructs from the CCL across the disciplinary periods with the results depicted in Figure 5.10. The findings for practitioners are depicted in Figure 5.11.

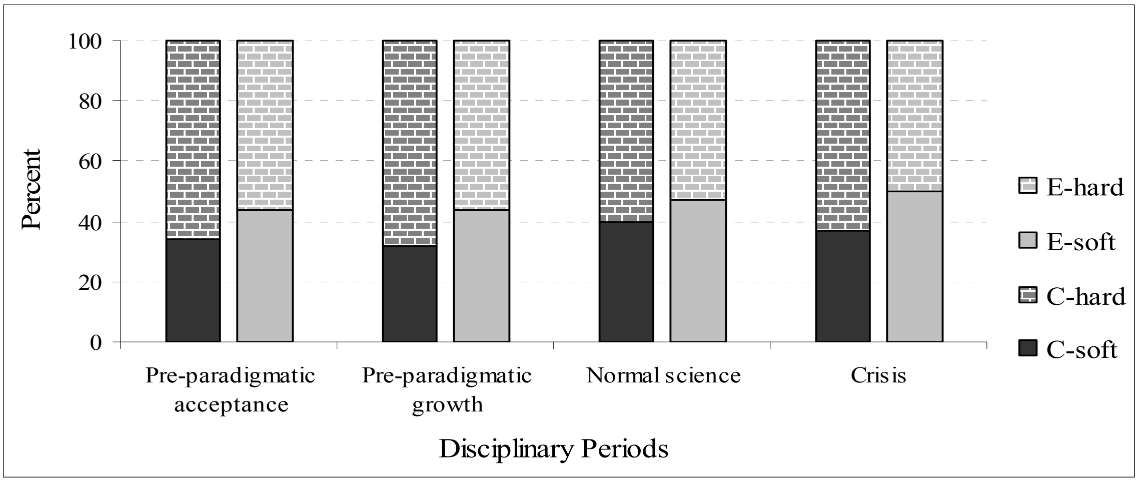

Figure 5.10: *Academic 'People- vs. System-centric' across the Disciplinary Periods*

Key: *Dark grey columns = CCL (C-soft: people-centric and C-hard: systems-centric), Light grey columns = ECL (E-soft: people-centric and E-hard: systems-centric).*

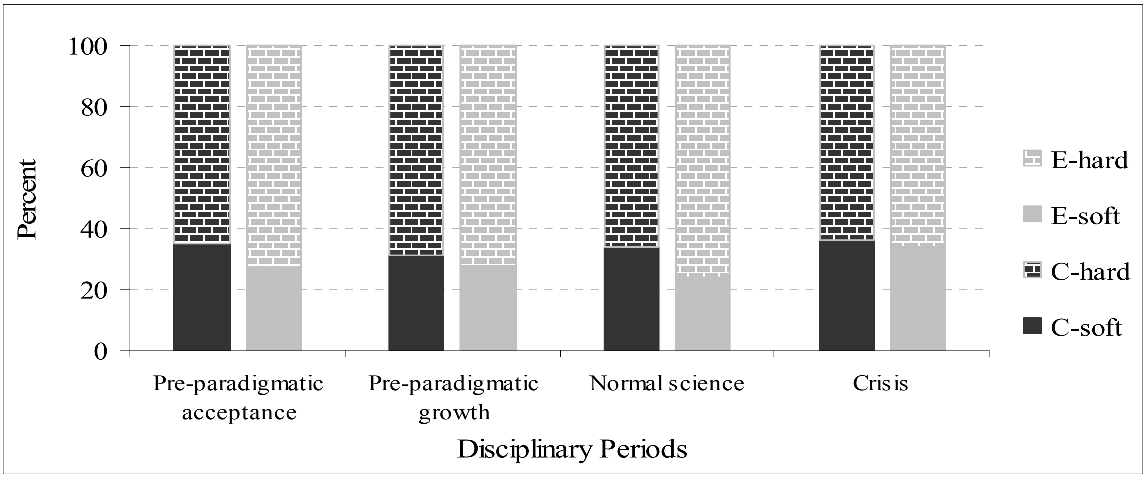

Figure 5.11: *Practitioner 'People- vs. System-centric' across the Disciplinary Periods*

Key: *Dark grey columns = CCL (C-soft: people-centric and C-hard: systems-centric); Light grey columns = ECL (E-soft: people-centric and E-hard: systems-centric).*

Findings from this stage of the analysis indicate that in regards to the CCL academics and practitioners are similar in focus with both depicting a 2:1 ratio in favour of system-centric constructs. An interesting observation is that in terms of the ECL there is a clear distinction between academic and practitioner approaches. For academics there is an even split between people-centric and system-centric constructs across all disciplinary periods in a 1:1 ratio, whereas practitioners indicate a clear focus on system-centric constructs at the expense of people-centric constructs in a 3:1 ratio.

The influence of the system-centric constructs across both construct lists is insightful. Given that the fundamental nature of SCM espouses integration, it is not surprising that system-centric constructs dominate, for information systems are the vehicle of that integration. However, the neglect of the people-centric constructs implies that the social aspects of SCM are being ignored, whether that is by design or merely omission is yet to be determined.

The study by Burgess et al. using the CCL found that there was a dominance of the hard system-centric constructs over the 100 academic articles analysed. They argued that the finding was un-anticipated given the emphasis within the SCM literature on developing trust and collaboration. The findings from this much larger study indicate that the same emphasis on the system-centric constructs exists. The question must be asked as to why.

Reflecting on the problematic issues surrounding a SCM definition there is evidence that indicates that practitioners are focusing on integrative capabilities: Logistics activities in the *acceptance* phase, global networks in the *growth* phase, business processes in the *normal science* period, and the network in the *crisis* period. As argued, technology is the vehicle for attaining that integration, hence it is logical that the hard system-centric constructs would dominate the depth of their SCM body of knowledge. Furthermore, the findings to date clearly show the influence environmental factors (such as the systematic advances in information technologies) have on practitioner strategies. Hence, it is argued that these definitional insights combined with the emphasis on the supply chain term (rather than on SCM) indicate an observance to developing technological capabilities to enable the flow of goods and services through the network of organisations involved and undertaken in a timely and accurate fashion. Therefore, it is entirely logical that to practitioners 'SCM' is a technological entity rather than a people-centric approach, and as such, is emphasised that way in terms of developing a body of knowledge.

Examination of the SCM origins also provides insight as to why there is dominance of system-centric constructs amongst academic literature. Developing from the OM domain (that has at its heart a focus on hard physical operations within an organisation), SCM logically assumes a role as being a core process of operations managers. Hence, an operations manager implementing SCM is more likely to do so through adopting and adapting information technology capabilities, rather than building intense human-social interactions. Furthermore, building a collaborative relationship with an external entity is the basis of negotiable contracts; as such, relationships, trust, and collaboration is described in the SCM literature as occurring between organisations…not individuals.

Overall, this section confirms the findings of Burgess et al. that there is a dominance of system-centric constructs in reality, even though there is the implication that SCM should develop people-centric constructs such as trust and close collaborative relationships. The implications for developing the SCM body of knowledge in any great depth requires that this disconnect be acknowledged and mitigated. It can be argued that this fundamental issue is at the heart of the SCM definitional and terminological debates and as has been discussed these debates are at the heart of the theoretical development within SCM. Consequently, until this disconnect is remedied developing the SCM domain further will fail, as attempts orientate around an ideal vision of SCM as a relationship driven people-centric entity at the expense of its system-centric reality.

5.3.3 Conceptual Framing of Supply Chain Management Knowledge

Related to the analysis of the people-centric and systems-centric aspects is the conceptual framing of SCM and the level of relationship that organisations enter into. An inherent assumption within SCM is that as organisations develop their external relationships (for instance become formally involved with more organisations) the higher the reliance on people-centric inter-organisational relationships. However, it was argued that these relationships are actually being developed from the position of system-centric technology utilisation rather than actual interpersonal interactions. As the examination in the previous section indicates, there is a high degree of reliance on system-centric constructs; as such, this finding is expected to influence the conceptual framing of SCM. RQ(2c) asks:

- RQ(2c): To what extent are there differences in the conceptual framing of SCM knowledge between academics and practitioners for each disciplinary period?

To facilitate obtaining an answer each of the 1,371 articles were categorised according to one of the following criteria:

- Activity = SCM as an Individual activity
- Process = SCM as a Process (or chain of related activities)

- System = SCM as a System (or series of related processes or related networks)
- None = No level of relationship identified (implied or alluded to)

Table 5.23 depicts the findings in absolute figures and relative percentages across the disciplinary periods, while Figure 5.12 visually depicts their evolution over the disciplinary periods.

Table 5.23: *Synopsis of the Conceptual Framing of SCM Knowledge across the Disciplinary Periods*

	Pre-Paradigmatic Period				***Normal Science Period***		***Crisis Period***		***Total***		***% Difference Between Periods***		
	(1a) 1998-1999		***(1b) 2000-2001***		***(2) 2002-2006***		***(3) 2007-2008***						
	n=	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***	***1a-1b***	***1b-2***	***2-3***
Academic													
Activity	1	0.6	5	1.7	3	0.4	2	0.8	11	0.8	1.1	-1.3	0.4
Process	65	39.4	48	16.9	156	23.3	62	24.5	331	24.1	-22.5	6.4	1.2
System	39	23.6	74	26.1	119	17.8	47	18.6	279	20.4	2.5	-8.3	0.8
None	17	10.3	10	3.5	34	5.1	12	4.7	73	5.3	-6.8	1.6	-0.4
Total	***122***	***73.9***	***137***	***48.2***	***312***	***46.6***	***123***	***48.6***	***694***	***50.6***	***-25.7***	***-1.6***	***2.0***
Practitioner													
Activity	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0
Process	18	10.9	8	2.9	124	18.6	13	5.1	163	11.9	-8.0	15.7	-13.5
System	25	15.2	139	48.9	233	34.8	116	45.9	513	37.4	33.7	-14.1	11.1
None	0	0.0	0	0.0	0	0.0	1	0.4	1	0.1	0.0	0.0	0.4
Total	***43***	***26.1***	***147***	***51.8***	***357***	***53.4***	***130***	***51.4***	***677***	***49.4***	***25.7***	***1.6***	***-2.0***
∑	***165***	***100***	***284***	***100***	***669***	***100***	***253***	***100***	***1371***	***100***			

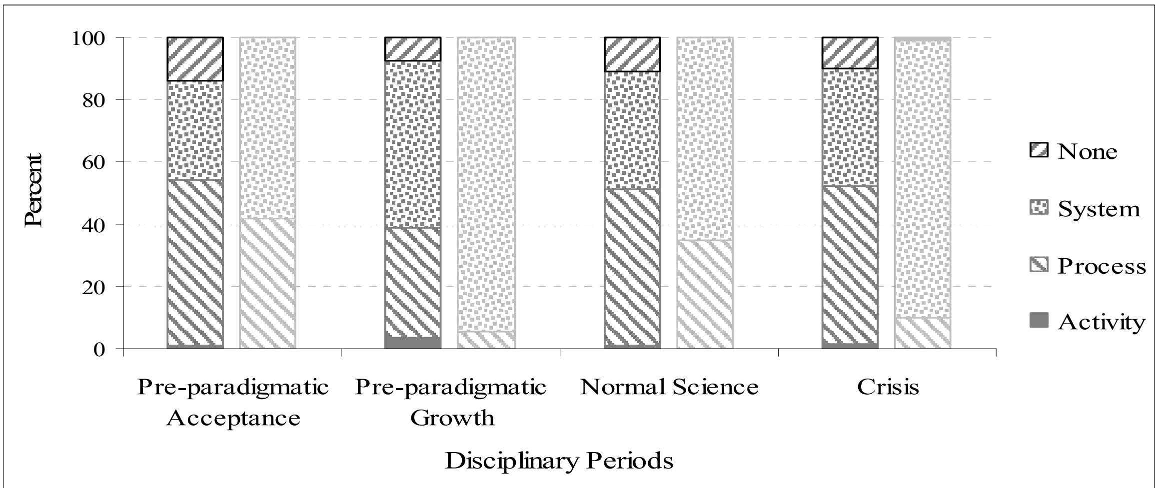

Figure 5.12: *Conceptual Framing across the Disciplinary Periods*

To facilitate determining the significance of the conceptual framing, four 2x4 chi-square analyses were performed. For the *pre-paradigmatic acceptance* period, results of the chi-square were significant, χ^2 (3) = 12.78, p = .005, where academics tended to use 'process' (n=65, 53.3%) or 'system' (n=39, 32.0%). Practitioners tended to use 'system' (n=25, 58.1%) or 'process' (n=18, 41.9%). Academics had no ('none') identifiable level of SCM relationship more often than did practitioners. For the *pre-paradigmatic growth* period, results of the chi-square were significant, χ^2 (3) = 63.13, p < .001, where academics tended to use 'system' (n=74, 54.0%) or 'process' (n=48, 35.0%). The majority of practitioners used 'system' (n=139, 94.6%). For the *normal science* period, results of the chi-square were significant, χ^2 (3) = 74.89, p < .001, where academics tended to use 'process' (n=156, 50.0%) or 'system' (n=119, 38.1%). The majority of practitioners tended to use 'system' (n=233, 65.3%) or 'process' (n=124, 34.7%). Academics had no ('none') identifiable level of SCM relationship more often than did practitioners. For the *crisis* period, results of the chi-square were significant, χ^2 (3) = 72.39, p < .001, where academics tended to use 'process' (n=62, 50.4%) or 'system' (n=47, 38.2%). The majority of practitioners tended to use 'system' (116, 89.2%). Academics had no ('none') identifiable level of SCM relationship more often than did practitioners. Table 5.24 depicts the findings of the chi-square analysis.

Table 5.24: *Results of the Chi-square Analysis for the Conceptual Framing of SCM Knowledge*

	Pre-Paradigmatic Period				***Normal Science Period***		***Crisis Period***	
	(1a) 1998-1999		***(1b) 2000-2001***		***(2) 2002-2006***		***(3) 2007-2008***	
	n=	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***
Academic								
Activity	1	0.8	5	3.7	3	1.0	2	1.6
Process	65	53.3	48	35.0	156	50.0	62	50.4
System	39	32.0	74	54.0	119	38.1	47	38.2
None	17	13.9	10	7.3	34	10.9	12	9.8
Total	***122***	***100***	***137***	***100***	***312***	***100***	***123***	***100***
Practitioner								
Activity	0	0.0	0	0.0	0	0.0	0	0.0
Process	18	41.9	8	5.4	124	34.7	13	10.0
System	25	58.1	139	94.6	233	65.3	116	89.2
None	0	0.0	0	0.0	0	0.0	1	0.8
Total	***43***	***100***	***147***	***100***	***357***	***100***	***130***	***100***
	χ^2 *(3) = 12.78,* **p** = *.005*		χ^2 *(3) = 63.13,* **p** < *.001*		χ^2 *(3) = 74.89,* **p** < *.001*		χ^2 *(3) = 72.39,* **p** < *.001*	

The findings indicate that for academics SCM is firmly entrenched as a ‘process’ in other words a chain of related activities across all disciplinary periods except the *pre-paradigmatic growth* phase where ‘system’ dominates. In sum, 48% of academic articles situate SCM as a process and a further 40% situate SCM as a system. Hence, academics evolve from ‘SCM as a simple process undertaken’ to ‘SCM as a sophisticated system or network’ before returning to the simpler SCM as a process. These findings imply an obvious answer for such a movement. Analysing the entire SCM system (network) is a difficult and complex task to undertake. Results of such a study would be superficial in nature due to a lack of in-depth analysis on the entirety of a complex system covering a multitude of organisations. Thus, it is not surprising that articles reflect a researcher’s focus on a specific aspect of that SCM system in the form of analysing parts of the process or activities undertaken.

In comparison, the findings for practitioners reveal that across all disciplinary periods 76% of articles situate SCM as a ‘system’ or in other words as a series of related processes/networks. This is an interesting observation and reflects the main themes of the practitioner focus on SCM; for instance, overall their definitions orientate around integration across networks of organisations. Furthermore, practitioners indicate a clear preference for system-centric constructs in the development of a body of knowledge, thus indicating that integration is technology driven rather than interpersonal relationships driven. Consequently, in terms of technology a far more sophisticated visualisation of SCM’s inter-linkages can be maintained and advocated for.

5.3.4 Interim Summary

Data analysis in this section was concerned with determining the extent of a unified SCM body of knowledge from an academic and practitioner perspective. Five different areas were analysed to provide a comprehensive conceptualisation of an SCM body of knowledge: the breadth of SCM knowledge, its depth via the CCL, ECL and construct focus, and the conceptual framing of SCM. Thus, this section employed several techniques to address the core research question of:

- RQ(2): Are there sufficient indicators of a unified body of knowledge in the SCM literature to signify it is a discipline?

Essentially, it was found that there is an integrated thread of thought running through SCM that is influenced by the perspectives of academics and practitioners dependent upon their own individual internal and external stimuli.

It has been argued that examining the SCM body of knowledge is an inconclusive means of determining the disciplinary identity of SCM (Harland et al., 2006). Further, it was believed that such an investigation would result in the development of miscellaneous categories rather than a combined stream of thought. The findings of this section indicate that this prevailing academic argument as to what constitutes SCM is flawed, as there exists a cohesive stream of thought within both academic and practitioner conceptualisations. Hence, this research answers critics of studies into the 'knowledge' criterion of Fabian that a unified body of knowledge was undeterminable.

However, knowledge is what it is through virtue of its surroundings. The deliberations of Harre and Gillett (1994) and Tsoukas (1996) state that as individuals our knowledge is built upon our participation and conformation to the discursive practices we operate within. Further, that the socialisation processes undertaken are where the discourse of the discursive practice is learned. The findings of this section indicate that a distinct body of SCM knowledge revolving around specific core characterisations exists; the question is whether there are sufficient indicators to signify SCM's status as a discipline. In answer, close examination reveals that inherent differences between the knowledge developed by academics and that developed by practitioners exist. Overall, a clear evolutionary path is evident and highlights the impact that internal and external forces have had on the actual users of SCM strategies compared with its theorists in the development of their own specialised knowledge.

Overall, in regards to providing an answer to the core research question of this section it is argued that there is evidence as to a unified body of SCM knowledge, however, this body of knowledge is heavily influenced by the perspectives of academics and practitioners. Consequently, it is more appropriate to state that two unified bodies of SCM knowledge exist that share enough similar characteristics to enable communication between academia and practice. However, given that SCM advocates at its core, integration, these findings serve as a warning as to the possibility of continued diverging development. The findings of this section of the analysis are summarised in Table 5.25.

Table 5.25: *Summary of Findings on the SCM Body of Knowledge*

Element	***Pre-Paradigmatic Period***		***Normal Science Period***	***Crisis Period***
	Acceptance	***Growth***		
Breadth of the SCM Body of Knowledge				
Academic	Develop knowledge around supply and logistics	Develop knowledge around supply, logistics and integration	Develop knowledge around supply, integration and logistics	Develop knowledge around supply, logistics and integration
Practitioner	Develop knowledge around integration and IT	Develop knowledge around integration and IT	Develop knowledge around integration and logistics	Develop knowledge solely around integration
Depth of the SCM Body of Knowledge				
Concise Construct List				
Academic	Dominance of logistics, business performance and inter-organisational relationships	Dominance of business performance, inter-organisational relationships and logistics	Dominance of business performance, inter-organisational relationships and logistics	Dominance of inter-organisational relationships, business performance and logistics
Practitioner	Dominance of business performance, leadership and IT	Dominance of IT, business performance, and logistics	Dominance of business performance, leadership and logistics	Dominance of business performance, leadership and logistics
Extensive Construct List				
Academic	Focus on SC-logistics performance	Focus on SC performance through IT integration software	Focus on SC performance through inter-organisational relationships	Focus on SC performance
Practitioner	Focus on SC performance through IT integration software	Focus on SC performance through IT integration software	Focus on SC performance through leadership strategies	Focus on SC performance through leadership strategies
System-centric vs. People-centric				
Academic	Dominance of system-centric constructs	Dominance of system-centric constructs	Dominance of system-centric constructs	Dominance of system-centric constructs
Practitioner	Dominance of system-centric constructs	Dominance of system-centric constructs	Dominance of system-centric constructs	Dominance of system-centric constructs
Conceptual Framing of a SCM Body of Knowledge				
Academic	SCM is a process	SCM is a system	SCM is a process	SCM is a process
Practitioner	SCM is a system	SCM is a system	SCM is a system	SCM is a system

5.4 The Degree of 'Quality' within Supply Chain Management

It has been argued that there is a tendency within disciplines to discount arguments and findings based on alternative methodologies (Boyer & Swink, 2008). It is suggested therefore that disciplines should periodically go through self-reviews of the procedures utilised to ensure quality through asking whether the status quo approach is still acceptable for use (Rungtusanatham et al., 2003). Although this suggestion is tempered by the fact that no one approach to quality should be regarded as being any better than another (Singhal et al., 2008). As was argued in Section 3.4, there is the threat of a dogmatic response to quality issues that ultimately inhibits disciplinary development as the status quo is rigorously defended; thus, entrenched approaches risk scientific advancement of a discipline. Consequently, the core research question for this section asks:

- RQ(3): Are there sufficient indicators of quality in the SCM literature to signify it is a discipline?

Within SCM, the quality of research has been debated within the context of addressing the gap between research and practice. As was identified, the gap has been well documented in a variety of disciplines due to its continuous re-discovery; normally after questions arise regarding the ability of research to be transferred and implemented in practice (Dess & Markoczy, 2008). Such questions are symptomatic of a domain querying its fundamentals as a legitimate discipline.

Of all of Fabian's criteria, the quality criterion is the only one that presented difficulties in the collection of overt data due to the nature of the information contained, and presented, within academic and practitioner publications. For instance, approaches to quality are easily examinable in academic articles through determination of the methodologies utilised and analysis procedures undertaken, in other words aspects that relate to rigour. However, it is normal for practitioner articles to fail to address or even mention such issues. Consequently, addressing this section's research question required the use of scientometrics to enable issues related to quality to be analysed from an academic as well as a practitioner perspective.

Briefly, scientometrics is an academic field tasked with determining the science about science. It has a recognised and established line of inquiry and methodological approach developed from the deliberations of Merton, de Solla Price and Garfield (Serenko, Bontis, Booker, Sadeddin, & Hardie, 2010). Areas such as authorship, author affiliations, productivity rankings, and frequency of publication are routinely investigated within scientometrics to facilitate determination of the overall quality of a domain. Consequently, it is an appropriate technique to utilise to facilitate the capture and analysis of the requisite data in this research.

In addressing RQ(3) this section provides answers to RQ(3a) and the level of rigour versus relevance evident within articles, and RQ(3b) as to authorship patterns in an attempt to mitigate procedural and conceptual differences between academics and practitioners.

5.4.1 Rigour versus Relevance

Whose needs are being met via published articles – academics or practitioners? A study published in 1987 (Williams & Oumlil, 1987) indicated that the pursuit of managerially relevant issues was a key indicator as to the quality of an article and hence its publishability. However, various studies indicate that the ensuing years point towards a change, with observance via rigour to a set of standards now being the key indicator of quality (Gupta et al., 2006; Spens & Kovacs, 2006). Although it is common to see referrals as to a study's ability to facilitate practitioner developments, these communicate as mere after-thoughts on the part of the author. Consequently, it was suggested that academics adhere to standards of quality that perpetuate a closed-loop research system at the expense of addressing issues and providing insight into areas of practitioner interest (Vermeulen, 2007). The disconnect threatened by this dichotomy raises serious questions as to the continued viability of research in facilitating the development of implementable SCM strategies from a practical orientation.

Subsequently, there is a need to investigate the degree of quality within academic and practitioner SCM publications to ascertain the extent of the closed-loop system evident and thus attempt to mitigate the irrelevancy (and threat of obsolescence) of a failure to address the real-world needs of practitioners. RQ(3a) asks:

- RQ(3a): To what extent are there differences in observance to rigour or relevance criteria by academics and practitioners for each disciplinary period?

To facilitate obtaining an answer each of the 1,371 articles were categorised according to one of the following criteria, which were purposefully developed to enable academic and practitioner differentiations:

- Literature review: Solely a review of previous literature that summarises knowledge in a topical area, and utilises either statistical techniques or narratives to map that body of knowledge

- Research-theory/model: Empirical or conceptual research (either quantitative, qualitative or a mix) that reflects the fact-finding procedures undertaken in the research process and provides theory or models to aid explanation
- Research only: Empirical or conceptual research (either quantitative, qualitative or a mix) that reflects the fact-finding procedures undertaken in the research process; no theory or model is offered in explanation
- Conceptual paper: Does not rely on data (either field collected or artificially collected via a laboratory setting) to develop new perspectives on topical areas
- Advertising: Pertains to those articles that are advertising services, support or software
- Case study: Presents real-world examples, including contextual background, of a phenomenon such as information pertaining to a company or industry
- Interview: Data and findings are based on open-ended question and answer style that encourages conversation

Table 5.26 depicts the findings in absolute figures and relative percentages across the disciplinary periods.

Table 5.26: *Synopsis of Rigour vs. Relevance across the Disciplinary Periods*

	Pre-Paradigmatic Period (1a) 1998-1999		**Pre-Paradigmatic Period (1b) 2000-2001**		**Normal Science Period (2) 2002-2006**		**Crisis Period (3) 2007-2008**		**Total**		**% Difference Between Periods**		
	n=	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***	***1a-1b***	***1b-2***	***2-3***
Academic													
LitRev	1	0.6	4	1.3	6	0.9	6	2.4	17	1.2	0.7	-0.4	1.5
ResThe	13	7.8	9	3.2	30	4.5	25	9.9	77	5.6	-4.6	1.3	5.4
ResOnly	78	47.3	74	26.1	156	23.3	64	25.2	372	27.1	-21.2	-2.8	1.9
Concept	17	10.3	24	8.5	56	8.4	17	6.7	114	8.4	-1.8	-0.1	-1.7
Advert	0	0.0	0	0.0	1	0.1	0	0.0	1	0.1	0.0	0.1	-0.1
Case	9	5.5	18	6.3	43	6.4	10	4.0	80	5.8	0.8	0.1	-2.4
Interview	4	2.4	8	2.8	20	3.0	1	0.4	33	2.4	0.4	0.2	-2.6
Total	***122***	***73.9***	***137***	***48.2***	***312***	***46.6***	***123***	***48.6***	***694***	***50.6***	***-25.7***	***-1.6***	***2.0***
Practitioner													
LitRev	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0
ResThe	0	0.0	0	0.0	1	0.1	1	0.4	2	0.1	0.0	0.1	0.3
ResOnly	2	1.2	14	4.9	41	6.1	12	4.7	69	5.0	3.7	1.2	-1.4
Concept	29	17.6	82	28.8	224	33.6	83	32.8	418	30.5	11.2	4.8	-0.8
Advert	0	0.0	0	0.0	2	0.3	0	0.0	2	0.1	0.0	0.0	-0.3
Case	10	6.1	46	16.3	80	12.0	27	10.7	163	11.9	10.2	-4.3	-1.3
Interview	2	1.2	5	1.8	9	1.3	7	2.8	23	1.8	0.6	-0.5	1.5
Total	***43***	***26.1***	***147***	***51.8***	***357***	***53.4***	***130***	***51.4***	***677***	***49.4***	***25.7***	***1.6***	***-2.0***
$\sum$	***165***	***100***	***284***	***100***	***669***	***100***	***253***	***100***	***1371***	***100***			

Key: *LitRev=literature review, ResThe=research and theory/model offered to aid explanation, ResOnly=research only (no theory/model offered to aid explanation), Concept=conceptual paper, Advert=advertising, Case=case study only, Interview=interview only.*

To determine the significance of the data chi-square analyses were performed. For the *pre-paradigmatic acceptance* period, results of the chi-square were significant, χ^2 (5) = 67.76, p < .001, where the majority of academics tended to produce articles pertaining to 'research only: no theory/model offered to aid explanation' (n=78, 63.9%). Practitioners tended to produce 'conceptual papers' (n=29, 67.4%) or 'case studies' (n=10, 23.3%). For the *pre-paradigmatic growth* period, results of the chi-square were significant, χ^2 (6) = 98.37, p < .001, where academics tended to produce articles with 'research only: no theory/model offered to aid explanation' (n=74, 54.0%) or 'conceptual papers' (n=24, 17.5%). Practitioners tended to produce 'conceptual papers' (n=82, 55.7%) or 'case studies' (n=46, 31.3%). For the *normal science* period, results of the chi-square were significant, χ^2 (6) = 214.64, p < .001, where academics tended to produce 'research only: no theory/model offered to aid explanation' articles (n=156, 50.0%) or 'conceptual papers' (n=56, 17.9%). Practitioners tended to produce 'conceptual papers' (n=224, 62.7%) or 'case studies' (n=80, 22.4%). Finally, for the *crisis* period, results of the chi-square were significant, χ^2 (6) = 122.29, p < .001, where academics tended to produce 'research only: no theory/model offered to aid explanation' (n=64, 52.0%) or 'literature review' articles (n=25, 20.3%), while the majority of practitioners tended to produce 'conceptual papers' (n=83, 63.8%). Table 5.27 depicts the results of the chi-square analysis.

Table 5.27: *Results of the Chi-square Analysis for Rigour vs. Relevance*

	Pre-Paradigmatic Period				***Normal Science Period***		***Crisis Period***	
	(1a) 1998-1999		***(1b) 2000-2001***		***(2) 2002-2006***		***(3) 2007-2008***	
	n=	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***
Academic								
LitRev	1	0.8	4	2.9	6	1.9	6	4.9
ResThe	13	10.7	9	6.7	30	9.7	25	20.3
ResOnly	78	63.9	74	54.0	156	50.0	64	52.0
Concept	17	13.9	24	17.5	56	17.9	17	13.9
Advert	0	0.0	0	0.0	1	0.3	0	0.0
Case	9	7.4	18	13.1	43	13.8	10	8.1
Interview	4	3.3	8	5.8	20	6.4	1	0.8
Total	***122***	***100***	***137***	***100***	***312***	***100***	***123***	***100***
Practitioner								
LitRev	0	0.0	0	0.0	0	0.0	0	0.0
ResThe	0	0.0	0	0.0	1	0.2	1	0.8
ResOnly	2	4.7	14	9.6	41	11.5	12	9.2
Concept	29	67.4	82	55.7	224	62.7	83	63.8
Advert	0	0.0	0	0.0	2	0.7	0	0.0
Case	10	23.3	46	31.3	80	22.4	27	20.8
Interview	2	4.7	5	3.4	9	2.5	7	5.4
Total	***43***	***100***	***147***	***100***	***357***	***100***	***130***	***100***
	$\chi^2(5) = 67.76$, $p < .001$		$\chi^2(6) = 98.37$, $p < .001$		$\chi^2(6) = 214.64$, $p < .001$		$\chi^2(6) = 122.29$, $p < .001$	

Key: *LitRev=literature review, ResThe=research and theory/model offered to aid explanation, ResOnly=research only (no theory/model offered to aid explanation), Concept=conceptual paper, Advert=advertising, Case=case study only, Interview=interview only.*

To understand the significance of rigour and relevance and its role as an indicator of quality, analysis of the four publications was undertaken. As per the results of the chi-analysis, there is the expectation that the two academic publications will publish articles that lean towards rigour, while the two practitioner publications will lean towards relevance. However, examination revealed distinct subtleties existing between the publications.

Figure 5.13 provides the top five rigour-relevance categories for JSCM and IJPDLM. Interestingly, within JSCM the category 'research only' trends down across the disciplinary periods, while IJPDLM indicates higher interest during the *pre-paradigmatic acceptance* and *crisis* periods. Furthermore, within JSCM there is clear evidence to suggest that the categories of 'research-theory/model offered' and 'conceptual papers' grew in importance over the 11-year period. Subsequently, JSCM reflects Kuhn's thoughts that as a domain establishes in practice it becomes easier to collect data from organisations implementing its strategies. Thus, articles reflect a transition from solely being research only articles to those that offer theory and/or models to aid explanation of real-world data. Thus, JSCM indicates the growing requirement to develop or adapt theory and models in the explanation of SCM concepts.

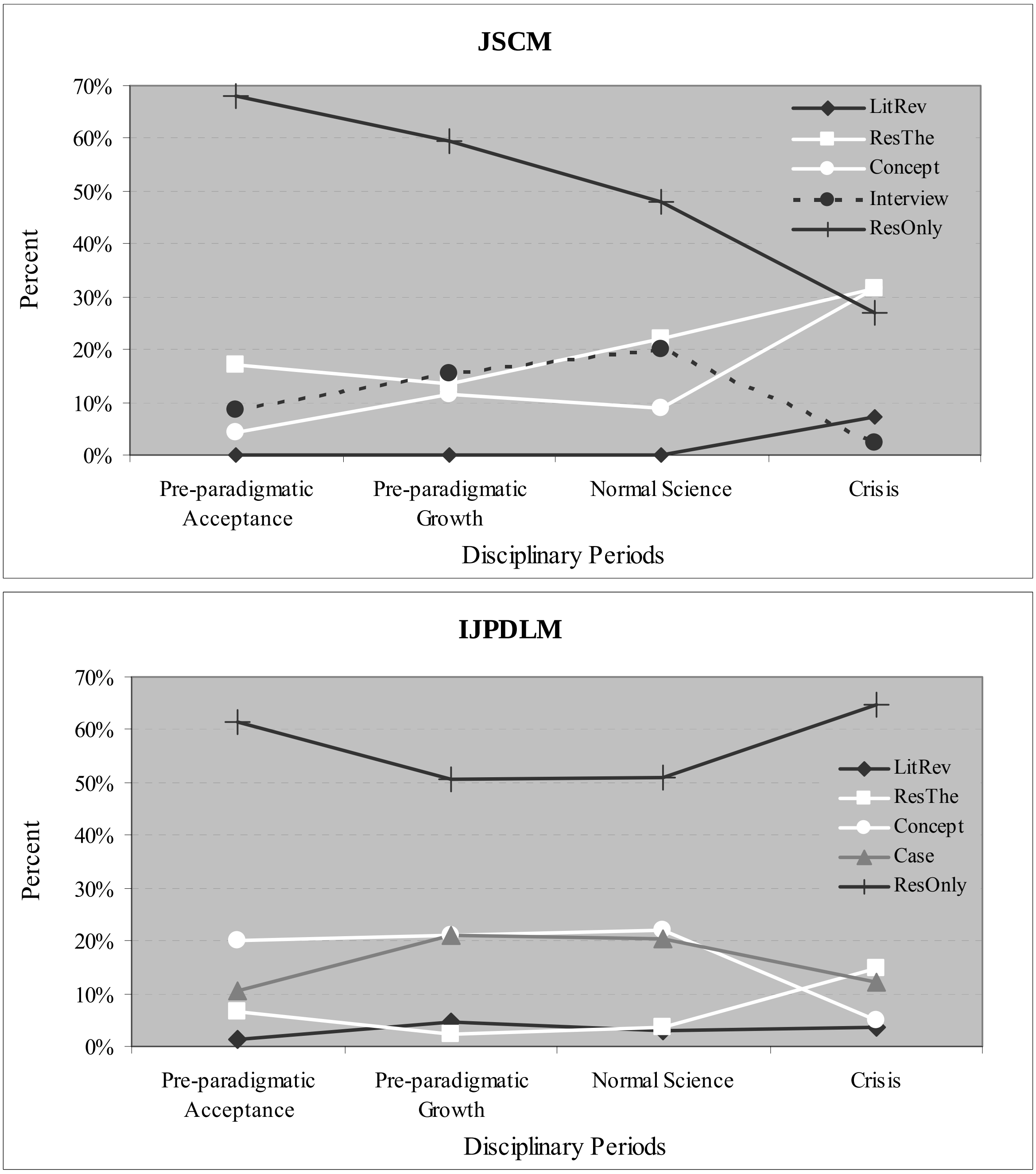

Figure 5.13: *Rigour vs. Relevance by Academic Publication*

In comparison, IJPDLM indicates a much lower requirement overall on articles that undertake research that offers theory and/or models to aid in explanation of SCM. Interestingly, the drop in articles between the *acceptance* and *growth* phases that depict research (both research only and the offering of theory/models to aid explanation) corresponds to a rise in 'case study' articles that present real-world examples of various phenomenon in an organisation or industry and 'literature review' articles that summarise the knowledge developed to date. This link then continues into the *normal science* period, before reversing in the *crisis* period. Thus, there is the suggestion that academics were querying practice as to the implications of SCM implementation in topical areas. Furthermore, the rise in research articles (of both types) in the *crisis* period reflects the beginnings of potential conflicts as researchers look for data and theory/models to either argue for change or to maintain the status quo. Consequently, the use of case studies throughout the *growth* and *normal science* periods reflects that there were queries amongst academia as to the accepted conceptualisation of SCM.

JSCM also reflects crisis. There is a rise in 'interview' articles from the *acceptance* to the *normal science* periods indicating that academics were engaging in conversations with practitioners as to real-world scenarios. These conversations virtually stop in the *crisis* period, and may have many causes such as academics focusing on the theorising of SCM or editors desiring more rigour-based articles. However, it must be remembered that practitioner article activity rates drop during this period, thus it is suggested that the reason that these conversations stop is that practitioners have moved on to newer strategic concepts. Overall, IJPDLM indicates a higher degree of adherence to categories representing rigour than JSCM. However, both publications attempt to mitigate their focus on rigour through providing a balance with practice: JSCM through employing interviews with practitioners and IJPDLM through employing practical case studies of either organisations or industries implementing SCM strategies.

Irrespective of their individualistic approaches to rigour and relevance, the findings from this section offer insight into a previous section's findings. In Section 5.2.3 on the level of theoretical development occurring within academia, it was identified that there was an emphasis on utilising the strategies of 'describing' and 'mapping' over each period as a foundation for theoretical development. Examination of the middle order strategy of 'linkages' was of secondary interest within each period, while of the higher order strategies pertaining to holistic theoretical development, only 'validation' was utilised in particular in the *normal science* and *crisis* periods. Overall, Section 5.2.3 argued that the practice of applying externally developed theory from other disciplines to specific areas of SCM, rather than developing a holistic SCM theory contributed to a fragmented conceptualisation of SCM. Furthermore, the level at which theoretical development occurred would remain orientated around the low to middle-order strategies until a holistic SCM theory was able to provide guidance as to the boundary and entirety of SCM.

The finding from this current section on the degree of quality within those academic articles reflects that there has been an overall emphasis on reporting real-world data without utilisation of theory and/or models to facilitate its explanation. However, JSCM provides indications that authors were providing theory and/or models to aid explanation from the *normal science* period, with IJPDLM from the *crisis* period. Thus, the two sets of findings reinforce each other: First, that utilisation of theory and/or models to aid explanation of SCM was not the primary concern of academic authors, and second, that research data was aimed at a low level of activity through describing and mapping SCM.

In terms of practitioners, Figure 5.14 provides the top five rigour-relevance categories for SCMR and LS. An interesting observation is the high percentage of conceptual articles in each publication compared with that observed within JSCM and IJPDLM. Furthermore, both SCMR and LS have a high incidence of 'case-based' articles, reflecting that real-world examples of SCM phenomena are of more practical importance than articles discussing research-based approaches. Hence, practitioners are less interested in the actual data and how it was gathered, than they are in the ramifications of how another organisation or industry has applied SCM and its various elements.

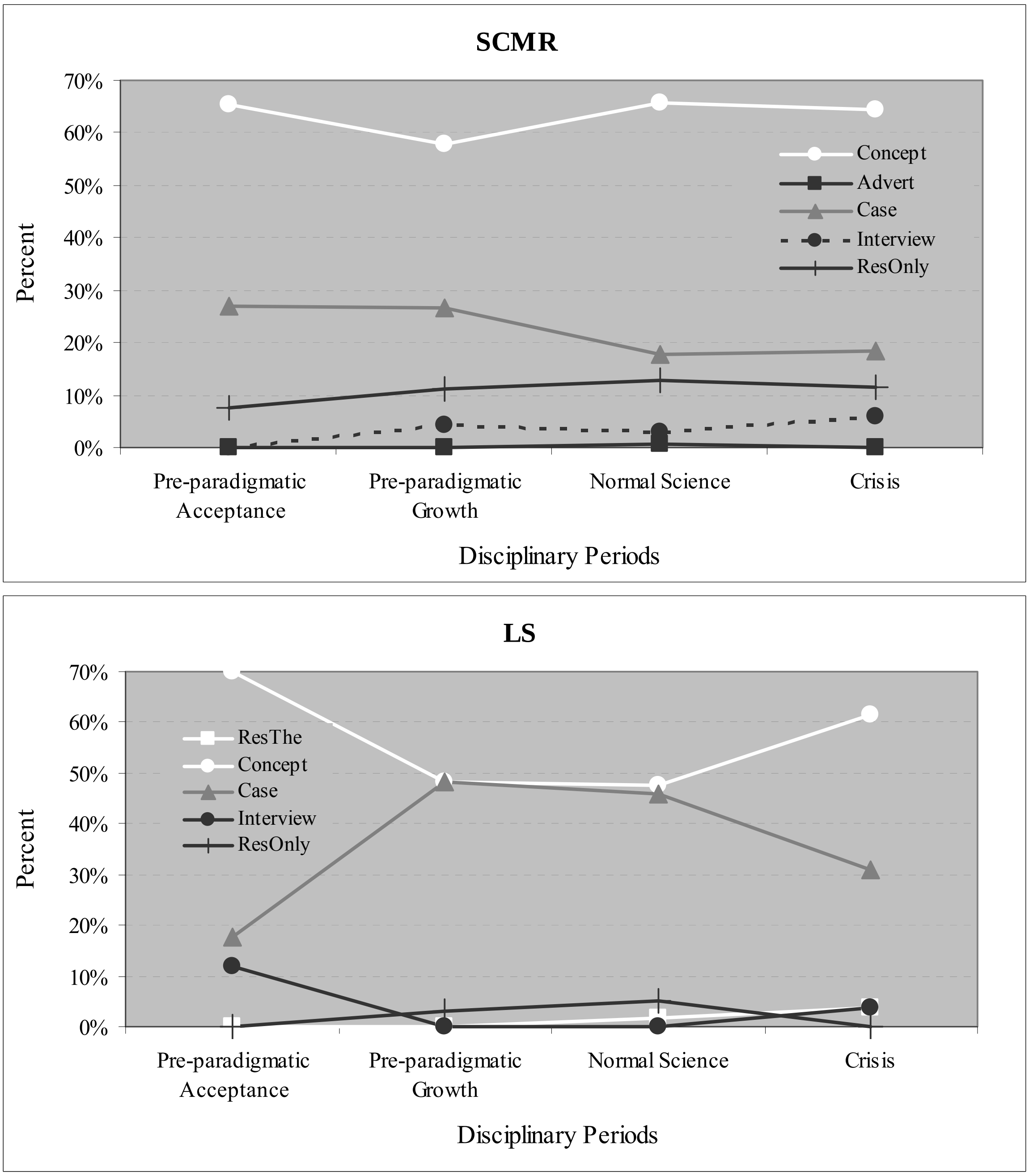

Figure 5.14: *Rigour vs. Relevance by Practitioner Publication*

Overall, SCMR has a higher incidence of research-only articles than LS, although LS has articles providing theory to aid in explaining SCM, which SCMR does not. This is surprising given that studies (for instance Menachof et al., 2009) asking academics as to their leading SCM-orientated journals identified SCMR as a leading publication, even though it is practitioner in origin rather than academic. Although no ranking was available for LS, it is surprising that they are publishing articles reflecting the theorising and modelling of SCM, as it would be expected that such articles would appear in SCMR due to a higher acceptance amongst academics of it being a leading publication. Thus, the implication is that LS is of greater value to academics than has been identified.

In summary, this section began by asking whose needs are being met through publishing articles. Early studies reveal that the pursuit of managerially relevant issues was an indicator of quality within an academic publication (Williams & Oumlil, 1987), however, more recent studies indicate the opposite with adherence to standards of rigour equating to quality (Gupta et al., 2006; Spens & Kovacs, 2006). The findings of this section indicate that academics continue to adhere to rigour, although attempts at mitigating the severity of such a singular approach to quality are evident via conversations and real-world examples of SCM phenomena from the perspective of practitioners. Examination of the practitioner publications revealed the expected adherence to issues of real-world relevancy, although articles based on adherence to standards of rigour (such as research only and research offering theory and/or models to aid explanation) were evident.

Although these findings were expected, the dichotomy between rigour and relevance raises serious questions as to the ability and viability of academic research to facilitate developing implementable SCM strategies. The threat of this disconnect is known as a closed-loop research system that self perpetuates to reinforce the status quo (Vermeulen, 2007). Although SCM scholars desire to be perceived as legitimate via adopting criteria that ensure scientific norms (Carter, 2008b), the threat of obsolescence due to a failure to address the real-world needs of practitioners is a real one. As these findings show, academics are failing to acknowledge the seriousness of such a threat through adherence to scientific norms. Determining their contributions to real-world discussions is the focus of the following section.

5.4.2 Can Authors Mitigate the Rigour-Relevance Divide?

Authors play a role in mitigating the rigour-relevance divide through publishing articles in each other's publications. Such publications play a strategic role in the development, dissemination, and historical analysis of SCM knowledge (Fawcett et al., 1995). Various studies analysing quality utilise ranking systems developed either through surveying academics and practitioners, or through utilising internationally recognised pre-existing ranking systems to determine the quality of a publication (Gibson & Hanna, 2003; Gibson et al., 2001; Menachof et al., 2009; Zsidisin et al., 2007). Quality is routinely referred to as adherence to standards of rigour; relevance to practitioners is stated, but is a minor role in the review process undertaken for publishing.

This section goes beyond the rankings of the publications to investigate the authorship of articles to identify the thought-leaders and their productivity over time, including those authors who publish in both communities publications thereby attempting to mitigate the rigour-relevance divide through their actions. RQ(3b) asks:

- RQ(3b): To what extent are there differences in the author publishing activities by academics and practitioners for each disciplinary period?

To facilitate ascertaining an answer, details as to the authorship of the 1,371 articles were collected. To reiterate, academic authors are those authors affiliated with an educational and/or research institution such as a college or university, while practitioner authors are those authors not affiliated with such institutions. There are 2,548 authors representing the total number of academic and practitioner authors, including double counting; of these, 58.2% (n=1,484) were from the academic publications and 41.8% (n=1,064) were from the practitioner publications. Of the total number of authors, 1,755 unique authors were identified (i.e. excluding double counting), with 57% (n=1,001) authors being from the academic publications and 43% (n=754) authors from the practitioner publications. Closer examination of the 1,755 authors revealed that 72 authors published articles in both the academic and practitioner publications; hence, the total number of unique authors is 1,719. Consequently, 1.25 authors wrote each article.

Table 5.28 provides a synopsis of the overall authorship (single through to various combinations of multiple authors) of each of the articles examined across the disciplinary periods. In terms of authorship, academic articles are dominated overall by two-author articles (38%, n=264), while practitioner articles are clearly dominated by single-author articles (63.9%, n=433). Interestingly, no academic articles utilise more than five authors, with the majority of articles being written by between one and three authors. In comparison, there were 10 practitioner articles written by five or more authors over the entire timeframe.

Table 5.28: *Synopsis of Article Authorship across the Disciplinary Periods*

	Pre-Paradigmatic Period (1a) 1998-1999		Pre-Paradigmatic Period (1b) 2000-2001		Normal Science Period (2) 2002-2006		Crisis Period (3) 2007-2008		Total		% Difference Between Periods		
	n=	*%*	*n=*	*%*	*n=*	*%*	*n=*	*%*	*n=*	*%*	*1a-1b*	*1b-2*	*2-3*
Academic													
1 author	35	21.2	45	15.9	90	13.5	31	12.3	201	14.7	-5.3	-2.4	-1.2
2 authors	48	29.1	56	19.6	127	18.9	33	13.0	264	19.3	-9.5	-0.7	-5.9
3 authors	32	19.4	29	10.2	73	10.9	36	14.2	170	12.4	-9.2	0.7	3.3
4 authors	5	3.0	5	1.8	21	3.1	19	7.5	50	3.6	-1.2	1.3	4.4
5 authors	2	1.2	2	0.7	1	0.2	4	1.6	9	0.6	-0.5	-0.5	1.4
Total	***122***	***73.9***	***137***	***48.2***	***312***	***46.6***	***123***	***48.6***	***694***	***50.6***	***-25.7***	***-1.6***	***2.0***
Practitioner													
1 author	32	19.4	105	36.9	220	32.9	74	29.3	431	31.4	16.3	-4.0	-3.6
2 authors	9	5.5	28	9.9	87	13.0	31	12.3	155	11.3	5.0	3.1	-0.7
3 authors	1	0.6	6	2.1	35	5.2	17	6.7	59	4.3	2.1	3.1	1.5
4 authors	1	0.6	5	1.8	10	1.5	6	2.4	22	1.6	1.2	-0.3	0.9
5 authors	0	0.0	0	0.0	2	0.3	2	0.7	4	0.3	0.0	0.3	0.4
6 authors	0	0.0	3	1.1	2	0.3	0	0.0	5	0.4	1.1	-0.8	-0.3
7 authors	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0
8 authors	0	0.0	0	0.0	1	0.2	0	0.0	1	0.1	0.0	0.2	-0.2
Total	***43***	***26.1***	***147***	***51.8***	***357***	***53.4***	***130***	***51.4***	***677***	***49.4***	***25.7***	***1.6***	***-2.0***
∑	***165***	***100***	***284***	***100***	***669***	***100***	***253***	***100***	***1371***	***100***			

Examination as to the frequency of authorship of academic and practitioner articles over the disciplinary periods while interesting, is insufficient in itself for charting the evolution of authorship over time. An in-depth investigation of the authorship data captured from the articles including author affiliation is required to determine an answer. Hence, the next sections delve deeply into author affiliation and productivity in determination of an answer, although first several issues related to how an author's productivity was analysed, are discussed.

Within the bounds of scientometrics, determining the productivity rankings of authors contributes to an understanding as to the output of an individual, and therefore provides an indication as to the acknowledged thought-leaders within a domain. However, a limitation exists as article production can be a poor indicator of research impact (Lowry, Karuga, & Richardson, 2007). In other words, there can exist articles in publications (either related directly to the domain or merely supportive) that contribute significantly to developments within a domain (both academia and practice) while other articles do not. Mitigation of this limitation is possible via utilising and analysing top quality publications in a study (i.e. leading academic journals and practitioner trade publications) (Chua, Cao, Cousins, & Straub, 2003). In other words, for an author to publish in an acknowledged leading publication (irrespective of whether it is an academic or practitioner publication) requires them to have met stringent criteria that ensure only high quality publications are published. Consequently, productivity rankings of authors are deemed indicative of an author's impact on a domain's quality.

As this research has as its primary concern the investigation of an SCM body of knowledge over time via comparisons of academic and practitioner conceptualisations, it was deemed that productivity rankings would provide insight into an author's impact on quality. The utilisation of four specific SCM-orientated publications, three of which are widely acknowledged as being leading publications (JSCM, IJPDLM and SCMR), met the above criteria for this analyses. The ranking of LS was undeterminable via acknowledged ranking systems; however, the previous section indicated that research-based articles that either utilised or developed theory and/or models to aid explanation of data were published within LS over the 11-years. Articles depicting that type of knowledge are deemed to be of a higher calibre as per Handfield and Melnyk's (1998) deliberations, than articles that do not offer such substantiations. Subsequently, as authors would not submit such articles to a low-ranked publication, it is suggested that LS operates to the same high standards as the other three publications utilised in this research; although it has not been officially recognised as such within academic ranking systems. (As an aside, SCMR, which is ranked highly by academics, has no such articles reflecting research that either utilised or developed theory and/or models to aid explanation).

A critical issue in determining the productivity rankings of individual authors involves assigning credit within multi-author articles. Four approaches are available within scientometrics: normalised page size, author position, direct count and equal credit (Chua et al., 2003; Lowry et al., 2007; Serenko et al., 2010). Utilising the *normalised page size* approach requires dividing the number of pages of an article by the number of authors to determine the relative contributions of each author. However, results can be distorted due to publications (journals and trade) applying strict page limits (Serenko et al., 2010). Furthermore, who is to say that the contribution of an article that is long is any more influential to a domain or of higher quality than a shorter one? Therefore, this approach was not utilised in this analysis.

The *author position* approach assigns values dependent upon the author's position in the list of authors. This is problematic as authors listed in alphabetical order can be unfairly advantaged or disadvantaged on the basis on their last name. Furthermore, the approach fails to acknowledge instances where authors contribute equally to an article. Hence, this approach was also not utilised in this analysis.

The *direct count* approach to productivity rankings assigns a value of 1.0 to each author, irrespective of the number of authors who contribute to an article. However, this approach disadvantages sole authors and benefits authors who collaborate on multiple articles. Thus, the ranking is inflated for those authors that collaborate on a large number of articles even though their actual contribution may be minor. Therefore, this approach was also not utilised in this analysis.

The final approach is that of *equal credit scoring*. In this approach each author is allocated a portion of a score (1.0) regardless of authorship position, thus a single author is allocated 1.0, two authors receive 0.5 each, three authors receive 0.333 each and so on. As such, this approach is less biased than the other three approaches as it provides an equal allocation of the rating irrespective of author order. As this approach mitigates the issues identified in the above approaches it was selected as the basis for ascertaining each author's productivity ranking in this analysis.

(1a) Pre-Paradigmatic Acceptance Period: Figure 5.15 visually represents the affiliations of authors for academic and practitioner publications. The figure also provides insight into the degree of multi-authored articles over this disciplinary period. In regards to academic articles, academic-affiliated authors dominate with 77% of the articles represented by single and two-author articles. In comparison, although it was expected that there would be a dominance of practitioners writing for practitioners, there is also evidence that academics are writing for practitioners as well. Hence, there are indications as to authors crossing into the other community to facilitate knowledge exchange.

Furthermore, such activity reflects positively on the abilities of individual authors to communicate in a manner conducive to success in the article submit-review process. As evident in Figure 5.15, academic-affiliated authors have a higher representation within practitioner publications, than practitioners have in academic publications. This discrepancy is suggested to be due to the requirement to meet set standards revolving around forms of rigour within academic articles. Thus, adherence to rigour may be a self-limiting factor in the determination to publish.

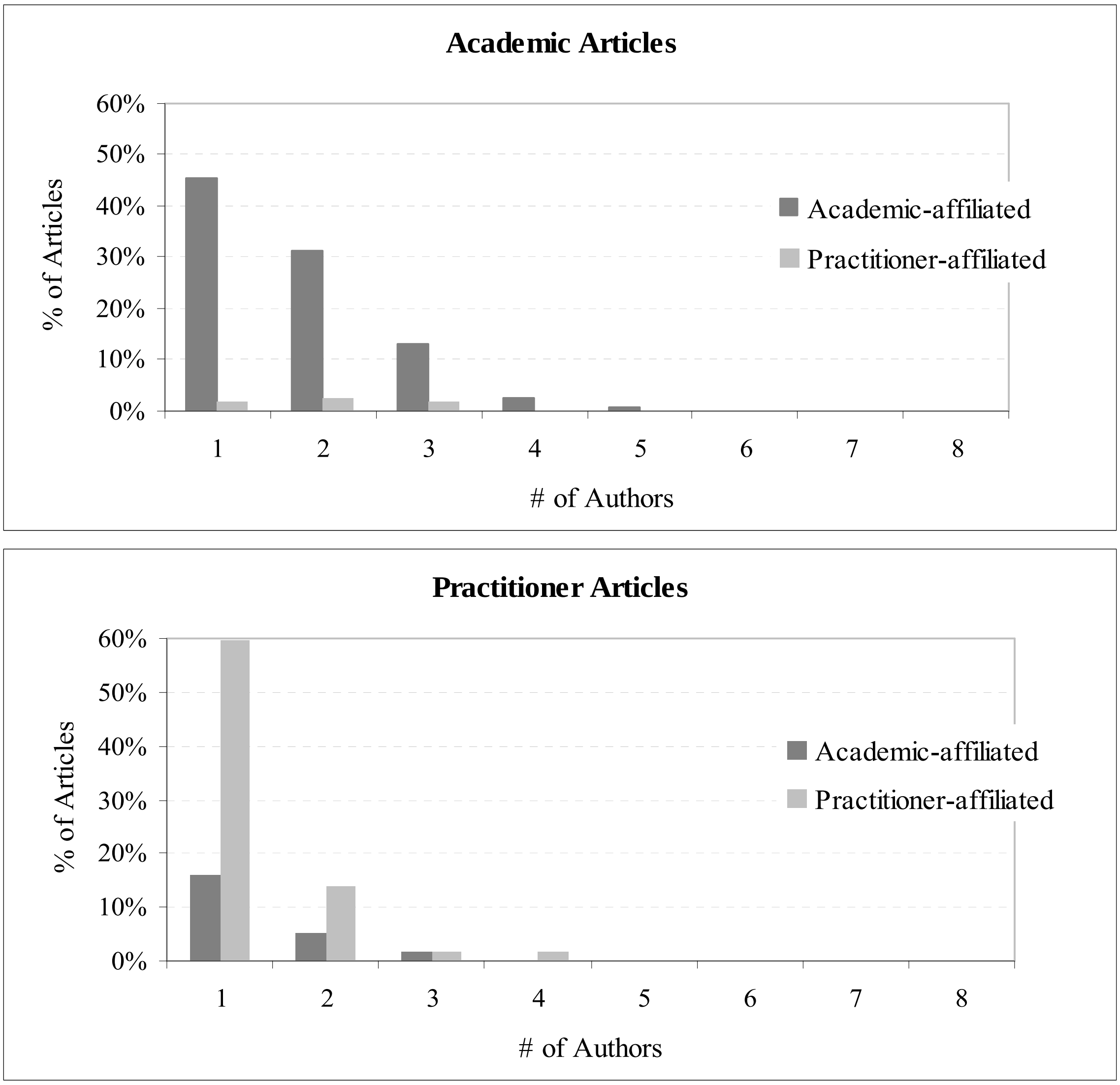

Figure 5.15: *Author Affiliation of Articles in the Pre-Paradigmatic (Acceptance) Period*

During this period there were 314 authors representing the total number of academic and practitioner authors, including double counting; of these, 81.8% (n=257) were from the academic publications and 18.2% (n=57) were from the practitioner publications. Of the total number of authors in this period, 278 unique authors were identified (i.e. excluding double counting), with 80.2% (n=223) authors being from the academic publications and 19.8% (n=55) authors from the practitioner publications. Only one instance of an author (*Maltz, A.B.* – academic affiliation) contributing to both academic and practitioner publications occurred within this period. Consequently, during the *acceptance* phase of the pre-paradigmatic period there were 1.68 unique authors per article (n=165). Specifically, 1.82 authors wrote the academic articles (n=122) and 1.27 authors wrote the practitioner articles (n=43).

To determine the authors with the greatest ability to influence SCM the top tier of authors were analysed. Top-tier authors are as those authors with productivity ratings greater than 1.0. Thus, sole authorship becomes the minimum benchmark productivity indicator. Table 5.29 indicates the top authors per academic and practitioner publication; articles written by anonymous authors were excluded. As evident, all nine authors irrespective of whether they published in academic or practitioner publications are affiliated with academia. Interestingly, the academic-affiliated author with the highest productivity rating (*Linville, R.P.* – 3.0) has not published in the academic publications during this period. Of further interest, the one author that published in both publications during this period does not make the top-tier of productive authors, scoring a combined productivity rating of 1.0 for this period.

Table 5.29: *Top-tier Authors for Productivity in the Pre-paradigmatic (Acceptance) Period*

Academic Publication Authors	***Affiliation***	***Productivity Rating***	***Practitioner Publication Authors***	***Affiliation***	***Productivity Rating***
Smeltzer, L.R.	1	2.00	Linville, R.P.	1	3.00
Gilmour, P.	1	2.00			
Dadzie, K.Q.	1	2.00			
Ellram, L.M.	1	1.70			
Walters, D.	1	1.50			
Moore, K.R.	1	1.50			
Murphy, P.R.	1	1.30			
Jayaraman, V.	1	1.30			

Key: *Affiliation: 1 = Academic affiliation, 2 = Practitioner affiliation, * = published in both publications*

Further examination of the affiliation of authors in each publication reveals an interesting observation. Of the 16 practitioner-affiliated authors contributing to academic publications (n=122), only three were sole authors equating to 2.5% of the total articles published. While of the 11 academic-affiliated authors contributing to practitioner publications (n=43) six were sole authors, which equates to 20.9% of the total articles published during this period.

Table 5.30 provides a synopsis of which community generated the most influence through writing and publishing in the other. Academic-affiliated authors contributing to practitioner publications produced 23.6% of the overall practitioner productivity, the majority of which were sole authors. Meanwhile, practitioner-affiliated authors contributing to academic publications produced 7.0% of the overall academic productivity, with the majority contributing via multi-authored articles. Overall, academics are exerting greater influence as to SCM development within practitioner publications, than practitioners are on academics.

Table 5.30: *Synopsis of Productivity in the Pre-paradigmatic (Acceptance) Period*

	Academic Publications				***Practitioner Publications***				***Total***			
	% of Affiliation		***% of Productivity***		***% of Affiliation***		***% of Productivity***		***% of Affiliation***		***% of Productivity***	
	A	***P***	***A***	***P***	***A***	***P***	***A***	***P***	***A***	***P***	***A***	***P***
> 1.0	4.0	0.0	14.2	0.0	1.8	0.0	7.0	0.0	3.6	0.0	12.3	0.0
= 1.0	11.2	1.3	20.5	2.5	9.1	43.6	11.6	55.8	10.8	9.7	18.2	16.4
< 1.0	77.6	5.8	58.3	4.6	9.1	36.4	5.0	20.5	64.0	11.9	44.4	8.7
Total	92.8	7.2	93.0	7.0	20.0	80.0	23.6	76.4	78.4	21.6	74.9	25.1
	100		***100***		***100***		***100***		***100***		***100***	

An interesting phenomenon is observed when comparing the affiliation of authors within each publication with their corresponding productivity. In terms of the academic publications the top 4% of academic-affiliated authors, who generated productivity ratings higher than 1.0, contribute 14.2% of the overall productivity, whereas the lowest 77.6% of academic-affiliated authors produce merely 58.6% of the overall productivity within that publication. Furthermore, examination of the last column of Table 5.30 indicates that more academic-affiliated authors (78.4%) contributed less to productivity (74.9%) overall, than practitioner-affiliated authors produced (21.6% of all authors contributed 25.1% of all productivity).

(1b) Pre-Paradigmatic Growth Period: Figure 5.16 visually represents the affiliations of authors for academic and practitioner publications during this phase of the pre-paradigmatic period. In regards to academic articles, academic-affiliated authors dominate with 79% of the articles represented by single and two-author articles. In comparison, within the practitioner publications sole-authored articles by practitioner-affiliated authors clearly dominate with 51% of the articles. Interestingly, there is an increase in academic authors contributing to articles within the practitioner publications during this period, than was observed in the previous phase. Thus, supporting Kuhn’s thoughts as to the pre-paradigmatic period being populated by researchers operating under the persona of explorers. Such authors seek to explore the extent of the topical domain and through doing so contribute to SCM knowledge development.

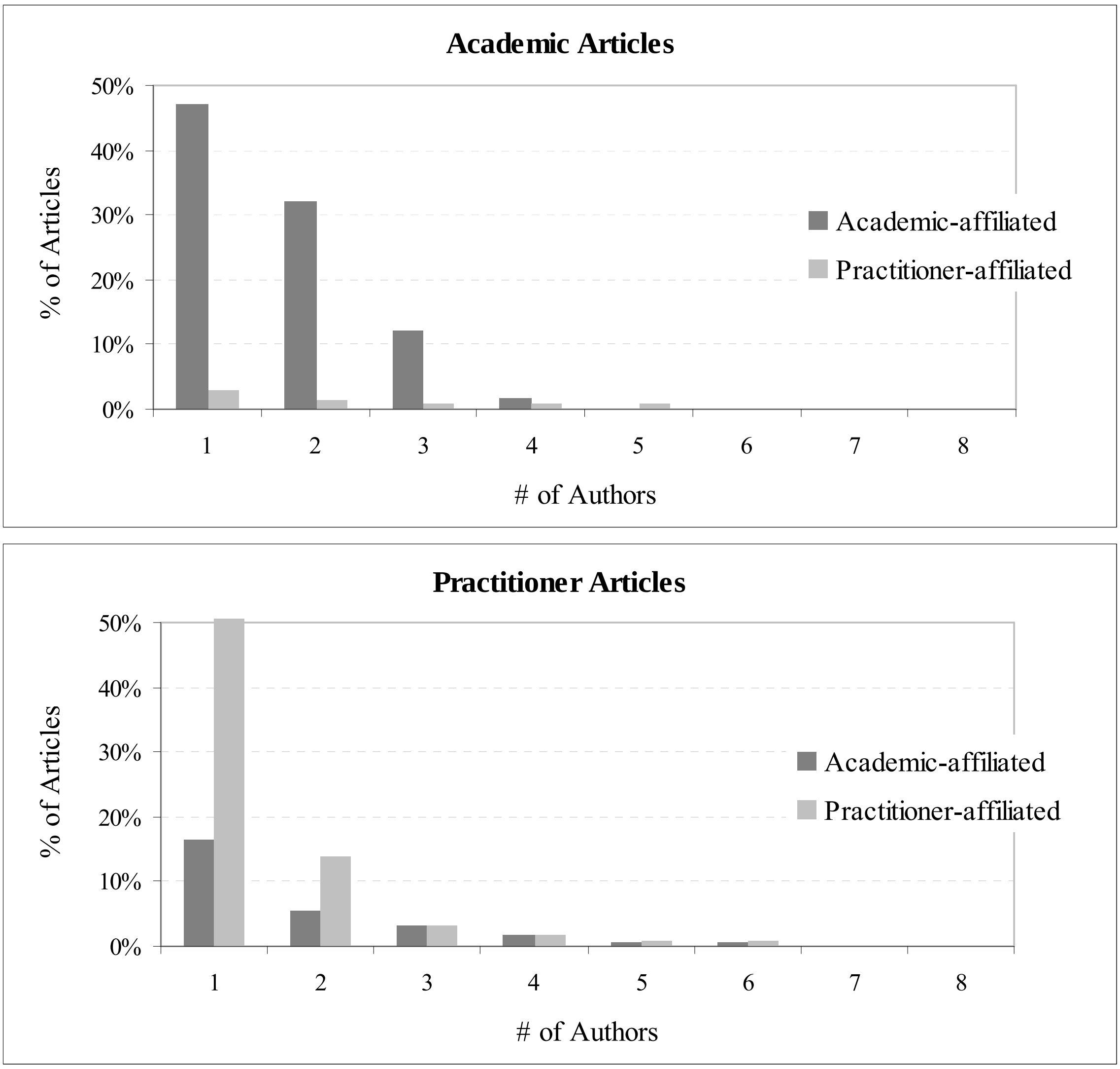

Figure 5.16: *Author Affiliation of Articles in the Pre-Paradigmatic (Growth) Period*

During the *growth* phase there were 491 authors representing the total number of academic and practitioner authors, including double counting; of these, 55.8% (n=274) were from the academic publications and 44.2% (n=217) were from the practitioner publications. Of the total number of authors in this period, 415 unique authors were identified (i.e. excluding double counting), with 55.9% (n=232) authors being from the academic publications and 44.1% (n=183) authors from the practitioner publications. Nine authors (all of academic affiliation) were identified as contributing to both academic and practitioner publications within this period (articles by anonymous authors were excluded). As such, during the *growth* phase there were 1.46 unique authors per article (n=284). Specifically, 1.69 authors wrote the academic articles (n=137) and 1.24 authors wrote the practitioner articles (n=147). Compared with the previous phase there is the indication that there has been a decrease in co-authored articles. Thus, on this basis a slight shift towards sole authorship is suggested.

Table 5.31 provides details as to the top-tier authors by productivity within academic and practitioner publications (articles written anonymously were excluded). Unlike the previous phase, the *growth* phase indicates that 66.7% of the most productive authors within the practitioner publications were practitioner affiliated. On this basis, it could be argued that practitioners are contributing to SCM development by influencing their own publications; however, the most productive author is an academic with the rating implying 10 sole-authored articles. Thus, the productivity of *La Londe, B.J.* equates to 6.8% of the total practitioner articles published during this phase. Meanwhile, it is not surprising that academics are the most productive within academic publications, although the most productive author (*van Hoek, R.I.*) is less than half as productive as *La Londe, B.J.*

Table 5.31: *Top-tier Authors for Productivity in the Pre-paradigmatic (Growth) Period*

Academic Publication Authors	*Affiliation*	*Productivity Rating*	*Practitioner Publication Authors*	*Affiliation*	*Productivity Rating*
van Hoek, R.I.	1	4.50	La Londe, B.J.	1	10.00
Cox, A.	1	3.33	Quinn, F.J.	2	5.00
Svensson, G.	1	2.00	Buxbaum, P.	2	4.00
Skjoett-Larson, T.	1	2.00	Kratz, L.A.	2	2.50
Ellram, L.M.	1	1.50	Smeltzer, L.R. *	1	2.00
Carter, C.R.	1	1.50	Sengupta, S.	2	2.00
Yrjola, H.	1	1.33	Meyer, M.M.	2	2.00
Watson, G.	1	1.33	Lapide, L.	1	2.00
Talluri, S.	1	1.33	Gooley, T.B.	2	2.00
Sanderson, J.	1	1.33	Ferrari, R.	2	2.00
Narasimhan, R.	1	1.16	Atkinson, W.	2	2.00
			Lee, H.L.	1	1.50

Key: *Affiliation: 1 = Academic affiliation, 2 = Practitioner affiliation, * = published in both publications*

Of interest in Table 5.31 is that only one of the nine authors that published in both academic and practitioner publications during this period rated higher than the base 1.0 for productivity. Of the other eight authors, all were below 1.0 productivity rating for practitioner publications, while only one rated 1.0 within academic publications. Thus, their contributions are from a multi-authored perspective. Subsequently, the degree to which these authors can influence each publication's development of SCM is limited.

In comparison to the previous phase, this *growth* phase reveals that of the 19 practitioner-affiliated authors contributing to academic publications (n=137), only four are sole authors representing only 2.9% of the total academic articles. Whereas of the 45 academic-affiliated authors contributing to practitioner publications (n=147), 11 were sole authors representing

15.3% of the total practitioner articles during this phase. Table 5.32 provides details for the examination as to which community was more influential in the other community. When writing for their own publications each community has a higher percentage of productivity compared to affiliation, which is expected. Interestingly, academic-affiliated authors contributing to SCM development within practitioner publications produced 23.5% of the productivity, while practitioner-affiliated authors writing in academic publications produced only 6.9% of the productivity. Overall, academics influence SCM development within the practitioner publications to a greater degree than practitioners influence academic publications.

Table 5.32: *Synopsis of Productivity in the Pre-paradigmatic (Growth) Period*

	Academic Publications				***Practitioner Publications***				***Total***			
	% of Affiliation		***% of Productivity***		***% of Affiliation***		***% of Productivity***		***% of Affiliation***		***% of Productivity***	
	A	***P***	***A***	***P***	***A***	***P***	***A***	***P***	***A***	***P***	***A***	***P***
> 1.0	5.2	0.0	21.4	0.0	2.2	4.9	10.5	17.3	3.9	2.2	15.8	9.0
= 1.0	9.1	1.7	15.3	2.9	3.8	32.2	4.8	40.1	6.7	15.2	9.9	22.2
< 1.0	77.6	6.5	56.4	4.0	18.6	38.3	8.2	19.0	51.6	20.5	31.4	11.8
Total	91.8	8.2	93.1	6.9	24.6	75.4	23.5	76.5	62.2	37.8	57.1	42.9
	100		***100***		***100***		***100***		***100***		***100***	

Furthermore, compared with the previous *acceptance* phase Table 5.32 reveals that the split between academic and practitioner affiliations was nearly 80:20 with productivity being 75:25, by the *growth* phase the split is roughly 60:40 for both affiliation and productivity. Thus, there are indications of a decline in academic authorship and a rise in practitioner authorship. Of interest is the overall academic authorship and productivity rating between the two phases. First, academic contributions to SCM development have declined considerably by 16.2% and 17.8% respectively. Second, the productivity of those authors is not 1:1, in other words in terms of productivity ratings more authors are producing fewer articles. In comparison, practitioner authorship and productivity ratings reveal the opposite; that there has been an increase in practitioner contributions to SCM development between these phases.

(2) Normal Science Period: Figure 5.17 represents the affiliations of authors for academic and practitioner publications, including insight into the degree of multi-authored articles occurring over this period. In regards to practitioner publications, there has been a continuation of the decline in sole authorship articles by practitioner-affiliated authors witnessed in the previous phases of the *pre-paradigmatic* period. Interestingly, the sole-authorship of articles by academic-affiliated authors reflects stability over the same period. Within academic publications, there is stability across all forms of authorship.

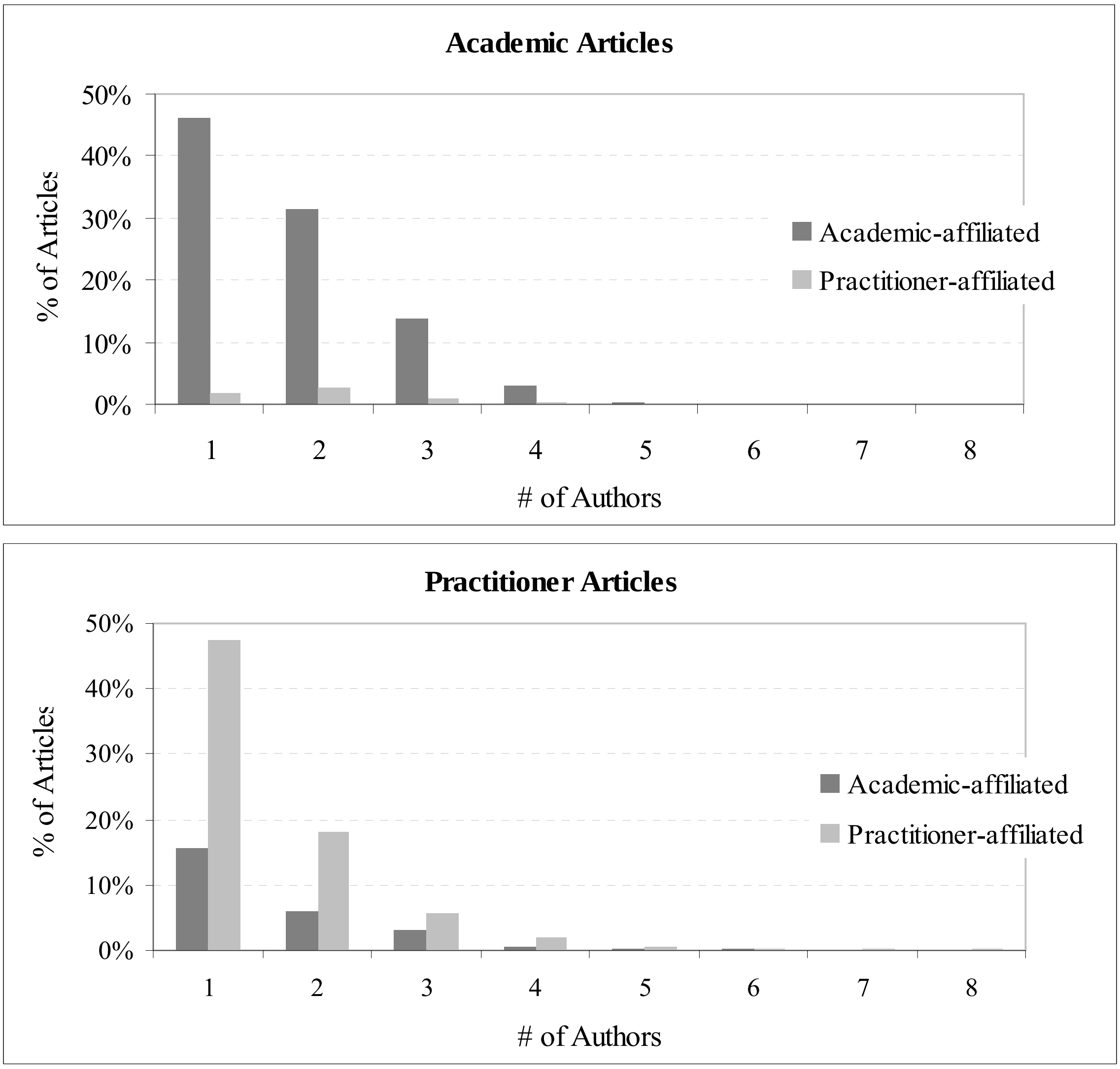

Figure 5.17: *Author Affiliation of Articles in the Normal Science Period*

Examination of the actual authors publishing during the *normal science* period reveals that there were 1,221 authors representing the total number of academic and practitioner authors, including double counting; of these, 53.4% (n=652) were from the academic publications and 46.6% (n=569) were from the practitioner publications. Of the total number of authors in this period, 927 unique authors were identified (i.e. excluding double counting), with 52.9% (n=490) authors being from the academic publications and 47.1% (n=437) authors from the practitioner publications. Thirty-two authors (31 academic-affiliated and one practitioner-affiliated) were identified as contributing to both academic and practitioner publications within this period.

Overall, there were 1.38 unique authors per article (n=669) during the *normal science* period, while specifically 1.57 authors wrote the academic articles (n=312) and 1.22 authors wrote the practitioner articles (n=357). Compared with the previous period these findings indicate that the shift towards sole authorship has continued, which is at odds with the authorship patterns presented in Figure 5.17. However, it must be remembered that the *normal science* period covers the greatest number of articles and authors. Subsequently, these findings may merely reflect a larger sample available for analysis, rather than a shift in actual authorship patterns. Determination as to whether an actual shift has occurred requires examination of the top-tier authors and productivity ratings of academic- and practitioner-affiliated authors.

Table 5.33 provides details as to the top-tier authors by productivity within academic and practitioner publications (articles written anonymously were excluded). Examination of the practitioner publications reveals that 68.1% of authors are practitioner-affiliated, while the most productive author is again an academic. No change occurs within academic publications, as the top-tier of authors are dominated by academic-affiliated authors. Compared with the previous *growth* phase the top-tier authors are considerably more productive and numerous in number, although caution is required as this period does cover the largest period. Of the 32 authors that contributed to both publications, only two generated more than the base 1.0 in productivity.

Table 5.33: *Top-tier Authors for Productivity in the Normal Science Period*

Academic Publication Authors	Affiliation	Productivity Rating	Practitioner Publication Authors	Affiliation	Productivity Rating
Svensson, G.	1	9.00	La Londe, B.J.	1	23.00
Carter, C.R.	1	4.00	Kerr, J.	2	7.00
Zsidisin, G.A.	1	3.33	Quinn, F.J.	2	6.25
Ellram, L.M. *	1	2.83	Cecere, L.	2	5.83
Ogden, J.A	1	2.58	Quinn, J.P.	2	5.00
Walters, D.	1	2.33	Kratz, L.A.	1	4.00
Knemeyer, A.M.	1	2.33	Trent, R.J. *	2	4.00
Rainbird, M.	1	2.33	Williams, L.R. *	1	3.50
Cavinato, J.L. *	1	2.25	Poirer, C.C.	2	3.00
Trent, R.J. *	1	2.00	Bharadwaj, S.	2	3.00
Tan, K.C.	1	2.00	Parker, B.	2	2.50
Murphy, P.R.	1	2.00	Hofman, D.	2	2.50
Keller, S.B.	1	1.99	Moody, P.E.	2	2.33
Talluri, S.	1	1.83	Spiegel, R.	2	2.00
Monczka, R.M. *	1	1.58	Sharman, G.J.	1	2.00
Zineldin, M.	1	1.50	Rizza, M.N.	2	2.00
Weber, M.M.	1	1.50	Mitchell, P.	2	2.00
Wagner, S.M.	1	1.50	Minahan, T.A.	2	2.00
Tibben-Lembke, R.S.	1	1.50	Lapide, L.	1	2.00
Prater, E.	1	1.50	Harris, M.E.	2	2.00
Large, R.O.	1	1.50	Gooley, T.B.	2	2.00
Handfield, R.B. *	1	1.50	Fontanella, J.J.	2	2.00
Halldorsson, A.	1	1.50	Burkett, M.J.	2	2.00
Gimenez, C.	1	1.50	Asgekar, V.	2	2.00
Sohal, A.S.	1	1.49	Aimi, G.	2	2.00
van Weele, A.J.	1	1.33	Reeve, J.M.	1	1.83
Towill, D.R. *	1	1.33	Closs, D.J. *	1	1.53
Skjoett-Larson, T.	1	1.33	Spector, R.E.	1	1.50
de Koster, R.B.M.	1	1.33	Sabath, R.E.	2	1.50
Jahre, M.	1	1.16	Patel, V.	2	1.50
Giunipero, L.C.	1	1.16	Norek, C.D.	2	1.50
Smaros, J.	1	1.08	Lieb, R.C. *	1	1.50
			Hagerty, J.	2	1.50
			Finley, F.	2	1.50
			Enslen, W.J.	2	1.50
			de Waart, D.	2	1.50
			Manrodt, K.B.	1	1.49
			Williams, A.J.	1	1.33
			O'Marah, K.	2	1.33
			Nelson, D.	2	1.33
			Mentzer, J.T. *	1	1.33
			Rudzki, R.A.	2	1.25
			MacEachem, D.	2	1.25
			Handfield, R.B. *	1	1.25
			Lambert, D.M.	1	1.20
			Vitasek, K.L.	2	1.16
			Rutner, S.M. *	1	1.16

Key: *Affiliation: 1 = Academic affiliation, 2 = Practitioner affiliation, * = published in both publications*

The productivity of academic- and practitioner-affiliated authors during the *normal science* period is provided in Table 5.34. As evident, there has been an increase from the previous *growth* phase of practitioners contributing to the academic publications (n= 312). Of the 34 practitioner authors not one produced higher than sole-authored articles, subsequently the overall productivity of practitioners contributing to academic publications is 4.6%. In comparison, of the 91 academic-affiliated authors contributing to practitioner publications (n=357), 29 were sole authors representing 3.9% of the productivity with the total contribution being 24.7%. Reflecting on whether the *normal science* period reveals a shift in authorship patterns, the findings suggest adherence to Kuhn's thoughts on disciplinary maturation, for stability of academic- and practitioner-affiliated authors as a percentage of combined affiliation in terms of productivity rating is evident.

Table 5.34: *Synopsis of Productivity in the Normal Science Period*

	Academic Publications				***Practitioner Publications***				***Total***			
	% of Affiliation		***% of Productivity***		***% of Affiliation***		***% of Productivity***		***% of Affiliation***		***% of Productivity***	
	A	***P***	***A***	***P***	***A***	***P***	***A***	***P***	***A***	***P***	***A***	***P***
> 1.0	6.7	0.0	27.6	0.0	3.4	7.3	13.6	21.9	5.2	3.5	20.1	11.7
= 1.0	10.0	0.4	15.7	0.6	3.2	23.8	3.9	29.1	6.8	11.4	9.4	15.8
< 1.0	76.3	6.5	52.1	4.0	14.2	48.1	7.1	24.3	47.0	26.1	28.1	14.8
Total	93.1	6.9	95.4	4.6	20.8	79.2	24.7	75.3	59.0	41.0	57.7	42.3
	100		***100***		***100***		***100***		***100***		***100***	

(3) Crisis Period: Figure 5.18 provides details as to the authorship patterns within this period. Compared with previous periods the graphs reveal consistency in academic authorship across both publications, however, of interest is that there are no practitioners as sole authors within academic publications and very few as co-authors. There may be several reasons for this. First, external pressure is being applied to academics globally to publish in leading journals as part of performance, promotional, and funding criteria. Such pressure may lessen the desirability of co-authoring with practitioner-affiliated authors. However, if that were the case then it would be expected that a similar decline would be evident in practitioner publications with academic-affiliated authors severely restricting their involvement in the authorship of practitioner articles as these would score lower on publishing rankings. This scenario is not evident in Figure 5.18.

A related and more probable reason revolves around this pressure on academics to publish. It has been common to read editorials in various academic journals on the sizeable increase in articles submitted for review over the past few years. As the pressure is on reviewers and editorial boards to maintain quality in the face of such an onslaught, it is common to see editors referring to such submission increases as being a positive move for their domain by indicating the popularity of the topical area (see for instance Carter & Ellram, 2009). However, such substantial increases in the number of submissions inevitably increases the time involved in the actual review and re-submit process. Academic researchers under pressure to increase their publishing records have no choice but to accept the lengthy process time involved, whereas practitioner-affiliated authors are under no such pressure. Thus, the decline in practitioner contributions may merely reflect the disincentive of undertaking such a lengthy submit-review process.

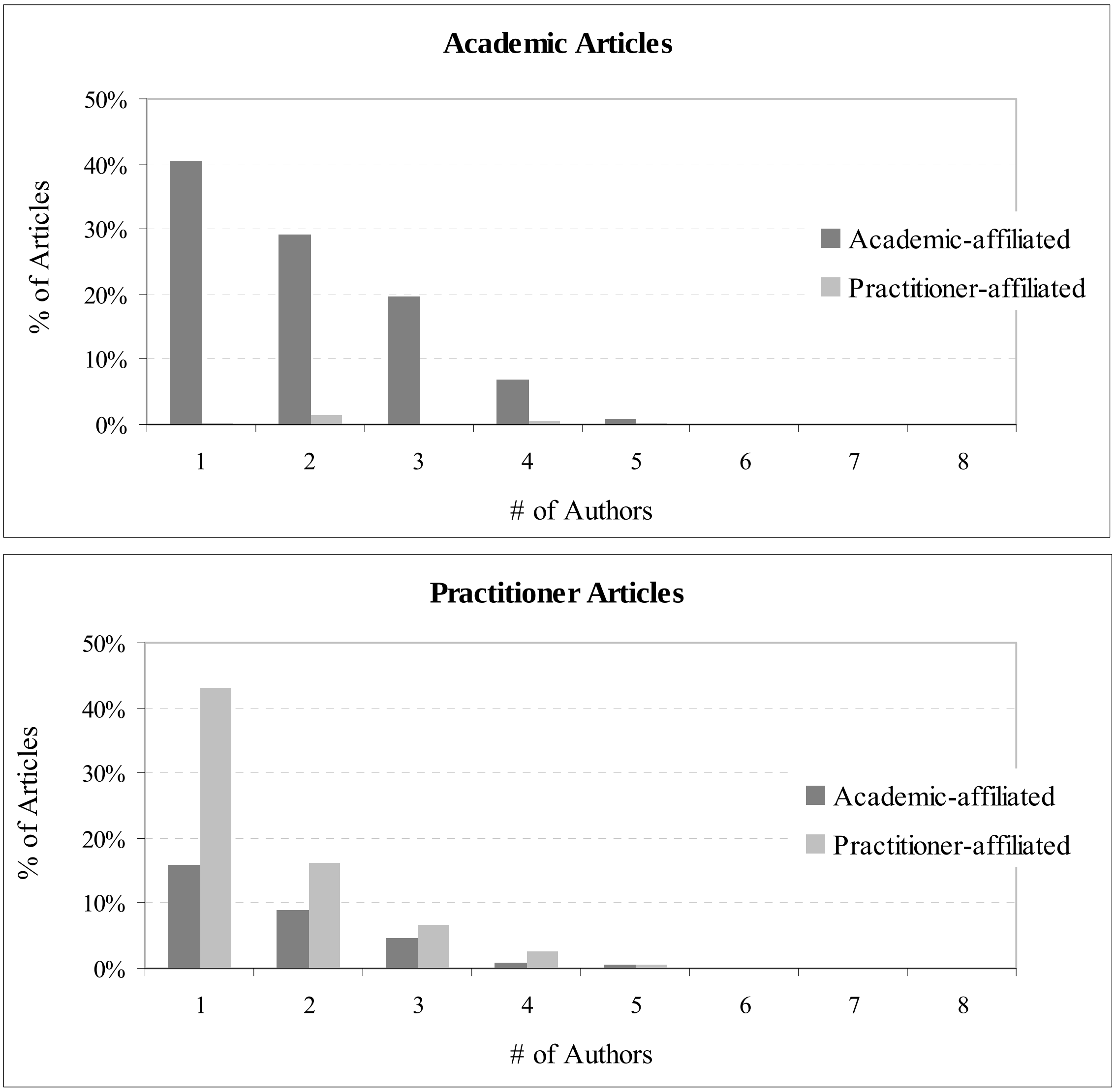

Figure 5.18: *Author Affiliation of Articles in the Crisis Period*

Examination as to the actual number of authors publishing during the *crisis* period reveals that there were 512 authors representing the total number of academic and practitioner authors, including double counting; of these, 57.7% (n=301) were from the academic publications and 42.3% (n=221) were from the practitioner publications. Of the total number of authors in this period, 456 unique authors were identified (i.e. excluding double counting), with 58.6% (n=267) authors being from the academic publications and 41.4% (n=189) authors from the practitioner publications. Of these unique authors, five (all academic-affiliated) were identified as contributing to both academic and practitioner publications. Overall, there were 1.80 unique authors per article (n=253), while specifically 2.17 authors wrote the academic articles (n=123) and 1.45 authors wrote the practitioner articles (n=130). These figures halt the trend identified in the past disciplinary periods, as the *crisis* period is indicating a shift to multi-authored articles with academics indicating the greatest change with a minimum of two authors for each article.

Analysis of Table 5.35 reveals that although an academic author again dominates the top-tier of productive authors within practitioner publications, a practitioner-affiliated author is a very close second. Furthermore, unlike the previous periods there are only two academic authors in the top-tier of authors as practitioners dominate with 80% of the rating, an increase of 11.9% from the previous period. No practitioner-affiliated authors are in the top-tier of authors within academic publications. Of the five authors identified as contributing to both publications during this period, not one reached a base productivity rating of 1.0.

Table 5.35: *Top-tier Authors for Productivity in the Crisis Period*

Academic Publication Authors	***Affiliation***	***Productivity Rating***	***Practitioner Publication Authors***	***Affiliation***	***Productivity Rating***
Carter, C.R.	1	3.99	Lapide, L.	1	8.00
Jonsson, P.	1	1.99	Kerr, J.	2	7.00
Mentzer, J.T.	1	1.50	Quinn, F.J.	2	3.33
Mattsson, S.A.	1	1.33	Kratz, L.A.	2	2.00
Min, H.	1	1.25	Francis, J.	2	2.00
			Hochman, M.	2	1.50
			Ericson, C.	2	1.50
			Davies, J.	2	1.50
			Rudzki, R.A.	1	1.33
			Tohamy, N.	2	1.33

Key: *Affiliation: 1 = Academic affiliation, 2 = Practitioner affiliation, * = published in both publications*

Table 5.36 provides details for the examination as to which community is more influential in the other community in terms of productivity. Examination of academic-affiliated authors contributing to SCM development within practitioner publications reveals that there has been a substantial increase from the previous *normal science* period of 9.9%, although their actual productivity has only increased by 3.2%. Interestingly, comparing the productivity with the previous period reveals that the increase is at the lower end of the rating, thus indicating that academic-affiliated authors are contributing from a multi-authored position, rather than as sole-authors. Furthermore, in terms of academic productivity within their own publications there is evidence of a massive decline by 11.6% in authors with ratings equal to and above 1.0, while productivity with the lowest rating of less than 1.0 has jumped by 14.4%; thus, reinforcing the shift by academic authors to multiple authorship. Overall, academic authors contribute to SCM development within academia and practice through collaboration with other authors with Figure 5.18 revealing that the preferred pattern of authorship being orientated around no more than three authors.

Table 5.36: *Synopsis of Productivity in the Crisis Period*

	Academic Publications				***Practitioner Publications***				***Total***			
	% of Affiliation		***% of Productivity***		***% of Affiliation***		***% of Productivity***		***% of Affiliation***		***% of Productivity***	
	A	***P***	***A***	***P***	***A***	***P***	***A***	***P***	***A***	***P***	***A***	***P***
> 1.0	1.9	0.0	8.2	0.0	1.1	4.2	7.2	15.5	1.5	1.8	7.7	8.0
= 1.0	10.9	0.0	23.5	0.0	4.8	22.2	6.9	32.3	8.3	9.2	15.0	16.6
< 1.0	84.3	3.0	66.5	1.8	24.9	42.9	13.8	24.3	59.6	19.5	39.4	13.4
Total	97.0	3.0	98.2	1.8	30.7	69.3	27.9	72.1	69.5	30.5	62.1	37.9
	100		***100***		***100***		***100***		***100***		***100***	

Examination of practitioner-affiliated authors contributing to SCM development (Table 5.36) within academic publications reveals that there has been a continuation of the decline evident over the past periods, with 3.0% of authors contributing a mere 1.8% of the productivity. This is a worrying trend, for despite potential reasons (such as the length of time involved), the implication is that practitioners are no longer active participants in the development of academic knowledge surrounding conceptualisation of SCM. Furthermore, within their practitioner publications there is evidence of a 9.9% drop in authorship affiliation, a positive sign is that fewer authors produced 3.2% more productivity. Overall, the findings of the *crisis* period follow Kuhn's theories in terms of change, with authors either participating in dialogue via greater contributions or via moving away into new unrelated areas of interest.

Interim Summary: It has been argued that publications play a strategic role in the development and dissemination of SCM knowledge (Fawcett et al., 1995), while authors play a role in the mitigation of the rigour-relevance divide through publishing in each genre. The quality of publications is of paramount concern in this mitigation process (Gibson et al., 2001; Menachof et al., 2009; Zsidisin et al., 2007), and thus utilisation of leading publications enables analysis of the authorship patterns within those publications. This section was concerned with determining the extent of the publishing activities of academics and practitioners in mitigating the rigour-relevance divide; consequently, analysis via scientometrics of authorship patterns over the disciplinary periods was undertaken.

If this research were examining author affiliation and productivity ratings only, the decline over time of practitioner involvement in publishing activities for both genres could be regarded as being due to the more competitive nature of the publishing process. That the academic realm has become more output-orientated would be perceived (by academics) as a positive step for developments within a discipline. However, this research holds as a primary concern the conceptualisation of SCM from both an academic and practitioner perspective in the formation and development of an SCM body of knowledge. Thus, this declining trend is viewed as being akin to a canary in a coalmine. Either practitioners are being muscled out of publishing (both in their own publications and academic) through the sheer volume of academic articles being submitted, and/or more worryingly practitioners regard the SCM concept as 'mature' in terms of its development, and as such see no value in offering their personal insight. These findings, in combination with the findings throughout this chapter viewed through Kuhn's theories as to disciplinary revolution, indicate that the second scenario is cause for concern.

5.4.3 Interim Summary

To mitigate inherent biases that limit knowledge accrual, disciplines should undertake periodic self-reviews of whether the status quo is still appropriate in providing effective analysis (Rungtusanatham et al., 2003). Hence, the standards that maintain quality require periodic review to ensure that they are fulfilling expectations.

Data analysis in this section was concerned with identifying the degree of quality within SCM from an academic and practitioner perspective. Two different approaches were analysed to provide a comprehensive understanding as to quality standards within SCM: rigour versus relevance, and authorship patterns of those attempting to mitigate procedural and conceptual differences to quality between academics and practitioners. Thus, this section employed scientometrics to address the core research question of:

- RQ(3): Are there sufficient indicators of quality in the SCM literature to signify it is a discipline?

Essentially, it was found that there is a serious threat of disconnect between addressing the real-world needs of practitioners, and the continued adherence to scientific norms by academics.

The findings of this section are not surprising. In fact, in part these findings were expected, however it is the magnitude of the threat they represent that is of concern. The gap between research and practice has been well documented in various disciplines, leading to questions as to how research can actually be implemented in practice (Dess & Markoczy, 2008). SCM is not alone in desiring to mitigate this gap, with various studies indicating the continued existence of a division (Gupta et al., 2006; Spens & Kovacs, 2006). Inevitably, the conclusion points towards a choice: Orientate around processes for rigour, or provide relevancy – do not attempt to address both, for inevitably critics will call for more of one or the other. Thus, individuals can mitigate the dichotic nature of this divide through their publishing activities, although this research found that academics publish in practitioner publications more than practitioners publish in academic ones.

Overall, in regards to providing an answer to the core research question of this section the indicators of quality that are evident signify the immaturity of SCM as a discipline. For a discipline has been defined as the common focus of scholars within a system of varied paradigms and theories (Fabian, 2000), thus the approaches to ensuring quality are part of that system. In terms of SCM, the domain is diverging along two approaches: Adherence to rigour via scientific norms and addressing real-world needs via relevancy. Until authors actively engage in the process of combining these two approaches amicably, their conflicting nature will continue the trend of bi-polarisation within SCM. The findings of this section of the analysis are summarised in Table 5.37.

Table 5.37: *Summary of Findings on the Degree of Quality within SCM*

Element	*Pre-Paradigmatic Period* — *Acceptance*	*Pre-Paradigmatic Period* — *Growth*	*Normal Science Period*	*Crisis Period*
Rigour vs. Relevance				
Academic	Adhere to rigour via research only (no theory/models offered in explanation of data)	Adhere to rigour via research only (no theory/models offered in explanation of data)	Adhere to rigour via combined research approach (no theory/models offered and indications of low levels of theory/models being offered to explain data)	Adhere to rigour via combined research approach (no theory/models offered and rising indication of theory/models being offered to explain data)
Practitioner	Address topics of relevance via conceptual discussions and case studies	Address topics of relevance via conceptual discussions and case studies	Address topics of relevance via conceptual discussions and case studies	Address topics of relevance via conceptual discussions
Authorship Patterns				
Author Affiliation				
Academic	80.2% of unique authors are academic	55.9% of unique authors are academic	52.9% of unique authors are academic	58.6% of unique authors are academic
Practitioner	19.8% of unique authors are practitioner	44.1% of unique authors are practitioner	47.1% of unique authors are practitioner	41.4% of unique authors are practitioner
Author Productivity				
Academic	1.82 authors writing academic articles, practitioners contribute 7.0% to productivity	1.69 authors writing academic articles, practitioners contribute 6.9% to productivity	1.57 authors writing academic articles, practitioners contribute 4.6% to productivity	2.17 authors writing academic articles, practitioners contribute 1.8% to productivity
Practitioner	1.27 authors writing articles, academics contribute 23.6% to productivity	1.24 authors writing articles, academics contribute 23.5% to productivity	1.22 authors writing articles, academics contribute 24.7% to productivity	1.45 authors writing articles, academics contribute 27.9% to productivity

5.5 Summary

Essentially, this chapter was tasked with analysing the body of data collected. The epistemological and ontological positioning of pragmatism enabled the analysis to be undertaken from a position of fusion, rather than division; thus, quantitative data informed the qualitative data and vice versa. The systematic reprocessing of SCM literature via categorisation into specific elements of interest enabled the parties involved – academia and practice – to participate equally in determination of SCM's disciplinary identity. Consequently, this research is unique as it is the first to study practitioner perspectives as to the disciplinary identity of SCM, and compare such conceptualisations with academia.

As per the quotation by Wenger et al. (2002) at the beginning of this chapter, understandings as to a discipline's identity and its body of knowledge specifically, is only enabled via the interweaving of all threads that contribute to its formation. Consequently, this chapter addressed the primary objective of this thesis:

- RO: To determine the degree to which academics and practitioners differ in their conceptualisation of SCM, and how these conceptualisations evolved over time.

To facilitate answering the objective, a disciplinary analysis framework was developed through the interweaving of Fabian's disciplinary analysis criteria and Kuhn's theories as to disciplinary evolution. The analysis framework provided a foundation for the discussions in this chapter. A vital first step in the analysis process was the differentiation of major periods of change, although it was cautioned that basing such distinct periods on mere article activity rates was ignorant of their content, and thus a potential limiting factor in subsequent analytical discussions. With this in mind, analysis of Fabian's three criteria was undertaken through comparisons of academic and practitioner texts. The analytical process for each criteria identified distinct threads of evolution within both academia and practice, thus the caution while justifiable was unwarranted.

Specifically, each of Fabian's criteria were analysed to determine whether sufficient indicators of coherence, a unified body of knowledge, and quality existed within the texts to signify whether SCM was a discipline or not. Table 5.38 provides a summarised overview of academic and practitioner conceptualisations in regards to SCM's identity. Overall, the analytical processes undertaken throughout this chapter reveal a divided domain. It is argued that given that SCM has at its core the principle of integration, such separation speaks of a deeply seated division in the discourse between academia and practice. Thus, a synthetic reality is evident that this thesis has challenged systematically. Attention now turns to reflecting on the overall research in the following chapter.

Table 5.38: *Summary of Academic and Practitioner Findings*

Element	***Pre-Paradigmatic Period***		***Normal Science Period***	***Crisis Period***
	Acceptance	***Growth***		
Coherence				
Academic	Focus on the supply chain	Integration of supply processes in the supply chain	Integration of supply processes in the supply chain	Integration and management of logistics in the supply chain to add value
Practitioner	Coordination of logistics channel	Integration of networks in the supply chain	Integration of business processes to add value in the supply chain	Integration of networks for value creation in SCM
Knowledge				
Academic	Develop knowledge on supply and logistics performance, SCM is a system-centric process	Develop knowledge on supply and logistics integration, SCM is a system of related system-centric processes	Develop knowledge on integrating supply and logistics for performance, SCM is a system-centric process	Develop knowledge on integrating supply and logistics for performance, SCM is a system-centric process
Practitioner	Develop knowledge on IT integration for performance, SCM is a system of related system-centric processes	Develop knowledge on IT integration for performance, SCM is a system of related system-centric processes	Develop knowledge on logistics integration and supply chain performance, SCM is a system of related system-centric processes	Develop knowledge on supply chain integration for performance, SCM is a system of related system-centric processes
Quality				
Academic	Adherence to rigour, low-level contributions from practice	Adherence to rigour, low-level contributions from practice	Adherence to rigour, very low-level contributions from practice	Adherence to rigour, virtually no contributions from practice
Practitioner	Adherence to relevance, a quarter of contributions are from academia	Adherence to relevance, a quarter of contributions are from academia	Adherence to relevance, a quarter of contributions are from academia	Adherence to relevance, a third of contributions are from academia

Chapter Six: Reflecting on the Disciplinary Identity of Supply Chain Management

The Blind Men and the Elephant: *From John Godfrey Saxe (1816-1887) in Linton, William James, (1878) Poetry of America: Selections from One Hundred American Poets from 1776 to 1876, pp. 150-152.*

It was six men of Indostan to learning much inclined, who went to see the Elephant, (though all of them were blind). That each by observation might satisfy his mind.

The First approached the Elephant, and happening to fall against his broad and sturdy side, at once began to bawl: "God bless me! but the Elephant is very like a wall!"

The Second, feeling of the tusk, cried, "Ho! what have we here so very round and smooth and sharp? To me 'tis mighty clear this wonder of an Elephant is very like a spear!"

The Third approached the animal, and happening to take the squirming trunk within his hands, thus boldly up and spake: "I see," quoth he, "the Elephant is very like a snake!"

The Fourth reached out an eager hand, and felt about the knee. "What most this wondrous beast is like is mighty plain," quoth he; "'Tis clear enough the Elephant is very like a tree!"

The Fifth, who chanced to touch the ear, said: "E'en the blindest man can tell what this resembles most; deny the fact who can this marvel of an Elephant is very like a fan!"

The Sixth no sooner had begun about the beast to grope, than, seizing on the swinging tail that fell within his scope, "I see," quoth he, "the Elephant is very like a rope!"

And so these men of Indostan disputed loud and long, each in his own opinion exceeding stiff and strong, though each was partly in the right, and all were in the wrong!

Moral: So oft in theologic wars, the disputants, I ween, rail on in utter ignorance of what each other mean, and prate about an Elephant not one of them has seen.

This famous poem about the blind men of Indostan and their interpretation of the elephant constitutes a warning of how easy it is to misinterpret the entirety of something (for instance an elephant) based on the investigations of a few specific elements (such as the trunk, knees, and tail), providing insight into the tension surrounding the disciplinary identity of SCM. Chapter One discussed how previous studies focused solely on two areas in the formation of SCM's identity: the application of various sub-elements of Fabian's coherence and quality criteria, and querying the academic conceptualisations. This thesis argues that failure to investigate the entirety of SCM via inclusion of Fabian's knowledge criterion, while ignoring practitioner conceptualisations, imposes a self-limiting force on SCM's development. Consequently, just like the blind men of Indostan arguing as to what constitutes an elephant, considerable debate is evident within the SCM and OM literatures as to what actually constitutes SCM; although each argument contributes to understanding, each also contributes to confusion. Accordingly, in order to visualise and understand the entire 'elephant' (in this instance SCM) a coordinated and integrated investigation of the component elements and their relationships was required.

To that end, the primary research objective throughout this thesis has been to address how academics and practitioners differ in their conceptualisations of SCM, and how these conceptualisations have evolved over time in the determination of SCM as a discipline, as a domain of practice, or as a holistic entity. Addressing such an objective has resulted in unique research that stands alone in its operationalisation, for the discourse of practice has not previously been studied and compared with the discourse of academia in the determination of SCM's identity. Consequently, this thesis provides a rare opportunity to gain a holistic insight into SCM's identity from a perspective not previously considered.

The utilisation of retrospective analysis enables the intellectual core of SCM to be rendered visible through the distillation of academic and practitioner contributions, which inter-weave in the formation of SCM's identity. Order was brought to the chaos of threads that form the tapestry of SCM through the formalisation of the disciplinary analysis framework in Chapter Three, its operationalisation in Chapter Four, and its analysis in Chapter Five. This final chapter is where the threads culminate in a coherent depiction of the SCM tapestry through reflecting on this research. Comprising four core sections (see Figure 6.1), this chapter first addresses the core research questions introduced in Chapter One (Section 6.1), subsequently discusses the specific contributions that this research offers academia and practice (Section 6.2), considers limitations of the research (Section 6.3), and then provides closing comments on future directions for SCM (Section 6.4).

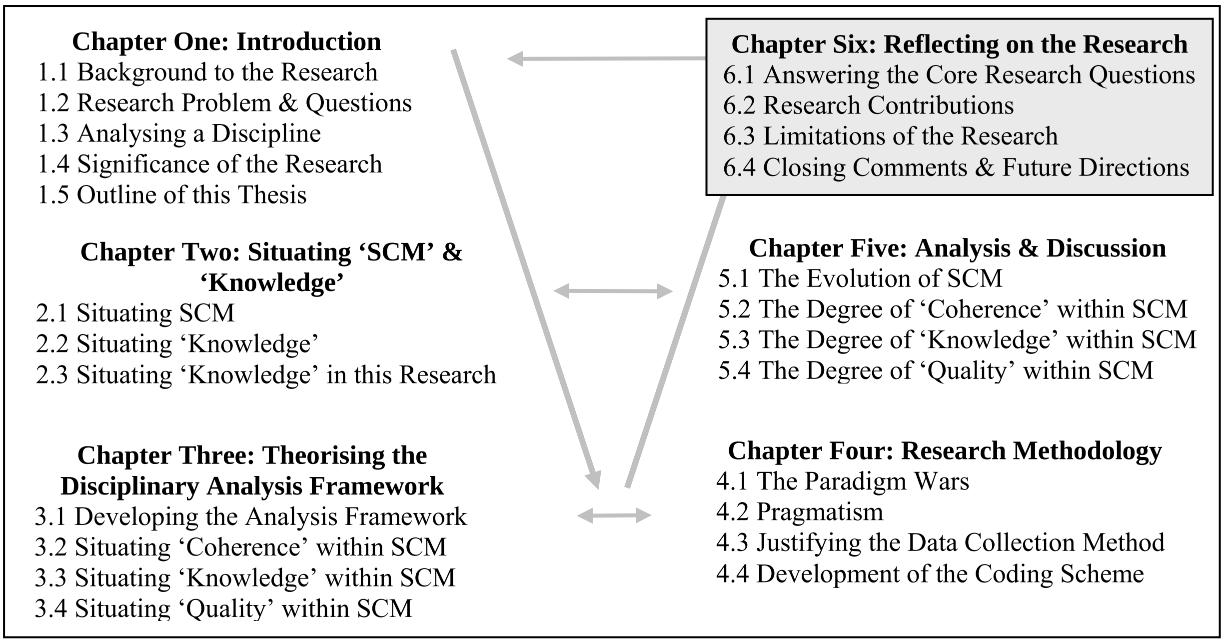

Figure 6.1: *Structure of Thesis Featuring Chapter Six*

6.1 Answering the Core Research Questions

In part, this thesis is an answer to the concerns of Harland et al. (2006) who, as stated at the beginning of Chapter One, queried whether calling a field a discipline or not affected subsequent research efforts, identities, policy-making, and investment decisions made by academics and professionals. Acknowledgement was made within Chapter One that although there is ready acceptance of designating SCM as a discipline, few studies actually query whether it is or not. There is an emphasis on labelling SCM as an ‘emerging discipline’ (Harland et al., 2006; Kouvelis et al., 2006), rather than attempting to ascertain its ‘true’ disciplinary identity (Giannakis & Croom, 2004; Ho et al., 2002). In addition, only academic conceptualisations are sought, while practitioner conceptualisations are overlooked; this was argued to be short-sighted of academia. Consequently, this research was dedicated to addressing this oversight through endeavouring to investigate both perspectives that combine to form SCM’s identity. The research objective was formulated as:

- To determine the degree to which academics and practitioners differ in their conceptualisations of SCM, and how these conceptualisations have evolved over time.

To facilitate investigations, an amalgamation of two approaches was employed: Fabian’s disciplinary analysis criteria (enabling the characteristics of a discipline to be investigated holistically), and Kuhn’s theories on disciplinary evolution (providing distinct periods as the basis for analysis).

The purpose of this section is to reflect on the research by resolving the three core research questions, formulated in Chapter One, that epitomise the characteristics of a discipline as theorised by Fabian. This reflection permits the lived reality of academia to fuse with the lived reality of practice, thereby allowing SCM’s complexity to be unravelled in a manner conducive to ascertaining its true nature; thus, the entirety of the ‘elephant’ is expressed holistically.

6.1.1 ‘Coherence’ within Supply Chain Management

The first core research question addressed Fabian’s (2000) criterion (a) and the degree of emphasis placed on paradigm inclusion (in other words, the level of coherence evident). It was formulated as:

- RQ(1): Are there sufficient indicators of coherence in the SCM literature to signify it is a discipline?

In order to reach an answer, it was necessary to refine the question of ‘coherence’. Through canvassing the literature, three specific elements of dissension were identifiable. Consequently, 1,371 academic and practitioner articles were analysed in terms of (1) their utilisation of an SCM definition, (2) the exact terminology used to depict SCM, and (3) their approach to the theoretical development of SCM.

First, in terms of an SCM definition, the disparity between academia and practice highlighted a fundamental difference in approach to conceptualising SCM. Across all disciplinary periods, academics operated from a fractured and diverse conceptualisation, which resulted in ongoing debate due to conflicting perspectives. By contrast, across all disciplinary periods practitioners orientated around similar themes and through doing so formed a unified conceptualisation of SCM. Interestingly, within the academic data the transition of definitions over the 11-year period corresponded with Kuhn’s theorisations on the evolutionary path of a discipline. Hence, academia transitioned through fragmentation, consolidation, and then fragmentation, with the final disintegration being an early indicator of an approaching paradigm shift within SCM. The clear evolutionary path theorised by Kuhn was not detectable within practice; instead, the steady decline in the offering of definitions pointed towards early consensus and an accepted unifying conceptualisation.

Second, the above disparity between academia and practice was not evident in regards to terminology utilisation; both academia and practice strongly preferred the founding term of ‘supply chain’ rather than that of ‘supply chain management’. This preference indicates that the tactical process-orientated concept of the ‘supply chain’ has an enduring appeal for both academia and practice, irrespective of the disciplinary period analysed. In terms of Kuhn’s theorisations and in relation to the utilisation of alternative terminology, evolutionary aspects were evident; however, this ‘evolution’ should be treated with caution due to the overwhelming preference for the term ‘supply chain’. Overall, these findings support earlier research in regards to terminology use by practitioners (Fawcett & Magnan, 2002), with the term ‘supply chain management’ merely being the rebadging of the earlier ‘supply chain’ concept (New, 1996).

The third and final element of interest, in terms of ascertaining the sufficiency of indicators of coherence, concerned SCM’s theoretical development. Disparity was anticipated due to the natural inclination of academia to expand theoretical horizons via testing, while practice would focus on implementation issues and consequently utilise a more descriptive formalisation. Surprisingly, consensus between academia and practice was evident, with close examination revealing a worrisome trend. Analysis across all periods identified that both academia and practice focused almost exclusively on simplistic descriptions in terms of SCM's development, rather than on sophisticated theory validation techniques. Consequently, the results from this section support earlier findings (see for example Handfield & Melnyk, 1998) where SCM is firmly entrenched within the lower order strategies of 'discovery' and 'description'. This may be due to the origins of the actual theories utilised within SCM.

As discussed in Chapter Three, it is commonplace to 'borrow' theory from other disciplines to facilitate understanding of various SCM processes and issues (Essig & Arnold, 2001; Zsidisin & Siferd, 2001). However, as Lakatos (1970) stated, this merely expands the 'protection belt' around the domain without actually refining it through the process of testing and retesting. Externally developed theory lacks the required contextual background to enable successful application to SCM. Thus, while there was the expectation that practice would utilise a more simplistic theorisation, it was also expected that academia would have transitioned beyond the mere descriptive phases in the theorising of SCM, to phases that focused on more sophisticated theoretical testing techniques. This research discovered no indications that evolutionary development (as theorised by Kuhn) occurred in terms of the theoretical development of SCM.

Overall, the elements examined in addressing the degree of coherence within SCM depicted the existence of a fragmented discourse, with a focus on boundary maintenance procedures as academics and practitioners reflected their own perceptual approaches to operationalising SCM. Given that SCM is targeted at integration, the findings constitute a warning to all stakeholders regarding SCM's boundary, as well as its differentiation from other, more established disciplines. Consolidation around a core set of SCM characteristics would enable the future development of SCM from a platform of consensus; in part, such consolidation was evident within practice, but not within academia. These findings lead to the conclusion that there are insufficient indicators of coherence present within SCM to signify that it constitutes a discipline. Instead, based on analysis of the three elements within the disciplinary characteristic of coherence, SCM constitutes a domain of practice.

6.1.2 'Knowledge' within Supply Chain Management

The second core research question addressed Fabian's (2000) criterion (b) and the impetus for new research (in a generic sense). Knowledge develops through research; Fabian's focus here is on whether that knowledge focuses on broadening or deepening understanding. Subsequently, the second core research question was formulated as:

- RQ(2): Are there sufficient indicators of a unified body of knowledge in the SCM literature to signify it is a discipline?

This question was addressed by examining popular perceptions regarding the concept of knowledge. Canvassing the knowledge-based literature in Chapter Two produced a thorough understanding as to how knowledge develops, how it has been historically philosophised, and how it is regarded in the modern era. Expanding on these discussions, Section 3.3 contradicted popular sentiment (see for instance Harland et al., 2006) to argue that it was indeed possible to ascertain SCM's body of knowledge. Consequently, the 1,371 selected articles were analysed in terms of their breadth and depth of knowledge, along with the conceptual framing of that knowledge.

In terms of the breadth of SCM knowledge, academia consistently focused on expanding knowledge concerning the functional areas of supply and logistics across all disciplinary periods, while practice emphasised expanding knowledge about SCM's integrative abilities across all periods. As such, both communities reflected their own individualistic needs when expanding their SCM body of knowledge: For academia, this meant the repackaging of purchasing and logistics, while for practice it was the desire to apply more structured coordination activities throughout the supply chain. Thus, these results support earlier findings which stated that SCM would become merely an extension of a core function (Ho et al., 2002) rather than a discipline in its own right.

To test the legitimacy of the above claim, two construct lists were utilised in the examination of the depth of SCM knowledge. For academia, the supply-logistics focus reflected the domination of constructs orientated around the buyer-supplier relationship. By contrast, the dominance of IT to facilitate integrative capabilities highlighted the influence on practice of technology developments over the 11-year period. This continued disparity between academia and practice indicated that in reality two separate bodies of SCM knowledge were in existence. Hence, academia operated from a limited conceptualisation of SCM in terms of building knowledge, while practitioners adapted to external stimuli (for instance, rapid developments in information technology) to constantly refine their body of knowledge.

This discrepancy between academia and practice suggests a fundamental disconnect between what SCM is believed to be, and what occurs in reality. To that end, examination of the people-centric and system-centric constructs revealed that although academia implies that SCM be orientated around people-centric aspects (for instance, building strong buyer-supplier relationships), their lived reality indicated the dominance of system-centric constructs. In comparison, practice consistently advocated the system-centric aspects of SCM, and thus their lived reality was one of utilising information technologies for their integrative capabilities. Consequently, the findings were supported by earlier studies where it was identified that SCM, although advocating an orientation around people-centric aspects, is in reality a system-centric concept (Burgess et al., 2006).

The other element of interest, in terms of ascertaining whether there were sufficient indicators of a unified body of knowledge within SCM, concerned the conceptual framing of knowledge. The term 'supply chain management' suggested that the conceptual framing of SCM should be at the process level (a chain of related activities). Half of academia (48%) did conceptually frame SCM at that level. Interestingly, a clear evolution was evident across the disciplinary periods, with academia situating SCM conceptually as a 'process to be undertaken', then 'as a sophisticated system', before returning to 'SCM as a process'. The discrepancy between academia and practice, witnessed in the preceding sections, was strongly evident in these findings. The majority of practice (76%) utilised a more sophisticated framing of SCM than did academia, with SCM being a 'system of related processes and networks'. Thus, practice maintained the theme evident in previous sections: that of integration through a preference for system-centric approaches.

An integrated thread of thought influences the perspectives of academia and practice, leading to the potential for a unified body of knowledge. The discursive practice that academics and practitioners operated within, through participation and conformation to each community's social norms, influenced their respective specialist knowledge (Harre & Gillett, 1994). It was argued that two bodies of knowledge exist that share enough characteristics to enable effective communication. However, at its core SCM advocates the principle of integration; these findings serve as a warning regarding the possibility of a continuing divergence between the knowledge bases of academia and practice. There are at present insufficient indicators of a unified body of knowledge within SCM to signify that it constitutes a discipline. Instead, based on this disciplinary characteristic, SCM constitutes a domain of practice while simultaneously presenting as an emerging discipline that requires further consolidation around a core knowledge base.

6.1.3 'Quality' within Supply Chain Management

The final core research question addressed Fabian's (2000) criterion (c) and the examination of the system of validation utilised within a domain to ensure quality research and discussion. It was formulated as:

- RQ(3): Are there sufficient indicators of quality in the SCM literature to signify it is a discipline?

This question was addressed by refining the notion of 'quality' by querying the perceptions of quality held within the SCM literature. Two specific elements surfaced as the basis of the analysis of the 1,371 articles: adherence to criteria that ensure rigour or relevance, and the publishing activities of authors.

In terms of adherence to rigour or relevance as the system of validation, there was the expectation that the findings would reflect the inherent nature of academia and practice. Consequently, it was expected that academia would engage with practice as to their real-world conceptualisations of SCM (during the *pre-paradigmatic* period), while adherence to standards of rigour would dominate by the *crisis* period. In general, these findings were indicative of trends identified in other studies, where the early periods are one of promoting relevance before a sea-change occurs within academia, and quality is measured via adherence to standards that ensure rigour (see for instance Gupta et al., 2006; Spens & Kovacs, 2006; Williams & Oumlil, 1987). In comparison, the findings for practice should reflect the real-world operational capabilities of SCM phenomena due to their interest in the practical ramifications of implementing SCM. Although these findings surrounding adherence to rigour or relevance were expected, caution is required. There is a very real threat of disconnect occurring within academia as research systems reinforce the status quo, resulting in a dichotomy between rigour and relevance. This threat of a closed-loop research system is well documented (Vermeulen, 2007); however, the desire by academics to legitimise SCM as a discipline via adherence to scientific norms risks continued separation from the real-world conceptualisations of practice.

The second and final element of interest, in terms of ascertaining whether there were sufficient indicators of quality within SCM, revolved around the publishing activities of authors. Employing scientometrics to aid analysis, an in-depth investigation of the authorship data captured from the articles indicated that during the *pre-paradigmatic* period authors were operating under the guise of explorers and contributing to both streams of publication. Hence, Kuhn's theorisation of researchers (both academia and practice) operating under the persona of explorers was supported, as such author crossover facilitates knowledge development and expansion through exploration. However, the *normal science* and *crisis* periods were characterised by falling contributions from practice to the academic publications, representing a severe reduction in their involvement in the forming of an academic conceptualisation of SCM. Furthermore, the academic contributions to their own publications and those of practice signified a sea-change to an orientation focused purely on publishing articles rather than making substantial contributions to conceptual development of the field.

Although academia as a whole could view the increased output of articles as support for SCM emerging as a discipline, the domineering nature of such a purely article-output focus is representative of a canary in a coalmine. Two possible scenarios may explain this finding. First, the academic 'publish at all costs' approach severely restricts practitioner input (in both academic- and practice-orientated publications) and thus acts as a limitation to SCM development from an alternative conceptualisation. Second, the decline in practitioner involvement via article contributions to the SCM academic literature is indicative of a conceptualisation that perceives the SCM concept as being 'mature' in terms of its development, and hence there is no value in offering further insight for its continued advancement. Subsequently, as per Kuhn's theorisations, SCM is at a crossroads where revolution towards a new form is likely.

Overall, in terms of quality it was identified that there is a serious threat of disconnect between academia and practice, as the real-world needs of practice clash with academics' continued adherence to scientific norms. Although this threat is well documented within the academic literature (Dess & Markoczy, 2008; Gupta et al., 2006; Spens & Kovacs, 2006), the development of effective strategies to mitigate its effects has not occurred. Within the bounds of this research, SCM texts were identified to be diverging through adhering to norms that ensure either rigour or relevancy (not both simultaneously). Therefore, it was suggested that authors should actively engage in processes that amicably combine these two approaches, otherwise their conflicting nature would continue a trend of bi-polarisation within SCM. Consequently, it is logical to conclude that there are insufficient indicators of a cohesive system of validation to signify that SCM constitutes a discipline. Instead, based on this disciplinary characteristic, SCM constitutes two separate domains: One orientated on criteria relevant to practice, the other focused on perpetuating scientific norms that ensure rigour irrespective of the long-term consequences.

This thesis has been concerned with one core issue throughout: Does SCM constitute a discipline? As the summarised results show, no it does not. SCM instead constitutes a domain of practice (the implications of which are discussed in section 6.4).

6.2 Research Contributions

Throughout this thesis, it has been the belief of this author that advancements within a domain can only occur through a constant challenging of existing assumptions. This thesis challenges current SCM discourse through mapping its conceptualisations from two disparate perspectives: academia and practice. The findings indicate the existence of a fundamental disconnect between the perspectives, threatening the underlying premise of SCM, integration. Consequently, there are numerous implications from this research that are significant, especially for academia.

6.2.1 Implications for Academia

The analysis presented in Chapter Five highlighted the fragmented nature of SCM, especially the fragmentation that was evident within the academic conceptualisations of SCM. Consequently, the research depicted in this thesis is of greater benefit for the community of academia, especially those academics operating within the realm of SCM.

This research employed an alternative lens to investigate SCM, namely the paradigm of pragmatism. Pragmatism has an inherent ability to mix quantitative and qualitative assumptions as required throughout a study's life. Its bi-focal lens enables microscopic as well as macroscopic details to be ascertained simultaneously, while its ability to link action and truth through a firm belief that theoretical models are not for mere contemplation purposes only, provides academia with a crucial tool for mitigating the disconnect identified with practice. Pragmatism espouses a worldview of fusion, rather than division (Denscombe, 2008; Johnson et al., 2007; Maxcy, 2003; Tashakkori & Teddlie, 1998). Consequently, within the bounds of this thesis, pragmatism provides a living example of the fusion required for the continuation of SCM as a viable field of interest.

The disciplinary analysis framework utilised in this thesis provides a systematic approach for other domains contemplating their own disciplinary identity. The framework combined

Fabian's three disciplinary analysis criteria with Kuhn's theorisations of disciplinary evolution (from the *pre-paradigmatic* period, to the *normal science* period, to the *crisis* period). This research is the first known example of the application of Fabian's criteria to SCM, and indeed to any domain contemplating its identity. Kuhn's theorisations provide the academic community with the benefit of understanding how and why a domain (whether officially recognised as a discipline, or just believed to be) evolves, allowing the revolutionary nature of the forces affecting a domain to be recognised for what they are: a simultaneous process of destruction and construction. Such change should not be viewed in a negative light, but instead embraced due to the possibilities provided; while few acknowledge the positive (Argyris & Schon, 1996; Baldridge et al., 2004; Tsoukas & Cummings, 1997), many exhort the negative (Carter, 2008a, 2008b; Mentzer, 2008; Reed, 2009; Storey et al., 2006; Vermeulen, 2007).

Furthermore, the framework enables the individual conceptualisations of academia and practice to be systematically analysed as to their involvement in the development of SCM's body of knowledge. There are certainly improvements that could be made to this framework through addressing a wider variety of sub-elements of Fabian's criteria (coherence, knowledge, and quality). The framework's application within the scope of this thesis highlighted its ability to examine the conceptualisations of academia and practice simultaneously in identification of SCM's definition, terminology, theoretical development, breadth and depth of knowledge, its conceptual framing, rigour or relevance focus of articles, and authorship patterns. As such, significant depth of detail was attained for the purposes of this research, and in doing so, addresses the concerns of Harland et al. (2006) outlined in Chapter One.

This thesis employed a data collection method not commonly considered in the examination of SCM, that of content analysis. Thus, this thesis is one of the few existing pieces of research that highlight the effectiveness of this method; it certainly is the most comprehensive example of content analysis application in the SCM context. Chapter Four revealed that a limited number of studies employed content analysis to investigate SCM. As the discussions revealed, and as Figure 4.5 illustrated, very few studies applied the method to ascertain elements of SCM's disciplinary identity, while Appendix 3 highlighted the particulars of several OM studies that had successfully utilised the method. Close examination of these combined studies revealed that quite frequently there was limited information provided in terms of actually applying content analysis, especially in terms of ensuring reliability and validity (two exceptions were identified: Spens & Kovacs, 2006; Tangpong, 2010). Subsequently, the depth of detail provided in this thesis as to the actual processes involved in the successful application of content analysis serves as a guide for future studies, whether these are within the bounds of the SCM context or not.

The research discussed in this thesis provides a comprehensive depiction of the characterisations of SCM via two perspectives. Consequently, this research challenges the synthetic reality that academia operates within through offering an alternative perspective in the conceptualisation of SCM: the perspective of practice. In general, this thesis furthers the debate surrounding SCM's potential as a standalone scientific discipline. Specifically, the findings decree that regarding SCM as a legitimate discipline, even one argued to be in the process of maturing, is an erroneous assumption. Accordingly, this research enables the questioning of the fundamental assumptions held by academia in terms of SCM's identity from the perspective of practice. It thus serves as a warning to other domains questioning their identity as a discipline or as a domain of practice: that underlying assumptions limit constructive dialogue regarding a domain's identity, and thus adherence to the status quo negatively impacts on the legitimacy of a domain to be a discipline.

Finally, on a much broader scale, the discussions within Chapter Two addressed the flawed thinking within academic literature that due to its complex philosophical nature knowledge is a difficult concept to address within a study. There has even been the suggestion that addressing knowledge in any detail is an unnecessary condition for research (Grant, 1996b). As the discussions in Section 2.2 highlighted, there is a fundamental requirement to address knowledge's contextual complexities before implementing a research programme. Section 2.3 highlighted the application of knowledge to this research through illustrating how the discursive practice that individuals are part of underlies what they know. The message for academics is that their community, and that of practice, both approach 'knowledge' via an orientation around their own particular discourse. Failure to perceive how an individual develops and attains knowledge is an inhibitor to meaningful research. Thus, there is a popular belief within the academic literature that knowledge has a physical element to it, and thus is a resource able to be moved, stored, transferred, and traded (Grant, 1996a; Kalling & Styhre, 2003; Nonaka & Takeuchi, 1995; Suddaby & Greenwood, 2001). Belittling such a complex philosophical concept through reductionism limits researchers to mediocre comprehension.

6.2.2 Implications for Practice

Nevertheless, what does all this mean for practice? The research discussed within this thesis, from its processes through to its justifications, will be of little practical use to those at the coalface of SCM development and implementation. Similar sentiments are acknowledged in the academic literature (Taylor & Taylor, 2009). However, the implications of the findings should raise concern, for they speak of a fundamental disconnect between those who do and those who (supposedly) theorise. Consequently, this thesis is a first step in acknowledging the contributions from practice in the development of SCM.

This thesis supports practice in the ‘stamping’ of their perceptions, experiences, and thoughts from an operational position, onto the conceptualisations of SCM that are held by academia. In general, the thesis provides evidence as to the consequences that can result from a diverging domain in terms of a lack of coherence, separate bodies of knowledge, and alternative views of what constitutes quality. Accordingly, this research legitimises the contributions from practice in the ongoing development of SCM.

It has been readily apparent throughout this research that the base concept of the ‘supply chain’ is what practice is actually undertaking, although they utilise the term ‘supply chain management’. Such findings are indicative of organisations focusing on the fundamentals in their operations: logistics and purchasing. These findings are supported by the earlier work of Fawcett and Magnan (2002), who stated that although practitioners might adopt the term ‘SCM’, they would not change their underlying operations. Such sentiments were evident at the dawn of SCM, with New (1996) stating that SCM is merely a buzzword for logistics and as such is purely a rebadging of the originating concepts. Consequently, practice should ‘return’ to undertaking the basics of good operating processes, rather than be concerned with the latest ‘flavour of the month’ advocated by academia.

6.3 Limitations of the Research

Although this research was undertaken in a manner that ensures legitimacy via the application of systematic processes throughout its operationalisation (these were discussed extensively throughout Chapter Four), limitations exist that should be acknowledged.

First, the disciplinary analysis framework theorised in Chapter Three was conceived through amalgamating the key thoughts of Frances Fabian and Thomas Kuhn. Although the works of Karl Popper on hypothetical knowledge production, and Imre Lakatos on the differentiation between the core elements and protection belt of a discipline, were briefly mentioned, they were not employed in the developmental phase of the theorised disciplinary analysis framework. Other works, such as Paul Feyerabend's (1993) 'anything goes' in his *'Against Method: Outline of an Anarchistic Theory of Knowledge'*, or even Bruno Latour's (2004) 'socially constructed realities' in his *'Why has Critique Run Out of Steam? From Matters of Fact to Matters of Concern'* may offer valuable insights into theorising a framework for investigating a domain's identity and its potential to constitute a discipline. These works plus the multitude of other writings in regards to the field of the *Sociology of Scientific Knowledge* may offer alternative insights into how a discipline is characterised and construed. Restricting the present analytical foundation to the two selected authors and their theorisations maintained this thesis at a manageable level of complexity; adding further contributors to the framework would conceivably cloud the results rather than adding clarity or depth. Future research employing alternative perspectives in the determination of SCM's disciplinary identity may identify findings contrasting to those within this thesis.

Related to the limitation concerning the disciplinary analysis framework is the capacity of the data collection method (content analysis). As the discussions within Chapter Four revealed, content analysis was selected as providing the research with a valuable tool for acquiring the necessary historical data for answering the research questions (Neuman, 2000). However, as was acknowledged, content analysis is not a typical method for researchers to select, although it 'fitted' with the philosophical underpinnings of this thesis (pragmatism) as well as the theorised disciplinary framework. Its successful utilisation requires the development of specific criteria to ensure objectivity throughout its application (Krippendorff, 2004); otherwise, the method is subjective in nature. Consequently, if the analysis framework were to be redeveloped on the basis of other seminal writings as to what constitutes a discipline's identity, then content analysis might be deemed an inappropriate method for data collection; other methods such as citation analysis might be deemed more appropriate.

A third, related, point, is that this research employed historical or retrospective analysis, via examination of 11 years of publication activity within four specific publications. Such analyses could have been undertaken via other historical records that are considered more 'current', for instance, conference proceedings (Neuman, 2000). Although an article published in a leading publication is regarded as the epitome of achievement (certainly for academics in terms of advancing careers), the long timeframe due to the processes involved with publication (such as the reviewing, editing, and reworking of article drafts) is both a mechanism for 'quality' control and a hindrance to achieving publication. This is not to say that the processes involved with publishing via conference proceedings are in any way lacking in terms of adhering to elements of rigour, nor that they are more attuned to addressing aspects of relevance. However, a broader, more current, perspective on SCM may have been achievable through the addition of conference texts in the analysis, rather than a reliance on articles that had gone through a more formal selection process over a longer timeframe to enable publication in a journal or trade periodical.

The selection strategy employed in the determination of the four publications that were analysed is also a potential source of concern. The four publications were selected on the sole basis of being representative of SCM knowledge developments. Due to SCM's interdisciplinary nature (covering topics as diverse as purchasing, logistics, and general operations), SCM-related articles are spread across a wide range of publications. Consequently, publications that were not consulted may have held informative articles relevant to this research. Through only analysing texts within four specific publications, the selection criteria may have imposed a self-limiting bias. Broader selection criteria, potentially utilising article search engine databases (for instance Proquest), may have provided a more comprehensive depiction of SCM conceptualisations from academia and practice, but would have imposed other limiting biases including dependence on specific keywords and non-comprehensive coverage of any publication. For the purposes of this research, longitudinal comprehensive coverage of specific leading outlets was deemed more important than piecemeal analysis of an uncontrolled set of mixed publications.

Finally, the nature of the research meant that data analysis was limited due to the text classification processes employed. Texts were analysed on the basis of specific language usage; if an article met the criteria for a category, it was assigned a value of '1' representing 'yes', whereas the value of '0' representing 'no' was assigned if the article did not meet the criteria. Subsequently, the data collected was categorical-nominal, limiting the range and power of potential statistical operations. There is ongoing debate between content analysts as to the desirability of applying more sophisticated analysis techniques (Krippendorff, 2004; Neuendorf, 2002). One reason is that applying sophisticated statistical techniques strikes at the very heart of the content analysis technique and its orientation to the qualitative or quantitative doctrine. Subsequently, researchers who identify with one orientation more than the other are likely to suffer from subjectivity, rather than objectively debating the benefits of applying sophisticated analysis techniques.

6.4 Closing Comments and Future Directions for SCM

Throughout this thesis, academic convention has been adopted, with all writing being completed in the impersonal third person. However, this research has not been undertaken by a faceless entity; instead, as the author of this volume, it has been my philosophical leanings and personal interest in the synthetic reality that pervades the domain known as 'supply chain management' that have driven this research to its culmination. It is in this last chapter, entitled 'reflecting on the disciplinary identity of SCM', that my personal reflections and thoughts as to the future direction of SCM are discussed.

Coming to the end of the thesis process, I find myself remembering a cartoon that one of my supervisors directed me towards (after a meeting where my frustrations at what I was observing in the academic literature boiled over). The 1971 slogan – 'We Have Met The Enemy and He Is Us' – popularised by Walt Kelly and his environmentally concerned character Pogo[11], is appropriate considering that academics may have been their own worst enemy in terms of SCM (its development, theorisation, and conceptualisation).

There is a ready acceptance amongst academics to designate SCM as a discipline. At the very least, there is the popular perception that SCM should be regarded as an emerging or maturing discipline (Harland et al., 2006), although the justifications given as to why are, in my mind, weak. Subsequently, very few studies set out with the specific aim of questioning the underlying characteristics of SCM for the express purpose of ascertaining whether it actually constitutes a discipline or not. Those few studies that were identified as being interested in SCM's identity adopt quite a narrow focus in light of SCM's wide-ranging characteristics (see for instance Burgess et al., 2006; Giannakis & Croom, 2004; Harland et al., 2006; Ho et al., 2002; Kouvelis et al., 2006; Wolf, 2008). The research discussed in this thesis is therefore unique, in that I held as an objective the questioning of the fundamental assumptions that both academia and practice hold regarding SCM. Thus, my premise was that it is only through challenging the status quo that understanding is attained as to what actually constitutes SCM.

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[11] © 1971 Walt Kelly. See http://www.pogopossum.com for more cartoons on Pogo.

As I discussed in Chapter One, the origins of the confusion surrounding SCM's identity can be identified in its multi-layered and multi-dimensional nature. The diverse views that jostle for acknowledgement as *the* view of SCM were presented as being symptomatic of its poorly integrated nature. As my research identified, there exists a fragmented discourse that is indicative of a diverging academic and practitioner conceptualisation as to what constitutes SCM. Based on the findings, I perceive SCM to be more identifiable as a domain of practice than as an academic discipline; hence, I deduce one conclusion: that SCM is effectively 'dead' in terms of being a viable discipline. However, such a negative sentiment begs the question: 'Where to from here?'

I have discussed in places the 'reweaving' of SCM into a new form, a new tapestry of threads. Can a tapestry continue to be woven if one set of threads (that of academia) is broken, or is it time for the academic thread to be tied to a new colour so that reweaving can begin again? For reweaving is what is required, as SCM is at a crossroads in terms of its future: Either academia can continue the never-ending debates surrounding SCM's conceptualisation (evident within discussions surrounding definition, terminology, theoretical development, body of knowledge, and adherence to rigour), or academia can embrace change via new paths of enlightenment (to Kuhn such revolutionary change is inevitable).

Specifically, reweaving must occur in several areas. For SCM to have a future, the separation of research from the messy realities of practice must end. Koontz (1980, p.176) has argued that academics "know too little about the actual task of managing and the realities practising managers face". In the decades since Koontz made this observation little has changed; as my findings indicate, this is at the core of the diverging discourse between the academic and practitioner conceptualisations of SCM. As a community, academia needs to accurately represent reality, rather than distort it through adherence to norms of behaviour that are not conducive to integration. Thus, relevance must be brought back into research, rather than a focus on rigour, as if rigour in some way can mitigate the practice-related shallowness of an article and its research.

As was discussed in Section 3.4.1, relevance to practice had at one time in SCM's past been the prime motivator for research (Williams & Oumlil, 1987); however, time has shown that addressing elements of rigour is of greater importance to an academic than relevance to practical considerations. This aspect is, to my mind, key to the discrepancy between academia and practice, for one interesting point stood out while coding the 1,371 articles: Earlier articles were, on the whole, written from a position based on more meaningful and insightful research, than later articles (which normally held substantial justifications as to the 'hows' of the study). Later articles were, on the whole, quite shallow in terms of insightful research; the area studied was reduced in scope to such a degree that any findings are trivialised, although each had what I deemed to be the 'necessary' paragraph stating how the research would help practice.

To further enable a successful reweaving of SCM, academia need to acknowledge that although practice has adopted the term 'supply chain management' for daily use, it is the concept of the 'supply chain' that they actually are implementing and utilising. To practice, the term utilised is in no shape or form a description of the activity actually undertaken. However, to academia the term depicts the boundaries through describing the activity that should be being undertaken; thus, the term and its definition are intertwined. As was discussed in Section 3.2.2, through adhering to the term 'supply chain management' academics are defending their claim on the territory of SCM from other disciplines (Kauffman, 2002), in this instance the founding fields of logistics and purchasing. Consequently, through defending its claim to 'SCM', academia is failing to acknowledge the reality of practice, thereby facilitating the confusion surrounding its accurate depiction in a formal definition. By taking for granted a term with which they are intuitively familiar, academics obscure its objective examination (Lyons, 1968).

Overall, this is not the end for 'SCM' (although it is for this thesis!); however, its future is uncertain if the status quo currently experienced is adhered to at all costs. Although well-intentioned, recent discussions to maintain the 'integrity of SCM' (see for instance Carter et al., 2008) are dangerous in that such discussions will stifle developments; as Kuhn stated, it is the anomalies currently being experienced that will force change, for this crisis requires resolution. The potential exists for a reweaving of the tapestry of ideas represented by the term 'supply chain management' into a form that is able to accurately manifest the interests and requirements of practice and academia. However, such reweaving requires academia to adjust to practice; if undertaken, SCM and the greater OM domain have a sustainable future. Consequently, if there is one lesson to be learnt from this research, it is that greater integration of the perspectives of practice (with that of academia) is essential for the longevity of a domain and its enduring legitimacy as a discipline.

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Appendices

Appendix 1: Fabian's Typology of Disciplines

The disciplinary approaches orientated under *solidarity* sees Fabian (2000) arguing that researchers benefit through interacting as a single professional-community. Thus, there is orientation around a dominant single paradigm with advocates within this community being further differentiated as to whether they are focusing on,

- *Back to basics:* the focus is on studying a domain's origins, developing knowledge depth, and utilising a single standard of quality to compare research. Consequently, there is a focus on methodology over theoretical issues thus providing consensus on methods, unit of analysis and variables. The approach is extremely dogmatic and will diminish the future popularity of the discipline.
- *Subordination:* the entire community moves towards promising paradigms of interest with the focus on developing a broad knowledge base; multiple standards of quality are utilised to compare the different kinds of research undertaken. Consequently, although it advocates movement to new paradigms there is a handicap due to forces of inertia favouring dominant assumptions and findings.
- *Disconfirmation:* there is enforcement of a strict system of falsification of all theories, thus one universal standard of quality is applied to all research irrespective of differences; knowledge is subsequently broad in nature. The measures in place for weeding out bad theories are highly effective, with the approach providing insight into what is not true or useful.

Alternatively, the disciplinary approaches orientated under *segregation* focus on a proliferation of theories unhampered by adherence to a dominant paradigm (Fabian, 2000). The orientation of approaches within this criteria are further differentiated:

- *Anything goes:* researchers assume that science is relative, thus all explanations are legitimate resulting in knowledge breadth utilising one quality standard, as all science is acceptable. Consequently, the approach enables healthy scepticism and philosophical critiques of the discipline.
- *Isolationism:* supports a separate paradigm with multiple standards of quality being utilised to compare different kinds of research with knowledge depth being

paramount. Consequently, the approach fuels conflict between researchers due to the separate paths of research undertaken, resulting in a lack of cohesion overall.

- *Restructuring:* is an ad hoc process that advocates the following of new areas of interest thus knowledge breadth and multiple standards of quality are utilised to compare the different kinds of research undertaken. The acceptance of diversity provides an incubator-type environment for new disciplines, although such willingness to restructure leads to premature restructuring occurring whenever disagreement arises.

Situated between the two orientations, is the approach orientated around *integration*. Fabian (2000) writes that instead of restricting new entrants to a domain, proponents instead advocate that accommodation of the newcomers is beneficial. Subsequently, further refinement occurs as the three approaches orientate around,

- *Middle-range theories:* researchers propose a set of conditions under which new theory can explain parts of the multidimensional nature of organisations. A single quality standard is utilised to compare research, thus knowledge depth is prevalent as new typologies, taxonomies and classifications proliferate. As such, this approach advocates that solid findings from a small population are ‘better’ than marginal findings applied to a broader population.
- *Interactionism:* seeks to resolve differences between theoretical perspectives (Fabian, 2000), and has as a core goal a focus on developing theories and paradigms that enable the bridging of various perspectives. Thus, knowledge is broad in nature with one standard of quality applied to all research irrespective of differences.
- *Multi paradigmatic:* researchers believe that more than one theory or paradigm can explain the same phenomenon, thus multiple interpretations are possible. Utilisation of multiple standards of quality enables comparisons across different kinds of research, with a focus on knowledge breadth. Consequently, the approach resolves differences through revealing convergence between paradigms and methods.

Appendix 2: List of Potential Journals to Examine

Academic Publications	*Year Range Available*	*Volumes per Year*	*Issues per Volume*
International Journal of Logistics Management	1998 - 2007	1	2
International Journal of Logistics: Research & Applications	1999 - 2007	1	3
International Journal of Operations & Production Management	1980 - 2007	1	12
International Journal of Physical Distribution and Logistics Management	1990 – 2007	1	10
Journal of Business Logistics	1978 - 2007	1	2
Journal of Purchasing and Supply Management formerly known as: - European Journal of Purchasing and Supply Management	2003 - 2005 1994 - 2002	1 1	6 4
Journal of Supply Chain Management formerly known as: - International Journal of Purchasing and Materials Management, - Journal of Purchasing and Materials Management - Journal of Purchasing	1999 - 2007 1990 - 1998 1974 - 1989 1965 - 1973	1	4
Journal of Operations	1995 - 2007	1	4 - 6
Logistics and Transportation Review	1978 - 1996	1	4 -5
Production and Operations Management	2003 - 2007	1	4
Supply Chain Management	1996 - 2007	1	5
Supply Chain Management: An International Journal	1996 - 2007	1	Between 3 and 6

Practitioner Publications	*Year Range Available*	*Volumes per Year*	*Issues per Volume*
CIO Insight	2002 - 2005	1	12
Logistics Management: formerly known as: - Logistics Management and Distribution Report - Distribution (merged with Logistics Management)	2002 – 2005 1998 – 2002 1993 - 1997	1	12
Logistics Spectrum	1996 - 2008	1	4
Logistics Today	1987 - 2005	1	12
Purchasing	1985 – 2005	1 – 2	10 -19
Purchasing and Supply Management	1980 - 2005		
Supply Chain Management Review	1998 - 2008	1	7

Appendix 3: Examples of Studies that Use Content Analysis

Study & Scope	***Aim***	***Main Findings***
(Giunipero et al., 2008) 10 years 1997 to 2006 9 journals n=405	Reviewed 405 articles selected from nine academic journals. Articles were coded and analysed via 13 categories that focused on the broader SCM concept. Aim: to provide an up to date review of the SCM field utilising a broad definition of SCM.	58% of articles fell into only three categories: SCM Strategy, SCM Frameworks, Trends and Challenges and Alliances/Relationships; 70% of articles had been published in the 2001 to 2006 period; and 55% of articles were from three journals (*JSCM, IJPDLM*, and the *JOM*). Consensus of SCM definition was lacking, with research focused on the focal firm or at the dyadic level. They question whether SCM is really being studied or whether it is merely relationship-based research.
(Burgess et al., 2006) 19 years 1985 – mid 2003 31 journals n=100	Reviewed 100 articles randomly selected from 614 held in the ABI/Inform Global Proquest database. Analysis was undertaken using four categories. Aim: to provide a structured review of SCM from a broader organisational perspective, something they argued was lacking in similar studies.	Findings indicated that the majority of articles were published between 1999 and mid-2003 and in only two journals: *JSCM* and *SCM*. A consensus is lacking on a SCM definition, and theory is 'borrowed' from other disciplines; overall, SCM is 'young'. They argue that the field risks confinement to a narrow intellectual base unless a new philosophical approach to research is utilised.
(Harland et al., 2006) 25 years 1980 to 2005 n=41	Reviewed 41 articles selected from the ABI/Inform Global Proquest database via specific criteria. Aim: to determine whether SCM is a discipline or not via the degree of coherence and quality evident.	Findings indicate that there is low levels of coherence but quality issues need addressing. Overall, SCM is not a discipline in its own right, but it is emerging as one.
(Kouvelis et al., 2006) 15 years 1992 – 2006 1 journal n=399	Reviewed 399 articles in POM seeking the contribution that the journal has made to SCM development. Aim: to illustrate the linkage between SCM development and the development of POM as a leading journal.	Found that SCM has evolved considerably and can be said to be maturing. Utilising other leading articles from other journals for in-depth discussion they found that several research streams dominate.
(Spens & Kovacs, 2006) 5 years 1998 – 2002 3 journals n=378	Reviewed 378 articles to determine the research approach used by authors. Articles were selected from three specific top-ranking logistics journals. Aim: to show the dominant research method utilised.	Their study supports and corroborates previous studies in showing that the majority of research is undertaken from a deductive position. They argue that there is confusion as to which research approach is followed, resulting in reduced reliability, possibility of replication and overall jeopardizes the rigour of research.
(Carter & Ellram, 2003) 35 years 1965 – 2000 1 journal n=774	Reviewed every article published over 35 years in one journal (*JSCM*). Analysed via subject and methodology. Aim: to explore the journals past and set direction for the future.	Findings indicated that the most common subject studied was 'Inventory & Production Management'. Research was dominated by Exploratory studies and Mail surveys. They argue that more theoretical development and theory testing is required to move away from the normative approach seen to date and enable the field to mature as a discipline.
(Miyazaki et al., 1999) 20 years 1978 to 1987 1 journal n=341	Reviewed all 341 articles from *JBL* over a 20-year period. Analysed via three categories. Aim: to better understand the journal's influence on the discipline.	Found that *JBL* covers a diverse range of topical areas, although a few authors dominate the field. Distinct periods evident in relation to subject matter, the authors argue this indicates the influence of a select few researchers on the field.
(Babber & Prasad, 1998) 10 years 1986 to 1995 22 journals n=141	Reviewed 141 articles which were selected on the basis of 'international purchasing, inventory management and logistics'. Aim: to lay the foundation for a comprehensive awareness and understanding to recent research.	Found an increase in interest in international purchasing, inventory management and logistics. Six journals were found to have 83% of all the research. Articles that developed and/or tested theory were limited – this is an area that they argue needs to be increased.

(Source: the author's own)

Appendix 4: Coding Form

Record the appropriate number or wording in the assigned area for each section. Refer to the coding scheme as required.

Unit of Analysis: ____________________

Article ID ____________________

Coder ID ____________________

Year ____________________

Coherence:

Definition ____________________

Terminology ____________________

Theoretical Development ____________________

Knowledge:

Breadth of SCM ____________________

Construct Focus ____________________

Depth of SCM ____________________

____

Conceptual Framing ____________________

Quality:

Rigour or Relevance ____________________

Authorship and affiliation 1____________________

2____________________

3____________________

4____________________

5____________________

6____________________

7____________________

8____________________

Appendix 5: Codebook

Section 1: General Information

Publication: record the publication number:

- 1 - Journal of Supply Chain Management
- 2 - International Journal of Physical Distribution & Logistics Management
- 3 - Supply Chain Management Review
- 4 - Logistics Spectrum

Year: record the year that the article was published.

Article ID: record the unique article ID
Journal-Year-Author(first 3 letters)Volume-Issue-Page number
E.g.: 1-07-ELL43-2-23

Coder ID: record your coder ID

Section 2: Coherence within SCM

Coding instructions and data language for all categories:

1 = the article is classified into the category

0 = the article is not classified into the category

Definition

Definition must be explicitly stated. There are no multiple entries, only one entry.

1. New = new definition explicitly stated (e.g. 'SCM is defined as…', 'We define SCM as…').
2. Existing = existing definition explicitly stated (e.g. within quotation marks, record citation and definition).
3. Implied = no definition explicitly stated, but implied based on discussion.
4. None = no definition explicitly stated or implied from discussion.

Terminology

There are no multiple entries, only one entry

1. Existing = new name for SCM, but still SCM being discussed (record name).
2. New = new name for SCM, and something completely different (record name).
3. SC = does not use 'SCM' or 'supply chain management' directly, instead uses 'supply chain' but implies 'SCM' concept.
4. SCM = uses 'SCM' or 'supply chain management' directly.

Theoretical Development

There are no multiple entries, only one entry.

1. Discover = uncover areas for study and (theory) development (asks, “What is going on here, is there something interesting to justify further investigation?”)
2. Describe = explore territory (asks, “What is there, what are the key issues, and what is happening?”)
3. Map = draw maps of the territory (asks, “What are the key variables, themes, patterns, categories evident?”)
4. Links = improve the maps by identifying the linkages between relationships (asks, “What are the patterns of linkages, is there an order, why do the relationships exist?”)
5. Validate = predict future outcomes via theory validation (asks, “Do we get a certain behaviour that was predicted by theory?”)
6. Extend = expand the map via theory extension/refinement, provide better understanding of the structure (asks, “Where does our existing theory apply or not apply?”)

Section 3: Knowledge within SCM

Coding instructions and data language for all categories:

1 = the article is classified into the category

0 = the article is not classified into the category

Breadth of SCM Knowledge

There are no multiple entries, only one entry.

1. Supply = Purchasing and Supply
2. Logistics = Logistics and Transportation
3. Integrate = Integrate Business Activity across Supply Chain and within Organisation
4. IT = Information Technology
5. Theory = Building Theory

Depth of SCM Knowledge: Concise Construct List

Multiple entries allowed

1. Leadership (top management support, strategic issues of importance)
2. Intra-organisational relationships (focus on internal relationships)

3. Inter-organisational relationships (focus on external relationships e.g. the buyer/supplier dyad)
4. Logistics (physical movement of products)
5. Process improvement (improving technological processes i.e. sharing IT systems)
6. Information system utilisation (adopting software/investment in IT systems)
7. Business financial performance (focus on strategic issues or competitive advantage)
8. Building theory only (i.e. may cover multiple aspects above but is solely conceptual and the focus is on building theory)

Depth of SCM Knowledge: Extensive Construct List

Multiple entries allowed

1 - Purchasing and Supply Issues

1A: Supplier

1. Development
2. Integration
3. Evaluation (or called selection)
4. Reduction (supplier reduction)
5. Involvement in supply risk management

1B: Outsourcing Decision

1. Make or Buy Decision
2. Strategic considerations to outsourcing decision

1C: Buyer / Supplier relationships

1. Trust issues
2. Power issues
3. Commitment issues
4. Strategic considerations
5. Performance outcomes
6. Size difference issues
7. Communication issues (includes negotiating skills)
8. Buyer Satisfaction

1D: Electronic Procurement

1. Web-based procurement
2. EDI
3. Auctions (sometimes called ‘reverse’)

4. Training/guidance/support by Supplier to Buyer

1E: Strategic Considerations

1. Ethical considerations (i.e. close relationships with suppliers)
2. Strategic sourcing issues (strategic reputation, international/globalisation issues, quality issues)
3. Environmental issues to consider when purchasing
4. Purchasing/Procurement history and development

2 - Logistics and Transportation Issues

2A: Logistics Integration

1. 3PL
2. 4PL
3. Strategic considerations to integration
4. Preferred transporter issues
5. Global Logistics Service providers

2B: Reverse Logistics / ‘Waste’ management issues

1. Based on environmental concerns only
2. Based on cost concerns only
3. Both 1 & 2 considered (i.e. it’s a strategic activity)

2C: Transportation Network

1. Domestic focus only
2. International focus only
3. Both 1 & 2 considered
4. Performance issues

2D: Transportation Technology

1. IT systems (developing, utilising i.e. tracking packages/shipments)
2. ‘Clean and Green’ Aspects (i.e. environmental concerns)

2E: Compliance Costs

1. Security issues (physical, IT related, terrorism)
2. Compliance issues (legal etc)
3. Cost considerations
4. Strategic considerations to implementing logistics (i.e. integrating with providers)

3 - Integration of Business Activity (across supply chain and within organisation)

3A: Leadership issues

1. Strategy (includes Corporate strategy)
2. Social Responsibility
3. Environmental concerns
4. Profitability, return on investment and best practice issues (includes employee incentives, cost cutting measures)
5. Importance of culture
6. Negotiation skills

3B: Information Technology integration and use

1. Purchasing Department (or similar name) ownership of software and support
2. IT department ownership of software and support
3. Supplier acquires IT ability (software/hardware upgrades) as cost of doing business with buyer
4. EDI – electronic data interchange
5. SC integration software (design, implementation and utilisation of; importance of, leveraging for financial gain)
6. SC profitability built upon IT issues (hardware and software implementation)
7. Strategic benefits to IT integration

3C: Production / Operational issues

1. Warehousing / Distribution centres (location of, size issues, IT systems)
2. Inventory management (critical need to manage to all stages of SC, as well as within organisation)
3. New Product Development
4. Demand Planning issues (includes managing demand issues, demand visibility and demand amplification)
5. New Process Development (includes management systems)

4 - General (i.e. a research only on a topic that covers all of the above aspects)

1. SC Performance issues (such as planning for and building in flexibility/agility, increasing SC financial performance, barriers to implementation)
2. SCM Professional’s Skill Level (ongoing training and learning, regarded as a profession and strategic contributor to organisation, wage levels, educational programmes)
3. SC Risk mitigation strategies (includes global SC considerations)

4. SC security (from the risk of terrorism)
5. Legislation (Government trade barriers, SCM legal issues/services offered, environmental concerns)
6. Theory Building of SCM (focus on rigour vs. relevance, conceptual paper on SCM development, trends and developments in SCM, methodology use within SCM)

Conceptual Framing

There are no multiple entries, only one entry.

1. Activity = SCM as an Individual activity
2. Process = SCM as a Process (or chain of related activities)
3. System = SCM as a System (or series of related processes or related networks)
4. None = No level of relationship identified (implied or alluded to)

<u>Section 4: Quality within SCM</u>

Coding instructions and data language for all categories:

1 = the article is classified into the category

0 = the article is not classified into the category

Rigour or Relevance

There are no multiple entries, only one entry.

1. Literature review: solely a review of previous literature that summarises knowledge in a topical area, and utilises either statistical techniques or narratives to map that body of knowledge
2. Research-theory/model: empirical or conceptual research (either quantitative, qualitative or a mix) that reflects the fact-finding procedures undertaken in the research process and provides theory or models to aid explanation
3. Research only: empirical or conceptual research (either quantitative, qualitative or a mix) that reflects the fact-finding procedures undertaken in the research process; no theory or model is offered in explanation
4. Conceptual paper: does not rely on data (either field collected or artificially collected via a laboratory setting) to offer new perspectives on topical areas
5. Advertising: pertains to those articles that are advertising services, support or software
6. Case study: presents real-world examples, including contextual background, of a phenomenon such as information pertaining to a company or industry.

7. Interview: data and findings are based on open-ended question and answer style that encourages conversation

Authorship of Article

Record the author's names in order of appearance. Record the last name and first two initials e.g. Harland C.M. Record author affiliation

1. Academic affiliation
2. Practitioner affiliation

Appendix 6: Krippendorff's Alpha Results for Test-Retest

Major Theme	Categories	Krippendorff's Alpha	% Rate of Agreement
Definition	New	1.00	100
	Existing	1.00	100
	Implied	0.94	97
	None	0.94	97
Terminology	Existing	1.00	100
	New	1.00	100
	SC	0.98	99
	SCM	0.98	99
Theoretical Development	Discover	0.96	99.5
	Describe	0.98	99
	Map	0.98	99.5
	Links	1.00	100
	Validate	1.00	100
	Extend	1.00	100
Breadth of Knowledge	Supply	0.97	99
	Logistics	1.00	100
	Integrate	0.98	99
	IT	1.00	100
	Theory	1.00	100
Concise Construct List (CCL)	Leadership	1.00	100
	Intra-organisational relationships	1.00	100
	Inter-organisational relationships	1.00	100
	Logistics	1.00	100
	Process improvement	1.00	100
	Information system utilisation	1.00	100
	Business financial performance	0.95	97.5
	Theory	1.00	100
Extensive Construct List (ECL)	S = Supplier - development	1.00	100
	S = Supplier - integration	0.96	99.5
	S = Supplier – evaluation	1.00	100
	S = Supplier – reduction	0.96	99.5
	S = Supplier - involvement in supply risk management	1.00	100
	S = Outsourcing - make or buy decision	0.80	99.5
	S = Outsourcing - strategic considerations to decision	0.50	99
	S = Buyer-Supplier relationships - trust	0.66	99
	S = Buyer-Supplier relationships - power	0.80	99
	S = Buyer-Supplier relationships - commitment	0.80	99
	S = Buyer-Supplier relationships - strategic considerations	1.00	100
	S = Buyer-Supplier relationships - performance	0.66	99.5
	S = Buyer-Supplier relationships - org size differences	1.00	100
	S = Buyer-Supplier relationships - communication	1.00	100
	S = Buyer-Supplier relationships - buyer satisfaction	1.00	100
	S = E-procurement - web based	1.00	100

Major Theme	Categories	Krippendorff's Alpha	% Rate of Agreement
	S = E-procurement - EDI	1.00	100
	S = E-procurement - auctions	1.00	100
	S = E-procurement - training/support	1.00	100
	S = Strategic considerations - ethics	1.00	100
	S = Strategic considerations - strategic sourcing	1.00	100
	S = Strategic considerations - environmental issues	1.00	100
	S = Strategic considerations - purchasing history	1.00	100
	L = Logistics integration - 3PL	1.00	100
	L = Logistics integration - 4PL	1.00	100
	L = Logistics integration - strategic considerations	0.66	99.5
	L = Logistics integration - preferred transporter	1.00	100
	L = Logistics integration - global service providers	1.00	100
	L = Reverse logistics - environmental concerns	1.00	100
	L = Reverse logistics - cost concerns	1.00	100
	L = Reverse logistics - both environmental and cost concerns	1.00	100
	L = Transportation network - domestic focus	1.00	100
	L = Transportation network - international focus	1.00	100
	L = Transportation network - both domestic & international	1.00	100
	L = Transportation network - performance	1.00	100
	L = Transportation technology - IT system development	1.00	100
	L = Transportation technology - environmental concerns	1.00	100
	L = Compliance costs - security issues	1.00	100
	L = Compliance costs - legal issues	1.00	100
	L = Compliance costs - cost issues	1.00	100
	L = Compliance costs - strategic considerations	1.00	100
	I = Leadership - strategy	1.00	100
	I = Leadership - social responsibility	1.00	100
	I = Leadership - environmental concerns	1.00	100
	I = Leadership - profitability	0.39	98.5
	I = Leadership - cultural importance	1.00	100
	I = Leadership - negotiation skills	1.00	100
	I = IT integration - purchasing dept ownership of	1.00	100
	I = IT integration - IT dept ownership of	1.00	100
	I = IT integration - supplier acquires IT ability	1.00	100
	I = IT integration - EDI	1.00	100
	I = IT integration - SC integration software	1.00	100
	I = IT integration - SC profitability built upon IT	0.97	99.5
	I = IT integration - strategic benefits to IT integration	0.49	97
	I = operations - warehousing	1.00	100
	I = operations - inventory management	1.00	100
	I = operations - new product development	1.00	100
	I = operations - demand planning	1.00	100
	I = operations - new process development	1.00	100
	G = SC performance	0.91	96.5
	G = SCM professional's skill level	1.00	100

Major Theme	Categories	Krippendorff's Alpha	% Rate of Agreement
	G = SC risk mitigation strategies	0.97	99.5
	G = SC security	0.32	98
	G = legislation impact	1.00	100
	G = theory building of SCM only	1.00	100
Conceptual Framing	Activity	1.00	100
	Process	1.00	100
	System	1.00	100
	None	1.00	100
Rigour vs. Relevance	Literature review	0.66	98.5
	Research: theory-model offered	1.00	100
	Conceptual paper	0.97	98.5
	Advertising	1.00	100
	Case study	1.00	100
	Interview	1.00	100
	Research only	1.00	100

Appendix 7: Distribution of Articles per Year and across the Disciplinary Periods

	Pre-paradigmatic Period								***Normal Science Period***										***Crisis Period***			
	Acceptance				***Growth***																	
	1998		***1999***		***2000***		***2001***		***2002***		***2003***		***2004***		***2005***		***2006***		***2007***		***2008***	
	n=	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***	***n=***	***%***
Academic																						
JSCM	20	24.1	27	32.9	25	18.2	27	18.4	25	19.9	16	13.6	19	13.6	20	14.0	20	14.1	17	14.0	24	18.1
IJPDLM	43	51.8	32	39.0	45	32.9	40	27.2	42	33.3	42	35.6	44	31.4	41	28.7	43	30.3	41	33.9	41	31.1
Total	***63***	***75.9***	***59***	***71.9***	***70***	***51.1***	***67***	***45.6***	***67***	***53.2***	***58***	***49.2***	***63***	***45.0***	***61***	***42.7***	***63***	***44.4***	***58***	***47.9***	***65***	***49.2***
Practitioner																						
SCMR	13	15.6	13	15.9	52	37.9	64	43.5	45	35.7	47	39.8	60	42.9	73	51.0	73	51.4	50	41.3	54	40.9
LS	7	8.4	10	12.2	15	11.0	16	10.9	14	11.1	13	11.0	17	12.1	9	6.3	6	4.2	13	10.8	13	9.9
Total	***20***	***24.1***	***23***	***28.1***	***67***	***48.9***	***80***	***54.4***	***59***	***46.8***	***60***	***50.8***	***77***	***55.0***	***82***	***57.3***	***79***	***55.6***	***63***	***52.1***	***67***	***50.8***
Overall Total	***83***	***100***	***82***	***100***	***137***	***100***	***147***	***10***	***126***	***100***	***118***	***100***	***140***	***100***	***143***	***100***	***142***	***100***	***121***	***100***	***132***	***100***

Appendix 8: Extensive Construct List across the Disciplinary Periods

	Pre-Paradigmatic Period (1a) 1998-1999		Pre-Paradigmatic Period (1b) 2000-2001		Normal Science Period (2) 2002-2006		Crisis Period (3) 2007-2008		Total		% Difference Between Periods		
	n=	%	n=	%	n=	%	n=	%	n=	%	1a-1b	1b-2	2-3
Academic													
S = Supplier - development	5	1.2	3	0.5	13	0.9	3	0.5	24	0.8	-0.7	0.4	-0.4
S = Supplier - integration	5	1.2	1	0.2	9	0.6	5	0.8	20	0.7	-1.0	0..4	0.2
S = Supplier - evaluation	8	1.9	6	1.0	17	1.2	7	1.2	38	1.3	-0.9	0.2	0.0
S = Supplier - reduction	5	1.2	1	0.2	9	0.6	3	0.5	18	0.6	-1.0	0.4	-0.1
S = Supplier - involvement in supply risk management	6	1.4	1	0.2	12	0.9	4	0.7	23	0.8	-1.2	0.7	-0.2
S = Outsourcing - make or buy decision	1	0.2	0	0.0	3	0.2	1	0.2	5	0.2	-0.2	0.2	0.0
S = Outsourcing - strategic considerations to decision	8	1.9	3	0.5	4	0.3	4	0.7	19	0.6	-1.4	-0.2	0.4
S = Buyer-Supplier relationships - trust	10	2.3	12	2.0	31	2.2	15	2.5	68	2.3	-0.3	0.2	0.3
S = Buyer-Supplier relationships - power	8	1.9	15	2.5	30	2.2	14	2.4	67	2.2	0.6	-0.3	0.2
S = Buyer-Supplier relationships - commitment	8	1.9	10	1.6	28	2.0	14	2.4	60	2.0	-0.3	0.4	0.4
S = Buyer-Supplier relationships - strategic considerations	9	2.1	14	2.3	31	2.2	14	2.4	68	2.3	0.2	-0.1	0.2
S = Buyer-Supplier relationships - performance	8	1.9	12	2.0	32	2.3	16	2.7	68	2.3	0.1	0.3	0.4
S = Buyer-Supplier relationships - org size differences	8	1.9	10	1.6	29	2.1	14	2.4	61	2.0	-0.3	0.5	0.3
S = Buyer-Supplier relationships - communication	9	2.1	11	1.8	34	2.5	17	2.9	71	2.4	-0.3	0.7	0.4
S = Buyer-Supplier relationships - buyer satisfaction	8	1.9	10	1.6	28	2.0	14	2.4	60	2.0	-0.3	0.4	0.4
S = E-procurement - web based	1	0.2	8	1.3	6	0.4	4	0.7	19	0.6	1.1	-0.9	0.3
S = E-procurement - EDI	0	0.0	1	0.2	1	0.1	1	0.2	3	0.1	0.2	-0.1	0.1
S = E-procurement - auctions	0	0.0	1	0.2	2	0.1	4	0.7	7	0.2	0.2	-0.1	0.6
S = E-procurement - training/support	1	0.2	4	0.7	1	0.1	1	0.2	7	0.2	0.5	-0.6	0.1
S = Strategic considerations - ethics	0	0.0	1	0.2	2	0.1	0	0.0	3	0.1	0.2	-0.1	-0.1
S = Strategic considerations - strategic sourcing	13	3.0	16	2.6	19	1.4	8	1.4	56	1.9	-0.4	-1.2	0.0
S = Strategic considerations - environmental issues	3	0.7	0	0.0	1	0.1	0	0.0	4	0.1	-0.7	0.1	-0.1
S = Strategic considerations - purchasing history	1	0.2	0	0.0	0	0.0	1	0.2	2	0.1	-0.2	0.0	0.2

	Pre-Paradigmatic Period (1a) 1998-1999		*Pre-Paradigmatic Period* (1b) 2000-2001		*Normal Science Period* (2) 2002-2006		*Crisis Period* (3) 2007-2008		*Total*		*% Difference Between Periods*		
	n=	*%*	*n=*	*%*	*n=*	*%*	*n=*	*%*	*n=*	*%*	*1a-1b*	*1b-2*	*2-3*
Academic (continued)													
L = Logistics integration - 3PL	3	0.7	5	0.8	18	1.3	5	0.8	31	1.0	0.1	0.5	-0.5
L = Logistics integration - 4PL	0	0.0	1	0.2	1	0.1	1	0.2	3	0.1	0.2	-0.1	0.1
L = Logistics integration - strategic considerations	1	0.2	0	0.0	5	0.4	0	0.0	6	0.2	-0.2	0.4	-0.4
L = Logistics integration - preferred transporter	2	0.5	4	0.7	5	0.4	0	0.0	11	0.4	0.2	-0.3	-0.4
L = Logistics integration - global service providers	0	0.0	3	0.5	6	0.4	0	0.0	9	0.3	0.5	-0.1	-0.4
L = Reverse logistics - environmental concerns	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0
L = Reverse logistics - cost concerns	0	0.0	1	0.2	1	0.1	2	0.3	4	0.1	0.2	-0.1	0.2
L = Reverse logistics - both environmental and cost concerns	0	0.0	1	0.2	8	0.6	1	0.2	10	0.3	0.2	0.4	-0.4
L = Transportation network - domestic focus	1	0.2	1	0.2	2	0.1	1	0.2	5	0.2	0.0	-0.1	0.1
L = Transportation network - international focus	3	0.7	2	0.3	2	0.1	0	0.0	7	0.2	-0.4	-0.2	-0.1
L = Transportation network - both domestic & international	0	0.0	1	0.2	2	0.1	0	0.0	3	0.1	0.2	-0.1	-0.1
L = Transportation network - performance	20	4.6	15	2.5	20	1.4	19	3.2	74	2.4	-2.1	-1.1	1.8
L = Transportation technology - IT system development	3	0.7	2	0.3	3	0.2	4	0.7	12	0.4	-0.4	-0.1	0.5
L = Transportation technology - environmental concerns	1	0.2	0	0.0	1	0.1	0	0.0	2	0.1	-0.2	0.1	-0.1
L = Compliance costs - security issues	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0
L = Compliance costs - legal issues	0	0.0	0	0.0	3	0.2	0	0.0	3	0.1	0.0	0.0	0.0
L = Compliance costs - cost issues	4	0.9	2	0.3	7	0.5	3	0.5	16	0.5	-0.6	0.2	0.0
L = Compliance costs - strategic considerations	11	2.5	10	1.6	30	2.2	6	1.0	57	1.9	-0.9	0.6	-1.2
I = Leadership - strategy	14	3.2	7	1.1	34	2.5	7	1.2	62	2.1	-2.1	1.4	-1.3
I = Leadership - social responsibility	1	0.2	1	0.2	4	0.3	2	0.3	8	0.3	0.0	0.1	0.0
I = Leadership - environmental concerns	1	0.2	3	0.5	6	0.4	2	0.3	12	0.4	0.3	-0.1	-0.1
I = Leadership - profitability	1	0.2	1	0.2	9	0.6	7	1.2	18	0.6	0.0	0.4	0.6
I = Leadership - cultural importance	0	0.0	0	0.0	5	0.4	2	0.3	7	0.2	0.0	0.4	-0.1
I = Leadership - negotiation skills	0	0.0	0	0.0	3	0.2	2	0.3	5	0.2	0.0	0.2	0.1
I = IT integration - purchasing dept ownership of	0	0.0	0	0.0	1	0.1	1	0.2	2	0.1	0.0	0.1	0.1

	Pre-Paradigmatic Period (1a) 1998-1999		*Pre-Paradigmatic Period* (1b) 2000-2001		*Normal Science Period* (2) 2002-2006		*Crisis Period* (3) 2007-2008		*Total*		*% Difference Between Periods*		
	n=	*%*	*n=*	*%*	*n=*	*%*	*n=*	*%*	*n=*	*%*	*1a-1b*	*1b-2*	*2-3*
Academic (continued)													
I = IT integration - IT dept ownership of	0	0.0	0	0.0	1	0.1	1	0.2	2	0.1	0.0	0.1	0.1
I = IT integration - supplier acquires IT ability	1	0.2	0	0.0	2	0.1	1	0.2	4	0.1	-0.2	0.1	0.1
I = IT integration - EDI	4	0.9	0	0.0	2	0.1	1	0.2	7	0.2	-0.9	0.1	0.1
I = IT integration - SC integration software	7	1.6	19	3.1	24	1.7	12	2.0	62	2.1	1.5	-1.4	0.3
I = IT integration - SC profitability built upon IT	1	0.2	16	2.6	11	0.8	8	1.4	36	1.2	2.4	-1.8	0.6
I = IT integration - strategic benefits to IT integration	0	0.0	0	0.0	2	0.1	1	0.2	3	0.1	0.0	0.1	0.1
I = operations - warehousing	4	0.9	1	0.2	3	0.2	2	0.3	10	0.3	-0.7	0.0	0.1
I = operations - inventory management	6	1.4	4	0.7	13	0.9	4	0.7	27	0.9	-0.7	0.2	-0.2
I = operations - new product development	3	0.7	2	0.3	5	0.4	3	0.5	13	0.4	-0.4	0.1	0.1
I = operations - demand planning	6	1.4	2	0.3	14	1.0	4	0.7	26	0.9	-1.1	0.7	-0.3
I = operations - new process development	1	0.2	1	0.2	2	0.1	0	0.0	4	0.1	0.0	-0.1	-0.1
G = SC performance	32	7.4	35	5.7	98	7.1	33	5.6	198	6.6	-1.7	1.4	-1.5
G = SCM professional's skill level	13	3.0	16	2.6	14	1.0	2	0.3	45	1.5	-0.4	-1.6	-0.7
G = SC risk mitigation strategies	1	0.2	2	0.3	24	1.7	7	1.2	34	1.1	0.1	1.4	-0.5
G = SC security	0	0.0	1	0.2	0	0.0	0	0.0	1	0.0	0.2	-0.2	0.0
G = legislation impact	0	0.0	1	0.2	1	0.1	0	0.0	2	0.1	0.2	-0.1	-0.1
G = theory building of SCM only	5	1.2	5	0.8	30	2.2	25	4.2	65	2.2	-0.4	1.4	2.0
Total	***275***	***64.1***	***305***	***49.8***	***764***	***55.1***	***333***	***56.3***	***1677***	***55.5***	***-14.3***	***5.3***	***1.2***
Practitioner													
S = Supplier - development	0	0.0	1	0.2	1	0.1	2	0.3	4	0.1	0.2	-0.1	0.2
S = Supplier - integration	0	0.0	3	0.5	1	0.1	2	0.3	6	0.2	0.5	-0.4	0.2
S = Supplier - evaluation	0	0.0	0	0.0	1	0.1	2	0.3	3	0.1	0.0	0.1	0.2
S = Supplier - reduction	0	0.0	0	0.0	1	0.1	2	0.3	3	0.1	0.0	0.1	0.2
S = Supplier - involvement in supply risk management	0	0.0	0	0.0	1	0.1	3	0.5	4	0.1	0.0	0.1	0.4

	Pre-Paradigmatic Period (1a) 1998-1999		*Pre-Paradigmatic Period* (1b) 2000-2001		*Normal Science Period* (2) 2002-2006		*Crisis Period* (3) 2007-2008		*Total*		*% Difference Between Periods*		
	n=	*%*	*n=*	*%*	*n=*	*%*	*n=*	*%*	*n=*	*%*	*1a-1b*	*1b-2*	*2-3*
Practitioner (continued)													
S = Outsourcing - make or buy decision	0	0.0	1	0.2	0	0.1	1	0.2	2	0.1	0.2	-0.1	0.1
S = Outsourcing - strategic considerations to decision	0	0.0	3	0.5	13	0.8	2	0.3	18	0.5	0.5	0.3	-0.5
S = Buyer-Supplier relationships - trust	3	0.7	8	1.3	14	1.0	6	1.0	31	1.0	0.6	-0.3	0.0
S = Buyer-Supplier relationships - power	3	0.7	8	1.3	11	0.8	5	0.8	27	0.9	0.6	-0.5	0.0
S = Buyer-Supplier relationships - commitment	3	0.7	8	1.3	11	0.8	5	0.8	27	0.9	0.6	-0.5	0.0
S = Buyer-Supplier relationships - strategic considerations	3	0.7	10	1.6	13	0.9	8	1.4	34	1.1	0.9	-0.7	0.5
S = Buyer-Supplier relationships - performance	3	0.7	8	1.3	19	1.4	5	0.8	35	1.2	0.6	0.1	-0.6
S = Buyer-Supplier relationships - org size differences	3	0.7	8	1.3	11	0.8	5	0.8	27	0.9	0.6	-0.5	0.0
S = Buyer-Supplier relationships - communication	3	0.7	8	1.3	11	0.8	5	0.8	27	0.9	0.6	-0.5	0.0
S = Buyer-Supplier relationships - buyer satisfaction	3	0.7	9	1.5	12	0.9	6	1.0	30	1.0	0.8	-0.6	0.1
S = E-procurement - web based	2	0.5	22	3.6	4	0.3	3	0.5	31	1.0	3.1	-3.3	0.2
S = E-procurement - EDI	2	0.5	4	0.7	0	0.0	1	0.2	7	0.2	0.2	-0.7	0.2
S = E-procurement - auctions	2	0.5	3	0.5	0	0.0	1	0.2	6	0.2	0.0	-0.5	0.2
S = E-procurement - training/support	2	0.5	4	0.7	0	0.0	1	0.2	7	0.2	0.2	-0.7	0.2
S = Strategic considerations - ethics	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0
S = Strategic considerations - strategic sourcing	7	1.6	4	0.7	11	0.8	6	1.0	28	0.9	-0.9	0.1	0.2
S = Strategic considerations - environmental issues	1	0.2	0	0.0	0	0.0	2	0.3	3	0.1	-0.2	0.0	0.3
S = Strategic considerations - purchasing history	0	0.0	0	0.0	1	0.1	0	0.0	1	0.0	0.0	0.1	-0.1
L = Logistics integration - 3PL	3	0.7	2	0.3	11	0.8	3	0.5	19	0.6	-0.4	0.5	-0.3
L = Logistics integration - 4PL	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0
L = Logistics integration - strategic considerations	1	0.2	3	0.5	6	0.4	0	0.0	10	0.3	0.3	-0.1	-0.4
L = Logistics integration - preferred transporter	0	0.0	3	0.5	3	0.2	2	0.3	8	0.3	0.5	-0.3	0.1
L = Logistics integration - global service providers	0	0.0	1	0.2	2	0.1	2	0.3	5	0.2	0.2	-0.1	0.2
L = Reverse logistics - environmental concerns	0	0.0	0	0.0	1	0.1	3	0.5	4	0.1	0.0	0.1	0.4
L = Reverse logistics - cost concerns	0	0.0	0	0.0	1	0.1	0	0.0	1	0.0	0.0	0.1	-0.1

	Pre-Paradigmatic Period (1a) 1998-1999		*Pre-Paradigmatic Period* (1b) 2000-2001		*Normal Science Period* (2) 2002-2006		*Crisis Period* (3) 2007-2008		*Total*		*% Difference Between Periods*		
	n=	*%*	*n=*	*%*	*n=*	*%*	*n=*	*%*	*n=*	*%*	*1a-1b*	*1b-2*	*2-3*
Practitioner (continued)													
L = Reverse logistics - both environmental and cost concerns	1	0.2	1	0.2	2	0.1	3	0.5	7	0.2	0.0	-0.1	0.4
L = Transportation network - domestic focus	0	0.0	1	0.2	1	0.1	0	0.0	2	0.1	0.2	-0.1	-0.1
L = Transportation network - international focus	0	0.0	3	0.5	1	0.1	1	0.2	5	0.2	0.5	-0.4	0.1
L = Transportation network - both domestic & international	1	0.2	2	0.3	2	0.1	0	0.0	5	0.2	0.1	-0.2	-0.1
L = Transportation network - performance	0	0.0	7	1.1	45	3.2	13	2.2	65	2.2	1.1	2.1	-1.0
L = Transportation technology - IT system development	1	0.2	12	2.0	12	0.9	8	1.4	33	1.1	1.8	-1.1	0.5
L = Transportation technology - environmental concerns	0	0.0	0	0.0	2	0.1	5	0.8	7	0.2	0.0	0.1	0.7
L = Compliance costs - security issues	0	0.0	0	0.0	11	0.8	2	0.3	13	0.4	0.0	0.8	-0.5
L = Compliance costs - legal issues	0	0.0	0	0.0	1	0.1	0	0.0	1	0.0	0.0	0.1	-0.1
L = Compliance costs - cost issues	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0
L = Compliance costs - strategic considerations	5	1.2	10	1.6	19	1.4	7	1.2	41	1.4	0.4	-0.2	-0.2
I = Leadership - strategy	13	3.0	19	3.1	73	5.3	24	4.1	129	4.3	0.1	2.2	-1.2
I = Leadership - social responsibility	1	0.2	0	0.0	4	0.3	4	0.7	9	0.3	-0.2	0.3	0.4
I = Leadership - environmental concerns	2	0.5	1	0.2	6	0.4	9	1.5	18	0.6	-0.3	0.2	1.1
I = Leadership - profitability	2	0.5	3	0.5	10	0.7	8	1.4	23	0.8	0.0	0.2	0.7
I = Leadership - cultural importance	1	0.2	0	0.0	3	0.2	4	0.7	8	0.3	-0.2	0.2	0.5
I = Leadership - negotiation skills	0	0.0	0	0.0	4	0.3	3	0.5	8	0.3	0.0	0.3	0.2
I = IT integration - purchasing dept ownership of	0	0.0	4	0.7	0	0.0	1	0.2	5	0.2	0.7	-0.7	0.2
I = IT integration - IT dept ownership of	0	0.0	4	0.7	0	0.0	0	0.0	4	0.1	0.7	-0.7	0.0
I = IT integration - supplier acquires IT ability	0	0.0	4	0.7	0	0.0	0	0.0	4	0.1	0.7	-0.7	0.0
I = IT integration - EDI	0	0.0	4	0.7	0	0.0	0	0.0	4	0.1	0.7	-0.7	0.0
I = IT integration -SC integration software	13	3.0	36	5.9	55	4.0	11	1.9	115	3.8	2.9	-1.9	-2.1
I = IT integration - SC profitability built upon IT	13	3.0	13	2.1	9	0.6	4	0.7	39	1.3	-0.9	-1.5	0.1
I = IT integration - strategic benefits to IT integration	9	2.1	6	1.0	0	0.0	0	0.0	15	0.5	-1.1	-1.0	0.0
I = operations - warehousing	1	0.2	0	0.0	2	0.1	0	0.0	3	0.1	-0.2	0.1	-0.1

	Pre-Paradigmatic Period (1a) 1998-1999		*Pre-Paradigmatic Period* (1b) 2000-2001		*Normal Science Period* (2) 2002-2006		*Crisis Period* (3) 2007-2008		*Total*		*% Difference Between Periods*		
	n=	*%*	*n=*	*%*	*n=*	*%*	*n=*	*%*	*n=*	*%*	*1a-1b*	*1b-2*	*2-3*
Practitioner (continued)													
I = operations - inventory management	2	0.5	1	0.2	5	0.4	2	0.3	10	0.3	-0.3	0.2	-0.1
I = operations - new product development	1	0.2	1	0.2	4	0.3	0	0.0	6	0.2	0.0	0.1	-0.3
I = operations - demand planning	1	0.2	5	0.8	18	1.3	7	1.2	31	1.0	0.6	0.5	-0.1
I = operations - new process development	1	0.2	1	0.2	1	0.1	0	0.0	3	0.1	0.0	-0.1	-0.1
G = SC performance	30	7.0	35	5.7	129	9.3	33	5.6	227	7.5	-1.3	3.6	-3.7
G = SCM professional’s skill level	11	2.6	9	1.5	24	1.7	7	1.2	51	1.7	-1.1	0.2	-0.5
G = SC risk mitigation strategies	0	0.0	1	0.2	11	0.8	14	2.4	26	0.9	0.2	0.6	1.6
G = SC security	0	0.0	0	0.0	2	0.1	2	0.3	4	0.1	0.0	0.1	0.2
G = legislation impact	0	0.0	1	0.2	2	0.1	4	0.7	7	0.2	0.2	-0.1	0.6
G = theory building of SCM only	1	0.2	2	0.3	5	0.4	0	0.0	8	0.3	0.1	0.1	-0.4
Total	***154***	***35.9***	***307***	***50.2***	***623***	***44.9***	***259***	***43.7***	***1344***	***44.5***	***14.3***	***-5.3***	***-1.2***
$\sum$	***429***	***100***	***612***	***100***	***1387***	***100***	***592***	***100***	***3021***	***100***			

***Key*: S =** Purchasing & Supply, **L =** Logistics & Transportation, **I =** Integration of Business Activity, **G =** General