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Paper Title: Critical evaluation of epistemology in supply chain research - Qualitative case study research in operations and supply chain management.

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Management 'discipline': Supply Chain

Keywords: Supply chain, sustainability, strategy, philosophical paradigms

Research methodology: Literature Review

Indicate in which area you would value help: (c) Methodology

Title

Critical evaluation of epistemology in supply chain research - Qualitative case study research in operations and supply chain management.

Abstract

The purpose of this paper is to offer a critical evaluation of epistemology in supply chain research. The two approaches, the positivist and post-positivist critical realism research traditions, are the primary philosophical foundations for case study research design. These are discussed in relation to the research project: 'exploring sustainable supply chain strategy'. Key concepts in the literature present characteristics of the research problem in relation to the methodological paradigm and theory development from which a summary that underpins the research strategy is outlined in the 'Research method' section. Finally, the research questions leading from the findings are presented.

Keywords

Supply chain, sustainability, strategy, philosophical paradigms

1. Purpose of the research

The purpose of this paper is to explore and compare two dominant philosophical paradigms in the field of supply chain management and offer a critique of the assumptions. The two approaches, the positivist and post-positivist critical realism research traditions, are the primary philosophical foundations for exploring the case study methodological paradigm and theory development¹ in supply chain (SC) research (see figure 1). In order to effectively critique each approach, an overview of the research problem, philosophical paradigms, and research traditions in supply chain (SC) are briefly presented. From this critique, a summary of the methodology and philosophical paradigm that underpins the research strategy in order to address the research problem is outlined. As methodology and theory development are interdependent, theoretical paradigms determine the type of theory developed. Findings indicate that positivist researchers continue to develop the rigours and quality of qualitative case study research from their most elaborated, dominant research paradigm, while the post-positivist critical realist tradition is helping broaden it.

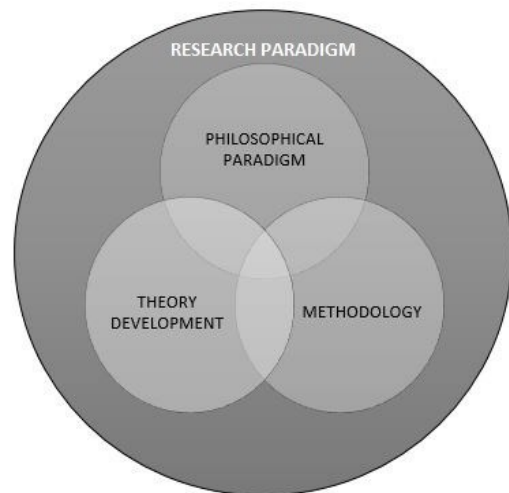


Figure 1 Philosophical paradigm, methodology and theory development in the context of the research paradigm including the problem, strategy and question

2. Key concepts from literature

In order to set the context for this paper, an overview of the research problem, philosophical paradigms, and supply chain research traditions are briefly presented.

2.1. Research problem

The purpose of the research project is to gain a deeper understanding into sustainable supply chain strategy (SSCS) from multiple perspectives. This is set under the assumption that business as usual is not considered sustainable and focal companies having to take greater levels of responsibility for

¹ It is important to note that theory development (building/generating, expanding/elaborating & testing) and theoretical frameworks refer to the theory generalised to contribute to new knowledge in terms of the research problem; and not the theoretical perspectives of philosophical paradigms as referred to by social science philosophers in the literature (Blaikie, 2007; Crotty, 1998).

sustainable issues across the whole supply chain strategy (SCS). The interplay between sustainability strategies along the SC and the context in which they are embedded, relationally and structurally, is worth investigating systematically (Jones *et al.*, 1997:922; Vurro *et al.*, 2009:609). The research explores the 'sustainable' processes in SCS from multiple theoretical perspectives, the foci of disciplines and stakeholder perceptions and preferences. It also looks at the focal firm in the context of the complex network in which it is implementing sustainability processes. Literature indicates that there is a limited capacity to integrate all three dimensions of sustainability in terms of the level of understanding of the actors (Seuring & Müller, 2008; 2011; Wolf, 2011; Taticchi *et al.*, 2014) and contextual setting (Vurro *et al.*, 2009; Miemczyk *et al.*, 2012) (see Appendix 1 for summary of characteristics of research problem).

2.2. Philosophical paradigms

A philosophical paradigm encompasses what Burrell and Morgan (1985) describe as ontology, epistemology, human nature and methodology. These paradigms have implicit and explicit assumptions and biases in determining the way in which we see the world. Thus, determining "the scientist's frame of reference in the generation of social theory and research... [In which] Rival perspectives within the same paradigm, or outside its, bounds appear as satellites defining alternative points of view" (1985:ix). This is particularly pertinent given the multiplicity of disciplines and theoretical perspectives in the field.

Kuhn's work on *paradigm shifts* (1996) states that scientific communities develop theory and research predominantly within a dominant worldview. He describes how "If science is the constellation of facts, theories, and methods collected in current texts, then scientists are the men who, successfully or not, have striven to contribute one or another element to that particular constellation" (1996:1). As Gold *et al.* suggest, "being sceptical of one dominant view and being open to a plurality of views... [and] recognising that knowledge is never value free and its subjective and contextualised nature" (2002:373). Another argument for this critique of qualitative case studies in SCM, is to understand the "specific foci of disciplines" (Boons *et al.*, 2012:135) in terms of a conceptual understanding of strategic sustainability. This gives the researcher the choice of contributing to knowledge by positioning oneself within the dominant research community or approaching the research problem from a different school of thought.

2.3. Supply chain research traditions

“An indicator of a research tradition is the extent to which there exists a set of dominant philosophical assumptions or a worldview that informs the work of researchers in a discipline” (Orlikowski & Baroudi, 1991:2).

In the ‘constellation’ of worldviews that determine the theoretical understanding of SC research, and the degree to which they are scoped and conceptualised, there are several philosophical paradigms. Of the four epistemologies - positivism, realism, constructivism and conventionalism (Easton in Naudé & Turnbull, 1998), two of the more prominent ones include the dominant positivist one and slightly less influential realist perspective. Glaringly obvious in omission is the constructivism interpretivist philosophical perspective that would polarise the “heterogeneous theoretical and epistemological premises” in qualitative case study research (Ketokivi & Choi, 2014:232).

3. Research method

This section considers the methodology and theoretical paradigm that constitute the research design.

3.1. Methodology

The research problem lends itself to case study methodology, as the research aim suggests a ‘how’ type question, in which there is little control over events and focus is of a contemporary complex phenomenon as described by Yin (2014). Eisenhardt (1989) argues that this methodology is appropriate particularly as it gives rich insight into complex social phenomena.

3.2. Philosophical paradigm

However well the methodology suits the research aim, there is still the matter of selecting a theoretical paradigm that underpins the research strategy. In this case, to be determined by the ‘double hermeneutic’ concepts of the researcher’s worldview and also the dimension of the research problem, i.e. pragmatic theory development of complex systems and subjective meaning making of socially produced realities. There are several obvious philosophical dimensions for consideration as defined by the research problem (see Appendix 1).

While all paradigms underpin empirical research, they have different views on how knowledge is produced and made sense of, thus impacting on the theory. *Table 1* highlights the critical knowledge built on the positivist and post-positivist worldviews in comparing two articles. When the two research

paradigms are compared, it is obvious that both advocate Chalmers (1999) claim that theory is valid if the theoretical framework is coherent, precise and informative and Meredith's (1992) call for greater methodological rigour in theory building. However, they differ on two levels: how knowledge is produced and the level of influence of respective philosophical paradigm.

Table 1 Comparison of positivist and post-positivist worldviews and approaches to qualitative case study methodology and theory development.

	Barratt, M., Choi, T.L. & Li, M. (2011) 'Qualitative case studies in operations management: Trends, research outcomes, and future research implications'.	Dubois, A. & Araujo, L. (2007) 'Case research in purchasing and supply management: Opportunities and challenges'.
Worldview	Positivist	Post-positivist critical realism
Context	Real world	Open system
Key argument framework	Inductive & deductive approaches to theory development	Qualitative & quantitative methods in theory development
Agenda	Theory building research protocols	Variety of theoretical agendas and appropriate methods
Research design	Specific	Versatile
Role of existing theories	<i>"Case studies are primarily used to develop new theories... the use of a priori constructs help shape the initial design of theory building research... (but) should not be in the resultant theory"</i> (2011:330)	<i>"The absence of well-established theoretical frameworks is an obstacle to debate on the methodological front, and adopting theory-infused, off-the-shelf methods risks sacrificing theory development on the altar of methodological rigour"</i> (2007:171)
Data gathering	Quantifiable dimensions	Thick description
Data analysis	Triangulation of multiple sources	Triangulation of multiple sources
Generalising to theory (see Table 4 for more detail)	Multiple (4-10) cases produces more rigorous and valid generalizable theory, i.e. "augment external validity and help guard against observer bias... provides increased reliability of data Y stronger substantiation of constructs and propositions" (2011:331)	Differentiates between analytical and statistical theoretical generalisation
Citation mapping	Benbasat et al. (1987); Bonoma (1985); Meredith, Raturi, Amoako-Gyampah & Kaplan (1989); Meredith (1989); Roth (2007); Yin (1994)	Kuhn (1970); Mitchell (1983); Ragin (1997); Stuart et al. (2002)

There is a need for richer, descriptive qualitative research, which interpretivism offers through multiple philosophical perspectives, such as hermeneutics, phenomenology and social constructivism.

The positivist approach generally considers single case studies, which offer detailed study of the research problem, as producing less generalizable theory. However, the critical realist approach argues the case for generalising to theory, i.e. analytical generalisation, no matter what the case size (Easton, 2010). In order to address the call for pragmatism, Mead's sociological philosophy can be found in multiple paradigms such as interpretivism - predominantly phenomenology and social interactionism (Crotty, 1998). However, while the research problem calls for an understanding of multiple subjective meanings, their inter-subjectivity and how these are communicated and structured in SCS, the problem is also complex and is better suited to critical realists understanding of open, complex, dynamic systems (Easton, 2010). In terms of the 'realist' dimension, Bhaskar's critical realism philosophical perspective, allows for the study of SC strategy structures and mechanisms objectively; while Harre (with an emphasis on the *constructionist* ontological view of social structures) allows for the *relativist* dimension of a more process-focused, dynamic world of constant activity and flux to be observed (Blaikie, 2007:145-151). This leads to the conclusion that while various philosophical paradigms have dimensions that contribute to understanding the research problem, critical realism is the best aligned in terms of both the research problem and this author's worldview.

4. Research questions

Embracing, at the heart of this paper, is the Kuhnian notion that what is critiqued is not the author's worldview but the impact of it on the research problem at hand and research field at large. Also, the understanding that each research paradigm offers its own meaning in a plurality of perspectives as discussed by Burrell and Morgan (1985). The purpose is to understand the philosophical dimensions of the research problem in terms of the research design and the researcher's worldview helping the researcher position her work within the research field. A summary of the findings leads to the following research questions in the context of the research problem:

1. What is supply chain strategy?
2. What are the processes by which sustainability is integrated and implemented along the supply chain?
3. What are the barriers and challenges in integrating sustainable processes across the supply chain?
4. How do focal firms integrate sustainability processes into supply chain strategies?

References

- Ahi, P. and Searcy, C. (2013) 'A comparative literature analysis of definitions for green and sustainable supply chain management.' *Journal of Cleaner Production*, 52(0), 8/1/, pp. 329-341.
- Barratt, M., Choi, T. Y. and Li, M. (2011) 'Qualitative case studies in operations management: Trends, research outcomes, and future research implications.' *Journal of Operations Management*, 29(4), May, pp. 329-342.
- Beamon, B. M. (1998) 'Supply chain design and analysis:: Models and methods.' *International Journal of Production Economics*, 55(3), 8/15/, pp. 281-294.
- Blaikie, N. (2007) *Approaches to social enquiry*. 2nd ed., Cambridge: Polity Press.
- Boons, F., Baumann, H. and Hall, J. (2012) 'Conceptualizing sustainable development and global supply chains.' *Ecological Economics*, 83, Nov, pp. 134-143.
- Brandenburg, M., Govindan, K., Sarkis, J. and Seuring, S. (2014) 'Quantitative models for sustainable supply chain management: Developments and directions.' *European Journal of Operational Research*, 233(2), 3/1/, pp. 299-312.
- Burgess, K., Singh, P. J. and Koroglu, R. (2006) 'Supply chain management: a structured literature review and implications for future research.' *International Journal of Operations & Production Management*, 26(7), 2006, pp. 703-729.
- Burrell, G. and Morgan, G. (1985) *Sociological paradigms and organisational analysis: elements of the sociology of corporate life*. Aldershot Gower
- Carter, C. R. and Rogers, D. S. (2008) 'A framework of sustainable supply chain management: moving toward new theory.' *International Journal of Physical Distribution & Logistics Management*, 38(5-6), 2008, pp. 360-387.
- Chalmers, A. F. (1999) *What is this thing called science?* 3rd ed., Buckingham: Open University Press.
- Crotty, M. (1998) *The foundations of social research: meaning and perspective in the research process*. London: SAGE.
- Dubois, A. and Araujo, L. (2007) 'Case research in purchasing and supply management: opportunities and challenges' *Journal of Purchasing and Supply Management*, 13(3) pp. 170-181.
- Easton, G. (2010) 'Critical realism in case study research.' *Industrial Marketing Management*, 39(1), Jan, pp. 118-128.
- Eisenhardt, K. M. (1989) 'Building Theories from Case Study Research.' *Academy of Management*, 14(4) pp. 532-550.
- Flynn, B. B., Sakakibara, S., Schroeder, R. G., Bates, K. A. and Flynn, E. J. (1990) 'Empirical research methods in operations management.' *Journal of Operations Management*, 9(2) pp. 250-284.
- Georgakopoulou, A. and Goutsos, D. (2004) *Discourse analysis: an introduction*. 2nd ed. ed., Edinburgh Edinburgh U.P.
- Gold, J., Holman, D. and Thorpe, R. (2002) 'The role of argument analysis and story telling in facilitating critical thinking.' *Management Learning*, 33(3) pp. 371-388.

- Hammersley, M. (1992) 'The Paradigm Wars: Reports From the Front.' *British Journal of Sociology of Education*, 13(1) pp. 131-143.
- Hammersley, M. (2005) 'Should social science be critical?' *Philosophy of Social Sciences*, 35(2) pp. 175-195.
- Hassini, E., Surti, C. and Searcy, C. (2012) 'A literature review and a case study of sustainable supply chains with a focus on metrics.' *International Journal of Production Economics*, 140(1), 11//, pp. 69-82.
- Jones, C., Hesterly, W. S. and Borgatti, S. P. (1997) 'A GENERAL THEORY OF NETWORK GOVERNANCE: EXCHANGE CONDITIONS AND SOCIAL MECHANISMS.' *Academy of Management Review*, 22(4) pp. 911-945.
- Ketokivi, M. and Choi, T. (2014) 'Renaissance of case research as a scientific method.' *Journal of Operations Management*, 32(5), Jul, pp. 232-240.
- Kuhn, T. S. (1996) *The Structure of scientific revolutions*. 3rd ed. ed., Chicago; London: University of Chicago Press.
- Meredith, J. (1992) 'Theory building through coconceptual methods.' *International Journal of Production Management*, 13(5) pp. 3-11.
- Meredith, J. (1998) 'Building operations management theory through case and field research.' *Journal of Operations Management*, 16(4) pp. 441-454.
- Miemczyk, J., Johnsen, T. E. and Macquet, M. (2012) 'Sustainable purchasing and supply management: a structured literature review of definitions and measures at the dyad, chain and network levels.' *Supply Chain Management-an International Journal*, 17(5), 2012, pp. 478-496.
- Naudé, P. and Turnbull, P. W. (1998) *Network dynamics in international marketing*. Oxford: Pergamon
- Orlikowski, W. J. and Baroudi, J. J. (1991) 'Studying Information Technology in Organizations: Research Approaches and Assumptions.' *Information Systems Research*, 2(1) pp. 1-28.
- Russell, B. (1967) *The problems of philosophy*. Oxford: Oxford University Press.
- Sarkis, J. (2003) 'A strategic decision framework for green supply chain management.' *Journal of Cleaner Production*, 11(4), 2003, pp. 397-409.
- Seuring, S. and Müller, M. (2008) 'From a literature review to a conceptual framework for sustainable supply chain management.' *Journal of Cleaner Production*, 16(15), 10//, pp. 1699-1710.
- Seuring, S. A. (2008) 'Assessing the rigor of case study research in supply chain management.' *Supply Chain Management-an International Journal*, 13(2), 2008, pp. 128-137.
- Shook, C. L., Adams, G. L., Ketchen, D. J., Jr. and Craighead, C. W. (2009) 'Towards a "theoretical toolbox" for strategic sourcing.' *Supply Chain Management-an International Journal*, 14(1), 2009, pp. 3-10.
- Stuart, I., McCutcheon, D., Handfield, R., McLachlin, R. and Samson, D. (2002) 'Effective case research in operations management: a process perspective.' *Journal of Operations Management*, 20(5), Sep, pp. 419-433.

Taticchi, P., Garengo, P., Nudurupati, S., Tonelli, F. & Pasqualino, R. (2014) 'A Review of Decision-Support Tools and Performance Measurement for Sustainable Supply Chain Management.' *International Journal of Production Research*, Special Issue Paper, TPRS-2013-IJPR-1633.R4.

Vachon, S. and Klassen, R. D. (2008) 'Environmental management and manufacturing performance: The role of collaboration in the supply chain.' *International Journal of Production Economics*, 111(2), Feb, pp. 299-315.

Vurro, C., Russo, A. and Perrini, F. (2009) 'Shaping Sustainable Value Chains: Network Determinants of Supply Chain Governance Models.' *Journal of Business Ethics*, 90, 2009, pp. 607-621.

Walker, H. and Jones, N. (2012) 'Sustainable supply chain management across the UK private sector.' *Supply Chain Management-an International Journal*, 17(1), 2012, pp. 15-28.

Wolf, J. (2011) 'Sustainable Supply Chain Management Integration: A Qualitative Analysis of the German Manufacturing Industry.' *Journal of Business Ethics*, 102, 221-235.

Yin, R. K. (2014) *Case Study Research: Design & Methods*. 5th ed., California: SAGE Publications.

Appendix I

Summary of philosophical dimensions arising from characteristics of the research problem

PHILOSOPHICAL DIMENSIONS	RESEARCH PROBLEM ISSUE	AUTHOR(S)
RICH DESCRIPTIVE QUALITATIVE RESEARCH	Progenitor research community of logistics, operations and supply chain management and their research paradigm dominated by positivism and mathematical modelling. Lack of 'descriptive, empirical Investigation'.	Meredith (1992); Brandenburg et al. (2014); Taticchi et al. (2014)
EMPIRICAL RESEARCH	The majority of research into sustainable supply chains has been empirical to create a conceptual understanding using theoretical frameworks of this nascent grounded in data from the real world.	Burgess et al. (2006); Seuring & Müller (2008); Walker & Jones (2012); Hassini et al. (2012)
PRACTICALITY	Gap between theory building and its application by industry.	Meredith (1992) Taticchi et al. (2014)
COMPLEX OBJECTIVE SYSTEMS	Supply chains (SCs) are an integrated production process consisting of raw material, manufacturing, warehousing, distribution and retail from the supplier upstream to the customer downstream. SSCM focuses on increasingly complex strategies and operations to meet the sustainability agenda. SC characteristics consist of a broad range of macro and local elements.	Vachon & Klassen (2008); Sarkis (2003); Beamon (1998)
MULTIPLE SUBJECTIVE MEANINGS	The research explores the 'sustainable' component of sustainable supply chain management (SSCM) from multiple theoretical perspectives, the foci of disciplines and stakeholder perceptions and preferences. Boons et al. (2012) refer to this as a Bateson-esque 'ecology of ideas' from the trans-disciplinary discourses of various research communities.	Carter & Rogers (2008); Sarkis (2003); Burgess et al. (2006); Shook et al. (2009); Ahi & Searcy (2013); Walker & Jones (2012); Boons et al. (2012)