# The governance of supply networks: a systematic literature review

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**Abstract**

**Purpose** – The purpose of this paper is to establish what is known regarding how supply network governance leads to network outcomes, what mechanisms underlie this relationship, and how context impacts it.

**Design/methodology/approach** – A systematic literature review identified 44 conceptual and empirical studies. Purely dyadic studies were excluded. Synthesis used the context-intervention-mechanism-outcomes (CIMO) logic.

**Findings** – From a categorization of contexts, governance instruments, mechanisms and outcomes a contingent conceptual framework is developed in the paper relating governance instruments to network outcomes dependent on the context. In general, formal instruments are adopted in dynamic and unstable circumstances defined as risky, uncertain, unpredictable or during organizational change. These instruments can result in coordination, control, viability and performance outcomes. Informal instruments tend to be adopted in contexts where prior relationships exist between actors.

**Research limitations/implications** – Arising from the conceptual framework three robust propositions are developed. A more nuanced view of power and trust is proposed to augment the explanations provided by transaction costs and social embeddedness. This provides opportunities for further research, including longitudinal and comparative studies.

**Practical implications** – The conceptual framework provides three propositions suggesting that in dynamic or unstable circumstances formal governance instruments can provide viability, control, coordination or performance outcomes. Informal governance instruments are more effectively used in established relationships to improve performance, control and viability.

**Originality/value** – The synthesis reveals contingencies in the appropriate governance modes of supply networks for desired outcomes in specific contexts, resolving apparent inconsistencies between prior studies.

**Keywords** Supply network, Governance, Trust, Power, Systematic review, Supply chain management

**Paper type** Literature review

## Introduction

Early research on supply chains focused primarily on dyadic interactions between buyers and suppliers (Giunipero *et al.*, 2008). Following Oliver and Webber's (1982) article recognizing the embedded nature of these dyadic relationships between firms in a supply network, there have been frequent calls (Anderson *et al.*, 1994; Choi *et al.*, 2001; Olsen and Ellram, 1997) for studies to focus on the entire supply network rather than on interactions between isolated pairs of firms. Supply networks "consist of interconnected entities whose primary purpose is the procurement, use and transformation of resources to provide packages of goods and services. Supply networks comprise chains through which goods and services flow from original supply sources to end customer" (Harland *et al.*, 2001, p. 22). Similarly, "supply networks are characterized by sets of purposeful and connected exchange relationships which may change over time ... in the performance of production tasks" (Andersen and Christensen, 2005, p. 1261).

A shift in focus from dyads to networks increases the variety of possible outcomes pursued within a supply network. While improved performance through greater efficiency and effectiveness is an objective common to both dyads and networks, foci on greater legitimacy or increasing flexibility, for example, may not be evident in dyads but are observed in networks (Choi *et al.*, 2001; Gaggio, 2006; Stephen and Coote, 2005). In addition, supply networks also focus on better alignment or closer integration (Barratt, 2004). From a supply network perspective therefore, a key issue for practitioners and scholars alike is understanding the functioning of networks so that we can "better understand why [supply] networks produce certain outcomes" (Provan and Kenis, 2008, p. 229). Specifically, we ask "how do

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governance instruments secure specific outcomes in given supply network contexts?"

Network governance refers to the set of instruments that coordinate participating organizations to deliver network outcomes (Grandori and Soda, 1995). Although a range of governance instruments (such as contracts, standards and social norms) has been identified, principally from research into dyadic relationships, their link to particular outcomes in the widely diverse contexts of supply networks has not been investigated systematically, so it remains unclear how specific outcomes can be achieved. For example, Cooper *et al.* (1997) suggest that performance is improved by using informal governance instruments, while Jaehne *et al.* (2009) contend that performance improvement is achieved through formal governance instruments. This inconsistency in the outcomes, achieved by the application of particular governance instruments, may be attributable to differences in context. In a review of literature, von Hagen and Alvarez (2011) indicated that contextual factors determine whether voluntary sustainability standards were used by powerful retailers differentially as either an enabler of "hands-off" coordination or close collaboration. For example Smith and Barrientos (2005) contrast supermarkets' adoption of Fair Trade standards. Currently, the role context plays in determining network outcomes in response to different governance instruments can only be determined by synthesis across multiple context-specific studies.

Shifting the emphasis from dyads to networks also enlarges the scope of contextual factors that may influence the connection between governance instruments and outcomes. Currently supply networks are operating in circumstances of increasing uncertainty or unpredictability and greater risk or vulnerability (Christopher and Lee, 2004). Greater reach and fragmentation of supply networks are both causes of uncertainty and vulnerability associated with globalization (Bitran *et al.*, 2007). Moreover, the inclusion of multiple players in a supply network may introduce additional objectives such as social responsibility and ethical considerations, which are perhaps less frequently visible in the consideration of isolated dyadic relationships, but increase risk and add to unpredictability (Nadvi, 2008). In addition, multiple players introduce a greater range of possible relational dynamics (Achrol, 1997) based, for example, on difference in organizational size, expertise and competency. Typically these relational dynamics are underpinned by differences in power relations and trust between actors as identified for supply chains by Barratt (2004).

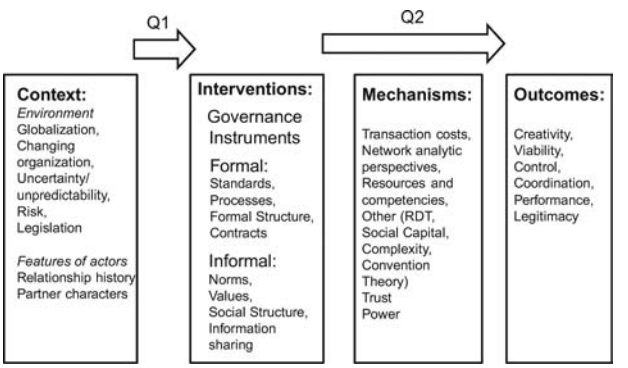
In this article we synthesise this fragmented, partial and seemingly inconsistent literature by developing a contingent conceptualization of the relationships between context, governance instruments and network-level outcomes, drawing upon the findings from a systematic review of the literature addressing the question, "How do governance instruments secure specific outcomes in given supply network contexts?". To achieve this we develop an analytic framework drawing on the design science paradigm, which seeks to develop knowledge to design interventions or systems for improved outcomes (Van Aken, 2004). Following the logic of prescription, research in the design sciences offers design propositions so that "if you want to achieve outcome O in context C, then use intervention type I" (Denyer *et al.*, 2008, p. 395). In supply networks, outcomes appear to be critically dependent on context (C) so that there is not necessarily a direct algorithmic relationship between intervention (I) and outcome (O), but rather a contingent relationship. Design propositions therefore offer information on what to do, in which situations, to produce what effect. Extending this logic of prescription to include causality, Denyer *et al.*(2008) encourage the identification of the generative mechanism (M), or theory, through which the intervention produces the outcome in the particular context in order to offer some understanding of why the outcome occurred. Adopting this CIMO-logic in a simple contingent contextual framework (Figure 1) we suggest that the instruments of supply network governance (I) may produce different supply network outcomes (O) based on different mechanisms (M) depending upon the specific supply network context (C). The framework provides the basis for synthesizing and reporting the findings from the systematic literature review.

Here we make two key contributions. First, since very few studies simultaneously embrace all four of context, intervention, mechanism and outcome, our conceptual framework permits the synthesis of literature on the governance of supply networks. Based on the more commonly supported relationships between these elements we are able to develop three general propositions. We also show how the framework may be used as a tool for analysing the governance of supply networks consisting of more than two members.

Our second contribution examines the role of trust and power as alternative mechanisms to the more conventional mechanisms of transaction costs and various network perspectives to explain the efficacy of particular governance instruments in delivering specific outcomes in different contexts. We suggest a more nuanced conceptualization of both trust and power that enhances further their explanation of supply network outcomes.

This article begins by describing the method adopted in this literature review. Overview findings describe the state of development of the field and reveal what is known concerning the context, governance instruments and outcomes of supply networks and the interrelationship between context and instruments (*i.e.* what is used in which circumstances?) and between instruments and outcomes (*i.e.* what outcomes arise from which instruments?). An investigation of the theoretical perspectives taken suggests possible explanatory mechanisms linking context, instruments and outcome. Recognizing that

**Figure 1** A conceptual framework for addressing the question "How do governance instruments secure specific outcomes in given supply network contexts?" based on CIMO-logic and showing the positioning of two sub-questions



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supply networks have an inherent social structure, we consider how the important relational constructs of power and trust provide alternative and equally satisfactory explanatory mechanisms, especially if a more granular view of trust and power is adopted.

## Methods

We apply a Systematic Literature Review methodology (Tranfield *et al.*, 2003; Denyer and Tranfield, 2009), in which there is a comprehensive search for relevant studies on a specific topic, which are then appraised and synthesized according to a pre-determined explicit method (Klassen *et al.*, 1998). Providing comprehensive coverage of the literature and ensuring comparability for repeated future searches, this method follows a series of ten steps that can be grouped into five main phases:

1 planning;
2 searching;
3 screening;
4 extraction and synthesis; and
5 reporting.

### Planning

In the first phase the main question guiding the review was defined by the authors through discussion with additional colleagues. The review question is:

> "How do governance instruments secure specific outcomes in given supply network contexts?"

Following other authors (Pittaway *et al.*, 2004; Rashman *et al.*, 2009) we adopted a strategy based on deconstructing the review question into two sub-questions each with their own sub-sections.

1 What contextual factors influence the selection of governance instruments in supply networks?
   - The contexts in, which supply networks have been investigated.
   - The governance instruments, which have been used as interventions in supply networks.
   - The impact of context on governance instrument selection.
2 How do governance instruments influence supply network outcomes?
   - Possible outcomes of supply networks.
   - The impact of governance instruments on supply network outcomes.
   - Theoretical mechanisms underpinning the instrument-outcome relationship.

### Searching

The search and review method was guided by the process outlined by Tranfield *et al.* (2003). All relevant sources of literature were identified by:

- The identification of the main keywords used in the different streams of literature. These keywords were later used to build search strings, which were applied to an electronic academic database.
- The identification of relevant book sections and other publications that were not covered by this database.
- The review of the references used in previous related literature reviews.
- The review of the work of influential authors in the field.
- The identification of key articles and book sections providing background information on specific topics from other sources, including colleagues.

The definition of search terms aimed at generating a list of articles that would be "both wide enough to recall a sufficient quantity of references and precise enough, in the light of information explosion, to eliminate unnecessary material" (Duff, 1996, p. 15). Table I lists the keywords that were used in the search of the database. Alternative words were found for different terms to address the divergence in terminology used by different areas of literature. A list of publications and terms that would be captured unintentionally by the proposed search but were deemed not relevant for this research are shown also in Table I. These were excluded in the review. The selected keywords were then used to construct search strings with Boolean connectors (AND, OR, AND NOT).

The strings were then used to search for titles and abstracts containing these terms among scholarly (peer reviewed) journals in the ProQuest database (ProQuest LLC, 2009) during the summer of 2010, which resulted in 1,433 titles being identified. The search string was saved in the database as well as all the titles for an initial screening.

### Screening

A first screen based on the relevance of the title to the object of study and the subsequent elimination of duplicates resulted in the retention of 212 documents for a more in-depth review of the abstract. These results were then exported to a reference management software package, Refworks (Refworks, 2007) for further review. Relevant papers were then selected using explicit inclusion and exclusion criteria (Table II) and quality criteria covering alignment between research questions, chosen methods and execution of research, methodological rigour and contribution to knowledge (Miles and Huberman, 1994). Selection was carried out by firstly reviewing the abstracts and then, in a second step, reviewing in full the papers that were provisionally selected on the basis of the abstract. A total 177 papers were rejected based on the abstract mainly because they focused on dyads rather than on whole networks. A further six were rejected based on full papers, leaving 29. In addition to these journal papers identified using the electronic database, six further studies were identified from a previous study on a related topic (Gereffi *et al.*, 2005; Grandori and Soda, 1995; Nassimbeni, 1998; Ponte and Gibbon, 2005; Provan *et al.*, 2007; Provan and Kenis, 2008). A further source (Sacchetti and Sugden, 2003) was included because it had been referenced in one of the selected studies and a book chapter (Humphrey and Schmitz, 2001) was identified as another additional source. An additional seven articles (Bitran *et al.*, 2007; Blowfield and Dolan, 2010; Laeequddin *et al.*, 2009; Lee, 2004; Olson, 2010; Rao and Goldsby, 2009; Simatupang and Sridharan, 2008) were identified by colleagues. This resulted in a total of 44 studies, which were then coded and analyzed. These are indicated by an asterisk in the reference list. All of the reviewed papers focused on:

- relationships at the network level (i.e. beyond the dyad); and
- aspects of the governance of supply networks.

**Table I** Keywords and search terms used in the systematic review

| Network | | Supply | | Governance | | Not relevant publications | Not related terms |
|---|---|---|---|---|---|---|---|
| **Network OR** | | Supply OR | | Governance OR | | health OR | Electr* OR |
| **Alliance OR** | | Procurem* OR | | Control OR | | environmental monitoring OR | merger OR |
| **Consort* OR** | | Chain OR | AND | Coordination OR | AND | computer OR | acquisition OR |
| **Partner* OR** | | Vertical | | Decision OR | NOT | IEEE OR | biolog* OR |
| **Collab*** | | | | Norm* OR | | Multimedia OR | psychology OR |
| | | | | Contract* | | Omega OR | semiconductor OR |
| | | | | | | Systems | fuzzy OR |
| | | | | | | | medical OR |
| | | | | | | | model* OR |
| | | | | | | | neural OR |
| | | | | | | | web OR |
| | | | | | | | facilit* OR |
| | | | | | | | wireless OR |
| | | | | | | | carrier OR |
| | | | | | | | VoIP OR |
| | | | | | | | circuit OR |
| | | | | | | | urban* OR |
| | | | | | | | inventory OR |
| | | | | | | | intermodal |

### Extraction and synthesis

A summary of the information contained in each article was prepared using a spreadsheet format organized under descriptive, methodological and thematic categories (Table III) following discussion and initial review. Descriptive information was extracted and because of the diversity of contexts, interventions, mechanisms and outcomes considered by individual papers rather than describing each paper in detail, we developed a set of more general categorizations for each of the four elements of the framework (Figure 1). The coding of the data was conducted independently by two authors; where their views differed, the issue was discussed until consensus was reached, with the involvement of the third author as necessary. This is consistent with standard practice (Jarvis *et al.*, 2003).

There are a number of alternative approaches to synthesis in reviewing literature systematically. Where empirical data have been collected in the same way to address the same research question the statistical procedure of meta-analysis is possible with increased reliability of the findings (Tranfield *et al.*, 2003). Heterogeneous data, which form the basis of this review, are much less amenable to this type of aggregative synthesis (Denyer and Tranfield, 2009), but more amenable to interpretative and inductive methods of synthesis. Since we are seeking to resolve a field problem (Denyer *et al.*, 2008), to determine what works in which circumstances, we have

**Table II** Criteria for including papers in the systematic review

| | Rationale |
|---|---|
| *Inclusion criteria* | |
| **Publication in peer reviewed journals** | Peer reviewed journals are likely to be of higher quality than other non-peer reviewed documents such as Conference papers, working papers, etc |
| **Papers have to have networks or inter-organizational relationships as a main theme** | The focus of the research is to study networks and network relationships |
| **Selection of papers will be open to any time frame** | The field has developed significantly since the 1980s but seminal papers date from much earlier |
| **Theoretical, empirical studies and review papers, either qualitative or quantitative papers** | Different approaches have contributed to the research area |
| *Exclusion criteria* | |
| **Paper focuses on dyadic relationships only** | The objective of the research was to identify governance issues related to networks formed by at least three organizations |
| **Papers related to topics where the focus is not on network relationships** | A vast body of literature addresses the topic tangentially but the focus is not on the relationships between organizations |
| **All studies or publications in any language other than English, Spanish, French, Portuguese, Italian** | These languages are the ones that the researchers involved in the review could read |
| **Editorial comments** | Editorial articles and comments on papers were only used as reference to the identified articles and not specifically reviewed |

**Table III** Categories used in extracting and analyzing data in the systematic review

| Area | Category | Information |
|---|---|---|
| **Descriptive** | Year | Year of publication |
| | Journal | Journal in which it was published or indication of book section, Conference proceedings if applicable |
| | Title | Complete title of the paper |
| **Methodology** | Paper type | Identify if the paper is analytical, empirical or if it is a literature review<br>Analytical papers are further categorized as conceptual, mathematical or statistical<br>Empirical papers are categorized as experimental design, statistical sampling, case studies and mixed methods |
| | Theoretical lens | Identify the theoretical paradigm present in the study and from which the analysis of the data has been executed |
| | Sampling | If samples were used, this category identifies: sample size, size of network, industry or country |
| | Unit of analysis | Distinguishes the unit of analysis used in the study such as individuals, firm, teams, networks or sub-networks |
| | Perspective | Identifies the use of longitudinal or cross-sectional approaches in the research |
| **Thematic** | Purpose | Single party or shared objectives for setting up a network |
| | Context | Economic, political, social conditions surrounding the network creation. Context within which the network operates |
| | Intervention (Lead) | Lead organization influential on making decisions regarding the network structure and coordination mechanisms |
| | Governance mechanisms | General information about coordination mechanisms used in the network |
| | Instruments | Specific instruments used for coordination of the network such as formal instruments (contracts, pledges, etc.), informal ones (norms, social mechanisms) or private or public standards |
| | Processes and systems | Information, communication and control processes and systems used in the network |
| | Structure and embeddedness | Connections among organizations both within the network and embedded in larger social and economic structures |
| | Coordination dynamics | Evolution of governance characteristics over time |
| | Mechanisms – Trust | Sources and uses of trust in the network |
| | Mechanisms – Power | Sources and uses of power in the network |
| | Network outcomes | Effects of having participated in the network for the network as a whole or for an individual organization (ex. upgrading opportunities, efficiency, innovation, etc) |
| | Other | Any other information presented in the study that is relevant for this research |

followed the guidance of Rousseau *et al.*(2008) in adopting an explanatory method of synthesis, in this case realist synthesis following CIMO-logic.

### Reporting

Here we use the sub-questions as a structure for reporting the findings from this review. Where there is both conceptual and empirical evidence to support the relationship between formal and informal governance instruments and either outcomes or contexts we feel more confident to integrate the findings. This we do through a series of three propositions. The theoretical mechanisms suggested by the review of the literature are then discussed separately and further augmented by a wider consideration of trust and power.

## Findings

A descriptive background to the analysis of thematic findings that follows is provided by locating them in terms of the chronology of the research and the nature of the studies.

### Studies over time

Even though the selection criteria did not place a restriction on the date of publication, only one article dates from the 1980s (Skinner *et al.*, 1987) and most have actually been published over the last decade, with 38 of the 44 studies being published since 2001 reflecting the increasing research focus on multi-actor networks. This accords with both Burgess *et al.*,'s (2006) and Giunipero *et al.*,'s (2008) observation of increasing publication in supply chain management since 2000.

### Nature of studies

The 44 selected documents were balanced across conceptual papers (19) and empirical papers (21). The remaining 4 were literature reviews (Bair, 2008; Belaya *et al.*, 2009; Provan *et al.*, 2007; Rao and Goldsby, 2009). The empirical papers were mainly case studies of organizations in a single context focusing on a specific issue, though a few (Fawcett *et al.*, 2006; Rooks *et al.*, 2006; Skinner *et al.*, 1987; Wathne and Heide, 2004) were based on survey data from the retail, information systems, agriculture and apparel industries.

### The contexts in which supply networks have been investigated

In common with other reviews (Burgess *et al.*, 2006) we find that the reviewed literature covers a number of different industry sectors ranging from agriculture to manufacturing. This diversity makes the synthesis of findings difficult. Nevertheless, by a process of abstraction, we identify

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six distinct categories of contextual circumstance (Tables IV and V):

1 globalization;
2 changing organizational structure or technology;
3 uncertainty or unpredictability;
4 risk;
5 legislation; and
6 partner characteristics/relationship history, where there is empirical evidence.

The conceptual development of supply network risk and also legislation is limited to a single article (Tables IV and V).

These six categories may represent more enduring themes, which permit more effective categorisation of supply network research, rather than the more ephemeral research focus reported in other reviews (Giunipero *et al.*, 2008) where research into particular topics or sectors appears to be short-lived.

## The governance instruments which have been used as interventions in supply networks

Governance instruments (such as value systems and formal and informal structures) which support and sustain cooperation and collaboration among organizations participating in a supply network to achieve common objectives may be differentiated into those that are formal and those that are informal (Tables IV and V).

Standards which specify the quality threshold for products or which specify the attainment or possession of particular criteria for participation are considered to be formal instruments, as are codified processes which permit supply network coordination. Legal contracts fall into the category of formal governance instruments. Defined structures either at an organizational level, such as network administrative organizations (NAOs) (Provan and Kenis, 2008), or at an individual level in terms of a specified role or particular functions that are pre-specified or even mandated, are also considered to be formal governance instruments. Each of these four types of formal governance instruments has been observed.

In contrast, governance instruments arising from embedding in a social structure and the attendant development of social norms that encourage or discourage particular behaviours at both an individual and organizational level (Jones *et al.*, 1997) are here defined as informal instruments. Information sharing, too, that is not obligated as part of a shared information system or required as part of a formal monitoring or reporting process is considered to be an informal instrument of governance, as are value systems, schema and culture. Barratt (2004) identified a similar list of informal governance instruments. These four types of informal governance instrument have been found in the articles reviewed here.

All categories of governance instrument in Tables IV–V contain both conceptual and empirical studies, although formal governance instruments have had more conceptual development and been subject to more empirical investigation than informal governance instruments. These generalizations leave considerable scope for more detailed specification both conceptually and empirically of different types of governance instruments in a supply network context.

## The impact of context on governance instrument selection

More than two thirds of conceptual and empirical papers considered both context and governance instruments (Tables IV and V). Using each of the six different contextual circumstances described above we now identify the governance instruments associated with each of them.

*Globalization*

Conceptually each of the governance instruments, except standards, has been invoked in response to globalization. Empirically however, we found no studies that explored the influence of globalization on the use of informal governance instruments. Gorman and Webber (2010) in a study of Côte d'Ivoire's horticultural exports note the importance of standards, processes and formal structures for an increase in the export of pineapples following increased competition from Central America and harmonization of European Import policies. Unfortunately, despite effective governance, the industry shifted from Côte d'Ivoire to Ghana because of political stability.

*Changing organizational structure or technology*

Each of the governance instruments has been linked both conceptually and empirically to changing organizational structure or technology. Selection and adoption of particular governance instruments to support changing organizational structure or technology in supply networks were influenced strongly by industry type and by access to technology. In industries, which demand high flexibility in response to the market, such as the fashion industry, organizational structures tended to be decentralized with sub-contractors acting as connecting nodes in supply networks (Andersen and Christensen, 2005). Similarly changes in IT (particularly in business communications technology) permitted flexible organizational structures or roles, so that independent companies or NAOs (Provan and Kenis, 2008) were able to manage complex supply networks (Bitran *et al.*, 2007). Technology enabled control systems allowed the possibility of effectively governing hitherto unmanageable structures; the collaboration between decentralized members of a supply network.

*Uncertainty/unpredictability and risk*

While external environmental factors such as uncertainty have been widely studied in dyadic relationships, this is only the case to a limited extent in supply networks. Rao and Goldsby (2009) in their review showed that external risks including environmental and industry factors were managed. They noted that these two factors were composed of a number of uncertainties. Environmental factors included political, policy, macro-economic, social and natural uncertainty, whereas industry factors included risk uncertainties in both input and product markets and also through competition. Formal governance instruments were chosen which facilitated access to key resources and capabilities, thereby mitigating environmental and industry uncertainties.

Only a few empirical studies (Alvarez *et al.*, 2010; Réviron and Chappuis, 2005; Wathne and Heide, 2004) have explored formal and informal governance instruments in conditions of uncertainty. Both conceptually and empirically we found no studies exploring informal governance instruments in relation to risk and furthermore only a few studies of formal instruments and risk.

**Table IV** Context, governance instruments and outcomes reported by the conceptual papers in the systematic review

| | Achrol (1997) | Andersen and Christensen (2005) | Choi and Wu (2009) | Choi and Kim (2008) | Choi *et al.* (2001) | Cooper *et al.* (1997) | Crook and Combs (2007) | Gereffi *et al.* (2005) | Grandori and Soda (1995) | Humphrey and Schmitz (2001) | Jaehne *et al.* (2009) | Jain and Benyoucef (2008) | Nassimbeni (1998) | Olson (2010) | Ponte and Gibbon (2005) | Provan and Kenis (2008) | Sacchetti and Sugden (2003) | Sherer (2005) | Stephen and Coote (2005) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Context* | | | | | | | | | | | | | | | | | | | |
| Globalization | | × | | | × | | | | | | × | × | | × | | | | | |
| Changing organization (structures and technology) | | | | | × | | | | | | | × | × | | | | | | |
| Uncertainty/unpredictability | | | | | | | | | × | | | × | | × | | | | | × |
| Risk | | | | | | | | | | × | | | | | | | | | |
| Legislation | | | | | | | | | | | | | | | × | | | | |
| Partner characteristics/ relationship history | × | | × | | | | × | × | × | × | | | | | × | | × | × | |
| *Instruments* | | | | | | | | | | | | | | | | | | | |
| *Formal* | | | | | | | | | | | | | | | | | | | |
| Standards (for output and for participation) | | | | | | | | | | × | | | × | | × | | | × | |
| Processes (control systems, coordination) | | | | | × | × | | × | × | × | × | × | × | | | | × | × | |
| Structure – organizations/ roles functions | | | | | | × | | | × | | × | | | | | × | × | | × |
| Contracts | | | | | | | | | | | | | | | | | | | |
| *Informal* | | | | | | | | | | | | | | | | | | | |
| Norms | | | | | × | | | | | | | | × | | | | | | |
| Value systems, schema, culture | × | | | | × | × | | | | | × | | | | | | | | |
| Structure – relationships/ embeddedness | × | | × | | × | | | × | | | × | | × | | | × | | | × |
| Information sharing | | | × | | × | × | | | × | | × | × | | | × | | × | × | |
| *Outcomes* | | | | | | | | | | | | | | | | | | | |
| Creativity (innovation, new products and processes, learning) | | | | | × | | | | | | | × | | | | | | | |
| Viability (sustainability, adaptability, flexibility) | | × | | | × | | | | | | | | | | | | | | × |
| Control (predictability) | | | | | × | | | | | | | × | | | | | | | |
| Coordination (integration, management) | | | | | | × | | | | | | | | | | | | | |
| Performance (competitiveness, efficiency, effectiveness, productivity) | | | × | × | | × | | | | | × | × | | × | | × | | | |

*(continued)*

Table IV

| | Achrol (1997) | Andersen and Christensen (2005) | Choi and Wu (2009) | Choi and Kim (2008) | Choi et al. (2001) | Cooper et al. (1997) | Crook and Combs (2007) | Gereffi et al. (2005) | Grandori and Soda (1995) | Humphrey and Schmitz (2001) | Jaehne et al. (2009) | Jain and Benyoucef (2008) | Nassimbeni (1998) | Olson (2010) | Ponte and Gibbon (2005) | Provan and Kenis (2008) | Sacchetti and Sugden (2003) | Sherer (2005) | Stephen and Coote (2005) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Legitimacy | | | | | | | | | | | | | | | | | | | |
| Firm level outcomes | | | | | | | × | | | | | | | | | | | | |
| *Mechanisms implied by theory* | | | | | | | | | | | | | | | | | | | |
| Changes in transaction costs | | | | | | | | × | | | | | × | | | | × | | |
| Network analytic perspectives (incl. social embeddedness and social exchange) | × | | × | × | | | | | | | | | | | | | | | |
| Changes in resources and competencies (resource based view) | | | | | | | | × | | | | | | | | | | | |
| Other (resource dependency theory, social capital, complexity theory, convention theory) | | | | | × | | × | | | | | | | | × | | | | |
| Trust (I = implied. E = explicit) | E | | I | | | | | | | | E | E | | | | | E | | |
| Power (I = implied. E = explicit) | E | | E | | | | E | E | | | | | | | I | | E | | |

**Table V** Context, governance instruments and outcomes reported by the empirical papers in the systematic review

| | Ahmadjian and Lincoln (2001) | Alvarez *et al.* (2010) | Bertels and Vredenburg (2004) | Bitran *et al.* (2007) | Blowfield and Dolan (2010) | Elg and Johansson (1996) | Fawcett *et al.* (2006) | Gaggio (2006) | Goldbach *et al.* (2003) | Harland and Knight (2001) | Laeequddin *et al.* (2009) | Lee (2004) | Nadvi (2008) | Nikoloyuk *et al.* (2010) | Parrilli and Sacchetti (2008) | Peng *et al.* (2010) | Réviron and Chappuis (2005) | Rooks *et al.* (2006) | Simatupang and Sridharan (2008) | Skinner *et al.* (1987) | Wathne and Heide (2004) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Context* | | | | | | | | | | | | | | | | | | | | | |
| Globalization | | | | | × | × | | | | | × | | × | | | | | | | | |
| Changing organization (structures and technology) | | | | | | | | × | | × | × | | | | × | × | × | | | | |
| Uncertainty/ unpredictability | | × | | | | | | | | | | × | | | | | × | | | | × |
| Risk | | | | | × | | | | | | | | | × | | | | | | | |
| Legislation | | | | | × | | | | × | | | | × | | | | | | | | |
| Partner characteristics/ relationship history | × | × | × | | | × | | × | × | × | | | | | | | | | | × | |
| *Instruments* | | | | | | | | | | | | | | | | | | | | | |
| *Formal* | | | | | | | | | | | | | | | | | | | | | |
| Standards (for output and for participation) | | | | × | | | | | × | | | | × | × | | | × | | | | × |
| Processes (control systems, coordination) | | | | × | | | × | | | × | | | × | × | | | × | | | | |
| Structure – organizations/roles functions | × | | | | | × | × | × | | × | | | | × | | | × | | | | |
| Contracts | | | | | | | | × | × | | | | | | × | × | | × | | × | |
| *Informal* | | | | | | | | | | | | | | | | | | | | | |
| Norms | | | × | | | | | × | | | | | | | | × | × | | | | |
| Value systems, schema, culture | | | | | | | | × | | | | | | | | | × | | | | |
| Structure – relationships/ embeddedness | × | × | | × | | | | | | | | | | | | × | | | | | |
| Information sharing | | | | | | | | | | × | | | | | | × | | | × | | |
| *Outcomes* | | | | | | | | | | | | | | | | | | | | | |
| Creativity (innovation, new products and processes, learning) | | | | | | | | × | | | | | | | × | | | | | | |
| Viability (sustainability, adaptability, flexibility) | | | | | | | | × | | | | | | | × | | × | × | | | × |
| Control (predictability) | | | | × | | | | | × | × | | | | | | | × | | | × | |
| Coordination (integration, management) | | | | | | | | | × | × | | × | × | | | | | | | | |
| Performance (competitiveness, efficiency and effectiveness, productivity) | | | | | | | | | × | | × | | | × | | × | | × | × | | |
| Legitimacy | | | | | × | | | | | | | | | × | | | | | | | |
| Firm level outcomes | | | | | | | | | | | | | | | × | | × | | | | × |

*(continued)*

Table V

| | Ahmadjian and Lincoln (2001) | Alvarez *et al.* (2010) | Bertels and Vredenburg (2004) | Bitran *et al.* (2007) | Blowfield and Dolan (2010) | Elg and Johansson (1996) | Fawcett *et al.* (2006) | Gaggio (2006) | Goldbach *et al.* (2003) | Harland and Knight (2001) | Laeequddin *et al.* (2009) | Lee (2004) | Nadvi (2008) | Nikoloyuk *et al.* (2010) | Parrilli and Sacchetti (2008) | Peng *et al.* (2010) | Réviron and Chappuis (2005) | Rooks *et al.* (2006) | Simatupang and Sridharan (2008) | Skinner *et al.* (1987) | Wathne and Heide (2004) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Mechanisms implied by theory* | | | | | | | | | | | | | | | | | | | | | |
| Changes in transaction costs | × | × | × | | | | | × | × | | | | × | | × | × | × | × | | | × |
| Network analytic perspectives (incl. social embeddedness and social exchange) | | | | | | | | × | | | | | | | | | | × | | | |
| Changes in resources and competencies (resource based view) | | | | | | | | | | | | | | | × | × | | | | | |
| Other (resource dependency theory, social capital, complexity theory, convention theory) | | | | | | × | | | | | | | | | | | | | | × | |
| Trust (I = implied; E = explicit) | | I | E | | | | | E | I | | E | | | | | E | E | | | | |
| Power (I = implied; E = explicit) | I | | | | | I | | | I | | | | | I | | | | | | | |

*Legislation*
While government legislation can shape the governance requirements of a supply network, weak or non-existent legislation can stimulate a supply network to self-regulate (Lenox and Nash, 2003). Standards set either by a lead firm or by external agents (Humphrey and Schmitz, 2001) can provide effective and efficient instruments for governing supply networks (Nadvi, 2008; Nikoloyuk *et al.*, 2010; Ponte and Gibbon, 2005). Moreover, in circumstances with heightened ethical standards, companies may outsource the governance of the network to multi-stakeholder entities, which enjoy high consumer trust (Blowfield and Dolan, 2010). This allows them to operate under the protection of another organization tasked with managing the ethical standards of the value chain as Blowfield and Dolan (2010) have shown for the relationship between retailers and the bodies of the Fairtrade Movement.

*Partner characteristics and relationship history*
Relationships between organizations within a supply network play a critical role in determining whether governance instruments were formal or informal (Alvarez *et al.*, 2010). Typically, informal governance arrangements (norms, culture and values) characterized established relationships, whereas new relationships were more formally governed through contracts, although literature from outside this systematic review suggests that this may be ameliorated by the surrounding social structure (Granovetter, 1985). In established relationships organizations tended to be compatible, sharing common value systems (Achrol, 1997) or schema (Choi *et al.*, 2001) and often having similar cultures (Cooper *et al.*, 1997). This compatibility allowed the adoption of less formal governance instruments. Furthermore, successive collaborative relationships between organizations reduced behavioural uncertainty and so the need for elaborate formal contracts (Alvarez *et al.*, 2010), consistent with work outside the supply network context (Ariño and Reuer, 2004; Ring *et al.*, 2005).

In summary, many of the available empirical studies have investigated both informal and formal governance instruments in the contexts of changing organizational structure and of partner characteristics/relationship history. Inevitably these two are linked. With changes in organization structure or technology, existing relationships may be altered and new ones created. Necessarily this impacts governance instruments especially those based on shared norms or relational embeddedness. The role of informal governance instruments beyond these two contexts has received scant empirical attention. This is not so for formal governance instruments where there has been some conceptual development and empirical investigation of most instruments in every context. Our main findings are that in circumstances where the organizational structure of the supply network changes, both informal and formal governance instruments are deployed. Enduring relationships permit the adoption of informal governance instruments. In circumstances of risk or uncertainty then formal instruments are commonly deployed.

## Possible outcomes of supply networks

There were seven different categories of outcome identified in the reviewed papers (Tables IV-V). Six of these referred to network level outcomes: creativity; viability; control; coordination; performance; and legitimacy. These enable the supply network respectively to do something new or different, to endure which may require flexibility and adaptability, to reduce the risk of uncertainty both within the network and beyond, to organize, to deliver against expectations and to be recognised and valued by other actors beyond the network. The seventh outcome addressed differences among network members, identifying firm level outcomes.

A greater number of papers explored supply network outcomes empirically rather than conceptually. Conceptual papers typically considered single outcomes, although Cooper *et al.* (1997) for example, discussed both performance and coordination in the development of partnership alliances in supply networks. We found no studies conceptualising the development of legitimacy in a supply network and only one considering coordination. Empirical studies more often focused on a number of possible outcomes; nevertheless, for any particular outcome the number of studies was few which made generalization problematic, especially where the cases were from very different contexts and employed different governance instruments.

## The impact of governance instruments on supply network outcomes

Twelve of 21 reviewed empirical studies provide data to support the relationship between governance instruments and outcomes, where only seven articles conceptualise these relationships. Moreover, conceptual development of the connection between governance instruments and outcomes was reliant on two articles (Choi *et al.*, 2001; Cooper *et al.*, 1997). Without these there would be little or no conceptualization of how formal or informal instruments respectively affect outcomes, other than performance (Table IV). In contrast empirical studies typically link several instruments to more than one outcome, making it difficult to discern clear relationships. However, there is a stronger empirical support for a link between formal governance instruments and different supply network outcomes (particularly viability, coordination, control and performance) than for informal instruments (Table V).

Greater rates of innovation are anticipated with informal distributed governance arrangements (Andersen and Christensen, 2005; Jain and Benyoucef, 2008; Nassimbeni, 1998: Réviron and Chappuis, 2005: Stephen and Coote, 2005: Wathne and Heide, 2004) where formal control does not lie with a single organization. Conversely, greater inter-connectivity constrains individual organization action, which limits creativity (Choi *et al.*, 2001). Formal shared information systems, which permit greater efficiency (and improved performance) in supply networks (Jaehne *et al.*, 2009) by integrating participating organizations, reduce the propensity to innovate in the network (Choi *et al.*, 2001).

The viability of the supply network seems to be influenced by a mixture of formal and informal governance instruments, which provide on-going stability. Those networks built on prior relationships, often because of a defined inter-organizational structure, are more durable (Human and Provan, 2000) drawing on shared norms and values. Peripheral members of the network have the capacity to destabilize such networks and may cause them to fail (Baum *et al.*, 2003).

Achieving control of activities based on tangible exchanges within a supply network, as in the manufacture and supply of

products or services, is more commonly achieved by formal instruments, whereas informal instruments ensure control of less tangible exchanges linked to learning and innovation (Harland and Knight, 2001). While opportunities to achieve overt and systematic control of networks are an option for only the most powerful actors in the supply network, there are nevertheless opportunities for other actors to influence the network in more subtle ways (Harland and Knight, 2001). However, even when the focal company seeks to exert more control, this can be difficult if the number of suppliers is too large, or if they actively exchange information (Choi and Krause, 2006).

Coordination of dispersed supply networks is less costly and more effective when it is centralized and even conducted by a lead organization (Belaya *et al.*, 2009; Nadvi, 2008). Of course coordination of a supply network may be achieved through many different governance instruments operating in concert at different points and times within the network. Stephen and Coote (2005) commented that these plural forms of governance must be compatible and not conflicting across the multiple linked relationships in the network.

Standards provide an indirect formal medium of both control and coordination. In some cases they alter both the formal and informal pattern of relations, for example, by linking sub-contractors more closely to manufacturers (Nadvi, 2008). In other cases they formally embed processes and procedures into certification requirements locking accredited organizations into particular practices (Wathne and Heide, 2004). Maintaining such standards may promote legitimacy (Nikoloyuk *et al.*, 2010) and enhance viability (Réviron and Chappuis, 2005).

Performance improvements arising from the application of both formal and informal governance instruments to supply networks occur through improvements in efficiency (Cooper *et al.*, 1997). Provan *et al.* (2004) studied a network providing services to adults with serious mental illness managed by an NAO that integrates four sub-networks of At-Risk Providers (ARPs), themselves managed by lead providers. They observed that improved performance (i.e. reduced costs) was in this case achieved through changes in informal structural arrangements rather than through formal governance instruments.

There is only a small amount of research linking governance to legitimacy. The empirical evidence suggests that supply networks that are either formally managed by NAOs or endorsed by others having a high level of public trust enjoy heightened levels of legitimacy for their activities (Alvarez *et al.*, 2010; Blowfield and Dolan, 2010; Goldbach *et al.*, 2003; Nikoloyuk *et al.*, 2010).

In summary, supply network performance is seen as a key outcome affected by a variety of formal and informal governance instruments and influenced by other outcomes such as viability and coordination and control. When these increase, performance increases. Informal governance instruments appear to have greater utility for exchanging less tangible items such as ideas for innovation. Conversely, formal instruments are more commonly used to regulate processes and the exchange of products.

### Theoretical mechanisms underpinning the instrument-outcome relationship

New institutional economic theory, notably Transaction Cost Economics, has limited applicability in supply networks (Bertels and Vredenburg, 2004; Réviron and Chappuis, 2005) because networks lie between the ideal types of markets and hierarchy (Gereffi *et al.*, 2005). Yet, it is the most frequently used theoretical perspective to explain empirical studies of inter-organizational exchange in supply networks (Table V). In many cases this is because the focus of the particular study is on single transactional relationships between different parties in the network. Interventions lower the transaction costs between organizations allowing the achievement of supply network objectives. However, these individual contractual relationships are also socially embedded in a wider supply network (Granovetter, 1985; Uzzi, 1997) and so network analytic perspectives and theories of social exchange and social capital in particular are also used to explain some of the conceptual and empirical interactions between members of the supply network (Tables IV-V). Knowledge of the skills and capabilities of other parties permits more effective exchange relationships. Rarely, though, are these alternative perspectives combined; for an exception see Gaggio (2006). Moreover, the most frequent approach in both empirical and conceptual studies is to provide no explicit theoretical explanation for the observed or proposed interactions (Tables IV-V); interactions simply happen.

Half of the papers do, however, draw attention either implicitly or explicitly to the important roles played by trust or power, or by both, in influencing the exchange relationships within the supply network (Tables IV-V). Commonly they are mentioned explicitly in conceptual papers, but more often implicitly in empirical papers, perhaps suggesting difficulties with operationalizing these constructs in supply network contexts. For Sacchati and Sugden (2003, p. 570), supply networks "entail an idea of governance in production where power becomes a crucial determinant of the nature of the relationships between actors". Trust also is critical to understanding effective working in socially embedded supply networks (Choi and Wu, 2009), and appears to be a key mechanism allowing performance outcomes in risky or uncertain/unpredictable environments. In many cases, however, trust and power are used simply to describe the context of the network (Ponte and Gibbon, 2005) rather than to explain the nature of the relationships between actors. Moreover, trust and power are often presumed without a clear explanation of their characteristic features (Elg and Johansson, 1996; Goldbach *et al.*, 2003). Furthermore Achrol (1997) notes that power is not an undifferentiated construct, but rather there are different kinds of power having different forms. We examine the role of trust and power more fully in the discussion.

## Discussion

Addressing both of the sub-questions in this review has helped incrementally to provide some insights into the review question, "How do governance instruments secure specific outcomes in given supply network contexts?" Following the logic of prescription (Denyer *et al.*, 2008) a range of different contexts, instruments and outcomes were separately identified and categorised. Each of these three elements has been combined with another to explore their interaction. Based on the more robust findings (see method for a definition) and recognising that empirical data relating to mechanisms (with the exception of transaction costs) is sparse and therefore dealt with subsequently, we are able to develop a conceptual

framework (Figure 2) and so to offer the following propositions linking context, instruments and outcomes:

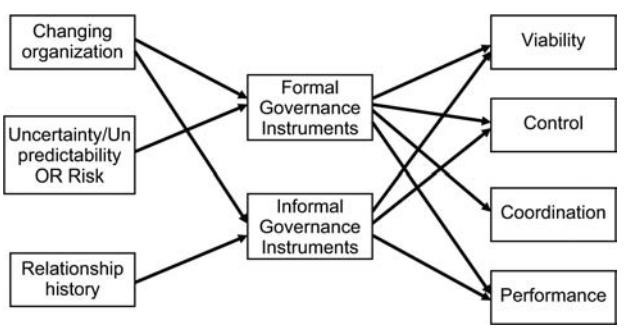
- In circumstances of changing organizational structure or technology, both formal and informal governance instruments are used to deliver viability, control, coordination and performance.
- In circumstances of uncertainty/unpredictability or risk, formal governance instruments provide increased viability, control, coordination and performance.
- As the history of relationships between partners increases, so the adoption of informal governance instruments is more likely leading to improvements in performance, control and viability.

There are, however, other contexts and alternative outcomes and it is unclear from this review whether all outcomes are possible in every context. There may be mutually exclusive, or managerially undesirable, combinations. For example, there may be no norms available in an uncertain or unpredictable environment upon which to base a shared understanding to agree desirable network level outcomes. Standards may be impractical where there is significant technological change within organizations in the supply network, so that the processes and possible products have fundamentally changed. More work is required to explore with more granularity how different governance instruments facilitate to a greater or lesser extent different combinations of context and outcome.

While these three propositions linking context, governance instruments and outcomes appear to have empirical validity, how the governance instruments exert their effects to produce particular outcomes in a specific context is much less clear. Tables IV-V show that no explanation is given in almost half of the reviewed articles and our understanding is limited commensurately. Nevertheless, based on the theoretical mechanisms that were discussed in the findings of the reviewed literature, we suggest the following possible explanations for each of these three propositions.

Changes to organization structure or the adoption of new technology disrupt existing social relationships and the associated social norms. Moreover, organizational change often affects organizational culture (Meyerson and Martin, 1987; De Witte and van Muijen, 1999). These effects reduce the efficacy of informal governance instruments to deliver particular outcomes, so that performance drops and coordination or control through informal monitoring is less effective. Adopting new technologies, such as IT, may change production and distribution processes by lowering transaction costs and may also affect behaviours, changing the nature of relationships between members of the supply network (Bitran *et al.*, 2007).

**Figure 2** An empirically derived framework connecting supply network context to outcomes through different governance instruments




In cases of uncertainty/unpredictability or risk, the selection of governance instruments may be explained by the need to lower transaction costs, for example, by reducing opportunism or by directly controlling costs (Wathne and Heide, 2004). Through the development and adoption of control systems, the designation and acceptance of particular roles or tasks within a network, or the requirement to adhere to particular standards, variation is reduced, predictability is increased and activity is delimited. These drive out uncertainty and lower transaction costs by constraining the behaviour of actors in the supply network (Crook and Combs, 2007). Typically, lower transaction costs increase (economic) performance and these instruments concurrently permit coordination and control. In the short term, at least, this may ensure viability.

Informal governance instruments are adopted where there is a history of relationships between partners and the exchanges are socially embedded (Jones *et al.*, 1997). Shared value systems or common cultures reduce coordination costs by specifying tacit rules of behaviour that are widely shared (Portes, 1998). Socialization encourages the convergence of expectations around aims and objectives and so enhanced network performance. Control is facilitated through established routines of communication and monitoring costs are reduced because there is a shared understanding of each party's skills and goals.

However, the interdependence between organizations in a supply network (Halinen *et al.*, 1999) suggest that the relational constructs of trust and power may provide alternative explanations to those suggested by transaction cost economics and the network analytical perspectives in the preceding paragraphs.

### Alternative mechanisms of influence: the role of trust and power

Power is a relational concept that determines the ability of one actor to influence, control, or resist the activities of another and is an integral part of the fabric of any organization and of its relationships with other firms in a "web of power relations" (Hardy and Clegg, 1996, p. 632). Consequently power is likely to manifest to a greater or lesser degree in all of the relationships throughout a supply network. Moreover, Levy (2008) noted that asymmetric power relations are inherent within global production networks, or global supply networks, leading to conflict and competition rather than cooperation. The supply network literature we reviewed that drew on transaction cost economics (Williamson, 1985) or resource dependence theory (Pfeffer and Salancik, 1978) presumed that there was an asymmetry or imbalance of power in the inter-organizational relationships in a supply network leading to a "power-over" perspective (Huxham and Beech, 2008). This is concerned with a single organization controlling a relationship to gain benefit at the expense of others in the relationship. Power, which enables dominant actors to control others in a network is manifest most obviously in formal contractual instruments (Gereffi *et al.*, 2005; Skinner *et al.*, 1987). Alternatively, less powerful actors in the supply network, perhaps because they are new entrants, rely on formal contracts to define their particular contributions to the network (Alvarez *et al.*, 2010; Belaya *et al.*, 2009; Peng *et al.*, 2010). In circumstances of uncertainty in the 1990s the

changing relationships of the Japanese automobile manufacturer, Toyota, with different suppliers (Ahmadjian and Lincoln, 2001) may be accounted for not by transaction cost economics as suggested by proposition 2 above, but by Toyota's desire to retain power, in one case "shoring up a governance structure that had tilted too far in the [supplier's] favour" (Ahmadjian and Lincoln, 2001, p. 696). Similarly, Goldbach *et al.*(2003) described the changes required to the cotton chain in order for the German mail-order business OTTO to market sustainable clothes. The adoption of organic cotton and changes to the manufacturing processes show OTTO exercising power over the whole supply network to ensure compliance to the new technological requirements, at least initially. Where there is a lower power asymmetry (as implied in proposition 3 above), more informal norms-based governance instruments are used (Gereffi *et al.*, 2005). Such a "power-to" perspective (Huxham and Beech, 2008) is concerned with ensuring that the inter-organizational entity functions effectively to meet shared objectives, often in collaborative settings. Even powerful actors effectively adopt a "power to" approach to ensure wider compliance beyond the immediate network or amongst marginal actors, as Nikoloyuk *et al.* (2010) show in their description of the round table for the production of sustainable palm oil, involving *inter alia* WWF, Migros, Sainsbury's, Unilever and the Malaysian Palm Oil Association.

Business environments are inherently risky, contingent and not foreseeable, and complex. These three characteristics ensure that trust is an integral part of business relationships (Bachmann and Zaheer, 2008). In a network of organizations, trust may be defined as the expectation that other organizations in a relationship will behave in a reliable, predictable, and fair manner, particularly when the potential for opportunism is present (Zaheer *et al.*, 1998). Where this predictability is absent (or reduced) as suggested in proposition 2 above, formal governance instruments may be used. The predictability of behaviour, which underpins trusting relationships has three sources (Sako, 1992). Contractual trust is founded on a universal ethic developed through socialization and education that individuals keep their promises and consequently that organizations will adhere to written or oral agreements. Competence trust is based on the belief that an organization has the technical and managerial capability to deliver the desired goods or services. These are skills-based and may be developed through training and learning. Together, contractual and competence trust build organizational reputation. Finally, good-will trust is the mutual expectation of open commitment to the other, in which an organization will do more for the other than is required (and perhaps specified in the contractual trust). This is founded on mutual experience and develops over time. Such changes in trust may account for the development of social norms and shared values that underpin the changing relationships between parties in a supply network and account for the degree of dependence on informal governance instruments (as suggested in propositions 1 and 3 above), especially in collaborative settings. For example, Bertels and Vredenburg (2004) noted the requirement for collaboration between multi-sector stakeholders in the supply of water to three Canadian cities. No single organization could influence the whole domain and mandated collaboration would be ineffective. Here informal governance mechanisms supplemented more formal ones to achieve shared performance objectives. In this case changing personnel disrupted these trust-based relations and affected the dependence wholly on informal governance instruments.

Relational constructs, like trust and power, are vital for understanding better the possible interactions between context, intervention and outcome in supply networks. Moreover, the more nuanced view of both trust and power described here provides the possibility of more precisely explaining the selection and adoption of particular governance instruments in specific contexts and their ability to achieve outcomes. Furthermore, these constructs may also operate in parallel, for example, as good-will trust develops differences in power may equilibrate. Such changes shift the choice of governance instruments away from formal ones towards more informal ones. This simultaneous operation of trust and power in inter-organizational relations in supply networks may also help to explain the concurrent competition and collaboration evident between firms in supply networks (Zerbini and Castaldo, 2007).

**Application of conceptual framework beyond the dyad**

Several authors (Ponte and Gibbon, 2005; Stephen and Coote, 2005) observe that governance forms may differ across the many relations in a supply network, especially in different segments. Responding to this we have used our framework to disaggregate a supply network, demonstrating its utility as a tool for analysing the governance of supply networks in two cases from the literature.

High quality hand stitched soccer balls are produced by over 100 small manufacturing firms in Sialkot Pakistan (Nadvi, 2008). These firms use sub-contractors often working from home to undertake the more labour intensive processes. The manufacturers sell to sports goods buyers from the leading brands including Nike, Adidas and Umbro. The reports by the world's media in the late 1990s of child workers in the Sialkot cluster presented a reputational risk to buyers. In conjunction with the Pakistani government and international agencies including FIFA and UNICEF, the Sialkot chamber of commerce and industry sought to remove child labour. A multi-stakeholder partnership of "global and local actors, representing industry, labour federations, NGOs, government and international agencies" (Nadvi, 2008, p. 335), established monitoring regimes and support for poverty alleviation, a root cause of child labour. Independently, some of the leading brand-name buyers exercised independent monitoring. Monitoring altered the organization of the cluster. Sub-contractors created stitching centres to prevent child labour, which was most often practised by home workers. These centres then supplied one manufacturer, rather than several as they had previously.

This supply network displayed several contextual features: a globalised value chain, externally imposed standards, and subsequently, a changed organizational structure. Formal governance instruments including standards and clear production processes were evident, while informal ones were not. These permitted improved performance, ensured legitimacy, and exerted control through compliance. Adherence to standards typically lowers transaction costs across the value chain. Here external monitoring agencies, including local NGOs and the buyers themselves, adopted a "power over" perspective in relation to the manufacturers. Moreover, the consolidation of production probably also reduced the "power to" perspective that had hitherto been

evident amongst sub-contractors and home-workers of a sports goods cluster worth $146m in 2005/2006 (Nadvi, 2008). Although not stated it is likely that contractual trust had increased, perhaps replacing prior competence trust between sub-contractor and home worker. Contractual trust dominated the relationship between manufacturers and buyers.

As a further example the framework is applied to Gorman and Webber's study of a vertically integrated supply network, the export of pineapples from Ghana to Europe (Gorman and Webber, 2010). There are many small scale pineapple producers in Ghana, who were largely dispersed in the 1980s and 1990s. Consolidation of the European market and legislative changes regarding both phyto-sanitary standards and restrictions on the airfreight capacity of commercial passenger aircraft were significant contextual factors influencing governance arrangements. A processing company, Blue Skies Holdings, was established in 1998 and had strong links to the European grocery sector through its existing marketing relationships. This company processed fruit for export and incorporated buying, transporting, packaging and delivery operations. It developed close relationships with the farmers, offering higher prices and paying promptly. To reap these benefits farmers needed to produce certified products to meet the Global GAP standards required by Blue Skies Holdings. The investment required to meet these standards effectively tied the producer to the company. In this case there were established relationships between Blue Skies Holdings and the European grocery market and between Blue Skies Holdings and the farmers. There were also changes in structural organization, by the introduction of Blue Skies Holdings amongst the disparate small scale producers and increased legislation. Within this complex context a variety of formal governance instruments were used between Blue Skies Holdings and the producers (standards) and Blue Skies Holdings and the European markets (formal procedures). Informal governance instruments - typically relational embeddedness – operated between farmers and Blue Skies Holdings and between Blue Skies Holdings and players in the European grocery sector. Through these established relationships, norms and shared values also developed, for example, the prompt payment of farmers by Blue Skies Holdings. Different governance instruments operating at different points in the supply network increased performance, coordination and control (for Blue Skies Holdings) and viability (for the farmers). Blue Skies Holdings had a variety of relationships. Relationships with the farmers were governed by "power over" in respect of the imposition of standards, but they also displayed an evolving trust relationship from contractual trust to competence trust and perhaps even good-will trust. These may permit the development of shared values and social norms and allowed improved performance and control. Relationships with the European grocery market exhibited contractual trust and may even have been subject to "power over" by retailers in the European market as it consolidated.

Gorman and Webber (2010) suggest five governance instruments (high levels of trust, sharing information, innovation, value addition and risk mitigation) based on the application of a World Bank framework for analysing value chains (Webber and Labaste, 2009). However, closer inspection of the World Bank framework suggests that it is predicated on the need to establish trusting relationships to enable information sharing and so innovation and the need to understand the asymmetries of power in different relationship types and how these affect outcomes. Independently this corroborates our assertion that trust and power are important mechanisms underpinning the governance of supply networks and supports the wider application and investigation of our conceptual framework.

## Directions for further research

The summaries to each thematic review question highlight what we know. From this we are able to identify a number of gaps in existing empirical knowledge of the contexts and outcomes of supply network governance, which provide significant avenues for further research. Here we consider three in more detail.

First, there is a dearth of longitudinal studies. Halinen *et al.* (1999) observed that in a network of businesses the outcomes achieved by businesses in different parts of the network create the context in which other businesses in the network must operate. Thus particular network outcomes become future network contexts in a dynamic cycle and by altering power and trust relationships subsequently influence the choice of governance instrument. With a few exceptions (Alvarez *et al.*, 2010) this dynamism is effectively lost in the supply network literature because of its static nature, reporting on a supply network at a point in time. Taking an iterative rather than a linear perspective on network evolution, Ring and Van de Ven (1994) suggest that personal relationships increasingly supplement formal role relationships, psychological contracts substitute for formal legal contracts and formal agreements increasingly mirror informal understandings and commitments.

Second, the thrust of the review has been to explore the connection between supply network contexts and their outcomes and how this may be mediated by governance instruments. The reviewed data are fragmented and diverse leaving a clear opportunity for empirical studies to clarify the relationships between the three elements (context, outcomes or governance instruments) by controlling one of them in comparative studies. This would reveal:

- what supply network outcomes are possible in a given circumstance by altering the instrument;
- what is the effect on supply network outcomes of using the same instrument in different circumstances; and
- in which circumstances particular instruments should be used to produce a desired outcome.

Third, the different sources of trust noted above have striking parallels with the three different types of trust presented by Lewicki *et al.* (2006) in their review of inter-personal trust models. They go on to suggest that trust transforms over time, progressing through these three types, beginning with contractual trust and ending with good-will trust. Although not demonstrated empirically, a similar sequence may be anticipated between firms as they become more familiar with each other through on-going mutual interactions in the supply network. Initial relations may be based on contractual trust, which may ultimately develop into good-will trust. Nevertheless, how these different forms of trust are manifest in the governance instruments between firms in a supply network, how the forms of trust change over time, how they are influenced by context, how different forms of trust serve

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to facilitate agreed supply network objectives, are not known and could be explored empirically. Good-will trust, or identification-based trust, may be critical to governance between firms in uncertain circumstances requiring agility and rapid responses made difficult by the contractual negotiations present in less trusting relations, or it may be necessary for successful supply network outcomes in uncertain or high risk environments. Governance instruments underpinned by contractual trust may not be sufficiently flexible to govern relationships in fast moving, rapidly changing environments. Moving beyond governance instruments based on calculus-based trust may be difficult for firms in a globalized supply network where the possibilities for interaction and increased understanding of another firm's behaviour are less than may be the case in regional or local supply networks.

## Conclusion

The literature underpinning the question "How do governance instruments secure specific outcomes in given supply network contexts?" is diverse and fragmented, rarely providing a complete analysis of context, intervention and outcome, and covering mechanism somewhat cursorily if at all, particularly in empirical papers. An analytic framework based on CIMO-logic has allowed us to synthesize fragments from a wide range of literatures focused on the governance of supply networks using a range of instruments, in diverse contexts and pursuing a variety of outcomes. Our initial findings provided a small number of discrete categories for each of these elements and these appear to provide a useful tool for analysing the governance of supply networks.

We have developed three broad propositions robustly grounded in empirical and conceptual literature. We have sought to explain the mechanisms underpinning them first by reference to conventional theoretical approaches such as transaction costs or network perspectives and then through a more detailed consideration of trust and power. The differentiation of contractual, competence and good-will trust suggests several promising lines of enquiry, such as the evolution of good-will trust, the necessity of good-will trust in uncertain environments requiring agility and the difficulty of developing good-will trust in globalised supply networks. Likewise, we suggest consideration of how power imbalances may lead differentially to the adoption of "power over" and "power to" perspectives by network actors. There are, though, numerous respects in which further empirical work is needed to confirm and extend our understanding of how to govern supply networks, an increasingly important challenge in a globalizing world.

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