Trust, power, dependence, and economics: can SCM research borrow paradigms?

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Abstract: With the inaugural issue of this new journal, researchers have an opportunity to publish in a journal that is entirely devoted to the new paradigm of supply chain management. With this development as a new field, some researchers argue that it is an extension, or in some cases, a subset of operations management. We contend that neither of these is the case. In fact, the field of SCM spans multiple interdisciplinary areas, and thus must draw from a vast field or prior research in business, industrial psychology, economics, operations research, and organisational science. Researchers in this field are encouraged to broaden the span of their epistemological base to allow the field to grow in a manner that can best advance our knowledge in how to manage supply chains.

Keywords: trust; power; supplier relationships; transaction cost; economics; relationship management.

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1 Introduction

The field of supply chain management (SCM) is changing. At one time, SCM was referred to under the rubric of 'operations management' (OM), while purchasing and logistics were considered distinctly different, if not somewhat related, fields. Today, we are witnessing an acknowledgement by the academic community that it is no longer enough to view operations within the context of the four walls of the enterprise; indeed, the boundaries must extend to customers and suppliers, and in some cases, extend beyond these first and second tier participants. From this notion was born the concept of the 'supply chain'. As organisations strive to improve operations across their supply chains, they are increasingly recognising that it is not the best single organisation, but the best 'supply chains' that will win the competition!

More than a decade ago, [1, p.214] noted that "operations management (OM) researchers must chart new and unfamiliar territory; territory frequented by organisational behaviour and marketing specialists". Twenty years later, SCM researchers face a similar challenge. SCM's origins lie in traditional disciplines such as purchasing, logistics, and operations management, which for many years were dominated by management science and operations research epistemological roots. It is really only in the last five to eight years that researchers have realised that the effective unit of analysis is not the enterprise, but the supply chain, and that mathematical equations cannot effectively capture the dynamics that occur within these value systems. The emergence of management changes such as e-procurement, strategic sourcing, third party logistics, outsourcing to China, and global competition have shaped how SCM systems are viewed, managed and evaluated. These changes have forced academicians to reexamine the questions and assumptions driving their research, as well as the methodologies and paradigms on which they rely. An assessment of relevant research from other fields that have a direct bearing on SCM is an important step in helping to refine the direction and content of SCM research to ensure a fit between practice and research. This perspective is not new, nor is it unique to this paper. However, the implications of an SCM research agenda that fails to mirror the changing environment in which businesses operate, as well as acknowledging the lessons learned in other fields, are major. If academicians fail to keep abreast of dynamic changes in supply chain management and relevant research, a number of dire consequences may result.

If we are to comprehensively publish research that examines issues that span 'supply chains', the breadth of papers that we have been seeing must increase. SCM research must examine a broader range of theoretical concepts, such as the interface of marketing, distribution issues, sourcing, product design, buyer–seller relationships, total cost management, and other research issues. Needless to say, I am delighted to see this occurring. However, these new types of research agendas create another problem: a broader literature base which many SCM researchers are not familiar with. As often happens in scientific communities, the first reaction of scientists when confronted with an approach that differs from their own is to dismiss it (see [2]). Is this a fatal flaw? I think that most would agree it is not. Rather, what we are seeing is that the field of SCM, which for several years was somewhat defined, has now become increasingly broad with different splinters of theory. Rather than allowing the field to fragment into distinct areas, we need to think about how to extend our conventional notion of what constitutes SCM.

One of the most misunderstood and ripe areas for research in SCM is in the area of trust. Trust (and its cousin, Collaboration) seems to be the single most discussed element in making supply chains function effectively and efficiently. Fortunately, there is a plethora of research that SCM researchers can build on, rather then having to 'reinvent the wheel' when studying trust and its related elements of power, dependence, and economics. Transaction cost economics dictates that the form of governance and the extent of trust may affect the degree of risk of loss perceived by agents of firms in alliances [3–5] but transaction costs do not necessarily increase with an increase in relationship-specific investments [6]. Relational theory furthers this approach by asserting that a relational capability is not a sufficient condition for realising relational rents [7]. Rather, organisations must establish what knowledge and resource investments are likely to ensure that both parties create joint value in the form of relational rents [8,9]. Organisational design theory also proposes that firms may place resource-based concerns in front of organisational economics when deciding whether or not to engage in interfirm cooperation [10–12]. Finally, network governance models suggest that a select, persistent, and structured set of autonomous firms will engage in creating new products or services, based on implicit and open-ended contracts that permit adaptation to environmental contingencies and which safeguard exchanges [12–15]. All four bodies of theory (transaction cost economics, organisational design, relational theory, and network theory) align with the central thesis, common to much of the emerging research in SCM, that effective communication of requirements with appropriate safeguards and approaches is critical to effective customer and supplier relationship management.

In an attempt to identify some of the major other fields of research that are relevant to SCM research, this essay summarises some of the key theories and conclusions in the related fields of marketing, economics, strategy, and management that may influence the theoretical evolution of supply chain management physical flows, information flows, and most importantly, relationship flows. These summaries are not meant to be all encompassing, but are intended to help researchers identify relevant themes that may help them refine their thinking of critical supply chain concepts and theory that maybe directly relevant to their area of inquiry.

2 Trust: easy to know, difficult to measure

Barber notes that:

> "In both serious social thought and everyday discourse, it is assumed that the meaning of trust and of its many apparent synonyms is so well known that it can be left undefined or to contextual implications." [16, p.7; 17, p.380]

This observation is corroborated by the evolution of trust in the fields of industrial economics, organisational behaviour, marketing, and organisational theory. Of all the elements critical to managing supply chains, trust is one of the most commonly cited elements, yet one of the most difficult to measure [18].

A comparison of the various definitions of trust across fields shows that trust can be grouped into eight conceptual paradigms (shown in Table 1). In paradigm one, authors posit that trust is a cognitive predictability or *reliability* of another party. The second paradigm addresses the *competence* of a party as a component of trust. In the third paradigm, a recognition of trust as an altruistic faith or *goodwill* felt toward another party is proposed. The fourth paradigm relates the concept of *vulnerability* to trust. Paradigm number five specifies that loyalty-based trust exists when a partner consistently goes *beyond the call of duty*. The sixth conceptual paradigm realises that multiple components of trust exist, which are defined by *cognitive* (reliability or task) trust and *affective* (altruistic) faith trust. The seventh body of theory adopts some of the most recent definitions of trust that combine vulnerability and the notion of affect and cognition-based trust. The final conceptual paradigm combines these different perspectives into a concept we define as *non-partisan trust*. Non-partisan trust assumes that the actors do not focus solely on the trustworthiness of the other party, but consider their relative vulnerability, as well as the cognition and affect-based trust demonstrated by themselves and the other party. In the following section, we identify each of these representative paradigms that are drawn from the marketing, organisation theory, sourcing, and organisation behaviour literature streams.

Table 1 The eight conceptual paradigms of trust

Body of theory	*Definition*	*Authors*
Reliability	Time and experience are critical elements in evaluating trust	Rossiter and Pearch [19]
		Deutsch [20]
		Rotter [21]
		Gambetta [22]
		Fairholm [23]
		Lorenz [24]
		Zucker [25]
		Lewis [26]
		Gulati [27]
		Good [28]
Competence	Experience and wisdom displayed by partner	Ghoshal and Bartlett [29]
		Luhmann [30]
		Butler [31]
Goodwill (openness)	Confidence that you can share information or problems with the other party	Pennings and Woiceshyn [32]
		Granovetter [12]
		Johnson Georges and Swap [33]
		Ring and Van de Ven [34]
		Farris et al. [35]
		Hart et al. [36]
Goodwill (Benevolence)	Accepted duty to protect the rights of your partner	Mayer et al. [37]
		Barber [16]
		Rempel and Holmes [38]
		Butler [31]
		Hosmer [17]

Table 1 The eight conceptual paradigms of trust (continued)

Body of theory	*Definition*	*Authors*
Vulnerability	Being unprotected or exposed while including an element of uncertainty or risk	Deutsch [20] Akerlof [39] Barney and Hansen [40] Klein et al. [41] Zand [42] Holmstrom [43] Sabel [44] Lorenz [24] Gambetta [45]
Loyalty	A partner is not just reliable but performs well in extraordinary situations	Rempel and Holmes [38] Larson [46] Friedland [47]
Multiple forms of trust	There are more than one type of trust	McAllister [48] Mishra [49] Gabarro [50] Bromiley and Cummings [51] Rempel and Holmes [38] Ghoshal and Bartlett [29]
Combining trust with vulnerability	Cognition and affect -based trust are combined with vulnerability	Mayer et al. [37] Hosmer [17]
The future of trust (non-partisan proactive-based trust)	Trust is the primary attention to your own trustworthiness and secondary attention to your partner's trustworthiness	Sabel [44] Mishra [49]

2.1 Reliability

Reliability can be broken down into requisite elements. Reliability is dependent on prior contact with a party or experience. Several authors [23,24,50] mention time as a key element to reliable trust. A second related major element is repeated interaction among the firms [27,28,50,52]. Repeated interaction and time [24] leads to levels of confidence, consistency [23], and finally trust [25,26]. Reliability then leads to predictability, which is confidence in future actions [23]. While reliability is important, what motivates reliability is often more important. Reliability must be based on integrity or honesty [53] to be effective. Reliability based coercion or stress eventually creates a suboptimal relationship or total breakdown.

A series of definitions define trust in terms of a firm or person's reliability or expectation of performance. Deutsch [20] created one of the first definitions of trust that accepted the extreme position that for trust to be present, expected loss must be greater than expected gain. Authors after Deutsch extended trust as an expectation to include situations where expected gains are greater than loss [21,22]. Reliability can often be confused with predictability. Reliability primarily addresses a party's past behaviour while predictability actually takes past behaviour and other information to address probabilities of future performance [19]. Reliability and predictability are closely related terms, and definitions addressing either term fall into this body of theory. Firms or people who meet a threshold level of predictability can by definition be trusted. This paradigm is best described by the following definition: "Trust is a range of observable behaviours and a cognitive state that encompasses predictability" [19].

2.2 Competence

Competence is one's perception of the ability of a party to meet commitments. The issues of trust and competence have been addressed by several authors [29,31,54]. Gabarro breaks competence-based trust into three key areas. The first is specific competence, which is trust in the other's specific function or area. The second is interpersonal competence, which is the ability of a person to work with people or people skills. The third is business sense, which addresses a person's experience, wisdom, and common sense. Ghoshal and Bartlett [29] analyse specific competence in technology or functional areas, which is similar to Gabarro's second type of competence. Other authors address competence and trust in more general terms linked closely to a person's or a firm's specific business experience or wisdom [26,54].

2.3 Goodwill

This was first defined by McAllister [48], and is identified with a heavy dependence on openness between people and emotional investment in the relationship. Affect-based trust could almost be confused with interpersonal or personal trust because personal issues creep into the relationship in terms of problem solving, listening, and sharing. A key distinction between cognitive- and affect-based trust is that while cognitive-based trust may or may not exist at the interpersonal level, affect-based trust almost always exists only at the interpersonal level. The importance of interpersonal relations is recognised to be an important element of trust [12,48].

Beyond reliability or predictability, trust can also be defined in terms of a faith in the goodwill of others. This faith or goodwill recognises the importance of interpersonal relations as an important element of trust [12,48]. This new type of goodwill trust evolved from discussion and research on benevolence [55,56], integrity [52,57], and honesty [58] as antecedents to trust. For instance:

> "Trust is a faith in the moral integrity or goodwill of others, which is produced through interpersonal interactions that lead to social-psychological bonds of mutual norms, sentiments and friendships [59] in dealing with uncertainty." [34]

> "Faith enables people to go beyond the available evidence and feel secure that a partner will continue to be responsive and caring. Feelings of faith begin with past experiences that show how much our partner cares." [38]

2.4 Vulnerability

A key breakthrough in the use of the term trust is the relationship between vulnerability and trust. Vulnerability is a key issue, because trust without some kind of vulnerability simply cannot exist. If a party chooses a course of action that involves no vulnerability then the firm has simply made a rational decision. One of the first definitions to include vulnerability was provided by Deutsch [20], who stated that trust involved choosing a course of action even if the probability of failure was greater than 50%.

Zand [42] believed that trust goes beyond expectation outcomes under uncertainty to expectation outcomes under vulnerability. Zand's definition is broader, in that he identifies two dimensions of trust vulnerability. Vulnerability projects a feeling of being unprotected or exposed while including an element of uncertainty or risk. If there is no uncertainty or risk, then the party is freely giving the other party something. If there is no exposure by both sides, then the firms are simply making a rational decision based on probabilities. "Trust is the mutual confidence that no party to an exchange will exploit another's vulnerabilities" [44, p.1133]. "Trust is a risk relationship which increases the trustor's vulnerability" [42].

> "Trust is a particular level of the subjective probability with which an agent assesses that another agent or group will perform an action, both before he can monitor such an action and in a context in which it affects his won action. For trust to be present there must be the possibility for disappointment or betrayal." [22, p.217]

The discussion on vulnerability uncovers a key distinction that must be made between trust and trusting behaviour. Trust can exist without action, but trusting behaviour is the action taken, based on trust in another party. Lorenz discusses how vulnerability is a key component of trusting action:

> "trusting behaviour consists of action that (1) increases one's vulnerability to another whose behaviour is not under one's control, and (2) takes place in a situation where the penalty suffered if the trust is abused would lead one to regret the action." [24, p.197]

A paradox that exists in the definition of trust was uncovered by Rempel and Holmes [38], who wrote that to be able to trust you must be willing to take the risk of trusting another party. To be a party to trust, you must take this risk. This is a critical element of SCM.

2.5 Loyalty-based trust

Loyalty-based trust occurs when after a period of reliable performance, goodwill or faith is developed in the other party [38]. This good will motivates a party to take altruistic actions in the relationship that they would not take in other relationships. Loyalty-based trust often occurs when a firm is not just reliable but performs well in extraordinary situations.

> "the first aspect of trust is predictability … the second aspect of trust is dependability. The feeling that your partner is a dependable person is based on the emerging sense that he or she can be relied on when it counts. Paradoxically, we can only be certain someone genuinely cares when a situation makes it possible for that person not to care … dependability grows out of a special set of circumstances that involve risk and personal vulnerability." [38, p.30]

Loyalty-based trust also occurs when individuals in both firms create strong interpersonal bonds beyond just their business relationship. Trust is "confidence the other party could be relied on and confidence that extra effort would be consistently made" [46, p.117]. "Trust is most typically promoted when a party to an interaction shows genuine responsiveness to the needs of its partner" [47, p.317].

2.6 *Multiple forms of trust exist*

Another group of authors realised that both altruistic-based trust and reliability-based trust exist [48]. For instance:

> "There are two types of trust which are a business risk view which hedges against moral hazards and advance selection and involves the predictability of one's expectations" [25,34, p.93; 54] and "Confidence in another's good will." [34, p.93; 52,60]

Holmes and Rempel et al. [38] identify two different types of trust that are similar to cognitive- and affect-based trust, but also state there are three dimensions to each type of trust. Holmes [38] and Rempel et al. [61] look at interpersonal and task trust. Both interpersonal trust and task trust is made up of three dimensions: reputational, reciprocal, and accommodation trust. Reciprocal and accommodation trust are emergent forms of trust. Other authors talk about calculative and altruistic trust. Calculative-based trust is fostered by mutual hostages and built on reputation [62–64]. Williamson [64] believes in only one type of trust which is altruistic trust.

Lewicki and Bunker [65] and Sheppard and Tuchinsky [66] describe three types of trust:

Calculus-based trust. Trust based on control or assuring that the other party will do what they say. Trust is sustained through a clear deterrent (punishment) and likely to occur if trust is violated. The threat of punishment is likely to be a more significant motivator than promise of a reward. Calculus-based trust often involves a high degree of monitoring to assess whether a party is being opportunistic. Calculus-based trust is fragile and therefore any violation of trust has potential to significantly alter or even end a relationship.

Knowledge-based trust. Knowledge-based trust is grounded in the predictability knowing the other party sufficiently well so that the other's behaviour is anticipatable. Knowledge-based trust relies on information rather than deterrence as a motivator. Knowledge-based trust develops over time as the parties develop confidence in the trustworthiness of the other party. In knowledge-based trust, regular communication and courtship are key processes.

Identification-based trust. Identification-based trust is based on identification with the other party's desires and intentions. Trust exists because the parties effectively understand and appreciate the other's wants. A mutual understanding develops as each side clearly understands the motivations and problems of the other side. Each party comes to understand what they must do to sustain the other's trust. Identification-based trust is also characterised as having: collective identity, collocation of personnel, creating joint products or goals, and commonly shared values.

3 Power: can you trust big customers?

One of the greatest deterrents to trust is power. Many industry stories detail the havoc wreaked on supply chains by powerful retailers, automotive OEMs, and other power brokers who drive bullwhip effects, vendor managed inventories, and other forms of power exertion. How should supply chain researchers treat power? What do we know about power?

French and Raven [67] identified three types of power associated with referent, legitimate, and coercive power with the three types of trust discussed in the prior section. If we compare these three types of power [68] with calculus-based, knowledge-based and identification-based trust [65], there appears to be some similarities as shown below.

Coercive power	*Calculus-based trust*
Expectation that the other party will punish in situation of nonconformance	Trust sustained through deterrence, punishment
Expert power	*Knowledge-based trust*
Power due to perception of knowledge in a given area	Knowing the other party so that their behaviour is anticipatable
Referent power	*Identification-based trust*
Basis of referent power is in identification of one party with the other, a feeling of oneness	Identification with the other party's desires and intentions

The definitions above reveal a link between the areas of power and trust. Perhaps the judicious use of power or even restraint from power use as discussed by Gaski and Nevin [68] can lead to the various types of trust discussed. Coercive power is the expectation of punishment from another party unless there is compliance. Non-coercive power involves referent, expert, legitimate, and reward power. The various forms of power in the literature are shown in Table 2.

Table 2 Power

French Jr. and Raven [67]	There are different types of power including referent, legitimate and coercive
Gaski [69]	There is not a strong relationship between power and dependence. Coercive vs. non-coercive power usage has not been effectively tested yet
Gaski and Nevin [68]	Exercise of power has an effect on satisfaction and conflict beyond the mere presence of power
Venkatesh et al. [70]	Found significance between use of a particular influence strategy and type of power in a relationship
Heide [71]	The more unilateral power is in a buyer-supplier relationship the higher the use of explicit contracts
Lusch and Brown [72]	The higher the level of dependence of the supplier or buyer on the other the higher the higher the use of explicit contracting

4 Dependence: too much is never a good thing

Dependence has been observed in two ways. First, dependence may be defined in terms of a relationship between one party (usually supplier) on another party (usually buyer). Second, the power one party has over another may be due to dependence, usually due to a high percentage of a supplier's output going to one buyer. Again, the spectre of the Walmarts, Carrefours, Home Depots, and other retailers come to mind. Several authors including Lascelles and Dale [73], Dwyer et al. [74] and Krause [75] have addressed the issue of dependence from a volume perspective. They hypothesise that the more a buyer buys from a supplier, the more likely the buyer will be able to influence the supplier. Williamson [76] first noted in transaction cost analysis that in market advantages (based on power or dependence) lead to opportunistic behaviour. Empirical testing, however, has not supported these ideas.

Table 3 Dependence

Treleven [77]	In situations with fewer suppliers buyers have fewer opportunities to exploit suppliers
Mohr and Spekman [78]	Interdependence is correlated with relationship performance
Emerson [79]	Power and dependence have a reciprocal relationship
Cadotte and Stern [80]	The power dependence relationship determines the amount of interdependence between parties
Lascelles and Dale [73]	The volume of business with a supplier impacts the ability of a buyer to impact a supplier
Frazier et al. [81]	Coercive use of power can damage a relationship
Dwyer et al. [74]	Power is a function of dependence of parties on one another
Noorweir et al. [82]	Voluntary restraint from the use of power improves the relational exchange norms of a relationship
Williamson [76]	Power assymetries will always be exploited
Heide [71]	The more dependent a supplier is the higher the use of explicit contracts is
Etgar and Valency [83]	The more dependence that is present the more vulnerable the weaker member is to the other
Heide [71]	The higher the degree of interdependence the more commitment exhibited by both parties
Lusch and Brown [72]	The more dependence a buyer has on a supplier the more likely the buyer is to have a long-term orientation

Dependence of a party on another means that one party will have power over another. Treleven [84] notes that in markets with limited numbers of suppliers, there is less leverage for buyers in negotiating with suppliers. Resource dependence theory also notes that when power between parties is in relative balance (high uncertainty), organisations will attempt to create negotiated environments.

Beyond Williamson, a growing number of authors assert that power can exist without opportunism [81,82]. Buyers do not automatically exploit power opportunities but may limit the use of power to strengthen a relationship [82]. Similarly, a buyer may refrain from using power to avoid the negative consequences associated with exploiting a dependent supplier [81]. Beyond dependence is the concept of interdependence between two firms. This interdependence is likely the product of a relationship between power and dependence [80], which was first hypothesised by Emerson in 1962. Emerson stated that power and dependence have a reciprocal relationship. In one of the few empirical analyses of interdependence, Mohr and Spekman tested the relationship between interdependence and relationship performance; however, a relationship was not proven.

5 Economics: prisoner's dilemna and transaction costs

For many years, an economic paradigm dominated the interorganisational relationship (IOR) literature [76,85]. The economic paradigm relied on two concepts: (1) the prisoner's dilemma and (2) transaction cost analysis. In the prisoner's dilemma, two prisoners are given their choice of pleas without knowing what the plea of the other party is. By analysing the responses of people put in the prisoner's dilemma, the optimal strategy for a prisoner is 'tit for tat', (or do to the other party what they just did to you) [85,86]. Serious concerns have arisen about the accuracy of the prisoner's dilemma in modelling cooperative relations [53,85]. These concerns focus on whether the prisoner's dilemma provides a large enough payout to parties which cooperate. A large cooperation payout may change the optimal strategy from 'tit for tat' to cooperation.

The second key economic concept relevant to the IOR literature is transaction cost economics (TCE), put forth by Williamson [76]. Transaction cost economics states that there are transaction and production costs of doing business between firms. Transaction costs are caused by market inefficiencies, which are in the form of opportunism, small number games, and bounded rationality in individuals. A problem associated with transaction cost analysis is that it ignores organisations that work with each other repeatedly [9,27,52] and treats each transaction independently. TCE also assumes all parties are opportunistic and in this respect TCE is a 'flat' paradigm. The assumptions of opportunism and independent transactions may be appropriate in a discussion of markets vs. hierarchies [87], but the emergence of hybrid relationships such as strategic alliances do not mesh with the TCE framework. The assumption of transaction independence ignores key factors such as trust [24] which is developed when each transaction is not seen as independent. Economic theory is now taking into consideration the area of game theory in looking at interorganisational relationships [88,89]. Game theory adopts a less stagnant approach towards relationships than TCE because each party begins to look at possible moves by the other party before taking action. Game theory, however, still does not recognise the full payoff firms can attain by cooperating, assuming parties are opportunistic.

Not all areas of economics ignore trust. Trust can occur incidentally in a relationship. Several authors state [45,86,90] that trust seems to evolve as firms cooperate over a period of time, but that initial cooperation occurs at random. While incidental trust is possible, this dissertation recognises and is more concerned with trust that is proactively developed because proactive trust is under the control of partnership participants and, therefore, can be controlled.

In the research performed by Hamel et al. [91] and Hamel and Prahalad [92], the emphasis in alliances is on one party winning and losing. As Hamel et al. [91, p.138] state “too much collegiality should set off warning bells to senior managers”. Gulati and Nohria [85] point out that the thinking of Hamel, Doz and Prahalad is an extended version of the prisoner’s dilemma where the firm that learns the most wins. Hamel, Doz and Prahalad argue that “alliances should be seen as learning races. CEOs or division presidents should expect occasional complaints from their counterparts about reluctance of lower level employees to share information”. The major emphasis in this paradigm is controlling the flow of information so that the ‘other side’ does not get unintended information. The problem with this view is that one must adopt by definition security measures against opportunistic behaviour like other economic theories such as TCE. Hamel et al. [91] treat each relationship independently, assume opportunistic partners and try to maximise the benefits to a party often at the expense of any further business with the other company. Their emphasis on preventative measures contrasts with the notions of trust and commitment that are necessary for benefits to be achieved, as noted in Lewis [26], Gulati and Nohria [38] and Barber [16].

The assumption that parties are opportunistic underlies the short term economic perspective. The solution to opportunism involves taking bilateral hostages, who provide manufactured vulnerability of both parties in the relationship. A hostage induced vulnerability must be distinguished from a synergistic driven vulnerability. Hostage vulnerability usually has tangential value to the alliance. The key to effectiveness in using hostages is the value of the asset to the donating party. From strategic vulnerability perspectives, assets are donated because they are valuable to the alliance. The asset may also be valuable to the donator but the primary reason the donation is made is because of the value of the asset to the relationship. Beyond hostages, Tesler [93] argues that self enforcing agreements are the answer to opportunism in situations of asset specificity and argues that the threat to terminate the agreement is enough to deter opportunism. Tesler [93] provides three assumptions underlying his argument including:

- the sequence of transactions are open ended
- on–off gains from cheating must always result in less than expected benefits from cooperating
- players share knowledge in the ranking of respective gains to be had from violating or upholding the agreement.

Lorenz [24] points out two key flaws in this argument including:

- if information is shared, trust is still involved because you must have trust that the information being provided is accurate
- unexpected events do occur but are ignored in this model, and trust will be essential in forming adaptations to contingencies in a jointly optimal way.

Table 4 Economic/Short term perspective

Dasgupta [88]	Looks at the impact of credibility, commitment, and reputation on trust in a game theory environment
Hirschman [87]	An ideal market rests on large numbers of price taking buyers and sellers with perfect information Trust and alliances have no place
Lorenz [24]	Trust is an economic lubricant which can reduce the cost of friction caused by transaction costs
Gulati [27]	Transaction cost analysis is flawed because it looks at each relationship independently ignoring repeat relationships
Ring and Van de Ven [52]	Transaction cost analysis is flawed because it looks at each relationship independently ignoring repeat relationships
Zajac and Olsen [9]	Transaction cost analysis is flawed because it looks at each relationship independently ignoring repeat relationships
Axelrod [86]	Cooperation and trust can be attained through a tit for tat strategy in the prisoner's dilemma
Fisher and Brown [53]	The prisoner's dilemma is a poor model of interorganisational cooperation
Gulati and Nohria [85]	The payoff of alliances is not represented well in prisoner's dilemma. Actually, working together has highest payoff, not one cheating and other trusting
Williamson [76]	Transaction cost analysis can provide a framework for explaining why firms engage in markets or hierarchies

Schmitz et al. [94], Hart et al. [36] and Gabarro [50] also found that reactions in unexpected events are critical to trust failure or development. The economics point of view highlights vulnerability of alliance partners [27] and assumes that all partners are opportunistic.

6 Collaboration: what does it mean?

Over the past 8 years, alternative paradigms to the economic paradigm have emerged. One of these paradigms is referred to as mutually shared alliances or collaborative relationships through alliances [85]. In mutually shared alliances, the payoff scheme in the prisoner's dilemma is challenged. Specifically, Gulati and Nohria [85] feel that the payoff for the two parties working together is substantially more than what is reflected in the prisoner's dilemma. In mutually shared alliances, greater emphasis is placed on ongoing managerial practices. Trust, generosity, feedback and repair are the guiding principles in mutually shared alliances. A key omission in the economic model is the assumption of independence between party transactions [85]. This omission is significant because experience can engender trust among partners, and trust can limit the transaction costs associated with future alliances [12,95,96]. The economic theory, specifically TCE is unraveled by Fisher and Brown [53] who argue that in relationships the game theory approach as depicted in the prisoner's dilemma [86] is not representative of relationships (strategic alliances) as a whole. *The fatal flaw of transaction cost economics* *is that it treats each alliance as independent, ignoring the possibility of repeat alliances* [9,52]. Gulati [27, p.86] argues that:

> "This is because, first in an area such as understanding, a party is better off understanding the other regardless if the other party is malicious because information is gained. In the prisoner's dilemma, if I am cooperative and the other party stingy, I clearly am worse off. Second, in real life, it is difficult to measure the impact of a decision on another party. Can we measure an action by another party as clearly equal to ours in cooperativeness?"

In the prisoner's dilemma, payoffs are clear. Also, a strong bias enters into perceptions of equity in actions by both sides. Often, these relations lead to downward spiralling substantive (results based) actions.

In the new mutually shared paradigm, a key underlying factor is the expected time frame of the relationship. Partners see the relationship as long term [85]. In fact, Lorenz [24] points out that trust is not necessarily a by product of other means but can be created intentionally. Lorenz [24, p.209] states that "The key in partnerships is to sacrifice short-term gains for the long-term benefits of mutual cooperation." The new hypothesised prisoner's dilemma payoff that considers a mutually shared paradigm, more accurately indicates the benefits that can accrue from synergies between firms when they work together. Firms today must pay more attention to mutually shared alliances incorporating a long term outlook, trust, generosity, feedback and repair [85].

A major component of the new relationship centred paradigm is congruence. Congruence ensures that actions match words [53,94,97,98]. In fact, actions, and not reputation, are the foundations of trust in a relationship [23], and congruence between actions and words are identified as an antecedent to trust [97]. Congruence is also a problem in relationships when firms want the benefits of long-term relationships, yet, their behaviours are the same ones they had in their short-term relationships [53].

While short term economic paradigms embodied in TCE ignore the role of trust, an evolving long term paradigm identifies trust in mutually shared alliance as a mediating factor in reducing transaction costs as described by Williamson [76]. Lorenz [24] points out that transaction costs are directly linked to the possibility that actors will behave opportunistically [27]. The presence of trust can avoid the expense of drafting comprehensive agreements for contingencies. Lorenz uses the metaphor of trust as a lubricant and transaction costs as the economic friction. Trust can also act as a response to opportunism and increase social bonds over time [30]. This proposition was empirically tested by Campbell [99]. Finally, in the area of problem solving, the new relationship paradigm emphasises an unconditionally cooperative and proactive stance [26,53]. For example, Lewis [26] proposes that firms should be as open to persuasion, while Fisher and Brown [53] advocate an unconditional constructiveness in relations (i.e. a party should give trust conditionally but be unconditionally trustworthy). Gulati and Nohria [85] argue that in a mutually assured paradigm it is best for partners to demonstrate continued commitment to the relationship even if the other party is not pulling their weight. Trust, generosity, and repair are the guiding principles as opposed to retaliation and restoration.

Table 5 Collaborative paradigms

Campbell [99]	Trust mitigates opportunism and increases social bonds over time
Heide and John [100]	Firms with a long-term orientation were found to be better at long-term relationships
Gulati and Nohria [85]	Trust, generosity and feedback, and repair should be the guiding principles of an alliance
Granovetter [12,95]	Trust can limit transaction costs with future alliances
Marsden [97]	Trust can limit transaction costs with future alliances
Luhmann [30]	Trust can increase social bonds over time
Fisher and Brown [53]	The optimal behaviour in relationships is to be unconditionally constructive
Lorenz [24]	Trust can be proactively developed
Fisher and Brown [53]	Statements and actions must be congruent to build trust
Anderson and Weitz [98]	Pledges must be followed by enactment and reciprocity by the other party for strong relations to develop
Sinatar [97]	Statements and actions must be congruent to build trust
Fairholm [23]	Actions, and not reputation, build trust in a relationship
Schmitz et al. [94]	Congruence of corporate culture and actions impacts trust
Fisher and Brown [53]	Partners continuously evaluate the consistency of promises and statements of credibility and behaviour over the life of the alliance
Ganesan [101]	Often firms behave differently in short term relations or will behave as though their goals from relations are short term which leads to incongruent behaviour to satisfy short term needs
Lewis [26]	Benevolence, dependence and trust impact long-term orientation
	Certain firms have a more cooperative philosophy, which is an advantage, yet avoid coercion. Know that it is in your best interest to help a key partner and avoid coercion

Similar to the mutually shared paradigm, Anderson and Weitz in 1992 and Krause in 1995 tested a construct called supplier commitment. Both Anderson and Weitz and Krause define commitment as the willingness to make short-term sacrifices for long-term benefits. Krause [75] found supplier commitment to be an important antecedent to supplier development efforts. Anderson and Weitz looked at the perception of commitment of distributors from the manufacturer's perspective. Anderson and Weitz depict commitment as a never ending cycle beginning with the buyer's perception of commitment from the distributor. Based on the perception, the buyer may make short term sacrifices to realise long-term benefits.

7 Asset specificity: putting your money where your mouth is

Nishiguchi [102] discussed four different types of asset specificity. These four types are as follows:

Dedicated asset specificity represents discrete and/or additional investment in generalised (as opposed to specific) production capacity in the expectation of making a significant sale of a product to a particular customer.

Human asset specificity arises in a learning-by-doing fashion through long-standing customer specific operations.

Site asset specificity refers to the successive stages that are immobile and are located in close proximity to one another so as to economise on inventory and transportation expenses. The fact that set-up and/or relocation costs are great usually necessitates a bilateral exchange relationship between the parties over the useful life of the assets.

Physical asset specificity refers to specific equipment such as molds or dies specific to a relationship.

Several researchers have explored the types of asset-specific investments made by firms. In contrasting Japanese and unsuccessful partnership agreements, Nishiguchi [102] found that successful buyer–supplier relationships had greater levels of site-asset specificity and three times as much human-asset specificity as their less successful counterparts in the UK and the USA.

While asset specificity can be seen as an opportunity for synergy among firms [102–104] it can also be seen as inhibiting because inflexible investments by parties have been made. Borys and Jemison [105] raise the issue of how collaborators can use asset specificity or what they call ‘bilateral hostages’ in a cooperative or hybrid relationship. Williamson [106] calls hostages ‘credible commitments.’ Kamath and Liker [104], instead of using the term hostages, describe asset specificity as “mutual entanglements which bind important suppliers and their customers”. A key question that then arises in the use of asset specificity is whether asset specificity builds trust or creates inflexibility which narrows the strategic options of both firms and makes both firms more sensitive or self conscious of the other’s trust breaking manoeuvres.

While there is significant support for the use of asset specificity, there is growing evidence that asset specificity can be harmful to interorganisational relationships. Asset specificity can create a situation where the ability to change directions is now limited. This could explain the mixed results obtained by authors such as Joshi [107], Campbell [99] and Zaheer and Venkatraman [62]. Joshi interestingly found that relations with high dependence (asset specificity with high switching costs) were more likely to see opportunism. This result was supported by Handfield et al. [108] who found that power asymmetries may overshadow asset specificity in buyer supplier alliances. Further evidence of the complicated role played by asset specificity is provided by Campbell who found that high asset specificity is the rule, not the exception, and that asset specificity cannot uniquely explain integration. One possible solution to the problem above is pointed out by authors who challenge the argument that asset specificity leads to trust. In fact, it may be that trust must be in place for asset specific investment to occur [24,34,38,104]. Nishiguchi and Dyer found differences among Japanese firms vs. US and UK firms. While culture may be a moderating factor in these relations [109,110], Nishiguchi [102] points out that Japan for many years had an exploitive subcontracting paradigm which did not change without significant Japanese government intervention on behalf of subcontractors in the 1950s. Therefore, the trusting relationships that the

Japanese have developed are not culturally based as Dore [60] argues, but rather related to regulation.

The argument of whether trust or asset specificity comes first is complex. As Kamath and Liker [10] and Nishiguchi [102] point out, asset specificity is a process between firms that grows over time and likewise, trust is also a process that grows over time [22,86,108]. A possible explanation for the mixed results regarding asset specificity and trust is that a moderating influence may be present. As discussed in the section above on the economic short-term philosophy toward interorganisational relationships, asset specificity can be seen as an instrument to mitigate opportunism. This type of application would have no relation to trust. In other instances, asset specificity is used because a certain amount of trust is already present and firms see an opportunity to mutually benefit as Japanese firms studied by Nishiguchi [102] and Dyer [111] have. In a specific example, human-asset specificity can be applied for a variety of reasons. Visits by the author to a big three automotive assembly plant reveal that suppliers provide on-site support to the plants, but the support is required only by poorly performing suppliers. This use of human-asset specificity is a far cry from the use of an on-site technical representative used by steel and electronics manufacturers whose emphasis is on creating new technical solutions to problems and not ensuring base quality and contract adherence issues.

In summary, the relationship between trust and asset specificity is complex. The philosophy of the firms involved is a moderating factor as well as the presence or absence of trust before implementation of asset specificity. A simple causal relationship between asset specificity and trust is not an accurate reflection of current industry practice. It appears that asset specificity has the possibility of becoming a liability in relationships where the more powerful partner demonstrates a short-term philosophy. If that same party demonstrates a long-term philosophy, asset specificity may be a positive influence.

Table 6 Asset specificity

Author	*Constructs/Relationships*
Kamath and Liker [104]	Suppliers are on a continuum of four levels where depth of involvement and responsibility are increased at each level. Successful partnerships depend on the right balance of supplier's technological capabilities, a customer's willingness to share information, and both partner's strategic requirements
Nishiguchi [102]	A strategy precedes asset specificity. Relational mechanisms must accompany asset specificity
Dyer [103]	Interdependence of firms (strategy) drives dedicated asset specificity. Asset specificity reduces cycle time, increases quality, and increases profitability
Ring and Van de Ven [34]	Contracts facilitate trust initially, but later, asset specificity and performance become important
Handfield et al. [112]	Dedicated and site asset specificity lead to better supplier responsiveness and human asset specificity
Lorenz [24]	Trust is expedient and must be used because comprehensive contracting is impossible. Trust is particularly critical in asset specific investment. This is an empirical investigation. Trust is costly, but lack of trust is more costly.
Zaheer and Venkatraman [62]	Mixed results obtained in analysing the relationship between trust and asset specificity. More business to a carrier to develop dependence led to more, not less, trust

Table 6 Asset specificity (continued)

Author	*Constructs/Relationships*
Joshi [107]	High levels of dependence (difficulty of switching partners) lead to more opportunism in a relationship while high levels of relational norms (shared expectations) lead to less opportunism
Campbell [99]	Asset specificity in interorganisational relationships is the rule, not the exception, and alone cannot explain high levels of interfirm integration
Hostages	
Borys and Jemison [105]	'Bilateral hostages' can be an important part of hybrid relationships
Williamson [106]	Firms make 'credible commitments in relationships'
Kamath and Liker [104]	Asset specificity provides 'mutual entanglements' between parties
Gulati and Nohria [85]	Asset specificity can be used to signal commitment between parties
Cooper et al. [113]	Unilateral commitments can be made to signal support
Gulati and Nohria [85]	Unilateral commitments can be made to signal support

8 Risk: how much will you put on the line?

When it all comes down to it, the major concern of supply chain managers is risk exposure. How much risk are we willing to put on the line? Authors take one of three positions in looking at risk in organisations. First, risk leads to trust [24] or is an element of trust [23]. If a firm performs well in a high risk situation, trust is influenced. Second, trust leads to risk [26,30] or risk taking behaviour [37]. A proven performer can be trusted over time in increasingly risky situations. Third, trust and risk occur simultaneously in a complex relationship where morality must be absent [53] and determine governance structure [52]. Varying levels of trust and risk may be present at different stages of a relationship with risk and trust affecting each other.

Table 7 Risk

Luhmann [30]	Trust leads to risk taking behaviour; trust and confidence have a complex relationship
Lorenz [24]	Trust is a solution to risk
Lewis [26]	Key to trust is being able to rely on your partner in tough situations (more risk)
Fairholm [23]	Willingness to risk close relations with others is an element of trust
Mayer et al. [37]	The fundamental difference between trust and trusting behaviours is between a willingness to risk and actually assuming risk
Gulati [27]	Contracts lower risk
Williamson [5]	Contracts or vertical integration lower opportunism or risk
Ring and Van de Ven [52]	Risk increases with time. Risk and trust determine governance structure (contract, alliance, vertical integration)
Williamson [5]	Use of hostages can reduce risk in high risk situations
Ring and Van de Ven [52]	Use of hostages can reduce risk in high risk situations
Fisher and Brown [53]	Determining how much you should trust another party depends on a risk analysis of the situation and not the morality
Kogut [114]	Mutual hostage positions in joint ventures provide alignment of incentives

From the literature, we can break the risk antecedent literature into two philosophies which involve trust and distrust. We discuss the trust literature above where trust can mitigate risk. First, trust and risk occur simultaneously as a relationship prospers and higher trust and risk combined with satisfactory performance by both parties lead to synergies. In cases where distrust is present, trust is achieved through costly means such as contracts or asset (hostage) exchange. The hostage stream uses asset specificity and control mechanisms such as contracts to mitigate opportunism. Some of the believed benefits to using control mechanisms are better alignment of incentives of both parties [114] and clear consequences to breach of duties [27]. Finally, risk is discussed in situations where distrust exists and contracts or mutual exchange asset specificity can be used to mitigate short term opportunism [5,27,52].

9 Communication: talking helps!

Firms must not only exploit opportunities to learn in supply chain relationships but must also monitor information flows [26,94,115]. Firms must clarify of what information will be shared and not shared [26,91]. High levels of trust require clarity on disclosure, specifying levels of access as opposed to deception [26,53]. Through clarity of information, trust will be developed. When ‘touchy’ issues are raised constructively, a party can be confident that the response will also be constructive [26].

Table 8 Communication

Zaheer and Venkatraman [62]	Trust impacts the joint action of firms (planning and forecasting together)
Perceived openness and fairness	
Lewis [26]	Good communication increases trust which increases predictability and reduces surprises
Gabarro [50]	Informal meetings are the best communication tools for expectations, not formal meetings
Spekman and Mohr [78]	Communication openness was positively correlated with partnership performance
Gabarro [50]	Proactive communication by both sides at the beginning of the relationship is key
Disclosure	
Altman and Taylor [116]	Subordinate openness or candour and symbolic gestures at the beginning of the relationship are keys
Stephens [117]	Trust is a critical antecedent to disclosure and reciprocity trust
Clarification	
Lewis [26]	Trust and disclosure are positive significant antecedent conditions for relational acceptance (partially supported)
Hamel et al. [91]	It is critical to clarify technologies, information, and other resources that will participate in the alliance and that which will not
Yoshino and Rangan [115]	It is critical to clarify technologies, information, and other resources that will participate in the alliance and which will not You must monitor going out into an alliance
Perceptions	
Gulati and Nohria [85]	The perceptions of both parties are important and the perceptions of your partner need to be managed

10 Conclusions: so what do we really know about trust in supply chains?

When it is all said and done, the following key conclusions can be drawn about managing trust in supply chains:

When it is all said and done, integrity in action and thinking seems to beget trust.

This paper was meant to stimulate thinking on the part of SCM researchers to identify some of the major areas of research that can help supply chain researchers to refine their thinking, and build models and paradigms on the thinking of researchers in other fields. Although much of the research to date has focused on analytical approaches to managing supply chains, the area that requires the greatest work is managing supply chain relationships.

Table 9 Formal trust building process

Author	*Construct/Relationship*
Gambetta [22]	Trust grows with use
Hirschmann [118]	Trust grows with use
Dasgupta [37]	Trust grows with use
Fairholm [23]	Trust cannot be demanded but must be earned over time
Gabarro [54]	Trust cannot be demanded but must be earned over time
Bateson [119]	Trust is depleted if not used
Hirsch [120]	Trust is depleted if not used
Kamath and Liker [104]	Suppliers move through stages of trust which involve specific behaviours and investments by buyer and supplier. Suppliers that move up exceed expectations
Nishiguchi [102]	Suppliers are tiered and trust plays a crucial role
Hart et al. [36]	Trust develops through a process similar to Maslow's hierarchy as seen through the inferior partner's eyes
Good [28]	Trust is built through stages

Consider the following e-mail I received from Tom Linton, Chief Procurement Officer of Agere Systems, stationed in Singapore.

> "I bought your book *Supply Chain Redesign* this weekend and started reading it. The book points out that the implementation of supply chain management is complex, with competing solutions and agendas. Even in the same industry you have too many competing solutions! I am currently focused on building a Supply Chain which is geographically located with the supply base. This is a huge advantage as Value Chains can not overcome the timezone same day impact. The core advantages of key supplier relationship management are also local and can not be overcome by distance. If we can automate human behaviour in these management systems the value chain will really gain speed."

After reading this e-mail, the notion of automating human behaviour seems silly. Can it be done? Is it a goal that is desirable? Is it possible? Why would we wish to do so? At first blush, it seems ridiculous. Humans are not automatons. Yet as we discussed it further, what Tom was really talking about was promoting greater understanding among different people in different geographic locations around the world; getting them to think on the same plane, as a single business, or even more importantly, as thinking that they are all part of the same supply chain. As we discussed it further, it became clear how critical supply chain relationships are in promoting alignment among people, yet how difficult it is. As Tom pointed out, there are no shortcuts in automating human behaviour; you have to be communicating and interacting with one another. In the end, it all comes down to trust.

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