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SUPPLY CHAIN INTEGRATION AND COLLABORATION FOR PRERFORMANCE IMPROVEMENT: AN AGENCY THEORY APPROACH

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ABSTRACT

In today's challenging business environment, organisations not only need to continue to leverage their internal sources of competitive advantage but also should strive to harness synergies across the multiple supply chains that they are part of. However, this has to be achieved through effective collaboration between partner organisations. This paper contributes to the current scholarly discourse on this topic by the application of the "Agency Theory" to the issues around supply chain integration and collaboration, towards enhancing operational performance. The paper presents a classification of supply chain integration and collaboration, as well as a conceptual framework, for understanding and explaining the relational aspects of supply chain collaboration, and links to performance.

Key words: Supply Chain Management, Agency Theory, Collaboration, Integration, Performance.

Introduction:

The current business environment is often described as *intensely* competitive, *increasingly* dynamic and globalised in. To remain competitive in such a challenging environment, organisations should not only continue to leverage their internal sources of competitive advantage but also should strive to tap into the synergies across the multiple supply chains that they are part of. This means, competition occurs between collaborating enterprise networks competing with each other; efficiencies are pursued through integration of business processes across supply chains, and customer value is created and delivered in the form of product-service packages, often, in partnership with multiple stakeholders in the supply network. However, such a holistic approach to competition poses a raft of challenges for many organisations: for example, dealing with disparities in commercial interests, investment priorities and risk

management; issues around resources and information sharing; managing change; protection of intellectual property; lack of transparency, trust and commitment; opportunism; and much more. In recent times, a range of “soft” aspects such as relationships, self interests, power and politics and transparency have come to the forefront of scholarly discourses, as key factors underpinning organisational performance and success. This paper contributes to the scholarly discourse by way of examining the application of the “Agency Theory” approach, which deals with issues around supply chain integration and collaboration, towards enhancing operational performance.

For the purpose of this paper, a “supply chain” is defined as a succession of (organisational) entities involved in the creation and delivery of customer value, whether it is in the form of a physical product, intangible service, or in some combination of the both. However, as organisations often form part of more than one supply chain, they can be more meaningfully interpreted to be part of a supply network or an enterprise network. Therefore, the terms ‘supply chain’, ‘supply network’ and ‘enterprise network’ will be used rather interchangeably in this paper, notwithstanding the subtle differences in their literal meaning. Supply chain “integration” refers to the configuration of intra- and inter-organisational structures mainly, at the business process level, in alignment with the overall strategic goals of partner entities. In effect, this integration facilitates the swift and even flow of physical materials and products or services, in addition to information, and the flow of funds through the supply chain. By comparison, supply network “collaboration” is taken to represent the behavioural and soft aspects that drive, facilitate, execute and control the above flow at all three levels of functioning: strategic, tactical and operational. As such, this paper differentiates between integration (structural configuration) and collaboration (commitment to relationships and cooperative efforts in sharing of resources, knowhow, risks and revenue). Operational performance is defined in terms of commonly accepted supply chain performance metrics, including the more traditional measures such as cost, throughput and service level. “Agency Theory” attempts to conceptualise and explain the relationship between the two parties indentified as ‘principle’ and ‘agent’, as applied to the delegation of authority (control and decision making) within organisational contexts. The theory is based on the notion of “agency problem” or the conflicting situation and subsequent behaviour of the principal and the agent when their (self) interests and goals differ. Relationship issues such as these are commonly cited in supply chain management literature.

Based on a comprehensive review of literature, this paper first proposes a classification of supply chain integration and collaboration that distinguishes the relationship-oriented “collaboration” from structural configuration-oriented “integration”. This classification, along with a synthesis of literature on agency theory, is then used as the basis for developing a conceptual framework for understanding and explaining the relational and behavioural aspects of supply chain collaboration, and their relationship to performance. Some limitations of the agency theory approach to supply chain collaboration and future research directions are also discussed.

Literature Review

Supply Chain Management

The contemporary discussion on competitiveness, by and large, revolves around the concept of “customer value creation”. Extensive and sophisticated definitions and interpretations of the term “customer value” can be found in marketing and business strategy literature [1-3]. Potential customers evaluate alternative products and services that are available in the market based on their “utility”. Utility as a value determinant reflects the benefits derived from consuming or possessing a product or service, and could manifest in various attributes. For instance, they may

reflect functional value such as technical performance, aesthetic value such as physical features, or social value such as brand image. A wider perspective of value may also imply other intangible attributes of a product–service package such as friendly customer service, convenience, availability, clean and attractive service settings and even social and environmentally–friendly aspects. However, to be able to use the term utility meaningfully as a measure of customer value, it should be expressed with reference to the price that a customer is willing to pay for a certain product or service at a particular time, under a given set of circumstances. This means that all of these value determinants may not be equally important to every customer every time, when making a purchasing decision [4].

Organisations can enhance customer value by way of improving product or service performance in terms of one or more of the key value determinants referred to above, reducing the cost of delivering a certain level of performance, or some combination of both. In Porter’s [4] terms “ ... it [the organisation] must deliver greater value to customers or create comparable value at a lower cost, or do both; ... delivering greater value allows a company to charge higher average unit prices, greater efficiency results in lower average unit costs” (p. 62). Porter’s [5] seminal work on competitive advantage discussed in detail how the notion of “value chain” can be used to organise a firm’s value adding activities so as to support a generic strategy.

Porter’s value chain framework has later been extended by some operations management scholars in their advocacy for value network and supply chain approaches to managing business operations across what they called “supply and demand chains” [6-8]. For instance, Rainbird [6] noted that “value chain has its own frictions and interaction costs and the friction arises as the core demand and supply processes interact and fuse” (p. 243). He further claimed, “while this interaction will generate costs ... it also is a potential source of dynamism and competitive advantage” (p. 243). Walters [9] proposed that while supply chain management serves “the functions of facilitator and as a means of differentiating a product offered, by adding generic or specific elements of service” value chain management, which he claimed to be a broader concept than supply chain management, “assumes the role of innovator, integrator and operations coordinator” (p. 103).

Today, markets are becoming increasingly global, whereas customer requirements are getting ever more sophisticated and rapidly changing. Customers’ knowledge of products and technologies and their awareness of social and environmental issues are constantly improving. Economic (and exchange rate) fluctuations, government regulations and societal pressure are the forces that firms must learn to live with. Organisations are increasingly relying on technology as a source of, as well as a vehicle for, achieving and sustaining competitive advantage. Mergers, acquisitions and alliances of varying forms are all too familiar scenes in the corporate world. The traditional organisational boundaries are becoming less meaningful when it comes to sustaining competitiveness. Instead, new rules of competition are emerging based on such concepts as extended enterprise, virtual organisations and value networks. These developments directly impact on how business operations are managed within and across organisational boundaries.

Supply Chain Integration and Collaboration

There is growing recognition of the supply chain and value network approaches to managing business operations. Many authors have called for viewing customer value creation in the context of a network of organisations rather than within the boundaries of individual firms [10, 11]. The notion of focusing on the entire supply chain to deliver superior value rests on the premise that:

- virtually, any product (or service) is created and delivered through the collective and coordinated efforts of multiple organisational entities in a supply chain; and
- there are synergies to be gained at each stage of value addition across the supply chain, as well as through synchronisation of internal and external supply chain processes (i.e. that cannot be realised if each individual partner was to act on its own).

A supply chain approach to managing business operations, on the one hand, advocates the alignment and integration of key business processes across the entire supply chain with particular emphasis on efficiency, responsiveness and agility [9, 12-14]. On the other hand it emphasises the importance of cooperation and collaboration between partners entities through such means as: sharing of information, resources and risks; improved communication; and long-term relationships based on transparency and trust. As such, “integration” and “collaboration” have emerged as two major conceptual pillars of supply chain management research. However, the intellectual argument remains that if a supply chain, functioning as a unified whole, exhibits the above characteristics, it should essentially achieve the ideal goal of “swift and even flow” of material, information and funds through the entire chain. A swift and even flow will, in turn, ensure that the value determinants are met at the lowest possible overall cost, thereby offering a superior value proposition to the customer.

The physical integration of supply chain processes can be facilitated, to varying degrees, for example, by appropriate contractual arrangements (such as joint ventures, strategic alliances and licensing) that lay out protocols for resources sharing, performance measurement and revenue distribution between the supply chain partners.

However, a truly distinctive and comprehensive approach to managing supply chains can be much more sophisticated and challenging than the interfacing of business processes and the management of materials and information flows within and across organisational boundaries. Because supply chains consist of a number of organisational entities that are operating based on varying business models with unique capabilities, resources and organisational cultures, other “soft” aspects such as relationships, trust and transparency become critical determinants of value creation and delivery at the supply chain-level [15]. This may also mean, apart from collaborating and coordinating the application of physical resources, supply chain partners should appreciate the role of ethics, organisational values and social responsibilities as essential ingredients for success within the context of supply chains [16-18]. Nonetheless, these noble precepts have to be observed against a host of evil forces and commercial realities that are inherent to the traditional entity of business: a desire to maximise returns at the individual organisation-level; frenetic moves towards business consolidation; incompatible goals, capabilities and infrastructure of individual organisations; and the need to protect commercially sensitive information and/or proprietary knowledge, just to name a few.

As the first step towards developing a comprehensive framework for addressing these issues, this paper presents an eclectic classification of the core attributes of supply chain integration and collaboration, largely drawing on extant and seminal literature.

As shown in Figure 1 above, distinctions are made between integration vs. collaboration, internal vs. external, data vs. process and informational vs. relational for the purpose of delineating the relationship-oriented “collaboration” and structural configuration-oriented “integration”. However, as per the scope of this paper, the emphasis remains on the relational and behavioural aspects of collaboration between partners (external), as opposed to process and data integration.

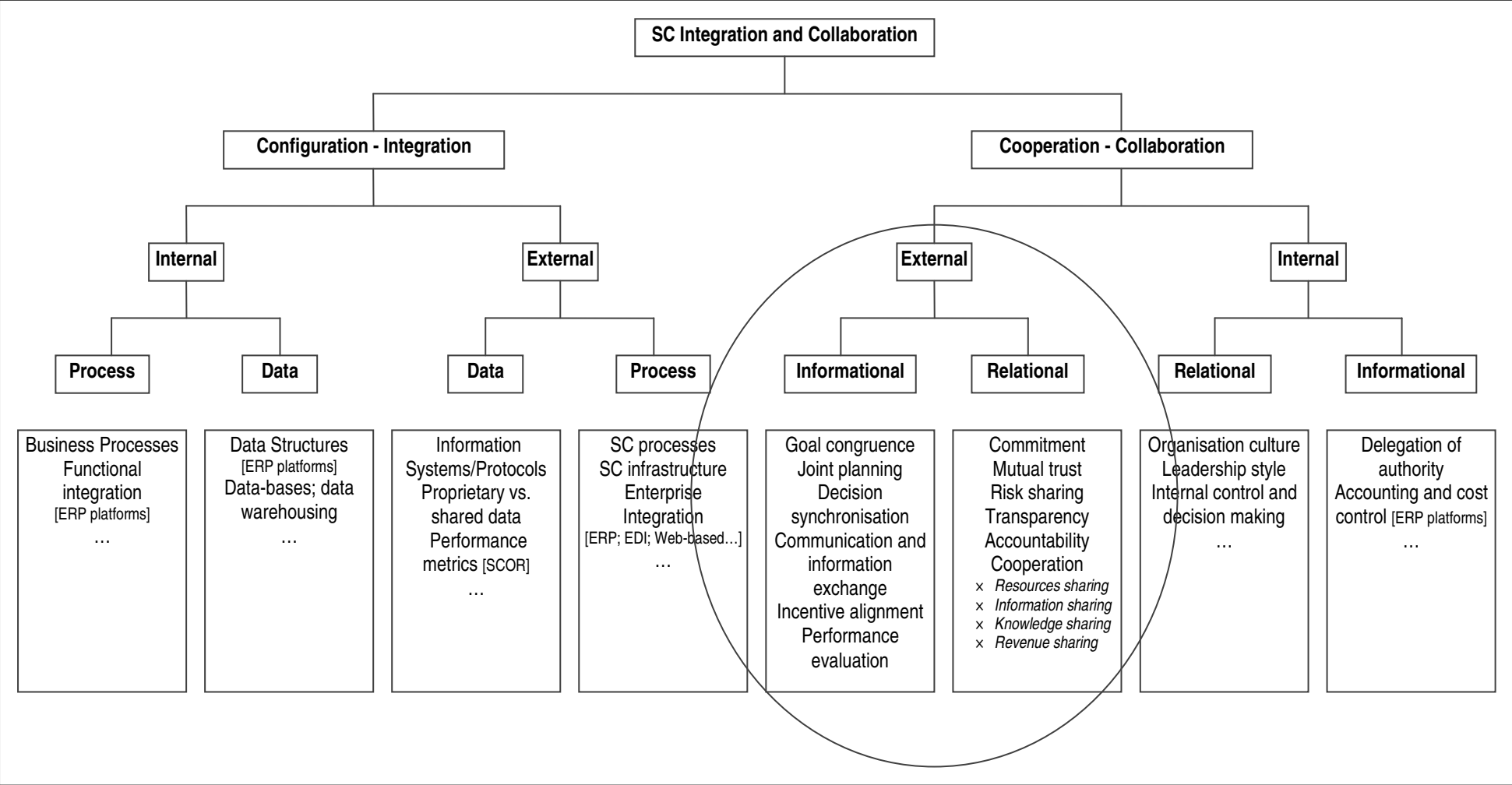


Figure 1: An eclectic Classification of Supply Chain Integration and Collaboration

Current Approaches to Supply Chain Integration and Collaboration

A number of researchers in the supply chain management area have proposed several alternative and complementary theoretical lenses through which supply chain dynamics can be studied. For instance, Halldorsson [11] have reviewed agency theory, transaction cost theory, network theory and resource-based perspective towards the development of a mid-range theoretical base for structuring and managing supply chains. Lavassani and Movahedi [19], after exploring the merits of eight theoretical frameworks (namely: transaction cost theory; resource-based view; knowledge-based view; strategic choice theory; agency theory; institutional theory; systems theory; and network perspective) for studying supply chain management, proposed stakeholder theory as a valuable complementary approach. Apart from the above literature that have reported on broader approaches to supply chain management, a number of other authors have examined how alternative theoretical frameworks can inform the various aspects (subsets) of supply chain management such as risk management, quality management, outsourcing, information sharing and corporate social responsibility [15, 20-22].

Supply chain integration and collaboration have also been examined in a similar vein, particularly, informed by theoretical insights gained from other areas of organisational theory. For example, Cao and colleagues [10] reported that supply chain collaboration has been studied from four perspectives: uncertainty reduction, transaction cost economics, resource based view, and learning and knowledge. Other authors have looked at the application of approaches such as stakeholder theory and theory of constraints to improve collaborative relationships in the supply chain [23].

Notwithstanding the insights developed through previous studies, some authors have claimed that there are no widely agreed definitions or conceptualisations of supply chain integration and collaboration, and this lack of clarity and consensus is hindering the progress of supply chain management research and practice [24, 25]. Positivist schools of thought have largely informed many conceptual frameworks proposed in literature, and the research efforts have predominantly focused on structural integration. While supply chain collaboration is sometimes interpreted as a means of achieving this structural integration, in many cases, not only the terms integration and collaboration are used interchangeably, but are also interpreted with terminology akin to structural or information-oriented interfacing of supply chain processes [13, 24, 26]. As such, there appears to be no widely accepted theoretical or conceptual foundation to inform supply chain integration and collaboration efforts. Nonetheless, a few recent contributions, for example of Cao and colleagues [10] and Simatupang and colleagues [23], have emphasised a more encompassing view of collaboration, incorporating the soft aspects such as goal congruence, decision synchronisation and incentive alignment, in addition to the more traditional hard aspects of resources and information sharing. The major issue, however, remains that the vast majority of theoretical perspectives proposed in previous studies are not able to adequately address the underpinning behavioural aspects such as relationships, trust, ethics and politics and power that are so prevalent in the current supply chain environment.

In an attempt to redress some of these issues, in the following section, we presents an agency theory-based framework for conceptualising and explaining supply chain integration and collaboration with particular emphasis on such soft aspects as commitment, cooperation, trust and supply chain partner attitude towards risk, discussed in the preceding section.

An Agency Theory Approach to Supply Chain Integration and Collaboration

The agency theory posits the relationship between the two parties identified as “principal” and “agent”, where the term “principal” is used to describe the party that delegates the tasks or duties to an “agent” who, typically, possesses specialised knowledge and skills [27, 28]. In effect, agency theory attempts to address the problem of (lack of) “goal congruence” between the principal and the agent resulting from the potential opportunistic, self-seeking behaviour of the agent which is presumed to be in conflict with the “utility maximisation”-oriented interests of the principal [29]. The problem is often characterised by: differences in attitudes towards risk; divergence in decision-making preferences; bounded rationality; an information asymmetry [30, 31]. The frameworks offered by the proponents of agency theory to address this problem include: governance structures that reduce information asymmetry and limit the self-seeking behaviour of the agent; contractual arrangements and incentive schemes that improve goal congruence and control of agent behaviour; and information mechanisms that improve transparency and accountability [21, 27, 28, 32].

Some authors have claimed that the principle-agent relationship is “one of the most common and oldest codified modes of social interaction” and that “examples of agency are universal” [33]. For instance, agency theory has been applied as a framework for conceptualising and explaining the relationships between contracting parties in such diverse areas as corporate governance, managerial economics, organisational design, labour market structure and ethics [28, 29, 34-36]. Supply chain partner relationships, as described by many authors in the discipline, closely resemble the agency problem. For example, a number of authors have cited (amongst others) goal conflict, asymmetry of information and incentive misalignment as major causes of conflict in supply chain relationships [10, 23, 37-39]. Despite the widely-cited universal applicability of the agency problem and the similarities between the agency problem and buyer-supplier relationships, applications of agency theory within the supply chain management domain have been sparse and piecemeal [11, 19]. As referred to earlier in this paper, a limited number of literature reports on studies that have used agency theory to examine such aspects as supply risk, information sharing; outsourcing and deterioration of product/service quality across the supply chain in a rather isolated fashion. Building on this knowledge, this paper examines how agency theory perspectives can be more comprehensively applied to improve supply chain relationships.

Although the classical agency theory encapsulates the relationship between the principal and agent within the context of delegation of authority, we support the view that “examples of agency problem are universal”, and therefore, agency theory can be a useful analytical lens for studying relational aspects of supply chain management. The traditional dyadic buyer-supplier relationships in a supply chain closely resemble the agency problem. However, the complex power dynamics played out in contemporary supply networks may make it quite difficult to articulate multiple relationships in terms of a simple buyer-supplier dichotomy. For example, as Griffiths and colleagues [16] have suggested, a more powerful large supplier can exercise control (“channel power”) over a small distributor(s) leading to the situation where the supplier may assume the role of principal. These issues are further explored in the following section.

The Proposed Conceptual Framework

The success of supply network relationships is widely attributed to commitment to relationships, and cooperation between partners, towards enhancing overall supply chain performance [10, 16, 37]. These behavioural traits are influenced by a number of contextual factors such as uncertainty, mutual distrust and disparate goals. For example, the more uncertainty partners can sense in a supply network, the more risk-averse they could become, and this may, in turn, change

their behaviour towards other partners – a partner’s flexibility in cooperating with other partners is expected to reduce as a result [40]. It is widely agreed that uncertainty can be minimized through improving the visibility of supply chain operations [41-44]. This means, for example, if each partner can share with other partners’ information regarding demand forecasts, production plans and capacity utilisation, the risk of potential stock outs or excess inventory can be minimised. Christopher and Lee [41] argued that in addition to improving visibility, supply chain confidence should be built through allowing supply chain partners to exercise shared control over supply chain operations. On the one hand, lack of control in supply chain operations may lead to a lack of direction and trust. On the other hand one dominant partner exercising control over the rest of the supply chain can undermine spirit of cooperation and collaboration [16, 28, 32]. Aligning partner goals and incentives across the supply chain towards optimising overall supply chain performance could contribute to minimising the impact of uneven distribution of control. Another widely discussed behavioural aspect is establishing and nurturing trust across the supply network [40, 45]. Lack of transparency in decision making across the supply network can have a negative impact on mutual trust between partners, and combined with goal incompatibility, this may lead to a lack of willingness to share resources, information and knowhow among supply chain partners [45]. These aspects are depicted in Figure 2 below and further discussed using agency theory perspectives, in the remainder of this section.

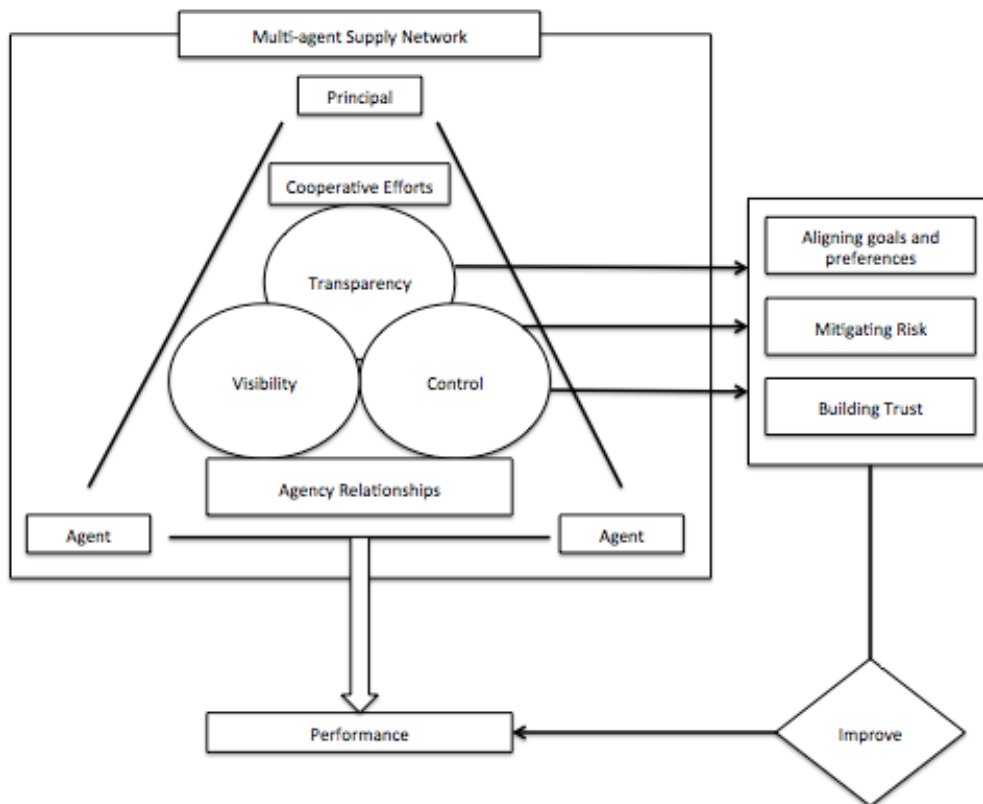


Figure 2: Conceptual Framework for Supply Chain Integration and Collaboration

The proponents of agency theory have advocated controlling risk and encouraging cooperative behaviour between the principal and the agent through such means as reducing information asymmetry and alignment of incentives. For instance, Eisenhardt [35] identified two key features of organisations recognised in agency models: “the divergence of preferences among organisational members”; and “outcome uncertainty” (p. 137). The notion of divergence of preferences or “effort aversion” is closely related to the issue of “goal conflict” cited in supply chain management literature, whereas uncertainty is viewed as a major challenge in managing supply chain risks. Eisenhardt [35] further noted that there are two interrelated control strategies to address this issue (namely, performance evaluation and appropriate recruitment and selection approaches), and argued that “the role of control is to provide measures and rewards such that agents pursuing their own self-interest will also pursue the collective interest” (p. 137). This type of reconciliatory approaches may equally apply to supply chain collaboration through such means as joint planning, integrated policies and decision synchronisation, as advocated in supply chain management literature. However, as some authors [16, 28, 32] have argued, channel power can be detrimental to supply chain collaboration, if not discharged through positive leadership. Exclusivity of control in a supply network can breed lack of trust in partner relationships. It can also limit the pace of the development of the network to the rate of development of the dominant partner [16]. An alternative, and perhaps more effective, approach to addressing the issue of goal conflict in a supply network is promoting collaboration between agents through improving communication and coordination and adopting common operational protocols such as demand forecasting and pricing models [46, 47].

Risk, from an agency theory perspective, can be attributed to the uncertainty associated with the key supply chain decisions such as partner selection (the risk that the partners may misinterpret their abilities and claim outcomes that they cannot deliver), or the risk of the moral hazard of a partner making decisions that does not best serve other partners [27, 29, 48]. Risk in the supply chain can also stem from information asymmetry and inability to monitor performance [27, 33, 49]. Faisal and colleagues [50] argued that sharing of information and improving visibility in the network can reduce both uncertainty and goal conflict among partners. Information sharing minimises risk, and if partners know what is happening in other parts of the supply network, there is less chance of unexpected detrimental events occurring. The reduced possibility of unexpected detrimental occurrences can provide agents with a sense of security and trust. Improved information sharing, monitoring the progress and actions of other agents, and closer relationships reduce the risk of moral hazard (lack of supplier effort) and adverse selection (inaccurate assessment of supplier abilities), as claimed in agency theory literature [27, 51].

Agency theory literature concerning ethics and social responsibility has also emphasised the significance of mutual trust in business relationships [18]. Trust or “confidence in each other’s voluntary contribution” in business relationships is often claimed to have a positive association with improved communication and information exchange [40, 45]. By comparison, lack of transparency in decision making processes and poor communication and information sharing, particularly when there is goal conflict (either deliberate or by default), can breed mutual distrust and loss of confidence in supply chain relationships, leading to politically motivated behaviour.

If supply chain management is based on a relationship arrangement between multiple parties to achieve some agreed-upon, common benefit, and pursue that goal through cooperative efforts, agency theory approaches can facilitate this relational arrangement by addressing the issues discussed above. Harmonised efforts of the partners, in a physically integrated supply chain will result in higher efficiency, better throughput and improved customer service.

Additionally, flexibility and agency cost can be used to measure the improvements in supply chain relationships. Flexibility is expected to increase through reducing risk and adopting an

information-sharing business culture in the network, whereas agency cost is expected to significantly drop through improving collaboration and trust. A comparison between flexibility and agency cost prior to- and after change in a supply chain and applying this framework to relationships between chains' agents closes the feedback loop [52]. A positive change in either one or both metrics would be considered as an indication of success.

The conceptual framework in Figure 2 illustrates how the proposed improvement of performance through collaboration can be achieved. In the multi-agent supply network, control, transparency and visibility are the key issues to be managed. They directly affect the cooperative efforts between agents and the principal, and, if deteriorated, they will drive the agents relationships to becoming an agency relationship. These factors (Visibility, Transparency, and Control) can be managed through mitigating risk, building trust between agents and aligning goals. If those factors are managed, the expected benefit will be an improved overall performance.

Summary and Conclusions

An increasing proportion of value creation takes place outside the boundaries of individual organisations[53, 54][53, 54]. This induces complexity and diversity into management decisions regarding the structuring of the operations, the positioning of activities and processes, the role and power of participants, and the most effective forms of collaboration between partners in a supply network. The paper discussed, in some detail, various agency problem-equivalent issues in supply networks, such as information asymmetry, conflicting objectives, differences in attitudes to risk aversion, outcome uncertainty, behaviour based on self-interest, and bounded rationality.

It argued that the current understanding of supply network dynamics is limited in that: existing conceptualisations do not explicitly recognise the two perspectives of process-oriented integration and relationship-oriented collaboration; and there is no comprehensive framework for informing the relational and behavioural aspects of supply chain management. Based on an extensive literature review, the paper presented an eclectic classification of supply chain integration collaboration, explicitly recognising the aspects of integration at process and data level, and collaboration with respect to information and relationships. The conceptual framework developed, informed by the agency theory, captured the core informational and relational aspects of supply chain collaboration and their link to supply chain performance. It was demonstrated that an agency theory approach to supply chain management can enhance partners' cooperative efforts (in sharing of resources, knowhow, information, risk and revenue) and commitment to their relationships, when the alignment of goals, mitigation of risks and building mutual trust can be achieved through improved visibility and transparency, as well as shared control over supply chain operations. This approach will in turn is expected to improve flexibility of supply chain operations while reducing agency costs, thus leading to improved performance in terms of operational efficiency, increased throughput and improved customer service.

Agency theory has been supported and followed by scholars for nearly eight decades. It has served as a viable platform for understanding the negative effects of multiagency relationships in supply networks. We believe that agency theory and majority of its researchers have so far failed to address the positive, beneficial side of agency relationships in SCM. As such, we consider investigating supply network aspects like risk, collaboration, and performance from an agency theory perspective is a useful alternative approach that can bring about tangible benefits.

This conceptual framework should be verified and validated using industry-specific case studies. Given, its limitations in addressing some behavioural aspects such as politics and power, and

ethics and social responsibility, in future research, this framework should be extended to include constructs representing the above aspects, preferably, from a social exchange theory perspective.

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