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## **Title: A game theory analysis of trust and social capital in sustainable supply chain management**

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**Abstract:** We consider the motivations of a customer-facing focal firm in a supply network regarding a choice between options for production methods and project direction. One option is purely economic, but with a negative social impact, while the other is a socially responsible alternative that entails a lower rate of economic return. In our game-theoretic analysis, the focal firm faces twin pressures: external pressure from its customers (who favour the pro-social option), and internal pressure from its network partners. After choosing the option for the project direction, all of the partners exert value-creating efforts: hence multi-sided moral hazard problems may exist in the form of effort-shirking. Social capital and trust within the network is enhanced by the choice of the social option, which mitigates the effort-shirking problem. Our analysis demonstrates that customer pressure and network social capital combine, and are substitutes, in inducing the focal firm to choose the pro-social option.

Track: Operations, logistics and supply management.

Word count: 5938

## **Introduction:**

In recent decades, product markets have increasingly been characterised by production and competition at an inter-network rather than an inter-firm level. This leads Jarimo, Pulkkinen, and Salo (2005) to contend that collaboration and cooperation in supply networks is becoming essential. Furthermore, scholars have increasingly recognised that, in addition to pure economic concerns, supply-chain behaviour may be driven by external and internal pressure to act in a socially responsible manner (Giunipero, Hooker, & Denslow, 2012; Walker, Di Sisto, & McBain, 2008). Collaboration within a supply chain, and the non-economic pressure it faces, is the focus of our analysis. Furthermore, we consider the role of social capital in promoting trust and cooperation in the supply chain.

Vertical disintegration has been a feature of globalisation, driven by the resource based view, as firms are able to optimise value-creation by outsourcing everything that is not a core competency to countries with lower cost bases (Barney, 1991; Buckley & Ghauri, 2004). However, these extended, global supply chains are also sources of concern. As manufacturing has been off-shored, pollution has effectively been re-located from West to East, and labour rights are also considerably inferior to those in the West. Besides differences in currency and wage levels, these inferior environmental or social practices may also contribute to lower cost levels. However, they also raise concerns with consumers, regulators and investors, and so increasingly influence purchasing decisions (Giunipero et al., 2012).

Understanding this phenomenon can be undertaken through the emerging discipline of sustainable supply chain management (Jayaraman, Klassen, & Linton, 2007). However, with the incumbent culture in many organisations being one of share-holder wealth maximisation and cost minimisation (Friedman, 1970; Husted & de Jesus Salazar, 2006; Isern, 2006), addressing social or environmental factors that counter cost optimisation can be expected to encounter barriers in delivery (Giunipero et al., 2012; Henderson & Venkatraman, 1993; Walker et al., 2008). Environmental or Ethical procurement policy seeks internal regulation of these factors in order to deliver change (Tate, Ellram, & Dooley, 2012). Yet, a tension may exist between firms' self-interest, which may not be in the interests of the entire supply chain, rather than behaviour oriented to benefit across the whole supply chain, and cooperative behaviour, leading to a reduction in negative social or environmental impacts (Li, Ragu-Nathan, Ragu-Nathan, & Subba Rao, 2006).

A theoretical means to explore this phenomenon is game theory. For example, using the prisoner's dilemma, free-riding issues can be examined where each individual firm may not have any incentive to cooperate (Jarimo et al., 2005). However, recent studies in behavioural economics have suggested that individuals do not act in ways that are completely self-interested. For them to act in ways that only reflect self-interest at an organisational level is linked to the culture of that organisation and the influences this has on personal behaviour. Empirical studies such as Goebel, Reuter, Pibernik, and Sichtmann (2012) and Reuter, Goebel, and Foerstl (2012) provide empirical research linking the 'orientation' of a firm as a variable describing the degree of ethical responsiveness the culture of an organisation has regarding the wider social or environmental impacts occurring in its supply chain.

Meanwhile, theoretical models of social preferences (also termed "other-regarding" preferences) have suggested that people are concerned with issues of fairness (Bolton & Ockenfels, 2000; Fehr & Schmidt, 1999, 2001, 2006), trust (Al-Najjar & Casadesus-Masanell, 2001; Berg, Dickhaut, & McCabe, 1995), empathy (Sally, 2001, 2002), and reciprocity. The traditional application of game theory within economic modelling - 'rational

economic man', or 'subjective expected utility' (French, Maule, & Papamichail, 2009) - assumes agents will act in ways that are self-interested. Empirical and experimental studies (Andreoni & Rao, 2011; Berg et al., 1995; Fehr & Schmidt, 2006) have demonstrated cooperative behaviour in practice (for example, in prisoner's dilemma and ultimatum bargaining games). Interestingly, this research in social preferences demonstrates that individuals may cooperate even in "one-shot" games, where there is no threat of future punishment. This research contradicts older economic theories where cooperation is expected only through the 'dismal' mechanism of the fear of future punishments.

The long-standing sociology concept of 'social capital' refers to the value that can be created through social relationships. Network theory deepens the conceptual and evidential basis for this (Bernades, 2010; Cruz & Matsypura, 2009; Lin, 1999). The desire to seek relationships and the psychological principles of empathy that underlie this are extended into issues of social and environmental impact. The term 'ethical' is popularly used here, although the meaning is 'moral'; it is possible to have an ethical stance that is immoral, for instance. Ethics is properly defined as the philosophy of morality (Hospers, 2013).

The incentives, or drivers, and barriers for firms and the people in them to act in an morally responsible manner in regard to society and the environment have been viewed in empirical studies (Giunipero et al., 2012; Walker et al., 2008). It is a rich interdisciplinary area between sociology, psychology and moral philosophy in management and business scholarship. However, the influence of the underlying logic of 'self-interested' game theory remains strong, and the economic solipsism encouraged by Friedman (Brooks, 2005) encourages a re-appraisal.

In this paper, we develop a behavioural game-theoretic supply chain model that analyses the following research questions:

- a) What are the factors driving the creation of trust and cooperation in a supply chain? In particular, we consider the role of empathy/social capital.
- b) What is the effect of stakeholder pressure (such as that exerted by customers) on the incentives of the supply chain to act in a socially responsible manner?

The rest of the paper is organised as follows. In the next section, we present a review of the relevant literature. In section 3, we develop the model. We conclude that section with a numerical example. Section 4 concludes with a discussion on the implications of behavioural economics for sustainable supply chain management.

## **2: Theoretical background**

The field of supply chain management includes a consideration of the relationships between firms, and this is influenced by behavioural as much as rational issues (Harland, 1996). The conventional demands of purchasing and supply management largely concern the optimisation of cost and value (Caniels & Gelderman, 2005), which in the wake of globalisation now occur through vertical disintegration and the outsourcing of processes (Buckley & Ghauri, 2004). However, the rising concern about ethics and sustainability in supply chains means a need to consider not just the economic dimension, but also social and environmental dimensions.

Carter and Rogers (2008) and Carter and Easton (2011) describe the notion of sustainable development in relation to supply chain management using a Venn diagram with three overlapping circles; economic sustainability, environmental sustainability and social

sustainability. Traditionally, companies seeking sustainable competitive advantage (Porter, 1985) have sought a position in the economic realm only. If a company seeks to deliver environmental or social objectives that move outside of the economically sustainable realm, they are entering sub-optimal performance and risk becoming bankrupt. That firms achieve social or environmental benefits that contribute to economic performance thus becomes important, as described in Porter and Van Der Linde (1995) and Porter and Kramer (2006). This is countered by the likes of Whiteman, Walker, and Perego (2012) and Pagell and Shevchenko (2013) who show that prioritising economic performance can mean failing to address factors that may be necessary to meet environmental or social goals if they are non-synergistic with economic benefit of individual firms.

Strategy, as defined in Porter (1979); Porter (1985), is an extension of neo-classical economics. Taking economic sustainability as a synonym for strategy thus anchors it within this same paradigm. By contrast, alternative views of strategy such as the resource-based view (Barney, 1991) or relational view (Grönroos, 1997; Prahalad & Ramaswamy, 2004) can accommodate aspects of behavioural psychology and ethical values that neo-classical economics cannot. Key research includes, Barney and Hansen (1994) on trust as a source of competitive advantage, and Ritter and Walter (2008) on trust as a source of value creation. Where marketing is concerned with trust between a firm and consumers, supply chain management has examined trust between a focal firm and suppliers. As discussed in Carter and Easton (2011), strategy, organisational culture, risk management and transparency (Fung, Graham, & Weil, 2007) are all critical aspects of sustainable supply chain management. Behavioural factors play a significant role in some of these, notably risk management and organisational culture.

One key example of how organisational culture assists in sustainable supply chain management is seen in Reuter et al. (2012). Here, the culture of an organisation is described as its 'orientation'. Empirical evidence on supplier selection decisions shows that 'shareholder-oriented' firms are highly price-sensitive in their decision making processes. By contrast, public-oriented firms are less sensitive. In other words, firms that are acutely focussed on maximising shareholder value, such as to meet quarterly figures, will prioritise economic performance above social or environmental performance. By contrast, firms that are not under equivalent pressure from investors and are more focussed on demonstrating social value are less price sensitive in supplier selection decisions and can favour options that generate social or environmental benefits that come at higher cost than the alternative option.

This may seem self-evident, or even tautological, but the game theory model described in the next section provides an alternative conceptual analysis of this phenomenon. Principally, this approach means being able to assess the pay-offs that may result from a rational approach, yet also consider how social capital, as a measure of interpersonal or informal inter-firm relationships, may shift the rational basis of the decision model away from pure self-interest. The game provides a means to formally model the relationship in a way that fuses economic rationality with morality. Various precedents exist for this. Hirsch and Meyer (2010) use investment accounting models to fuse rational economic and ethical views. Here, the work of Homann (2008) provides a foundation.

Hirsch and Meyer's game consists of two partners in the supply chain. One partner (Partner A) moves first, deciding whether or not to 'invest in cooperation' with B. Partner B then observes Partner A's decision, and decides whether or not to 'exploit' Partner A. In this game, the payoffs are such that Partner B has an incentive to exploit at the second stage of the game. Solving backwards, this means that Partner A does not cooperate at the first stage.

This no cooperate/exploit equilibrium represents a one-sided prisoner's dilemma, since both parties would be better off if they could agree to cooperation and non-exploitation.

Hirsh and Meyer proceed to then transform the game into a *non-game* theoretic approach. Instead, Partner A's decision is considered as an investment appraisal decision, with the probability of Partner B's trustworthiness (that is, not exploiting A) taken as exogenously given. Hirsh and Meyer then conceptualise, without modelling, the factors that may induce B to be trustworthy (the relative strength of the financial benefits from opportunistic behaviour, Partner B's reputation (which implicitly is based upon repeated game-playing with punishments), and (relevant to our enquiry), the ethical values shared by the partners.

We contribute to Hirsh and Meyer's analysis as follows. First, our model considers a supplier network with N members (rather than two). Second, we explicitly model the decision of the network to cooperate. In our model, rather than considering a binary decision for each player (cooperate or defect), we consider multi-sided moral hazard in the form of effort-shirking, with each partner choosing an optimal effort level from a continuous distribution. Third, we consider explicit pressure on the focal firm (both externally by the customer, and internally from the supply partners) in the choice of economic or social direction for the supply network (Hirsh and Meyer do not consider this). Furthermore, we consider the role of social capital in promoting trust within the network.

Various other game theoretic models have addressed supplier relations, social capital and corporate responsibility. These include Lippert and Spagnolo (2005, 2011); Spagnolo (1999), Ghosh and Shah (2012) and Saak (2012). Spagnolo, and Lippert and Spagnolo consider a repeated prisoner's dilemma framework, and take the dismal view that social capital promotes cooperative and trusting behaviour in an organisational network due to future punishment threats to those network members who defect (this is called the 'shadow of the future'). In contrast, in our analysis, we take the more positive view that social capital and trust can promote cooperation across the supply chain, even in a one-shot case. That is, the trading partners cooperate with each other due to empathy.

To summarise: Carter and Rogers (2008) and Carter and Easton (2011) hold that the optimum position for firms is to ensure that their social and environmental initiatives are economically sustainable. Porter and Kramer (2006) provide similar justification stating that failure to achieve strategic alignment between economic performance and social or environmental performance will result in such 'responsible' initiatives being terminated as soon as the financial circumstances demand it. The phrases 'win-win' or 'synergistic' as opposed to 'trade-offs' or 'zero-sum games' often characterise this phenomenon. By contrast, Pagell and Shevchenko (2013) state that this position means social and environmental challenges are totally ignored by business if they are non-synergistic with maximal economic performance. This is a contemporary resurrection of the debate, summarised by Brooks (2005), of the 'corporate social responsibility' discourse from Bowen (1953), to Friedman (1970), to Carroll (1979) and beyond.

In reality, practitioner organisations find themselves pressured to consider environmentally and socially responsible issues in decisions such as supplier selection. The sources of this pressure can be varied, including from consumers, from investors or from regulators. Responses may or may not be economically optimal. However, now that the required changes in practice must occur along a now globally-distributed supply chain, there are many challenges for achieving improved environmental and social performance. Numerous examples of supply chain scandals in recent years show the influence of downward cost

pressure prompting opportunistic behaviour. The BP Gulf of Mexico oil spill, Bangladesh textile factory disasters, the European horse meat contamination or Chinese milk contamination scandals all saw an apparent failure or flaunting of existing standards and rules in order to maximise profit that increased risk of negative social or environmental outcomes. The next section describes a model to illustrate these challenges.

### **3: The Model**

Consider an upstream supply chain consisting of  $N$  partners, where Firm 1 is the customer-facing firm (throughout the paper, we interchangeably refer to this firm as Firm 1, the focal firm or the lead focal firm), and  $n \in [2, N]$  are suppliers to Firm 1. The firms work together on a 'project' to create a product. The customers of the focal firm have an influence over the product based on its desirability, though in practice this influence could also be attributed to regulators or investors, but here the term customers is used to refer to all of these.

The focal firm is pressurised by the customers in the product market to act in a socially responsible manner, which for simplicities sake we label 'ethical'. Furthermore, the behaviour of the focal firm may affect the trust, empathy, and social capital within the supply chain, as the partners (by assumption) prefer socially responsible, 'ethical' behaviour.

We specify the following timeline in our model. At Date 1, the lead firm chooses a 'project' for the supply chain to work on. Option 1 for the project is an 'economically-driven' project, with no positive 'ethical' connotations. Option 2 is a socially-responsible, 'ethical' project. Let us also assume that Option 1 has higher economic value-creating potential, but Option 2 is preferred by the customers of the lead firm (who thus pressure the lead firm to choose it), and is also preferred by the partners in the supply chain.

After the lead firm has chosen the option for the project, then, at Date 2, all of the partner firms in the supply chain (including the lead firm) simultaneously work together on the project. Their unobservable effort levels affect the value-creation of the project. Hence, potential multiple-sided moral hazard exists, in the form of effort-shirking by each of the firms. Our interest in this paper is to examine whether social capital can mitigate the effort-shirking problem, hence promoting value-creation.

At Date 3, the partners' Date 2 efforts bear fruit in the form of the value of the final product, which the lead firm takes to the product market. The customers observe the lead firm's project choice, and reward or punish the lead firm according to whether the firm acted ethically or not in its choice of Option 1 or Option 2 for the project (recall that Option 1 is the less ethically responsible but with higher financial returns, while Option 2 is the more ethically responsible but with lower financial returns).

Our interest is to analyse the effect of customer and supplier pressure on the lead firm's choice of 'ethical' or 'unethical' option. In order to do so, we solve the game by backward induction.

#### *3.1: Date 2: Each firm's optimal effort choice.*

First, we take as given, the Date 1 project choice of the lead firm, and analyse the effect of this choice on the firms' optimal effort levels.

All firms exert simultaneous value-creating efforts  $e_1, e_2, \dots, e_n$ . The final value of the product is:

$$V(N)[1 + \gamma(e_1 + e_2 + \dots + e_N)(1 + \theta(N))]. \quad (1)$$

Where  $\gamma$  represents each partners' ability (hence, we assume for simplicity that firms have identical ability).  $\theta(N)$  represents social capital.  $V(N)$  represents the 'base' value of the product when all partners supply zero effort. Hence, effort level is value-adding.

For each firm  $n \in [2, N]$ , the payoff function is

$$\Pi_n = \frac{V(N)}{N}[1 + \gamma(e_1 + e_2 + \dots + e_N)(1 + \theta(N)) - \beta e_n^2]. \quad (2)$$

Note that we assume that the final project value is shared equally over the N firms. The final term of payoff (2) represents the firm's cost-of-effort.

We find the representative supplier's optimal effort  $e_n^*$  by solving  $\frac{\partial \Pi_n}{\partial e_n} = 0$ . We thus obtain, for each supplier firm:

$$e_n^* = \frac{V(N)\gamma[1 + \theta(N)]}{2\beta N}. \quad (3)$$

Hence, each firm's effort level is increasing in ability  $\gamma$ , and the level of social capital  $\theta(N)$ .

The only difference between the payoff of the customer-facing firm, Firm 1, and the payoff of each of the  $n - 1$  firms, is that Firm 1 is alone in facing customer (i.e. external 'stakeholder') pressure. We will see below that this pressure is not affected by effort level. Therefore, Firm 1 has identical optimal effort to the other  $n-1$  firms (equation 3).

Thus, substituting (3) into equation (1) for each of the  $n$  firms, we obtain the *indirect* project value (that is, incorporating the optimal effort levels), as follows:

$$\bar{V} = V(N) + \frac{V^2(N)\gamma^2[1 + \theta(n)]^2}{2\beta}. \quad (4)$$

We next substitute (4) into (2) to obtain

$$\Pi_n = \frac{V(N)}{N} + \frac{V^2(N)\gamma^2[1 + \theta(n)]^2}{2\beta N} - \frac{V^2(N)\gamma^2[1 + \theta(n)]^2}{4\beta N^2}. \quad (5)$$

### 3.2: Date 1: The lead firm's choice of ethical or unethical project

We now move back to Date 1. The customer-facing Firm 1 faces customer pressure. We model this as follows. In Date 1 of the game, Firm 1 makes a choice, between Option 1 and 2. Option 1 is the 'economic' project, which has higher base value than Option 2:  $V_1(N) > V_2(N)$ , but has no social value. Option 2 has social value.



If Firm 1 chooses Option 1, social capital in the supply chain is destroyed. If Firm 1 chooses Option 2, social capital is retained, and stakeholders (the customers) provide a ‘reward’  $b > 0$  to firm 1.

Specifically, Firm 1’s payoff from choosing Option 1 or 2 is

$$\Pi_1(\text{Option.1}) = \frac{V_1(N)}{N} [1 + \gamma(e_1 + e_2 + \dots + e_N)] - \beta e_1^2. \quad (6)$$

$$\Pi_1(\text{Option.2}) = \frac{V_2(N)}{N} [1 + \gamma(e_1 + e_2 + \dots + e_N)(1 + \theta(N))] - \beta e_2^2 + b. \quad (7)$$

respectively.

As noted above, Firm 1’s optimal effort level is identical to all of the suppliers: see equation (3).

Substituting all of the optimal effort levels into (6) and (7), Firm 1 makes its choice of Option 1 or 2 (economic or social) for the project by comparing:

$$\Pi_1(\text{Option.1}) = \frac{V_1(N)}{N} + \frac{V_1^2(N)\gamma^2}{2\beta N} - \frac{V_1^2(N)\gamma^2}{4\beta N^2}. \quad (8)$$

$$\Pi_1(\text{Option.2}) = \frac{V_2(N)}{N} + \frac{V_2^2(N)\gamma^2[1 + \theta(n)]^2}{2\beta N} - \frac{V_2^2(N)\gamma^2[1 + \theta(n)]^2}{4\beta N^2} + b. \quad (9)$$

Since  $V_1(N) > V_2(N)$ , but  $\theta(n) > 0$ ,  $b > 0$ , it is ambiguous which option Firm 1 prefers: Option 1 provides higher economic value, but Option 2 provides social capital within the supply chain, and customer ‘reward’ (e.g. the customer is prepared to pay a higher price for the product: think of ‘Fair-trade’ products. See Poret and Chambolle (2007) for research into price premium calculations for Fair Trade products).

We proceed to consider the effect of social capital (represented by the parameter  $\theta$ ) and customer pressure (represented by the parameter  $b$ ) on Firm 1’s choice of option for the project.

First, consider the case where there is no social capital in Option 2, and no customer pressure ( $\theta = 0; b = 0$ ). Since  $V_1(N) > V_2(N)$ , it is clear that (8)  $>$  (9): Firm 1 unambiguously chooses Option 1 (the economic project).

Thus, as we increase the level of  $\theta$  and/or  $b$ , there exists critical values of these parameters at which (8) = (9): the lead firm is indifferent between the two Options. Further increases in  $\theta$  and/or  $b$  will result in the lead firm switching to the social project, Option 2.

Formally:

**Proposition 1:** *There exist critical values of the social capital and customer pressure parameters (respectively denoted as  $\theta_C$  and  $b_C$ ), such that:*

- a) *If  $\theta \in [0, \theta_C]$  and/or  $b \in [0, b_C]$ , the lead firm chooses economic(option 1).*

b) If  $\theta > \theta_c$  and/or  $b > b_c$ , the lead firm chooses social (option 2).

Next, by comparing (8) and (9), we note that  $\theta$  and  $b$  are substitutes in equating (8) and (9): that is:

**Proposition 2:** *The critical value of the social capital parameter is inversely related to the actual level of the customer pressure parameter, and the critical value of the customer pressure parameter is inversely related to the actual level of the social capital parameter,; that is:*

a)  $\theta_c'(b) < 0$

b)  $b_c'(\theta) < 0$

*Thus, the higher the level of customer pressure, the lower the required social capital, and the higher the social capital level, the lower the required customer pressure, to induce Firm 1 to choose the socially-responsible option.*

In order to clarify, we consider the following numerical example:

$$V_1(N) = 500; V_2(N) = 100; N = 10; \beta = 10; \gamma = 10.$$

Substituting these values into (8) and (9), and equating, we find that the critical values of  $\theta_c$  and  $b_c$  satisfy the following:

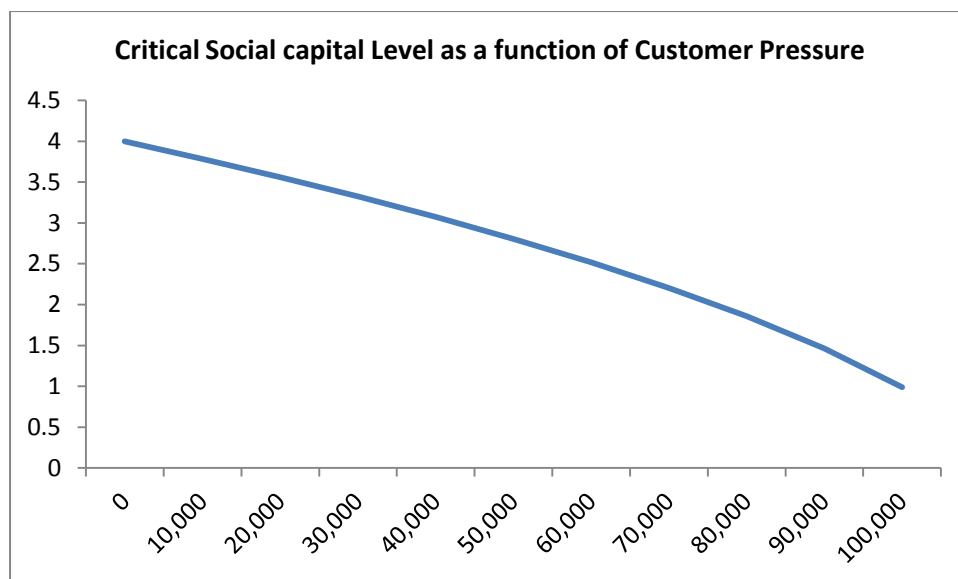
$$4750(1 + \theta)^2 + b = 118,790.$$

Re-arranging, we obtain:

$$\theta_c = \sqrt{\frac{118,790 - b}{4750}}, \tag{10}$$

Which confirms proposition 2: the critical values  $\theta_c$  and  $b_c$  are inversely related.

Equation (10) is represented in the following graph:



**Diagram 1:** *This diagram demonstrates the relationship between customer pressure and critical social capital. Combinations of these two variables below the line result in the focal firm choosing the economic Option 1, and above the line the social / ethical option: Option 2). The negative relationship demonstrates that customer pressure and social capital are substitutes in driving the lead (focal) firm to choose the socially-responsible production option. That is: the higher the level of customer pressure, the lower the social capital required to drive the lead firm to make the social choice, and vice versa. (Note that the customer pressure parameter is measured in monetary terms, while the social capital parameter represents a multiplicative factor enhancing value-creation.).*

The horizontal axis represents the actual level of customer pressure  $b$ , and the vertical axis represents the critical level of social capital  $\theta_c$ . Therefore, for a given level of customer pressure  $b$ , social capital ‘below the line’ results in the lead firm choosing the economic option, Option 1, while social capital ‘above the line’<sup>1</sup> results in the lead firm choosing the social option, Option 2.

The diagram demonstrates that the focal (customer-facing) firm’s economic and social choices are affected both by external pressure (from the customers) and the internal social capital within the supply chain. (See the description under the diagram for more discussion).

### Discussion, limitations and implications for practice and research

The role of customer pressure in this model is central. Here, existence of consumers' ethical values within the economic value-chain produces an economic impact. This phenomenon is not addressed within traditional neo-classical economics, as discussed by the relationship approach to marketing (Grönroos, 1997), co-creation of value (Prahalad & Ramaswamy, 2004), or service dominant logic (in contrast with goods dominant logic) (Vargo & Lusch,

<sup>1</sup> In developing a game-theoretic model, we need explicit payoffs to solve the game. So we have to attach some implied monetary value, even to non-economic factors. So, in this model, we have some implied economic value to the customer pressure parameter  $b$  (for example, taking the social project boosts customer demand) and to the social capital parameter  $\theta$  (if you look at the payoffs, this parameter is a multiplicative factor on the value-creation of the network: so for example, higher social capital enables higher value-creation). In the numerical example, we assign numerical values to all of the parameters, and this enables to derive numerical values for the critical behaviour parameters (customer pressure and social capital).

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2004; Vargo & Lusch, 2011). Each of these approaches anchors the consumer within the wider value-chain, conceptual consideration of which is deepened by systems theory (Maglio, Vargo, Caswell, & Spohrer, 2008; Vargo & Lusch, 2011). These areas all offer future areas for research leading to theory building.

The practical relevance of this research is that firstly, values can matter and matter a lot. This is well-appreciated by any business leader who has faced a reputational scandal leading to fall in consumer trust, fall in market share and loss of economic performance. However, this view is under served in theory. The prevalent culture may remain one of profit maximisation for the personal or organisational benefit, not the maximisation of benefit (both economic or non-economic) for the wider networks of parties in a value chain, or of wider society affected (Fearne, Garcia Martinez, & Dent, 2012; Lepineux, 2005). This paper has described the application of behavioural economics research to sustainable supply chain management using game theory.

There is a need for a deeper understanding of the behavioural aspects at play in inter-firm relationships. This needs to be considered alongside similarly themed research and so future research may begin by conducting a systematic literature review (Tranfield, Denyer, & Smart, 2003) on this overlap, also considering the opportunities for synthesis between these two fields of study (Denyer, Tranfield, & Van Aken, 2008). The topic of sustainable and responsible business has long considered the interplay between optimising economic returns, yet traditional economic theory has not provided a sufficient account of behavioural factors such as trust and co-operative behaviour, where the resulting relationship can be a significant creator, or destroyer, of economic value. Research areas such as service dominant logic (Vargo & Lusch, 2011) suggest a new paradigm may accommodate such factors and this deserves further scrutiny in the context of supply chain management (Lusch, 2011). The nature of external influences (Walker et al., 2008) for sustainable supply chain management is also central to the analysis here, and deeper analysis may be considered through consideration of institutional theory (DiMaggio & Powell, 1983; Lawrence, Suddaby, & Leca, 2011).

Further research could also explore recent cases of transformation of supply chains, including by the influence of external forces, either activists, consumers, investors, regulators or all of the above in combination. Such examples might include recent campaigns linking palm oil to the threatened extinction of the orang-utan, use of toxic chemicals in textile production, or many others.

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