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Structured Abstract

Purpose (mandatory)	To examine how first-tier suppliers in multi-tier supply chains adapt their vertical and horizontal relationships to reduce the risk of slavery-like practices.
Design/Methodology (mandatory)	Using Archer's morphogenetic theory as an analytical lens, this paper presents case analyses adduced from primary and secondary data related to the development of relational anti-slavery supply capabilities in Brazilian-UK beef and timber supply chains.
Findings (mandatory)	Four distinct types of adaptation were found among first-tier suppliers: horizontal systemisation, vertical systemisation, horizontal transformation and vertical differentiation.
Research limitations/implications (mandatory)	This study draws attention to the socially-situated nature of corporate action, moving beyond the rationalistic discourse that underpins existing research studies of multi-tier, socially-sustainable, supply chain management. Cross-sector comparison highlights sub-country and intra-sectoral differences in both institutional setting and the approaches and outcomes of individual corporate actors' initiatives. Sustainable supply chain management theorists would do well to seek out those institutional entrepreneurs who actively reshape the institutional conditions within which they find themselves situated.
Practical implications (if applicable)	Practitioners may benefit from adopting a structured approach to the analysis of the necessary or contingent complementarities between their, primarily economic, objectives and the social sustainability goals of other, potential, organisational partners.
Social implications (if applicable)	A range of interventions that may serve to reduce the risk of slavery-like practices in global commodity chains are presented.
Orginality/value (mandatory)	This paper presents a novel analysis of qualitative empirical data and extends understanding of the agential role played by first-tier suppliers in global, multi-tier, commodity, supply chains.

Introduction

Slavery is an intrinsic, if overlooked, part of the history of management studies (Cooke, 2003) and continues to be an endemic and persistent feature of current social-economic systems (Crane, 2013; New, 2015). Although exact prevalence figures are a matter of some debate, the International Labour Organisation (ILO) and Walk Free Foundation estimated that, in 2016, around 24.9 million people were in situations of forced labour, a particular form of modern slavery, with around 16 million of these cases occurring in the private sector (ILO, 2017). In addition to its detrimental social effects, the total illegal worldwide profits obtained from such forms of exploitation have been calculated to amount to US$150.2 billion per year; with over a quarter of these profits – US$43.4 billion- gained from forced labour exploitation outside the domestic sphere (ILO, 2014). Abusive employment conditions akin to modern slavery continue to be found in the upstream operations of global commodity supply chains as diverse as conflict-mineral mining, plantation farming and shrimp fishing (Hofmann et al., 2018; LeBaron, 2019; Nakamura et al., 2018). Recent studies have confirmed concerns about forced labour in diverse sectors and geographical locations including cotton harvesting in Uzbekistan, Assam tea plantations in India and coffee growing in Ghana (LeBaron, 2019; McGuire and Laaser, 2018). Such studies reveal the routine realities of practices such as illegal fees and corruption; high debts; contract substitution; the inability to change one's employer; wages and salaries subject to delay or illegal deductions and restriction of movement (Bryk and Muller-Hoff, 2018; LeBaron, 2019). Violations of acceptable employment conditions range from the lethal fire and building safety practices at Rana Plaza, a Bangladeshi garment factory used by the major fashion brands Benetton, Mango, Matalan and Primark, to the exploitation of children by manufacturers in Vietnam and Cambodia supplying accessories such as footballs for the sportwear brand Nike (Blamires, 2011; Young, 2020). The Rana Plaza case action by the international community led to the Bangladeshi Accord - an enforceable contract between downstream buyers and Bangladeshi labour representatives (Salminen, 2018) - and Nike was forced to tighten its recruitment procedures.

There have been increasing calls from civil society organisations, and legislative action from Governments in California, the United Kingdom (UK), France, Australia and The Netherlands, to compel businesses to take action to eradicate the scourge of modern slavery from their organisations and supply chains. Caruana et al. (2020) identify the supply chain management domain as one area of study in which promising academic work has started to emerge. Gold et al. first identified the challenge of modern slavery to supply chain management in 2015, highlighting the need for further theory development. Agent-based modelling and empirical studies have, to date, focused upon UK hand car washes, Spanish agriculture and the activities of, particularly branded-fashion, UK retailers (Benstead et al., 2018; Chesney et al., 2017; Chesney et al., 2019; Esoimeme, 2020). The determinants, wealth effects and reported remediation and detection practices of the mandated corporate social disclosure required by the UK Modern Slavery Act, which places a duty upon commercial organisations operating in the UK to disclose the steps that they have taken to eradicate slavery from their supply chains, or to report that they have taken no such steps, have also been examined (Cousins et al., 2018, Flynn, 2019; Flynn and Walker, 2020; Stevenson and Cole, 2018). Such studies do not, however, shed light upon changes to management practices further upstream which, this research suggests, may have to date gone largely unreported.

Modern slavery research in the supply chain management literature is frequently discussed in terms of social sustainability. Social sustainability is concerned with the management of social resources, including people's skills and abilities, institutions, relationships and social values (Sarkis et al., 2010). Private or public assessment schemes have been introduced in attempts to address explicitly social issues such as child labour and unsafe working conditions (Pagell and Wu, 2009). Sustainable supply chain management involves attention to orientation, continuity, collaboration, risk management and proactivity (Beske and Seuring, 2014). Business sustainability efforts in supply chains concern both the internal and external stakeholders of a company (Svensson et al., 2018). Social networks play an important role in dealing with local stakeholders and institutions in emerging economies (Lu et al., 2018). Further investigation of social issues in these lower tiers, particularly in emerging economies, is needed (Venkatesh et al., 2020). As others have noted (Sauer and Seuring, 2018a), the extension of sustainable supply chain management toward multi-tier sustainable supply chain management shifts the focus of sustainable practices to sub-, or lower-tier, supplier management (Mena et al., 2013; Tachizawa and Wong, 2014).

It has been suggested that novel approaches to remediation opportunities for supply chain collaboration may be possible – including horizontal as well as vertical, multi-tier and bottom-up alternatives (Caruana et al., 2020). Lower-tier adaptations may differ from those found in the focal supplier layer (Grimm et al., 2016). Indeed, to bring about significant change, supply chain stakeholders; stakeholders in society; the company's markets and business networks often combine their efforts to improve sustainable business practices (Svensson et al., 2018). Yet such interventions have largely been theorised as rational management mechanisms to increase competitive advantage (Etsy and Wilson, 2006; Moxham and Kauppi, 2014; Benstead et al., 2018). A more nuanced examination of the interplay between the social and the rational is needed (Sauer and Seuring, 2018a). It is to an examination of these phenomena in the relational, anti-slavery capability building of first-tier suppliers in upstream multi-tier commodity supply chains in Brazil that this paper attends.

One of the BRICS group of nations, Brazil is a major emerging economy and a leading exporter of global commodities to countries in the developed world. In rural areas, the problem of forced labour is long-standing and most prevalent in cattle ranching and agriculture (United Nations, 2010). In 2006, the Brazilian Government was taken to the International Inter-American Court for its lack of action in the Fazenda Brasil Verde v Brazil case, where approximately 340 trafficked men were removed from the ranch by Government labour inspectors over a period of two decades (Centre for Justice and International Law, 2016). In urban areas, forced labour has been described as a feature of the Brazilian garment industry (United Nations, 2010). The plight of Bolivian workers exposed to conditions of slave labour in Sao Paulo garment factories producing for M5 Textil, the parent company of the Brazilian high street fashion brand M.Officer, led the Brazilian Ministry of Labour to threaten the company with a US$1.2 million fine for damages, a further US$613 thousand fine due for social dumping, and the loss of its right to sell its products in the state of Sao Paulo for up to ten years (Diniz and Cunha, 2017).

UK retailers source many of their products from global commodity markets such as Brazil, which is a major exporter of beef and timber (Cook, 2019; Faostat, 2018). The global supply chains of companies supplying Brazilian beef and timber into the UK formed the unit of analysis. Analysis of such tropical commodities has been found to highlight issues of global inequality that may be less obvious in other industrial contexts (Bair, 2009). This study, of the realities of first-tier

Brazilian-UK beef and timber supply, used blended methods to obtain and triangulate supply chain data. Cases are adduced from primary and secondary empirical data obtained through practitioner workshops, interviews and documentary sources. Archer's social morphogenetic theory (1988,1995) is used as an analytical lens to examine the adaptations made in response to demands from customers to eradicate the risk of modern slavery from upstream supply chains. How these initiatives served either to reproduce or transform relationships between suppliers and other supply chain stakeholders in the lower tiers of these multi-tier supply chains is examined. These cross-sectoral cases offer particularly interesting exemplars for two reasons. In Brazil practices analogous to slavery are known to persist in the upstream operations of the commodity chains of both the beef and timber sectors (Emberson et al., 2019) and civil society actors have turned to businesses to realise further improvements in social conditions. The adaptations to relational anti-slavery capabilities found among first-tier Brazilian beef and timber suppliers are categorised into four distinct types: horizontal systemisation, vertical systemisation, horizontal transformation and vertical differentiation.

The remainder of this paper is structured as follows. First, three relevant streams of literature in the supply chain management domain are reviewed: the adaptation of relational governance in multi-tier supply chains, the development of relational, socially-sustainable, capabilities and the emerging literature related to the agency role of first-tier suppliers. In the next section, the research setting is introduced, evidence of slavery-like practices in Brazilian-UK beef and timber commodity supply chains is discussed and the characteristics of commodity supply chains in the beef and timber sectors outlined. Next, the research design, data collection and analytic lens are described before a model is presented of the four types of relational, anti-slavery supply chain capability developments identified. Finally, these findings are discussed, the implications for sustainable, multi-tier supply chain management theory and practice delineated, and the paper concluded.

Literature Review

Adapting relational governance in multi-tier supply chains

Governance relates to "the relations through which key actors create, maintain and potentially transform network activities" (Raynolds 2004, p.728 cited by Gimenez and Tachiwaza, 2012). An overview of selected socially-sustainable multi-tier supply chain literature may be found in Table I. In a systemic review of the governance structures used to extend sustainability to suppliers, Gimenez and Tachiwaza (2012) found that combining both assessment and collaboration had a positive impact on environmental performance and corporate social responsibility. Assessment includes any activity related to evaluating suppliers (e.g. questionnaires and company visits), whereas collaboration refers to working directly with suppliers providing them with training, support or other activities. Their findings complement those of Lee and Klassen (2008), who also found support for the synergistic effect of simultaneous implementation. These authors identified two streams of literature on supply chain corporate social practices and supply chain governance: one covering the implementation of supplier codes of conduct and the other considering underlying market governance mechanisms in the light of calls for more extensive collaboration. Alvarez et al. (2010) report how the governance mechanisms used to extend sustainability throughout the supply chain should not be treated as a fixed element but rather as an adaptable one. In their systemic review of the supply network literature, Pilbeam et al. (2012) found that, in general, formal instruments are adopted in dynamic and unstable circumstances defined as risky,

uncertain, unpredictable or during organisational change. These instruments can result in coordination, control, viability and performance outcomes. Informal instruments tend to be adopted in contexts where prior relationships exist between actors. Furthermore, in their study of the Nespresso supply chain network of coffee traders, farmers and NGOs, Alvarez et al. (2010) found that formal governance mechanisms were incorporated into the relationships to enable the supply chain network to grow and to provide clarity to all actors. Relational quality processes that increased trust were critical elements in the early phase and were explicitly built into a second phase of development. Associated with this evolution, there were important changes observed in relational conditions. An expanding scale and scope of activities was observed and, supporting this expansion, an increased formalisation of the governance mechanisms associated with the network. This study extends existing research in the environmental sustainability field and examines the dynamics of socially- sustainable governance mechanisms in multi-tier supply chains.

[Insert Table I about here]

Mena et al. (2013) were the first to categorise multi-tier supply chain relational governance modes as open (where there is no direct interaction between the focal firm and its lower-tier suppliers); transitional (where the focal firm begins to build a link with its lower-tier suppliers) and closed (where there exists a formal relationship). Tachiwaza and Wong (2014) suggest four different approaches to the governance of multi-tier supply chains: direct; indirect; work with third parties and don't bother. These authors also identify a range of contingency factors related to power; stakeholder pressure; material criticality; industry; distance and dependency. Sauer and Seuring (2018a) add the concept of 'cascading', where two or more multi-tier supply chains are combined into a cascade of supply chain segments. Sustainable supply chain management performance depends on the level of relationship governance and control of multi-tier suppliers (Lu et al., 2018). The present study shows that, despite the lack of direct interaction with upstream customers, the threat of sanctions has led first-tier suppliers to engage in the development of a wide array of creative governance mechanisms to support the eradication of contemporary slavery.

Building dynamic, relational, socially-sustainable, capabilities in multi-tier supply chains

Dynamic capabilities are conceived as those internal and external organisational skills, resources and functional competencies that an organisation develops to meet the requirements of its changing environment for the purposes of wealth creation (Teece et al., 1997). These capabilities cannot be easily bought, as they are tacit, socially complex and rare (Barney, 1991). However, organisations may develop relational capabilities by collaborating with other organisations and so gain access to the complimentary resources and skills of others (Dyer and Singh, 1998). Environmental supply chain management researchers have identified sustainable supply chain management as a relational capability which encompasses supplier selection, environmental collaboration and evaluation (Paulraj, 2011). Paulraj (2011) argues that organisations must not only develop unique internal resources, but they must also consequently leverage them to identify strategic partners, manage them collaboratively and further evaluate them to meet future sustainability goals. Pagell et al.'s (2010) study identifies how some purchasers implementing sustainable supply chain management bought leveraged commodities in a way akin to the development of relationships suggested for more strategic suppliers. These authors suggest that the arms-length contractual relationships typically used for commodity goods may no longer be suitable. Indeed, relational theory has been used to explain the

collaborative approaches of large organisations working together - and with non-business partners in horizontal collaboration - to achieve sustainability (Touboulic and Walker, 2015; Benstead et al., 2018). Furthermore, Dabilkar et al., (2016) identify significant trade-offs between lowering costs and improving social and environmental compliance for non-critical components. This study furthers understanding of the conflicts inherent within different types of collaborative relationship adaptations which emerge from the development of socially-sustainable capabilities in the lower tiers of multi-tier supply chains as managers seek to develop dynamic, relational, anti-slavery capabilities with other 'non-traditional' supply chain actors (Stevenson and Cole, 2018).

Some have advocated that companies should adopt a holistic approach to sustainability throughout the supply chain and engage in radical structural change to improve overall sustainability performance (Lee, 2010). However, such normative approaches have been criticised, with other commentators suggesting that progress may in fact reflect a slower pace of change and adaptation (Padin and Svensson, 2013). Various characteristics have been identified that may make change in upstream, lower tier suppliers particularly difficult to manage (Mena et al., 2013; Tachiwaza and Wong, 2014; Sauer and Seuring, 2018b). These include a lack of information; the degree of influence that downstream actors are able to exert; the relative insulation of upstream actors from consumer-pressure due to their relative anonymity and a tendency to rely upon short-term relationships (Tachiwaza and Wong, 2014). In addition, Sauer and Seuring (2018b) assert that the influence of the focal firm decreases with rising distance and diverging institutions in the supply chain. Technology-driven solutions such as the use of Industry 4.0, blockchain, the internet of things and the analysis of big data have also been advocated as means to improve sustainability (Sharma et al., 2020; Venkatesh et al., 2020). This study provides a better understanding of the possibilities for and problems of forming relationships to effect change in the sub-tiers of multi-tier supply chains. This is all the more important given that it is in these raw material supply tiers that major sustainability impacts most often occur (Sauer and Seuring, 2018b).

The importance of agency

The theoretical development of sustainability research in supply chains has been informed by a large number of organisational theories, including the social variant of institutional theory and the extended resource-based view (Moxham and Kauppi, 2014; Nakamba et al., 2017). While these theories are helpful in exploring supply chain structures, Wilhelm et al. (2016) examine the conditions under which first-tier suppliers act as agents who fulfill the lead firm's sustainability requirements (i.e., the primary agency role) and implement these requirements in their suppliers' operations (i.e., the secondary agency role). Drawing upon Williamson's (1981) transaction cost economics, their study highlights the importance for lead firms of incentivising each agency role separately and reducing information asymmetries, particularly at the second-tier level. In addition, their inductive analysis reveals several contingency factors that influence the coupling of the secondary agency role of the first-tier supplier. These factors include resource availability at the first-tier supplier's firm; the lead firm's focus on the triple-bottom-line dimension (i.e., environmental or social); the lead firm's use of power and the lead firm's internal alignment of the sustainability and purchasing function. This study pays particular attention to first-tier suppliers secondary agency role, indicating how some actors may go beyond simply implementing the lead firm's sustainability requirements.

Sauer and Seuring (2018b) argue that the specific characteristics of multi-tier supply chains, as well as the challenges of achieving triple bottom line sustainability, require the alteration of current research approaches. However, the institutional approach upon which they draw neglects consideration of corporate actors' agency. The importance of including both internal and external supply chain actors in sustainable supply chain management has already been recognised (Svensson et al, 2018). Malik et al. (2019) use activity theory to provide a processual perspective of internal and external agent relationships which, they suggest, could be used to explain the difference between internal and external agential effects on socially-sustainable supply chain management. Yet, while activity theory provides useful purchase upon common or shared intention, it is less effective in the facilitation of an understanding of the potential conflicts between actors and their goals and, thus, fails to provide an adequate theorisation of the potential for both complementarity and conflict when actors are involved in social change

In this study Archer's morphogenetic theory (1988, 1995) is used as an analytical lens. It contributes to this emerging literature through the development of a model of the adaptations resulting from relational, anti-slavery, supply chain capability building by focal, first-tier suppliers. The adoption of a morphogenetic lens permits analysis of the necessary and contingent structural and cultural complementarities and contradictions which serve to condition, yet not predict, the effects of action, offering analytic explanation of how relational anti-slavery supply chain capability developments with, and of, some corporate actors serve either to reproduce or transform existing socio-cultural conditions. This problematises the predictive validity of studies of first-tier suppliers' agency - whether derived from theory or practice. It complements the study of the Bangladeshi clothing industry reported by Ventrakesh et al. (2020), who investigate the drivers of social sustainability compliance from the perspective of suppliers that adopt a double agency role by complying with buyer-imposed social sustainability compliance while managing the compliance of lower-tier suppliers on behalf of the buyer, in that it highlights a range of situational conditions that may make some actions easier than others.

Research setting: Slavery in Brazilian Beef and Timber

Despite its sophisticated anti-slavery legislation, in 2016 there were an estimated 369,000 people in modern slavery in Brazil (Global Slavery Index, 2018). Cattle ranching and timber activities accounted for a major proportion of the number of identified slavery cases (Reporter Brasil 2019a; 2019b). The use of slave labour to support livestock production has a long history in Brazil (Trindade Marahao Costa, 2009). Research has shown the persistence of debt bondage and other conditions analogous to slavery, illegal under current Brazilian law (Phillips and Sakamoto, 2011; Rezende Figueira and Esterci, 2017). Identified cases, the majority of which are reported in the legal Amazon, relate to poor lodging and working conditions, including for those engaged in peripheral activities such as pasture cleaning (Phillips, 2011). By contrast in the timber sector, federal government information suggests instances of slavery are scattered across states, with most rescue operations occurring in plantation cutting and processing in planted forests (Reporter Brasil, 2019b). In line with the thesis advanced by Bales (2016), Reporter Brasil report that cases of slave labour are related to illegal logging. According to a representative from the Ministry of Labour and Employment, statistics based upon Government reports may underplay the actual geographical spread of the problem since labour inspectors have limited resources, focus mainly on cases involving larger numbers of victims and can identify slavery in managed plantations more easily than in native forest. Despite their similar

labour problems, these two commodities have distinctive supply chain characteristics (see Figure 1).

[Insert Figure 1 about here]

The beef supply chain is characterised by a complex network of upstream farms, comprised of small cattle breeders, fattening farms and ranches. Downstream, industrial meat processing operations have been consolidated into three large, international, firms that purchase live cattle for slaughter through arms' length, spot market, purchasing arrangements (Pinheiro et al., 2019). These arrangements result in each processor dealing directly with around 70,000 separate cattle suppliers, drawing upon a market served by 1.3 million livestock producers. A few, large, companies control much of the export commodity market. The impetus for sustainable supply chain management capability development has been driven primarily by the threat of illegal deforestation, particularly within the Amazon biome. The implementation of agricultural certification schemes, which include labour standards, has proved largely unsuccessful and, while there have been small-scale interventions in which closer, more collaborative, working relationships have been developed with selected, strategic, suppliers, these have failed to develop any critical mass (Cameron, 2017; Gueneau 2018; Maguire-Raipaul et al., 2016; Newton et al., 2014; Rainforest Alliance, 2016).

In the timber sector, Brazil has developed large-scale industrial forest plantations which promise to provide a sustainable source of timber. Most of Brazil's log production comes from these plantations, which account for nearly all of the country's exports (Wellesley, 2014). Ownership structures vary. The verticalisation of forestry and primary processing organisations mean some forestry operators supply directly to UK importers. In other cases, first-tier supplier firms focus solely upon timber processing, or upon processing and import operations. Supplier portfolios tend to be smaller than in the beef sector, with 2,000 suppliers typical. The length of the production cycle, which ranges from seven to fourteen years depending upon the species, means that it is possible for timber processors to develop longer-term, more collaborative supply relationships with their forestry suppliers (Pinheiro et al., 2019). There is also greater product variety than in the beef supply chain. Sustainable supply chain management has been driven primarily by managers' attention to ensuring their suppliers are compliant with the evolution of private governance schemes such as those enshrined in Forest Stewardship Council (FSC) standards (Humphries and McGrath, 2014; Pattberg, 2006; Pinto and McDermott, 2013). These standards include criteria related to workers' rights, the assessment of which has become more closely prescribed as standards have matured.

At the time of this study, large beef and timber processors used the Brazilian Government's dirty list (lista suja in Portuguese) to inform their purchasing procedures. Following an agreement made in 2009 with the international charity Greenpeace, the three largest beef processors had also introduced externally-audited information systems to block supply from any dirty list named supplier. High success rates in removing blacklisted suppliers were reported in these companies' annual sustainability reports.

Research Design

Research methods, data collection and case selection

The supply chain management field and its close connection to real-world practice requires a diversity of research methods that complement each other (Darby et al., 2019). The research

was carried out in three phases between November 2017 and March 2019. This phased approach allowed deeper insight into the business practices that were described (Bryman and Bell, 2007). The first phase involved the generic mapping of Brazilian-UK beef and timber operations and the identification of UK importers using UK trade data. Semi- structured interviews of between 1- 1½ hours were conducted with representatives from UK beef and timber trade associations. These were audio-recorded and later transcribed. In depth interviews of this type are recognised to provide well-grounded, rich description and explanation of locally occurring processes (Eisenhardt and Graebner, 2007).

In the second phase, secondary data related to slavery cases identified in Brazilian Ministry of Labour and Employment inspectors' reports, between 2010-2016 for timber and 2015 -2017 for the beef sector, were analysed. Financial transactions between identified offenders and UK importers and distributors were traced using public and private trade databases. This data was used to produce maps of the Brazilian-UK supply chains of 3 Brazilian beef processing firms and 7 Brazilian timber processors in which slavery-like practices were found. Each supply chain was constructed from the perspective of the Brazilian first-tier supplier firm: the meat processor for beef and the timber processor in the case of timber.

In a third phase of research, a sector-event timeline based upon media reports of slavery for each company was constructed and the annual statements of the identified UK companies were open- and then axially-coded (Strauss and Corbin, 1990). Where available, annual modern slavery statements of each identified company were analysed to identify reported changes in supply chain management practices. These reported changes were grouped into four categories: raising awareness; legislative reinforcement; risk assessment and supply chain initiatives. Across sectors, in several cases UK companies reported the implementation of sanctions against suppliers who were found to have cases of slavery in their supply chains. Although Brazil was identified as a country of high potential risk by individual companies in both sectors, no specific initiatives with their first-tier suppliers were described.

In parallel with these phased data collection activities, three workshops and follow-up interviews were conducted in Brazil with purposively-selected informants, including leading Brazilian trade associations and organisations from the identified supply chains in each sector. Workshop participants included Government, non-governmental and business representatives (see Table II for details of the organisations and roles of those who participated in the workshops). Finally, representatives from nine Brazilian firms (4 in the beef sector and 5 in timber) completed a semi-structured questionnaire. Questionnaires in Portuguese were distributed to market-leading processors in the Brazilian beef and timber sectors. Six companies responded – two from the beef sector and four from the timber sector. An English translation of the questionnaire may be found in Appendix 1.

[Insert Table II about here]

Access to representatives from individual Brazilian organisations was negotiated directly, through a UK trade association and via a Brazilian certifier. The intermediaries were able to advise on those companies that they knew had developed relational anti-slavery capabilities in this area. Face to face interviews were conducted in English by three researchers, one of whom was a bilingual, native, Portuguese speaker who also provided simultaneous interpretation when this was required. Two interviewees were at Director-level, with other informants holding various managerial, technical and analyst roles. A senior Government labour inspector;

sustainability consultant and forest certification manager were also interviewed. Full details of interviewees, including their role and organisation, may be found in Table III. Since the subject matter was considered sensitive in Brazil, data from interviews conducted there were recorded in the form of typed field notes. These were checked and annotated the same day by two of the authors. Data from these, and other secondary, sources provided by interviewees was used to adduce four cases where focal first-tier suppliers had developed relational capabilities to undertake anti-slavery initiatives in their upstream supply chains. The next section describes how Archer's morphogenetic theory was then used as an analytical lens to produce a case narrative of each of these four initiatives.

[Insert Table III about here]

A morphogenetic analytic lens

Writing within the realist paradigm, Margaret Archer offers a graphic metaphor of social change as 'a wild zigzag as social groups struggle to wrest the wheel from one another' (Archer, 1995, pp. 81-2). Her morphogenetic theory (1988, 1995) accommodates the analytic separation and recombination of structure, culture and agency to produce temporally-phased narratives of changing or stable social conditions. These conceptual foundations allow clarification of 'within case' conditions, provide analytical generalisability and, hence, enable cross-case comparison (Eisenhardt, 1989; Gummerson, 1988). Archer's (1988, 1995) analytical dualism enables exploration of stability and change through examination of the interactions between groups of people – such as individual businesses - and the structures and cultures (ideas) with which they engage. Structural entities are dependent upon physical and material resources (e.g., land, cattle, trees). Distinct homogeneous social roles emerge (e.g., buyers and suppliers). Ideas like legal and illegal deforestation stand in logical relationship to one another. Agents' viewpoints and interests become the focus of attention. Relationship changes may be adduced. Over time, actors' actions can alter structural and cultural configurations, and agency.

These stratified interactions between structural, cultural and agential properties produce emergent first-, second- and third- order effects that create distinct situational logics. Collective agency is both conditioned by these logics and, in turn, reshaped by actors' actions. Structural institutional properties emerge from complementary and contradictory relationships. These may be external and contingent (two or more entities exist without one another) or necessary and internal (where entities, such as a buyer and supplier, are interdependent). Likewise, cultural emergent properties surface from logical interactions between different ideas. These depend on whether ideas, presented in the form of propositional knowledge, are contradictory or complementary, as well as whether they are dependent or independent. The propensity for either sociocultural stability or change depends, in combination, upon the relative orderliness or disorderliness of these emergent institutional properties with the interests and agency of individual social actors and collective organisational groupings, which Archer refers to as corporate actors. Structural and cultural configurations position agents in distinct situational logics (Table IV). These logics condition (but do not determine) actors' subsequent social behaviour. Whether or not any one of these configurations produces social change depends upon the relationship between these structural and cultural 'parts' (what Archer calls 'systemic interaction') and observed relationships between people. Systemic relationships may be necessary or contingent, contradictory to or complementary with both structural and cultural pre-existing conditions. The propensity for either sociocultural stability or change depends upon the relative orderliness or disorderliness of these emergent institutional properties in combination

with the interests and agency of individual social actors and the collective organisational groupings, or corporate actors, from which they emerge.

[Insert Table IV about here]

A multiple-case study approach to the analysis was adopted. The case study method has been recognised as a suitable vehicle for the development and extension of exploratory theory (Eisenhardt, 1989; Eisenhardt and Graebner, 2007; Ketokivi and Choi, 2014). Its use has received particular attention in operations management (Stuart et al. 2002; Voss et al., 2002). Case studies allow the phenomenon of interest to be studied in a real-life setting (Eisenhardt, 1989; Stake, 2000) and support the collection of in-depth information (Voss et al., 2002). This study sought to examine the development of relational, socially-sustainable, supply chain management capability initiatives designed to support the eradication of slavery from upstream supply. A multiple case study design of this nature offers the opportunity to create more robust, testable theory (Eisenhardt, 1989; Meredith, 1993); augments external validity; guards against observer bias (Barrett et al., 2011; Handfield and Melnyk, 1998) and, to a degree, improves generalisability (Voss, 2008).

Adaptations to relational anti-slavery supply chain capabilities in Brazilian beef and timber supply chains

The outcome of each case of relational anti-slavery development was categorised into one of four distinct categories: horizontal systemisation, vertical systemisation, horizontal transformation and vertical differentiation. Each of these adaptation types is shown diagrammatically in Figures 2 and 3 and described in the section that follows.

[Insert Figures 2 and 3 about here]

Horizontal systemisation

In the first case a leading mixed pulp and timber processor in Brazil adapted its existing socially-sustainable supply chain capabilities by establishing horizontal collaborative relationships with forestry operators beyond its current supply base. This initiative served to extend FSC small and low intensity managed forest (SLIMF) compliance beyond traditional buyer-supplier supply chain relationships, further systematising the existing hegemony of the FSC.

This first-tier supplier worked with around 2,000 small-scale partners (formentados in Portuguese), forest lease- and free-holders near its large-scale processing operations. Initially conducted by in-house auditors, it had recently engaged specialist, third-party, auditors to assess the management practices, including compliance with national labour regulations, of these potential suppliers to the FSC's plantation management standard. This initiative emerged against the backdrop of structural, contingent, complementarities between the first-tier supplier and co-located plantation owners leading to the situational logics of opportunism.

The cultural imperative that provided the engine for this change was the first-tier supplier's intent to drive value creation through export market development and to realise the price advantage of a certification premium. The concomitant complementarities between these two economic drivers produced the situational logics of protection – each component acting to mutually-support the other - with the resulting systemisation of wood certification which continued throughout the sector, reproducing protective, socio-cultural relationships between the various actors involved (i.e., auditors, certifiers, the first-tier supplier and its forestry suppliers).

Vertical systemisation

In this case, a Brazilian meat processor, and one of the world's largest meat packers, had developed relational supply chain capabilities with a small, Brazilian, anti-slavery non-governmental organisation (NGO). The anti-slavery NGO focused upon the co-development of action plans with corporate actors to eradicate slavery from their commercial operations. Existing processes to ensure environmental sustainability among the meat processors' suppliers were expanded and extended to encompass the assessment of specific factors relating to social sustainability. The resulting systemisation reinforced existing differentials in bargaining power and negotiation position in the vertical supply chain and protected existing supply chain relationships, again resulting in socio-cultural morphostasis.

Buying from over 70,000 suppliers and processing 34,000 head of cattle through its slaughterhouses each day, this first-tier meat processor was intent upon protecting its sources of supply. Transgressions related to Brazil's anti-slavery laws by the owners of the small cattle ranchers and farms that supplied it threatened the efficient and profitable operation of its local slaughterhouses since suppliers could be blacklisted, reducing the capacity of its supply base. The first-tier meat processor, along with other large Brazilian meat packers, had agreed not to enter into commercial relationships with owners who Ministry of Labour inspectors identified as in contravention of their workers' rights. Beyond a moral imperative, the threat of sanctions acted as a spur to the first-tier processor to keep its direct suppliers' slavery-free.

Contingent complementarities existed between the position and roles played by the first-tier supplier and the anti-slavery NGO. The complementarities between these two organisations' ambitions to eradicate slavery from farms and cattle ranches led to the emergence of the structural logic of opportunism. The first-tier supplier voluntarily chose to engage with the NGO and was the only one of the three large Brazilian meatpackers to sign up to the National Pact it championed. In 2017, this led the two organisations to collaborate on a project to identify and remediate slavery risk among this first-tier supplier's existing supply base.

Drawing upon existing resources in the form of geo-spatial imaging data related to farm boundaries and social indicators of slavery risk, actors from the two organisations mapped the risk presented by its suppliers based upon their geographical location. The locations of farms that were operationally important to the first-tier supplier due to their production volume and contribution to export orders, and that were located within the legal Amazon, were used to identify farms within areas identified by the anti-slavery NGO as high risk, based upon a range of socio-economic indicators. Such farms were to be audited by the first-tier supplier for compliance to Brazil's labour standards. Auditing reinforced the first-tier suppliers' superior bargaining power and negotiating position vis á vis its suppliers, strengthened the anti-slavery NGOs credentials as a leading player in Brazil in the fight against slavery and, to some extent, served to deflect criticism from the unequal distribution of supply chain resources, reproduced by spot-market competition, which served to keep cattle prices low and depress farmers' economic ability to raise upstream labour standards.

Horizontal transformation

In a third case, one of the world's largest producers of eucalyptus pulp and timber began the process of developing relational capabilities with newly-formed, community-based, agricultural associations as part of a rural land development programme. The scheme involved the creation of designated community areas for growing crops close to the first-tier timber processors'

forestry operations to provide agricultural income-generating opportunities. Working with communities close to its three, primary, mill sites in Brazil, this first-tier supplier selected communities for their involvement in the scheme based on their social and economic vulnerability, the impact of its operations and the communities' regional and local importance. Historically, community relationships had been tense, with disputes over land and wood theft for local charcoal production. The first-tier timber processor had spent millions of Brazilian Reals guarding its forestry operations. Whereas property disputes had produced necessary contradictions, the re-distribution of structural resources in the form of land created necessary complementarities between it and its local communities. With the introduction of its rural land development programme, the pulp and timber processor provided tools, inputs and technical assistance for the selected communities leading to necessary complementarities that produced the situational logics of integration at the systemic level and solidarity at the level of social interaction. Against this backdrop, the company used the associations to teach community members the technical and marketing skills needed to generate an income from growing crops. Resources were targeted at newly-created associations with the aim that these cooperatives would be able to operate independently within 5 years. In cultural system terms, the scheme produced contingent complementarities between the first-tier supplier's operations and the livelihoods of those members of the community with whom it engaged, leading to the situational logics of opportunism. In combination, these new relationships led to structural and cultural morphogenesis and created a new - and more sustainable - socio-cultural system.

Vertical differentiation

The final case of relational anti-slavery capability development adduced related to the introduction of an on-line platform for Brazilian livestock farmers to conduct a voluntary self-assessment of the sustainability of their suppliers. Developed by a multi-stakeholder initiative, this intervention aimed to drive up standards among farmers of small and medium-sized farms, where the members of the multi-stakeholder initiative believed the majority of illegal labour practices were to be found. This part of the upstream supply chain was characterised by spot-market relations based primarily upon price. In 2018, with the introduction of this scheme, the multi-stakeholder initiative started to build up a database of farms' capabilities against a series of criteria and indicators constructed around five principles: management; communities; value chain; environment and workers. Criteria and indicators in the worker category reflected current Brazilian labour laws.

Farmers were asked to rate their current performance at one of five performance levels to provide a baseline for improvement. The system supported the analysis of year-on-year improvements, designed to encourage farmers to extend self-assessment upstream by encouraging fattening and breeding farms to purchase only from those suppliers who either achieved a certain level of performance or to increase the percentage of suppliers at a given level from year to year. This approach introduced contingent complementarities into upstream, vertical supply relationships, offering the potential for suppliers to go beyond price and to differentiate their offer in terms of sustainability. This enabled the positive selection of suppliers operating to higher sustainability standards. In structural terms, supplier differentiation became possible, with the resultant diversification of sustainable supply chain capabilities. The contingent complementarities created offered the possibility of opportunistic specialization, leading to supply base sectionalization at the socio-cultural level.

Discussion

In line with the existing sustainable supply chain management literature, this study confirms that first tier suppliers in multi-tier supply chains engage in the development of dynamic, relational, capabilities to acquire the skills and resources that they need to adapt their supply chains. For the mixed pulp and paper processor, the specialist auditing capabilities required were outsourced to a third-party consultant. The meat processor expanded its partnership with the anti-slavery NGO to include an assessment of slavery risk. The eucalyptus pulp and timber processor created a co-operative organisation to support the development of management and technical capabilities among the local community, while the multi-stakeholder initiative led the development of the system to support on-line voluntary self-assessment. In common with Alvarez et al. (2010), this study shows that governance mechanisms in place between first tier-suppliers and their supply chain partners can be adapted. Market governance structures were challenged by the voluntary, on-line, self-assessment scheme created by the multi-stakeholder initiative, resulting in vertical differentiation in the relations between lower-tier suppliers and relations with non-traditional, horizontal, community actors were transformed through the rural land development programme of the eucalyptus pulp and timber processor.

In contrast to practices identified among upstream actors, no proprietary codes of conduct had been introduced (Lee and Kassen, 2008). Instead, formal instruments, in the form of civil and private governance schemes, served to reinforce existing governance relationships- both between the meat processor and its, vertical, lower-tier suppliers and in the horizontal relationships that were forged between the pulp processor and its local, potential, supply base. In both cases, first-tier suppliers acted in a secondary-agency role to strengthen existing governance mechanisms (Wilhelm et al. 2016).

However, rather than the result of incentives as suggested by Wilhelm et al., (2016), first-tier suppliers' actions in these beef and timber multi-tier commodity supply chains were a response to the threat of sanctions – in the form either of contract cancellations by their customers, or to avoid the loss of supply capacity through the blacklisting of lower tier suppliers found to be in breach of Brazilian anti-slavery regulations. The impact and implementation of modern slavery laws and the broader legal framework surrounding Brazilian-UK beef and timber supply chains have been described in detail by Pinheiro et al. (2019). These authors question the degree to which existing legal and regulatory frameworks are implemented effectively or whether they have been established to give the impression of Governmental efforts to end slavery. While acknowledging these limitations, this study provides evidence of action by some corporate actors.

Initiatives in the timber sector exhibited contingent, horizontal, collaboration which situated actors in the logics of opportunism: enabling these first-tier suppliers to make choices about the complementarities between anti-slavery initiatives and existing corporate ambitions. In the case of the mixed pulp processor, this led to the systemisation of an existing compliance-based approach while the eucalyptus pulp and timber processor, by contrast, created a new socio-cultural system which exploited complementarities between the provision of alternative livelihoods in the alleviation of poverty, and hence a in slavery risk, and the financial benefits accrued from the prevention of wood theft. These divergent choices emerged despite the similarly long production lead times, collaborative governance modes, formal assessment, physical co-location, relatively small supplier portfolios and financial resources that characterised this sector. The mixed pulp processor was the only first-tier supplier in which assessment and collaboration were combined (Gimenez and Tachiwaza, 2012). Here, in

common with the horizontal transformation of supply relations between the eucalyptus and pulp processor and the community, the long product lead times of timber facilitated a partnership approach. The mixed pulp processor's initiative however demonstrated only horizontal systemisation not social transformation: there was no commensurate adaptation of the system as was evident in the case of the eucalyptus pulp and timber processor.

In the beef sector, necessary complementarities produced vertical collaboration in the form of social audits based upon expanded risk profiling at the meat processor and the introduction of voluntary, on-line, self-assessment among lower-tier cattle breeding and fattening farms by the multi-stakeholder organisation. These initiatives emerged from the situational logics of protection – to preserve supply capacity in the face of potential supplier blacklisting. At the meat processor, existing relational capabilities which supported environmental sustainability were developed to enable anti-slavery risk identification, further systematising existing supply chain relationships. The multi-stakeholder initiative, however, promised the introduction of vertical differentiation between suppliers – discriminating between those with superior anti-slavery capabilities and effectively creating a new socio-cultural system. Again, these distinct approaches emerged despite common sectoral characteristics in the form of short production lead times, the prevailing market governance mode and large supplier portfolios.

Beske and Seuring (2014) conclude that 'only companies with sustainability as a core value appear to take the extra effort of transforming their supply chain, or at least parts of it, into a sustainable supply chain' (p.329). In contrast to adopting an alternative, risk-based approach, they discuss the use of what Harms et al. (2013) refer to as an "opportunity oriented" strategy for competitive advantage (p. 214): where a business engages with supplier development to manage supplier chains for sustainable products. However, according to Beske and Seuring (2014), these companies will have to make greater efforts to reach true sustainability throughout the whole supply chain if they want to attain high sustainability performance and maintain their respective competitive advantage in the long run. This research shows, however, that even in the absence of direct action by downstream corporate actors, first-tier suppliers engaged in a range of creative initiatives, involving the development of diverse, relational, anti-slavery supply chain capabilities.

Though not its primary focus, this analysis also has implications for the use of technology to improve sustainability in multi-tier supply chains. Such socio-technical system developments were evident in each of the cases of vertical supply relationship development in the beef sector. Where these cases differ, however, is in the resulting social change. Whereas the comparison of geo-spatial imaging data with indicators of social vulnerability served to protect existing relationships, resulting in social morphostasis in the case of the beef processor, the involvement of the multi-stakeholder initiative group in information-technology-supported voluntary self-assessment led to differentiation and the potential for social morphogenesis. Information technology use is more likely to lead to effective change in some social situations than others. This brings into sharp relief the need for supply chain theorists and practitioners to consider the existing situational logics that shape the setting of information technology use in multi-tier supply chains. The findings of this study also have implications for both sustainable multi-tier supply chain theory and management practice.

Implications for theory

Drawing upon research data from this investigation into the global commodity supply chains of Brazilian-UK beef and timber, this paper develops a model of the adaptations made by first-tier suppliers to their relational anti-slavery capabilities with both vertical and horizontal supply chain partners. In so doing, it presents four distinct adaptation types: namely, horizontal systemisation; vertical systemisation; horizontal transformation and vertical systemisation. This expands and extends insight into what Wilhelm et al. (2016) identify as their dual agency role. The paper also contributes to an understanding of the nature of the social conditions – and their accompanying situational logics- in which first-tier suppliers conceived these adaptations. This more sophisticated understanding of social conditioning allows exploration of the interplay between social structures and corporate action and delivers a methodological contribution, highlighting the efficacy of the use of Archers' (1988, 1995) morphogenetic theory as an analytical lens for research into corporate agency in sustainable multi-tier supply chain management. Adopting this lens permits a more fine-grained analysis of multi-tier supply chain structures and how corporate actors manage their activities at sub-national and intra-sectoral level.

Implications for management practice

This study extends understanding of the range of relational capability development initiatives undertaken by first-tier suppliers. Other authors have already identified the need for managers to attend to risk detection and remediation capabilities within their own businesses, supply chains and with other, non-traditional, business-non-business partners (Gold et al., 2015; Stevenson and Cole, 2018). Specifically, buyers need to be aware of and improve their ability to monitor the capability developments of their first-tier suppliers to improve labour conditions and prevent human rights violations in their upstream global commodity supply chains. To prevent or mitigate adverse impacts, they can look to first-tier suppliers to go beyond the cascading of buyer-defined solutions (Sauer and Seuring, 2018a) and to creatively adapt relational capabilities with both vertical, lower-tier suppliers and other, non-traditional, horizontal actors.

First-tier suppliers may benefit from adopting a structured approach to the analysis of the necessary or contingent complementarities between their, primarily economic, objectives and the social sustainability goals of other, potential, partnering organisations. This study draws attention to the circumstances within which different types of dynamic, relational capability development may prove possible: i.e., where either opportunistic or protectionist situational logics exist. In the first case, where the focus is upon vertical relationship development, supply chain managers can evaluate the management capability of potential lower-tier suppliers as part of supplier selection and evaluation processes. In the second, where the logics of opportunism exist, this approach may prove particularly advantageous when combined with stakeholder theory to determine which non-business-partnerships to develop.

The findings of this study problematise the threat of sanctions. While in some cases this may act as a spur to action, it may also create potential supply chain vulnerabilities, particularly where adaptations are focused upon vertical relationships. Here, buying firms and their first-tier suppliers may have to undertake contingency planning to ensure, for example, that sufficient, socially-sustainable, supply capacity is available to meet demand. Both horizontal and vertical systemisation offer ways in which such additional capacity can be generated. Horizontal systemisation, by the mixed pulp and timber processor, and vertical systemisation, evident in the case of the beef processor, demonstrate how relational anti-slavery capabilities can be developed to minimise the risks of lower-tier, supply capacity, loss.

Conclusions

This paper presents an analysis of first-tier suppliers initiatives based upon relational, anti-slavery capability development with a range of supply chain partners in the global, multi-tier, commodity supply chains of Brazilian-UK beef and timber. The use of morphogenetic theory as an analytic lens increases understanding of the dual-agency role of first- tier suppliers' in these multi-tier supply chains and how, in certain situational logics, their actions may serve either to transform or reproduce pre-existing supply chain relationships with lower-tier suppliers. Where corporate actors are situated in contingent relationships that permit opportunistic exploitation (in the Archerian sense of being free to make what one will of the logics of relational anti-slavery supply chain capability building) this freedom led one company processing eucalyptus pulp and timber to effectively create a new socio-cultural system by forming a cooperative organisation to build technical and managerial skills within the local community while another, the mixed pulp processor, sought to adapt to the existing system by extending FSC auditing to non-suppliers.

In a further two cases, both the meat processor and members of the multi-stakeholder initiative focused upon relational anti-slavery supply chain capability development within necessary, vertical, supply relationships characterised by the logics of protection. Here, the multi-stakeholder group developed a new system to enhance supplier selection, enabling the vertical differentiation of lower-tier suppliers. The meat processor, however, although enmeshed in the same protective logics, adapted its existing environmental systems, extending these to include anti-slavery risk assessment.

The contribution of this paper is threefold. Firstly, it attends to the socially-situated nature of first-tier suppliers' dual agency role, moving beyond the rationalistic discourse that underpins existing research studies of multi-tier socially-sustainable supply chain management. In forging the capabilities for horizontal or vertical relational supply capability development to eradicate the risk of slavery, this study demonstrate how first-tier suppliers *could*, but importantly did not always, take advantage of the necessary or contingent complementarities that existed between their, primarily economic objectives, and the social sustainability goals of the other corporate actors with which they partnered (namely, a consultant, cooperative, multi-stakeholder initiative and an anti-slavery NGO) to create *new* socio-cultural systems.

Secondly, this cross-sector comparison highlights sub-country level differences both in institutional setting and, just as importantly, in the responses of corporate actors to the development of relational, anti-slavery supply chain capabilities within these sectors. Sauer and Seuring (2018b) draw upon a country-level definition of institution difference, which they clarify rests upon the mean difference between the cognitive, normative and regulative elements of institutions in between the countries of the buyers and suppliers. These findings present a challenge to this normative account on two counts: firstly, institutional differences were present in the Brazilian context where regulations that applied to cattle farmers and meat processors (first-tier suppliers) exhibited distinct differences (Pinheiro et al., 2019). Hence, determining institutional difference at the country level fails to reflect the distinctive socio-cultural situations in which first-tier suppliers find themselves.

Third, and contrary to existing, institutional theory approaches, this analysis reveals intra-sectoral differences in these corporate actors' approaches and outcomes. This analytical approach reveals how first-tier suppliers may exert their agency in the creation of idiosyncratic, anti-slavery solutions. These findings illustrate the variety of creative agential response in which

first-tier suppliers in multi-tier supply chains engage – some of which led to adaptations that effectively created new socio-cultural systems. Their actions go beyond the cascading of compliance programmes from branded retailers in the global north – although such responses were evident - and show the exploitation of sophisticated, relational, supply capabilities with a range of horizontal and vertical partners, including a newly-formed cooperative and as part of a multi-stakeholder initiative. While this illuminates the creative possibilities of first-tier supplier action in multi-tier supply chains, the situated logics in which corporate actors find themselves enmeshed appear to make action in some situations easier than others. Specifically, initiatives were coincident with the logics of opportunism and protection. Despite this, intra-sectoral analysis also demonstrates that even under these relatively benign conditions, some actions may have limited effect upon the social structures and cultures within which they take place and, hence, upon the underlying social problem of slavery that they seek to address. While it is not predictive, a morphogenetic analysis offers practitioners a structured way of considering their options - and the possible outcomes.

These findings have implications for further research. While Archer concurs that structure and culture are important in that they have a conditioning effect upon action, this study highlights that a focus on institutional structure and culture *alone* is insufficient either to explain or to predict corporate action. Instead, if corporate agents are to reshape, rather than simply to reproduce, existing unsustainable practices such as those that exist in the Brazilian-UK beef and timber industry, sustainable supply chain management theorists would do well to identify and research the institutional entrepreneurs who actively *reshape* the institutional conditions within which they find themselves situated. Further comparative research of first-tier suppliers in other institutional settings is therefore required to test and expand the application and generalisability of this model.

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Figure 1 Generic supply chain flows for Brazilian-UK beef and timber operations

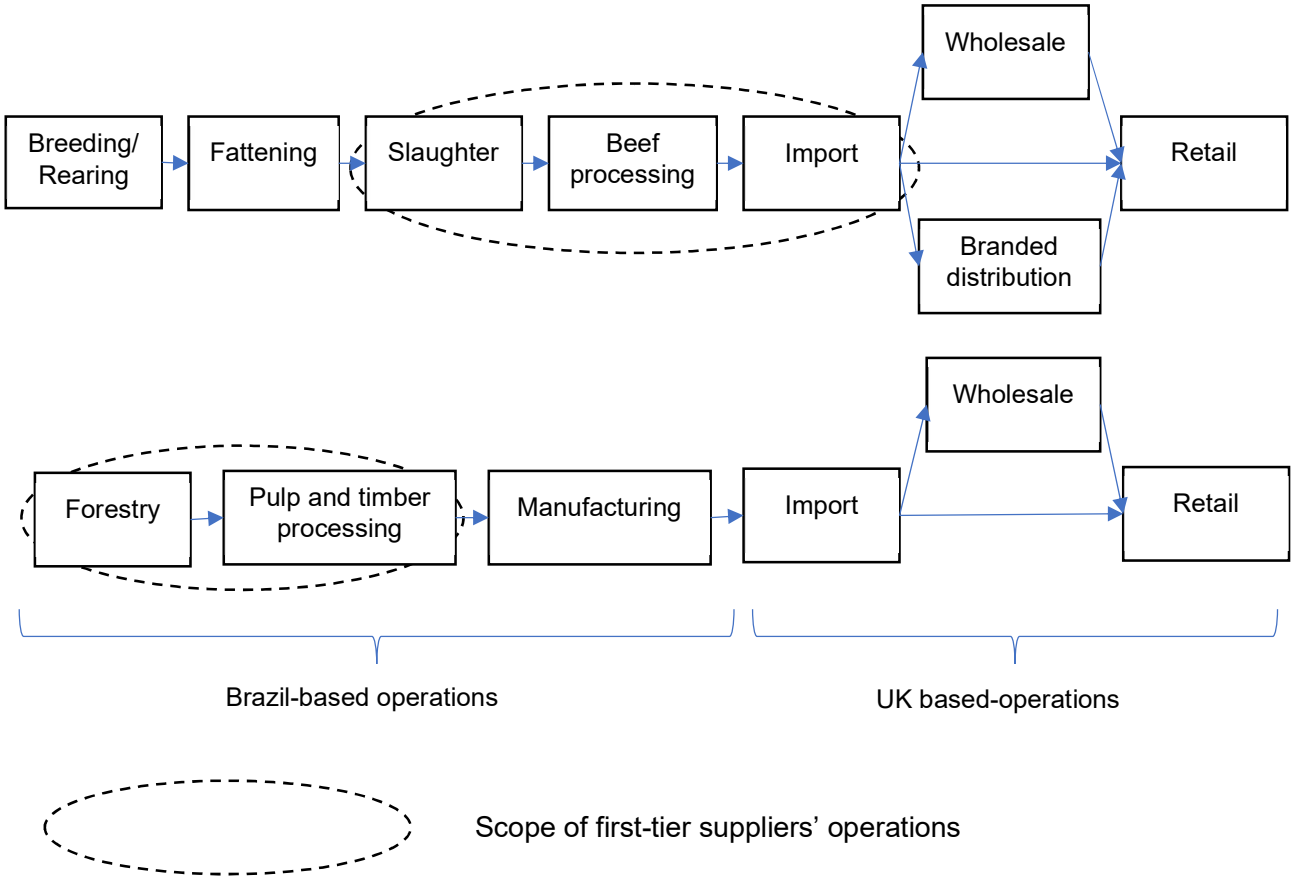

Figure 2 Diagrammatic representation of collaborative horizontal and vertical relationships between corporate supply chain actors

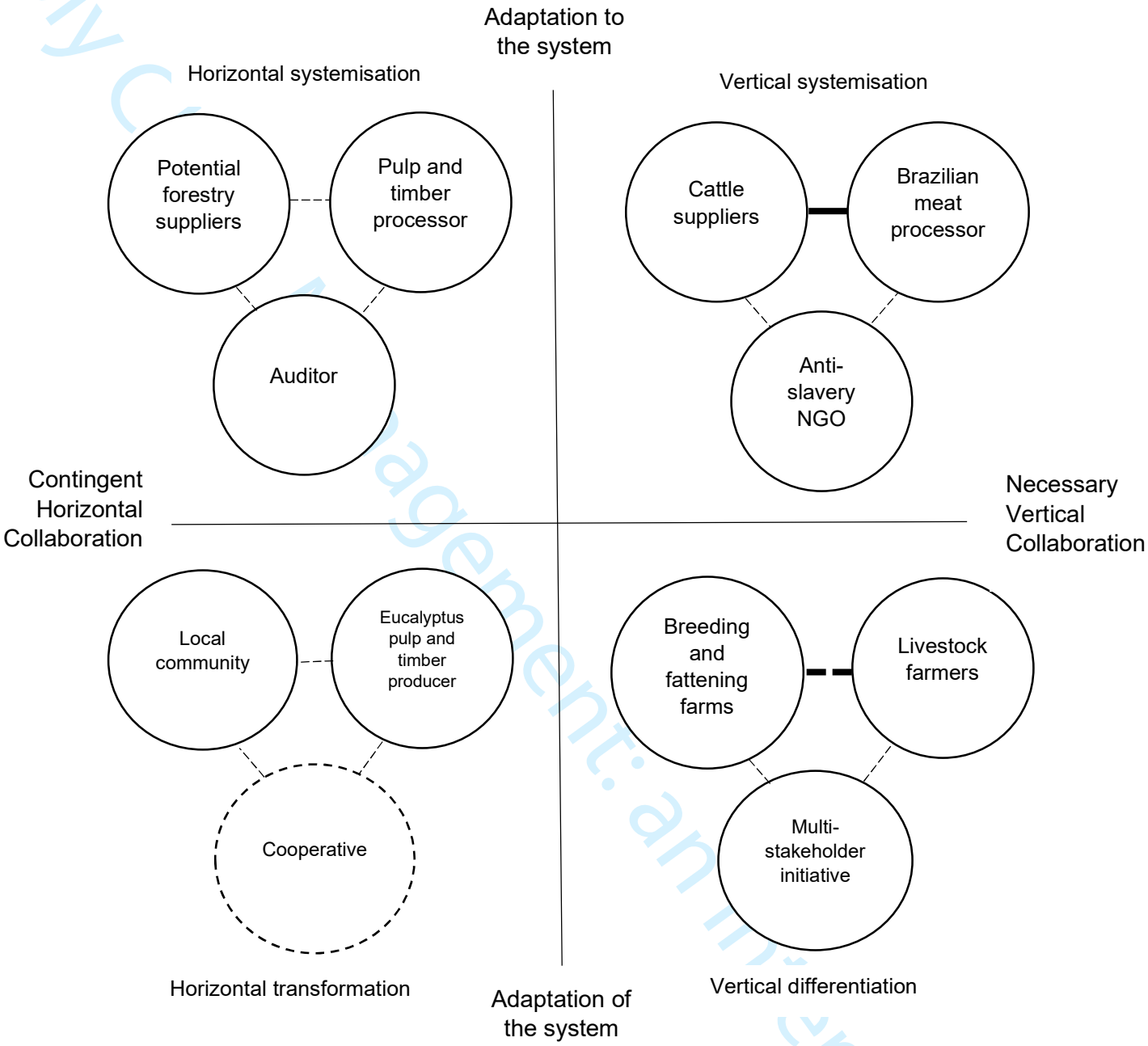

Figure 3 Adaptations to and of relational anti-slavery capabilities

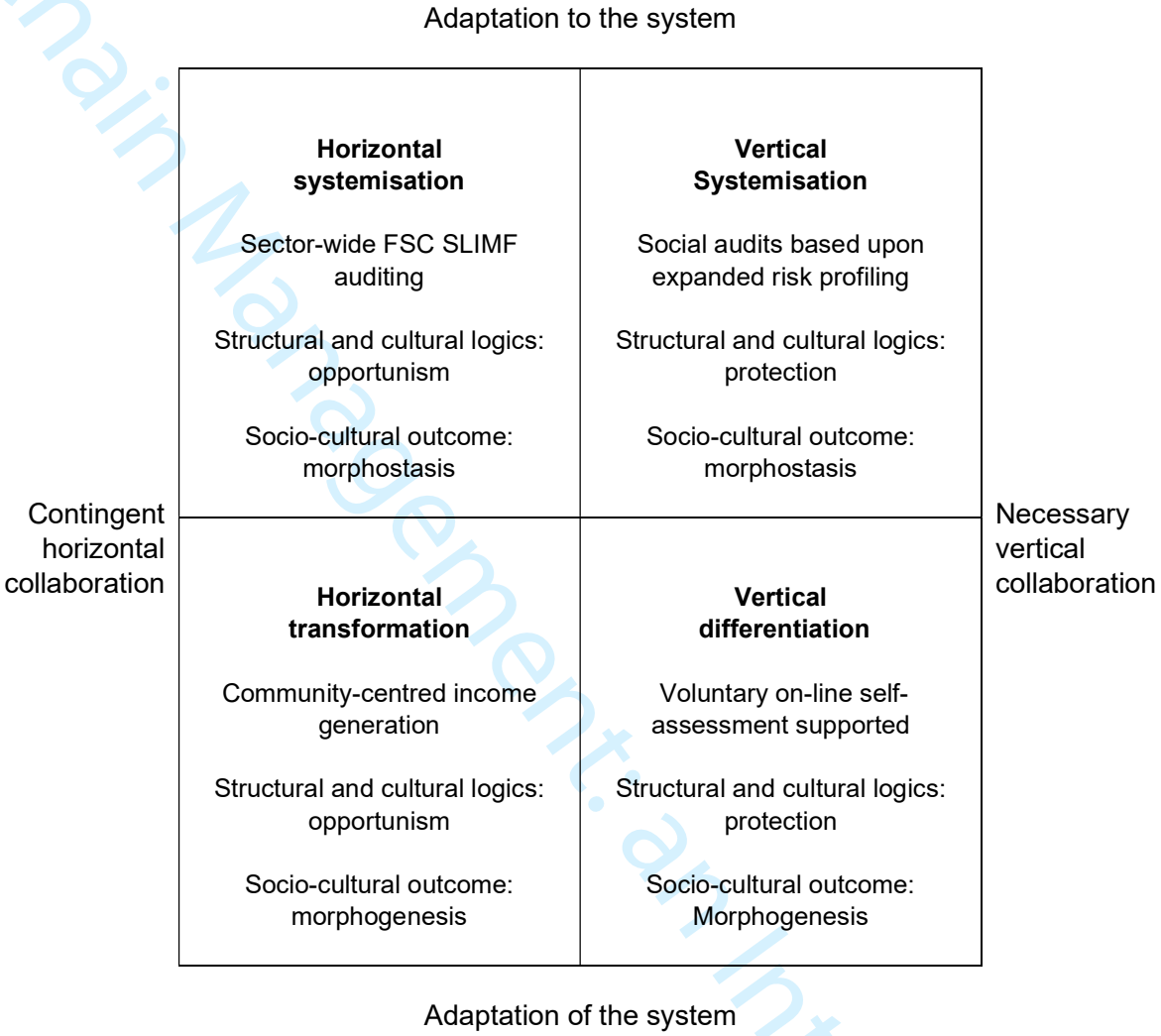

Table I Selected relational governance in multi-tier supply chains literature

Authors (date)	Paper type	Theoretical perspective	Research methods	Geographical and industry focus (where applicable)	Key findings
Lee and Klassen (2008)	Empirical	Theory-building	Case study	Environmental management capability development of SME suppliers within the Korean Automotive industry	Drivers of SME suppliers' environment management capabilities include environmental championing and buyer-monitoring whilst external resources, support and monitoring acted as enablers. For larger suppliers, environmental championing,
Alvarez et al. (2010)	Empirical	Dynamic network governance	Single, longitudinal case study	Nespresso Coffee supply chain: Costa Rica, Columbia, Guatemala, Mexico, Brazil	Networks rely upon informal mechanisms; formal governance mechanisms are related to network growth to provide clarity; relational quality processes that increase trust were critical in
Gimenez and Tachiwaza (2012)	Literature review	-	Structured literature review of 41 papers	-	When used in tandem, assessment and collaboration have a positive impact on environmental sustainability performance and corporate social
Pilbeam et al. (2012)	Literature review	-	Systematic review of 44 conceptual and empirical papers, excluding dyadic studies	-	Formal governance instruments are adopted in dynamic and unstable circumstances defined as risky, uncertain, unpredictable or during organizational change. Adoption can lead to coordination, control, viability and performance outcomes. Informal instruments tend to be adopted
Mena et al. (2013)	Empirical	Theory-building	Inductive case study design	Beer (multi-national), bread and pork (UK-based)	Multi-tier supply chain management dynamics affect power balance, structure, interdependence and relationship
Tachiwaza and Wong (2014)	Literature review	-	Systematic literature review of 39 studies	-	Build a conceptual framework of four approaches to manage the sustainability of multi-tier supply chains: direct, indirect; work with
Sauer and Seuring (2018a)	Empirical	Conceptual	Delphi study	Mineral supply chains	Propose a cascaded approach to multi-tier supply chain management to link upstream
Lu et al. (2018)	Literature review	Social networks	Two systematic literature reviews of 5 and 154 papers respectively	-	Use the guanxi network constructs of ganquin, renquig, xinren and mainzi to expand the construct of social networks. Increases in the flow of supply chain capital generate trust and enhance the ability to increase

Table II Roles and organisations of non-academic Brazilian workshop participants

Organisational Type/ Workshop	Workshop 1	Workshop 2	Workshop 3
Trade Associations (1)	Forestry Affairs, Brazilian Tree Industry		
Government (2)	*Fiscal Labour Auditor, Brazilian Ministry of Labour and Employment*		Human Rights and Justice Policy Officer, British Embassy Brasilia; *Fiscal Labour Auditor, Brazilian Ministry of Labour and Employment*
Non-Governmental (13)	*Environmental Department Representative, Economic and Social Brazilian Development Bank;* Executive Co-ordinator, Multi-stakeholder organisation for sustainable beef; *Social Auditor, Brazilian certifier;* *Member, Brazilian public policy and human rights;* *In-country Expert, International business and human rights NGO;* *Researcher, Brazilian anti-slavery advocacy organisation; Executive Director, UK corporate responsibility NGO coalition*	Agricultural Certification Representatives (2), *Social auditor*; Brazilian certifier; Executive Director, Forest Certification; Research Director, Nexus Ambient	*Environmental Department Representative, Economic and social Brazilian Development Bank; Executive Director,* Anti-slavery NGO; *Faculty Member, Brazilian public policy and human rights academy;* *In-country Expert, International business and human rights NGO;* *Researcher,Brazilian anti-slavery advocacy organisation; Executive Director,* *UK corporate responsibility NGO coalition*
Businesses (3)			Representative, Paper and pulp processor; Sustainability Director and Public Relations Manager, Meat Processor

Italics denote that the representative attended more than one workshop

Table III Roles and organisations of interviewees

Interviewees	Role	Organisation
Trade Associations (3)	Policy Director	UK meat traders' association
	Executive Director	National forest certification association
	Technical Manager	Timber trade association
Government (1)	Fiscal Labour Inspector	Brazilian Ministry of Labour and Employment
Non-governmental Organisations (2)	Fellow-Development and Socio-environmental Rights	Brazilian human rights advocacy organisation
	Executive Director	Brazilian anti-slavery membership organisation
Business (7))	Forestry Manager	Forestry operator
	Sustainability Consultant	Forestry operator
	Community Relations, Environment and Forest Certification Manager	Paper and pulp processor
	Senior Business Analyst - Forests	
	Business Analyst - Forests	
	Sustainability Director	Meat processor (interviewed twice)
	Meat Division Manager, Industrialized Department	Meat processor

Table IV Structural and cultural emergent properties and their situational logics

Socio-cultural system component	Configuration	Emergent Properties	Situational Logic
Structural configuration	Necessary complementarities	Integration. Necessary and internal linkages between systemic structures, where institutions are mutually reinforcing e.g., first-tier supplier as buyer - lower-tier suppliers	Protection
	Necessary incompatibilities	Compromise. Necessary and internal linkages, but marked incompatibilities first-tier supplier as buyer – blacklisted supplier	Correction
	Contingent incompatibilities	Competition. Society is an open system and no formation is hermetically sealed against external influences e.g. buyer- raw material substitute	Elimination
	Contingent compatibilities	Differentiation. An open system, no effective barriers which can be erected against the incursion of contingent relationships which may provide highly compatible with the interests of particular groups e.g. first-tier supplier as buyer – non-business sustainability partner	Opportunism
Cultural configuration	Constraining contradictions (Necessary Contradiction)	Syncretism. The attempt to sink differences and link contradictory elements e.g. sustainability and economic growth	Correction
	Concomitant complementarities (Necessary complementarities)	Systematisation. Strengthening of pre-existing relations and/or extension and additional relationships among the parts (e.g. risk identification and compliance auditing)	Protection
	Competitive contradictions (Contingent incompatibilities)	Pluralism. What Archer (1995, p241) describes as a 'battleground of ideas' (e.g. globalisation versus localism)	Elimination
	Contingent complementarities	Choice (e.g. anti-slavery practices and environmental sustainability)	Opportunism