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Research paper

Toward an agent-system contingency theory for behavioral supply chain and industrial marketing research☆

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ABSTRACT

In this study, we develop an agent-system contingency theory as a general multi-level theory of managerial decisions in the supply chain and industrial marketing (SCIM) context. The proposed theory rests on two basic assumptions: agent decision authority and bounded rationality, and postulates that agent-level properties (i.e., relevant personality traits of human agents in SCIM) and system-level properties (i.e., inter-firm and/or intra-firm properties) can concurrently and interactively influence managerial decisions and actions in SCIM. We then propose the synergistic use of experiment and survey as a methodological framework to facilitate the empirical efforts in behavioral SCIM research oriented by the agent-system contingency theory. We also provide empirical illustrations regarding how the agent-system contingency theory and the accompanied methodological framework can be applied to behavioral SCIM research inquiries, using two studies in the decision contexts of opportunism and vertical integration. Combining the proposed multi-level theoretical and methodological approaches, this study offers scholars a platform on which they can systematically advance their behavioral SCIM research agenda in the future.

1. Introduction

Over the past decades, various industries have experienced outsourcing trends, escalating the importance of buyer-supplier relationships (BSRs), industrial/business-to-business (B2B) marketing, and supply chain management (SCM) (e.g., Hadjikhani & LaPlaca, 2013; Lussier & Hall, 2017; Narayanan & Narasimhan, 2014). Lying at the heart of effective management of these exchanges is the ability to manage various behavioral aspects in the relationships, such as opportunism, coordination, negotiation, mutual adaptation, and responses to various external changes (e.g., Dion & Banting, 1988; Hinterhuber & Liozu, 2015; Mesquita & Brush, 2008). These behavioral elements can have significant performance implications to individual firms in the exchanges, thus gaining attention from scholars in various domains, particularly SCM and industrial marketing. These two domains have increasingly become overlapping with common managerial decisions and issues, such as pricing, negotiations, buyer/supplier behavior, information sharing, relationship management, and product development/commercialization (Lambert & Cooper, 2000; Lambert & Enz, 2017; Parente, Lee, Ishman, & Roth, 2008), in which behavioral aspects in the exchange relationships can play a vital role.

SCM as a research domain has provided business professionals with managerial prescriptions to cope with various complex challenges embedded in supply chains and BSRs (e.g., Mentzer et al., 2001). Rooted in the theory of industrial organization of microeconomics, the SCM field has conventionally rested on economic behavioral assumptions, such as self-interested/monetary motives, rational decision-making, and optimization (Donohue & Siemsen, 2010). Despite its contributions to managerial practices, behavioral anomalies in supply chains that do not correspond to the prescriptions of SCM normative models still abound, such as issues in managing inventory and order quantities under uncertain demands (e.g., Croson & Donohue, 2002, 2006; Kocabıyıkoğlu, Göğüş, & Gönül, 2016). Similarly, industrial marketing has gone through a paradigm shift from the economic rationality/profit maximization of the transactional approach to the bounded rationality and mutual satisfaction of the behavioral/relational approach (Hadjikhani & LaPlaca, 2013). Evidences from B2B pricing research also overwhelmingly indicate that these pricing decisions violate basic principles of rational choice (e.g., Hinterhuber, 2015). Such anomalies heighten the need for an alternative theoretical lens that potentially improves the collective understanding of phenomena in supply chains and industrial marketing (SCIM).

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Table 1
Literature review summary.

Theoretical Orientation	No.	Study	Research Domain	Key Findings/Insights
Macro (System) Level	1	Carson et al. (2006)	Governance, opportunism	Contractual and relational governance have effects in constraining opportunism under conditions of volatility and ambiguity.
	2	Ganesan (1994)	Mutual dependence, trust, long-term orientation	Buyer-supplier mutual dependence and trust affects the long-term orientation in a buyer/seller relationship.
	3	Heide and John (1988)	Dependence, transaction-specific investment	Small firms can reduce dependence on their principals in exchange relationship to safeguard transaction-specific assets made by the small firms.
	4	Hult et al. (2007)	Culture, supply chain performance	Culture of competitiveness and knowledge development has a positive association with performance.
	5	Jap and Anderson (2003)	Relationship safeguard, opportunism	Relationship safeguards can preserve performance outcomes and future expectations given varying levels of ex post opportunism in the relationship.
	6	Jaspers and van den Ende (2006)	Transaction-specific investment, environment uncertainty, vertical integration	Asset specificity and high uncertainty are considered significant factors influencing vertical integration decisions.
	7	Joshi and Arnold (1998)	Relational norm, dependence, compliance	The positive effect of dependence on compliance only holds under conditions of high relational norms. In low relational norm-based relationships, dependence does not increase compliance.
	8	Noordewier et al. (1990)	Relational governance, acquisition costs	Performance in terms of acquisition costs is enhanced when, under conditions of uncertainty, firms introduce more relational elements into their purchasing arrangements to enhance performance in terms of acquisition costs.
	9	Provan and Skinner (1989)	Dependence, opportunism	Farm and power equipment dealer opportunism is negatively related to dealer dependence on a primary supplier and positively related to supplier control over dealer decisions.
	10	Wrong (1961)	Social norms, human behaviors	Provided arguments that sociological theory assumed universally human behaviors are dictated by social norms in exchanges, which was limiting in explaining human behaviors, and suggested that sociologists need to develop a more complex conception of human nature.
	11	Zaheer and Venkatraman (1995)	Relational governance	Examined relational governance as form of inter-organizational strategy.
Micro (Agent) Level	12	Croson and Donohue (2002, 2006)	Cognitive limitation, supply chain performance	Agents' behavioral issues, such as cognitive limitation, can affect supply chain performance even in idealized supply chains.
	13	Bagozzi (2006)	Social and self-conscious emotions, B2B relationships	Self-regulation of behavior by salespersons and customers as essential mechanisms for initiating, maintaining, and resolving business-to-business exchanges.
	14	Dion and Banting (1988)	Openness, honesty, negotiation, supply chain performance	Agents' characteristics, such as openness and honesty, rather than exploitation of sellers, are more closely associated with high overall performance from B2B negotiation.
	15	Gebauer and Fleisch (2007)	Belief, risk aversion, objective setting	Disbelief in service as a financial opportunity, risk aversion, and overambitious objective setting of managers in manufacturing firms limited the managerial motivation to extend the service business.
	16	Hinterhuber (2015)	B2B industrial pricing, rational choice	Provided a comprehensive overview of the literature relevant to industrial pricing and found that, in B2B industrial pricings, customers and managers consistently violate basic principles of rational choice.
	17	Hung and Tangpong (2010)	General risk propensity, new product development	Agents' general risk propensity is associated with their likelihood of accepting a risky NPD proposal from their buyers.
	18	Kocabıyıkoğlu et al. (2016)	Anchoring, price setting, order quantity, profit	Agents' anchoring behavior in price-setting newsvendor experiments leads to sub-optimal results.
Micro (Agent) Level	19	Lim and Ho (2007)	Ex ante beliefs, performance	Decision-makers' beliefs can affect the performance of multiple-block contract between a manufacturer-retailer dyad under a deterministic downstream demand.
	20	McNally et al. (2009)	Disposition traits, new product portfolio management strategy	There exist relationships between managers' dispositions to NPPM strategy: analytic cognitive style is associated with balance, ambiguity tolerance is associated with strategic fit, and leadership style is associated with the relative weights applied to each dimension.
	21	Moritz et al. (2013)	Cognitive reflection, order quantity	Cognitive reflection contributes to a better understanding of newsvendor decision-making behavior.
	22	Schweitzer and Cachon (2000)	Anchoring, insufficient adjustment bias, order quantity, profit	Subjects seem to suffer from the anchoring and insufficient adjustment bias in a newsvendor experiment.
	23	Tähtinen and Blois (2011)	Emotions, B2B relationships	Individuals' emotions (e.g., anger, joy, fear, pride, attachment) played an important role in salesperson-customer interactions, and acted as mediators in problematic B2B relationships.
	24	Wu (2013)	Fairness, perception	Their results suggest that decision-makers demonstrated social preference for fairness, and deviated from the economic self-interest assumption, in a perceived long-term contractual relationship.
Both Levels	25	Iyer et al. (2015)	Issue interpretation, cognitive biases, heuristics, organizational objectives, B2B pricing	Individual managerial factors such as issue interpretation, cognitive biases, and heuristics moderate the influence of environmental and organizational contexts (e.g., dynamism and organizational objectives) on price setting.
	26	Li et al. (2013)	Conscientiousness, reciprocity norm, contract adjustment	Decision-makers' conscientiousness and interfirm reciprocity norm interactively shaped supply contract adjustment decisions
	27	Lussier and Hall (2017)	Perception, cooperation, long-term orientation	Customers' perceived salespeople's cooperation (e.g., efforts, behaviors) is increased (e.g., higher regardless of actual cooperation) when a salesperson possesses a customer orientation or in a long-term salesperson-customer relationship.

(*continued on next page*)

Table 1 (*continued*)

Theoretical Orientation	No.	Study	Research Domain	Key Findings/Insights
	28	Mischel and Shoda (1995)	Trait-activation, cognition, emotion, motivations, values, situations	Proposed a theory that reconciled paradoxical findings on the invariance of personality and the variability of behavior across situations. The theory suggests that individuals' personal characteristics (e.g., cognition, emotion, motivations, and values) are triggered by specific psychological features of situations and influence the individuals to exhibit certain behaviors.
	29	Schneider (1983)	trait-oriented approach, situation-oriented approach	Reviewed research on interactional psychology and presented an interactionist interpretation of current thinking on job attitudes, socialization to work, and leadership.
	30	Su et al. (2017)	Individual negotiation styles, governance mechanisms, opportunism, compliance	Firm-level governance and individual negotiation styles have uneven effects on opportunism and compliance.
	31	Tangpong et al. (2010)	Relational norms, cooperativeness, opportunism	Individual differences (e.g., cooperativeness) of decision-making agents and firm-level factors (e.g., relational norms) can interact and influence decisions and actions in supply chains.
	32	Tangpong et al. (2014)	Cooperativeness, competitiveness, partnerial, adversarial supply chain relationships	Agent-level properties (e.g., cooperative and competitive attitudes) and system-level properties (e.g., partnerial and adversarial relationships) co-developed over time and broadly shaped supply chain decisions.
	33	Widmier (2002)	Compensation, empathy, customer orientation of salespeople	Customer satisfaction incentives and salespeople's level of empathy are positively related to customer orientation. Sales volume incentives and job tenure were negatively related to customer orientation. Salespeople's level of empathy moderates the effect of customer satisfaction and sales volume incentives on customer orientation.

Recent research also increasingly provides evidences suggesting that individual differences (e.g., personality and cognitions) of decision-making agents can shape how they exercise their discretion and ultimately influence their decisions in SCIM (e.g., Lussier & Hall, 2017; Tangpong, Hung, & Ro, 2010; Widmier, 2002). In a bigger picture, this emerging research stream implicates the importance of not only system-level (macro-level) but also individual-level (micro-level) properties to the system's performances or outcomes. This basic theoretical argument is in line with that of a broader behavioral research movement in other fields, such as behavioral operations (e.g., Gino & Pisano, 2008) and behavioral strategy (e.g., Powell, Lovallo, & Fox, 2011), and has motivated us to re-center our theoretical focus on human agents who operate in the SCIM context.

In this paper, we aim to achieve three objectives. First, we maintain that several research findings on the important roles of human agents in SCIM share a common underlying theoretical thrust that can be systematically developed into a general theory of managerial decisions in SCIM. We therefore develop an *agent-system contingency theory*, which is a multi-level theoretical lens focusing on the interplay of agent- and system-level properties in explaining managerial decisions in SCIM. By considering the potential effects of these two sets of properties and of their interactions in the theorization, the agent-system contingency theory can help mitigate the issue of 'cross-level fallacy' (i.e., errors in attributing effects of micro-level factors to macro-level factors, or vice versa) that threatens the validity of research findings (e.g., Rousseau, 1985). Second, to facilitate the application of the agent-system contingency theory in behavioral SCIM research, we propose a methodological framework based on the synergistic use of experiment and survey that, together, can address the challenges inherent in cross-level research designs. Finally, we illustrate the use of our proposed theoretical and methodological approaches to behavioral SCIM research through two empirical studies in the decision contexts of (a) opportunism and (b) supply chain vertical integration. We choose these two decision contexts as they are prevalent and important decisions in SCIM, and the literature has suggested that both macro- and micro-level factors can play important roles in these decisions (e.g., Carter & Hodgson, 2006; Tangpong et al., 2010).

2. Literature background

The extant literature regarding managerial decisions in SCIM has largely been guided by macro-level analytical lenses that often assume certain universal human agent characteristics or even overlook the importance of human agents in their theoretical development. For example, transaction cost economics (TCE) rests its behavioral assumptions on the concept of contractual man, characterized by bounded rationality and opportunism/self-interest behaviors (Williamson, 1985). Likewise, social exchange theory assumes human agents to be rational beings whose behaviors in exchange relationships are calculated and reward-contingent (Blau, 1964), whereas industrial organization assumes the behaviors of an economic man such as self-interested/monetary motives, rational decision making, and optimization (Donohue & Siemsen, 2010). Contrastingly, relational exchange theory has its implicit behavioral assumptions based on the over-socialized conception of man whose behaviors are dictated by social norms in the exchanges (Wrong, 1961). Such universal human behavior assumptions simplify the theoretical development process. However, they also potentially limit the explanatory power of the theories when applied to SCIM phenomena involving a range of individual differences among human agents. In addition, the discrepancy of behavioral assumptions among these grand theories indeed reflects the nature of human agents regarding their individual differences, which are critical to micro-level analyses but often excluded or under-emphasized in macro-level theoretical considerations.

Recently, the micro-level and behavioral analyses of SCIM have emerged as an alternative analytical approach to the conventional

macro-level approaches to SCIM research. The representative streams of these literatures are summarized in Table 1. For example, behavioral research in supply chains suggests that individual differences in terms of buyers' risk preference, misperceptions, and cognitive biases/reflection explain the systematic deviations between actual and optimal order quantities under uncertain demands (e.g., Kocabıyıkoğlu et al., 2016; Schweitzer & Cachon, 2000) and varying inventory management practices and task-related outcomes (e.g., Moritz, Hill, & Donohue, 2013). In the supply chain contracting context, Wu (2013) found that decision-makers demonstrated social preference for fairness, and deviated from the economic self-interest assumption, whereas Li, Tangpong, Hung, and Johns (2013) revealed that decision-makers' conscientiousness and interfirm reciprocity norm interactively influenced supply contract adjustment decisions. Tangpong et al. (2010) also found that agent cooperativeness reinforced relational norms in suppressing opportunism in BSRs, and Su, Chen, and Ro (2017) reported that firm-level governance and individual negotiation styles had uneven effects on opportunism and compliance. In addition, Tangpong, Hung, and Li (2014) highlighted that agent-level properties (e.g., cooperative and competitive attitudes) and system-level properties (e.g., partnerial and adversarial relationships) co-developed over time and broadly shaped supply chain decisions.

Research streams in industrial marketing and B2B relationship contexts also point to the important roles of human agents in SCIM. For example, early research suggested that purchasing agents' openness and honesty were associated with high performance (Dion & Banting, 1988). Subsequent research also found that individual manager factors (e.g., cognitive biases and heuristics) moderated the influence of environmental and organizational contexts on B2B price setting (Iyer, Xiao, Sharma, & Nicholson, 2015), and that individuals' emotions (e.g., anger, joy, fear, attachment) played an important role in salesperson-customer interactions (Bagozzi, 2006), and acted as mediators in problematic B2B relationships (Tähtinen & Blois, 2011). Likewise, incentive systems and salesperson characteristics (i.e., empathy and tenure) were found to be associated with salesperson customer orientation (Widmier, 2002). In the B2B cooperation context, research revealed that customers' perceived cooperation from salespeople did not always match with the actual cooperation; rather, it was influenced by the salesperson and relationship characteristics (e.g., customer orientation and long-term relationships) (Lussier & Hall, 2017).

The results of the above research highlight that SCIM research can benefit from further examination of micro−/agent-level drivers and their effects on managerial decisions in SCIM. These research studies also arguably share a common theoretical thread that highlights the importance roles of human agents and their individual differences, besides macro−/system-level drivers, in SCIM. We maintain that these collective research findings can be synthesized toward an overarching theoretical frame or a general theory that can potentially explain a broad range of managerial decisions in SCIM. As such, in this study, we develop the agent-system contingency theory as a general theory of managerial decisions in SCIM, which we present in the next section.

3. Theory development: agent-system contingency theory

Building on the above literature, we synthesize both macro-level and micro-level theoretical thrusts and propose the agent-system contingency theory as a multi-level theory for behavioral SCIM research. The central thesis of this theory lies in the contingency logic that agent-level properties (i.e., those inherent in human agents functioning in SCIM) interact with system-level properties (i.e., those that are external to the human agents) in influencing managerial decisions in SCIM. The focus on the properties at these two levels as our theoretical building blocks in this study is also in line with previous behavioral research (e.g., Borg & Young, 2014; Pattinson, Nicholson, & Lindgreen, 2018; Su et al., 2017; Tangpong et al., 2010). The conceptual framework of the agent-system contingency theory is graphically summarized in Fig. 1.

As an initial step in developing this theory, we narrow down the scope of agent-level properties to personal characteristics of human agents in SCIM and focus specifically on individual differences in terms of personality traits. We contend that humans' biases, perceptions, and cognitions are largely a function of their individual differences such as personality traits. As Donohue and Siemsen (2010, p. 4) noted, although research has identified aggregate decision biases across a population, the data also suggest that such behavior largely varies at the individual level, thus begging "*the question of whether there are individual characteristics or cognitive tendencies that one can use a priori to predict performance*". An example along this line of logic is that, while at the aggregate level, human agents may tend to exhibit risk-aversion behaviors (e.g., Jensen & Meckling, 1976; Kahneman & Tversky, 1979), at the individual level, the degree of risk aversion varies by individuals and arguably is a function of individuals' personality traits such as risk propensity (e.g., Hung & Tangpong, 2010). Research on personality traits has been well established in psychology and organizational behavior, highlighting that personality is an organized set of personal characteristics that uniquely shape individuals' cognitions, emotions, motivations, and behaviors in various situations (e.g., Allport, 1937; Cattell, 1965). Thus, in developing the agent-system contingency theory, our focus on individual differences regarding personality traits would be an appropriate starting point.

We conceptualize system-level properties, another building block of this theory, as those that are external to human agents and reflect characteristics of firms, supply chains, and/or exchange relationships. Based on the literature, system-level properties can then be classified into inter-firm and intra-firm properties. Inter-firm properties are those that have evolved or been established between exchange partners in SCIM, such as relational norms, dependence, and relationship-specific investments (e.g., Heide & John, 1988; Jap & Anderson, 2003; Noordewier, John, & Nevin, 1990). Conversely, intra-firm properties are those that have evolved or been established within firms in SCIM, such as organizational cultures and practices (e.g., Donohue & Siemsen, 2010; Hult, Ketchen, & Arrfelt, 2007). Both inter- and intra-firm properties are considered macro-level properties, which form the operating conditions in which human agents with various personality traits operate. As such, the agent-system contingency theory is positioned to address basic research questions, such as "*how do human agents with distinct personality traits shape various managerial decisions in SCIM?*" and "*how do human agents with distinct personality traits interact with different macro-level operating conditions in influencing various managerial decisions in SCIM?*" In a sense, the agent-system contingency theory integrates both micro- and macro-level properties in explaining managerial decisions in SCIM.

3.1. Assumptions

The agent-system contingency theory rests upon two important assumptions: (1) agent decision authority and (2) bounded rationality. First, this theory assumes that human agents operating in the SCIM context possess necessary authority to make decisions and take actions, which shape the outcomes in SCIM. Without the decision authority, the agents do not have an adequate ground of influence to shape SCIM dynamics. In this regard, the agent-system contingency theory shares the same fundamental with the agency theory, which focuses on agency relationship whereby principals delegate duties and related authorities to agents who perform the duties on the principals' behalf (Jensen & Meckling, 1976). The agent-system contingency theory and the agency theory, however, differ sharply regarding the assumption of universal agent behaviors whereby the former does not assume agents' risk aversion and self-interest seeking but the latter does. Within the framework of the agent-system contingency theory, agents differ in their personal characteristics. It is possible that some agents are inherently risk-averse or concerned more about their self-interest while others are not. In addition, the agent decision authority assumption is consonant

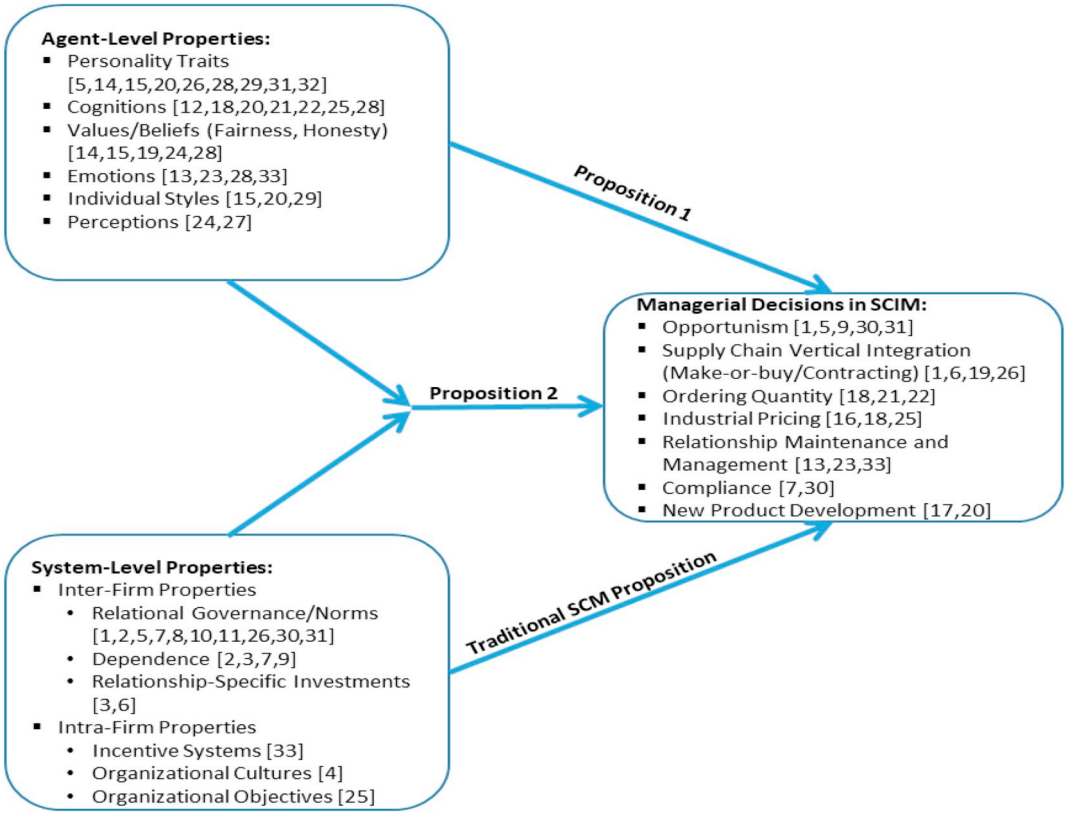

Fig. 1. Framework of agent-system contingency theory. Note: The numbers in the brackets in Fig. 1 are reference numbers corresponding to those in Table 1.

with the importance of managerial authority, which is rooted in the seminal work of Weber (1947), well-documented in the management literature (e.g., Nelson, 1993), and empirically supported (e.g., Tangpong et al., 2010).

The second assumption of the theory is regarding bounded rationality. Articulated by Simon (1957), the central thrust of bounded rationality is that human agents are endowed with limited cognitive capacity in processing and analyzing information. Their rationality is further limited by information, knowledge, and time available to them in making decisions. As such, decision making tends to be guided by the *satisficing* rather than the *optimizing* principle, whereby decision-making agents choose an alternative that can satisfy a set of pre-specified levels of their needs (Simon, 1957). Unlike the optimizing principle of hyper-rationality in economics that suggests the existence of one optimal alternative, the satisficing principle of bounded rationality implies the existence of multiple satisfactory alternatives, each of which still meets the pre-specified needs. The availability of multiple satisfactory alternatives emancipates the agents from the constraints that would "homogenize human differences" (Mongar, 1969, p. 200) and regulate their decision patterns. Thus, the decision-making agents can select an alternative based on their personal *wants* rather than the constraining *needs*. Parallel to Levinson's (1958) assertion, the greater the number of acceptable alternatives, the more important the intrapersonal determinants.

Bounded rationality is a critical assumption of this theory since it yields a decision circumstance under which the conventional rationality of an economic man is not tenable, permitting personal characteristics of decision-making agents to exert their influence on decision outcomes. Due to cognitive limits, imperfect information, and incomplete knowledge, boundedly rational agents often operate under ambiguous and less clear-cut decision circumstances. As Greenstein (1967, p. 637) simply put, "ambiguous situations leave room for personal variability to manifest itself". The bounded rationality assumption is also in line with an assumption of exchange theory (e.g., Emerson, 1976), asserting that "actors face substantial degrees of ambiguity and uncertainty – about what potential partners value, the utility of different exchanges to them, and what exchanges are being made between others in the exchange network" (Lawler, 2001, p. 323). Thus, 'outcome uncertainty' is a boundary condition of this theory that can be deduced from the bounded rationality assumption. Resting upon such assumption, the agent-system contingency theory is more applicable to decision situations characterized by high degrees of outcome uncertainty that allows agents' personal characteristics to largely exert their decision-influencing effects. If the decision situations are characterized by high degrees of outcome certainty, the conventional economic rationality will eventually suppress the decision-influencing effects of personal characteristics. This theory then becomes less useful in such situations. However, given that today's fast-changing business landscapes are often characterized by high degrees of uncertainty, the uncertainty boundary condition is a lesser concern. Thus, the agent-system contingency theory arguably remains a useful theoretical framework.

3.2. Theoretical propositions

The agent-system contingency theory postulates two general theoretical propositions: (1) trait relevance and (2) agent-system property alignment in explaining managerial decisions in SCIM. First, the *trait relevance* proposition is rooted in the field of person-situation psychology, suggesting that individuals' personal characteristics (e.g., cognition, emotion, and motivations) are triggered by specific psychological features of situations and influence the individuals to exhibit certain behaviors (e.g., Mischel & Shoda, 1995). Therefore, personal characteristics or personality traits can predict individuals' behaviors only in trait-relevant situations (Schneider, 1983). Applying this line of reasoning to managerial decisions in SCIM, we argue that various decision circumstances in SCIM have inherent psychological features, which are uniquely salient to decision-making agents with certain distinct personality traits. Those features embedded in the decision

circumstances trigger the relevant personality traits to exert their influences on the agents' decisions. The concept of trait relevance also implies that some personality traits are relevant to a given decision circumstance while others are not, and such relevant personality traits can be logically identified a priori. This helps narrow down the number of potential personality traits to be examined within the framework of the agent-system contingency theory in a given decision context. For example, psychological features such as new experiences, excitements or fears, and risk-reward motives are inherently relevant in the innovation adoption decision context. When perceived by the decision-making agent, these psychological features can trigger the agent's openness and risk propensity to exert influence on the eventual decision outcome (e.g., Hung & Tangpong, 2010; McNally, Durmusoglu, Calantone, & Harmancioglu, 2009). Such personality traits are thus considered relevant to the decision context and can shape the agents' decision. This line of reasoning suggests a general theoretical proposition as follows.

Proposition 1. Decision-making agents' personality traits relevant to decision contexts influence managerial decisions in SCIM.

Second, the *agent-system property alignment* proposition is built on the theoretical insight from the contingency theory (e.g., Lawrence & Lorsch, 1967), positing that organizational effectiveness/outcomes are largely governed by the interplay of both internal and external factors to the organization. Contingency logics over the years have shaped research in both macro and micro domains, resulting in variations of contingency theory, such as the structural contingency theory of organizational adaptation (Donaldson, 1995) and the person-culture fit model (O'Reilly, Chatman, & Caldwell, 1991). In the SCIM context, we maintain that the fundamental logic of contingency theory provides a theoretical structure that both micro- and macro-level conceptual elements of the agent-system contingency theory (i.e., agent- and system-level properties, respectively) can be harmonized. Specifically, we contend that system-level properties (e.g., relational norms, dependence) form macro-level operating conditions in which decision-making agents with distinct personality traits function. As such, the agents' decisions can be externally influenced by the macro-level operating conditions and internally influenced by their personality traits relevant to the decision contexts. In addition, the macro-level operating conditions and the personality traits of the agents can be qualitatively dissonant with, neutral to, or consonant with each other, resulting in (a) agent-system property misalignment, (b) agent-system property co-existence, or (c) agent-system property alignment, respectively. In the case of agent-system property misalignment, the macro-level operating conditions, dissonant with the agents' personality traits, will suppress the decision-influencing effects of the personality traits. Likewise, the personality traits incompatible with the macro-level operating conditions can undermine the external impacts of such operating conditions on the eventual decisions. In the case of agent-system property co-existence, the neutral operating conditions and the agents' personality traits exert their decision-influencing effects independently. In the case of agent-system property alignment, the consonant macro-level operating conditions and the agents' personality traits interact with each other in amplifying their decision-influencing effects.

Whether a macro-level operating condition is considered dissonant with, neutral to, or consonant with a specific personality trait of the decision-making agent can be logically determined a priori. Examples of agent-system property alignment and misalignment abound. For instance, in the context of buyer-supplier opportunism, agent cooperativeness (i.e., agent-level property) and relational norms (i.e., system-level property) interact and amplify each other in mitigating opportunism in BSRs (Tangpong et al., 2010). In the context of B2B pricing, the translation of environmental contexts (e.g., dynamism, rivalry) and organizational objectives into appropriate pricing can be impeded by managers' cognitive biases in terms of underestimating uncertainty and being satisfied with status quo (Iyer et al., 2015). This is an illustrative example of the agent-system property misalignment between external/organizational contexts calling for aggressive pricing and managers' cognitions toward conservative pricing. The concepts of agent-system property alignment, co-existence, and misalignment thus suggest the following propositions.

Proposition 2.1. The interaction between dissonant/consonant macro-level operating conditions (i.e., system-level properties) and decision-making agents' personality traits (i.e., agent-level properties) relevant to decision contexts influences managerial decisions in SCIM.

Proposition 2.2. Neutral macro-level operating conditions (i.e., system-level properties) and decision-making agents' personality traits (i.e., agent-level properties) relevant to decision contexts independently influence managerial decisions in SCIM.

The two general propositions of the agent-system contingency theory can guide the development of testable hypotheses regarding specific SCIM inquiries and relevant agent- and system-level properties. In the next two sections, we provide a methodological framework and two empirical illustrations regarding how the agent-system contingency theory and the methodological framework can be applied to behavioral SCIM research inquiries.

4. Methodological framework: synergistic use of experiment and survey

Behavioral SCIM inquiries oriented by the agent-system contingency theory can be empirically investigated through the synergistic use of experiment and survey research methods, the general framework and methodological steps of which are presented in Fig. 2. As Babbie (1989) summarized, a common practice in experimental research is that researchers manipulate external stimuli and introduce them to human subjects, and then observe their behavioral responses. Therefore, it is a powerful method in investigating the effects of external factors on human behaviors. In the context of the agent-system contingency theory, system-level properties are stimuli external to decision-making agents. Experimental methods have become more commonly used in SCIM research (e.g., Bonney, Plouffe, & Wolter, 2014; Pulles & Hartman, 2017; Rungtusanatham, Wallin, & Eckerd, 2011). However, a constraint inherent in experimental methods is that, by itself, it is not equipped with operationalizing micro-level factors internal to human subjects, such as individual differences and personalities. Thus, when operating as a sole method, behavioral experiments do not permit researchers to address multi-level research inquiries involving both external stimuli inherent in the systems (i.e., system-level properties) and factors internal to human agents functioning in the systems (i.e., agent-level properties). As such, the use of survey methods, to complement the experimental approach, enables researchers to measure factors internal to human agents via questionnaire items. Conversely, when used as a sole method to capture both agent- and system-level properties, survey research can be constrained in its ability to capture external stimuli or system-level properties. This is because survey instruments do so *ex post* and does not have the control and ability to manipulate the ranges of external stimuli *ex ante* as in the experimental research. As such, the proposed methodological framework synergizes the strengths of both methods in addressing a range of behavioral SCIM inquires guided by the agent-system contingency theory.

4.1. Determine the agent- and system-level properties for the analysis

In applying the agent-system contingency theory to behavioral SCIM research, researchers first determine the agent- and system-level properties relevant to their SCIM research inquiry being investigated. The general propositions of the theory can then guide the development of specific testable hypotheses regarding the relationships between the agent- and system-level properties and the managerial decision of

interest (see the illustrations in Section 5).

4.2. Develop experimental vignettes and survey measurement items

To empirically test the developed hypotheses, the instrument in this methodological approach includes both experimental vignettes and survey measurement items. Vignettes are short descriptions of situations with hypothetical characters that can be used in conjunction with the survey method to solicit respondent opinions (Finch, 1987). The use of vignettes has been shown to generate more valid and more reliable measures of respondent opinion than the use of simpler but more abstract survey questionnaires (Alexander & Becker, 1978), and the vignette-based experiment has evolved into an established form of experiment (see Rungtusanatham et al., 2011).

To closely approximate real-life decision-making situations, the experimental vignettes should be grounded in actual business incidents. This can be achieved by first identifying the known business events that relate to the behaviors to be studied. Such business events are often reported in newspapers or trade magazines. For example, one may derive a vignette relevant to new product development decisions based on the Boeing 787 development process, which was reported by *Businessweek* and *Wall Street Journal*, among others (Hung & Tangpong, 2010). The business scenario then is used as the base experimental vignette. Alternatively, past literature may already have established vignettes relevant to decision contexts of interest. For instance, Joshi and Arnold (1998) presented a validated vignette regarding opportunism in BSRs. Once the base experimental vignette is developed, it can be expanded to include manipulations of system-level properties (i.e., stimuli). The inclusion of manipulations in the experimental vignettes allows researchers to systematically manipulate and vary stimuli in the vignette description and observe their contrasting effects on the subjects' responses (Croson & Donohue, 2002).

In addition, agent-level properties of interest, which may be in forms of personality traits or other personal characteristics (e.g., cognitions and values), can be operationalized through survey items. For established constructs, validated scales may be available in the literature, e.g., the Big Five personality traits (Goldberg et al., 2006). In the case that appropriate measurement items do not exist in the literature, researchers may need to develop new items, following the item generation steps outlined by Hinkins (1998). The manipulated experimental vignettes, in tandem with survey measurement items, enable researchers to assess the effects of agent- and system-level properties on the subjects' responses concurrently. Thus, researchers can determine the independent and interaction effects of the two-level properties on decision outcomes in relation to their hypotheses.

4.3. Select experimental subjects

Subjects should be reasonably familiar with the decision described in the vignette and are expected to respond to the experimental manipulations. For example, purchasing professionals will be well-suited for studying SCIM decisions related to the operations in exchange relationships, whereas senior-level managers will be more suitable for studying SCIM decisions that have strategic implications, such as supply chain integration. When the suitable subjects are limited in number and/or are difficult to access, researchers may consider using surrogates in place of or together with the targeted subjects, provided that similar behavioral patterns between the targeted subjects and the surrogates can be established (e.g., Boyer & Swink, 2008).

4.4. Conduct the experiment and administer the survey measurement items

As experimental vignettes with manipulations are used, subjects should be randomly assigned into groups (i.e., experimental and control groups matching the vignettes with and without manipulations, respectively). Through randomization, each group is presumed probabilistically equivalent where systematic biases are neutralized (Babbie, 1989). Each group is then given (1) a unique experimental vignette to introduce different levels of system-level properties across groups and (2) common survey measurement items to capture agent-level properties of interest.

4.5. Analyze and interpret results

Once the subjects have responded, the data analyses for this experiment-survey synergistic method take three steps. First, statistical tests (e.g., *t*-test) need to be performed to check whether the experimental manipulations for the system-level properties are successful. Second, scale reliability and validity tests (e.g., Cronbach's alpha, factor analyses) are performed to ensure that the scales measuring the agent-level properties are reasonably reliable and valid. Finally, correlational analyses (e.g., regression analyses) can be performed to test the proposed relationships between the decision outcome as the dependent variable and the agent- and system-level properties as independent variables along with their interaction. The hypotheses can then be confirmed or disconfirmed.

5. Empirical illustrations

To illustrate how the general propositions of the agent-system contingency theory can guide the development of specific testable hypotheses and how the proposed methodological framework can be applied in testing the hypotheses, we conducted two studies on managerial decisions regarding opportunism and vertical integration in SCIM.

5.1. Study 1: opportunism in BSRs

Study 1 on opportunism in BSRs is extended from Tangpong et al. (2010) experimental work on the interaction effect of relational norms and agent cooperativeness on opportunism in BSRs. This study extended beyond theirs by framing the hypotheses based on the agent-system contingency theory and including both relational norms and dependence as system-level properties while maintaining agent cooperativeness as the agent-level property of interest.

5.1.1. Background and hypotheses

Opportunism is defined as “self-interest seeking with guile” (Williamson, 1975, p. 6), and occurs in BSRs when one party unilaterally acts for its own gain potentially at the expense of the long-term mutual gains of both parties (Brown, Dev, & Lee, 2000). In the agent-system contingency framework, we contend that opportunism in BSRs is incubated when the decision-making agent of one party decides to act for unilateral gains without concerning for adverse consequences on the other. Cooperativeness arguably is a key personality trait of the decision-making agent relevant to the decision whether to act opportunistically toward the partner in BSRs. It embodies agreeableness, team orientation, and compassion (e.g., Chatman & Barsade, 1995; Tangpong et al., 2010), and reflects predisposition toward fairness, support, and concern for others (e.g., Wilmot & Hocker, 2001). In BSR contexts, cooperativeness can be a key internal drive of decision-making agents to collaborate, promote mutual interests, strengthen long-term relationships between partners, which collectively restrain opportunistic behaviors (e.g., Biong & Selnes, 1996; Jap, 2001). We thus elaborate Proposition 1 of the agent-system contingency theory and propose the following hypothesis.

Hypothesis 1. *Decision-making agents' cooperativeness mitigates opportunism in BSRs.*

The literature on buyer-supplier opportunism has also identified two key characteristics of BSRs, namely relational norms and dependence (e.g., Carson, Madhok, & Wu, 2006; Joshi & Arnold, 1998; Provan & Skinner, 1989), that are associated with opportunism

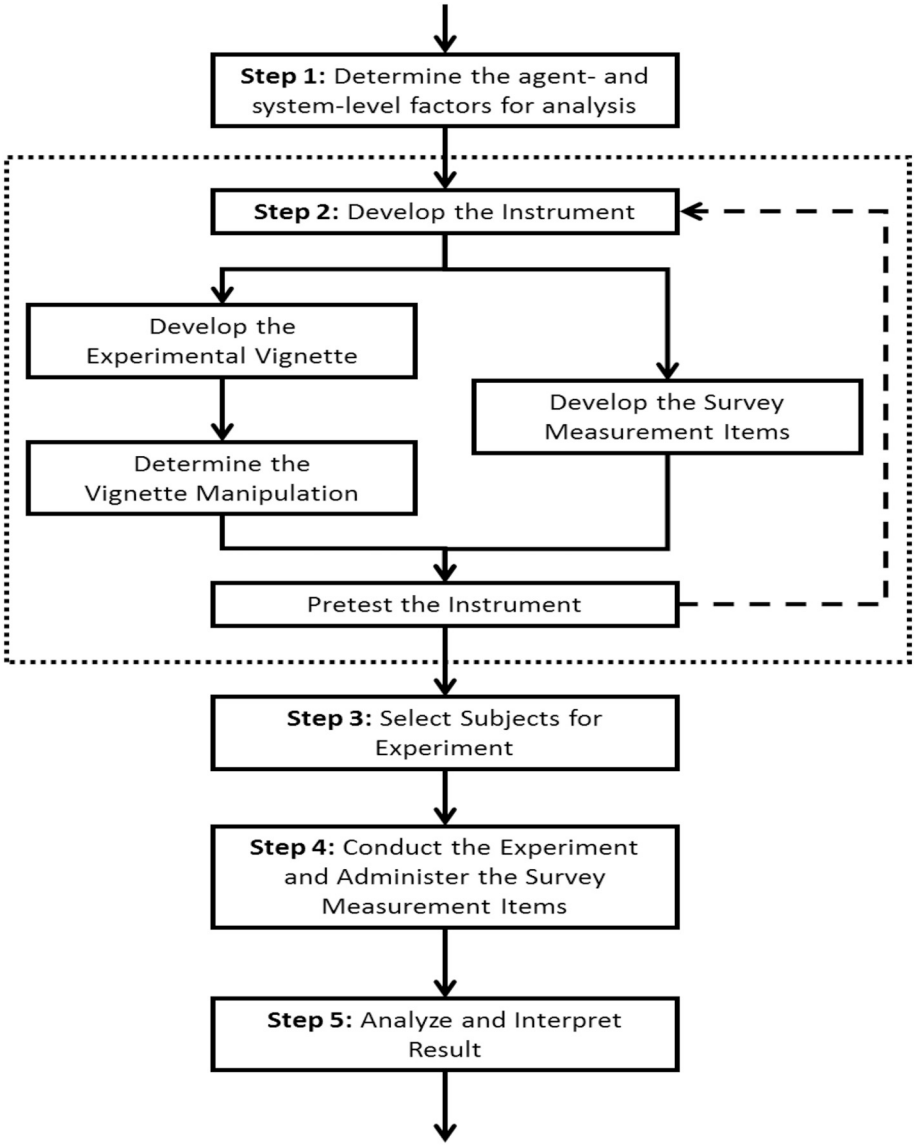

Fig. 2. Methodological framework.

mitigation. Research in opportunism mitigation has largely focused on relational governance, using relational contracting or relational norms. These relational mechanisms are typically referred to as the values shared among BSR partners concerning appropriate behavior that maintains or improves their relationship (Heide & John, 1992; Noordewier et al., 1990). Partners in BSRs characterized by high relational norms display a long-term orientation and strive for mutual interests. All these provide a foundation for constraining opportunism in BSRs (Carson et al., 2006; Ganesan, 1994). We argue that relational norms in BSRs are considered a macro-level operating condition consonant with agent cooperativeness, as the modus operandi guided by the relational norms are aligned with the cooperative agents' predisposition to act in supportive and fair manners. As such, we expect agent cooperativeness to interact with relational norms in amplifying their opportunism-mitigating effects. We thus elaborate Proposition 2.1 of the agent-system contingency theory and propose the following hypothesis.

Hypothesis 2. *Agent cooperativeness interacts with relational norms in mitigating opportunism in BSRs.*

Alternatively, opportunism-mitigating mechanisms in BSRs can be based on dependence, defined as the degree to which an exchange party needs to maintain the relationship with the other party to obtain necessary resources and to attain its desired goals (e.g., Frazier, 1983; Heide & John, 1988). A firm that is highly dependent on its partner in a BSR tends to have a concern about preserving the relationship with its partner. Thus, the dependence-based mechanisms to mitigate opportunism in BSRs are characterized by the replaceability of partners (Heide & John, 1988). As a highly dependent party needs the exchange relationship for its viability, the threat to terminate such relationship can substantially deter the dependent party from acting opportunistically toward the other (e.g., Etzioni, 1961; Kumar, Stern, & Achrol, 1992). The replaceability concern as the opportunism-inhibiting mechanism of dependence is arguably independent from the internal predisposition of cooperative agents to act in fair and supportive

manners. We then contend that the presence of dependence constitutes a neutral macro-level operating condition under which the cooperative agents function. As a neutral macro-level operating condition, dependence only co-exists with agent cooperativeness, and its mitigating influence on opportunism in BSRs is independent from that of agent cooperativeness. We therefore elaborate Propositions 2.2 of the agent-system contingency theory and propose the following hypothesis.

Hypothesis 3. *Agent cooperativeness and dependence independently rather than interactively mitigate opportunism in BSRs.*

5.1.2. Experimental design and participants

To test Hypotheses 1–3, we designed a vignette-based experiment, coupled with the use of survey instrument, as outlined in our proposed methodological framework. The participants were 172 MBA students in the U.S.: (a) 29.7% from a Midwest university and 70.3% from an East Coast university, (b) 52.3% male, (c) 69.8% Caucasian, and (d) the average age and management experience of 28.5 and 1.9 years, respectively. The use of MBA students as experimental participants in this study has been supported by previous research practice. Several researchers have found similar decision-making patterns between MBA students and professional managers, and MBA students have been used as reasonable surrogates to professional managers in previous studies (e.g., Langfred, 2004; Liang, Kale, & Cherian, 2014; Mantel, Tatikonda, & Liao, 2006; Schriesheim & Hinkin, 1990).

The experiment was a two-by-two (i.e., high/low relational norms and high/low dependence) between-subject design. We randomly assigned participants into four groups, and each of the participants read a short business vignette adopted from Joshi and Arnold's (1998) BSR study (see Appendix A for the experimental vignettes). In the given vignette, participants acted as the purchasing manager of an electronic equipment manufacturer and rated their responses in terms of opportunistic behaviors toward the supplier. The manipulation checks of the relational norms and dependence levels were also successful, indicating that the variation of low and high relational norms and dependence entered subjects' considerations as experimentally designed.

5.1.3. Measurements

To measure opportunism, we used a four-item instrument available in Tangpong et al.'s (2010) study. The instrument attained adequate reliability and validity with the Cronbach's alpha of 0.69 and a Goodness-of-Fit Index of 0.99. Agent cooperativeness was also operationalized, using Tangpong et al.'s (2010) measurement approach and 10-item instrument, which attained the Cronbach's alpha of 0.75 and a Goodness-of-Fit Index of 0.99, indicating adequate reliability and validity. The sum score of the items in each instrument was then used as its composite measure. Agent cooperativeness scores were then mean-adjusted to remove the concern of multicollinearity in the subsequent regression analyses. Regarding relational norms and dependence, they were coded as 1 and 0 for the high and low groups, respectively, as in the experimental design. Finally, we controlled for (a) gender – male and female coded as 1 and 0, respectively, (b) ethnicity – Caucasian and non-Caucasian coded as 1 and 0, respectively, (c) age (years), (d) work experience (years), (e) management experience (years), and (f) campus – coded as 1 and 0 for East Coast and Midwest universities, respectively.

5.1.4. Data analysis and results

The correlation analysis indicated that some control variables were significantly correlated among each other, but Variance Inflation Factors did not indicate multicollinearity problems among them. Table 2 summarizes the regression analysis results. In the Agent and System Model, Agent Cooperativeness was negatively related to Opportunism ($p < .001$), thus supporting Hypothesis 1. Relational Norms was also negatively related to Opportunism ($p < .01$).

The Full Model results in Table 2 also indicate that Relational Norms was negatively related to Opportunism ($p < .01$), and the interaction of Agent Cooperativeness and Relational Norms was negatively related to Opportunism ($p < .01$) as well. The interaction of Agent Cooperativeness and Dependence, however, was not significant, indicating that they act independently rather than interactively in influencing Opportunism. These results thus yield support for both Hypotheses 2 and 3. It is also noted that Agent Cooperativeness became an insignificant predictor in the Full Model, as the explained variance from Agent Cooperativeness in the Agent and System Model was probably subsumed by its interaction with Relational Norms in the Full Model. This finding is consistent with that of Tangpong et al. (2010). Overall, these results are largely consistent with the central thesis of the agent-system contingency theory.

5.2. Study 2: supply chain vertical integration

Study 2 examines vertical integration from the perspective of agent-system contingency theory. It included relational norms as the system-level property while maintaining decision maker's risk propensity as the agent-level property.

5.2.1. Background and hypotheses

Vertical integration has been a phenomenon that captures scholars' attention as a contrasting approach to outsourcing over the past decades. Vertical integration (i.e., ownership integration) decisions influence the boundary of the firm as the firm's managers decide which activities are to be performed within or outside the firm's boundary (e.g., Jaspers & van den Ende, 2006; Pisano, 1990). TCE has provided a theoretical guidance regarding vertical integration decisions (i.e., make-or-buy decision) to achieve the firm's efficient boundary (e.g., Williamson, 1985). TCE postulates that the transactions of activities characterized by high asset specificity and high uncertainty should be internalized into the firm's hierarchy (i.e., vertical integration) since such high asset specificity and high uncertainty cause market failure. Thus, they are considered significant factors influencing vertical integration decisions (Jaspers & van den Ende, 2006).

In the agent-system contingency framework, we contend that a supply chain vertical integration begins with the decision-making agent of a firm deciding to expand the firm's boundary by bringing in-house a certain activity previously performed by an external vendor. Typically, vertical integration reflects the firm's major commitment/investment, thus exposing the firm to greater financial risks. With vertical integration involving tradeoffs between (a) opportunism and transaction cost and (b) management complexity and hierarchy cost, the outcomes of vertical integration are difficult to warrant *ex ante*. We argue that risk propensity, i.e., individual predisposition toward taking risks or the reverse of risk aversion (e.g., Bromiley, 1991; Hung & Tangpong, 2010), is a key personality trait of the decision-making agent relevant to the vertical integration decision, given the uncertain and risky nature of the decision. We thus contend that risk propensity of the decision-making agent increases the likelihood of the vertical integration decision, as the agent with higher risk propensity can tolerate a higher level of uncertain outcomes associated with the vertical integration decision. Proposition 1 of the agent-system contingency theory can then be elaborated into Hypothesis 4 as follows.

Hypothesis 4. *Decision-making agents' risk propensity is positively related to the supply chain vertical integration decision.*

The macro-level operating condition that we use to examine the vertical integration decision is relational norms. In the BSR literature, relational governance has emerged as an alternative form of

Table 2
Results of regression analyses in Study 1.

		Standardized Beta	
Dependent variable: opportunism	Control	Agent and System	Full
	Model	Model	Model
Control variables			
Gender	0.10	0.06	0.03
Ethnicity	−0.07	−0.09	−0.14†
Age	0.28**	0.25**	0.26**
Management Experience	−0.14	−0.16†	−0.16†
Campus	0.08	0.03	−0.01
Independent variables			
Agent Cooperativeness (H1)		−0.27***	−0.01
Relational Norms		−0.22**	−0.22**
Dependence		0.08	0.09
Agent Cooperativeness × Relational Norms (H2)			−0.30**
Agent Cooperativeness × Dependence (H3)			−0.09
R Square	0.07	0.19	0.23
Adjusted R Square	0.04	0.15	0.19
F Value	2.43*	4.65***	4.92***

† $p < .1$.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

governance in addition to the two-polar market and hierarchy (e.g., Williamson, 1985; Zaheer & Venkatraman, 1995). Research on relational governance has suggested that relational norms are a predominant form of relational governance and can act as a viable governing force increasing customer's satisfaction and mitigating opportunism (e.g., Heide & John, 1992), even when the transactions are high in asset specificity and uncertainty (e.g., Carter & Hodgson, 2006; Crosno & Dahlstrom, 2008). Relational governance seems to be a preferred governance mode to hierarchy, which typically involves high entry cost, hierarchy cost, management complexity, and integration problems. Thus, within the agent-system contingency framework, relational norms in exchange relationships are considered a macro-level operating condition that can influence the vertical integration decision. Espousing long-term relationships and collaborative efforts between partners (e.g., Heide & John, 1992; Macneil, 1980), relational norms create the macro-level operating environment with less frictions, low transaction costs, and low opportunism risk. When decision-making agents operate in such relational environment, their risk propensity is arguably suppressed from exerting its full influence in driving the agents' decision toward a risky option of vertical integration. Put differently, relational norms form an operating environment dissonant with risk propensity of the agents. As such, in the high relational norms environment, the impact of agent risk propensity on vertical integration decision is expected to be weakened. This line of reasoning is consistent with Proposition 2.1 of the agent-system contingency theory and suggests Hypothesis 5 as follows.

Hypothesis 5. *The interaction of agent risk propensity and relational norms in exchange relationships is negatively related to the supply chain vertical integration decision.*

5.2.2. Experimental design and participants

To test Hypotheses 4 and 5, we followed the proposed methodological framework as in Study 1. Participants in Study 2 were 98 U.S. business executives (i.e., presidents, vice presidents, executives, and directors). The participant demographics included (a) 48% male, (b) 86% Caucasian, and (c) the average age and management experience of 54.6 and 18.9 years, respectively.

In this study, we grounded the base vignette in actual incidents: Caterpillar's acquisition of Progress Rail Services Corporation in 2006 and General Motor's acquisition of Fisher Body in 1926. In this vignette, participants assumed the role of a senior manager at an electronic equipment manufacturer who had to decide whether to recommend acquiring its supplier or signing a long-term contract with its supplier in the face of high uncertainty and high asset specificity. The manipulation materials regarding low and high relational norms were added to the base vignette, resulting in two experimental vignettes (see Appendix B for the full description). Participants were randomly assigned into two groups: one for the high-relational-norms vignette and the other for the low-relational-norms vignette. The manipulation check of relational norms was also successful, indicating that the variation of low and high relational norms entered into subjects' considerations as we intended.

5.2.3. Measurements

The dependent variable was the likelihood of recommending for vertical integration over long-term contract with a 1–7 scale (1 = not very likely; 7 = very likely). Relational norms were the experimental manipulation with the high and low groups coded as 1 and 0, respectively. To measure the agent risk propensity, we used an existing five-item instrument available in Hung, Tangpong, Li, and Li (2012). Item #2 of the original scale was dropped due to its low factor loading. The remaining four items attained the Cronbach's alpha of 0.90 and the Goodness-of-Fit Index of 0.99, indicating a reasonable degree of reliability and validity, respectively. The sum score of the four items was used as the composite measure of risk propensity. This composite score was also mean-adjusted to remove the concern of multicollinearity. Finally, our control variables included (a) gender – male and female coded as 1 and 0, respectively, (b) ethnicity – Caucasian and non-Caucasian coded as 1 and 0, respectively, (c) age (years), and (d) management experience (years).

5.2.4. Data analysis and results

The correlation analyses indicated that some control variables were significantly correlated among each other, but Variance Inflation Factors did not indicate multicollinearity problems among them. In addition, using the standardized residual approach, we identified two outliers and thus excluded them from further data analyses. Table 3 summarizes the regression analysis results. In the Agent and System Model, Agent Risk Propensity was positively related to the Likelihood of Vertical Integration Decision ($p < .01$), but Relational Norm was not significant. The results thus yielded support for Hypothesis 4. The results of the Full Model indicated that Agent Risk Propensity was still positively related to the Likelihood of Vertical Integration Decision ($p < .001$), while its interaction with Relational Norms was negatively related to the Likelihood of Vertical Integration Decision ($p < .05$). Thus, the results support both Hypotheses 4 and 5, and are largely consistent with the central thesis of the agent-system contingency theory.

6. Discussion and conclusion

In this study, we developed the agent-system contingency as a general theory for behavioral research in SCIM. We based the agent-system contingency theory on two assumptions: agent decision authority and bounded rationality and developed two central propositions of this theory (i.e., trait relevance and agent-system property alignment). We then proposed a methodological framework to facilitate behavioral SCIM research oriented by this theory. Finally, we

conducted two studies to illustrate how the theory and the proposed methodological framework can be applied to managerial decisions regarding opportunism and vertical integration in SCIM. The results of both studies also provided some empirical support to the central propositions of the theory, underlining the complex interplay between agent- and system-level properties in shaping managerial decisions in SCIM. Specifically, in Study 1, the agent-system contingency theory explains the variation of opportunism in BSRs through the agent-level cooperativeness and its consonance with the system-level relational norms. In Study 2, the theory explains the variation of supply chain vertical integration decision through the agent-level risk propensity and its dissonance with the system-level relational norms. In sum, within the framework of the agent-system contingency theory, unless we consider both agent- and system-level properties in tandem, our understanding of managerial decisions in SCIM will be less complete, and our ability to explain or predict such decisions will be rather limited.

This study has expanded the current literature in three meaningful ways. First, it provides a general multi-level theory that serves as a common theoretical thrust, underlying recent research findings regarding the important roles of human agents in SCIM. As the agent-system contingency theory unifies decision-influencing forces internal to decision-making agents (i.e., agent-level properties) and those external to the agents (i.e., system-level properties), it is a more complete theoretical lens than the traditional macro−/system-level approach to SCIM research. This study also emphasizes the importance of the interactions between agent- and system-level properties in shaping managerial decisions in SCIM, thus adding to the current theoretical discourse regarding the agent-system interplays in SCIM dynamics. A recent view on agent-system co-development suggests that agents and supply chain systems co-evolve and influence each other over time (Tangpong et al., 2014). This study may extend that view by suggesting that agent-system interactions, when influential to decision outcomes in SCIM, may serve as an incubating ground for agents and systems to co-evolve. In other words, agent-system interactions may theoretically be considered an antecedent of agent-system co-development. As agent-system interactions are the initial interface between the properties of agents and those of systems in influencing SCIM decisions, they provide viable opportunities for agents and systems to co-evolve toward each other over time. The premise of agent-system interactions being an antecedent or a pre-condition of agent-system co-development is indeed interesting and is worth further investigation in the future. To examine this inquiry, future research may take forms of longitudinal research designs. For examples, given the significant amplifying interaction between agent cooperativeness and relational norms, future research may observe how highly cooperative agents may lead to stronger relation norms in BSRs over time, or vice versa. Likewise, given the significant suppressing interaction between relational norms and agent risk propensity, researchers may also observe how strong relational norms may shape the agents toward being more risk-averse, or how highly risk-seeking agents may disrupt relational norms in BSRs over time. This research stream would further support or challenge the arguments for agent-system co-development in general and for agent-system interactions being its pre-condition in particular.

Table 3
Results of regression analyses in Study 2.

Dependent variable: vertical integration decision	Standardized Beta		
	Control	Agent and System	Full
	Model	Model	Model
Control variables			
Gender	0.12	0.09	0.11
Ethnicity	0.08	0.08	0.11
Age	−0.33*	−0.26*	−0.28*
Management Experience	0.28*	0.19	0.21†
Independent variables			
Agent Risk Propensity (H4)		0.30**	0.49***
Relational Norms		−0.16	−0.15
Agent Risk Propensity × Relational Norms (H5)			−0.31*
R Square	0.09	0.19	0.25
Adjusted R Square	0.05	0.14	0.19
F Value	2.24†	3.51**	4.11***

† p < .1.
* p < .05.
** p < .01.
*** p < .001.

Second, this study also contributes to the advancement of behavioral/relational approach to industrial marketing and B2B research. The recent paradigm shift in industrial marketing and B2B research was from the transactional approach to the behavioral/relational approach (Hadjikhani & LaPlaca, 2013). Evolving from there, the agent-system contingency theory in this study re-centers the theoretical focus on human agents and how they interact with the SCIM system (i.e., their operating conditions) in shaping SCIM decisions. The focus on personality trait as a key construct in this theory can help simplify the theoretical development and empirical efforts in behavioral SCIM research, given (1) that personality traits encapsulate individuals' behavioral attributes, such as cognitions, emotions, and motivations (e.g., Allport, 1937; Cattell, 1965) and (2) that established measurement scales are widely available for various personality traits (e.g., Goldberg et al., 2006). As such, the focus on personality trait in behavioral SCIM studies can potentially propel the research progress of this line of inquiry.

Finally, the agent-system contingency theory is developed as a general theory for behavioral research in SCIM, and its central propositions can be applied to various decisions in SCIM. Likewise, the general methodological framework proposed in this study synergizes the strengths of both experimental and survey methodologies and can be applied to various multi-level behavioral SCIM inquiries oriented by the theory. Collectively, the agent-system contingency theory and the accompanied methodological framework have broad applications to various behavioral SCIM inquiries. As such, these proposed frameworks potentially serve as a platform on which scholars can advance behavioral research in SCIM in a more holistic and more expeditious manner.

Despite its contributions, this study also has some limitations. First, this study tested the agent-system contingency theory in two decision contexts – opportunism and vertical integration. Future research can further test this theory in other decisions in SCIM as illustrated in Fig. 1 (e.g., industrial pricing, relationship management) to assess the generalizability of the theory across various decisions in SCIM. Empirically testing additional hypotheses derived from the central propositions of the theory is an important process to further support or falsify the theory (Bacharach, 1989), or perhaps to reveal new boundary conditions of the theory and call for more theorizing efforts (Weick, 1995).

Another limitation is that this study confines the theoretical development of the agent-system contingency theory to the decisions, the outcomes of which are somewhat uncertain. As the prospect theory literature suggested, different ways of framing the decisions can potentially yield different decision outcomes (e.g., Kahneman & Tversky, 1979). Future research can examine the role of decision-framing in relation to this theory. It is possible that certain personality traits can interact with certain ways of decision-framing in shaping decision outcomes. The inclusion of decision-framing into the theorization of agent-system contingency framework has high promise in yielding a more complete theoretical lens in explaining managerial decisions in SCIM. This is another area of future research that could prove fruitful.

Acknowledgement

All three authors contributed equally to this research.

Appendix A. Experimental vignettes for Study 1

Introduction

You are a purchasing manager responsible for the purchase of microchips for a midsize electronic equipment manufacturer. Microchips are an important component for the equipment that you manufacture; therefore they need to be purchased on a regular basis. You have one existing supplier for this component.

Low Dependence

As purchasing manager responsible for microchips, you find yourself in a situation wherein it is not difficult for you to find a suitable replacement for the existing supplier. If you decide to stop purchasing from this supplier, you could easily replace their volume with purchases from alternative suppliers. There are many competitive suppliers for microchips and you can switch to them without incurring any search costs. Switching suppliers is not going to have any negative effects on the quality or design of the equipment that you manufacture. Your production system can be easily adapted to use components from a new supplier. The procedures and routines that you have developed are standard and they are equally applicable with any supplier of this component. The skills that your people have acquired in the process of working with the supplier can easily be changed to fit another supplier's situation. You can therefore terminate your relationship with your present supplier without incurring any costs.

High Dependence

As purchasing manager responsible for microchips, you find yourself in a situation wherein it is difficult for you to find a suitable replacement for the existing supplier. If you decide to stop purchasing from this supplier, you could not easily replace their volume with purchases from alternative suppliers. There are very few, if any, competitive suppliers for microchips and you cannot switch to them without incurring significant search and verification costs. Switching suppliers is also going to have negative effects on the quality or design of the equipment that you manufacture. Your production system cannot be easily adapted to use components from a new supplier. The procedures and routines that you have developed are unique and hence they are not applicable with any other supplier of this component. The skills that your people have acquired in the process of working with the supplier cannot easily be changed to fit another supplier's situation. You cannot therefore terminate your relationship with your present supplier without incurring significant costs.

Low Relational Norms

Both you and your supplier bring a formal and contract governed orientation to this relationship. Exchange of information in this relationship takes place infrequently, formally, and in accordance to the terms of a prespecified agreement. Even if you do know of an event or change that might affect the other party, you do not divulge this information to them. Strict adherence to the terms of the original agreement characterizes your relationship with this supplier. Even in the face of unexpected situations, rather than modifying the contract, you adhere to the original terms. You have and “arm's length” relationship with your supplier. You do not think that the supplier is committed to your organization—in fact; you think that if you did not carefully monitor this supplier's performance, they would slack off from the original terms. Above all, you see your supplier as an external economic agent with whom you have to bargain in order to get the best deal for yourself.

High Relational Norms

Both you and your supplier bring an open and frank orientation to the relationship. Exchange of information in this relationship takes place frequently, informally, and not only according to a prespecified agreement. You keep each other informed of any event or change that might affect the other party. Flexibility is a key characteristic of this relationship. Both sides make ongoing adjustments to cope with the changing circumstances. When some unexpected situation arises, the parties would rather work out a new deal than hold each other responsible to the original terms. You tend to help each other out in case of unexpected crises. If your supplier is unable to fulfill an order, they recommend an alternative source of supply for the same. Above all, you have a sense that your supplier is committed to your organization and that they work with you keeping your best interests in mind. You see each other as partners, not rivals

Decision

Recently, the supplier informed you that they are involved in a labor dispute. Consequently, they are temporarily unable to guarantee on-schedule delivery. This creates some uncertainty for your organization. Delayed delivery of microchips, may, for example, cause problems for your organization in meeting delivery schedules to customers. The supplier has called to get your regular order. Drawing from experience, how would you be most likely to react in this situation?

Appendix B. Experimental vignettes for Study 2

Introduction

You are a senior manager of Company M, which is an electronic equipment manufacturer. You have an existing supplier, Company N, which provides components to several of your company's key products. Company N has worked with your company to develop components for your products in the past and is very familiar with your product lines and expectations. In order to supply to your company, Company N has invested in dedicated and specialized production equipment and processes. Company N has even dedicated an assembly facility near your plant that caters to your company's specific production needs. There is also a team of dedicated design and production engineers in Company N that work solely with your company's product development groups. As company N has made all these investments specifically for your company, it will be costly for your company to find a comparable alternative supply source. In a sense, both companies are “locked into” this relationship.

Low Relational Norms

Both you and Company N bring a formal and contract- governed orientation to your business relationship. Exchange of information

High Relational Norms

Both you and Company N bring an open and frank orientation to your business relationship. Exchange of information in this relationship takes

in this relationship takes place infrequently, formally, and in accordance to the terms of a pre-specified agreement. Even if one party does know of an event or change that might affect the other party, such information would not be divulged to the affected party. Strict adherence to the terms of the original agreement characterizes the relationship between your company and Company N. Even in the face of unexpected situations, modifying the contract to cope with the changing circumstances is uncommon. Instead, one party would hold the other party responsible to the original terms. In short, your company and Company N have an “arm's length” relationship. You do not think that Company N is committed to your organization — in fact; you think that if you did not carefully monitor Company N, they would slack off from the original terms. Above all, you see Company N as an external economic agent with whom you have to bargain in order to get the best deal for yourself.

place frequently, informally, and not only according to a prespecified agreement. You keep each other informed of any event or change that might affect the other party. Flexibility is a key characteristic of this relationship. Both sides make ongoing adjustments to cope with the changing circumstances. When some unexpected situation arises, the parties would rather work out a new deal than hold each other responsible to the original terms. You tend to help each other out in case of unexpected crises. If Company N is unable to supply products to you, they recommend an alternative supplier to you to maintain the same order quantity. Above all, you have a sense that Company N is committed to your organization and that they work with you keeping your best interests in mind. You see each other as partners, not rivals.

Decision

Given the high frequency and volume of the components that your company needs for its key products, securing a reliable supply of these components with competitive pricing is very important. This objective is further complicated by fluctuating component price driven by competing global demands and limited supply. Recently, there is a discussion at your company about the possibility of acquiring Company N. Acquiring Company N is financially possible for your company. It will integrate your company's supply network and exclude Company N's product and service from your competitors. Securing an access to this supply source should prevent your company from price hikes in key components provided by Company N. However, doing so will increase management complexity for your company, and it is unclear whether your company can improve or even maintain the current component cost by acquiring Company N.

Alternatively, your company can negotiate with Company N and sign a long-term exclusive dealing contract with explicitly set price range and price protection clauses. Signing such a long-term contract should prevent your company from price hikes in the key components provided by Company N unless some drastic events occurs and change Company N's cost structure completely. Doing so will also shield your company from the complexity of managing the operations of Company N. However, the exclusive dealing contract will also prevent your company from buying the components from Company N's competitors even when other suppliers become more competitive.

As a senior manager of Company M, you need to take a position to support your company's direction of either (a) acquiring Company N or (b) signing the long-term contract with Company N

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