

**The Decision to Outsource Production:
A Behavioral Study of Supplier Advantage, Ability to Monitor and
Bandwagon Pressure**

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Abstract

The past decade has witnessed unprecedented outsourcing of manufacturing jobs to contract manufacturers (CM). Conventional wisdom in operations strategy would advocate that manufacturing firms with relative internal cost and/or quality capabilities should limit their outsourcing of production to retain competitive advantages. But what if decision makers are systematically biased towards more outsourcing because they face bandwagon pressure or fail to account for their ability to monitor supplier performance? The extant literature would suggest that such biases could have significant unintended consequences that would be deleterious for the buyer. Accordingly, this paper examines the individual decision making behaviors of supply chain professionals in the outsourcing process to assess whether managerial biases systematically influence outsourcing and, if so, provide explanations for such biases. Specifically, we determine what percent of finished products that experienced sourcing managers would contract out, given their supplier's relative cost and/or quality capabilities when compared to their own internal production abilities. Moreover, we consider how the buyer's ability to monitor supply performance and bandwagon pressure effects moderate the percent of production being outsourced. We use a scenario-based behavioral experiment with a sample of 263 managers to investigate this dilemma. We find that managers underweight the ability to monitor cost but not quality. We attribute this finding to managers' overconfidence in the ability to control supplier quality shirking. Additionally we find that managers jump on the proverbial "bandwagon" and thus may unduly increase the amount of production that is outsourced. Lastly, we examine individual and employment characteristics that may enhance or mitigate the bandwagon effect. These behavioral results are used to provide guidance to managers about outsourcing conditions which may result in biased decisions.

Keywords: Bandwagon Pressure, Partial Outsourcing

1. Introduction

This paper takes a behavioral operations lens in examining the managerial decision to outsource all or part of a firm's production to a contract manufacturer¹ (hereafter outsourcing is used interchangeably) versus producing within its own plants. Our focus here is to investigate the role

¹ In this research, we consider "pure" outsourcing to a contract manufacturer; and not contract manufacturing offshore. See Gray, Roth and Leiblein, 2011 for a definitions and a discussion of internal production, pure offshoring; pure outsourcing and offshoring-outsourcing.

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that a supplier's cost and quality capabilities--relative to the buyer's own internal production abilities--plays in a manager's decision process when information is incomplete and inferences must be made. With the exception of Gray, Roth and Tomlin (2009a), who investigated a firm's propensity to outsource production, much of the prior empirical research on sourcing evaluates performance of a given supply chain structure (e.g., contract manufacturing or internal manufacturing) (See for example, Gray et al. 2011, Handley 2012, Handley and Benton 2012, Randall and Ulrich 2001). In contrast, our work informs research and practice on how a manager's behavioral decision processes regarding sourcing may influence the structure of the supply chains. Our work was motivated by the conundrum revealed in the empirical work of Gray, Roth and Tomlin (2009a), which called for more rigorous research on how the ability to measure capabilities--such as quality--may influence production outsourcing decisions. These authors found that manufacturing managers' propensity to outsource production was influenced by the buyers' strategic intent of low cost, but puzzlingly from an operations strategy view, not quality. Gray et al. (2009a, p. 712-713) conclude:

“The resulting insight (regarding quality priorities): manufacturing managers, on average, may be overconfident regarding their ability to manage quality across organizational boundaries and may not fully understand the unintended consequences of their outsourcing choices...in their make-buy decision making, manufacturing managers are apt to weigh measurable, direct low-cost benefits, which in turn shapes their propensity toward outsourcing. Managers are less consistent in their consideration of quality when deciding whether or not to outsource, possibly because the risks and benefits associated with quality in outsourcing are often difficult to assess...However, the cost of poor quality can have a deleterious influence on the business and the brand, which may not be immediately evident.”

As a result, unintended often hidden, costs may surface due to underestimation of quality risks, supplier quality shirking or opportunistic renegotiation. We explore the cause of these unintended costs by examining if managers' ignore supplier opportunism by neglecting the ability to monitor supplier performance. Thus our first research question is: Do managers neglect the ability to monitor supplier performance, in general?

More traditionally, the supply chain management literature proposes broader strategic management and economic schemas, such as production outsourcing as a decision that is determined by the macro characteristics of the competitive environment (Porter 1985), the supplier (Barney 1999) or the transaction (Williamson 2008). Accordingly, the rational, focal firm (buyer) must determine how production should be governed in order to minimize costs and opportunistic behavior (Barney 1999, Williamson 2008, Handley and Benton 2012, Handley

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2012). In practice, these supply chain decisions are based on the key assumptions that managers, who actually make the outsourcing decision for firms, are 1) have the foresight to anticipate opportunistic behavior and choose the governance structure that appears to provide the greatest competitive advantage (Williamson 1975, 1985) and 2) are wealth maximizing and are not influenced by social utilities (Camerer and Thaler 1995). Yet the supply chain literature often overlooks how the managers' behaviors, caused by bounded rationality (Mantel et al. 2006) and/or individual characteristics (March 1994), may be biased systematically regarding outsourcing; and in turn, may actually increase opportunistic behavior and decrease competitive advantage. Lastly, it is clear that social utility considerations are pervasive in economic transactions (Camerer and Thaler 1995) and may influence outsourcing (Griffith et al. 2006, Handley and Benton 2012, Maloni and Benton 2000). While it is clear that social utility may influence supply chain dynamics, managers are either unaware or do not know how to appropriately manage social influences (Griffith et al. 2006, Handley and Benton 2012, Maloni and Benton 2000). Arguably, ignorance of these influences may result in outsourcing decision biases that exacerbate what Benton (2010) calls "hidden supply chain costs."

Our study advances prior related supply chain strategy literature and practice by examining empirically two salient outsourcing decision biases identified by Gray et al. (2009a) that may influence outsourcing: overconfidence and the so-called bandwagon effect (McNamara et al. 2008). Specifically we investigate how the ability to monitor supply performance and bandwagon pressure moderate the role of relative supplier cost and quality advantages in outsourcing choices. A manager's perceived ability to monitor supplier performance on outsourcing can be manifested in two seemingly contradictory ways. First, a rational theory of behavior would propose this: the greater the buyer's ability to monitor supplier performance, the greater the actual direct costs incurred (e.g., auditing) and outsourcing would be reduced (Eisenhardt 1985). Alternatively, when a supplier's quality capability is unable to be monitored, then overconfidence, may in part, explain a manager's increased propensity to outsource production (Gray et al. 2009a). Overconfidence occurs when people overestimate their level of control, their performance or the accuracy of their predictions (Moore and Healy 2008). Notably, research in behavioral economics, psychology and management indicates that overconfidence is ubiquitous in managerial decision-making. To date, however, Gray et al.'s (2009a) conjecture-- that managers may be increasing outsourcing because they are overconfident in their ability to

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control supplier behavior--has not been established empirically using a behavioral operations lens.

Thus, the first contribution of this study is to employ a rigorous behavioral experiment--using the construct of ability to monitor supplier performance--to help resolve the alternative perspectives. The practical implications of managers' systematically overestimation of their ability to monitor and control contract manufacturer's actions on sourcing decisions--especially for difficult to measure capabilities, like quality-- is potentially significant. Conceivably, much more "risky" outsourcing would occur than if managers' choices were more calibrated to suppliers' potential for opportunism. We note that managerial confidence is domain specific (West and Stanovich 1997), such that managers may be overconfident about their ability to control certain supplier behaviors, but not others. Based upon the quality management literature, cost performance is typically considered easier to monitor than quality (Crosby 1979, Deming 1986; Anderson et al. 1994). Accordingly, we would expect a manager to emphasize quality and difficultly monitoring supplier performance when outsourcing, then cost. However, this may not be the case because managers may be overconfident about quality (Gray et al. 2009a). Thus, we evaluate how the ability to monitor supplier performance behaviorally affects managers' outsourcing choices with respect to both relative supplier cost and quality advantages

Besides monitoring difficulties, Gray et al. (2009a) posited that managers may be jumping on the bandwagon to pursue supplier advantages, especially those advantages that they perceive to reduce costs. This conjecture leads to our second question. Does bandwagon pressure moderate the relative supply cost and quality advantages, leading managers to increase the percentage of outsourced production over what they would have made in its absence? In the psychology literature joining the bandwagon is 1) about conforming to group behavior and 2) is motivated by information about how to behave in a given situation and the need for approval from others (Cialdini 2009, Cialdini and Goldstein 2004).

In contrast, institutional theory and strategy literatures take an organizational perspective. Bandwagons are a set of processes whereby organizations are pressured by institutions to become more similar (DiMaggio and Powell 1983). Bandwagons may be driven by institutional coercive, mimetic or normative pressures to conform (DiMaggio and Powell 1983). Alternatively, bandwagons may be fads driven by fears of lost competitive advantage or opportunity (Abrahamson and Rosenkoff 1993, McNamara et al. 2008). These views are not

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incommensurate. In fact, they would suggest that outsourcing bandwagons may provide managers with information (e.g., outsourcing is the right thing to do) and conform to professional norms (e.g., outsourcing to gain supplier advantage). The notion of bandwagon effect has been observed in a wide variety of literatures including acquisitions (McNamara et al. 2008), adoption of management techniques (Staw and Epstein 2000) technology adoption (Rohlf's 2003). Thus, while bandwagon pressures may drive firms to adopt the same outsourcing strategy as their competitors, there is dearth of information at the micro level in the supply chain and sourcing literatures about whether bandwagon pressure systematically influences individual managers to increase the percentage of outsourcing. A second major contribution of this research is to empirically validate that at the micro level, outsourcing decisions are positively impacted *directly* by bandwagon pressures.

Related issues point to our third contribution. This study is the first to show that individual characteristics may either exacerbate or mitigate the bandwagon effect on outsourcing decisions. Again, we contend, but do not test in this study, that making the wrong choices leads to unintended consequences, including the loss of sourcing leverage due to a deterioration of the firm's manufacturing and learning competencies (Anderson and Parker 2002, Gray et al. 2009, Handley in press). Further, these challenges and associated hidden costs and quality risks associated with knowledge transfer to contract manufacturers (Gray et al. 2012), as well as a degradation of its innovation capabilities, are often linked to internal manufacturing prowess (Council on Competitiveness 2011, Pisano and Shih 2009, Roth et al. 2010).

We investigate these questions using a scenario-based role playing experiment (Rungtusanatham et al. 2011). We use a volunteer sample of 263 experienced Institute of Supply Management (ISM) members to capture implicitly the complexities and nuances of sourcing decisions. Following Gray et al. (2011, 2012), the context for our study is the pharmaceutical sector². We design the decision-making scenarios so that a single manager has all the relevant outsourcing information about the supplier's cost and quality advantage, ability to monitor supplier performance, and competitive pressures. This method and design has been shown in the behavioral literature to enable the isolation of individual decision maker characteristics and biases that may influence his outsourcing decision (Mantel et al. 2006).

² According to Gray and co-authors, pharmaceutical products (excluding devices) are not 100% testable. At the plant level, quality risks have been associated with contract manufacturing, but not at the decision-making level.

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The empirical results from our experiment are now summarized. First, as hypothesized, that both high cost and/or quality capabilities of the contract manufacturer relative to the buying firm's manufacturing abilities indeed act to increase outsourcing. In addition, we find that manager's outsourcing propensity is reduced, on average, when there is an inability to monitor supplier performance, even when the supplier presents a relative cost advantage over the firm's internal manufacturing. In contrast, inability to monitor supply performance has no moderating influence on relative supplier quality advantage. These are consistent with Gray, et al.'s (2009a, 2012) findings that difficult to measure capabilities, like quality, have no effect on the decision to outsource. In other words, unlike costs, where the rational model is prevails, reduced sourcing occurs when measurement is difficult; however, managers are not altering their decision processes accordingly when it comes to supplier quality advantage. Thus, managers may be overconfident in assuming that they can adequately manage quality (e.g., by codification and testing) and knowledge transfer issues (e.g., adding sufficient resources) or that their suppliers know more than they do regarding quality, and will provide it even without their ability to monitor adequately.

Unexpectedly, these behavioral results signal a naive understanding of quality management practices and their relationship to costs (Crosby 1979, Deming 1986, Ward and Duray 2000, Rungtusantham et al. 2001, Shah and Ward 2003) and knowledge management (Anand et al. 2010, Grant 1996, Roth et al. 1994). It is well-established in quality management that ensuing product failures, quality risks, and recalls in the field actually increases total costs. The notions of *overconfidence* (Langer 1975), *availability bias* (Tversky and Kahneman 1974), and *myopic learning* (Levinthal and March (1993) may further explain these observations from a behavioral lens. Specifically, managers may believe they can control supplier quality thus shifting their focus to cost management. The more emphasis the firm places on costs relative to quality, the more its internal decision makers may emphasize cost over quality, regardless of tangibility and inability to monitor. Therefore, the pervasiveness of firms' emphasis on per unit "costs" determined prior to the make-buy decision, and the likelihood that the costs of poor quality outcomes are lagged, provide a plausible explanation underlying the behavioral theories.

Second, the empirical finding that the bandwagon affects outsourcing directly, regardless of relative supply cost and quality advantages as posed by Gray et al. (2009). Rather managers may be jumping on the bandwagon for psychological reasons, such as following the crowd

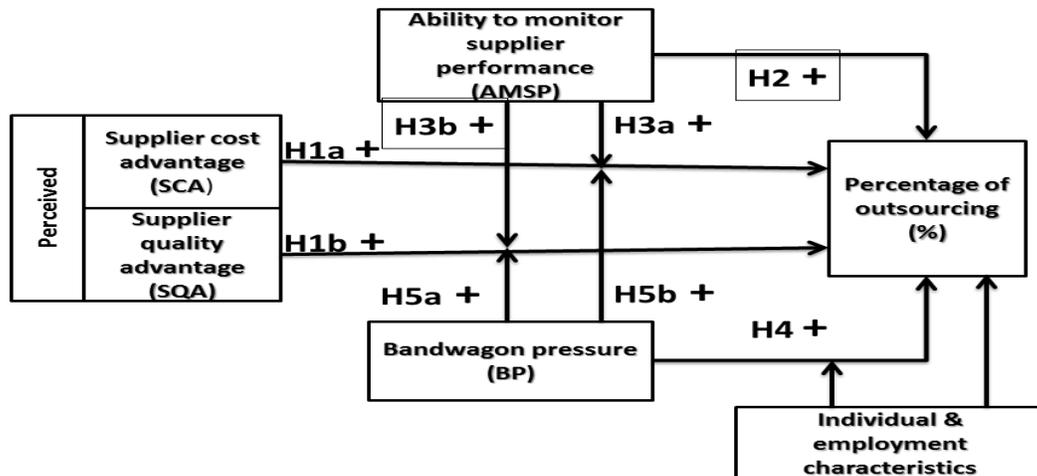
because the crowd provides proof of what should be done (Cialdini 2009). Third, examining individual differences sheds light on factors that reduces bandwagon pressure, and in turn, offers managerial guidance in such areas as leadership training and simulations. We find that managers with more sourcing experience are less affected by the bandwagon pressure, but the pressure is not eliminated completely. Surprisingly, we did not find evidence that education mitigated against bandwagon pressures, but we did find a weak gender association. Women in this study, on average, tended to cave into the bandwagon pressure more than their male counterparts, which as gleaned from the behavioral literature, may be attributed to gender conformance and self-esteem issues. While it is rare in the supply chain sourcing literature to investigate how individual characteristics may influence decision-making processes, this study sheds light on the importance from a behavioral perspective.

The rest of the paper proceeds as follows. First, we review the partial outsourcing literature and our theory-based, hypotheses and model. Next, we discuss our experimental methodology sample frame, and data collection. Third, we discuss our results. Lastly, we conclude with the implications for academia and practice with suggestions for future research.

2. Model and Hypotheses

Our hypothesized model is depicted in Figure 1. We begin with a discussion of the dependent variable, percentage of production outsourced to a contract manufacturer, and then develop the hypotheses leading to outsourcing decisions.

Figure 1 Hypothesized model



2.1 Percent of Production Outsourced

We include the options to make or buy as well as partial outsourcing as the dependent variable in our model. Our dependent variable then is: what percentage of production is allocated to in-house manufacturing versus outsourced to contract manufacturers? We note that partial outsourcing occurs when a firm simultaneously makes and buys (Anderson and Parker 2002, Gray, et al. 2009b). We specifically allow for partial sourcing because outsourcing “need not be a binary decision (Mantel et al. 2006 p. 835)” and pure make or buy are “endpoints of a *continuum* of sourcing strategies (Heriot and Kulkarni 2001 p. 18).” Moreover, partial outsourcing is a commonly used strategy in practice (Hennart 1993, Heriot and Kulkarni 2001, Parmigiani 2007).

2.2 Supplier Advantage

Outsourcing to acquire supplier expertise (Leiblein and Miller 2003) (or partially outsourcing to access to supplier expertise (Parmigiani 2007, Parmigiani and Mitchell 2009)) while developing internal expertise is well established. This literature stream generally treats supplier expertise as an absolute advantage or disadvantage (Leiblein and Miller 2003, Parmigiani and Mitchell 2009). However, competitive advantage is heterogeneous across firms and relative; and thus, a supplier may have a competitive advantage in one operational area (e.g. cost) and a disadvantage in another (e.g., delivery, flexibility, quality). Thus, it is important to examine the operational components of a supplier’s (relative) advantage instead of examining absolute advantage for several reasons: 1) Managers may outsource in order to leverage the operational advantages of a supplier (Gray et al. 2009b). 2) Managers may outsource to learn from a more capable supplier. 3) Operational advantages may be weighted differently within a given decision. For example, supplier quality may be an order qualifier, whereas a supplier cost may be an order winner.

For this experiment, we limit our investigation to relative supplier cost and quality advantage and disadvantage because cost and quality are fundamental concerns in the structuring of production (Hayes et al. 2005). Moreover, cost and quality are often motives for considering outsourcing (Moschuris 2007) or stated competitive priorities (Gray et al. 2009a). That said, the positive relationship between supplier cost and quality advantage and the percentage of outsourcing is consistent with the extant outsourcing literature (i.e., Barney 1999, Gray et al. 2009a, Leiblein and Miller 2003, Parmigiani and Mitchell 2009), which draws on the resource-based view (RBV) of the firm. The logic is simply that managers act to increase the percentage

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of outsourcing to a supplier who provides an advantage either in terms of cost or quality. Therefore:

H1a: Managers prefer to increase the percentage of outsourcing when a supplier has a cost advantage, ceteris paribus.

H1b: Managers prefer to increase the percentage of outsourcing when a supplier has a quality advantage, ceteris paribus.

2.3 Ability to Monitor Supplier Performance

The literature is mixed as to whether or not managers will be influenced by the ability to monitor supplier performance. In one stream, managers may be overconfident in their ability to control supplier behavior (Gray et al. 2009a). This minority view is supported by literature that suggests managers believe that they can control outcomes and neglect factors that may suggest that they cannot (Camerer and Lovallo 1999, Malmendier and Tate 2005, Malmendier and Tate 2008). Typically, this overconfidence results in excessive risks that harm performance (Camerer and Lovallo 1999, Malmendier and Tate 2005, Malmendier and Tate 2008). When may managers be overconfident? Managers are more confident in a familiar domain (West and Stanovich 1997). Moreover, familiarity and the resulting overconfidence may lead to an illusion of control when in fact managers may have little to no influence over events or outcomes (Langer 1975). If managers believe that they can control supplier malfeasance, they may neglect the ability to monitor supplier performance when outsourcing.

The other literature stream represents the dominant view that managers will account for the ability to monitor supplier performance when outsourcing (Heide 2003, Mayer and Salomon 2006). The analytic and economic literature in sourcing proposes that supplier opportunistic behavior may be contingent upon the ability of the firm to monitor supplier performance (Kaya and Ozer 2009, Eisenhardt 1985, Jensen and Meckling 1976). The ability to monitor supplier performance affects the costs of monitoring and enforcing the adherence to contractual terms (Williamson 1975, 1985, 2008), measuring outcomes, observing behaviors that lead to outcomes and subsequently the rewarding or punishment of performance (Eisenhardt 1985, Eisenhardt 1989, Jensen and Meckling 1976). Therefore, we would expect less outsourcing when it is difficult to monitor supplier performance because more intricate and costly control systems are to measure performance outcomes (Eisenhardt 1985). Thus we hypothesize that:

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H2: Managers prefer to decrease (increase) the percentage of outsourcing when supplier's performance is hard (easy) to monitor, ceteris paribus.

2.4 Moderating Effect of the Ability to Monitor Supplier Performance on Supplier Advantage

Supplier cost and quality advantage are important for establishing initial production costs, but they require monitoring as the supplier can under bid to win a contract then raise prices in renegotiation (Gray et al. 2012; Gray et al 2009a) or shirk on quality (Gray et al. 2011). The greater the inability in monitoring supplier performance or information asymmetry about a supplier's behavior, the more the threat of opportunism reduces the appeal of acquiring a supplier's advantage (Heide 2003) and acts to reduce outsourcing. In this case, managers can be expected to pursue more insourcing because the benefits of the planned allocation of production to the supplier may not be fully realized. However, we do not know if managers behave differently based on the type of supplier opportunism. The type of supplier opportunism may depend on cost (Williamson 1975, 1985) or quality (Kaya and Ozer 2009). For example, suppliers may misrepresent changes in their cost structure or cost advantage in order to opportunistically renegotiate contractual terms, while supplier quality advantage is ripe for shirking.

Moreover, the literature is also mixed as to whether or not managers may act differently when presented with different forms of opportunism. Gray et al. (2009a) suggests that managers when outsourcing may be overconfident and may neglect opportunism. This rationale is supported by the psychology literature, whereby managers may be overconfident in one domain (i.e., quality management) and not another (i.e., cost management) (West and Stanovich 1997). Accordingly, it is plausible that managers are prone to the illusion of control over certain supplier behaviors (i.e., quality shirking), but not others (i.e., opportunistic renegotiation). On the other hand, the dominant perspective--in the realm of economics--contends that managers will be concerned with opportunistic behavior whether it is opportunistic renegotiation *or* quality shirking (Eisenhardt 1985, Jensen and Meckling 1976). Accordingly, managers should prefer less outsourcing when the supplier's performance is difficult to monitor as there is less exposure to opportunistic renegotiation or quality shirking as the percentage of outsourcing decreases. At the same time, managers should choose a higher percentage of outsourcing when a supplier has an advantage and it is easy to monitor supplier performance because they believe that can

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capture the benefits of the supplier's advantage (Barney 1999). Hence the attractiveness of supplier cost or quality advantage is contingent upon the ability to monitor their performance.

More specific to supplier cost advantage, it is common for suppliers to bid below cost order to win a contract, and then to act opportunistically upon contract renegotiation because there is a *hold-up* due to asset specificity or high costs of switching (Aron, et al., 2005). The hold-up problem would lead managers to place effort in accurately assessing a supplier's cost advantage prior to outsourcing. Moreover, opportunistic renegotiation does not occur only at the beginning or end of a contract. Opportunistic renegotiation can occur anytime when there are high switching costs in a transaction and incomplete or unenforceable contracts (Williamson 1975, 1985). For example, a supplier that files for Chapter 11 bankruptcy protection is allowed to renegotiate its contracts, such as observed recently in the opportunistic renegotiation within the automotive industry. Moreover, renegotiation may occur without bankruptcy. For example, Ford received contract concessions without declaring bankruptcy (Dolan 2009, Ingrassia 2009). Ironically, these concessions were made in-part by threats not facts (Ingrassia 2009). Clearly, the actual facts may be more difficult to verify. Therefore, monitoring after entering into a contract can help the firm avoid being taken advantage of by opportunistic renegotiation by detecting real versus feigned changes in the supplier's production cost structure. Therefore, difficulties in monitoring supplier performance may result in higher costs due to renegotiation. Thus, we hypothesize that:

H3a: The positive relationship between supplier cost advantage and the percentage of outsourcing is reduced by the inability to monitor supplier performance.

Similarly, suppliers have incentives to offer high quality initially and then to allow quality to diminish over time (Roth, et al., 2008). In this case, suppliers may not benefit from continued investment in maintaining quality (Kaya and Ozer, 2009). Moreover, a supplier may not realize the impact of poor quality (e.g., reduced customer loyalty, increased warranty costs) (Deming 1986)--and unless the poor quality is detected and the supplier is held responsible, quality shirking may persist (Kaya and Ozer 2009). Hence, the supplier's quality advantage must be monitored for shirking behavior. Thus, we hypothesize that:

H3b: The positive relationship between supplier quality advantage and the percentage of outsourcing is reduced by the inability to monitor in supplier performance.

2.5 Bandwagon Pressure

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Bandwagon behavior occurs if managers base their outsourcing decisions on the observed behaviors of competitors. Bandwagon behavior may be considered rational if managers discern that there is a competitive advantage associated with the trend in the supply market (Porter 1985). However, managers will rarely know why a competitor made a particular decision. Thus, managers may jump on the bandwagon because they feel pressure to conform with the competitors' decisions. This conjecture is based on three related psychological mechanisms that explain, in part, why a manager may be influenced by bandwagon pressure to increase outsourcing including: 1) social pressure (Asch 1955), 2) communication of subjective information about the decision (Festinger 1950) and 3) social proof of the correct action (Cialdini and Goldstein 2004, Cialdini 2009). These perspectives indicate that the competition's action of outsourcing informs the manager about the acceptability of their choice. Peer opinion exerts social pressure on the decision maker to conform to the perceived peer group's norms (Asch 1955). "If everybody else is doing it," then the decision maker may believe their peers possess relevant information, which is unavailable to the decision-maker (Festinger 1950). Since a competitor's outsourcing behavior implies a belief that it is the correct outsourcing decision, a manager that makes the same choice as their peers has social proof of the "correctness" of their choice (Cialdini and Goldstein 2004). Moreover, the manager may reduce internal and external criticism of a given choice by imitating the competition. Thus:

H4: Managers prefer to increase the percentage of outsourcing when competing organizations prefer to increase outsourcing, ceteris paribus.

2.6 Moderating Effect of Bandwagon Pressure on Supplier Advantage

Supplier advantage may be enhanced by the presence of bandwagon pressure for several reasons (DiMaggio and Powell 1983, McNamara et al. 2008, Staw and Epstein 2000). First, popular management techniques (e.g., outsourcing), which are presumed to increase performance, may lead to increased imitation (Staw and Epstein 2000). Second, increasing outsourcing in order to gain some advantage is a fundamental premise of supply chain management (Barney 1999, Hayes et al. 2005)); therefore, institutionalized norms may exist that put pressure on managers to pursue supplier advantages (DiMaggio and Powell 1983). Third, managers may face competitive pressure to outsource to gain supplier advantage (Gray et al. 2009a, McNamara et al. 2008). Specifically, managers may feel pressure from coercion to follow the bandwagon if they assume

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everyone else is outsourcing to gain an advantage; therefore, they may feel a normative pressure since pursuing supplier that is what is expected of them or they may feel a mimetic pressure to imitate other firms' successes (DiMaggio and Powell 1983). In short, managers may be conforming because they "fear missing out on competitive opportunities that early adopters appear to be seizing" (McNamara et al. 2008, p. 116). Consequently, managers may overlook formal analyses of the risks and benefits associated with their decision and jump on the bandwagon (McNamara et al. 2008). For these reasons, the effect of supplier advantage on the percentage of outsourcing will be increased in the presence of bandwagon pressure. Thus we hypothesize that:

H5a: The positive relationship between supplier cost advantage and the percentage of outsourcing is increased by bandwagon pressure.

H5b: The positive relationship between supplier quality advantage and the percentage of outsourcing is increased by bandwagon pressure.

3. Research Methods

Our research questions require an examination of managerial decision-making processes. Experimentation is an ideal approach for such an examination since it allows for a high degree of control over data collection. Traditional laboratory experiments are, however, not appropriate for complex research questions such as ours, where the problem context requires subjects with specialized domain knowledge (Mantel et al. 2006, Rungtusanatham et al. 2011). Conversely, controlled field experiments are unlikely to yield a sufficient sample of managers since subjects would be hesitant to participate in manipulating real aspects of their operations or supply chains (Fisher 2007). Because of these challenges, a scenario-based role-playing experiment is well-suited for collecting data to examine our research questions (Rungtusanatham et al. 2011). Scenario-based role-playing experiments are widely accepted in general management research (Tomlinson et al. 2004) and marketing (Song and Zinkhan 2008). These types of experiments are gaining popularity in supply chain management research (Mantel et al. 2006, Sutcliffe and Zaheer 1998; Verma and Pullman 1998, Tangpong et al. 2010).

This study is the first to use a scenario-based role-playing experiment to examine differences in outsourcing decisions that can be attributed to supplier cost advantage, supplier quality advantage, ability to monitor supplier performance, and bandwagon pressure, while simultaneously considering the impact of differences in individual characteristics. In our

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scenario-based role-playing experiment, we manipulate supplier cost advantage, supplier quality advantage, and ability to monitor supplier performance as between-subject factors at two levels (HIGH versus LOW) and bandwagon pressure as a within-subject factor also at two levels (ABSENT versus PRESENT). The four-factors, repeated-on-three-factors design matrix is shown in Table 1.

Table 1 Design Matrix

Scenario	Between-	Within-subjects factor			
	Supplier Cost	Supplier	Ability to	Bandwagon pressure (BP)	
A	High	High	High	Absent	Present
B	High	High	Low	Absent	Present
C	High	Low	Low	Absent	Present
D	High	Low	High	Absent	Present
E	Low	Low	Low	Absent	Present
F	Low	High	High	Absent	Present
G	Low	High	Low	Absent	Present
H	Low	Low	High	Absent	Present

3.2 Subjects

Our target population comprises of experienced supply managers who have encounter outsourcing decisions. As such, we invited 440 Institute of Supply Management (ISM) members from 15 ISM Chapters throughout the United States to participate in the experiment; 353 accepted our invitation. Of the 353 subjects, 269 had prior sourcing experience, completed our experiment, and provided useable responses. However, of these 269 subjects, only six indicated having a doctorate degree. Given the small subset and the inability to draw inferences with respect to education because of this small number, we do not include these six subjects in our subsequent analyses³. Table 2, detailing the profile of the 263 subjects, reveals that these subjects are highly experienced, middle aged, predominantly male, well educated, employed across a variety of industries, and primarily from large firms.

Table 2 Sample Characteristics

	n	Percentage
Age		
Under 21	2	0.8
21-30	20	7.6
31-40	34	12.9
41-50	77	29.3
51-60	94	35.7
61-70	31	11.8

³ Notably, preliminary analysis of our respondents indicated that subjects with doctoral degrees had significantly different responses than those with master's degrees; and hence, could not be collapsed into a 'graduate' degree category. Assessing the influence of higher education on sourcing decision-making is a key area for future research

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Over 70	7	1.1
No response	2	0.8
Total	263	100.0
Gender		
Female	108	41.1
Male	155	58.9
Total	263	100.0
Education		
High School	21	8.0
Associate's degree	31	11.8
Bachelor's degree	123	46.8
Master's degree	88	33.5
Total	263	100.0
Number of employees (size)		
Under 250	52	19.8
Over 250-500	27	10.3
Over 500-750	20	7.6
Over 750-1000	11	4.2
Over 1000	153	58.2
Total	263	100.0
Industry		
Aerospace	29	11.0
Automotive	20	7.6
Consumer Products	18	6.8
Hi-Tech	15	5.7
General Manufacturing	50	19.0
Pharmaceutical	11	4.2
Other	120	45.6
Total	263	100.0
Work experience	Mean (Median)	Std. Dev.
Years of sourcing experience	15.3 (14.0)	9.7
Total years of work experience	25.8 (25.0)	11.0

3.4 Analytical Method

The analytical method employed is a function of experimental design and characteristics of our data. To control for possible influences from a manager's individual characteristics (i.e., education, gender, and years of sourcing experience) or employment characteristics (I.e., industry, firm size) mitigate the bandwagon effect we designed our experiment with a repeated measures of a subject's outsourcing decision both when bandwagon pressure is absent and then again when it is present. These two observations of the outsourcing decision are likely to be correlated because they share a common source of variability, the specific manager. As a result

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of this, we are likely to violate the independence of residuals assumption used in standard regression analyses. We statistically test for this assumption by examining the degree of nesting or intraclass correlation coefficient (ICC). We find, as expected, that the residuals are highly correlated within-subjects (ICC=0.82, $p < 0.001$). Not accounting for correlated residuals inflates Type I error rates (Cohen et al., 2003). Moreover, our subjects are randomly drawn from a population of managers and may have random variations in outsourcing, suggesting a potential violation of the homogeneity of variance assumption of standard regression.

Linear mixed modeling (LMM) or a two-stage random effect model accounts for violations with respect to the independence of residuals and the homogeneity of variance. LMM explicitly models (see Equation 1) for random variability due to differences in managers and correlated errors of their repeated outsourcing decisions. As a result LMM accurately predicts estimates of our hypothesized relationships (see Equation 2) or fixed effects, which are exactly like regular regression coefficients in that they are a single or ‘fixed’ parameter estimate that applies to all managers (Cohen et al. 2003).

3.4 Analytical Model

We use notation consistent with Cohen et al. (2003) to analytically model the random effects or variability introduced by subjects in our experiment (see Equation 1), the fixed effects or population estimates of the parameters of subject-level predictors (Supplier Cost Advantage: SCA, Supplier Quality Advantage: SQA, Ability to Monitor Supplier Performance: DMSP, Gender: GDR, Education: ED, Years of Sourcing Experience: YSE, Firm size, and Industry), the interactions of subject-level predictors (SCA x DMSP, SQA x DMSP, SCA x SQA, SCA x SQA x DMSP), “repeated measures level” fixed predictors (BP) and the fixed interaction between level 1 and 2 predictors (BP x SCA, BP x SQA, BP x DMSP, BP x SCA x SQA, BP x SCA x DMSP, BP x SQA x DMSP, BP x SCA x SQA x DMSP, BP x GDR, BP x ED, BP x YSE) as seen in Equation 2. The Level 1 (repeated measures level) equation can therefore be written as:

$$y_{ij} = B_{0j} + r_{ij} \quad (\text{Equation 1})$$

Whereas the Level 2 (subject level) equation can be written as:

$$B_{0i} = \gamma_{00} + \gamma_{01}(\text{Firm size } i) + \gamma_{02}(\text{Firm} \\ + \gamma_{03}(\text{YSE}_i) + \gamma_{10}(\text{BP}) + \gamma_{11}(\text{BP} \times \text{SCA}_i) + \gamma_{12}(\text{BP} \times \text{SQA}_i) + \gamma_{13}(\text{BP} \times \text{DMSP}_i) \quad (\text{Equation 2})$$

The repeated measure within a manager, i , is observed twice in our experiment; hence $i = \{1 \text{ or } 2\}$. Subjects are denoted by $j = 1, 2, 3, \dots, 263$. Dummy variables were created for Industry where 1= Aerospace, 2= Automotive, 3= Consumer products, 4= Hi-Tech, 5= General

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Manufacturing, 6= Pharmaceutical and 7= Other. “Other” is the omitted group. Dummy variables were created for Firm size where 1= Under 250, 2= Over 250-500, 3= Over 500-750, 4= Over 750-1000, 5= Over 1000. “Over 1000” is the omitted group. Dummy variables were created for education where 1=High School, 2= Associate’s degree, 3= Bachelor’s degree, 4= Master’s degree. “Master’s degree” is the omitted group.

We use maximum likelihood (ML) estimation to iteratively estimate the parameters from equation 1 and 2. We implement our analyses of these equations in Stata 10 making use of the “xtmixed” command and the Newton-Raphson algorithm. We use the Newton-Raphson algorithm as it allows for an asymptotic estimate of standard errors and covariance parameters using the observed Hessian matrix, while the alternative expectation-maximization (EM) algorithms are known to provide optimistic estimators (Lindstrom and Bates 1988). In addition, we confirm our results using the Proc Mixed command in SAS 9.1.3 using the Newton-Raphson algorithm.

4. Experimental Checks

We assess convergent and divergent validity by performing manipulation checks. To assess discriminate validity, we performed a confound checks (Wetzel 1977). In addition we look for possible artifacts of our experimental method by examining our data for signs of demand characteristics or systematic and uncontrolled cues may bias subject responses (Rosenthal and Rosnow 1991). Lastly, we perform a realism check where subjects were asked to respond to a set of questions developed by Pilling et al. (1994) to assess the extent to which the scenarios depicted realistic context and issues.

5. Results

Table 6 provides a summary of the predictions and results. We estimate our hypothesized linear mixed model using maximum likelihood estimation. We report a summary of the statistical results from Stata in Table 7.

5.1 Direct Effects of Supplier Cost and Quality Advantage

H1a and H1b state that managers will prefer to outsource more when the contract manufacturer has a production advantage over internal manufacturing operations. In order to test our hypotheses, we must first examine if H1a-b explain a significant amount of the model variance. As posited parameter estimates, depicted in Table 3, suggest that managers may indeed increase the percentage of outsourcing to suppliers with a cost or quality advantage. Simply put

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managers, on average, pursue more outsourcing when a contract manufacturer has a cost advantage the ($\gamma_{0,11} = 17.39, p < 0.01$). Similarly, managers, on average, pursue more outsourcing when a contract manufacturer has a quality advantage ($\gamma_{0,12} = 23.65, p \leq 0.01$). Taken together, our findings support conventional wisdom in operations strategy, as advocated by the resource-based view (Barney 1999, Leiblein and Miller 2003). Namely, managers pursue outsourcing because the supplier provides some production advantage. Since it is evident that managers weigh the suppliers cost and quality advantage when deciding how much to outsource, we evaluate in the next section the conditional effects of the ability to monitor by examining their interactions with the ability to monitor supplier performance as well as bandwagon pressure.

Table 6 Summary of Predictions and Results

Hypothesis	Results
H1a: Managers prefer to increase the percentage of outsourcing when a supplier has a cost advantage.	Supported
H1b: Managers prefer to increase the percentage of outsourcing when a supplier has a quality advantage.	Supported
H2: Managers prefer to decrease (increase) the percentage of outsourcing when supplier's performance is hard (easy) to monitor.	Not supported
H3a: The positive relationship between supplier cost advantage and the percentage of outsourcing is reduced by the inability to monitor supplier performance.	Supported
H3b: The positive relationship between supplier quality advantage and the percentage of outsourcing is reduced by the inability to monitor supplier performance.	Not supported
H4: Managers prefer to increase the percentage of outsourcing when competing organizations prefer to increase outsourcing.	Supported
H5a: The positive relationship between supplier cost advantage and the percentage of outsourcing is increased by bandwagon pressure.	Not supported
H5b: The positive relationship between supplier quality advantage and the percentage of outsourcing is increased by bandwagon pressure.	Supported

5.2 Monitoring and Outsourcing Behaviors

5.2.1 Does Monitoring Influence the Percentage of Outsourcing?

H2 predicts that managers will allocate the percentage of production that is outsourced in part due to the ability to monitor contract manufacturer performance. Upon examining the parameter estimate ($\gamma_{0,13} = 1.86, p > 0.05$), we find evidence that does not support H2. Gray et al.'s (2009a) speculation that managers are overconfident about their ability to control supplier opportunism may be correct as our finding suggests that managers, on average, may not be concerned with supplier opportunism. Theory indicates that this finding may be a result of managers being overconfident in their firm's ability to detect supplier malfeasance and neglecting increased transaction costs resulting from increased risks costs of contracting and monitoring costs associated with supplier dependence. Nonetheless, this managerial behavior invites the unintended consequence of an increased likelihood of undetected supplier opportunism. In short,

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this finding suggests managers are complacent and suppliers may benefit by pursuing opportunistic behavior.

Table 7 Factors Influencing Outsourcing

Variable	Model		
	Coefficient	Estimate ^a	Std. error
Intercept	γ_{00}	27.54**	5.00
Firm size ^b Under	$\gamma_{0,1}$	-0.79	3.52
Over	$\gamma_{0,2}$	-2.19	4.56
Over	$\gamma_{0,3}$	3.40	5.14
Over	$\gamma_{0,4}$	-3.57	6.70
Industry ^c	$\gamma_{0,5}$	-1.32	4.39
Automoti	$\gamma_{0,6}$	2.39	5.07
Consume	$\gamma_{0,7}$	2.14	5.30
Hi-Tech	$\gamma_{0,8}$	-15.55**	5.91
General	$\gamma_{0,9}$	-0.92	3.78
Pharmac	$\gamma_{0,10}$	6.48	6.60
Supplier Cost	$\gamma_{0,11}$	17.39**	5.50
Supplier Quality	$\gamma_{0,12}$	23.65**	5.49
SCA x SQA	$\gamma_{0,13}$	0.79	7.89
Ability to Monitor	$\gamma_{0,14}$	1.86	5.52
AMSP x SCA	$\gamma_{0,15}$	20.94**	7.72
AMSP x SQA	$\gamma_{0,16}$	2.53	7.90
AMSP x SCA x	$\gamma_{0,17}$	-9.30	11.16
Gender (GDR)	$\gamma_{0,18}$	2.25	2.89
Education^d	$\gamma_{0,19}$	-0.12	5.65
(ED ₂ =	$\gamma_{0,20}$	0.44	4.87
(ED ₃ =	$\gamma_{0,21}$	-4.60	3.24
Years Sourcing	$\gamma_{0,22}$	-0.19	0.14
Bandwagon	$\gamma_{1,0}$	8.94**	3.36
BP x SCA	$\gamma_{1,1}$	1.76	3.85
BP x SQA	$\gamma_{1,2}$	0.07	3.87
BP x AMSP	$\gamma_{1,3}$	-0.39	3.91
BP x SCA x SCQ	$\gamma_{1,4}$	-1.85	5.51
BP x SCA x AMSP	$\gamma_{1,5}$	-0.71	5.46
BP x SCQ x AMSP	$\gamma_{1,6}$	-0.41	5.55
BP x SCA x SCQ	$\gamma_{1,7}$	1.23	7.78
GDR x BP	$\gamma_{1,8}$	-3.57†	2.02
ED₁ x Bp^e	$\gamma_{1,9}$	-1.59	3.89
ED₂ x Bp^e	$\gamma_{1,10}$	-2.50	3.34
ED₃ x Bp^e	$\gamma_{1,11}$	-0.07	2.24
YSE x BP	$\gamma_{1,12}$	-0.25*	0.10
Residual (variance)			122.34**
Random Intercept			360.05**
R ₁ ²			42.23 ^f
- 2 Log Likelihood			4736.38** ^f
N ₁			263
N ₂			2
N _{effective}			289

*p ≤ 0.05; **p ≤ 0.01; †p ≤ 0.10.

Bold indicates

^a Unstandardized estimates

^b Firms Over 1000 employees is the omitted group.

^c Other is the omitted group.

^d Master's degree is the omitted group.

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^e The interaction between Master's degree and Bandwagon Pressure is the omitted group.

^f The null model used in calculations includes firm size and industry predictors.

These findings suggest that there may be a managerial bias for selective cost monitoring, when the supplier has a cost advantage. Moreover, the bias may be rational, the greater percentage of outsourcing the greater the exposure to opportunistic renegotiation. Therefore we would rationally expect the percentage of outsourcing to be used as a governance mechanism to control costs and risks. Moreover, these findings are also consistent with agency theory (Eisenhardt 1985, Jensen and Meckling 1976) and suggest that managers do not exhibit overconfidence in their firm's ability to monitor and control a supplier's cost advantage.

Figure 2 Interaction of the Ability to Monitor Supplier Performance and Supplier Cost Advantage

5.2.3 Are Managers Concerned with Quality Shirking?

H3b states that managers will be concerned with monitoring the supplier's quality advantage for shirking behavior. We test this hypothesis by looking at the interaction between the ability to monitor supplier performance and supplier quality advantage. We find that the interaction does not explain a statistically significant amount of variance in the percentage of outsourcing ($F=0.17, p > 0.10$); therefore, we reject H3b. In other words, the relationship between the supplier's quality advantage and the percentage of outsourcing does not depend on the ability to monitor the supplier's performance. This finding may, in part, be attributed to manager's overconfidence assuming that a supplier's quality will not change when monitoring is difficult, which is consistent with Gray, et al. (2012). Managers may believe that their firm can manage supplier quality (e.g., be able to detect any change without effort or that the supplier won't shirk on quality). In short, if managers believe they can manage supplier quality without monitoring, they may be overestimating their firm's ability to detect changes in supplier behavior. Conceivably, managers may be overconfident because their beliefs are miscalibrated (Kahneman et al. 1999). Another possible source of managerial overconfidence is the *fallacy of initiative* (Tversky and Kahneman 1973), where managers may attribute less opportunistic behavior to contract manufacturers because they believe them to have less initiative to act opportunistically. In addition, we speculate managers may be treating quality as an order qualifier and treating cost as an order winner by neglect the monitoring of supplier quality advantage because they are placing an emphasis on the suppliers cost advantage. Yet, by failing to consider the ability to monitor the

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supplier's quality advantage managers may be inadvertently increasing quality risks and agency costs.

5.3 Do Managers Outsource More When Facing with Bandwagon Pressure?

H4 asserts that managers facing bandwagon pressure will outsource more. Examining the parameter estimate, we find a significant and positive relationship between bandwagon pressure and the percentage of outsourcing ($\gamma_{1,0} = 8.94$, $p \leq 0.01$) supporting H4. Our finding adds a subtle nuance to the prevailing view that supply chain decisions are influenced by the actions of the competition (Hayes et al. 2005, Porter 1980). The prevailing view suggests that managers should assess their new competitive position, prior to make a decision. Our operationalization of bandwagon pressure was simply to tell the managers that competitors were outsourcing, nothing more nothing less. We do not say why the competition is outsourcing, which we believe is consistent with practice⁴. Managers are left to speculate as to the rationale behind the decision as well as what the news means for their competitive position. This ambiguity may contribute to managers looking to the competition for the right course of action (Cialdini 2009). In real world outsourcing situations, managers may be ignorant of what the right decision is to make and thus follow "the rest of the crowd" assuming that the competition is better informed. Ironically, 'the rest of the crowd' may be ignorant as well. This pluralistic ignorance can cause bandwagon behavior (Cialdini 2009). Additionally, conformity or joining the outsourcing bandwagon has several psychological benefits for managers. First, it provides social proof the right course of action and may reduce criticism if the choice turns out poorly (Cialdini 2009). Second, conformity diffuses responsibility for the decision (Cialdini and Goldstein, 2004). Third, and finally, managers that conform may have a positive assessment of their decision and subsequently feel better about their choice (Cialdini and Goldstein, 2004).

5.3.1 Does the Effect of Bandwagon Pressure Enhance the Suppliers Cost or Quality Advantage?

H5a-b state that the relationship between supplier advantage and the percentage of outsourcing will increase when bandwagon pressure is present. In other words managers will find supplier cost or quality advantage more appealing when faced with bandwagon pressure. An alternative interpretation of the interaction is supplier advantage may increase bandwagon pressure's

⁴ News articles or firm financial reporting of outsourcing seldom mention anything beyond improved performance or competitive position.

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relationship with outsourcing. We do not find evidence for either H5a ($F= 0.16, p > 0.10$) or H5b ($F= 0.14, p > 0.10$), as the interaction between bandwagon pressure and supplier cost advantage does not explain a statistically significant amount of the variance in the percentage of outsourcing. Failure to support H5a is counter to the popular notion that managers are jumping on the bandwagon to pursue low cost manufacturing. Similarly, failure to find support for Hypothesis 5b suggests managers are not increasing their outsourcing because they are feeling bandwagon pressure with regard to quality. Rejection of Hypothesis 5a and 5b, taken together, indicates that managers may not be jumping on the bandwagon because of supply market factors and pursuit of competitive advantage, as suggested by Gray, Roth and Tomlin (2009). Rather the bandwagon has a direct effect on outsourcing. This direct relationship indicates that managers may be conforming and looking to the competition (or speculating about what the competition is doing) for the right thing to do irrespective of their firm's specific situation; therefore, our study suggests that the bandwagon effect reflects a psychological phenomenon (e.g., social proof) (Cialdini 2009). Moreover, additional support for this interpretation would be provided if individual decision maker characteristics influence bandwagon pressure. We examine these characteristics below.

5.4 Do Decision-Maker Characteristics Relate to the Percentage of Outsourcing?

5.4.1 Does Gender Matter?

We control for the possibility that gender may influence the decision to outsource. Our results indicate that men do not outsource more than women ($\gamma_{0,18} = 2.25, p > 0.10$). While men tend to be more risk taking (Byrnes et al. 1999), may have different perceptions of risks (Gustafson, 1998) or may have different motives than women (Atkinson 1957), our decision-making context may play a role in the lack of a direct gender effect on outsourcing (Eckel et al. 2008). Managers may receive professional socialization (i.e., March 1994) and this indoctrination may occur regardless of gender. This managerial socialization process may influence attitudes conceptions and perceptions of risk (March and Shapira 1987). If true, this explanation suggests that managerial socialization may play an important role in outsourcing. As such, we suggest that this finding merits future examination.

5.4.2 Do More Educated Managers Outsource More?

We control for the possibility that higher level of education may be positively related to the percentage of outsourcing. We find that education does not explain a significant amount of the

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variability in the percentage of outsourcing ($F= 1.23, p > 0.05$). Education may not play as large of a role because our sample has a meaningful amount of experience, and managers have “learned by doing.” Also, our finding may be an artifact of our sample because the majority of our sample has either a bachelor’s ($n=106$) or master’s degree ($n=75$).

5.4.3 Does Experience Help?

We control for the possibility that experienced managers may outsource less. We do not find support for this control, as ($\gamma_{0,18} = -.019, p > 0.10$). This lack of association may be due to our sample, which is predominantly moderate to highly experience in the sourcing domain. Alternatively, it is possible that managers develop expertise through “training” activities and not necessarily through experience alone (Camerer and Johnson 1991).

5.5 Do Individual Characteristics Enhance or Mitigate the Effect of Bandwagon Pressure?

5.5.1 Does Gender Influence Bandwagon Pressure’s Effect?

The relationship between bandwagon pressure and the percentage of outsourcing may be influenced by gender. Specifically, men will be influenced less by bandwagon pressure to increase outsourcing than women, see Figure 3. We find weak support for this control ($\gamma_{1,8} = -3.57, p \leq 0.10$). When we compare the estimated means we find male managers outsource less due to bandwagon pressure. There are two possible explanations for this finding: group orientation and self-esteem. First, women are in general more likely to be persuaded by group views and conform to group pressure (Eagly and Carli 1981) (i.e. bandwagon pressure); however, the size of the influence may depend on contextual factors. Particularly, women may conform more when in group situations as women are more oriented towards creating and maintaining interpersonal harmony, than men (Eagly 1978). This weak finding may be due to the fact that the decision was allowed to be made anonymously and privately. Consequently, these differences may be larger in a public or group decision-making situation where bandwagon pressure may be more direct. Second, men tend to have higher self-esteem (Fiengold 1994), which could influence their belief in the ‘correctness’ of their initial outsourcing decision, and hence, they are resistant to modifying it.

With that said it is worth mentioning that male managers start outsourcing more to being with than female managers ($p \leq 0.10$); however, with bandwagon pressure women attain about the same levels as their male counterparts. This finding suggests that women may be less risk taking

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to start off with, but when they observe competitors outsourcing they end up taking the same risks as men.

Figure 3 Interaction of Gender and Bandwagon Pressure

5.5.2 Does Education Mitigate Bandwagon Pressure's Effect?

The relationship between bandwagon pressure and the percentage of outsourcing will be reduced by increasing education. We find that the interaction between education and bandwagon pressure does not explain a statistically significant amount of the variance in the percentage of outsourcing ($F = 0.24$, $df = 3$, $p > 0.10$). We suggest that education may not reduce bandwagon pressure's effect for two reasons. First, the education level in our sample has a restriction in range; therefore, confidence differences due to education may be small. Second, experience may influence decision-maker confidence. The effect of experience on confidence may overshadow the role that education may play in this context.

5.5.3 Does Experience Mitigate Bandwagon Pressure's Effect?

The relationship between bandwagon pressure and the percentage of outsourcing will be reduced by increasing sourcing experience. We find the interaction between the years of sourcing experience and bandwagon pressure does explain a statistically significant amount of the variance in the percentage of outsourcing. Managers with more experience outsource due to bandwagon pressure at a smaller rate than those with less experience ($\gamma_{1,12} = -0.25$, $p \leq 0.05$). We plot the interaction effect as seen in Figure 4. Notably, highly experienced managers or managers with 26 years of sourcing experience are less affected by bandwagon pressure, than less experienced managers, who have only 5.6 years of sourcing experience. This finding suggests that experience can substantially reduce, but not eliminate the effects of bandwagon pressure. Arguably, the reduction in the effect of bandwagon pressure on the percentage of outsourcing is due to differences in confidence and uncertainty about the decision. As experience increases individuals tend to become more confident in their decisions (Griffin and Tversky 1992, Heath and Tversky 1991). This increased confidence leads to a decrease in the reliance on social proof (Cialdini 2009) because the manager believes he already made the right choice. Similarly, managers with more experience may be more knowledgeable or have greater expertise. This greater level of knowledge may allow managers to be more discerning (Simon

and Chase 1973); and in turn, they may determine that in this context the information provided by bandwagon pressure is not relevant to their decision.

Figure 4 Interaction of Sourcing Experience and Bandwagon Pressure

5.6 Do Employment Characteristics Effect the Percentage of Outsourcing?

As stated earlier, we control for employment characteristics of the decision maker that may influence the decision with the percentage of outsourcing. We controlled for the manager's current size of the firm and industry where the manager is employed. We find that firm size does not play a role as Firms Under 250 employees ($\gamma_{0,1} = -0.79, p > 0.10$), Over 250-500 ($\gamma_{0,2} = -2.19, p > 0.10$), Over 500-750 ($\gamma_{0,3} = 3.40, p \leq 0.10$) and Over 750-1000 ($\gamma_{0,4} = -3.57, p > 0.10$). do not differ in outsourcing from firms with Over 1000. Similarly, we find that industry, in general, does not significantly influence outsourcing save for one, the high technology industry ($\gamma_{0,8} = -15.55, p \leq 0.01$). We speculate that this may be because knowledge and learning are an integral part of this industry and that outsourcing may diminish their knowledge or learning (Pisano and Shih 2009); hence, these managers prefer to retain in-house manufacturing. This finding, while not central to our study, is interesting for future research.

6. Discussion and Limitations

Our findings suggest that managers may be overconfident when monitoring supplier quality advantage is difficult when contrasted with supplier cost advantage. As a result, excessive outsourcing may be occurring⁵. This contradictory finding suggests that managers are concerned with supplier opportunistic renegotiation but not quality shirking. Nonetheless, managers should clearly be concerned with both because they both influence cost or risk. To the extent that suppliers are inherently effort adverse (Jensen and Meckling 1976), they will shirk unless monitored. We believe there are several possible explanations that may explain this contradictory finding. First, managers may be overconfident about their ability to control supplier quality (Gray et al. 2009a), but not cost. Overconfidence may be a result of miscalibration in beliefs (Kahneman, et al. 1999). Specifically, managers may believe quality is ubiquitous or easy to control. The proliferation of quality management literature, systems and certification standards (e.g., ISO) may contribute to this misperception. However, quality varies greatly even when

⁵This interpretation is supported by Camerer and Lovallo (1999) who found that overconfidence may promote excess entry into competitive games or markets.

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similar quality systems are in place (Gray et al. 2011) or the same quality standards are implemented (Sroufe and Curkovic 2008). Any of these causes individually or a combination of causes may explain why managers are overconfident in their ability to monitor or control supplier quality advantage but not cost advantage.

Second, this miscalibration of cost and quality beliefs may be the result of myopic learning. The supplier actions based on cost opportunism (i.e., contract renegotiation) may provide feedback that is immediate and unambiguous outcomes (i.e., reduced profits). To the contrary, supplier actions based on quality opportunism (i.e. quality shirking) may be time lagged and have ambiguous outcomes (decreased customer satisfaction, increased warranty costs and product recalls). Levinthal and March (1993) report that learning is biased towards immediate and unambiguous outcomes, whereas it is difficult to learn when the cause-effect relationship is lagged.

Third, cost opportunism may be more available in memory than quality opportunism. Thus, cost may be more memorable because of the aforementioned learning, as well as from their performance evaluations and incentive systems. Managers are evaluated and promoted in part on their job performance. It is commonly believed that managers are more likely to be evaluated on their performance in terms of short-term costs not total delivered costs may include the lagged costs of poor quality from suppliers. Moreover, incentive systems may reemphasize short-term cost performance over long-term total costs. For these reasons, supplier cost opportunism may be more memorable than supplier quality opportunism. Tversky and Kahneman (1973, pg. 232) suggest that: "Continued preoccupation with an outcome may increase its availability, and hence, it's perceived likelihood." In other words, because cost is more memorable, managers may believe that supplier cost opportunism is likely to occur, than supplier quality opportunism. As result, managers choose to monitor cost but not quality.

Regarding bandwagon pressure, our findings indicate that conformance is not driven by the pursuit of supplier cost or quality advantage. Instead, bandwagon pressure appears to have a systematic effect where managers imitate what the competition is doing. This suggests bandwagon pressure may be a psychological phenomenon instead of an institutional one. Significant interactions between bandwagon pressure and gender as well as sourcing experience support this interpretation. Moreover, it suggests that managers may assume the competition knows what the right decision is, hence they conform (Cialdini 2009). Ironically, managers that

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conform to bandwagon pressure may evaluate their outsourcing decision performance as better when they are following the crowd (Cialdini and Goldstein 2004, Cialdini 2009); however, actual perform may be worse because they are later adopters (McNamara, et al., 2008) or efficiency is reduced (DiMaggio and Powell 1983). Moreover, managers may not be aware that they are influenced by bandwagon pressure (Cialdini and Goldstein 2004).

Thus, managers may systematically increasing risk because they are joining the bandwagon and overconfident about their ability to control quality. Our findings suggest that buyer behaviors may have unintended consequences for the buyer-supplier relationship. Specifically, the buyer by being overconfident and failing to monitor supplier quality advantage may create a perverse incentive where the supplier may benefit more from quality shirking. Additionally, managers that think they can control quality or that are joining the bandwagon may be the cause of adverse selection. This is contrary to the traditional view (Akerlof 1970) that the supplier's hidden information causes adverse selection as managers may ignore supplier information when making their choice. In contrast, the buyer may make decisions that do not have firm's best interests in mind and consequently increase costs.

Lastly, we contribute by identifying two important individual characteristics of the managers that may also influence the relationship between bandwagon pressure and outsourcing: gender and years of sourcing experience. Specifically, inexperienced managers are more vulnerable to bandwagon pressure and male managers may be more resistant to bandwagon pressure than women. These characteristics inform firms as to how to mitigate the effects of bandwagon pressure and may have human resource implications. First, firms should assign more experienced managers when a decision may involve bandwagon pressure. Second, team-based decisions with gender diversity may mitigate the influence of bandwagon pressure. Third, both findings suggest that a firm with a system that reviews outsourcing decisions and provides performance feedback may improve decision-making.

Given our results, the biases introduced by bandwagon pressure, overconfidence and individual characteristics may be reduced by counterfactual thinking (Kahneman 1995). Take for example, the managerial interventions: First, by identifying instances where a higher or lower percentage of outsourcing does not make sense managers may be able to identify underlying assumptions or gain insights into their current decision. Second, firms can require that alternative supplier assessment occur, one where the suppliers are evaluated holistically and

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another where attribute based evaluation strategies are implemented. Evaluating potential suppliers in these two different ways has two primary benefits. (1) Reevaluating the contract manufacturer from different frames may offer different insights and convergent validity. (2) Considering alternative-based evaluation and attribute based evaluation are complementary. Evaluating every alternative requires high cognitive attention (Hastie and Dawes 2010), so important details (i.e., quality) may be overlooked. Conversely, attribute-based evaluation defines attributes a priori (e.g., cost and quality) making sure that important details are evaluated but often results in narrower search for information (Hastie and Dawes 2010).

As with any empirical study, ours is not without limitations. First, we examine individual manager decisions. These decisions may not be indicative of organizational behavior as organizational processes may mediate the relationship between the individual manager's decision and the organization's decision. Behavioral operations would indicate that the manager's decisions or recommendations will weigh heavy in their organization's decision-orientation. Future research is needed regarding organizational processes and decision shaping. Second, we do not explicitly link overconfidence or bandwagon pressure to organizational outcomes. While the literature is clear that overconfidence (Malmendier and Tate 2005, Malmendier and Tate 2008) and joining the bandwagon (McNamara et al. 2008, Staw and Epstein 2000) tend to lead to negative organizational outcomes, the extant literature does not examine overconfidence or bandwagon pressure within supply markets or more specifically outsourcing. Therefore, we cannot conclude that either overconfidence or bandwagon result in poor performance. Each of these limitations is an opportunity for future research. We suggest that in the future researchers tie overconfidence and bandwagon pressure to organizational outcomes and performance.

7.0 Conclusions

Our experimental results, taken together, suggest that managers increased outsourcing due to bandwagon pressure and prospective overconfidence, and consequently, may inform from a behavioral perspective what Anderson and Parker (2002) call an *outsourcing trap*. Furthermore, the deleterious effects of overconfidence and bandwagon pressure have been hypothesized to be major and irrational causes of both stock market and housing bubbles (Shiller, 2005). Using these analogies, this study provides the first empirical evidence that similar behavioral operatives may be creating an *outsourcing bubble*, with significant ramifications for supply chain structure. Many companies have moved production to suppliers that are difficult to monitor, yet

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nonetheless remain confident about their ability to know what the suppliers is doing (Harney 2008, Roth et al., 2008). Both supply chain management theory (Eisenhardt 1989, Williamson 1985) and case study observations (Harney 2008, Roth et al., 2008) suggest suppliers will shirk when the buyer is unable to monitor supplier performance.

While not specifically addressed in this paper, many of the touted benefits associated with outsourcing to suppliers in low cost countries are diminishing, as costs rise due to increased complexities of outsourcing and offshoring (Gray et al. 2011), and a myriad of operational malfeasances come to light. While low cost countries provide an attractive price tag, the cost of shirking, poaching of intellectual property and contract renegotiations may eclipse the benefits of outsourcing (Harney 2008). Nonetheless, many companies be joining the offshoring-outsourcing bandwagon (Gray, et al. 2009a, Levine 2011); and the unintended consequences may be eroding manufacturing country and firm-level competitiveness. We believe future research on offshore outsourcing is needed to study this issue. Nonetheless, even with pure outsourcing, the bandwagon pressure and overconfidence may be irrationally increasing supply costs and risks.

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