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Information Asymmetry in Management Research: Past Accomplishments and Future Opportunities

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Information asymmetry is a condition wherein one party in a relationship has more or better information than another. The information asymmetry concept is widely diffused throughout management research, and its existence is a core assumption within leading theories on organizations. Despite information asymmetry's central role, however, there have been no systematic reviews of the management literature using the concept. As a result, there is no established level of knowledge of information asymmetry as a management concept, nor is there a unified basis for directing future research leveraging the concept. In response, we review 223 relevant articles from leading management journals and develop a framework for organizing and assessing information asymmetry research. We consolidate understanding of information asymmetry's meaning, conceptual applications, roles in different theoretical models, antecedents, and how focal actors' self-interests influence the selection of mechanisms for managing it. Further, we highlight opportunities for extensions to core management theories and specify research prospects within several management subfields. Overall, the framework can help guide researchers as they work to advance understanding of one of the management field's most ubiquitous concepts.

Keywords: *information asymmetry; asymmetric information; information impactedness*

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Information asymmetry—a condition wherein one party in a relationship has more or better information than another (Akerlof, 1970)—is a cornerstone of management research. The concept is central to subfields such as strategic management (e.g., Bergh, Johnson, & DeWitt, 2008), corporate social responsibility (e.g., McWilliams, Siegel, & Wright, 2006), human resource management (e.g., Gomez-Mejia & Balkin, 1992), organization behavior (e.g., Brodbeck, Kerschreiter, Mojzisch, & Schulz-Hardt, 2007), organization theory (e.g., Paruchuri & Misangyi, 2015), international business (e.g., Cuypers, Ertug, & Hennart, 2015), and entrepreneurship (e.g., Eckhardt & Shane, 2003). The challenges and opportunities created by information asymmetries are foundational elements of many theories, including agency theory (Jensen & Meckling, 1976), transaction cost economics (Williamson, 1975), resource-based theory (Barney, 1991), institutional theory (DiMaggio & Powell, 1991; Zucker, 1987), resource-dependence theory (Pfeffer & Salancik, 1978), and signaling theory (Spence, 1973).[1]

Given information asymmetry's ubiquity, it is surprising that no comprehensive review of the concept and its surrounding literature is offered in extant management research. Lacking systematic assessment, the field has no established level of knowledge of information asymmetry as a management concept. Instead, understanding of information asymmetry is based on isolated subfields and different theories, interpretation and application of the concept are vulnerable to inconsistencies, and there is no unified basis for directing future research. Further, the management field currently has no foundation for synthesizing findings across studies or for offering best practices for future investigations. Without baseline knowledge of the current use of information asymmetry in management research, scholars face ambiguity on how to define, apply, interpret, and further develop knowledge of and about the concept. Such a situation impedes progress surrounding theories that incorporate information asymmetry.

In this review, we organize management research on information asymmetry into an integrative framework. This framework highlights antecedents and conditions that give rise to information asymmetry, captures the diversity of how information asymmetry has been applied theoretically and the roles it plays in theoretical models, identifies the mechanisms used to manage information asymmetry, and describes how focal actors' self-interests might influence the selection of a resolution mechanism for managing information asymmetry. Using the framework, we review the current state of knowledge on information asymmetry, and we provide recommendations for advancing future research on the concept. Specifically, we offer suggestions for developing a comprehensive understanding of the concept, discuss how information asymmetry can be used to expand extant theories, and identify new research opportunities in several management subfields.[2] Additionally, as information asymmetry plays a role in multiple theories, we suggest that it could serve as a linchpin for connecting those theories in the pursuit of new conceptual synergies.

A Review of Past Accomplishments

Because the information asymmetry concept originated within economics, we first captured its initial formulation and development by searching leading economics journals, like the *Quarterly Journal of Economics, American Economic Review*, and the *Review of Economic Studies*. We also traced the works of seminal contributors (e.g., Akerlof, 1970; Arrow, 1963; Spence, 1973; Stiglitz, 2002; Williamson, 1975, 1985, 2005) from their initial formulations to their reflections on the concept. We used this initial step to ascertain the evolution of information asymmetry within its original literature, devoting special attention to its definitions, conceptual properties, derivations, explanations, antecedents, and resolutions.

Drawing from these findings, we then examined how information asymmetry has been incorporated within management research. Given the vast volume of research on and about the concept both within management and in allied fields, like accounting, economics, entrepreneurship, finance, human resource management, and international business, we restricted our search to quantitative, qualitative, and theoretical works within six leading management journals: *Academy of Management Journal* (*AMJ*), *Academy of Management Review* (*AMR*), *Administrative Science Quarterly* (*ASQ*), *Journal of Management* (*JM*), *Organization Science* (*OS*), and *Strategic Management Journal* (*SMJ*). These journals previously served as sources for reviews of topics like acquisitions (Haleblian, Devers, McNamara, Carpenter, & Davison, 2009), organizational configurations (Short, Payne, & Ketchen, 2008), and the upper-echelons perspective (Carpenter, Gelatkanycz, & Sanders, 2004). While these six journals are "big tent" outlets, we acknowledge that many articles on information asymmetry appear in other credible journals in management and in allied fields. The boundaries of our search thus create limitations on the content and implications of our review while also suggesting opportunities for examining the generalizability of our findings beyond the journals we assessed.

We searched the six journals using ABI/Inform, JSTOR, Wiley, and Google Scholar from their inception through 2017 using the terms *information asymmetry, information asymmetries, asymmetric information*, and *information impactedness*. This yielded more than 600 articles. We then examined each article and eliminated those that did not use information asymmetry in their conceptual argumentation. This screen left a set of 223 articles (i.e., 83 from *AMJ*, 38 from *AMR*, 11 from *ASQ*, 13 from *JM*, 32 from *OS*, and 46 from *SMJ*), which are listed by journal in Table 1.

Next, we analyzed each article to identify how information asymmetry was used, and we recorded descriptive and methodological aspects of the concept's application. We found just two articles published during the 1980s. Research activity grew rapidly in the 1990s (40) and 2000s (96). While the current decade (2010-2019) is not complete, the trend suggests continued growth (already 85). As Table 2 summarizes, the application of information asymmetry in management has been diverse. Within our sample, 65% of articles were grounded in strategic management, followed by international management/business (13%), organization theory (9%), and other subfields. Agency theory was the most widely used theoretical perspective (36% of the articles), followed by transaction cost economics (14%), signaling theory (11%), resource-based theory (9%), institutional theory (9%), social network theory (6%), and informational economics (5%).

Table 2 also reveals the broad range of phenomena studied, such as alliances, initial public offerings, governance, and compensation, among others. This range of topics is consistent with our sample journals' aim of publishing articles reflecting the diversity of management research. In terms of methodology, empirical papers often used firm-level archival data collected exclusively from U.S. companies (85 articles). A smaller number relied solely on survey designs (19), whereas an additional set combined survey and archival data (9). Some studies used experimental designs (8). Among non-U.S. samples, Asian data (16) were more prevalent than European data (12).

Table 1
Reviewed Information Asymmetry Research

Academy of Management Journal
Kotlar, Signori, De Massis, & Vismara (in press)
Ryu, McCann, & Reuer (in press)
Gomulya & Mishina (2017)
Shin, Hasse, & Schotter (2017)
Banks, Pollack, Bochantin, Kirkman, Whelpley, & O'Boyle (2016)
Boivie, Graffin, Oliver, & Withers (2016)
Campbell, Sirmon, & Schijven (2016)
Crilly, Hansen, & Zollo (2016)
Holloway & Parmigiani (2016)
Liu & Maula (2016)
Plummer, Allison, & Connelly (2016)
Zhang & Qu (2016)
Paruchuri & Misangyi (2015)
Belogolovsky & Bamberger (2014)
Boone & Özcan (2014)
Kim & Jensen (2014)
Rhee & Fiss (2014)
Washburn & Bromiley (2014)
Zhang, Li, & Li (2014)
Kistruck, Sutter, Lount, & Smith (2013)
Lamin (2013)
Ozmel, Reuer, & Gulati (2013)
Bednar (2012)
Crilly, Zollo, & Hansen (2012)
Reuer, Tong, & Wu (2012)
Geletkanycz & Boyd (2011)
Wowak, Hambrick, & Henderson (2011)
Li & Tang (2010)
Semadeni & Anderson (2010)
Westphal & Graebner (2010)
Wong & Boh (2010)
Zhang & Gimeno (2010)
Jensen & Roy (2008)
Kang (2008)
Li, Eden, Hitt, & Ireland (2008)
McNamara, Haleblain, & Dykes (2008)
Heeley, Matusik, & Jain (2007)
Kapoor & Lim (2007)
Kroll, Walters, & Le (2007)
Li, Yang, & Yue (2007)
Martens, Jennings, & Jennings (2007)
Miller, Fern, & Cardinal (2007)
Westphal & Stern (2007)
Katila & Shane (2005)
Agarwal, Echambadi, Franco, & Sarkar (2004)
Certo, Daily, Cannella, & Dalton (2003)
Gomez-Mejia, Larraza-Kintana, & Makri (2003)
Gong (2003)
Lee & O'Neill (2003)
Sanders & Carpenter (2003)
Wan & Hoskisson (2003)
Zhang & Rajagopalan (2003)
Hoskisson, Hitt, Johnson, & Grossman (2002)
Park, Chen, & Gallagher (2002)
Shen & Cannella (2002)
Gomez-Mejia, Nunez-Nickel, & Gutierrez (2001)
Hitt, Bierman, Shimizu, & Kochhar (2001)
Chang & Hong (2000)
Dooley & Fryxell (1999)
Westphal (1999)
Bloom & Milkovich (1998)
Sanders & Carpenter (1998)
Saxton (1997)
Hitt, Hoskisson, Johnson, & Moesel (1996)
Nohria & Gulati (1996)
Roth & O'Donnell (1996)
Sharma & Kesner (1996)
Zahra (1996)
Parks & Conlon (1995)
Pillutla & Murnighan (1995)
Welbourne, Balkin, & Gomez-Mejia (1995)
Werner & Tosi (1995)
Abrahamson & Park (1994)
Buchholtz & Ribbens (1994)
D'Aveni & Ravenscraft (1994)
Kesner, Shapiro, & Sharma (1994)
Harrison & Harrell (1993)
Nayyar (1993a)
Worrell, Davidson, & Glascock (1993)
Gomez-Mejia & Balkin (1992)
Kerr & Kren (1992)
Mallette & Fowler (1992)
Nayyar (1992)

Academy of Management Review
Hoskisson, Gambeta, Green, & Li (in press)
Jia (in press)
Klein, Mahoney, McGahan, & Pitelis (in press)
Gao, Yu, & Cannella (2017)
Cobb (2016)
Cowen, King, & Marcel (2016)
Krause & Bruton (2014)
Schmidt & Keil (2013)
Afuah & Tucci (2012)
Raes, Heijltjes, Glunk, & Roe (2011)
Zardkoohi, Bierman, Panina, & Chakrabarty (2011)
Brodbeck et al. (2007)
Colella, Paetzold, Zardkoohi, & Wesson (2007)
Schoorman, Mayer, & Davis (2007)
Sirmon, Hitt, & Ireland (2007)
Hagedoorn (2006)
Labianca & Brass (2006)
van Oosterhout, Heugens, & Kaptein (2006)
Bonardi, Hillman, & Keim (2005)
Afuah (2003)
Certo (2003)
Sundaramurthy & Lewis (2003)
Hendry (2002)
Jacobides & Croson (2001)
Dharwadkar, George, & Brandes (2000)
Gomez-Mejia, Welbourne, & Wiseman (2000)
Ramamurti (2000)
Rangan (2000)
Shane & Venkataraman (2000)
Chatterjee, Lubatkin, & Schulze (1999)
Barringer & Milkovich (1998)

(continued)

Table 1 (continued)

Coff (1997)
Sharma (1997)
Quinn & Jones (1995)
Lado & Wilson (1994)
Fox & Marcus (1992)
Walsh & Seward (1990)
Eisenhardt (1989)
Administrative Science Quarterly
Ody-Brasier & Vermeulen (2014)
Rogan & Sorenson (2014)
Zhu & Chung (2014)
Ferguson & Hasan (2013)
Kleinbaum (2012)
Zaheer & Soda (2009)
Galaskiewicz, Bielefeld, & Dowell (2006)
Luo & Chung (2005)
Malhotra & Murnighan (2002)
Freeman (1999)
Tosi & Gomez-Mejia (1989)
Journal of Management
Martin, Wiseman, & Gomez-Mejia (in press)
Schepker, Oh, & Patel (2018)
Mooney, Semadeni, & Kesner (2017)
Ndofor, Wesley, & Priem (2015)
Ecker, van Triest, & Williams (2013)
Miller, Indro, Richards, & Chng (2013)
Connelly, Certo, Ireland, & Reutzel (2011)
Makadok (2011)
Shin & Seo (2011)
Certo, Holcomb, & Holmes (2009)
Ragozzino & Reuer (2009)
Zhang, Soh, & Wong (2009)
Hitt, Hoskisson, & Ireland (1994)
Organization Science
Reuer & Devarakonda (2017)
Park & Tzabbar (2016)
Bidwell & Mollick (2015)
Pontikes & Barnett (2015)
Reuer & Lahiri (2014)
Bednar, Boivie, & Prince (2013)
Lee (2013)
Pierce & Toffel (2013)
Zhang & Luo (2013)
Lumineau & Oxley (2012)
Reuer & Ragozzino (2012)
Ahuja & Yayavaram (2011)
Werder (2011)
Bidwell (2010)
Zaheer, Hernandez, & Banerjee (2010)
Chittoor, Sarkar, Ray, & Aulakh (2009)
Groysberg & Lee (2009)
Greenwood, Li, Prakash, & Deephouse (2005)
Santos & Eisenhardt (2005)
Gerwin & Ferris (2004)
Keister (2004)
Stewart (2003)
Wasserman (2003)
Postrel (2002)
Schilling & Steensma (2002)
Vanhaverbeke, Duysters, & Noorderhaven (2002)
Schulze, Lubatkin, Dino, & Buchholtz (2001)
Thornton (2001)
Liebeskind (2000)
Prietula & Watson (2000)
Shane (2000)
Madhok & Tallman (1998)
Strategic Management Journal
Cuypers, Cuypers, & Martin (2017)
Desender, Aguilera, Lópezpuertas-lamy, & Crespi (2016)
McCann, Reuer, & Lahiri (2016)
Park, Borah, & Kotha (2016)
Tong, Reuer, Tyler, & Zhang (2015)
Feldman, Gilson, & Villalonga (2014)
Reuer, Tong, Tyler, & Ariño (2013)
Seamans (2013)
Montiel, Husted, & Christmann (2012)
Schijven & Hitt (2012)
Graffin, Carpenter, & Boivie (2011)
Hasan, Kobeissi, & Wang (2011)
Ragozzino & Reuer (2011)
Zhang & Wiersema (2009)
Bergh et al. (2008)
Schnatterly, Shaw, & Jennings (2008)
Zhang (2008)
Capron & Shen (2007)
Laamanen (2007)
Cohen & Dean (2005)
Carow, Heron, & Saxton (2004)
Cottrell & Nault (2004)
Folta & Janney (2004)
Huyghebaert & Van de Gucht (2004)
Makhija (2004)
Rothaermel & Deeds (2004)
Sanders & Boivie (2004)
Coff & Lee (2003)
Durand & Vargas (2003)
Henderson & Cool (2003)
Leiblein & Miller (2003)
O'Brien (2003)
Shamsie (2003)
Tuschke & Sanders (2003)
Filatotchev & Bishop (2002)
Amit & Zott (2001)
Certo, Covin, Daily, & Dalton (2001)
Dussauge, Garrette, & Mitchell (2000)
Merchant & Schendel (2000)
O'Donnell (2000)
Reuer & Koza (2000)
Shaw, Gupta, & Delery (2000)
Brush & Artz (1999)
Lassar & Kerr (1996)
Nayyar (1993b)
Nayyar (1990)

Note: For a complete list of references for the citations in this table, please see the supplemental material available with online publication of this article.

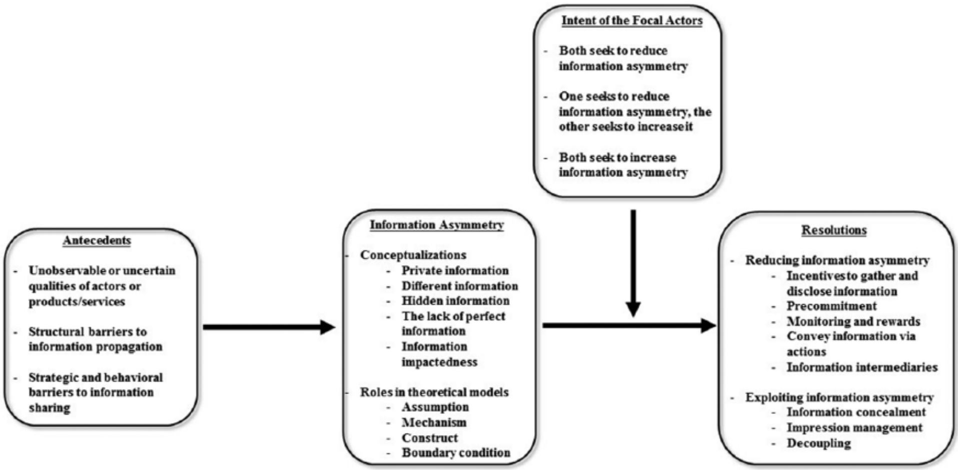
Table 2
Mapping the Landscape of Information Asymmetry Applications in Management Research

Management Subfield (No. of Articles)	Theories Frequently Used	Prominent Phenomena	Total Articles per Journal						
			SMJ	*AMJ*	*AMR*	*OS*	*ASQ*	*JM*	Overall
Strategic management (146)	• Agency theory • Institutional theory • Resource-based theory • Signaling theory • Transaction cost economics	• Generic business level strategies • Corporate governance • Mergers and acquisitions • Alliances	35	52	19	21	10	9	65%
International business (29)	• Agency theory • Institutional theory • Signaling theory • Transaction cost economics	• Alliances • Mergers and acquisitions	7	12	3	4	0	3	13%
Organization theory (20)	• Agency theory • Signaling theory • Institutional theory	• Generic business level strategies • Contracting	0	8	8	4	0	0	9%
Entrepreneurship (11)	• Agency theory • Signaling theory • Industrial economics	• Valuation of IPOs	3	5	1	1	0	1	5%
Human resource management (9)	• Agency theory • Trust theory • Human capital theory	• Compensation	1	3	3	1	1	0	4%
Organizational behavior (8)	• Agency theory • Organizational justice • Game theory • Stewardship theory • Fairness theory	• Corporate governance	0	3	4	1	0	0	4%

Note: Overall column shows proportion of articles by management area, for example, 65% of articles were from strategic management, with *AMJ* and *SMJ* being the most frequent sources for articles in this area. *AMJ = Academy of Management Journal; AMR = Academy of Management Review; ASQ = Administrative Science Quarterly; JOM = Journal of Management; OS = Organization Science; SMJ = Strategic Management Journal.*

We leveraged this analysis to develop an organizing framework for our review. As shown in Figure 1, the framework encompasses four interrelated topics: (a) antecedents and conditions leading to information asymmetry, (b) how information asymmetry has been conceptualized and applied theoretically, (c) resolutions to the condition of information asymmetry, and (d) the intent of focal actors as a moderating condition in the selection of a resolution. We first review the centerpiece of the framework—how the concept of information asymmetry has been applied to explain theoretical relationships—in order to

Figure 1
A Conceptual Model of Management Research on Information Asymmetry



establish understanding of the concept in management research. We then discuss antecedents, actors' intent, and resolutions.

Information Asymmetry: Conceptualizations

Our review found that the information asymmetry concept was applied in several different ways in management research. We present the most common approaches in descending order, based on how frequently they appeared in our review.

Private information. Information asymmetry was most frequently depicted as present when a party has access to privileged or private information. This information may be proprietary, be legally protected, not be required for reporting purposes, or arise from specialized assets (e.g., Ecker, van Triest, & Williams, 2013) or expertise (e.g., Gomez-Mejia, Welbourne, & Wiseman, 2000). Connelly and colleagues highlight that "because some information is private, information asymmetries arise between those who hold that information and those who could potentially make better decisions if they had it" (Connelly, Certo, Ireland, & Reutzel, 2011: 42). Private information also affects normal business activities: "Information asymmetry arises between headquarters and the R&D subsidiary because local managers will have specific knowledge that is not available to their superiors" (Ecker et al., 2013: 911). Similarly, Makadok (2011: 1319) stresses that

> information asymmetry theories are based on differences in the ability to assess the value of either inputs or outputs. Some market participants may have better information than others about the value-in-use of the goods, services, or resources that they trade with each other.

Private information has been identified as a source of acquisition gains (Capron & Shen, 2007) and competitive advantage (Makadok, 2011). It has often been casted as a critical reason for why some firms outperform others (Rugman & Verbeke, 2002; see Kraaijenbrink, Spender, & Groen, 2010, for a review). From this perspective, firms have a better understanding of their resources than competitors, and they can use this knowledge advantage to more accurately assess the basis of their competitive advantage (e.g., Schmidt & Keil, 2013).

Different information. Stiglitz (2002: 469) succinctly described information asymmetry as a condition wherein "different people know different things." Schmidt and Keil (2013: 214) elaborated on this depiction by stating that "information is not homogeneously distributed in the market . . . nor is access to relevant information open to all firms in the market." Similarly, Semadeni and Anderson (2010: 1175) stress "high information asymmetry [arises] when market actors possess different and unequal stores of market knowledge," while Hambrick and Mason (1984: 390) note that

> information asymmetries exist in all exchange relationships. However, in the strategic decision process such asymmetries are accentuated as each strategic decision-making team member brings different perspectives, specialized knowledge, values, priorities, and goals to bear on the decision, factors it is difficult for other team members to know about.

This approach toward information asymmetry was observed in venture capitalist and alliance networks (Ozmel, Reuer, & Gulati, 2013), in strategic alliances (S. Park, Chen, & Gallagher, 2002), between top management teams and their middle and lower managers (Afuah & Tucci, 2012; Sirmon, Hitt, & Ireland, 2007), in manager–analyst (e.g., Washburn & Bromiley, 2014) and trust relationships (Schoorman, Mayer, & Davis, 2007), as well as in "times when credible market signals are missing . . . and status and reputation fill in the gaps" (Galaskiewicz, Bielefeld, & Dowell, 2006: 345).

Hidden information leads to pre- or postcontractual opportunism. This application entwines the ex ante problem of "adverse selection" and/or the ex post problem of "moral hazard" with the concept of information asymmetry (e.g., Akerlof, 1970; Stiglitz, 2002). Taking an ex ante perspective, Vanhaverbeke and colleagues highlight that "information about the quality and performance characteristics of applicable assets is not common knowledge, and any information provided by a present owner may be opportunistically biased, causing adverse selection problems" (Vanhaverbeke, Duysters, & Noorderhaven, 2002: 717). Gomez-Mejia, Nunez-Nickel, and Gutierrez (2001: 82) offer an application of this definition from the ex post perspective:

> Given bounded rationality and information asymmetries, it may be impossible for a principal to specify performance criteria *ex ante* and to contract for the services of the best possible agent. . . . Thus, relational, or long-term, contracting alleviates moral hazard problems stemming from divergence between the interests of principal and agent.

We also identified examples linking the concept to both ex ante and ex post opportunism. Schulze, Lubatkin, Dino, and Buchholtz (2001: 100) note that

> information asymmetries and incentives therefore combine and pose a moral hazard to agents, which owners can reduce by monitoring agent conduct, gaining access to their firm's internal

information flows, and providing incentives that encourage agents to act in the owners' best interests.

This depiction plays a central role in agency theory. When the principal recognizes that the agent has hidden information that may allow him or her to behave opportunistically, precontractual safeguards and postcontractual monitoring can be used complementarily to attenuate the associated negative effects (e.g., Eisenhardt, 1989).

Information asymmetry as the lack of perfect information. This application depicts how participants in information markets navigate their lack of perfect information about one another. Stigler (1961) provided a seminal insight by comparing informationally disadvantaged buyers and advantaged sellers and their respective strategies for accumulating or disseminating information. Akerlof's (1970) formulation of this tension in asset markets described how incomplete and asymmetrically distributed information among parties to a transaction would affect seller and buyer behavior. Not long afterward, Spence's (1973) conceptualization of information signals—costly attributes that provide information about otherwise unobservable qualities—clarified how participants in information markets could use signals to distinguish seller quality (see Connelly et al., 2011, for a review).

We found multiple examples of this market-level approach. For leveraged buyouts, Fox and Marcus (1992: 68) stress that "whether due to the manager's own poor performance or due to information asymmetry or capital market myopia, a hostile takeover is a threat to the manager's job security and to the value of his or her human capital." The condition also affects firms in emerging economies, which "often face high transaction costs incurred by information asymmetry, contractual fraud and disputes, and inefficient financing" (Luo & Chung, 2005: 411). Other applications included selecting joint venture partners (Reuer & Koza, 2000), faculty pay (Gomez-Mejia & Balkin, 1992), monitoring of CEOs (Kerr & Kren, 1992), pay secrecy (Belogolovsky & Bamberger, 2014), and firms in international markets (Kim & Jensen, 2014).

Information impactedness. Williamson (1975: 40) depicted information asymmetry as a source of transaction costs within his "organizational failures" framework. Through leading to "information impactedness," Williamson argues that information asymmetries between potential transaction partners raises the search, monitoring, and bonding costs of a transaction due to the high cost of achieving informational parity and the proclivity to behave opportunistically when given the chance. Because it is costly for underinformed parties to achieve informational parity, some firms may exploit superior information to their own advantage, leading honest firms to leave the market.

Balakrishnan and Koza (1993) argue that information asymmetries can drive up transaction costs between potential business parties, compelling them to opt for alliances rather than use markets or hierarchical (i.e., merge or acquire) solutions. In his conception of the swollen middle, Hennart (1993) argues that alliances can economize information asymmetry–based transaction costs by reducing the continued search and bonding expenses associated with market transactions, while enabling parties to limit the specialized investments and withdrawal costs associated with hierarchical governance. From this perspective, alliances reduce information asymmetry–based transaction costs while maximizing transaction value (Reuer & Koza, 2000). Other applications include Argyres and Zenger (2012) and Feldman and colleagues' examination of analysts' role in interpreting divestitures and spin-offs (Feldman, 2016; Feldman, Gilson, & Villalonga, 2014).

Summary. Management researchers have applied information asymmetry in a variety of ways. "Private information" often arises in explanations of competitive advantage and resource-based theory, "different information" is commonly construed in market-level efficiencies, "hidden information" is often associated with agency theory as it is depicted as leading to adverse selection and moral hazard, a "lack of perfect information" frequently leads parties to send and assess signals, and "information impactedness" is generally constructed as a source of transaction costs. Viewed broadly, the five categories of applications seem to coalesce into two distinct yet interrelated subgroups: (a) creating/sustaining advantage relative to forces for and against transparency and (b) creating hazards that parties seek to perpetuate or remedy through signals, screens, and ex ante and ex post actions. As we discuss next, our review also uncovered that information asymmetry played different roles across various theoretical models.

Information Asymmetry: Role in Theoretical Models

In his classic work on theory building, Bacharach (1989) identified assumptions, mechanisms, constructs, and boundary conditions as the primary components of a theory. We examined how information asymmetry was applied in theoretical models using Bacharach's components as an organizing structure.

Information asymmetry as an assumption. Assumptions are theoretical conditions considered to be true or taken for granted; they are used to relate concepts, constructs, and variables to one another (Bacharach, 1989). In this role, information asymmetry is an underlying element of theoretical reasoning. Paruchuri and Misangyi, for example, use the concept as an assumption when stating that "there is a high degree of information asymmetry and dependence in the relationship between shareholders (i.e., audience) and the top management of firms (i.e., who are either directly or indirectly culpable)" and then apply it to their context of interest by stating that "industry bystander firms with vigilant boards are less vulnerable to being perceived as instantiating the culpability generalized by the industry category than are those industry bystander firms with less vigilant boards" (Paruchuri & Misangyi, 2015: 176). Zhang, Li, and Li (2014: 703) likewise assume that "foreign firms with higher intangible assets have greater information asymmetry between them and their domestic competitors, which increases the barriers to imitation" and that "intangible assets of foreign firms can also create higher barriers to imitation by increasing causal ambiguity of their competitive advantage."

Information asymmetry as a mechanism. Mechanisms are plausible channels of influence, allowing the theoretician to engage in "predicting beyond chance" (Bacharach, 1989: 510) how causal effects flow from independent to dependent variables. In this vein, actors can use information asymmetry to actively pursue their self-interests. For example, Nayyar (1990: 517) suggests "information asymmetries cannot be viewed as merely another obstacle in the competitive battle, because they can be a potent source of competitive advantage for those service firms that consciously develop new services for their existing customers." Other examples of information asymmetry as a mechanism include CEOs-chairs using information asymmetry to secure a poison pill (Mallette & Fowler, 1992), making board appointment decisions to manage the perceived quality of the firm (Boivie, Graffin, Oliver, & Withers, 2016), and the selection of alliance partners to safeguard firms' intellectual R&D assets (Li, Eden, Hitt, & Ireland, 2008). When viewed as a mechanism, actors apply information asymmetry to exploit their information advantage relative to a less informed party.

Information asymmetry as a construct. A construct exists conceptually but "cannot be observed directly" (Bacharach, 1989: 498). Theory building involves explaining relationships between constructs; such relations are often depicted using box-and-arrow diagrams to convey ideas about influence and causality. When serving the role of a construct, information asymmetry and its relationships to other constructs should appear in an article's conceptual model (if one is provided) and in its theorizing. Banks, Pollack, Bochantin, Kirkman, Whelpley, and O'Boyle (2016) provide an example in their study on the gulf between academics and practitioners. First, information asymmetry is included in the formulation of a research question: How does information asymmetry play a role in contributing to higher collaboration costs when conducting joint research between academics and practitioners? Second, information asymmetry is part of a proposition: Mutual knowledge of utility functions can mitigate the negative effects of information asymmetry. Last, information asymmetry is depicted in a diagram as an influence on collaboration costs that in turn reduce the capabilities of practitioners and academics to collaborate and create new knowledge.

Information asymmetry as a boundary condition. Information asymmetry can also act as a boundary condition limiting the applicability and generalizabilility of theories (Bacharach, 1989). Used in this function, the concept often assumes the role of a moderator within a theoretical model, such that focal actors will change their behaviors if the level of information asymmetry changes. Nayyar (1993a) predicts that information asymmetry will moderate the relationship between the purchase of experience services and firm performance, because this boundary condition tends to change the purchasing behavior of buyers: "The interactive effects of information asymmetry between buyers and sellers and experience services, whose quality can only be determined after purchase, will be related positively to performance" (p. 36). Brodbeck and colleagues (2007) argue that groups can outperform individual decision makers and social combinations of individual votes when information asymmetry among the group members is higher. Kotlar, Signori, De Massis, and Vismara (in press) argue that information disclosures during a family firm's IPO process serve to change family owners' preferences for underpricing levels, allowing them to more readily trade-off socioemotional wealth against financial wealth. In all these cases, information asymmetry is depicted as having a moderating role wherein different levels of information asymmetry change the relationship between independent and dependent constructs.

Summary. In sum, we found that information asymmetry most frequently serves as an assumption within a theoretical model. A far smaller number of studies use it as a mechanism, with fewer yet deploying it as a construct or boundary condition. Developing these latter three theoretical roles would add significantly to understanding of information asymmetry's value as a conceptual phenomenon. More generally, in order for theory to advance efficiently, we encourage scholars using information asymmetry to be transparent about both the conceptual approach to the concept they are adopting (e.g., private information, different information) and the role information asymmetry plays within their theorizing (e.g., assumption, mechanism).

Antecedent Conditions That Lead to Information Asymmetry

We found three broad categories of factors believed to create information asymmetry: unobservable or uncertain qualities of actors or their products and services, structural barriers to information propagation, and strategic and behavioral barriers that limited information sharing.

Unobservable or uncertain qualities. A pervasive antecedent is how exchange participants attempt to navigate each other's unobservable or uncertain qualities. These attempts span social and economic processes, like the valuation of (target) assets, ex ante and ex post assessment of product or service quality, and assessing partner qualities and intentions (Folta, 1998; S. Park & Ungson, 1997; Ragozzino & Reuer, 2009). The relevant qualities of targets, products, and partners may be wholly unobservable, such as when potential acquirers cannot conduct due diligence on target assets (e.g., during hostile takeovers), when products are entirely new, or when firms have no prior experience with a potential partner (Jensen, 2003). In other cases, information about actors' qualities is available, but uncertainty still exists (e.g., Groysberg & Lee, 2009), as an actor might have to perform due diligence under time pressure or rely on product or service quality information from third-party sources or because the available information is sparse or dated.

The depiction of unobservable and uncertain qualities in actors leading to information asymmetry was found in diverse settings, including investment banks as financial advisors (Lee, 2013), potential target firms (Rogan & Sorenson, 2014; Zaheer, Hernandez, & Banerjee, 2010), potential exchange (Rangan, 2000), alliance (Madhok & Tallman, 1998; Vanhaverbeke et al., 2002), and R&D partners (Reuer & Lahiri, 2014), entrepreneurial ventures (J. Zhang, Soh, & Wong, 2009), and IPO firms (Certo, 2003; Miller, Indro, Richards, & Chng, 2013). Information asymmetry also impacts labor markets and hampers the assessment of relevant qualities of potential employees (Bidwell & Mollick, 2015); specialized candidates, like "star" analysts (Groysberg & Lee, 2009); and "organizational misfits"—people who follow atypical career trajectories (Kleinbaum, 2012). Information asymmetry can also emerge due to unobservable and uncertain qualities of complex products and services (Pierce & Toffel, 2013; Stewart, 2003), such as the grapes used in champagne production (Ody-Brasier & Vermeulen, 2014), the counsel provided by professional service firms (Greenwood, Li, Prakash, & Deephouse, 2005), and the mechanisms through which top executives add value to firms, which are largely unobservable and possibly unfathomable to board members (Sundaramurthy & Lewis, 2003), venture board members (Krause & Bruton, 2014), and institutional investors (J. Shin & Seo, 2011).

Unobservable or uncertain qualities could give rise to all five conceptual applications of information asymmetry. "Private information" results when managers retain information about unobservable qualities; market intermediaries, like analysts, might use their expertise in interpreting differences in information to promote their services ("different information");

agents could use non-observability to pursue their self-interests ("hidden information"); high-quality firms have incentives to signal their strong points to underinformed observers ("lack of perfect information"); and transaction partners use safeguards to protect against potential opportunistic behavior ("information impactedness").

Structural barriers. Other articles consider preexisting structural barriers that reduce actors' ability to access or disseminate information as antecedents to information asymmetry. Access to information might be impeded by a lack of means through which information can be communicated and processed. Alternatively, intrinsic characteristics of actor networks, such as incompleteness or sparseness, may impede or weaken information flows. Examples include "psychic distance," defined by Johanson and Wiedersheim-Paul (1975: 308) as "factors preventing or disturbing the flows of information between firm and market . . . such factors are differences in language, culture, political systems, level of education, level of industrial development, etc.,"[3] and linguistic barriers in intrafirm relationships (e.g., Hinds, Neeley, & Cramton, 2014), acquisitions (e.g., Cuypers et al., 2015), and alliances (e.g., Joshi & Lahiri, 2015).

Numerous studies reported such barriers. Examples include cultural distance between parent and foreign subsidiary (D. Shin, Hasse, & Schotter, 2017), vagaries in the IPO process (Kotlar et al., in press; Plummer, Allison, & Connelly, 2016), geographic within-country distance (Ryu, McCann, & Reuer, in press), within-firm diversification (Hitt, Hoskisson, & Ireland, 1994), and decentralization between headquarters and subsidiaries (Ecker et al., 2013). These barriers are often observed in emerging economies (Luo & Chung, 2005; Zhu & Chung, 2014), in political markets where public policy initiatives are "traded" (Bonardi, Hillman, & Keim, 2005), and more broadly in market transactions (Lado & Wilson, 1994; Shane & Venkataraman, 2000; Quinn & Jones, 1995; J. Zhang & Luo, 2013). Barriers involving between-actor collaborations were discovered in studies on the principal–agent problem (e.g., Gomez-Mejia & Balkin, 1992), on selecting candidates for corporate boards (Boivie et al., 2016), and on executive succession (Y. Zhang & Qu, 2016). Structural barriers also complicate the deployment of employees with specialized knowledge (Postrel, 2002), and increase friction in the relationships between firms and investors (Schepker, Oh, & Patel, 2018), new entrants and incumbents (Pontikes & Barnett, 2015), buyers and sellers (Afuah, 2003), firms and regulators (Ramamurti, 2000), and academics and practitioners (Banks et al., 2016).

Structural barriers relate to several conceptual applications of information asymmetry, including "private information," such as between a firm's subsidiary and headquarters; "different information," such as between different types of investors; and "hidden information," giving rise to adverse selection and moral hazard for instance during hiring and/or selection processes. More specifically, when private information is valuable, those that have it are incentivized to invest in safeguards to keep the information private. Here parties seek to prevent appropriation of value and may attempt to do so through limiting the transferability and replicability of the information. Further, structural barriers may contribute to information impactedness and to raising transaction costs. Parties to a transaction that do not have private information and are disadvantaged by structural barriers to its diffusion face the threat of opportunism on behalf of the party that does have the information advantage. The resulting information impactedness likely requires monitoring and follow-up to minimize unanticipated costs and risks.

Strategic and behavioral barriers to sharing information. Given the potential benefits of having an information advantage, some actors keep information private in order to benefit themselves or their firms (Connelly et al., 2011). For instance, studies on stakeholder opportunism suggest that stakeholders evaluate their context before deciding how to behave strategically. Laws, regulations, and contacts in place determine the extent to which they use information asymmetry for their own advantage (e.g., Werder, 2011). Another example arises from studies on competitive advantage, wherein "barriers to imitation (such as tacitness or social complexity) pose information transmission problems between the source and sourcing firms, creating information asymmetry and information costs" (Alston & Gillespie, 1989: 390). Similarly, an actor bridging structural holes "in the past may exploit opportunities to recreate them to maintain the asymmetry embodied in the position to gain brokerage and control benefits" (Zaheer & Soda, 2009: 9). Some scholars also suggest that managers may use information asymmetry as an instrument to realize objectives such as managing earnings. Indeed, earnings management "can create costs in the long-term for uninformed stakeholders as a result of information asymmetry" (Martin, Wiseman, & Gomez-Mejia, in press). Other applications include selectively communicating information to stockholders (Fox & Marcus, 1992), maintenance of central network positions (Hagedoorn, 2006), and seeking credit for the firm's success (Sundaramurthy & Lewis, 2003). Strategic barriers also may arise from internal policies, such as pay secrecy among employees. Belogolovsky and Bamberger (2014: 1710) note that "in the vast majority of work places, pay-related information is intentionally made asymmetrical by employers," suggesting that pay secrecy can protect employees' privacy and morale as well as possibly save payroll costs. Behavioral barriers stemming from inherent limitations on human information processing could be important. These might include issues surrounding bounded rationality, absorptive capacity, cognitive complexity and other sociocognitive phenomena.

Strategic and behavioral barriers have ties to all five conceptualizations of information asymmetry. For instance, private and hidden information results when managers develop barriers to limit information's diffusion. Such impediments to sharing would also contribute to a lack of perfect information among firm stakeholders. The implication is that transaction partners are again faced with safeguards to protect against potential opportunistic behavior through exploiting information impactedness.

Resolutions to Asymmetry

Our review unveiled five primary means to reduce information asymmetry as well as three to increase it and thereby gain advantages over others (Figure 1). We review each and then consider possible linkages to the three antecedent conditions that give rise to information asymmetry.

Incentives to gather and disclose information. Some authors argue that parties searching for a partner with the "right" level of ability and willingness (Madhok & Tallman, 1998: 332) tend to reduce information disadvantages by increasing the breadth of available information (Jacobides & Croson, 2001). Others suggest that information gathering can be conducted through learning from existing partners (Gerwin & Ferris, 2004; Zaheer et al., 2010). This approach includes "weeding out of uncooperative exchange partners" and concentrating on those that facilitate inter-partner learning (Lumineau & Oxley, 2012: 823). In general, studies consider how informationally disadvantaged parties are incentivized to gather more information when faced with future acquisition targets (Zaheer et al., 2010), business group affiliations (Chittoor, Sarkar, Ray, & Aulakh, 2009), interpersonal ties (J. Zhang et al., 2009), and other prospective partners (Reuer & Lahiri, 2014; Schilling & Steensma, 2002; Vanhaverbeke et al., 2002).

Other studies scrutinize how firms seek to reduce information asymmetry via information disclosure, through which a focal actor produces third-party verified prospectuses disclosing important information about their business model, leadership, credit history, and business prospects to potential investors. IPOs serve as a prominent example. The IPO firm is far more knowledgeable about its true qualities and future value than prospective investors due to the firm's shortened history and limited public paper trail. This information asymmetry pushes investors to demand the IPO firm absorb the uncertainty surrounding its value itself by underpricing its equity. IPO firms therefore tend to "leave money on the table" as they have to set the offering price below their inherent value (e.g., Cohen & Dean, 2005; Heeley, Matusik, & Jain, 2007; W. M. Sanders & Boivie, 2004). IPO underpricing is thus a fairly precise measure of the irrecoverable costs associated with unresolved information asymmetry. When an IPO firm discloses information concerning its past as well as its future intentions through its prospectus, this information flow shrinks the informational gap between the focal firm and potential investors. In turn, this can reduce the amount of money left on the table as potential investors can more precisely estimate the firm's market value.

Precommitment. Information asymmetry can also be resolved through precommitment, through which a focal actor demonstrates the truthfulness and seriousness of its intentions to another actor, for example, by investing in new infrastructure (Smit, 2003) or by showing interest in a certain type of remuneration (John & John, 1993; Ryan & Wiggins, 2001, 2002). Debt financing is an example of a situation in which precommitment is pivotal. Firms seeking financing are often asked to pay a credit premium to the debt providers, as information asymmetry increases uncertainty surrounding the quality and the future intentions of a focal firm in the eyes of providers. Higher uncertainty implies that the debt provider perceives higher risk and therefore demands a higher credit premium. Firms searching for debt financing are thus expected to compensate debt providers for the higher risk by increasing the coupon rate of the bond, thus leaving money on the table by overpaying for their debt.

A firm can reduce overpayment via precommitment, not only by showing prospective debt investors the type of future moves they intend to make but also by stressing their sense of responsibility toward related past investments. In turn, the information asymmetry gap shrinks as debt investors derive more information about the seriousness of the firm's intentions. Another example is a contingent earnout, which transfers ownership from seller to buyer in gradients over time, reducing the risk of overpayment in mergers and acquisitions (Shen & Reuer, 2005).

Monitoring and rewards. Monitoring systems serve to reduce private information through verifying agents' behavior so that they cannot deceive their principals. Monitoring is typically cast in terms of board leadership structure (Westphal, 1999) and composition (W. G. Sanders & Carpenter, 1998), regulatory bodies (Ramamurti, 2000), the media (Bednar, 2012), and advisors (Westphal, 1999). For example, shareholders might monitor officers' disclosures to prevent concealment of negative organizational outcomes (Abrahamson & Park, 1994). However, monitoring's effectiveness is limited. Gomez-Mejia and Balkin (1992: 923) note "when an agent has high autonomy, independence, and highly specialized information, monitoring becomes very difficult and expensive, [so] principals will rely on incentives to reward agents for appropriate outcomes." Outcome-based incentives attempt to "coalign the preferences of agents with those of the principal, because the rewards for both depend on the same actions and, therefore, the conflicts of self-interest between principal and agent are reduced" (Eisenhardt, 1989: 60). The impact of information asymmetry can thus be reduced through rewards; incentives are meted out to agents when they act in accordance with objectives set by their principals (Jensen, 1983). Such outcome-based incentives can include stock options (W. G. Sanders & Carpenter, 2003), flexible benefit plans (Barringer & Milkovich, 1998), piece-rate contracts (Sharma, 1997), and performance-dependent CEO compensation contracts (Bloom & Milkovich, 1998).

Convey information via actions. Information asymmetry can also be reduced through actions that provide information to external parties. Prior research has shown how information asymmetries associated with unobservable qualities can be reduced by information signals (e.g., Akerlof, 1970; Spence, 1973), which include actions taken by managers and their firms. For example, signaling through reputation may provide information about the focal firm itself, or about the firms with whom the focal firm shares a tie. Most IPO firms seek to build a coalition of high-status actors who vouch for their quality, including reputed venture capitalists, prestigious underwriters, high-status auditors, and high-profile directors (Plummer et al., 2016). The connection between the IPO firm and prestigious actors constitutes a credible signal informing prospective investors that the focal firm has high value and viable future prospects. Similarly, firms intending to raise capital via debt financing use their reputation to reassure investors and inform them about their quality and value.

Forming relationships is a risky and costly activity. Each party faces not only uncertainty concerning the qualities and intentions of its potential partner but also potential costs, like those associated with relationship termination, the possibility that the actual benefits are lower or the actual costs higher than those expected ex ante, and the opportunity cost of forgoing relationships with others. A reputation signal is therefore useful to firms trying to establish a new relationship as it allows them to leverage the reputation they have built by making prior costly investments in it (Boyd, Bergh, & Ketchen, 2010). Reputation in fact contains information that other actors possess about the focal firm, implying that it is a crucial means through which quality can be communicated to prospective partners.

Our review uncovered a wide variety of actions posited to reduce information asymmetry, including signals of organizational legitimacy (Certo, 2003); judgments used to evaluate lobbying content (Jia, in press); formal credentials for external candidates (Bidwell & Mollick, 2015); reputation (Greenwood et al., 2005); board composition (Bednar, 2012); strategic actions, such as leveraged buyouts (Fox & Marcus, 1992); investment bank reputation for IPO firms (Reuer & Ragozzino, 2012); type of financing used (McNamara, Haleblian, & Dykes, 2008); and firm status (Galaskiewicz et al., 2006). Detailed reviews of management research relying on signaling theory by Connelly and colleagues (2011) and Bergh, Connelly, Ketchen, and Shannon (2014) offer additional examples.

We also found evidence of other information provision strategies, such as linguistic tactics, whereby the firm's communications are used to influence stakeholders' perceptions.

Gao, Yu, and Cannella (2017: 129) focus on communication in the form of "a specific and public statement made" to influence outsiders. Other studies focus on how actions may convey power, such as the ability to enact changes during the investment process (Hoskisson, Gambeta, Green, & Li, in press), the influence existing venture capitalists have on the behavior of the CEO in comparison with new ones (Wasserman, 2003), and the formation or maintenance of structural holes (Zaheer & Soda, 2009), all of which are believed to indicate a partner's power through its actions.

Information intermediaries. Firms may use information intermediaries to reduce information asymmetries. Healy and Palepu (2001) describe organizations serving in third-party roles, whereby they interpret corporate actions and provide expert opinions on the meaning of the observed behaviors. A prominent intermediary is the security analyst, who sits between managers and investors and is "in a position to reduce the asymmetry of information between these two groups of actors" (Feldman et al., 2014: 1447). These authors also note that analysts specialize by industry and products, which enhances their standing as information sources.

Firms also may rely on market forces as an information arbiter. Bergh and colleagues (2008) contend that managers will use the sell-off market to mitigate limited information on the value of unrelated assets when their firms make divestiture decisions. Similarly, Capron and Shen (2007) propose that acquiring private over publicly held firms presents a trade-off between incomplete information about private firms with capital market valuation of publicly held ones. They find that previously developed search routines may help reduce the threats of limited information associated with private firms. Another example includes the Internet, which can "reduce asset specificity, opportunism, and information asymmetry for some transactions, thereby reducing transaction costs" (Afuah, 2003: 41; Ahuja & Yayavaram, 2011). On balance, managers and owners may rely on information markets to mitigate the threats created by information asymmetry.

Information concealment. Some actors use devices to increase informational gaps. In information concealment, focal actors decide not to reveal the information they possess in order to exploit informational advantages over possible rivals or extract more rent from another party. For example, resource-based theory posits that firms have incentives to conceal information about their sources of competitive advantage. Here information asymmetry builds "causal ambiguity" that serves as a barrier against imitation of strategic resources and capabilities, thereby contributing to the sustainability of competitive advantages (Brush & Artz, 1999).

Information concealment also is common in the labor market for senior executives (Boivie et al., 2016). Similar to the more generic labor market (Spence, 1973), only the candidates themselves know their true qualities and motivation in relation to potential senior managerial job posts. Seasoned executives are likely to possess job-critical soft skills, while less experienced candidates will primarily offer hard skills (Boivie et al., 2016). Because many business owners prefer to hire candidates with both types of skills, seasoned executives are incentivized to conceal the knowledge they possess about soft skills from prospective candidates outside their close group so that they can exploit an information advantage. The consequence is that there are severe time compression diseconomies in the executive production process, which makes the pool of prospective candidates with both hard and soft skills stays quite steady, meaning that supply of prospective senior executives cannot easily fluctuate with demand.

Impression management. Firms also exploit informational advantages via impression management (Porac, Wade, & Pollock, 1999), which is defined as actions taken and information released to positively influence others' reactions toward the self or initiatives undertaken by the self (Dutton, Ashford, O'Neill, Hayes, & Wierba, 1997). Executives use this mechanism to influence stakeholders' and analysts' opinions of their firm, exploiting the fact that due to information asymmetry, these parties heavily rely on what information firms release and how they present it. When a firm reports strong earnings, for example, external parties often react positively, as they interpret the performance as indicative of the firm's well-being (Whittington, Yakis-Douglas, & Ahn, 2016). Knowing this, executives are incentivized to show earning improvements to reap the benefits coming from the expected positive reaction. Some become tempted to use accounting subterfuge to misrepresent earnings. The implementation of the impression management mechanism is further incentivized when executives can directly benefit from the reaction following the information disclosure, such as current CEOs achieving a higher level of compensation (cf. Westphal & Fredrickson, 2001) or interim CEOs having a higher likelihood to gain permanent appointments (e.g., Chen, Luo, Tang, & Tong, 2015).

Decoupling. Information asymmetry can also be exploited through decoupling, which is defined as the discrepancy between the formal adoption of standards and procedures and the lack of their implementation (Westphal & Zajac, 2001). A classic example involves the announcement of a stock repurchase plan that is not followed by any concrete actions (W. G. Sanders & Carpenter, 2003; Westphal & Zajac, 2001). Executives know the market tends to react positively to repurchase announcements (Westphal & Zajac, 2001), as shareholders interpret them as positive indictors about firms' future prospects and they expect that actual buybacks will follow (Crilly, Hansen, & Zollo, 2016). Executives might nonetheless choose to announce a buyback knowing full well that it will not happen because the announcement alone allows them to raise new cash flow that they can use to their own advantage (Crilly et al., 2016; Westphal & Zajac, 2001). Decoupling therefore allows firms to exploit their informational advantage about the future actions that the firm will undertake at the expense of shareholders.

Linking resolutions and antecedents. These linkages are seldom explicitly developed, as theoretical models tend to portray information asymmetry as a given characteristic of the situation at hand, and resolutions are then applied to address it relative to the objectives of the focal parties. We call for expanding the depiction of resolutions as a useful next step in understanding information asymmetry and in furthering theoretical models. Specifically, linking the antecedent conditions, independently and collectively, to the resolutions discussed above present opportunities to better understand the effectiveness of particular resolutions. For example, the resolution of "monitoring/rewards" might be linked to the antecedent condition of "unobservable/uncertain qualities," such as in the case of agency theory (Eisenhardt, 1989). In addition, theoretical arguments could be used to explain the adoption of other resolutions, such as information intermediaries, impression management, decoupling, and so on. Alternatively, consideration of the source of information asymmetry and how it is best resolved through consideration of feasible resolution alternatives would also constitute a valuable integration. We offer additional suggestions for developing these relationships in the section Future Opportunities below.

Intent of the Focal Actors

The strength of the relationship between the existence of information asymmetry and the selection of a resolution device to reduce or exploit information advantages appears likely to be contingent upon focal actors' intent and motivation.[4] We consider three possible settings: reduce-reduce, reduce-increase, and increase-increase.[5]

Reduce-reduce. This condition exists when both sides of a transaction collaborate to reduce their respective levels of information asymmetry about each other. Our review revealed numerous examples of this condition, such as when managers and employees agree to productivity standards to reduce shirking (Gomez-Mejia & Balkin, 1992). Other examples include reducing information asymmetries between firms and market analysts (Kotlar et al., in press; Rhee & Fiss, 2014), foreign venture capitalists and local firms (Y. Zhang, Li, & Li, 2014), firms and current or potential investors (Certo, 2003; Heeley et al., 2007), CEOs and boards of directors (Westphal, 1999; Y. Zhang & Rajagopalan, 2003), principals and agents (Gomez-Mejia et al., 2000; Jacobides & Croson, 2001), new firms and venture capitalists (Certo, Daily, Cannella, & Dalton, 2003; H. Park & Tzabbar, 2016), partners in vertical exchange relationships (Lumineau & Oxley, 2012), borrowers and lenders (Ahuja & Yayavaram, 2011), senior and middle managers (Bidwell, 2010), alliance partners (Madhok & Tallman, 1998; McCann, Reuer, & Lahiri, 2016), merger and acquisition partners (Cuypers, Cuypers, & Martin, 2017; Ragozzino & Reuer, 2011), firms within a larger business group (Luo & Chung, 2005), and parties to a contract (Malhotra & Murnighan, 2002). The overall message of this research is that when the intent is to reduce information asymmetry on both sides of a relationship, positive resolutions and joint value creation become more likely.

Reduce-increase. This condition occurs when one actor seeks to reduce information asymmetry while another seeks to increase it. For example, a firm's board of directors is often cast as having an incentive to reduce information asymmetries, while the firm's management may have an interest in increasing the condition (W. G. Sanders & Carpenter, 1998; Sundaramurthy & Lewis, 2003). Similar instances were observed with respect to firm management and large owners (Bednar, Boivie, & Prince, 2013; Dharwadkar, George, & Brandes, 2000), shareholders (Martin et al., in press; Schepker et al., 2018), institutional investors (J. Shin & Seo, 2011), and stakeholders (Crilly et al., 2016), including the media (Bednar, 2012) and regulators (Ramamurti, 2000). Other examples include a firm seeking to increase information asymmetries with respect to rivals (Gao et al., 2017), first-mover competitors (Semadeni & Anderson, 2010) and new entrants (Pontikes & Barnett, 2015), entrepreneurs and resource owners (Huyghebaert & Van de Gucht, 2004), and buyers and sellers (Hitt, Hoskisson, Johnson, & Moesel, 1996). Viewed collectively, this research suggests that a push-pull relationship between parties can evolve in various ways and have varied influences on the degree to which information asymmetry is resolved. It is important to note that the same parties may have differing goals depending on the issue at hand; for example, boards and CEOs might wish to jointly reduce information asymmetry in one instance while having competing agendas at other times.

Increase-increase. A final condition exists when both parties seek to increase the other's level of information asymmetry. Examples include intermanager relationships (Coff & Lee, 2003, Nohria & Gulati, 1996), offers among competing job candidates (Pillutla & Murnighan, 1995), employee salaries (Belogolovsky & Bamberger, 2014), and firms using asymmetries to strategic advantage (Nayyar, 1992, 1993a, 1993b). Often considered in terms of competitive advantage, articles cast information asymmetry as a critical barrier for protecting sources of economic rents both domestically (Nayyar, 1993a; Schmidt & Keil, 2013) and internationally (D. Shin et al., 2017; Y. Zhang et al., 2014). The overall takeaway of this research is that when actors' intent is to increase each other's information asymmetry, resolutions wherein only one party—or neither party—benefits become more likely outcomes.

Future Opportunities for Management Research on Information Asymmetry

Most research considers information asymmetry in terms of one or two relationships within the context of our Figure 1. For example, some studies examine how structural conditions lead to information asymmetry (e.g., Brodbeck et al., 2007; Schmidt & Keil, 2013) and in turn influence decision making (e.g., Harrison & Harrell, 1993; Labianca & Brass, 2006). Our Figure 1 suggests that research bridging the components of information asymmetry—that is, linking antecedents, conceptualizations, theoretical roles, and resolutions—would produce a more complete understanding of the concept. Some seminal contributions apply this integrative approach. For example, Eisenhardt's (1989) overview of agency theory traces information asymmetry from antecedents to resolutions, similar to Williamson's (1975) consideration of information impactedness. However, only a small number of studies link antecedent conditions, actors' intent, and outcomes (e.g., Belogolovsky & Bamberger, 2014; Gomez-Mejia & Balkin, 1992; Li et al., 2008), creating considerable opportunity for inquiry that explains relationships across these components. Such research would consider big-picture questions, such as, What approaches are most effective at resolving key antecedent conditions and how does actor intent shape these links? What conceptualizations are associated with which resolution and when do resolution attempts fail? More generally, what combinations of relationships exist among the three antecedent conditions, the five conceptual applications, the various possible resolutions, and the intentions of focal actors? Developing theory describing these relationships would significantly advance our understanding of information asymmetry. We also note that much remains to be learned about the concept itself, especially in terms of its conceptual applications and its roles within theory.

Using Information Asymmetry to Enhance Theoretical Development

The information asymmetry concept provides opportunities for making new predictions within theories relying on the assumption for their descriptive insights and for integration of

Figure 2
Information Asymmetry Scenarios Between Agents and Principals

Agent

Party With the Informational Advantage

		Increasing Information Asymmetry	*Reducing Information Asymmetry*
Principal **Party With the Informational Disadvantage**	*Increasing Information Asymmetry*	“Collusion” Toward a Third Party Example Agent: (Bidding) Firm Example Principal: Investment bankers	Pay Secrecy Example Agent: Employee Example Principal: Employer
	Reducing Information Asymmetry	Natural Home for Agency Theory Example Agent: Manager (Firm) Example Principal: Shareholders	Gainsharing and Mutual Monitoring Example Agent: Employee Example Principal: Employee

insights across theories. We offer recommendations for both prospects using agency theory as an example, as it was the most frequently used theoretical perspective in our review.

Opportunities within agency theory . . . and beyond. Varying the role of information asymmetry within individual theories also could yield new research opportunities. As an illustration, in Figure 2 we offer a 2 × 2 matrix that builds on agency theory to depict two actors facing an “increase or reduce” information asymmetry decision with respect to one another. The natural home of information asymmetry within agency theory is the setting in which the party with the informational advantage wants to exploit its advantage while the other party seeks to mitigate its informational disadvantage (i.e., the bottom left quadrant) (Eisenhardt, 1989). Shifting from here to the increasing-increasing cell (i.e., from the bottom left to the top left) illustrates a situation in which the two parties seek to exploit the informational gap at the expense of a third party.

Alternatively, one can shift from the natural home of agency theory to the increasing-reducing cell (i.e., from bottom left to top right) by changing both the situational details and the actors at play. Similar scenarios could be mapped out and examined for the relationships involved in transaction cost economics, signaling theory, resource-based theory, and other relevant perspectives. In each case, the four cells would identify how the research venues associated with a theory can span different contexts as well as players when information asymmetry conditions are varied relative to the central actors. These depictions provide pathways for developing more precise conceptualizations of information asymmetry and its differing roles in various theories. Further, explicating the role of information asymmetry within agency theory to clarify its role as an assumption, mechanism, construct, and boundary condition present opportunities to extend our knowledge of the theory.

Information asymmetry can also serve as a linchpin for building conceptual bridges between theories that share the concept. Synthesizing theories relative to information asymmetry could add refinement and additional predictive insights to each theory by (a) specifying new conditions for when each theory's core arguments hold, when they do not, and provide extensions to each; and (b) generating new explanations of phenomena involving information asymmetry. As an example, we consider agency theory and signaling theory. Agency theorists propose that contract designs can reduce the impact of information asymmetries between agents and principals by aligning agent compensation with effort, shifting risks from the principal to the agent, and sharing outcomes more equally among the two parties (Eisenhardt, 1989). Adding ideas rooted in signaling theory might recast these solutions. Specifically, researchers could consider whether information signals given by the principal and agent serve as substitutes to costly monitoring and incentive structures. Relevant research questions would include the following: Might signals serve to discourage opportunism when agents have less oversight? Is the signal value of the agent's reputation sufficient to make agency contracts self-enforcing? Under what conditions do the agent and principal reach an equilibrium based on the information available to both, and what incentives can be used to maintain that optimizing point? Further, what changes arise if the information asymmetry assumption is relaxed? In the case of agency theory, its primary mechanisms for safeguarding against the hazards of information asymmetry, such as monitoring behavior and outcome-based incentives, become less important, and information signals might become the main basis for guiding ex ante contractual agreements.

We also encourage management scholars to gaze in a proverbial mirror regarding agency issues and information asymmetry. Concern is growing in many fields, including management, about the credibility of scientific findings (e.g., Bergh, Sharp, Aguinis, & Li, 2017). Prominent cases of article retractions have drawn attention to the information asymmetry favoring authors as agents of the field. More subtle problems were highlighted by Goldfarb and King (2016), who estimated that up to 40% of findings across 300 strategic management articles they examined were biased by underrepresenting nonsignificant statistical levels and overemphasizing significant ones. These problems and others arise because authors have "private" and "hidden" information about sample screens, handling of outliers, determinations of final reported models, and the like. One implication is that readers may face moral hazards when receiving and acting upon findings.

Increasing transparency would help address these issues, such as by requiring authors to openly adhere to Aguinis, Ramani, and Alabduljader's (2018) list of best practices that span research design, measurement, analysis, reporting empirical findings, and methodological decisions. Widespread implementation would reduce information asymmetries in the research process and thereby protect the trustworthiness of the field's findings. We also recommend journal editors leverage the asymmetry resolutions found in our review. Specific relevant actions could include, for example, providing incentives for authors to fully disclose methodological information (i.e., incentives to disclose; see Figure 1), making a commitment to weight the quality of research design and analysis more heavily in publication decisions while weighting findings less heavily (i.e., precommitment), and having a third-party expert evaluate reported data and findings (i.e., information intermediaries).

Extending Information Asymmetry Research in Various Management Subfields

In an editorial on review articles, Short (2009: 1315) asserts that "a table outlining how a review topic can bridge other research streams and spur new theoretical insights moves the review piece . . . to a more theoretical contribution that could lead to future scholarly insights."

Table 3
Examples of Research Opportunities Involving Information Asymmetry

Management Subfield	Research Opportunities	Possible Method for Exploring Each Opportunity
Entrepreneurship	Managing information asymmetry in crowdfunding campaigns	Policy capturing design wherein the investment potential of a series of actual crowdfunding campaigns that vary in terms of information asymmetry is assessed
	The role of information asymmetry in pursuing an entrepreneurial orientation	Observational and qualitative techniques that can “dig deep” into group dynamics within entrepreneurial project teams
Ethics and corporate social responsibility	Managing information asymmetry to mitigate and perhaps neutralize social media outrage over company controversies	Archival investigations of social media outrage incidents
	Crafting virtue signaling messages that build company reputation and do not generate cynicism	Linking firm’s virtue signaling to prominent measures of reputation and corporate social performance, such as *Fortune* magazine’s most admired companies list and measures offered in the KLD Research & Analytics database
Human resource management	Increasing transparency within the human resource function as a means to improve high-performance work systems and enhance individual and organizational outcomes, especially in service industries	Field experiments that unveil mechanisms by varying information asymmetry across manufacturing and service sectors teamed with archival analysis
International business	Enriching understanding of information asymmetry as a theoretical construct by considering both narrow and broad operationalizations	Confirmatory factor models of information asymmetry-related variables, including tests of factor structures across context and research questions
	Examination of the role of institutional factors in the selection and use of information asymmetry mechanisms	Testing nuanced contingency perspectives via mediation and moderation methods
Organizational behavior	Development of a view of leadership as the management of information asymmetry	Grounded theory building via qualitative methods
	Diagnosing the role, if any, of information asymmetry in cognitive biases, such as escalation of commitment	Laboratory studies focused on untangling the dysfunctional decision-making mechanisms launched by uncertainty and information asymmetry

(continued)

Table 3 (continued)

Management Subfield	Research Opportunities	Possible Method for Exploring Each Opportunity
Organization theory	The role of information asymmetry as a potential boundary condition in resource-dependent relationships	Dyadic research designs involving primary and archival data
	How information asymmetry factors into reactions to performance above and below aspiration levels	Two-step designs wherein firms' aspiration levels are diagnosed via primary data and performance relative to those levels are assessed archivally
Strategic management	The role of information asymmetry on acquisition valuation and outcomes	Panel studies of information asymmetry, investor reaction to acquisition announcements, and acquiring firm performance
	Information asymmetry as a device for appropriating resource performance streams	Longitudinal studies of performance distribution to firm stakeholder groups

In response, we provide Table 3 and we discuss its entries below. In doing so, we were guided by Short et al. (2008), whose review article on configurations developed research questions and proposed ways to test them within seven subfields: entrepreneurship, ethics and corporate social performance, human resource management, international business, organizational behavior, organization theory, and strategic management. In offering research topics in these areas, we set the stage for inquiry diagnosing the links between antecedents to information asymmetry and the tools available to resolve asymmetry, a key need identified by our review.

Entrepreneurship. Entrepreneurship research offers opportunities to study the relationship between uncertain qualities of actors (a key antecedent) and incentives to disclose information (a resolution mechanism). Information asymmetry exists in most entrepreneurial situations because the creators of a business almost always know more about the inner workings of their ventures than do their key stakeholders. Crowdfunding offers a good example. Through crowdfunding, entrepreneurs acquire financial resources by convincing a series of individuals to contribute money, often in exchange for a product or a small share of the business. This opens up another funding option beyond self-funding, funding by "family and friends," angel investing, and venture capital. Crowdfunding is generally done via dedicated platforms, like Kickstarter. Because crowdfunders seldom interact in person with entrepreneurs, a project's webpage usually provides all of the information upon which crowdfunders decide whether to invest (Vismara, 2016). This arm's-length relationship gives rise to research questions such as, What design elements of online crowdfunding campaigns—like project narratives, biographies, and photographs—create or resolve information asymmetry between entrepreneurs and funders? Should entrepreneurs always strive to reduce information asymmetry or are there circumstances where creating information asymmetry makes receiving donations more likely? Similar to existing crowdfunding studies on other topics, inquiry designed to address these questions could maximize realism via policy capturing designs wherein participants assess the investment potential of a series of actual campaigns that vary in terms of information asymmetry.

Another opportunity is linking entrepreneurial orientation—the extent to which a firm's strategies and behaviors center on generating and exploiting new opportunities—with information asymmetry. According to Lumpkin and Dess (1996), entrepreneurial orientation is a multidimensional construct consisting of autonomy, competitive aggressiveness, innovativeness, proactiveness, and risk taking. Along each of these dimensions, information asymmetries may accrue. For example, *autonomy* refers to the extent to which organizational members possess the freedom to pursue entrepreneurial ideas independently. High levels of freedom create information asymmetry in that organizational members inside an idea development group will know more about the idea than other members. Executives thus have to determine how much information asymmetry they can tolerate. Relevant questions include the following: How can firms best balance project developers' autonomy needs with executives' monitoring needs? Should the information asymmetry created by autonomy be reduced incrementally as a project develops, or should resolution be postponed until the project is finished? Observational and qualitative techniques might be key to addressing these questions.

Ethics and corporate social performance. The scrutiny exerted by stakeholders on the morality of companies' actions has never been higher, and this presents opportunities to examine how firms manage structural, strategic, and behavioral barriers to information sharing via resolution mechanisms. A key reason is the growing influence of social media platforms, like Facebook and Twitter. Two phenomena link social media directly to issues related to information asymmetry and ethics. The first is *social media outrage*, which refers to the tendency of online users to express anger about corporate behavior. News about corporate behavior used to be distributed by traditional news media, like newspapers and television networks. Because these media operated in an "infomediary" position (Deephouse & Heugens, 2009), information asymmetries between corporations and the general public used to be resolved selectively and often only partially due to the (ideological) filtering role of these media. The rise of social media platforms has "democratized" news gathering and dissemination by putting these roles in the hands of the public through a process of disintermediation but has also made the factual basis of news reports more vulnerable by deprofessionalizing journalism as an occupation. For researchers, this raises interesting questions about how firms should manage the information asymmetry about key events between themselves and their stakeholders. Social media outrage seems to grow in reaction to silence, so proactive and skillful public relations efforts are increasingly necessary to protect corporate reputations in the age of social media. Strategically reducing information asymmetry via thorough disclosure to stakeholders could therefore provide companies with a protective buffer against greater difficulties. Methodologically, archival investigations of social media outrage incidents are likely to uncover examples of both best and bad practices that could in turn be used to help companies prevent future outrage situations.

The second phenomenon is *virtue signaling*, which refers to a company publicly expressing support for worthy causes, often via social media, in order to convince observers of the "correctness" of its values (Payne, Moore, Bell, & Zachary, 2013). Done skillfully, virtue signaling can reduce information asymmetry with stakeholders by conveying information via actions taken. This can serve as a reputation-building strategy, and the resulting stronger reputation can constitute a resource that helps the company achieve superior performance, as described by resource-based theory (Bergh, Ketchen, Boyd, & Bergh, 2010; Boyd et al., 2010). However, poorly conceived virtue signaling efforts—such as when there is decoupling between words and deeds—often are received cynically by social media users. The resulting backlash can undermine a company's reputation. Given this context, researchers might assess how well or poorly firms approach virtue signaling and then examine if virtue signaling is related to measures of reputation and corporate social performance, such as *Fortune* magazine's most admired companies list, the measures offered in the KLD Research & Analytics database, and the Reputation Institute's RepTrak data.

Human resource management. Actions that exploit and reduce information asymmetry play a role in many aspects of human resource management. A firm that is seeking a new hire, for example, communicates desirable attributes in its job advertisement, but potential applicants cannot know whether the listed attributes are the real criteria that will drive the hiring decision or whether some of the firm's actual criteria remain unobservable. Information asymmetry remains relevant after a person is hired. During performance appraisals, for instance, individuals struggle to determine whether their evaluations and raises are equitable because usually they lack knowledge of others' assessments and the size of the raise pool. In some companies, employees are strongly discouraged from discussing their pay with colleagues. Meanwhile, both in recruiting and assessment processes, individuals have incentives to hide negative information about themselves; this, too, creates information asymmetry. We suspect that future inquiry would find that better managing information asymmetry—creating greater transparency between employer and employee such that only sensitive information is withheld—within the human resource management function can improve outcomes at the individual (e.g., job satisfaction, intent to turnover) and organizational (e.g., financial performance) levels.

High-performance work systems (HPWSs) might be key here. HPWSs are sets of human resource management practices that build employees' knowledge, skills, and abilities as well as their motivation to excel (Becker & Huselid, 1998). Meta-analytic evidence demonstrates that HPWSs have a strong association with valued outcomes (Combs, Liu, Hall, & Ketchen, 2006). Within most companies, however, leveling the playing field between company and employees with regard to information is not a major focus of performance-enhancing practices, such as flexible work schedules, incentive compensation, training, and employee participation. Meanwhile, Combs and colleagues found that HPWSs have significantly stronger benefits in manufacturing settings, and they assert that many existing approaches to human resources "appear better aligned with manufacturing work" (Combs et al., 2006: 508). This is worrisome, given that manufacturing currently accounts for less than 10% of U.S. workers. Because service industries involve much more ambiguity for workers compared to manufacturing settings, we suspect that efforts to reduce ambiguity via greater transparency would help service workers perform better. To test such a supposition, one might begin with a field experiment that manipulates levels of information asymmetry across manufacturing and service settings and asks subjects to complete questionnaires on the job. This could unveil causal mechanisms that could further be examined via archival data, such as the ASSET4 ESG database.

International business. Given the inherent cultural differences, understanding how information asymmetry arises (i.e., antecedents) and how to manage it (i.e., resolutions) is particularly challenging within international business research. One advantage here, however, it that the field of international business is relatively unique in that multiple studies have developed indicators that proxy for asymmetries. One example is the liability of foreignness—a disadvantage presumed to occur when a firm ventures outside its home market. Baik, Kang, Kim, and Lee (2013) developed a seven-item composite measure of this concept that includes various sources of information gaps as well as institutional and cultural factors. While this measure is conceptually best interpreted as a formative index, its items in fact correlate strongly, suggesting that information asymmetry can both be operationalized narrowly (e.g., through disclosure requirements) and broadly (e.g., also spanning cultural and institutional factors). A promising avenue for theory development would be to conduct a comparison of several indicators and testing their applicability to a range of research questions involving information asymmetry's antecedents and resolutions. Such construct development work offers strong potential to enrich our understanding of the information asymmetry construct.

There are several more specific avenues to use international business to expand understanding of information asymmetry. Consider, for example, a comparison of formal and informal institutions (North, 1991). The former comprises rules, laws, and a third-party enforcement infrastructure that have implications for the interactions between firms and their stakeholders, while the latter consists of self-enforcing cultural norms. Both aspects of institutional settings could affect elements of the conceptual framework offered in Figure 1. For example, Zhou, Anand, and Yu (2007) examined the information aspect of national institutions in the context of cross-border acquisitions. Both culture and institutional variables shed new light on an understudied aspect of our Figure 1 model: boundary conditions. These variables can be used to advance theory via the use of more nuanced contingency perspectives, such as mediation and moderation.

Organizational behavior. It is surprising that information asymmetry has had such a modest presence within organizational behavior research, given that key phenomena within this research area, such as leadership, are likely to serve as antecedents to information asymmetry, resolution mechanisms, or both. Smircich and Morgan (1982: 257) conceptualized leadership as "the management of meaning." From their view, the essence of leadership is not hierarchical supervision and dispensing rewards and punishments, but rather, it is providing interpretations of situations to subordinates that provide direction to those subordinates. This view has been the foundation of studies focused on how leaders guide their charges via sensemaking and sensegiving (e.g., Clark, Gioia, Ketchen, & Thomas, 2010; Gioia & Chittipeddi, 1991).

Inspired by this work, we envision research that views leadership as the management of information asymmetry. Such a perspective would focus on how leaders can improve the performance of individuals, work groups, and organizations via their approach to reducing—or not reducing—information asymmetry between themselves and their subordinates in various situations and using the mechanisms shown in Figure 1 (Kyj & Parker, 2008). Within a struggling company or a company that is being acquired, for example, rumors of layoffs can paralyze workers. Deciding how much information to share—taking into account both concerns for worker effectiveness and moral obligations to those workers—is a daunting managerial challenge. As in the two Gioia studies mentioned above (Clark et al., 2010; Gioia & Chittipeddi, 1991), qualitative grounded theory building would be an important first step toward assessing the viability of viewing leadership as the management of information asymmetry.

Examination of cognitive biases and how these biases can lead to bad decisions is another promising area. Because workers are boundedly rational (Simon, 1955), they are subject to distortions, such as escalation of commitment (Staw, 1981) and threat rigidity (Staw, Sandelands, & Dutton, 1981), whereby flawed thinking leads to suboptimal behaviors. Research into the informational aspects of these problems has focused on uncertainty (i.e., a lack of needed information), but attention has yet to shine on information asymmetry. Beyond a lack of needed information, we wonder if decision makers are more susceptible to phenomena such as escalation of commitment and threat rigidity when they are at an information disadvantage relative to others facing the same decision (Colella, Paetzold, Zardkoohi, & Wesson, 2007; Schijven & Hitt, 2012). Conceptually, the fear that "they know something I don't know" might give rise to self-doubt and a lack of confidence that in turn fuel dysfunctional thinking and suboptimal choices. Carefully crafted laboratory studies could untangle the potential complementary mechanisms launched by uncertainty and information asymmetry. Overall, experimental designs were quite rare in our article pool: Only four articles used pure experiments, while another four used quasiexperimental or field study designs. Greater use of experimental designs could contribute substantially to many of the topic areas listed in Table 3.

Organization theory. Information asymmetry is often an unarticulated assumption in organization theory research, yet many theories in this domain could benefit from a more deliberate acknowledgment of the concept's nature, its causes, and ways to resolve it. For example, resource dependence theory seeks to predict how organizations structurally absorb sources of resource provision uncertainty in their environments in order to preserve their decision autonomy (Drees & Heugens, 2013; Hillman, Withers, & Collins, 2009). Theorists in this domain traditionally have focused on resource dimensions like scarcity and substitutability as predictors of the invasiveness of the absorption option chosen—low criticality and high substitutability would lead to noninvasive options, like long-term contracts and mild forms of co-optation, whereas critical and nonsubstitutable options are expected to lead to quasivertical integration (Pfeffer & Salancik, 1978). A research opportunity resides in assessing whether information asymmetry is a salient boundary condition to predictions of this kind: Does high information asymmetry between resource providers and resource seekers engender more costly and invasive absorption choices? Can a joint effort to reduce information asymmetries make less costly and invasive options feasible? The predictive power of resource dependence theory might improve by acknowledging and incorporating this boundary condition.

Another example involves performance feedback theory, a prominent branch of the behavioral theory of the firm that explains how senior managers respond to feedback signals concerning the performance of the organizations they lead in relation to self-applied historic (i.e., focal organizational prior performance) and social (i.e., competitors' concurrent performance) aspiration levels (Greve, 2003; Jordan & Audia, 2012). The theory predicts that responses to below-aspirational performance tend to be (often unnecessarily) frantic, whereas above-aspirational performance tends to lead to complacency (Greve, 2008). Importantly, a core assumption of the theory is that feedback signals are noisy, but the sources of this noise are often treated as exogenous to the theory's domain. Bringing information asymmetry into play therefore could lead to several interesting extensions: Do middle managers strategically cultivate information asymmetry by manipulating performance signals to influence top managerial behavior? Is information asymmetry between senior and divisional managers a boundary condition to the theory, such that in cases of low information asymmetry, senior managers are more likely to base their decisions on detailed knowledge of divisional operations rather than on weak performance feedback signals? Overall, we see considerable opportunities for theory extension within organization theory deriving from a further integration of the information asymmetry concept.

Strategic management. Information asymmetry is a pervasive matter throughout strategic management research—indeed, 65% of the articles we reviewed fell within this domain. However, many additional research opportunities exist to further extend information asymmetry research within strategic management. We illustrate using two examples. Within mergers and acquisitions, each firm has features that are unobservable or uncertain from the other's perspective (Reuer, Tong, & Wu, 2012). When combined with cheap financing and compensation incentives for CEOs to grow their firms, information asymmetry could lead to overpayment for the target firm, which in turn could weigh down future earnings. While overpaying is a form of resolution, it is a less-than-desirable one. This scenario seems especially likely in cross-border cases whereby the acquiring firm is entering unfamiliar territory and cultures, which exacerbates its information disadvantage (e.g., Balakrishnan & Koza, 1993; Reuer & Koza, 2000). Further, information asymmetries could imperil implementation programs, as the acquired firm's leaders might believe that their new bosses do not understand their contributions, thus compelling them to leave the company. Such departures that have been linked to reduced postdivestiture performance (Bergh, 2001; Cannella & Hambrick, 1993). Collectively, when information asymmetry is higher, knowledge of the target firm and its operations are lower, raising the likelihood of strategic and implementation problems and, ultimately, failure. Panel studies of information asymmetry, investor reaction to acquisition announcements, and acquiring firm performance could diagnose such relationships.

More generally, explaining performance differentials is a central objective of strategic management research, and information asymmetry plays a role in understanding how performance streams are shared with the firm's claimants. For instance, Coff (1999) demonstrated that a firm's earnings from its competitive advantages are not distributed equally among stakeholder groups and that these groups compete within an internal market to appropriate resources. From this perspective, groups with higher bargaining power claim more of the firm's returns than weaker parties. By exaggerating the firm's needs for resource investments to strengthen its prospects, managers could use their information asymmetry advantage as a method for undermining owners' demands for dividend payouts. Again, this is a form of resolution, but not necessarily a desirable one, at least from the owners' perspective. In contrast, owners might require more careful monitoring mechanisms by the board of directors and stricter behavioral controls to help overcome informational disadvantages and allow them to more effectively compete for the returns. Longitudinal studies focused on changes in different performance measures to reflect the priorities for different stakeholder groups would provide insights into when information asymmetry serves as a mechanism for affecting the appropriation of firm returns among stakeholder groups. Overall, there are few aspects of strategic management whereby information asymmetry does not apply.

Conclusion

The information asymmetry concept underlies some of the management field's most important theories and topics. Indeed, limited information may be one of the most common problems surrounding human and organizational interactions of any kind. Our objective was to establish the current level of knowledge of information asymmetry in the management discipline and provide a unified basis for directing future research leveraging the concept. We pursued this objective by developing an organizing framework for reviewing research on the concept's structure, ranging from its antecedents through its resolution devices. Our findings provided the basis for making specific recommendations on the concept itself, clarifying its role in furthering theory development, and offering guidance for subsequent research efforts. Looking to the future, our hope is that researchers will focus on how the concept's meaning, applications, properties, and relationships can open new theoretical vistas across the various subfields contained within management.

Notes

1. In fact, information asymmetry's role in understanding organizations and commerce is so pivotal that Nobel Prizes in Economics have been awarded to multiple theorists whose work informed the concept, including William Vickery and James Mirrlees in 1996; George Akerlof, Michael Spence, and Joseph Stiglitz in 2001; and Oliver Williamson in 2009.

2. As others have already reviewed the rise of signaling theory in management research (e.g., Bergh, Connelly, Ketchen, & Shannon, 2014; Connelly, Certo, Ireland, & Reutzel, 2011), our focus is on the conceptualization of information asymmetry, its role within management theories, and how the field's understanding of information asymmetry can be advanced theoretically and methodologically, rather than focusing on a particular perspective and its prescriptions for resolving the risks associated with information asymmetry.

3. We thank an anonymous reviewer for this observation.

4. We discuss situations wherein actors seek to reduce or increase information asymmetry in order to pursue their own self-interests. Some might adopt a more passive approach and do neither. We acknowledge an anonymous reviewer for this observation.

5. There may be situations wherein a combination of the three scenarios exist. We appreciate an anonymous reviewer raising this possibility.

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