Information Systems Research
Vol. 21, No. 2, June 2010, pp. 207–226
ISSN 1047-7047 | EISSN 1526-5536 | 10 | 2102 | 0207

informs

DOI 10.1287/isre.1090.0249

Research Commentary

Information Transparency in Business-to-Consumer Markets: Concepts, Framework, and Research Agenda

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The Internet has brought about significant changes in the availability of market information in many industries. E-commerce technologies provide sellers with opportunities to design electronic mercantile mechanisms that reveal, conceal, bias, and distort market information, depending on their goals and market position (e.g., suppliers versus intermediaries). In particular, in information-intensive industries where electronic markets play an important role, many firms are using advanced technologies to put innovative strategies into play that are based on the provision of differential information to their customers. We examine the role of information transparency in electronic markets. We contend that there is an opportunity to develop research on sellers' strategies regarding information disclosure to customers and competitors. For that purpose, we develop a set of concepts and a framework to guide future research. We then propose an interdisciplinary agenda for research on the emerging and increasingly important topic of *transparency strategy*, which we define as the set of policies and decisions that a firm makes to disclose, conceal, bias, or distort market information.

Key words: business-to-business e-commerce; business-to-consumer e-commerce; electronic markets; information transparency; market mechanism design; transparency strategy
History: V. Sambamurthy, Senior Editor and Associate Editor. This paper was received on May 12, 2007, and was with the authors 14 months for 2 revisions. Published online in *Articles in Advance* December 15, 2009.

1. Motivation

After more than 15 years since the start of the information revolution triggered by the Internet, it is evident that consumers in many markets benefit from more information to make purchase decisions. The Web 1.0 era of the late 1990s and early 2000s marked the emergence of third-party intermediaries such as shopbots and market exchanges that display the combined offers from suppliers. In the current Web 2.0 era, anyone can publish information on the Internet; product review sites have emerged with individuals' opinions and experiences related to suppliers, products, and services. Simultaneously, competitors have access to inexpensive intelligence based on the information available online. In a sense, the "cat is out of the bag," and managers now must face the challenge of confronting this new open, dynamic, and information-rich business environment. As the Internet gradually becomes a mainstream channel for information exchange and market transactions, organizations are forced to deal with the paradox that the very benefit of the Internet—making information available to facilitate product marketing and distribution—also makes it difficult to capture profits because buyers and competitors are better informed (Porter 2001).

However, this same electronic trading environment creates an opportunity for sellers to strategically disclose and tailor information to reach their target consumer base. *Information transparency* is increasingly viewed strategically as firms consider the trade-off between attracting new customers with market information and the risk of losing information advantages to customers and competitors (Tapscott and Ticoll 2003). How can firms manage these trade-offs and develop strategies to compete effectively? In this research commentary, we make a call for research that studies the strategic revelation of information by selling firms and IT as an enabler of these strategies.

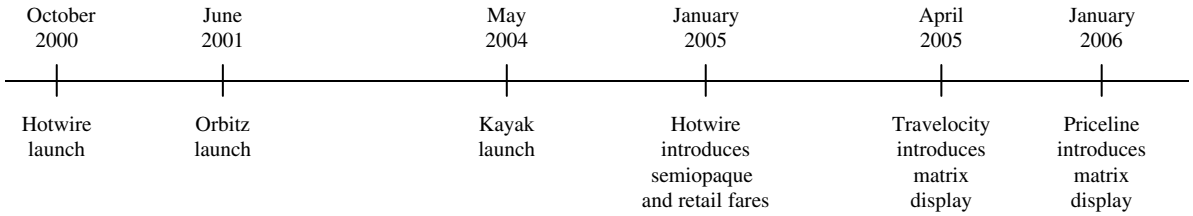
Continued improvements in processing power, data storage, and information transmission capabilities fuel the development of advanced technologies to distribute products and information via the Internet. In particular, e-commerce technologies have increased the overall ability of firms to strategize with market information and to develop innovative mercantile mechanisms that reveal or conceal information. One of our motivations for this research commentary is the information revolution underway in the travel industry, which we have researched extensively for years. In just over a decade, the online travel sector reached half of total U.S. travel sales. In this new competitive environment, the core strategic dimension of competition is the transparency of selling mechanisms enabled by advanced technologies (Granados et al. 2006). New intermediaries have played a major role by innovating in the online channel. Priceline.com introduced the first opaque mechanism that conceals airline carrier information and itineraries, coupled with discounted prices. On the other hand, Kayak.com, an online travel metasearch site, offers an easy-to-use interface to search for fares in multiple airlines and online travel agencies, with instantaneous filtering options based on user-defined search criteria. Kayak, which initially scraped existing *online travel agency* (OTA) sites and airline portals to gather travel information, now uses state-of-the-art technology to populate its databases, power its search engine, and display travel offers.

Existing travel suppliers have also played a major role in the development of the OTA industry, although more so in a reactionary mode. In 2001, major airlines supported the launch of Orbitz, a new OTA that revolutionized the industry by providing a highly transparent mechanism through its matrix display of fares by airline and number of layovers. This competitive move by airlines was partially driven by the strong growth of OTAs, and in particular by the growing distribution power of market leaders, Expedia and Travelocity. The introduction of a new transparency regime by Orbitz not only made consumers better informed but also allowed competitors to track and react to each other's online pricing tactics. In two years, thanks to its transparency strategy, Orbitz caught up to become one of the leaders, and since its introduction, the competition in the transparency dimension has intensified. However, Orbitz has kept an edge on the transparency of their matrix display mechanism because of its use of advanced search technologies and IT platforms to operate (Granados et al. 2008a). Major U.S. airlines also simultaneously launched Hotwire to compete in the opaque niche, where reduced price offers are made without information about the airline carrier or the travel itinerary.

The travel industry has evolved at a fast pace in the use of information to compete. In line with similar developments in other industries, we see two common themes that can be used to frame a research agenda and formulate guidelines for firms in other industries. First, there is a common thread among many of the competitive moves: *the emergence of deliberate strategies on the information revealed in the online channel* (see Figure 1 for a summary of the developments in the OTA industry). Second, we observe that successful strategies are often those that have a tight link between the transparency of a selling mechanism and the technology that powers it.

In this research commentary, we argue that transparency strategy is a dimension of systems design that complements other relevant dimensions recognized in the IS literature, such as the alignment of incentives of users, software engineering techniques, and methodologies to test user acceptance (Ba et al. 2001). These three existing dimensions of systems design cater to users within the firm. We contend that, given the increasing role of digital systems in product distribution and competition, an important consideration for systems design is its *information disclosure*

Figure 1 Transparency Initiatives by Major OTAs Since Year 2000



Notes. This figure provides the timeline of major initiatives announced by existing OTAs or the launch of OTAs that have become major players in online air travel market since the launch of Hotwire in October 2000. The timeline was developed by analyzing the press releases from all major OTAs during the period of January 2000 to January 2006.

policy to parties outside the firm, or its *transparency strategy* (Granados et al. 2008a).

E-commerce technologies enable firms to develop selling mechanisms that reveal, conceal, and manipulate market information. However, there are complexities and challenges that can potentially be sorted out with academic inquiry and research. We observe that established firms tend to assume a reactive position and find themselves in catch-up mode, trying to understand and respond to increases in the market information disseminated by third parties (Granados et al. 2008b). For example, airlines only reintermediated the OTA sector after Expedia and Travelocity were already well established. Other firms, like the intermediaries in the travel industry, have taken a more proactive approach to compete, but given that the Internet channel is still relatively new, many of their moves have been experimental at best. In addition, the organizational capabilities necessary to develop processes for sound transparency strategies are not trivial. Marketing departments are held accountable for marketing strategies, finance departments are held accountable for financial plans, but who is accountable for the disclosure of private information? Is it the CIO, the CEO, or marketing? Public relations? All C-level executives? Given these managerial challenges and complexities, there is a need to develop theoretical and practical guidelines for firms to effectively compete with information.

In this research commentary, we argue in favor of advancing research in transparency strategy. In §2 we build on the existing knowledge scattered across multiple disciplines to develop a research framework and foundations for studying transparency strategy. In §3, we summarize what we know about transparency strategy, based on an interdisciplinary literature review. In §4, we examine what we do not know, and use the research framework from §2 to identify important research questions and directions. Finally, we reflect on our findings and on the implications for practitioners.

2. Conceptualization and Research Framework

Much of the IS literature has traditionally focused on the management of information within the firm to support managerial decisions. Because information is strategically used by firms to compete, an additional component is the strategic disclosure of private information to external parties. *Transparency* can be an elusive and ambiguous concept, so it is our objective at the outset to clearly define and set boundaries for what a firm's transparency strategy may be. In this section, we will conceptualize information transparency in the context of managerial decisions to reveal or conceal private information, and we then formulate a research framework. The answers to the following three *domain questions* and two *content questions* in Table 1 provide the context or domain and boundaries or contents for research on transparency strategy. Different combinations of answers to the above questions will lead to the different research domains and topics. We next answer these questions in the context of this research commentary.

2.1. Key Definitions

We define *information transparency* as the level of availability and accessibility of market information to its participants (Zhu 2004). This conceptualization implies that both the *quantity of the information* available and the *quality of the interface* to make

Table 1 Domain and Content Questions for the Study of Transparency Strategy

Domain questions	Content questions
Definition: What is the contextual definition of information transparency? *Information from*: Which party is considering the disclosure of information? *Information to*: Which party is the receiver of the information?	*Information elements*: What information is being disclosed? *Actions*: What are the possible actions with respect to the strategic revelation of the information?

the information accessible are important. For example, the sheer amount of information displayed can have an impact on transparency. Complex layouts may make a lot of information available, but accessibility may be low if buyers cannot easily consume information that matters to make a purchase decision. Simple layouts that provide just the necessary information often improve transparency (Galitz 2007). Likewise, the way information is displayed and organized in a user interface can also influence accessibility (Degeratu et al. 2000). For example, a long list of search results common in many online search tools makes the information available, but a matrix display such as the one in Orbitz brings additional transparency to compare product offerings in just one screen.

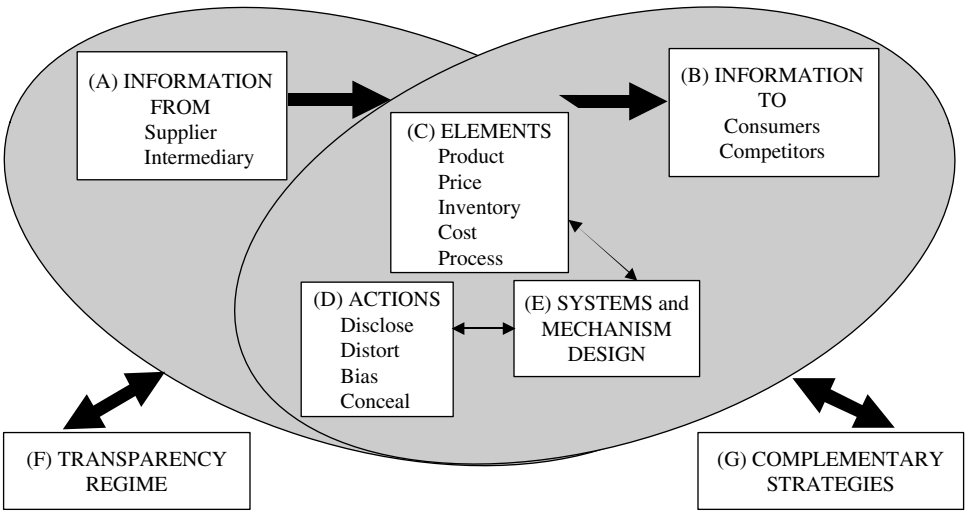
Our choice of the word *transparency* is deliberate, because it implies the intention of the sender to disclose or withhold information. In contrast, constructs like *information availability* or *information sharing* do not necessarily imply that the disclosure of information can be intentional. Our emphasis on accessibility is partially motivated by the notion that in the era of information overload, availability of information is not enough. If a firm is truly interested in revealing information to an external party, it will not just make the information available, but it will also design the search mechanism such that the receiver can sort through the data and extract the information necessary to meet its goals.

2.2. Research Framework

To structure our perspective on research directions for transparency strategy, we offer the framework in Figure 2, which answers the domain and content questions mentioned earlier. We next explain each component of the framework to set the context and boundaries of our call for research.

2.2.1. Information From (A). Which party is considering the disclosure of information? There are multiple types of organizations that can benefit from transparency strategies, such as profit organizations, nonprofit organizations, consumer associations, and government entities. For the purpose of the commentary, we will focus on selling firms in a supply chain, namely, suppliers and intermediaries.

Figure 2 Research Framework for Business-to-Consumer Transparency Strategy



2.2.2. Information To (B). Which party is the receiver of the information? We refer to the case of information disclosure between two firms in a supply chain as *business-to-business* (B2B) *transparency strategy*, and information disclosure from sellers to consumers as *business-to-consumer* (B2C) *transparency strategy*. Other possible recipients of the information are the remaining participants in the supply chain, government entities, associations, and the public in general. In this commentary, we focus on B2C transparency strategy, but we include competitors on the receiving end. This is because information released to consumers typically can also be observed by competitors.

The last three questions point out the different components of a transparency strategy, namely, the information elements, the possible actions to reveal or conceal information, and the technology that supports the strategy. These components of transparency strategy are influenced by the strategies and incentives of the parties that disclose or receive the information. The oval shapes in Figure 2 show how transparency strategy is in part a product of the incentives of both senders and receivers.

2.2.3. Information Elements (C). What information is being disclosed? Based on an extensive review of relevant literature in IS, economics, marketing, operations, and finance, and our own research on how firms strategize with information, we identify the following categories of information elements that selling firms can strategize with to compete and that are relevant to the strategies and objectives of consumers and competitors on the receiving end.[1] A more transparent B2C market will result from greater transparency in one or more of these categories of information elements.

[1] This is not an exhaustive list of dimensions of information transparency but merely a core set of broad categories of information elements that are important based on our review and which we focus on to make the analysis in this commentary tractable. Examples of other dimensions of information transparency are in the B2B context, where transparency of demand and location may be considered strategic to the firm. Moreover, when considering other constituents such as the local communities and the government, information transparency can take other relevant forms, such as authenticity, originality, priorities, governance, etc.

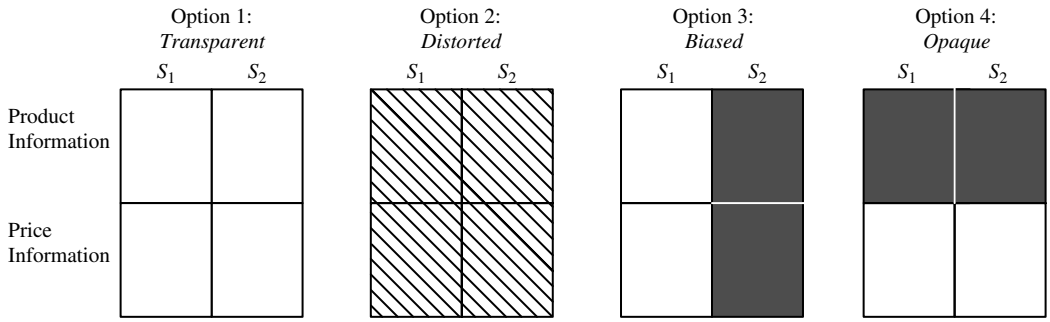
- *Price*: Information about prices, such as current market prices, quotes, and historical transaction prices (Granados et al. 2006, Soh et al. 2006).
- *Product*: Information about product characteristics and quality (Bakos 1997, Mollgaard and Overgaard 2000).
- *Inventory*: Information about inventory availability, which provides clues about the tension between supply and demand (Lyons 1996, Jain and Moinzadeh 2005, Dewan et al. 2007).
- *Cost*: Information about the costs of production and distribution (Sinha 2000, Gal-Or 1988, Zhu 2004).
- *Process*: Information about the transaction process, such as decision criteria, policies, transaction events (Adomavicius et al. 2006), and the firm's internal management and production processes, such as order fulfillment and privacy protection protocols.

2.2.4. Potential Actions (D). What are the possible actions with respect to the strategic revelation of the information? Thanks to advanced e-commerce technologies, sellers increasingly can make strategic decisions about the information elements that they choose to disclose in a transparent manner. In addition, firms can deliberately mitigate transparency through distortion, bias, or opaqueness (Granados et al. 2006). Figure 3 illustrates the set of options that firms can choose. Any combination of these options for each one of the information elements being considered represents the full set of strategic alternatives.

The four cases are as follows:

- *Transparent*: All information elements are revealed by making them available and accessible (see Option 1, Figure 3).
- *Distorted*: Firms can distort information by implementing obfuscation strategies that decrease transparency, without completely concealing the information (Ellison and Ellison 2004). For example, a simple pricing scheme may increase information transparency to the potential buyer, while ad hoc, unpredictable price adjustments may be implemented to disable the buyer from ascertaining full price transparency (Oh and Lucas 2006). Alternatively, outdated or inaccurate information can be presented, such as a rough estimate of market prices—for example, the

Figure 3 Transparency Strategy: Transparent, Distorted, Biased, and Opaque



Source. Granados (2006).

Notes. This figure illustrates the core set of options to disclose, distort, bias, and conceal information in a market with two sellers S_1 and S_2. In Option 1, the *transparent* case, product and price information for both sellers is available and accessible. In Option 2, the *distorted* case, product and price information for both sellers is available, but it is distorted. In Option 3, the *biased* case, product and price information is available, but only for Seller 1. Alternatively, preferential access can be given to the information about the offerings of Seller 1. In Option 4, the *opaque* case, product information for both sellers is available, but price information is concealed. Note that product and price information in this graphical representation can be replaced by other information elements, including inventory, cost, and process information. Likewise, S_1 and S_2 can be replaced with other market dimensions.

average price paid for a hotel reported on Priceline.com[2] (see Option 2, Figure 3).

- *Biased*: Biased displays provide preferential availability or accessibility of information along a certain market dimension. Option 3 in Figure 3 illustrates bias in favor of Seller 1. S_2's information is concealed, whereas S_1's information is revealed. Bias can also occur by showing information in a preferential order. Examples are search engines and online intermediaries that display first the search results of suppliers with which they have preferential agreements (e.g., Google's paid placement mechanism).
- *Opaque*: Some market mechanisms conceal information along one or more of the categories of information elements (see Option 4, Figure 3).

The examples of the strategic actions by OTAs discussed earlier are a case in point. At one extreme is Orbitz, which has developed technologies, Web interfaces, and business practices to provide high levels of transparency for both product and price information (Option 1). At the other extreme are Hotwire and Priceline.com, opaque mechanisms that conceal information about the airline and travel itinerary until after purchase (Option 4). Most major airlines use complex pricing schemes accompanied by dynamic pricing adjustments to obfuscate their pricing strategies (Option 2). Airline, car rental, and hotel supplier portals typically show their own travel offers, so they are biased selling mechanisms (Option 3).

2.2.5. Systems and Mechanism Design (E). Strategic decisions to reveal or conceal information will have direct implications for IT and systems design. In particular, transparency strategy will have implications for information disclosure via electronic distribution channels and information portals, so it needs to be incorporated into the systems design process. Failure to do so may lead to a disconnect between the firm's information disclosure decisions and the actual information disclosed.

A strategy of high transparency (Option 1) may require a higher Web infrastructure capability to display more information online. For example, the search engine of Orbitz is powered by an advanced IT platform that enables the display of hundreds of results for each request. In addition, transparency may require advanced technologies that make the relevant information accessible and tailored to the recipient graphically or in an organized manner for easier consumption, as is the case of Orbitz's matrix display. Another example is the use of Ajax technologies, which allow dynamic changes to a display as user-specified filters or commands are entered or modified (Granados et al. 2008b). This technology is used for

[2] This information is obfuscated because the buyer does not know what the average reflects: the grand average over all the hotels since the beginning, the average this month, this week, or in the last hour, for example.

popular Web applications like Google Maps and for screen refreshes in Kayak's search mechanism.

On the other hand, the design of a market mechanism by which purchase transactions take place can affect the transparency of the information (Anindalingam et al. 2005). Some auction mechanisms (e.g., English auction) can lead to higher price transparency relative to posted prices because buyers and sellers can observe the bids of other participants (Soh et al. 2006, Zhu 2004). Therefore, the design of the features, rules, and trading process of an electronic market or selling mechanism should deliberately consider and incorporate transparency strategy to avoid unintentional deviations from the information disclosure policies of the firm.

2.2.6. Transparency Regime (F). At any given point in time, information may be available for market consumption, or it may be private to the firm, and firms must be aware of both to strategize effectively. Regarding the former, we define a market's *transparency regime* as the aggregate information disclosed by competitors, suppliers, buyers, customers, and other third parties. A guiding principle to predict transparency regimes is based on the proposition that the emergence of the Internet as a platform for commercial transactions will lead to frictionless commerce, where market participants will be perfectly informed about product offerings and prices as search costs decrease (Brynjolfsson and Smith 2000). Therefore, the online channel will contribute to more transparent regimes. For example, shopbots display supplier, product, and price information to consumers with easy-to-use filtering and sorting options (Smith 2002). In addition, Web 2.0 technologies have made social networking sites and online product review sites possible; consumer groups and individuals can post comments about their perception or experience with products and suppliers (Ba and Pavlou 2002, Shaffer and Zettelmeyer 2002).

Why is the transparency regime an important input to transparency strategy? With a vision of the expected long-term transparency regime of a market or industry, firms can better define a strategic direction for information disclosure, which will in turn influence competitive moves in shorter-term horizons. For example, in anticipation of the impact of the Internet on the travel distribution, Orbitz deliberately adopted a strategy to compete with transparency from its inception.

Alternatively, a firm with market power can influence a market's transparency regime. For example, the Orbitz matrix display triggered competition in the transparency dimension by other OTAs, which led to a more transparent regime in the industry. Transparency regimes are the product of the individual actions of firms, which can change the overall levels of information offered to consumers in the long run.

2.2.7. Complementary Strategies (G). Transparency strategy also relates to the alignment and coordination with other managerial decisions (Ellison and Ellison 2004, Granados et al. 2008a), which we label *complementary strategies*. Although we do not focus on this aspect of the framework in this commentary, we include it in the framework to highlight that it is important for transparency strategy to be aligned with other decisions within the firm, such as pricing strategy and product design.

One complementary strategy is *pricing strategy*. For example, Hotwire's recent strategy to segment markets based on incomplete information considers pricing strategy and product design decisions. Hotwire segments consumers by offering airline tickets with three levels of product information, each with a different price. At the opaque level (cheapest price option), no product information is provided except origination and destination. At the semiopaque level (midrange price option), approximate departure times are revealed. Finally, the retail level provides an exact itinerary for the lowest retail price.

Another complementary strategy is related to *product design*. Clemons et al. (2002) suggest that an online intermediary that strategically emphasizes product transparency should reflect this choice in product design. Moreover, firms can opt to develop products to position their offers in the increasingly broader spectrum of possibilities for consumers. For example, Clemons (2008) argues that in the age of consumer informedness, consumers are more demanding, so firms should develop hyperdifferentiated products and implement targeted offers to hit the *sweet spot* of consumer demand.

3. What We Know About Transparency Strategy

One of the motivations for our call for research on B2C transparency strategy is that we find the related literature to be scarce and scattered across disciplines. This is perhaps not surprising because only until the end of the last millennium did the Internet generate numerous options for sellers to strategize with information. Prior to that, they were subject to the transparency regime in their respective industries and only those with enough market power could deliberately and effectively implement transparency strategies by disclosing information through their own channels. In this section, we provide a review of what we know about transparency strategy. Based on this review, we derive a set of guidelines for B2C transparency strategy. There are three broad research areas in the literature from which we gathered what we know about transparency strategy: (1) *B2B transparency strategy* and the disclosure of information from sellers to other firms in the supply chain; (2) *electronic market design* to intermediate trade, including the design of financial e-markets; and (3) *transparency regimes* and their impacts on competition, consumer welfare, and market efficiency.

3.1. 2B Transparency Strategy

For a long time, technologies for information exchange have been used strategically by firms to improve both operational efficiencies and performance in supply chains. For example, firms use electronic data interchange (EDI) technologies to increase efficiencies in product distribution, inventory management, and logistics. We next provide a synthesis of interesting and relevant insights from this literature that can be applied to B2C transparency strategy.

There is an increasing recognition of the strategic nature of IT-enabled information exchange on supply chain performance (Lee et al. 2000). Pioneers such as Dell and Wal-mart have developed successful supply chain strategies using technologies for information sharing such as EDI and radio frequency identification (RFID), and have fueled the vision of the strategic imperatives of transparency strategy in B2B markets (Lee 2004). Today, information disclosure in B2B markets is well recognized as an enabler of efficiency for supply chains (Patnayakuni et al. 2006) and as a strategic dimension for individual firms (Hoffman et al. 2002). However, transparency strategy in B2B markets is not trivial because both the sender and receiver of the information can use it strategically for their own benefit. Therefore, the sender must decide what its information disclosure policy is and whether it will participate in existing electronic channels for B2B information exchange and trade.

3.1.1. To Disclose Information or Not? In B2B relationships, information sharing using electronic channels can lead to efficiencies in the supply chain (Kim et al. 2005), so it makes sense to be transparent to supply chain partners as long as efficiencies are expected. For example, Jain and Moinzadeh (2005) model the supplier's choice to reveal information about finished product inventory in a partnership with a buyer, to show that revealing this information can be of mutual economic benefit. Transparency about the order fulfillment process for online buyers may increase customer satisfaction (Costa et al. 2008), and it may also allow suppliers to be aware of outstanding orders for inventory replenishment.

However, even in these efficiency-seeking partnerships, participants may use information strategically, and it may not be in their best interest to be transparent. Corbett (2001) shows different contractual arrangements between a supplier and a buyer, where they share private information about production setup costs and inventory back-order costs, respectively, and concludes that the wrong contractual design can motivate a buyer to distort its inventory back-order costs to get the most out of the arrangement. McAfee and Schwartz (1994) studied process transparency in the context of contract terms between a supplier and a buyer. They found that policies to make contract terms transparent may mitigate buyers' fears that a monopolist supplier will continually renegotiate terms and engage in selective discounting.

3.1.2. To Participate or Not? One way for suppliers to implement a transparency strategy is by making deliberate decisions to sell via existing trading platforms. A supplier's level of involvement in B2B electronic markets is dependent on its IT capabilities and market power (Hoffman et al. 2002); on environmental factors such as demand uncertainty, market volatility, and market fragmentation (Choudhury 1997); and

on the degree of cost transparency to which it may be exposed (Zhu 2004). A supplier with low IT capabilities and low market power will likely rely on third-party electronic intermediaries to transact, which restricts its ability to strategize with information because it is subject to the design imposed by the intermediary. On the other hand, a supplier with high market power and high IT capabilities is in a position to develop its own distribution channel or marketplace, to exert control over information disclosure policies. However, this control can potentially deter competitors from joining the marketplace, lest the owner will use information from transaction history to its advantage (Kalvenes and Basu 2006).

With respect to buyers, there is an emerging research stream that studies the design of procurement systems and their transparency levels. In procurement auctions, buyers may provide different information about the bidding process, which will affect bidder behavior and the overall outcome of the auctions (Kulp and Randall 2005), so a smart design of the informational features is critical for B2B procurement systems to be effective (Arora et al. 2007). For example, Ariba, an electronic B2B market maker, once convened reverse auctions, and buyers determined the revelation policy in terms of winning bids, number of bidders, and other auction process details. The early success of Ariba contrasted with the failure of Covisint's procurement auction system (Applegate and Collins 2005). Covisint was a joint venture between three major U.S. automakers, and in retrospect they should have developed a coherent transparency strategy to eliminate the possible reluctance to participate from suppliers and other competitors.

3.2. Information Transparency and Electronic Market Design

The literature on the design of financial markets (e.g., Madhavan 2000) and the auction literature provide a foundation for the design of electronic selling mechanisms. This research suggests that there are certain features of a market's design that may impact information transparency. These features may or may not be directly related to the disclosure of specific information elements.

3.2.1. Transparency Design Features. Transparency design features are those related to information disclosure policies throughout the trading process. For example, the opaque strategy of Hotwire is reflected on the clearance fare that excludes airline and itinerary information prior to purchase. The transparent strategy of Orbitz led to a design of an interface that showed a summary of all available offers in one screen via the matrix display.

Consumers demand both product and price information from different suppliers, so a common strategy for online intermediaries such as online retailers and shopbots is to be unbiased in the inclusion and display of information about supplier offerings. However, that is not the only alternative. Some intermediaries have biased markets to favor suppliers with whom they develop special arrangements. Such is the case of some OTAs, which up until recently developed preferential agreements to favor specific airline offers in their search results displays. Online intermediaries must also cater to suppliers because they require a critical mass of both buyers and sellers to be viable (Soh et al. 2006, Smith 2002).

Viswanathan et al. (2007) examined online infomediaries in the auto industry and found that for those perceived as *product transparent*, consumers paid higher prices; whereas for others perceived as *price transparent*, consumers paid lower prices. Therefore, intermediaries should consider suppliers' concerns that price transparency may erode market prices, while appealing to consumers' appetites for easy price and product comparisons. Soh et al. (2006, p. 706) have coined this dilemma the "Catch-22 of electronic marketplaces." One alternative is to make selling mechanisms more product transparent, which appeals to both consumers and competitors.

3.2.2. Other Design Features. Emerging research on electronic market design (Anindalingam et al. 2005) suggests that, depending on the design of the trading process in an electronic market, there may be an impact on the level of information transparency to the consumer. For example, traditional auctions can provide clues about price transparency because potential buyers observe the bidding behavior of others.

In line with how most financial markets work, other aspects of market design that can influence information transparency are the price discovery process, such as the bidding mechanism (Terwiesch et al. 2005), and

the transaction protocols, such as the rules of trade (Madhavan 2000).

3.3. Price and Product Transparency Regimes

Economists have studied the implications of the premise that e-commerce technologies structurally lower search costs for market information. Related search-cost models typically assume that the difference in information search costs across channels is an independent or exogenous variable (e.g., Bakos 1997, Campbell et al. 2005, Lal and Sarvary 1999, Viswanathan 2005), in line with the economics literature on search costs (Salop 1977, Varian 1980). The broad objective of this research is to determine the impact of higher transparency about competitive offerings on competition and social welfare.

3.3.1. Price Transparency. Most studies on price transparency have been carried out in the context of competition policy (Campbell et al. 2005, Schultz 2005) and the design of efficient financial markets (Bloomfield and O'Hara 1999, 2000). The debate stems from a fundamental discussion on the positive and negative long-term impacts of price transparency on competition and welfare. One side of the debate is that lower search costs for price information on the consumer side may lead to lower prices, to the benefit of consumers (Bakos 1997, Stigler 1961). There are several empirical studies that support this claim, by showing evidence that prices are lower on the Internet than in conventional channels (e.g., Brown and Goolsbee 2002, Brynjolfson and Smith 2000, Zettelmeyer et al. 2006).

The opposite argument is that higher price transparency on the supplier side increases prices by facilitating *tacit collusion* and mitigating competition (Campbell et al. 2005, Granados et al. 2006, Schultz 2005, Stigler 1964, Varian 1980). By monitoring each other's prices, competitors can signal price increases, or through punishments deter each other from price reductions to a tacitly agreed market price.

Hence, managers are faced with the difficult task of supporting higher price transparency, because in practice it is difficult for sellers to separate information transparency to consumers and competitors (Mollgaard and Overgaard 2000). Price information disclosed online to consumers can be viewed by competitors also. Therefore, the impact of price transparency on market prices depends on which one of the two opposite effects prevails: the *negative effect of better-informed consumers* or the *positive effect of better-informed competitors*. Mollgaard and Overgaard (2000) call this dual effect of price transparency a "mixed blessing."

The impact of IT-enabled price transparency is likely to be different for homogeneous versus differentiated products. For *homogeneous products*, the effect of price transparency on price competition because of better-informed consumers is only partially offset by tacit collusion, which will result in lower net prices (Boone and Pottersz 2006, Campbell et al. 2005, Schultz 2005). On the other hand, for *differentiated products*, price transparency is likely to make collusion relatively more difficult, which will exacerbate price competition (Anderson and Renault 1999, Bakos 1997, Schultz 2004). The intuition is that in differentiated markets consumers will search more to find the product with the right fit, increasing competition and the competing firms' incentive to deviate from a collusive agreement. For products with important nondigital attributes that require physical inspection, prices may increase in the presence of the Internet. Because of the need to incur a costly trip to the store to inspect new offerings, consumers may prefer to stay loyal to a brand purchased online with which they are familiar with (Lal and Sarvary 1999). In general, obfuscation strategies with nonprice information making the comparison difficult can also help suppliers differentiate their products and overcome the negative impact of price transparency. Therefore, when faced with price competition, firms may need to embrace enhanced transparency in other dimensions such as product transparency.

3.3.2. Product Transparency. Marketing research offers valuable insights on conceptualizing product transparency strategy. Consumer behavior researchers have found evidence that consumers may view a product with suspicion in the absence of information about salient attributes of the product. For example, Johnson and Levin (1985) observed lower product ratings when the appropriate product information was missing.

For homogeneous products, product transparency is not a major driver of purchase decisions. For differentiated products though, higher product transparency will likely lead to higher prices (Bakos 1997).

Boone and Pottersz (2006) modeled the level of awareness of the products offered and found that the higher the awareness of the full set of product offerings is, together with their prices, the higher the demand will be, and prices may increase when supply is fixed.

3.3.3. The Internet and Transparency Regimes. Although the Internet may have broadly brought markets closer to perfect information, the impact may vary across industries and markets. Granados et al. (2006) studied several industry sectors in the travel and financial securities industries to predict the extent to which different industries will structurally move to higher levels of information transparency because of the Internet. They conclude that long-term changes in transparency regimes will vary across industries, depending on the ease of electronic representation of a product and the degree of competition.

3.4. What We Know: Guidelines from the Literature

Overall, our assessment is that there is much ground to be gained in the development and practice of B2C transparency strategy. Nevertheless, there are some guidelines that can be derived from this synthesis of the literature.

3.4.1. Managing Trade-Offs. Transparency strategy decisions are not typically straightforward, and they involve managing trade-offs. For example, the literature on B2B transparency strategy suggests that full transparency is beneficial to improve the performance of supply chains. It is not necessarily the best alternative in some situations, however, particularly when the receiving party has incentives to use that information to his or her sole advantage, or when unintended consequences result from sharing information, such as an increase in cost transparency. One of the foundations of B2B transparency that also applies in the B2C context is that transparency strategy by sellers should incorporate the incentives and objectives of the buyer or consumer to better evaluate these trade-offs.

Intermediaries face the additional challenge of balancing the strategies, incentives, and interests of suppliers and consumers while developing a viable business model. For example, buyers may favor transparency of price information, but the suppliers may not, so price transparency strategy and the related design of the trading mechanism are critical for the intermediaries to succeed.

3.4.2. Systems and Mechanism Design. Regarding more-specific guidelines for transparency strategy, the literature on product and price transparency regimes provides the opportunity for some concrete design recommendations. More information about competitive offerings does not necessarily lead to lower prices and lower profits, contrary to the commonly held expectation that emerged with the advent of the Internet. As most studies in the B2B and B2C markets so far suggest, price transparency is likely to have a negative impact on market prices, but this impact may be offset by the ability of suppliers to tacitly collude. Also, sellers and intermediaries can develop product-transparent selling mechanisms that offset the price competition effect. The implications for the design of online selling mechanisms are summarized in the following principles:

- **Design Principle 1 (The Participation Principle):** *Suppliers can participate in or influence the design of selling mechanisms of online intermediaries as an alternative to developing their own.*
- **Design Principle 2 (The Price Transparency Strategy Principle):** *Suppliers should consider the collusive effect of price comparison sites in addition to the price-competition effects to develop their price transparency strategies.*
- **Design Principle 3 (The Product Transparency Strategy Principle):** *In the design of online selling mechanisms, suppliers and intermediaries should emphasize product transparency features to drive consumers away from straight price comparisons.*

The research- and practice-oriented findings here are synthesized from our analysis of existing literature, which is scattered across different academic disciplines. Academics have just scratched the surface in the effort to provide fundamental guidelines for transparency strategy and the relationship with systems design. There are still important questions that remain unanswered, including whether these principles can guide practical design and whether the expected behavior is observed. As we learn more from new research efforts, there will be more principles and guidelines that focus on specific contexts. We next propose a research agenda with more-specific research questions in mind that will fill these gaps.

4. What We Don't Know: Framing a Future Research Agenda

There is much ground to be gained to develop theories about the impact of information transparency and practical guidelines for sellers to strategize with information. We make a call for research on the *impact of information transparency* on consumers and the consequent *normative design questions* that arise for sellers to strategize online with market information. The broad research directions that we propose are based on the research framework of Figure 2, and they include:

- actions to disclose or conceal information elements that influence purchase decisions;
- the consequent implications for the design of systems and electronic selling mechanisms; and
- the consideration of environmental factors in the form of transparency regimes.

Impact of Information Transparency. From a broad perspective, to research the impact of information transparency on consumers, empirical methods such as surveys, experiments, case studies, and data mining can be used to examine how different information elements influence consumers. The complexity that arises from the interdependence of transparency decisions for the firm underscores the challenge that academics face to build theory and guidelines about transparency strategy. There are two ways in which these interdependencies arise. First, revealing information to consumers will likely imply revelation to competitors and other market participants. It is difficult to model these interdependencies of information disclosure to multiple players or to isolate the effects in empirical studies without losing some of the realism and complexity. For example, the existing literature related to information revelation has focused on either B2B information transparency or B2C information transparency, yet much of the information displayed by firms on the Internet is available to both firms and consumers.

Second, even though it would be ideal to develop separate strategic guidelines for each one of the informational elements (e.g., price, product, inventory, cost, and process information), in practice they would be difficult to implement because transparency in one dimension may influence transparency in another dimension. For example, buyers typically demand to see prices associated with product offers, so product and price transparency are often not separable in practice. Price transparency provides clues about sellers' margins, which increases cost transparency (Sinha 2000, Zettelmeyer et al. 2006, Zhu 2004). Inventory transparency may provide clues about future market prices (Dewan et al. 2007). Thus, examining individual categories of information elements will be valuable, but so is the need to study the interdependencies across information elements.

Normative Design Questions. Parallel to the need to understand the impact of information transparency on consumers is the necessity to develop research that identifies the optimal or incrementally better design of information systems and selling mechanisms. These designs are a major component of the implementation of a transparency strategy because they can impact online shopping behavior. The guidelines for the design of systems and market mechanisms should consider the interdependencies that are inherent across transparency decisions. Here, methods such as analytical modeling, simulations, experiments, and algorithmic development might be suitable.

We next provide some promising research directions within each component of the transparency strategy framework, based on our assessment of areas that are particularly relevant for practitioners and the recognition of the challenges ahead. See Table 2 for a summary of what we know, the research questions, and related research methods that could be employed.

4.1. Information To

When suppliers distribute products online, they openly display information to potential buyers or current customers, but this information will be visible to competitors. There are trade-offs to be made, because gains in sales attributable to higher transparency may be offset by negative impacts as competitors become better informed. For example, the effects may be negative when competitors have access to inventory and cost information. Dewan et al. (2007) find that information intended for consumers on available stock can be used by competitors to set prices dynamically to their advantage. Many airlines now display available seats on a given flight, which exposes their inventory to competitors. As in B2B electronic markets (Zhu 2004), suppliers may be reluctant to sell via an intermediary or electronic market if their cost structures are exposed. Regarding price transparency,

Table 2 Research Questions and Directions on B2C Transparency Strategy

Framework components	What we know	Research questions	Research methods
Information to	Online transparency strategies to consumers and competitors are not independent.	• What are the individual and joint effects of disclosing information online to consumers and competitors? How should sellers strategize accordingly?	Analytical models, data analysis, simulations
Information elements	Price transparency increases price competition. Product transparency mitigates it.	• What are the individual and joint effects of product, price, process, cost, and inventory transparency on consumers? How should sellers strategize accordingly?	Field and controlled experiments, data analysis, simulations
Actions	*Suppliers*: Transparency attracts consumers but makes them smarter. *Intermediaries*: Transparency decisions should cater to both suppliers and buyers.	• What are the effects of disclosure, distortion, bias, and opaqueness on consumers? How should sellers strategize accordingly?	Economic experiments, analytical models
Systems and mechanism design	Price transparency strategy must incorporate price collusion effects and price erosion effects. Design systems and mechanisms with high product transparency.	• What IT and organizational capabilities are necessary to effectively link transparency strategy with systems and mechanism design? • How does the design of online selling mechanisms impact transparency? What design principles can be derived from these impacts?	Case studies, simulations, algorithmic development
Transparency regime	Information-intensive and competitive markets will have more-transparent regimes.	• What will be the online transparency regimes by industry? • How should predictions of an industry's transparency regime influence transparency strategy?	Analytical models, case studies, simulations

losses because price erosion can be offset by the ability of competitors to tacitly collude. This leads to the first research question for B2C transparency strategy:

• **Research Question 1 (The Effects of Information Disclosure on Consumers and Competitors):** *What are the individual and joint effects of disclosing information online to consumers and competitors*? *How should sellers strategize accordingly*?

This broad question includes research on any of the relevant individual information elements, namely, product, price, inventory, cost, and process information. Analytical modeling techniques from game theory are appropriate to consider information to customers and competitors separately, and the literature on search costs, competition policy, and transparency in financial markets provides a foundation on which to build. However, considering the joint effects of information transparency on consumers and competitors can make analytical models intractable, so data analysis of real-world impacts and simulations are possible complementary methods. The specific research questions will be shaped by the different trade-offs in transparency decisions that suppliers and intermediaries face.

Suppliers. For suppliers, one of the trade-offs that needs to be considered is the increase in price competition as consumers become better informed about market prices, versus the decrease in competition because of collusive practices. There are some empirical evidence and modeling results on the separate effects, and there are some modeling results of the joint effects to inform competition policy (Mollgaard and Overgaard 2000). So far, search cost models indicate that the *negative effect*—more-informed consumers and price competition—will be hard to overcome, but this

has yet to be tested empirically. We need to understand the conditions under which the net effect of price transparency is positive or negative.

Intermediaries. For intermediaries, the information intended for consumers is not just accessible to competitors but also to the suppliers they serve. Whereas consumers favor price information that allows them to pay less for a given product, some suppliers may be concerned about the downward pressure on profits of price transparency. These suppliers may avoid selling via an intermediary that is price transparent. For example, Redfin (www.redfin.com) is a real estate broker that provides high price transparency through comprehensive filtering options, historical price-per-square foot trends, and appraisal estimates. Initially, real estate brokers hesitated to list their inventory on Redfin because of the transparency of the site (Thompson 2007). A similar example is Zillow (www.zillow.com), which uses available real estate market information to establish home price estimates. Zillow operates as an information transparency intermediary in the markets that it serves, even though not all real estate professionals agree with the accuracy of the price assessments that it makes on behalf of home owners. Clearly, increasing attention is necessary for the design of electronic market mechanisms that perform well for both suppliers and consumers, while considering the effect of making the information available to competitors.

4.2. Information Elements and Joint Effects

As we noted earlier, an information element in one category (e.g., price transparency) can have an impact in another category (e.g., cost transparency). These interdependencies across information elements also make the problem complex for researchers to model and empirically analyze, but it is nevertheless a practical challenge that can benefit from academic research. This leads to our second research question.

• **Research Question 2 (The Effects of Different Information Elements on Consumers):** *What are the individual and joint effects of price, product, cost, inventory, and process transparency on consumers*? *How should sellers strategize accordingly*?

A scientific approach to the assessment of the value that consumers place on individual information elements will enable the creation of guidelines for transparency strategy. Real-world data of sellers that disclose and conceal information to different market segments can be examined to derive the value that consumers place on specific information elements. This practice is common in online tiered memberships with different levels of information disclosure, such as free and upgraded memberships. It is also the case of sellers with opaque and transparent selling mechanisms, such as Hotwire and Priceline.com.

Economic experiments where the information provided is manipulated while other factors are controlled can provide insights on consumers' willingness-to-pay for specific information elements. Experiments on price and product transparency can build on the methodologies from existing studies in financial markets (Bloomfield and O'Hara 1999, 2000), marketing (Lynch and Ariely 2000), and design research on mercantile mechanisms (Adomavicius et al. 2007). In addition, field experiments can be performed in collaboration with firms that are interested in examining the effects of disclosing specific information elements.

Suppliers. One challenge suppliers face is the difficulty in separating product and price information, because buyers will typically demand to see the price associated with a product offer. Other than a few studies that have examined price elasticity effects (Chevalier and Goolsbee 2003, Ellison and Ellison 2004, Granados et al. 2009), the joint impacts of product and price information have seldom been studied empirically. An interesting direction is to empirically test the modeling result of Boone and Pottersz (2006) that higher awareness of the products and prices in differentiated markets will increase demand.

Intermediaries. There are a few studies that provide some preliminary insights to answer this question for intermediaries. Baye and Morgan (2001) modeled a monopolist information gatekeeper for a homogeneous product and found that such an infomediary is viable when it charges fees to bring consumers and sellers together in an electronic market. However, online intermediaries have the catch-22 dilemma of satisfying both sellers and buyers, so they are faced with complex design decisions related to information disclosure. Lynch and Ariely (2000) performed experiments with an electronic shopping system with different transparency levels and found that it is optimal for

online intermediaries to be transparent in both product and price information, because it will attract more consumers. In addition, their experiments suggest that product transparency decreases consumers' sensitivity to prices.

On the other hand, Montgomery et al. (2004) used simulations to show that consumers may be better off with a reduced set of product offers rather than a complete list of offers. In other words, given the risk of information overload, in markets with numerous offers it may be appealing for consumers to receive a reduced set of recommendations rather than a full set. This finding is in line with studies in financial markets that suggest full information transparency may not always be optimal for traders (Bloomfield and O'Hara 2000, Madhavan 2000).

4.3. Potential Actions

As we mentioned earlier, there is a rich body of literature in economics and financial markets to analyze the effects of information transparency, which feeds the discussion on whether higher transparency in markets leads to higher efficiency, more competition, and lower prices. There is an opportunity to adapt analytical models that apply the lessons from this literature to the context of B2C electronic markets and studies the situations under which it is beneficial for sellers to strategize by being more transparent.

Moreover, there is a need to develop new research streams on what firms can do to mitigate information transparency: namely, distortion, opaqueness, and bias. A common theme that we found in our review of the literature is that full transparency is not always beneficial, because it may lead to price erosion in the market. This outcome can be detrimental to both suppliers and intermediaries, and it may partially explain why firms are increasingly using obfuscation, bias, and opaqueness strategies to bring some degree of friction back to the market. This leads to our third research question.

• **Research Question 3 (Disclosure, Distortion, Bias, and Opaqueness):** *What are the effects of disclosure, distortion, bias, and opaqueness on consumer behavior*? *How should sellers strategize accordingly*?

We propose research to examine the trade-off between the benefits to the seller of obfuscation, bias, and opaqueness, and the losses in sales to consumers that demand quality information. Making product offerings and pricing structures more complex may decrease information transparency to the benefit of sellers (Ellison and Ellison 2004), but it is not clear whether the positive impact on prices will be higher than the negative impact of consumers who are lost to competition or who are reluctant to make a purchase because of the lack of transparency. Here, economic experiments where the treatment variable is disclosure, distortion, bias, and concealment of information will be appropriate to control for other factors that may affect consumer purchase decisions.

Suppliers. A supplier's selling mechanism is typically biased to provide preferential treatment to its product offers (Grover and Teng 2001), but it is not clear when or how this biased strategy is adequate. There are instances where nonbiased transparency strategies have been implemented by suppliers. For example, whereas many insurance companies display only their offers online, Progressive Casualty Insurance Company (www.progressive.com) adopted an aggressive online strategy by displaying information not only about its insurances services and prices but also about its competitors. This may be a strategy to attract consumers. One combined option for suppliers is to include offers from competitors but distort or conceal information that does not favor the perception of their products.

Intermediaries. Intermediaries may engage in preferential agreements with certain suppliers to display information in their favor (e.g., biased search results), but the benefits are likely to come at the expense of market share losses as suppliers and consumers that demand neutrality defect. Intermediaries may also be pressured by suppliers to distort or conceal information to consumers. These decisions should be based on the trade-off between the gains from supplier participation and the losses attributable consumers who defect to intermediaries that are more transparent.

4.4. Systems Design and Transparency

We next discuss how transparency strategy affects systems design, and vice versa, and formulate related research questions.

Transparency Strategy → Systems Design. In the Information Age, firms increasingly compete with market information and have the ability to manipulate and alter this information. Firms can realize significant benefits by devising effective strategies for information disclosure to both its customers and competitors. There are interesting IT and systems design and implementation implications that relate to innovation in collecting, synthesizing, and presenting information to make it more transparent or to withhold it in the form of bias, distortion, or opaqueness. Ultimately, the implementation of these strategies relies heavily on the deployment of technologies and online selling mechanisms. Therefore, there should be a tight link between the transparency strategies and related IT projects.

For example, in 2003 Air Canada established a five-tier branded fare structure based on an à la carte menu that travelers can use to determine the product features and price points at which they are willing to travel, without the complex Saturday-night-stay and advance purchase rules (Flint 2006). The airline's portal allows consumers to purchase a customized bundle of service features that includes seat assignment and mileage accrual. The company uses state-of-the-art pricing search engines and reservation systems to implement this strategy. Air Canada claims that its recovery from bankruptcy filing in 2003 can be partially attributed to the success of its transparent price structure and the enabling technologies. This leads us to formulate the following question.

• **Research Question 4 (IT and Organizational Capabilities for Transparency Strategy):** *What IT and organizational capabilities are necessary to effectively link transparency strategy with systems and mechanism design*?

This question can be answered through case studies of suppliers like Air Canada, which has successfully developed internal capabilities and processes to implement transparency strategies in conjunction with IT infrastructure planning and the design of online selling mechanisms. Case studies of how online intermediaries implement transparency strategies will inform both intermediaries and suppliers. The difficulty lies in the fact that it is not straightforward to assign responsibilities for the successful implementation of a transparency strategy from its conception to its technological implementation. For example, price transparency strategy may require involvement and accountability of marketing, sales, legal, and finance, and coordination is necessary with the IT function so that their input is reflected in the design of electronic selling mechanisms. A possible role for a chief information officer or chief innovation officer is to coordinate with other departments to incorporate transparency strategies into the organization's IT infrastructure and applications.

Systems Design → Transparency Strategy. So far, we have proposed research to determine how transparency strategy affects systems design. Transparency strategy is likely to affect transparency features of the design of a selling mechanism. However, the link between transparency strategy and systems design is bidirectional. Research on financial markets, auction design, and electronic markets design suggests that nontransparency features of a market mechanism can have an impact on information transparency. These design features can be broadly categorized as transaction protocols and the price discovery process (Granados et al. 2006), and they include the different kinds of trading designs and processes that distinguish listed price mechanisms from auctions. This research is founded on analytical models of electronic market design and algorithmic development for auctions. This leads to another question.

• **Research Question 5 (Transparency Strategy and Online Selling Mechanism Design):** *How does the design of online selling mechanisms affect transparency*? *What design principles can be derived from these impacts*?

Priceline.com is an example of how nontransparency design features can have an impact on information transparency. With its "name-your-own-price" mechanism, Priceline.com innovated by allowing consumers to bid for an airline seat or hotel room rather than listing an offering price. This protocol affects transparency in two ways. First, consumers see less transparency of market prices, so many of them search across other sites before bidding on Priceline.com. Second, suppliers are not aware of competitors' tactical pricing moves, which disable their potentially collusive strategies. These adverse effects on transparency can have significant implications for the viability of the business model. Some consumers may be reluctant to bid blindly, whereas some suppliers may decline to

participate in the channel because of the potential negative effect of the opaque mechanism on market prices. More broadly, innovation in the design of B2C selling mechanisms will benefit from research that unravels the possible consequences of nontransparency design features on information transparency and the consequent prescriptive guidelines.

4.5. Transparency Regimes

Much of the literature on transparency regimes studies whether markets with perfect information will be more efficient or beneficial to consumers, and whether e-commerce technologies and the Internet will indeed make markets more efficient. Further work can inform the following research question.

• **Research Question 6 (Industry Transparency Regimes):** *What will be the transparency regimes by industry*?

This question is important for sellers to be able to predict, to the extent possible, what the long-term effect of advanced e-commerce technologies will be on the transparency regime of their respective industries. To the extent to which a vision exists, managers will be better equipped to compete for a long-term position in the market. For example, if a transparent market environment is expected, sellers that anticipate this outcome will likely develop transparent strategies to preempt the competition. Here, analytical modeling techniques such as game theory modeling will be useful, but the modeling assumptions should account for particularities of specific industries. For example, the degree of competition and product characteristics (e.g., the degree of product differentiation) may be a factor in determining the long-term outcome of competition for transparency (Granados et al. 2006), so different industries may have different outcomes.

In addition, case studies of industries that have advanced at a faster pace in the transparency dimension will be valuable. These are typically industries where the online channel has gotten to a high share of overall sales in the industry. We have tried to develop a deep understanding and document how the travel industry has evolved in the last few years, but more studies are necessary in other industries to understand the different dynamics of transparency that may emerge, and what the drivers are of different transparency regimes. Ultimately, these predictions about transparency regimes are likely to influence transparency strategy. This leads to our final research question.

• **Research Question 7 (Transparency Regimes and Transparency Strategy):** *How should predictions of an industry's transparency regime influence transparency strategy*?

We suggest that the more informed sellers are about the predictions of a transparency regime in their respective industries, the more successful transparency strategies will be. We propose research that informs sellers on how to act on predictions of transparency regimes. The answers are not likely to be straightforward. For example, given a prediction of a transparent regime, a seller has an incentive to preempt the market and position itself as a transparent player, as Orbitz did in the OTA industry. However, because price transparency can have a negative impact on market prices, sellers may also have incentives to collude to form a less price-transparent regime for temporary benefit. This trade-off makes the decision on which action to take nontrivial. Methodologies like simulations may be appropriate to unravel long-term outcomes by incorporating decision rules based on firms' incentives to be transparent and the competitive reactions that may arise over time.

5. Conclusions

5.1. Implications for Practitioners

Some firms already have developed *explicit transparency strategies* to manage the disclosure of market information, whereas others simply react to competitive actions, consumer behavior, and business conditions. Managers will be able to better confront the challenges offered by higher IT-enabled transparency potential based on new knowledge that emerges from our proposed research agenda, which will allow them to strategize with information in a more deliberate manner.

We have interviewed managers of firms that are making bold moves in the transparency space, and they acknowledge the uncertainty that arises from trying to strategize with market information. They wonder how consumers and competitors will react to

innovations in their selling mechanisms, and whether the long-term evolution of the industry will make it worthwhile to be a frontrunner or to fall back to a role of market follower. We have also talked to managers of firms that are standing on the sidelines, waiting for other competitors to make innovations to bring transparency to the market. They fear being the frontrunners because of the uncertainty of the impact of these innovations. Our exposure to real-world developments suggests that there is much research to be done to understand and create new theories and ideas, and further inform the practice of transparency strategy.

5.2. Research Opportunities

The most significant research opportunity is in B2C transparency strategy, based on our interdisciplinary evaluation of the extant literature. Transparency strategy in B2B markets is tightly linked to research that studies information-sharing strategies for supply chain management. It is a managerial responsibility that is typically well defined under the function of supply chain strategy. In contrast, research on B2C transparency is relatively scarce. Part of the reason may be that governance of B2C transparency strategy for suppliers is elusive, because there is no single function in the traditional organizational structure that can be held responsible for the information disclosed to consumers. However, it is increasingly a fundamental strategic dimension, and those firms that develop sound transparency strategies are bound to stay ahead of competition. Therefore, in this research commentary we identified research opportunities for B2C transparency strategy where there is a gap between current business practices and existing research.

The interdisciplinary nature of this topic represents both a challenge and an opportunity for IS researchers. Cross fertilization of research and methodologies across business disciplines, economics, and computer science will be necessary to effectively deliver the theory and guidelines that seem so relevant to strategize with information in this era of ubiquitous information. We are concerned, however, that the incentives may not be there for this cross fertilization to occur. The IS academic community can potentially play a leading role, because it has expertise in multiple reference disciplines that will be necessary to develop this comprehensive research agenda and to unravel the link between transparency strategy and system design.

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