ABSTRACT

With the advent of the Internet, we have seen existing markets transform and new ones emerge. In this paper, we contribute to the understanding of this phenomenon by theorizing about the role that IT plays in affecting market information, transparency and market structure. In particular, we introduce a new theoretical framework which uncovers the process and the forces that, together with IT, facilitate or inhibit the emerging dominance of transparent electronic markets. Transparent electronic markets offer unbiased, complete, and accurate market information. This theory development effort is based on an inductive approach using the case study method, in which we contrast and compare the forces that have led the air travel and financial securities markets to become increasingly transparent. Our findings suggest that IT alone does not explain a move to transparent electronic markets, however. Instead, we argue that enhanced electronic representation of products, and competitive and institutional forces have also played an important role in the process by which most sellers have come to favor transparent markets.

Keywords: Economic theory, electronic commerce, electronic markets and hierarchies, market design theory, market structure, market transparency, theory-building research.

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I. INTRODUCTION

The electronic markets hypothesis (EMH) posits that IT reduces coordination costs between suppliers and buyers, leading to the dominance of market-based forms of economic activity [Malone, et al., 1987]. The primary drivers of this move are advanced ITs such as the Internet, which provide a platform that reduces information search costs. The EMH predicts that, in this technological environment, biased electronic markets will emerge as suppliers take advantage of IT to lock in buyers. However, unbiased electronic markets will gradually dominate, where all products and suppliers can be evaluated by buyers to make well-informed decisions.

Unbiased markets generally benefit buyers because they are better able to discern the product that best fits their needs. On the other hand, this very benefit to buyers may be a threat to sellers, as they forego the benefits of information asymmetries. Consequently, some industries which were expected to move to unbiased electronic markets have not done so. Possible explanations include the move-to-the-middle hypothesis [Clemons, et al., 1993] and the risk-augmented transaction cost theory [Kauffman and Mohtadi, 2004a], which uncover the incentives of market participants to favor biased markets. Nevertheless, many firms deliberately compete by offering unbiased information to buyers, despite the threat to their profits. In this paper, we explain this paradox by exploring economic benefits of unbiased markets for both sellers and buyers.

So far, theories of the impact of IT on market structure explain rather specific outcomes. At one extreme, there are theories such as the EMH that predict a move to unbiased electronic markets. On the other hand, there are theories that explain why biased markets and other quasi-market forms may prevail. However, both outcomes are observed in the real world. For example, while some online travel agencies have embraced the Internet to offer products and prices from multiple airlines [Granados, et al., 2005], a similar move which would be expected in the
mortgage industry has not occurred, at least not to the same extent [Hess and Kemerer, 1994]. In addition, we observe that firms have used IT to strategize with information in more than just the level of bias of their market mechanisms. A more complete characterization of the possible strategies is related to the concept of market transparency, which includes the accuracy and completeness of market information, in addition to the level of bias. Therefore, there is an opportunity to extend the theoretical foundations of the impact of IT on market structure, based on real-world observations from recent years, as the evolution of electronic markets is fueled by the Internet.

In this paper, we examine how IT influences market structure and shapes the forces that facilitate or inhibit a move to transparent electronic markets, and set the stage for future research on other forms of advanced market organization. We use a case research strategy, which is appropriate to answer “how” questions [Benbasat, et al., 1987] and uncover process knowledge. In particular, we build theory to answer the following research questions:

- To what extent do we observe a move to transparent markets in different sectors?
- What are the factors and theoretical bases that explain differences in market structure in the presence of IT?

To answer these questions, we leverage the theory of market design [Spulber, 1999], which studies the design of market mechanisms that enable trade. This theoretical lens allows us to introduce a set of market design dimensions that characterize the impact of IT on a market’s structure. We use these market design dimensions to analyze the IT-driven transformation in the air travel and financial securities markets. Then, consistent with case study methodologies for theory development [Eisenhardt, 1989], we perform a cross-case analysis to develop testable propositions regarding the impact of IT on market structure.
We recognize that there are many technological and market design choices that firms make that may affect market structure. Given the context of our mini-cases, we focus on the decisions that sellers make to release or conceal information from buyers as a starting point in this theory-building effort, and invite further theoretical development to explore IT and market structure in other dimensions.

We next present the theory of electronic markets and hierarchies and the theory of market design. In the third section, we analyze the market structure transformation of the United States financial securities markets and the air travel industry. In the fourth section, we perform a cross-case analysis to derive a theoretical framework of the impact of IT on market transparency. We conclude with our theoretical contribution and opportunities for future research.

II. THEORETICAL BACKGROUND

We define an electronic market as a system that allows market participants to exchange information about prices and product offerings electronically. In this paper, IT refers to technological artifacts that enable electronic markets, such as Internet and network technologies. We next describe the electronic markets and hierarchies theory and market design theory, which provide building blocks to formulate an explanation of how IT shapes a market’s structure.

ELECTRONIC MARKETS AND HIERARCHIES

Theories about the impact of IT on organizational forms are rooted in transaction cost economics. Coase [1937], in his discussion of the boundary of the firm, suggested that the flow of materials will occur within a firm to the extent that the respective transaction costs are lower than in the price mechanisms of markets. More generally, firms (or hierarchies) and markets are two polar forms of economic activity, while contractual arrangements between firms fall along a
continuum from firms to markets, such as electronic integration, long-term contracts, and joint ventures [Zaheer and Venkatraman, 1994].

Building on transaction cost economics, the EMH predicts that IT will lead to higher use of market transactions in the conduct of economic activity [Malone, et al., 1987]. IT reduces market coordination costs, such as the cost of searching for suppliers, establishing contracts, and buying supplies in the spot market. The EMH also predicts that moves to market-based forms of organization will be gradual; they will not occur all at once.

The first stage is a move from electronic hierarchies to biased electronic markets, where suppliers benefit from implementing systems that conceal or distort information about competitors. In the second stage, competitive and legal forces lead to the adoption of unbiased electronic markets, where all options for trading are made available. Finally, in the third stage, the proliferation of information in unbiased markets leads to personalized markets, with functionality that allows buyers to filter the options available for trading. In this manner, Malone et al. [1987] and other researchers brought to surface the potential impact that IT can have on the informational structure of markets.

Despite these theoretical predictions, real world observations point out that IT innovations have not necessarily been leading to market-based forms of organization. Hess and Kemerer [1994] analyzed mortgage markets. They suggest that the EMH may need to be reframed because it does not clearly explain the lack of electronic market organization in the industry.

Alternative theories have emerged to explain these outcomes, which we label quasi-market theories. These theories suggest that IT also reduces coordination costs of rather hierarchical contractual arrangements, so relationships with a few suppliers may prevail. Clemons, et al. [1993] proposed a move-to-the-middle hypothesis. They recognize that IT may not only impact
the transaction costs of market coordination, but also the transaction costs of long-term business relationships, such as monitoring product quality or safe-guarding relationship-specific investments. By reducing product complexity and asset specificity, IT reduces the transaction costs of long-term relationships, so buyers may prefer explicit coordination with a few suppliers over the purchase of supplies in the spot market.¹ Wang and Seidman [1995] suggest that, due to negative externalities, it may be optimal for fewer suppliers to join an electronic data interchange system. More recently, Kauffman and Mohtadi [2004a] proposed a risk-augmented transaction cost theory that is aimed at explaining the market structure effects of demand and supply shocks, such as sudden inventory build-up due to a recession or the loss of a key supplier. They showed that the possibility of shocks impacting large buyers’ procurement may lead them to safeguard their profits through vertical or biased relationships, rather than pursuing trade in a market setting.

Moreover, the EMH has not effectively explained the fall in the number of suppliers that occurred in the auto industry in the 1990s [Cusumano and Takeishi, 1991]. Bakos and Brynjolfsson [1993] proposed an interpretation based on the theory of incomplete contracts, which posits that not all desired aspects of a trading relationship are contractible. So buyers may limit the number of suppliers to maintain supplier incentives to make non-contractible investments such as quality, responsiveness, and innovation. Hence, the equilibrium number of suppliers may decrease in the presence of IT.

With the advent of e-commerce technologies and the Internet, we have observed the emergence of new markets and the proliferation of existing ones. Theoretically, this phenomenon can be partially explained with the EMH, which suggests that IT will reduce coordination costs

¹ Asset specificity refers to assets that are specific to the business relationship and that are not easily re-deployable. Therefore, investing in these assets becomes a sunk cost attributable to that relationship.
across firms, leading to proportionally higher market-based forms of economic activity.

However, there is a need to develop theory to understand how and why different forms of market structure have emerged, and which ones may prevail in the long run. In this paper, we attempt to contribute to this theory development by analyzing the air travel industry and the financial securities industry, which are representative of IT-enabled market transformations in recent years. While we incorporate a transaction cost perspective to develop a theoretical framework of the impact of IT on market structure, we also aim to introduce new theoretical perspectives. In particular, we leverage our analysis with market design theory, which offers a foundation to explain why firms make different choices that affect market structure. Before presenting our analysis of these industries, we first provide a review of the different market design choices and how they are influenced by IT advances.

**POSSIBLE OUTCOMES OF MARKET STRUCTURE**

Based on neo-classical economics, in competitive markets an exogenous mechanism selects prices that establish equilibrium between supply and demand. The related theory—market design theory or market microstructure theory—attempts to illuminate this “black box” by taking an alternative view [Madhavan, 2000]. Market microstructure is defined as the set of market participants, institutions and mechanisms that enable trade. It emphasizes that firms make explicit decisions to select trading prices and coordinate transactions that support exchange. Spulber [1999, p. 7] states that “[f]irms create and operate markets: setting prices, carrying out transactions, producing and distributing information, and forming and monitoring contracts.” Equilibrium outcomes are aggregate results of the individual firms’ actions, including choices affecting market microstructure.
The theory of market design focuses on economic consequences of a trading mechanism’s design. It has been extensively applied in the context of financial markets to understand how electronic trading influences liquidity, efficiency, and the distribution of wealth [Clemons and Weber, 1990; Schwartz, 1995], and there is a growing body of literature on the design of electronic markets, grounded on auction theory [Anandalingam et al., 2005].

**IT, Electronic Markets, and Market Design**

Firms use IT to design a market’s degree of automation and informational features. (See Table 1.)

<table>
<thead>
<tr>
<th><strong>MARKET DESIGN DIMENSIONS</strong></th>
<th><strong>DESCRIPTION</strong></th>
<th><strong>IMPACT OF IT</strong></th>
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<tbody>
<tr>
<td><strong>Informational Features</strong></td>
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<tr>
<td>Market Transparency</td>
<td>Availability and accessibility of market information.</td>
<td>Increases potential for complete, accurate, and unbiased market information</td>
</tr>
<tr>
<td>Price Discovery</td>
<td>Process by which market prices are established</td>
<td>Enables innovative and dynamic mechanisms</td>
</tr>
<tr>
<td>Trading Protocols</td>
<td>Transaction process and rules</td>
<td>Increases flexibility to set trading rules</td>
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<tr>
<td><strong>Degree of Automation</strong></td>
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<tr>
<td>Reach</td>
<td>Frequency of transactions and geographical reach</td>
<td>Increases reach potential</td>
</tr>
<tr>
<td>Reliance on Intermediaries</td>
<td>Degree of intermediation</td>
<td>Enables electronic intermediation and direct trading</td>
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*Source: Adapted from Madhavan [2000]*

The *degree of automation* of a trading mechanism influences the temporal, geographical, and structural characteristics of a market [Schwartz, 1995]. For example, Internet-based electronic markets enable around-the-clock trading across national boundaries. In addition, automation allows sellers and buyers to trade without the intervention of intermediaries. *Informational features* of market design include market transparency, price discovery, and trading protocols. We now discuss in more depth how IT influences these informational features in the context of
electronic trading.

*Market transparency* specifies the extent to which information is made available to market participants, including pricing, product, and supplier information [Granados, et al., 2005]. Market transparency is negatively affected by sellers’ decisions to bias, conceal, or distort information. A *biased market* is defined as a market where product and price information from all sellers is not presented equitably. A market that displays only prices but lacks information about product characteristics is not fully transparent because information is incomplete. On the other hand, a market that distorts information is not fully transparent because the information is inaccurate. Incomplete or distorted information may be driven by intentional market designs of sellers, or by technological imperatives that limit the quality and quantity of information that can be made available. We define *opaque markets* as those where information is incomplete or distorted. For example, Hotwire ([www.hotwire.com](http://www.hotwire.com)) is an online travel agency that offers last-minute fares of multiple airline offers, exhibiting a low level of bias. However, it does not show the airline or itinerary until after purchase.

E-commerce technologies increase the potential for market transparency. In turn, firms strategically decide whether to capitalize on this potential in two ways. First, they can make choices regarding the design of a market mechanism, such as their own Internet portal or an electronic exchange in which they have decision-making power. Second, they can make strategic decisions to trade in a market based on its information disclosure rules. Large market participants often avoid trades in electronic markets that require identity disclosure because it provides signals about their cost structure [Zhu, 2004] or their motivation to trade [Clemons and Weber, 1990; Madhavan, 2000]. On the other hand, buyers generally prefer market transparency because they can better ascertain their product valuation and select the best product
and supplier. However, there are situations in which buyers may prefer less market transparency. For example, in business-to-business markets, high-demand buyers may express concerns about sharing too much information about their demand forecasts, lest an electronically linked supplier will exploit that information and turn prices against them [Kauffman and Mohtadi, 2004b].

*Price discovery*, the process by which market prices are established, is another important aspect of market design. Price discovery involves the process by which latent demand and supply result in realized market prices and trade volumes [Madhavan, 2000]. In some markets, by obtaining details about the trading process, buyers and sellers are able to discover their reservation prices. For example, in financial markets transaction history provides clues about demand and supply pressures, which influence the prices at which buyers and sellers are willing to transact [Pagano and Roell, 1996].

Auction theory is related to price discovery in electronic market design [Anandalingam, et al., 2005]. Electronic market mechanisms such as double auctions have a *dynamic* price discovery process: every bid by buyers, sellers, or intermediaries is a signal to determine transaction prices. Other market mechanisms, such as posted prices, are more *static*. ITs such as the Internet enable the creation of novel and dynamic mechanisms, increasing the potential for price discovery. In turn, sellers make choices regarding market designs along a continuum of static vs. dynamic market mechanisms. For example, Internet-based electronic auctions of airline tickets have enabled markets for distressed inventory of seats close to flight departures [Klein and Loebbecke, 2003].

*Trading protocols* represent the rules of trading and transactional exchange. Protocols are often the result of ongoing business practices and transactional norms. They may reflect government regulations to ensure fair trading practices, market participation fees and other fixed
transaction costs for the market participants. Advanced ITs enable innovative and flexible
definition of transaction protocols. For example, the practice of 24-hour electronic trading in
financial markets is now possible thanks to Internet technologies. On the Internet, a change in
trading rules may require a small, immediate, and inexpensive change in a website’s design that
will become rapidly available to all buyers.

**IT and Market Design Trade-offs**

Together, these informational features of market design influence market performance.
However, there are trade-offs to be made, because changing a market’s design in one dimension
may affect it in another [Levecq and Weber, 2002]. In the market transparency dimension,
suppliers and intermediaries are commonly faced with the trade-off between the benefits of a
more transparent market to attract buyers and the losses that may be incurred by releasing private
information. While market transparency may increase demand by attracting buyers, it may put
seller profits at risk due to better informed buyers [Porter, 2001].

In the price discovery dimension, sellers face the decision to post fixed prices or negotiate.
While negotiation allows effective price discovery, there are information and negotiation costs
that may deter buyers [Riley and Zeckhauser, 1983]. There is also a trade-off between selecting
a fixed price versus an auction mechanism. While an electronic auction may attract buyers
through effective price discovery, it may also hurt seller revenues as buyers enjoy higher levels
of price transparency. Therefore, market design decisions that buyers, sellers, and intermediaries
make depend on the evaluation of these trade-offs.

We contend that IT transforms these market design trade-offs, such that the long-term
expected aggregate outcome of sellers’ market design decisions will change. In the next section,
we examine this process for air travel and financial securities, which have gone through
significant IT-driven changes in the dimension of market transparency, including the level of
market bias. Based on these mini-cases, we develop a theoretical framework of the impact of IT
on market structure.

III. WITHIN-CASE ANALYSIS: AIR TRAVEL AND FINANCIAL
SECURITIES

The robustness of a theoretical model is largely based on its ability to explain different kinds
of outcomes that are observed for a given phenomenon. We seek to explain the extent to which
different industries adopt transparent electronic market mechanisms. Some industries make it to
that point sooner, while others arrive later (and possibly not at all). Thus, since our goal is to
develop an effective variance theory, we selected the air travel industry and the financial
securities industries for our study, because they exhibit significant variation in the degree of bias,
accuracy, and completeness of market information. We observe that since the advent of the
Internet, these industries have made strong moves towards higher market transparency and hence
lower levels of bias, but the sources and extent of this transformation differ by industry sector.

In this section, we present two mini-cases of the market transformation of air travel services
and the financial securities trading. The findings that we present summarize our extensive
within-case analysis on these industries based on prior project research experience, and more
importantly, current press releases, academic journals, specialized industry publications, and
interviews with industry experts.

CASE 1: ELECTRONIC MARKETS FOR FINANCIAL SECURITIES

Financial securities have been traded electronically for decades in markets such as the New
York Stock Exchange (NYSE). Recently, Internet technology has created new opportunities for
electronic transactions in both business-to-business (B2B) and business-to-consumer (B2C) electronic markets. In this mini-case, we examine the forces that, together with Internet technology, have resulted in new market mechanism designs for the trade of financial securities. We focus on the differences that have emerged in the electronic trade of bonds and stocks, despite the fact that the emergence of Internet technology exerted simultaneous influence on both industries.

**The Institutional Markets for Equities and Bonds**

The markets for fixed income securities in the United States have been the province of a group of powerful investment banks that have exercised considerable market power. The result for private corporations and public organizations that wish to issue bonds to obtain capital in the primary market, as well for investment management firms and individuals that wish to trade bonds in the secondary market, is that they have not been able to benefit from some of the efficiencies that are normally associated with the equities market. Equity markets vary in all design dimensions, namely market transparency, price discovery, and trading protocols [Levecq and Weber, 2002; Madhavan, 2000]. In the market transparency dimension, designs vary in the time and extent of the information, and it is commonly intervened by regulations to ensure efficiency and fairness. For example, U.S. regulations require that transactions be reported within 90 seconds of the transaction, compared to 90 minutes in the London Stock Exchange. In the price discovery dimension, there are auction markets which are order driven, that is they match buy and sell orders continuously. On the other hand, there are call markets which are quote driven, that is they match prices based on bid and ask quotes from a market maker. Transaction protocols determine other conditions of trade such as the immediacy and the priority of order execution.

Instead, for bonds, up until 1997 there were only a few viable private electronic markets that
permitted bond issuance and trading, but not many (e.g., Bloomberg, Morgan Stanley, First Boston Corporation, etc.) [Bond Market Association, 1997a]. During the 1990s, there were contentious public policy debates related to the “opaqueness” of the bond market [Bond Market Association, 1997b]. Prices were difficult for investors to see because trade-related information was guarded by the market-making investment banks. They stalled the move to newer market designs that permit fuller market transparency. This practice is facilitated by the inherent diversity of bonds relative to equities. Firms with one or two issues of stock (common and preferred) may have numerous bond series, reflecting different coupon rates and the maturity of the debt. Therefore, there may be millions of fixed income securities compared to a few thousand shares [Allen, et al., 2001].

During the 1990s, the impacts of new e-commerce technologies began to be felt, as trading and competition started outside of the traditional trading floors [Economides, 2001]. Prior to gaining authority as a primary issuer of bonds like investment banks, commercial bank J. P. Morgan innovated with a dial-in screened-based bond issuance market for “vanilla debt” involving the most well known corporate names. Although the system, Capitalink, did not succeed, it nevertheless sensitized the market to the possibilities that technology held for transforming market design in support of bond issuance. Later, during the growth of the Internet, other investment banks, government agencies and entrepreneurs implemented technology-based approaches to trade various kinds of fixed income securities [Bond Market Association, 1998-2003]. A number of players put together different types of e-markets, including auction systems, inter-dealer systems, multi-dealer systems, single-dealer systems, and cross-matching systems [Bond Market Association, 2003]. Examples are MarketAxess (www.marketaxess.com) for bond trading among institutional investors and the Bloomberg Municipal
Despite recent innovation in the design of market mechanisms for bond trading, the effect of electronic markets for bonds has not had the same lasting effect as in equities markets. Because of the existence of single-dealer markets which use the Internet as a means to involve their own institutional investment clients, there is still bias in the bond market. Some of these systems are reachable via the Internet, while others are only available through an intermediary, Bloomberg Inc., the preeminent quote vendor and financial news network [Bond Market Association, 2002]. They include Lehman Brothers (www.lehmanlive.com), Credit Suisse First Boston (www.csfb.com), Merrill Lynch (www.ml.com), Morgan Stanley (www.morganstanley.com) and J. P. Morgan (www.jpmorganexpress.com), among others, and reflect the fact that the prior “oligopoly players” are still using the new technologies to make markets for bonds based on client relationships, instead of a full-fledged market-based approach.

However, there have been significant advances in market transparency and fairness in the trade of bonds thanks to Internet technology. Kauffman and Lu [2005] analyze the structure and performance of digital bond markets in the U.S., and noted the path-breaking range of their innovations. The Internet has provided a basis for pushing the capabilities for bond exchange beyond what was historically observed, when bonds were largely traded in biased electronic markets. In addition, it is clear that with this new technology has come a greater impetus for competition around new and enhanced market designs. But the emergence of transparent electronic markets for bonds has been slowed down by their own nature. Bonds are not as commodity-like as stocks. So considerations necessary to an effective market process may still be affected by the inherent complexity of bonds, which may explain why only 10% of corporate bonds were electronically traded in 2000 [Allen, et al., 2001].
**Bond and Equities Markets for Individual Investors**

In the 1990s, Internet-based trading mechanisms for individual investors also emerged, such as E*trade (www.etrade.com), Charles Schwab (www.schwab.com) and Ameritrade (www.ameritrade.com). Internet brokers allow individual investors to trade stocks electronically with low transaction costs. In addition, they provide timely market updates and archives of research reports. By providing Internet-delivered market information, automated trading, and low transaction costs for individual investors, these companies succeeded in an industry that had historically been controlled by large, powerful players.

Despite the emergence of these discount brokers, the niche for full-service brokers remains. In the equities markets, there is still a need for brokers that provide value-added investment services to individual consumers. In particular, given the overload of information for a given stock or group of stocks, it may be economically justified for investors to pay for information brokerage services that increase the level of market transparency even further, at a fee. Hence, there remain opportunities for product differentiation and market segmentation, which make hierarchical forms and biased markets feasible. For example, wealthy individuals often prefer an investment services firm to manage their investments.

The rise of B2C transparent electronic market mechanisms in the stock market presents similar trends as in the B2B sector. On the other hand, bond trading remains in the hands of professional trading firms to a greater extent. Web-based technologies for the trade of financial securities are still evolving, but the product complexity of bonds limits the development of transparent bond markets.
CASE 2: MARKETS FOR CORPORATE AND LEISURE TRAVEL SERVICES

Online travel sales increasingly threaten the market-making position of traditional travel agencies. In 2003, about 40% of U.S. airline tickets were sold via the Internet [Airline Business and SITA, 2003]. An important driver of this trend is the increased level of market transparency facilitated by technologically-innovative, unbiased and customer-friendly online travel agencies (OTAs) such as Orbitz (www.orbitz.com) and Expedia (www.expedia.com). In the same year, approximately 20% of U.S. corporate travel revenue was managed online [Phocuswright, 2003]. These are both significant amounts relative to the overall cross-industry percent of retail sales through the Internet, which was near to 2% [U.S. Census Bureau, 2004]. In this mini-case, we explore the accelerated IT-driven move to markets in the corporate and leisure air travel markets.

B2B Air Travel Markets: Airlines and Travel Agencies

Travel agencies take advantage of the high complexity of airline prices and product descriptions to act as information brokers by simplifying offers to corporate and leisure travelers [Clemons and Row, 1991]. The information brokerage role performed by travel agencies was strengthened in the 1980s with the development of CRS technology. This technology was developed by airlines after deregulation of the industry in 1978 to compete effectively. CRS terminals were typically installed at travel agency locations based on long-term contractual sales agreements. Through these contracts, agencies were “locked in” to an airline or small set of airlines depending on the CRSs installed [Copeland and McKenney, 1998]. By 1983, 80% of tickets were sold by travel agencies through CRS terminals.

Due to the biased nature of CRS contracts between airlines and travel agencies, allegations emerged suggesting that automation of airline ticket distribution had resulted in an anti-competitive market environment. In June 1983, the government concurred and intervened,
ordering CRSs to provide data on their flights and ticket prices to competitors, avoid
discriminatory fees, and eliminate screen biases that favored the position of product offers for the
airline owner or owners of a CRS.

While the level of bias decreased in the market for airline tickets due to these new laws,
travel agencies still had the ability to conceal and distort information from consumers [Levine,
1987]. CRSs reduced product complexity for travel agencies, but travelers remained dependent
on their relationship with the agencies to get the best travel offer at the best price. Globalization
and extension of the functionality of these CRSs to include hotel and car reservations led to
Global Distribution Systems (GDSs), which allowed airlines and travel agencies to further
consolidate their competitive positions by offering complete and timely information to the
traveler for air transportation, ground transportation, and lodging.

**B2B Air Travel Markets: Corporate Travel**

Corporate travel accounts for approximately 55% of total air travel passengers
[PhocusWright, 2003]. Historically, brick-and-mortar travel agencies have added value for
business travelers by searching for the best prices and services. In addition, they aggregate
demand for corporations to negotiate lower prices and value-added service with airlines
[Clemons and Row, 1991], contributing to the segment of the industry known as *managed
business travel*.

Corporate travel customers typically have a need for special services. Frequently, their plans
change and they need timely attention to change their travel itineraries. In addition, travel
itineraries are sometimes complex, involving more than just a simple round trip between two
cities. Therefore, the complexity of corporate travel needs is an opportunity for traditional travel
agencies to provide *service brokerage* between airlines and corporations.
Rosenbluth Travel is a case in point [Clemons and Row, 1991]. Rosenbluth Travel developed an information system that consolidated travel offers from several major computer reservation systems (CRSs) to provide value-added service to its corporate travel customers. The company gained competitive advantage by improving efficiency for its customers, through a wider variety of product offers tailored to specific customer needs. In addition, the system provided complete and accurate information about prices and alternative itineraries, both current and historical. Soon competitors replicated this technological innovation, but at that point Rosenbluth travel had consolidated its position in the B2B travel agency services market worldwide.

Despite technological advances that allow corporate travelers to perform transactions directly with airlines, travel agencies continue to perform an added-value role in the business segment of air travel. This may explain why transparent OTAs have successfully penetrated the leisure and unmanaged business travel markets (see below), but they are just beginning to make inroads in the managed business travel segment. In 2003, 20% of U.S. corporate travel was sold online, compared to 40% for the industry as a total. Due to the service requirements of business travelers, there may be a limit to the value that can be extracted from Internet-based reservation-making [Chircu and Kauffman, 2001]. Nevertheless, recently major OTAs have developed strategies to further penetrate the corporate travel business segment, and brick-and-mortar travel agencies such as Carlson Wagonlit Travel are being forced to respond with their own Internet-based market mechanisms that offer the lowest prices in the market [Reinan, 2004].

B2C Air Travel Markets

In the 1980s and 1990s, travelers typically built relationships with a preferred travel agency to book and purchase airline tickets. Soon the development of the Internet enabled new B2C distribution channels in many industries, and the air travel industry was no exception. In the
1990s, multiple online travel agencies (OTAs) emerged to offer travel products to consumers over the Internet, threatening the information brokerage role of travel agencies.

The design of market mechanisms in these OTAs varied [Klein and Loebbecke, 2003]. Most OTAs offered travel options based on list prices. However, others attempted innovative price discovery mechanisms. For example, TravelBids introduced auctions from the consumer’s side, where consumers would post an itinerary and travel agencies would bid for the trip based on their inventory availability and prices. Priceline.com introduced a *name-your-own-price* mechanism that resembles a sealed-bid auction, where consumers make a bid for a trip and only after purchase the airline and specific itinerary is revealed. Some OTAs were designed to be transparent, such as Expedia (www.expedia.com), which displays itineraries and prices from multiple airlines based on a trip search request. Others were designed to be opaque in either product, price, or supplier information, such as Priceline.com (www.priceline.com) and Hotwire (www.hotwire.com). Opaque OTAs compensate the consumer for this lack of market transparency with lower prices.

In an attempt to maximize revenues, some OTAs initially created biased selling mechanisms. Similar to GDSs in their inception, OTAs such as Travelocity (www.travelocity.com) and Expedia (www.expedia.com) negotiated agreements with airlines to favor their itineraries in a screen display, resulting in biased offers to consumers. In addition, airlines reintermediated the online travel sector by developing their own websites, which offer airline-specific itineraries.

Recently, the airline industry made a bold move to reintermediate the online travel sector. Five major airlines introduced Orbitz (www.orbitz.com) in 2001, claiming that it was the most transparent OTA. Orbitz was designed with state-of-the-art technology to offer as many products as possible for a travel request. In addition, Orbitz developed preferred agreements with
airlines and distributors that guaranteed their claim to “give the lowest published fares anywhere” [Salkever, 1999]. Soon other OTAs followed Orbitz’s competitive move for higher market transparency [Granados, et al., 2005]. Expedia and Travelocity have retracted from their strategy to bias fare searches in favor of specific airlines, and Hotwire and Priceline.com added transparent mechanisms to their opaque product offers. Nevertheless, after only two years, Orbitz had consolidated its position as a leader in the OTA market.

IV. CROSS-CASE ANALYSIS: THEORETICAL FRAMEWORK

Advances in IT increase market design alternatives and add complexity to a firm’s evaluation of market design trade-offs. In the Internet environment, while traditional players have created electronic market mechanisms to sell and purchase products, non-traditional market-makers have also emerged with new and innovative market mechanisms. Examples covered in our mini-cases are Capitalink in financial markets, and Priceline.com in air travel, among others. As our analysis of air travel and financial Internet markets shows, the market design options for firms have multiplied. Therefore, for most traditional and non-traditional firms to favor higher market transparency in the presence of IT advances ITs, some market forces must influence their decisions in this direction.

The benefits of transparent electronic markets generally are more evident for buyers than for sellers. For buyers (i.e., buying firms or consumers), transparent markets allow consumers to better discern the product that best fits their needs, and possibly at a better price. Sellers (i.e., suppliers or intermediaries), on the other hand, have incentives to maintain information advantages and explicit coordination with buyers, particularly in the form of biased electronic markets [Malone, et al., 1987]. How then, can the aggregate IT-enabled strategies of sellers
result in the dominance of transparent markets? What are the forces that drive this process? Likewise, what are the inhibiting forces?

In this section, we perform a *cross-case* analysis to show how, despite the explosion of IT-driven strategic alternatives for sellers, under certain conditions markets with unbiased, complete, and accurate information will tend to prevail. We develop a theoretical framework of the move to transparent electronic markets, by contrasting and comparing the status of market structure in the financial securities and air travel industry sectors. (See Figure 1.)

**Figure 1. Structure of Air Travel and Financial Securities Markets**

<table>
<thead>
<tr>
<th>Source of Difference</th>
<th>Financial Securities</th>
<th>Air Travel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Opaque or Biased Market</td>
<td>Transparent Market</td>
</tr>
<tr>
<td>Bonds</td>
<td></td>
<td>Equities</td>
</tr>
<tr>
<td>Corporate (B2B)</td>
<td></td>
<td>Travel Agency Distribution (B2B)</td>
</tr>
<tr>
<td>Leisure (B2C)</td>
<td></td>
<td></td>
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</tbody>
</table>

**Notes:** (1) Transparent e-markets are less dominant for bonds than stocks due to the higher product complexity of bonds. (2) Price competition in the travel industry has facilitated the move to transparent e-markets. However, differentiation strategies possible in corporate travel markets have inhibited this move. Service-oriented corporate travel products make biased and opaque markets competitive, in part due to the non-digital nature of customer service. (3) Travel agency distribution became transparent due to regulatory measures that curbed anti-competitive behavior.

A move to transparent markets can be viewed as a process by which most sellers’ market design trade-offs evolve to favor and implement transparent market mechanisms. To characterize the key ideas up front, we offer the following brief explanation. The driving forces in the move to transparent facilitate electronic trade. These forces lead to markets with accurate, complete and unbiased market information. Next, we explain how these forces interact in each stage of the move to transparent markets, as depicted in Figure 2.
Note: The stages of the EMH are illustrated in the dashed rectangle, where A represents the reduction in coordination costs and transaction risks due to IT, which leads to biased electronic markets. Link B shows the impact of IT on market transparency. Link C shows the impact of IT on product characteristics. Links D and E show the impact of product characteristics, institutional forces, and competitive forces on market transparency.

**ELECTRONIC MARKETS AND HIERARCHIES (LINK A)**

The EMH suggests that IT facilitates the move to market-based electronic trading by diminishing market coordination costs. However, as quasi-market theories suggest, IT does not fully eliminate the incentives sellers have to implement biased markets in their own self-interest. Instead, other forces come into play to facilitate the dominance of transparent electronic markets.

**IT-DRIVEN MARKET TRANSPARENCY (Link B)**

IT enables transparent market design choices to attract buyers. First-movers will benefit most from proprietary technological innovations, but competition is likely to follow. We observe this phenomenon in both air travel and financial securities, where new technologies have enabled competition for customers with market information. Representative examples are Rosenbluth and Orbitz in air travel and Capitalink in the bond market. These firms took advantage of e-commerce technologies to increase their customer base by developing technologies to process and offer market information beyond common industry practices. This leads to our first proposition:
Proposition 1 (The IT and Market Information Proposition): *Sellers will deploy and develop IT to compete with market information.*

The IT and Market Information Proposition suggests that firms will innovate to compete with transparent market mechanisms, beyond the traditional low cost and product differentiation strategies. We observe that in all industry sectors of air travel and financial securities markets, the move to transparent electronic markets started with innovations to compete with market information. As sellers automate their processes and take advantage of e-commerce technologies, they will increasingly compete for buyers by offering product and price information that informs their purchase decisions.

This proposition expands and complements the transaction cost-based premises of electronic markets and hierarchies theory. It suggests that a milestone necessary for a move to transparent electronic markets is the use of IT for revenue-generating strategies. More generally, when innovative information brokerage strategies begin to occur, therein lies the foundation for a move from biased and opaque markets to transparent electronic markets. However, this proposition falls short of suggesting that IT alone leads to the dominance of transparent markets. Incentives may remain for most sellers to maintain non-transparent selling mechanisms. For example, quasi-market theories suggest that biased and hierarchical market mechanisms may prevail even in the presence of IT. More generally, while IT enables new market designs to compete for buyers, the trade-off relationship between the transaction cost reductions from biased and opaque mechanisms and the increased revenues from transparent mechanisms may still fall in favor of the former. This may explain why some markets have remained biased despite the presence of advanced ITs. We contend that, together with IT, other conditions and forces must be present in order for transparent market mechanisms to prevail.
IT AND ELECTRONIC PRODUCT REPRESENTATION (LINKS C AND D)

We define *electronic product representation* as the ability to describe a product through an electronic medium. The air travel and financial securities markets suggest that ITs that reduce product complexity and that digitize product characteristics influence electronic product representation, which in turn has an impact on sellers’ market transparency choices.

**IT and Product Complexity**

Bonds exhibit a high level of product complexity relative to other financial securities, which may explain why the proliferation of transparent bond market mechanisms has been slower than in equity markets. IT-driven pressure to adopt transparent market mechanisms is structurally weakened by the complexity of bonds, which still makes biased and opaque bond markets viable.

Bonds are complex for both institutional and individual investors. Therefore, bond trading is still mainly in the domain of professionals who make complex decisions over the many different risk profiles offered by fixed-income securities. Individual investors still lack automated brokerage services that provide bond investment recommendations. This relative lack of IT based automated mechanisms leads to the persistence of long-term relationships between individual investors and investment services firms for bond trading.

More generally, we contend that the higher the level of product complexity, the less is the pressure that IT exerts on suppliers and intermediaries to adopt transparent market mechanisms. This is because firms can provide value-added services to simplify product complexity for the buyer. This opportunity for *service differentiation* decreases the need to seek innovative market designs. Buyers face uncertainty and opportunism risks that suppliers and intermediaries can mitigate by offering long-term business relationships, resulting in viable biased or opaque markets.
However, by reducing product complexity, IT may in turn reduce the competitive viability of opaque and biased market mechanisms. For example, motivated by the complexity of airline schedules and prices, airline owners of CRSs originally enjoyed economic benefits by controlling and selling airline schedule and price information through preferential agreements. However, travel agencies such as Rosenbluth developed technologies to aggregate, filter and simplify complex information displayed by CRSs, to the benefit of corporate travel customers [Clemons and Row, 1991; Granados, et al., 2005]. In response, CRSs have become more open and service-oriented.

**Digital Product Characteristics**

Products can be classified based on the ability to represent them electronically. At one extreme are information goods, which are digital in nature and can be easily represented electronically. At the other extreme are physical goods such as clothes, which defy accurate representation electronically. We contend that the along this continuum of product types, the more a product can be described digitally, the higher are the chances that transparent market mechanisms will prevail. Our rationale is two-fold, based on our observations of the air travel and financial markets. First, the relative success of OTAs was driven by the user-friendly and consistent display of product offers from multiple airlines, including the itinerary, number of stopovers, and prices. More generally, since unbiased market mechanisms offer product options from multiple suppliers, they require more processing, flexible tailoring, and manipulation to provide equitable information to buyers. Digital product representation reduces these costs of information processing, so the cost benefits are relatively higher for unbiased electronic markets.

Second, both equity and leisure travel products are relatively easy to convey electronically, which allowed non-traditional firms such as E*trade and Expedia to develop websites with
innovative market information displays. Upon their entrance, traditional firms were pressured to reintermediate the online market with their own transparent mechanisms. More generally, the ease of representing products electronically makes it more difficult for sellers to distort or conceal information, because there is competitive pressure from other players who can also provide this information at a low cost.

It follows that IT artifacts which enable digital representations of a product favor a move to transparent markets. CRS technology in the air travel industry translated the complex information on airline schedules and service so that travel agencies could better translate this information to travelers. Later, this same technology was used by online travel agencies to develop user-friendly interfaces for travelers to make their own purchases. On the other hand, the Internet allowed discount equity brokers to develop user-friendly representations of stock market information for individual investors. This leads to our second proposition:

- **Proposition 2 (The IT and Electronic Product Representation Proposition):** *IT that enables effective electronic product representation favors a move to transparent electronic markets.*

The IT and Electronic Product Representation Proposition suggests that, on a relative basis, industries where IT advances make it easier to electronically represent a product will make a faster move to transparent electronic markets. Again, our rationale is both transaction-cost based and revenue-based. Since unbiased markets require more information processing capabilities than biased markets, if IT reduces product complexity or increases the ability to represent products electronically, the respective cost reduction is relatively higher for unbiased market mechanisms. On the other hand, a higher electronic product representation makes it difficult for a seller to distort or conceal information, because there is competitive pressure from other sellers who can provide accurate and complete market information.
COMPETITIVE AND INSTITUTIONAL FORCES (LINK E)

The air travel and finance industries provide evidence that competitive and institutional forces favor a move to transparent electronic markets.

Competitive Forces

In U.S. air travel, it is common to observe price competition among airlines since the deregulation of the industry, particularly in leisure markets which have been commoditized. In the absence of the ability to compete effectively with differentiation strategies, competition by innovative and transparent OTAs has emerged successfully in the leisure segment. However, the competitive forces that favor transparent electronic mechanisms for leisure travel are mitigated in corporate travel due to its different nature. The market power that corporations obtain through consolidation of demand by travel agencies and the need for value-added services (e.g., handling complex trips and time-sensitive itinerary changes) reduces the pressure on corporate travel providers to compete with market information. Therefore, opportunities for product differentiation make biased and opaque market mechanisms viable in corporate travel.

In competitive environments, firms have an incentive to adopt innovative market designs as strategies for differentiation, rather than fuel losses from price competition. Facing the choice of implementing an IT-enabled transparent mechanism or competing on price to attract buyers, many firms will prefer to compete for buyers with market information. Potential incremental benefits from a biased or opaque market mechanism will not offset the potential losses that price competition brings. In addition, implementing transparent market mechanisms increases pressure to eliminate price discrimination. For example, the Internet has allowed consolidation of international financial and air travel markets, diminishing the ability of firms to price-discriminate based on regional and national borders [Economides, 2001; Reuters, 2004].
More generally, competitive forces tend to make transparent market mechanisms more viable than biased and opaque ones. These forces are ones that provide incentives for firms to compete with price rather than through product differentiation. Sellers with market power may be in a position to lock in buyers through biased and opaque market mechanisms rather than engage in price competition. In contrast, in the absence of market power and product differentiation strategies, *price competition* prevails. This is the case in commodity markets, where price is a key determinant of buyer preferences and possible product differentiation strategies are scarce.

**Institutional Forces**

It follows that institutional forces that promote a competitive environment also favor a move to transparent markets. Some institutions explicitly lobby to prohibit market bias and opaqueness, such as consumer protection agencies, industry lobbying groups, and regulators that prohibit predatory behavior by firms with market power. In the 1980s the airline owners of GDSs gave preferential treatment to their own travel options in screen displays, so regulations were created to prohibit these practices of market bias. Moreover, regulations were introduced that required owners of GDSs to share sales information with other airlines, allowing competitors to have complete and accurate information about each other’s products, prices, and sales history.

On the other hand, these institutional forces exert an indirect impact on market structure. Legal and other institutional forces that prohibit anti-competitive behavior indirectly lead sellers to favor transparent mechanisms. In particular, in the presence of regulations that make explicit collusion illegal, sellers may prefer transparent electronic markets to tacitly collude and avoid losses from price competition [Varian, 1999; Campbell, et al., 2005]. This theoretical impact of institutional forces that discourage explicit collusion has been observed in financial and air travel markets. Christie and Schultz [1995] found that traders tacitly colluded to avoid trading at the
odd-eighth quotes, increasing the average spread. The study prompted an investigation by the Securities and Exchange Commission, resulting in a $1 billion dollar settlement with investors to drop pending lawsuits. Similar competitive and legal forces may also explain why, despite the risk to their profits, major U.S. airlines reintermediated the Internet B2C air travel market with Orbitz, which provided transparency to the market beyond what had been observed so far. The aforementioned analysis leads to the following proposition:

- **Proposition 3 (The Competitive Forces Proposition):** *In the presence of price competition and laws that prohibit explicit collusion, sellers will favor and implement transparent electronic market mechanisms to collude tacitly.*

### THE MOVE TO TRANSPARENT ELECTRONIC MARKETS

So far, we have shown that IT favors transparent market mechanisms in three ways. First, in line with the EMH, it decreases the competitiveness of hierarchical and biased market mechanisms by market coordination costs (Link A in Figure 2). Second, it enables new and innovative ways to compete for buyers with market information, increasing the potential for market transparency (Link B). Third, it increases the ability to disseminate market information electronically, by enabling digital representation of products and reducing the complexity of product descriptions (Link C). However, these impacts of IT do not eliminate all incentives sellers have to implement biased market mechanisms. Competitive and institutional forces further diminish the attractiveness of biased or opaque market mechanisms. This leads to:

- **Proposition 4 (Transparent Electronic Market Proposition):** *In competitive industries where products can be effectively represented electronically, IT will lead to the dominance of transparent electronic markets. The absence of any of these factors inhibits the move to transparent electronic markets.*

Based on the conditions stated in the Transparent Electronic Market Proposition, the theory of transparent electronic markets predicts the industry sectors where the IT-driven dominance of transparent electronic markets will be observed. We contend that competition and product
characteristics that favor electronic trading are sufficient to tilt the trade-off between the benefits of biased or opaque market mechanisms and transparent market mechanisms in favor of the latter. Other industries with any of the conditions absent may still experience a move to transparent markets, although at a lower pace or to a lesser extent than those where all conditions are present.

**DISCUSSION**

In this theory-building research effort, we were originally motivated by an in-depth analysis of the air travel industry [Granados, et al., 2005]. We were perplexed by the decision of U.S. airlines to invest in the development of technology to launch a transparent online travel website, with unbiased, complete, and accurate information. As we expanded the analysis to include other industries, we obtained consistent observations of deliberate strategies by firms to compete with market information, despite the risk to their profits.

Our theoretical propositions are the outcome of inductive and deductive thinking to explain how IT leads to transparent electronic markets. Initially, we used existing theories of industrial organization and market design theory to evaluate the air travel industry and try to explain these paradoxical observations. A cross-case analysis of industry sectors within air travel led to a series of propositions. These propositions then were refined based on further literature review of related theory and a case study of financial securities. Table 2 summarizes the questions, theoretical propositions, and support from the cases that have resulted from this iterative process.

The propositions that we obtained from our multiple case analysis explain that the move to transparent electronic markets is grounded on the use of IT in competitive strategy. All of our propositions develop the notion that sellers will not only design market mechanisms to reduce transaction costs, but also to strategize and compete against their rivals. We contend that it is this
Table 2. Theory Development and Empirical Support

<table>
<thead>
<tr>
<th>QUESTIONS</th>
<th>THEORY DEVELOPMENT</th>
<th>SUPPORT FROM CASES</th>
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<tbody>
<tr>
<td>Why do sellers make market info available to buyers despite the risk of losing info advantages? How can sellers compete by offering market info?</td>
<td><em>IT</em> leads firms to compete in the dimension of market transparency (Link B, Proposition 1).</td>
<td>Innovative mechanism designs in the Internet channel. Some examples are Capitalink and E*Trade in financial markets, and Expedia, Priceline.com, and Rosenbluth Travel in air travel.</td>
</tr>
</tbody>
</table>
| What industry-specific factors influence the extent to which sellers use market information to compete? How do they exert this influence? | *Electronic product representation* moderates the use of IT to compete with market information (Link D). | - Bond markets are less transparent than equity mkts.  
- Corporate travel markets are less transparent than leisure markets. |
| What environmental forces influence the extent to which sellers use market information to compete? How do they exert this influence? | *Competitive and institutional forces* moderate the use of IT to compete with market information (Link C, Proposition 2). | - CRS and Internet technologies enabled transparent market mechanisms in air travel and financial markets. |
| Why does the availability of market information differ across industries? Why have unbiased electronic markets prevailed in some industries but not in others? Under which circumstances will transparent electronic markets prevail? | IT and moderating factors determine the difference in the extent of a move to transparent markets. | - Bond markets and corporate travel markets are less transparent than others within their respective industries. |
|                                                                         | In industries where IT and all moderating factors are present, transparent electronic markets will prevail (Proposition 4). | - There are fast-growing transparent electronic mechanisms in the equity markets and leisure air travel markets.  
- Transparent B2B electronic markets dominate in travel agency ticket distribution |

competitive pressure that, under certain conditions, leads most firms to favor and implement transparent electronic markets.

Nevertheless, the propositions carry forward some elements of transaction cost-based perspectives of industrial organization. For example, the reduction in information processing costs due to declining product complexity favors a move from biased and opaque markets to
transparent markets, analogous to the existing rationale for the move from hierarchies to markets. On the other hand, Malone, et al. [1987, p. 492] predicted that “[p]roducers who start out by providing an electronic hierarchy or a biased electronic market will eventually be driven by competitive or legal forces to remove or significantly reduce the bias.” Through our analysis, we have shown what these forces are and how they interact with IT to facilitate the dominance of transparent electronic markets.

The question remains as to whether the impact of IT on internal forces within organizations may change the outcomes of market structure embedded in our propositions. Our analysis assumes that internal operation remains constant across firms, and therefore external forces dictate the organization of markets. Putting that assumption aside we contend that, regardless of the impact of IT on the internal forces of the firm, the external forces will continue to dictate the long-term outcomes. As the cost of IT investments decrease and the processing power of computers increases, IT will allow most players in an industry to process data and generate more timely, accurate, and complete information, which will only accelerate the outcomes on market information dictated by our propositions.

V. CONCLUSIONS

We have proposed a new theory of transparent electronic markets to explain and predict the role of IT on market structure transformations. The core rationale of the theoretical framework is as follows. Sellers have economic incentives to adopt biased and opaque market mechanisms. While IT enables transparent market mechanisms, IT alone will not eliminate these incentives. Our analysis of the financial securities and air travel markets suggests that a combination of IT, competitive forces, institutional forces, and enhanced electronic product representation triggered the move to transparent electronic markets.
We have taken advantage of the advanced stage of air travel and financial markets to develop a theoretical framework about the impact of IT on market structure. We applied an inductive approach appropriate in case study methodology [Eisenhardt, 1989] to examine the forces that play a role in the evolution of markets, towards high structural levels of market transparency. By analyzing multiple industry sectors within these settings (i.e., B2B and B2C bond and equities markets, B2B travel agency and corporate travel markets, and B2C leisure travel markets), we found that new IT-enabled informational strategies are being used to compete for buyers, which is creating structural changes in the level of bias, accuracy, and completeness of market information. In addition, there are common forces that drive these changes in market structure.

Although the number of contexts that we have examined is not large, they nevertheless allowed us to develop a set of propositions that can be potentially observed and tested in other industry settings. Additional in-depth case studies can be performed to validate and enhance these propositions. For example, an interesting case is that of the book market, where Amazon.com has led the path to greater levels of market transparency. Amazon.com has included secondary markets in customers’ search requests to reduce biases and enable price discovery, despite the risk to their profits. In addition, in 2003 it introduced a “Search Inside the Book” feature on its website that allows consumers to browse pages of more than 120,000 books, to effectively increase product transparency in the industry [Economist, 2003].

With a larger dataset of industry cases, empirical analysis can be done to determine the impact of IT and other forces on market transparency. For example, cross-country studies by industry can be done to examine the impact of different degrees of competitiveness and legal forces on market structure. Similarly, cross-industry studies can be done to determine the impact of product characteristics on market transparency.
Finally, we propose theory-building to examine the impact of IT on other dimensions of market design. For example, while auction markets for used products have proliferated thanks to the Internet, they are not necessarily transparent. A buyer that engages in one auction commonly accepts the biased nature of this market mechanism, where other product offers are not considered. The success of Internet-based auction markets for used products (e.g., www.ebay.com) suggests that the impact of IT on market structure should also be examined along other dimensions of market design, such as price discovery.

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