Overview

My research studies the economic impact of IT-driven changes in the availability of market information. In particular, my dissertation examines the impact of Internet-enabled market transparency on consumer demand, firm strategy, and the broader impact on a market’s structure. My long term goal is to develop a modeling and empirical basis for a theory of market transparency in electronic markets. This research agenda has been presented at multiple conferences and has already led to several publications and research awards. The Carlson School of Management recently ranked my dissertation proposal in first place in the 2005-2006 fellowship competition. I was consequently nominated and later awarded the prestigious University of Minnesota Graduate School Fellowship.

Motivation. I am motivated to pursue research that is problem-driven, based on my years of experience in industry. Before joining the PhD program at the Carlson School of Management, I spent ten years marketing, selling, using, and implementing information systems in four continents. I became fascinated with the widespread economic and social consequences of advanced information technologies. Therefore, my interest is to develop research that informs the economic decisions that consumers and organizations face in today’s dynamic technological environment. As a means for deeper understanding of the real-world economic impact of IT, I am pursuing a PhD minor and an MS in Applied Economics.

Research Background. The Internet revolution brought about significant changes in market transparency, defined as the availability and accessibility of information to market participants. For example, air travelers can use online travel agencies to browse through hundreds of travel offers to their destination, compared to typically few offers from a traditional travel agent or airline prior to the Internet era. Two forms of market transparency have been particularly affected, product and price transparency. Product transparency is related to information about the product variants available and their characteristics. Price transparency is related to information about market prices, including historical transaction prices and price quotes.

Generally, market transparency benefits consumers because they are able to better discern the product that best fits their needs at a better price. However, due to better informed consumers, the marketing and distribution benefits of the Internet also make it difficult for sellers to capture profits (Porter, 2000). I propose research on the economic impact of IT-driven market transparency on consumers, firms, and industry structure. The rationale for this research agenda is that the impact on the individual consumer is likely to affect how firms strategize in the presence of IT-driven market transparency, and in turn, the aggregate result of firms’ strategic actions is likely to have a broader impact on the industry sector. Therefore, our understanding of the impacts at the firm and industry level will benefit from research findings at lower levels of analysis. Next, I describe the research streams that stem from these levels of analysis.
Research Stream #1: The Impact of IT-Enabled Market Transparency on Consumers

IS researchers and economists have found analytical support for the proposition that an increase in market transparency benefits consumers because they are able to better discern the product that best fits their needs at a better price. (Bakos, 1997; Stigler, 1961). However, despite the relevance of this topic in the information age, empirical research that examines the impact of IT-driven market transparency on consumers’ economic behavior is scarce. In this research stream, I empirically examine the impact of information availability on consumers’ economic behavior. The research questions are:

- How does electronic market transparency impact consumers’ willingness-to-pay?
- What is the effect of IT-enabled product and price transparency on consumer demand?

I have access to a large data set of airline ticket sales for both Internet-based and traditional travel agencies. I am using this database to examine the impact of IT-driven market transparency on consumers, and I will use this data in future related research projects.

Research in Progress. In my dissertation research, I examine the impact of market transparency on consumers’ willingness-to-pay, in terms of consumer demand and the price elasticity of demand. I test the following hypotheses, which are grounded on IS, marketing, and economics literature (Bakos, 1997; Lynch and Ariely, 2000; Stigler, 1961):

H1: Product transparency is positively related to consumers’ willingness-to-pay.
H2: Price transparency is negatively related to consumers’ willingness-to-pay.

I use econometric techniques to analyze a data set of 3 million airline tickets sold by U.S. travel agencies during a one year period. This analysis is innovative because I incorporate product and price transparency as explanatory variables in an otherwise standard econometric demand model. In addition, I developed new measures of product and price transparency for the different online and offline travel agencies in the data set.

Preliminary results of this econometric analysis support the above hypotheses. Product transparency is found to have a positive relationship with consumer demand. On the other hand, price transparency is found to have a negative relationship with consumer demand and a positive relationship with price elasticity of demand.

Accomplishments. An analysis of transparency strategies of online travel agencies and the literature review that led to the above hypotheses was published in a chapter of the book Advances in the Economics of Information Systems (Granados, et al., 2005a), edited by K. Tomak of the University of Texas at Austin. A working paper with the results of the econometric analysis was presented at the Workshop on IS and Economics (WISE) in December 2005. The paper is in preparation for submission to Management Science (Granados, et al., 2005c).

Future work. Data collection of airline ticket sales and prices at a finer level of detail was completed in May 2005, with the support of a software agent that scraped prices from major online travel agencies. With this new data set I will validate the findings from the first econometric analysis. I am exploring innovative research ideas together with my industry contacts and faculty advisors, including field experiments and economic experiments to examine consumer responses to different levels of transparency. Finally, I plan to develop this empirical research in an international context, to test the impact of market transparency in different economic, cultural, technological, and industry environments.
Research Stream #2: The Impact of IT-Enabled Market Transparency on Firm Strategy

IT-enabled market transparency is a strategic paradox for organizations. Due to better informed consumers, the very benefit of the Internet—making information available to facilitate product marketing and distribution—also makes it difficult to capture profits (Porter, 2000). For example, through my experience in airline pricing and revenue management, I gained an insider’s view on how the Internet has transformed market transparency in the industry. With the advent of the Internet, some online travel agencies such as Expedia introduced transparent market mechanisms, while traditional travel agencies continue to play a significant role in air travel distribution. In this environment with heterogeneous transparency levels, major U.S. airlines hesitated to aggressively pursue airline ticket distribution via the Internet, and often retrenched as they feared that by selling tickets online, their pricing strategies would be exposed.

In this research stream, I try to explain this strategic paradox by analyzing and assessing the economic benefits of market transparency for sellers. The research questions are:

- How should sellers strategize in a market with heterogeneous transparency levels across competitors and distribution channels?
- Are these normative guidelines in line with real-world observations?

Research in Progress. I developed an analytical model of the prices and transparency levels that a firm should adopt to maximize profits. In the model, I assume that IT allows a firm to control relative prices and transparency levels in two channels. The first one is an Internet-based channel, and the second one is an offline or brick-and-mortar channel. I also assume that consumers’ willingness-to-pay is affected by different transparency levels, in terms of demand shifts or changes in the price elasticity of demand. The model’s output is the optimal transparency levels and prices by channel. Similarly, the model can be used to derive optimal relative prices and transparency levels for different sellers, rather than channels.

The general result is that if consumers value market transparency, the transparent online channel or should have a lower price than the opaque one to maximize profits. In addition, I provide guidelines based on historical sales by channel (or seller) to assess whether the relative price and transparency strategies are optimal, and the consequent directional actions that must be taken otherwise to increase profits.

Accomplishments. I presented the analytical model at the INFORMS Conference of IS and Technology (CIST) in October 2003 (Granados, et al., 2003). Since then, I enhanced the model and the normative guidelines were used to evaluate multi-channel transparency strategy in the air travel industry. Based on an econometric analysis of demand for online and traditional travel agencies, I find that relative prices implemented by airlines in online and offline channels are not optimal, given their level of transparency. The related paper was presented at the Workshop on IT and Systems (WITS) in December 2005. An extended version of the paper is in 1st round review at Information Systems Research (ISR) (Granados, et al., 2006a).

Future Work. At this point the model is not restricted by an assumption regarding the impact of market transparency on consumers’ economic behavior. Therefore, a natural progression of this research will be to incorporate into the model the empirical results from Research Stream #1, regarding the impact of market transparency on consumers’ willingness-to-pay. In particular, normative guidelines will be derived separately for product and price transparency, because the evidence suggests that their effects on consumer demand and price elasticity of demand are different.
Research Stream #3: Impact of IT-Enabled Market Transparency on Market Structure

This research is a theory-building effort to explain and predict how IT will structurally impact market structure. So far, theories of the impact of IT on economic activity explain and predict rather specific outcomes. At one extreme, there are theories such as the electronic markets hypothesis (Malone, et al., 1987), which predict that electronic markets will become more transparent due to structural reductions in the level of bias, where information about all sellers will be made available. On the other hand, other theories predict that biased electronic markets or hierarchies may prevail, such as the move-to-the-middle hypothesis (Clemons, et al., 1993). However, both outcomes are observed in the real world.

In this research stream, I develop theory to explain how IT influences market organization and shapes the forces that facilitate or inhibit transparent electronic markets. In this way, I will develop a theory of the informational impact of electronic markets on market information and transparency. I will answer the following research questions:

• What are the factors and theoretical bases that explain differences in market organization in the presence of IT?
• Under what conditions will transparent electronic markets dominate in an industry?

Research in Progress. I use case study methodology to build theory that explains different outcomes of market organization in the presence of IT. In particular, I propose three sets of variables that, together with IT, facilitate or inhibit the move to transparent electronic markets: Competitive forces (e.g., degree of price competition, market power), institutional forces (e.g., regulatory), and industry-specific conditions (e.g., product characteristics). The theory suggests that initially firms will have economic incentives to use e-commerce technologies to bias, conceal, and distort information, resulting in the predominance of biased and opaque electronic markets. Subsequently, in the presence of IT advances and other forces, firms will make individual market design decisions that, in aggregate, will lead electronic markets to become transparent. On the other hand, the absence of any of these forces will inhibit the move to transparent electronic markets.

Accomplishments. I presented this theory at the JAIS Theory Development Workshop in November, 2004 and at the American Conference in Information Systems (AMCIS) in August, 2005. The corresponding paper was published in the Journal of the AIS (Granados, et al., 2006b).

I developed the theory in the context of business-to-business electronic markets and presented it at the Hawaii International Conference on System Sciences in January, 2006 (Granados, et al., 2005b). The related paper is forthcoming in Information Systems and e-Business Management (Granados, et al., 2006c). Finally, I submitted another related paper to MIS Quarterly but it was rejected.

Future Work. I believe that the peer review process through journals and conferences will be instrumental to further develop this theory-building project in the right direction. In particular, the feedback I have received from the Journal of the AIS will guide the next steps in its development.
References


