EMERGING INSTITUTIONS:

TRANSACTIONAL INTEGRITY IN E-COMMERCE

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Abstract

The advent of e-commerce has led to predictions of massive disintermediation of the global economy. However, we argue that these predictions overlook important trading hazards inherent to virtual exchange. As a result, realizing the potential benefits of e-commerce depends critically on the emergence of private and quasi-public institutions supporting transactional integrity. Examination of e-commerce's short history in the US provides evidence of the emergence of such market-supporting institutions; implications for managers are discussed.

Introduction

Flip through the pages of any popular business journal these days, and it quickly becomes apparent that e-commerce – business conducted online via the Internet – is a hot topic. A Wall Street Journal special feature in July of this year proclaimed: "As online business accelerates, one thing is for certain: Buying and selling will never be the same." ("E-Commerce," 7/12/99, p. R.1) Market potential is routinely projected to be in the trillions of dollars,[1] as everything from books to cars to insurance become available on the Web, and as consummation of multi-million dollar business-to-business transactions via the Internet becomes routine.

Some sobering facts nonetheless lurk behind all this hype. Estimates of *current* electronic commerce start at around $50 billion, only a small fraction of the projected potential; and most consumer surveys on the topic reveal a deep-seated anxiety about the integrity of business transactions conducted over the Internet. Reports of research by the credit card giant Visa International, for example, suggest that only 5 percent of consumers trust e-commerce (NUA Internet Surveys, 3/25/99). Undoubtedly, this anxiety can in part be attributed to the natural suspicion engendered by any new and unfamiliar technology.[2] However, as argued in more detail below, there are indeed some aspects of e-commerce that raise new trading hazards – or more precisely exacerbate old ones – and the resulting lack of "transactional integrity" stands as a real obstacle to realizing the potential of e-commerce markets.

A 1997 study sponsored by the European Commission illustrates the hazards of e-commerce. It reported that citizens and businesses in Europe have lost anywhere from 6 billion to 60 billion ECUs – much of it because of fraud involving sites on the Web that

[1] For example, a December 1998 estimate from the Wall Street Journal was for electronic commerce to "soar to $1 trillion by the year 2002" (WSJ, 12/7/98, p. R.22). Some forecasters go so far as to suggest that up to a third of all business in the year 2000 will be conducted electronically (Celestino, 1999)

[2] For a fascinating history of the telegraph and how it raised many concerns that resonate with today's response to the Internet and e-commerce, see Standage, 1998.

appeared to be for legitimate businesses, but were in fact fronts for criminal operations. Consumers were duped into giving their credit card number for products or services that were never delivered (Ghosh, 1998, p. 17). And in the US, Cyveillance, an Internet private investigator, recently claimed that up to 20% of Web vendors of luxury goods were, knowingly or not, selling counterfeit merchandise (Working Woman, May 1999). In addition, the General Accounting Office has identified cases of fraudulent imitation of brokerage-firm Web sites: Investors believe they are sending money to the broker when, in fact, the address is a post-office box. When perpetrators are detected, they merely shut down the Web site and copy another one ("Growth in Internet Securities Fraud...," Wall Street Journal, 3/22/99).

The emergence of e-commerce markets in the US provides researchers with a fascinating real-time natural experiment in the process of institution building. In response to consumer concerns about transactional integrity, a variety of institutions are emerging. These range from "institutionalized gossip" (Kollock, 1999) in online auction houses, to specialized e-commerce intermediaries (so-called "infomediaries") to quasi-public institutions specifically designed to protect consumers in their dealings with e-commerce companies.

Detailed analysis of the particular trading hazards salient to e-commerce markets, and of the emergence of institutions designed to bring transactional integrity to this new trading arena, can contribute not only to our understanding of e-commerce, but to our broader understanding of market-supporting institutions. The current paper represents a first step toward this objective. Below, we provide additional background on the scope of e-commerce activities, and examine claims that the Internet promotes "disintermediation," (roughly speaking, cutting out the middleman) whereby consumers gain direct access to competitive producers around the globe. We critically evaluate the feasibility of disintermediation by focusing on trading hazards that are most salient in online markets. We also examine the efficacy of reputation mechanisms as a disciplining force in e-commerce, relative to more traditional product markets. This sets the groundwork for

analysis of alternative institutional responses supporting transactional integrity that have emerged to date in e-commerce markets in the US. The final section of the paper summarizes implications for managers and suggestions for future research.

The scope of e-commerce

Despite the recent hype, electronic commerce is far from a new phenomenon. Businesses have used Electronic Data Interchange (EDI) to facilitate information sharing and administer transactions with select suppliers and customers for over thirty years.[3] However, traditional EDI is conducted over a closed "computer-to-computer" system, dedicated to a particular network of business partners, with information exchange governed by a customized protocol. As such, use of these systems was beyond the reach of many small companies, and large companies limited participation to suppliers and customers with whom they had sufficiently close business dealings to warrant the not-inconsiderable investment and coordination required to establish and maintain EDI.[4]

The idea that electronic commerce would "change the face of commerce" (Wall Street Journal, 7/12/99, p. R6) did not gain currency until the take-off of the Internet in the early/mid 1990s. The open architecture of the Internet raised the possibility that businesses could reach potential suppliers and customers – even individual consumers – all over the globe. In addition, for some goods and services (specifically, information-

[3] Indeed, one can argue that the mid-nineteenth century marked the true advent of "e-commerce:" Morse invented the telegraph in 1844, and by 1850 more than 10,000 miles of wire had been laid in the US, bringing in a new "information era" (Geisst, 1997, pp. 45-46). In 1862, Jay Cooke & Co., the first "wire house" used telegraphy to coordinate the simultaneous sale of a huge Union government bond issue in many cities. Cooke was so successful in raising so much money so quickly that Giesst (1997, pp. 53-58) argues he "contributed in no small way to the outcome of the [civil] war."

[4] The costs associated with traditional EDI go far beyond simple hardware costs: "Since EDI involves minimal human intervention, the procedures used for the exchange of messages have to be formally specified. Detailed bilateral agreements are needed to provide such specifications, yielding high relationship-specific costs. These costs have resulted in a situation in which EDI is applied only in long-term, stable trading relationships among trusting partners" (Bons, Lee and Wagenaar, 1998, p. 61).

based products), production suddenly became independent of its location: not only do buyers and suppliers now meet on the Web, but "the transaction can also be executed via the net. As a consequence, potential market partners can become de facto market partners independent of their location" (Beck, 1999, p. 75).

It is useful here to distinguish three basic applications of e-commerce which differ significantly from each other in their characteristics and thus, potentially, in the salience of transactional integrity issues. These three applications are business-to-business, retail (business-to-individual), and auction (individual-to-individual).[5]

Business-to-business transactions represent by far the most developed application of e-commerce to date. Forrester Research, Inc. estimates that, in 1998, businesses spent $43.1 billion on Internet-based purchases of hard goods from other corporations, across a wide range of industries ("E-Commerce," Wall Street Journal, 7/12/99), and annual growth rates of almost 100% are predicted for the next few years. The potential for business-to-business e-commerce thus exceeds that of traditional EDI by several orders of magnitude. General Electric, for example, already buys $1 billion-worth of goods from 1400 suppliers through its "Trading Process Network" Web site, cutting the length of the bidding process in half and lowering the cost of goods by 5-20% ("Big, Boring, Booming," Economist, 5/10/97).

But it is the retail sector that fires imaginations and fuels estimates of e-commerce's ultimate potential; and here, current activity is much more modest. 1998 online shopping amounted to just $7.1 billion, almost half of which was accounted for by purchases of books, personal computer hardware, and travel ("Buying Frenzy," Wall Street Journal, 7/12/99). Nonetheless many other categories are starting to heat up (such as apparel, PC software, grocery, specialty gifts and music) and with Internet usage creeping toward 50% in middle-to-upper income brackets in the US, the predictions of market potential do not

[5] Labor markets are also increasingly coming "online." See Beck (1999) for analysis of potential changes in labor markets stemming from the rise of the Internet.

seem quite so outrageous.

Online auctions, where individuals come together to trade goods or services, also receive a great deal of attention in the press. The oldest and most well-known of these auction sites is eBay.com, but there are in fact over 1000 such sites on the Web (Kollock, 1999), selling everything from collectibles to high-tech patent licenses. Most of these sites operate in a similar fashion to eBay - the auction company acts simply as a listing agency, providing a forum for buyers and sellers to come together, in return for a small fee; no warranties or guarantees for the goods are given by the company.[6] Activity at online auction sites has nonetheless taken off. EBay alone now gets over a million unique visitors a day ("Art's Big Bang," Forbes, 8/9/99).

At first sight, Ebay appears to be the epitome of a "disintermediated" market, as myriad buyers and suppliers connect directly on the web with minimal intervention by third parties. Since much of the projected potential of e-commerce is predicated on this ideal (Ghosh, 1998; Larsson and Lundberg, 1998), it is important to assess the consequences of such a change in trading relations, and to ask whether disintermediation of e-commerce markets is a realistic expectation. We make such an assessment in the following sections, by first examining the role of intermediaries in traditional product markets, and then drawing implications for e-commerce markets.

The Internet, search costs and disintermediation

Intermediaries are ubiquitous in traditional product markets. Successful completion of a transaction between producer and consumer involves several activities: search (where the buyer finds potential suppliers and evaluates product offerings); bargaining; and satisfactory exchange of the agreed-upon product and payment (i.e., execution of the transaction). Each of these activities add "transaction costs," accounting for the difference

[6] In addition, some online auctions sell off new merchandise for manufacturers – for the purposes of our analysis, such sites are considered a "retail" e-commerce application.

[7] For the buyer, costs incurred in search, bargaining and transaction execution drive a wedge between

between the total price paid by the buyer and that which the seller receives.[7] Intermediaries (by definition, organizations that stand "between" producers and consumers to facilitate transactions) may specialize in any, or all, of these activities, so reducing transaction costs and increasing market efficiency. Such intermediaries include wholesalers, retailers, shopping malls, delivery firms, advertising agencies, and banks.

A popular argument today is that information networks increase the "transparency" of the market (Larsson and Lundberg, 1998), letting customers connect with many potential suppliers directly on the Web, and leaving middlemen redundant. Thus, Ghosh (1998, p. 1) writes: "Without the imposition of political boundaries and geographic distances, it is as easy to do business with a remotely located specialty store as it is with the local superstore bookstore."

The rise of the Internet and e-commerce may indeed render many traditional intermediaries obsolete. Larsson and Lundberg (1999, pp. 39-45) argue that those intermediaries specializing in search and bargaining activities, such as retail superstores, are especially threatened. The powerful search engines available for "surfing" the Web can bring information from many producers directly to a buyer at virtually zero cost (except for the time spent waiting for Internet pages to load). This not only reduces direct search costs, but also may significantly reduce bargaining costs. When more of the relevant information about a transaction is public information, comparison-shopping is made easier, and there is less incentive for suppliers to engage in protracted negotiation. As analyst Kate Delhagen says, "It's a great time to be a consumer. You have more power than you could possibly imagine." ("A Site-Eat Site World," Wall Street Journal, 7/12/99).

The increased information flow over the internet thus may greatly reduce transaction

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marginal utility and the maximum price they are willing to pay the seller. On the seller's side, these activities raise the minimum price required above the marginal cost of production, even in perfectly competitive markets.

costs – and in turn reduce profits available to traditional intermediaries. As futurist George Gilder predicts: "Disintermediation of existing channels is a major development. It's a direct result of the increased sovereignty of the customer in the information economy" (Informationweek, 10/20/97). This verdict may be rather too hasty, however, for intermediaries play multiple roles. Although the Internet may well reduce information gathering, searching and bargaining costs, it is possible that it may actually increase the need for intermediation along other dimensions. An assessment of this possibility requires that we look more closely at intermediation services related to evaluation and performance assurance.

One important economic function of traditional intermediaries is to evaluate and credibly communicate product information to consumers. Intermediaries can afford to make the necessary investments to become experts in the evaluation of particular types of products. This is because they make repeat purchases of similar items, unlike consumers who may purchase a given item only once or twice (Choi, et. al, 1999). In addition, product quality claims are more credible coming from an intermediary that sells products from multiple producers. Again, the intermediary is a repeat player in the market, and continued payoffs from the sunk investments in product knowledge depend on maintaining a reputation for candor (Klein and Leffler, 1981). In addition, collusion with any single producer to sell a good in the face of customer complaints (in return for a share of profits) is unlikely, since damage to the intermediary's reputation will spill over to affect its sales of other products (Biglaiser and Friedman, 1994).

Intermediaries also provide services related to performance assurance, by ensuring that a product is delivered in a timely manner, that its quality and performance meet the buyer's expectations, and that accounts are settled satisfactorily. For example, banks (financial intermediaries) screen out risky borrowers before lending out their depositors' money via mortgages, car loans, etc., and can thus reliably commit to a promised return on savers' investments. Without banks, savers would have to lend money directly to borrowers, and decide for themselves which ones were most trustworthy. Moreover, if loans were not

repaid in a timely fashion, investors would have to individually track down delinquent borrowers and attempt collection.

In the following section we take a closer look at the hazards faced by online traders and suggest that, indeed, some of the very characteristics of the Internet that reduce the cost of information gathering simultaneously exacerbate problems of information reliability, and undermine transactional integrity in disintermediated online markets.

Information reliability and the hazards of disintermediated e-commerce

Kollock (1999, p. 2) provides a nice summary of the information problem facing participants in that most disintermediated of e-commerce markets, the online auction:

> First of all, there is the fact that one is dealing with a party who may be identified only by an email address and who in all likelihood lives far away, perhaps even in a different country. This is a Prisoner's Dilemma transaction that requires a great amount of trust given that it may not be possible to track down or even identify the other party and that the two sides of a transaction are likely to be separated in both time and distance.

Perhaps not surprisingly, online auctions were the number one source of Internet fraud complaints in 1998, according to the National Consumers League (Press Release, 2/23/99), with "scams" ranging from fake photos, misleading descriptions, and failure to ship merchandise, to price manipulation, and bogus loss and damage claims.[8]

Difficulties in assessing the reliability of information is a fundamental problem in online markets because of inherent information asymmetry and information cost problems, exacerbated by low entry and exit costs, and spatial and temporal separation. These issues are discussed in turn, below.

Information Asymmetry and Information Costs

[8] For an informative description of the most common online auction scams, and ways to avoid them, see "Dirty Tricks: Online Auction Scams" at http://www.auctionwatch.com/awdaily/features/dirtytricks.

Information problems impede the efficient execution of many transactions in the economy because information is often asymmetrically distributed between buyer and seller and may be equalized only at great cost in some circumstances. Furthermore, it can be costly for an arbiter to gather the information necessary to fully understand a dispute that arises between two opportunistic parties, even when both have identical knowledge of the underlying circumstances.[9]

Information asymmetry is exacerbated in e-commerce markets since it encompasses not only the "usual" problem of private information regarding product attributes (Akerlof, 1970) – witness the counterfeit luxury goods mentioned earlier – but also potential uncertainty about the very identity of the trading partner one is dealing with. As the quote from Kollock (1990) highlights, the situation is most extreme in online auction markets, where traders are identified essentially by e-mail addresses, many of which are virtually impossible to trace and very easy to change.[10] But the problem also exists in retail markets. As a 1997 Economist editorial mused: "What is behind that Web article image of a superstore? Might it be just a teenager with a graphics program?" (The Economist Survey, 5/10/97, p. E14) The cited examples of widespread reported fraud in Europe, and imitation of brokerage-firm sites in the US, suggest that suspicions such as these are, in some cases, well founded.[11]

What about the costs of information gathering for effective arbitration of disputes? Here,

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[9] This is the "information impactedness" condition referred to by Williamson (1996, p. 65).

[10] Free e-mail accounts are viewed with particular suspicion in online auctions, as such services typically allow users to use any name they want, and don't verify identities or ask for credit-card numbers (Wall Street Journal, 12/7/98).

[11] The problem is exacerbated by the free-for-all in the market for Internet domain names. For example, it is possible to register a domain name similar to an existing brand, hoping to pick up business when people accidentally visit ("Internet body to tackle abuse...", Marketing, 5/6/99). This practice, called "passing off" has been the subject of several high-profile lawsuits in Britain involving such well-known companies as Virgin Enterprises, British Telecom and Marks and Spencer ("Registration of Internet Domain Names..." Consumer Policy Review, Sept/Oct 1998).

the main sources of additional difficulties in e-commerce markets are the ease of impersonation (alluded to above), and the lack of a reliable "paper trail" regarding a transaction. Realizing e-commerce's full potential means relying on "digital documents," which are much more easily corrupted or manipulated than the traditional paper documents used in contractual agreements. As a writer on security in e-commerce puts it:

> In Internet-based sessions, messages are transmitted through a number of middlemen before reaching their final destinations. These middlemen are internet routers for the messages and include the mail servers on either end of the connection. Any one of these routers may copy, modify or even delete messages." (Ghosh, 1998, p. 13).

Such concerns are magnified further in international markets, where there is as yet no agreement about the legal status of digital documents.[12]

Low barriers to entry and exit

Fundamentally, all one needs in order to establish an electronic business is a web-site (or even just an e-mail address for online auctions). This absence of barriers to entry is often touted as one of the greatest promises of e-commerce. But minimal barriers to entry are not an unequivocal plus. On the one hand, ease of entry and exit reduces market power and can bring lower prices. On the other hand, when firms can effectively change identity at a moment's notice, entirely new dimensions of fraud open up, and traditional forms of fraud become easier.

One novel type of internet fraud involves "pagejacking" - misdirecting web surfers to false copies of legitimate businesses and tricking them into revealing passwords and PIN numbers, or diverting them from seemingly benign sites to online pornography sites from which they are unable to escape.[13] Traditional penny stock manipulators can plant

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[12] Even within a firm, securing digital documents from third-party manipulation is far from a trivial issue: a joint report by the FBI and the Computer Security Institute found that 61% of U.S. firms reported between one and five network intrusions in 1998 (cited in "E-Commerce," Computer Reseller News, 4/5/99).

[13] See "Regulators Crack Down on Web Pornographers" by John Simons, *Wall Street Journal*, Sept. 23,

legitimate looking web news stories hyping stocks in Zairian diamond mines and other such scams.[14] Even for "quasi-legitimate" businesses, Web technology makes it simple to change the name and appearance of the company, in order to shake off a bad reputation. This means that "entry" and "exit" take on quite different meanings than in traditional product markets, since a company can essentially exit the business and re-enter with a different identity at very low cost, and with no perceptible break in activity. This exacerbates the twin problems of information asymmetry and information cost discussed above. Information is easier to gather, but its quality and reliability suffers.

Temporal and spatial separation

The global reach of e-commerce is also double-edged in its impact on consumers. There is great attraction in the idea that e-commerce renders geographic distance and political boundaries meaningless, bringing far-flung and highly competitive suppliers to the buyer's doorstep – but only until a dispute arises. The temporal and spatial separation involved in trading over the Internet is particularly problematic for relatively small-value transactions, where tracking down a dishonest or delinquent trading partner and pursuing litigation in a different state (or a foreign country) is far too costly, relative to the value of the transaction. Such separation also may make verifying information about a supplier (or buyer) prohibitively expensive.

In sum, the characteristics of the Internet do indeed appear to exacerbate the trading hazards facing transactors in e-commerce markets. In the following, we first consider the role of reputation as a potential solution to the identified trading hazards. We then draw implications for the organization of e-commerce markets and institutions necessary to support transactional integrity.

Reputation in disintermediated e-commerce markets

1999 and "Trapped in the Web Without an Exit," J.D. Biersdorfer, *New York Times*, October 7, 1999.

[14] Based on information published online by the Texas State Securities Board, at http://www.ssb.state.tx.us.

From the point of view of a consumer considering an online purchase, one seemingly obvious response to the trading hazards identified above is to deal only with firms that have a well-established reputation for honest dealing. Firms that have attained such a reputation are unlikely to "cheat" a buyer, since the consequent loss of reputation may cost the firm valuable future business.[15] Reputation is an effective market disciplining device as long as certain conditions are met. Specifically, it must be the case that misbehavior is easy to detect, easy to communicate to other current and potential transactors, and is met sufficiently often with "punishment" harsh enough to deter transgressors.

At first glance, the rapid flow of information on the Internet would appear to enhance the efficacy of reputation mechanisms. Transgressions will be discovered and publicized much more rapidly, relative to more "conventional" markets, decreasing the likely one-shot pay-off tempting potential cheats. But a closer look at the trading hazards outlined above reveals the limitations of this argument. For example, in Internet-based markets, easy entry and exit raise the specter of fly-by-night operators like pagejackers, and make it harder for legitimate e-commerce firms to establish credible reputations for permanence, reliability and honest dealing.

[15] This can be understood in the context of a "Prisoners' Dilemma" game: The only equilibrium outcome in a one-shot Prisoners' Dilemma is "cheating" by both players, but this can be overcome in a repeated game setting. In particular, there exist strategies that can lead to a cooperative equilibrium. The credibility of commitments to maintain the cooperative outcome is enhanced when firms make sunk investments that would be lost in the event of defection. Many common features of market interaction can be seen as measures to establish and maintain reputations. For example, older bank buildings, dating from an era of bank runs and failures, resemble millennia-old Greek or Roman temples. The idea is that depositors should feel safer entrusting their savings to an institution with an aura of timeless permanence – and with enough money to afford such a building. In addition, to the extent that there may be a limited secondary market for such peculiar buildings, the sunk investment serves as a credible commitment to honest dealing, since much of the investment would be lost in the event that angry depositors precipitously withdrew their savings, forcing liquidation. (For a comprehensive discussion of reputation effects, see Ch. 14 in Krepps, 1990; section 6 in the chapter is particularly useful.)

The virtual anonymity of transactors on the Web, together with low costs of entry and exit, also seriously undermines the effectiveness of reputation systems based on "negative" information, such as the use of blacklists. Blacklists were initially popular in UseNet *forsale* newsgroups (early Internet trading groups) where lists of suspect traders were posted on the Web. Such lists were soon abandoned, however, as it became clear that blacklists are inherently vulnerable to mistakes and manipulation. Malicious hackers, deranged customers and unscrupulous competitors could post false accusations too easily. And because assuming a new identities makes casting off a negative reputation so simple, real malefactors could evade punishment (Kollock, 1999).

The ability to easily change identity is less of a problem in "positive reputation systems," where transactors gradually accumulate a reputation for straight dealing, based on a history of successful trades. Such systems were more successfully employed in UseNet groups, but their effectiveness as a disciplining force in disintermediated e-commerce markets is still subject to serious limitations. Who will pay to keep records of e-commerce trading histories? Obviously the e-commerce businesses have an interest in recording positive feedback about their own trades, but this means that self-reports would have little credibility. The small, relatively homogeneous groups of traders involved in specialized UseNet groups were often able to overcome the inherent collective action problem through an elaborate set of informal rules.[16] But such norm-based solutions are hard to sustain when the size and heterogeneity of a trading group expands. The very

[16] Kollock (1999, p. 8) documents the case of a Usenet group specializing in the exchange of *Magic* trading cards. Participants are encouraged to post positive references each time they have a successful trading experience. Thereafter, "[the] norm is that the person with the fewer references sends his or her cards first. Once the cards are received and inspected, the trader with the greater number of references then sends his or her cards to complete the trade. Traders with approximately equal number of references are expected to "simul-send" - sending their cards to each other at the same time."

[17] See Grief (1993, pp. 535-542), for discussion of the significance of a stable trading coalition based on social identity for the establishment of effective reputation mechanisms supporting trade among the Maghribi Traders in the 11th century.

success of e-commerce and online auctions thus exacerbates the problem.[17]

Placed in this context, the slow take-off of the retail e-commerce sector, as compared with business-to-business applications, seems quite reasonable. Businesses are much more able to overcome the trading hazards and limits to reputation-building just described in their dealings with other companies. Not only are such transactions much more likely to be undertaken in the context of an ongoing relationship, but firms are also more adept at using the legal system to discipline errant transactors.[18] As a consequence, transferring business-to-business transactions to the Internet reduces search and bargaining costs without incurring large offsetting increases in transaction costs associated with evaluation and performance assurance. A significant net reduction in transaction costs for business-to-business e-commerce is thus a predictable outcome. Similar reductions in transaction costs in retail e-commerce depends on the emergence of institutions supporting transactional integrity into the market. For this reason, we concentrate on retail and auction markets in the remainder of the paper.

Private institutions supporting transactional integrity: Re-intermediation

Given the extent of trading hazards described above, one can understand why the retail e-commerce market has been described as "a jungle populated by fly-by-night scam artists offering phony weight loss products, deceptive travel programs, pyramid buying schemes and all sorts of goods and services at too-good-to-be-true prices" (Discount Store News, 5/3/99). Indeed, what is perhaps more surprising is that retail e-commerce has taken off at all.

In fact, despite the dire warnings and widely circulated horror stories such as those cited

[17] See Grief (1993, pp. 535-542), for discussion of the significance of a stable trading coalition based on social identity for the establishment of effective reputation mechanisms supporting trade among the Maghribi Traders in the 11th century.

[18] In addition, the slower take-off of retail e-commerce most surely reflects the greater departure from current practice that this represents for many traditional businesses.

earlier, the level of actual fraud in retail e-commerce appears to be quite limited. No definitive estimates currently exist, but the American Bankers Association has estimated, for example, that online fraud is insignificant compared to ordinary check fraud. Also, as of 1997, Visa International had not reliably documented a single case of fraud involving credit-card numbers stolen over the Internet ("Timorous Trade," Economist, 5/10/97).

We should not overlook the role played by traditional financial intermediaries such as credit card companies in combating potential online fraud: credit card companies play an important monitoring and certification role in ordinary transactions, and appear to be playing much the same role in e-commerce. If a buyer pays with a credit card, as opposed to a check, the seller's payment is assured. On the other side of the transaction, a seller who cheats a buyer paying with a credit card faces the wrath of the credit card company, not the impotent anger of a disgruntled buyer who may be thousands of miles away. Thus, credit card companies may provide performance assurance which is otherwise lacking[19] and as such are important facilitators of e-commerce markets. The more common use of debit cards (which offer significantly less protection), may provide one explanation for the European Commission's much higher estimate of online fraud in Europe (reported in Ghosh, 1998, p. 17).

The vigilance of the credit card companies does not by itself provide adequate assurance of transactional integrity to sustain growth in e-commerce markets, however. First, the credit card companies provide the monitoring and certification only to registered merchants -- person-to-person (auction) markets such as e-Bay are outside the realm of credit card operations. Second, disputes about the quality of a product are not covered by regulations governing credit card use, and the protection offered to consumers by varies widely among credit card issuers. Third, because most online purchases are completed without a customer's actual signature, merchant protection is incomplete. And finally,

[19] In the US, a card holder's liability is limited to $50 in the case of a stolen card, provided it is reported in a timely fashion. In the case of a disputed charge, the buyer also has the right (under the Fair Credit Billing Act of 1993) to withhold payment while the credit card company investigates the claim.

using a credit card online is as yet a novel experience that strikes fear in the heart of many e-commerce participants ("Fraud..." Card News, 6/2/99). As a result, we see the emergence of a variety of "new" institutions that serve the purpose of supporting transactional integrity in online markets. Foremost among these are private intermediaries. Below, we discuss two types of intermediaries: the "infomediary," which serves purely as a conduit and evaluator of information (and includes most online auction houses in their current form), and the fully-fledged e-commerce intermediary.

The "Infomediary" and Institutionalized Gossip

"Infomediaries" can play an important role in resolving the obstacles to effective reputation systems that arise in otherwise disintermediated e-commerce markets. These specialized intermediaries' main activity is to invest in machinery to track, evaluate and report the trading performance of individual manufacturers and sellers, so increasing the reliability of information available to buyers on the Web. For example, online auction companies will get more business if they provide safeguards against cheating. And indeed, the last few years have witnessed many innovations in this regard.

The simplest example of a mechanism introduced by an infomediary to increase information reliability for individual traders is the "institutionalized gossip" now found at most auction sites. Although there are variations on the theme, most online auctions use systems similar to the one at eBay.com, which operates as follows:[20] Users are encouraged to post comments about their trades in the "Feedback Forum." This information is then made available to other users in a variety of ways. The most prominent is a series of colored stars, based on the number of positive (or negative) comments that the trader has accumulated, which is displayed after a trader's name wherever it appears. To prevent manipulation of the system, only one comment from each clearly identified participant is counted in developing overall ratings and, once posted,

[20] See Kollock (1999) for more details on the operation of these systems, as well as discussion of their effectiveness, and unresolved design issues.

neither eBay nor any user can delete or modify a comment. In addition, an enforcement mechanism is provided, as traders whose ratings drop below a certain threshold are automatically barred from further trading.

In retail markets, infomediaries are also springing up everywhere. Services range from generic price-comparison searches (available at all of the major Web portals such as Yahoo.com and Excite.com), to Epinions, Deja.com and other sites providing a forum for user opinions on a broad range of products (in the spirit of eBay's Feedback Forum). There are also many sites specializing in bringing together buyers and sellers within a particular product domain, such as Autobytel.com and Microsoft's Carpoint, which both provide access to car dealer invoices, so short-circuiting the traditionally tortuous negotiation process between dealers and consumers.

On one level, these infomediaries simply lower search costs by bringing thousands of producers and consumers together directly on the Internet. But they also play a role in increasing information reliability. A spokesperson from Deja.com, for example, when questioned about the reliability of opinions expressed at that site, given that advertising is a primary source of revenue, responded: "We have no incentive to do anything except try to make this valuable for consumers. The primary relationships we have are with marketers who sell all of the products across a category, so we don't do any better on one product versus another" ("E-Commerce Report," New York Times, 10/25/99).

The car dealer referral services play a similar role: In addition to new cars, Autobytel lists "certified" used cars, which must meet minimum standards. Although this certification relies on inspections and self-reports from listing dealers, customers nonetheless have greater confidence in the reliability of reports coming through Autobytel. Since it is a repeat player in the market, Autobytel is better able to evaluate dealers. And since the company does not profit directly from the sale of a car, the incentive to distort information is removed. Indeed, Autobytel has a strong incentive to maintain a reputation for reliability so that consumers continue visiting the site and buying from its affiliated

dealers.[21] From a dealer's perspective, the presence of an intermediary who is trusted by consumers helps to overcome the "lemons problem" endemic to used car sales (Akerlof, 1970). This problem arises whenever quality is hard to ascertain. A dealer selling high quality used cars cannot credibly convince customers of their quality. Consequently, buyers refuse to pay higher prices and the dealer has nothing to lose by selling lemons. Autobytel bridges this credibility gap by sorting dealers in a way that is credible to buyers.

None of the above infomediaries actually gets involved in the transaction itself, or guarantees performance. As a consequence, significant residual hazards face traders in these markets. Consider, once again, auction markets: As long as the auction house is not directly involved in the transaction, the danger persists that traders will honor a series of transactions, to build up a positive reputation, and then cheat. The problem becomes particularly acute for high value, infrequent transactions, where the seller's one-time payoff to cheating is large, relative to the value of future access to customers through the infomediary. Even a low probability of being cheated might put many potential customers off trading altogether.

Of course, customers are also potential defectors, and trading hazards exist on both sides of a transaction, as this report in Forbes ("Art's Big Bang," 8/9/99) illustrates:

> In April, a Boise Idaho-based art dealer named Robert Miller sold a Van Gogh still life for $10 million on eBay. The buyer disappeared. Then again, the dealer, who says he bought the painting from a local pawnshop for $15 and has picked up several Rembrandts and Picassos in the same way, has never had his paintings independently authenticated.

A good example of the solution to such problems comes as online auctions try to move up into higher valued items, such as upscale art, antiques and collectibles. Lacking the

[21] The volume and frequency of site visits matter to Autobytel because, as with many infomediaries, the primary source of revenue is not from fees collected from car buyers or even affiliated dealers, but from the sale of advertising space on the site, and from sales of related products, such as insurance, warranties, repairs, etc.

expertise to evaluate such items (and given the difficulties of evaluation by individual customers), online auction companies have teamed up with traditional auction houses: eBay with Butterfield & Butterfield (America's third-largest auction house, located in San Francisco) and Amazon.com auctions with Sotheby's. These deals are about more than buying expertise, however. As Amazon.com's chief executive put it, "We're trying to create a whole new auction site, one that makes sense for valuable objects...selling *fully authenticated, fully guaranteed* objects on line using Sotheby's experts around the world..." ("Sotheby's and Amazon.com," New York Times, 6/17/99, p.8, emphasis added). Thus intermediaries may take on a more active role in the actual execution of online transactions, effectively internalizing the reputation system and absorbing the costs of potential cheating.

Other E-commerce Intermediaries

For Amazon.com to take on the role of a fully-fledged intermediary in online auctions is not such a departure for the company, since its core business involves intermediation in the market for books (and other media products), where it operates in a similar fashion to traditional distribution intermediaries. To understand the re-emergence of such intermediaries in e-commerce, the question we must ask is: What further reductions in transaction costs result from the involvement of a fully-fledged intermediary, as compared with an "infomediary"? Or, more specifically, why is a satisfaction "guarantee" offered by Amazon.com more credible than that offered by a producer working through an infomediary?

The answer is twofold: First, because the intermediary executes transactions connecting many buyers and many sellers, risks are pooled, and the cost of "insuring" each transaction is reduced as a result.[22] Second, the cost to the intermediary of developing a bad reputation is greater than that for an individual producer, for the reasons discussed earlier. The reduction in costs and increase in credibility benefit both consumers and

[22] There may also be economies of scale in the logistics involved in executing retail transactions.

producers, and encourage the establishment of fully-fledged intermediaries in e-commerce markets.

Do these advantages of fully-fledged intermediation mean that the infomediary is just a transitional form of organization in e-commerce, and that we can expect them to disappear as the market matures? We believe that the answer is "no" – as with any internalization decision, there is a trade-off involved here, with greater internalization bringing added costs of bureaucracy. Thus, fully-fledged intermediation will be reserved for situations where the benefits of pooling for insurance purposes is large, and where the differential credibility of commitments made by intermediaries and producers is greatest -- for instance in fragmented markets such as publishing.[23] By the same reasoning, we would not expect to see fully-fledged e-commerce intermediaries replace infomediaries such as Autobytel in the new car market, since the major car manufacturers each have a very large customer-base and are themselves long-term players in the market, with highly valuable reputations to protect. Ford Motor's recent agreement with Microsoft Corp., to sell factory-direct cars ordered online at Microsoft's CarPoint site provides some support for this notion.[24]

Privacy, security, and the emergence of quasi-public institutions in e-commerce

The above discussion demonstrates how e-commerce intermediaries can effectively

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[23] An interesting variation on this theme is also occurring in low-value online auctions: As part of an antifraud program announced this year, eBay started offering insurance to participants, free of charge, for up to $200 per trade. The insurance is backed by Lloyds of London ("How eBay Will Battle Sham Bids, Mislabeling," 1/15/99).

[24] Other recent activity in the auto retailing sector is apparently at odds with this prediction, with the entry of several companies (e.g., CarsDirect.com, Drive-off.com, and AutoNation) standing more squarely "between" car dealers and end customers, offering a firm price on a particular car to the online shopper. Nonetheless, closer scrutiny of virtually all of these companies' offerings reveals that the actual transaction is still undertaken by an independent car dealer. (See "New Tactics shake Up Online Auto Retailing," by Fara Warner, *Wall Street Journal*, October 18, 1999, p. B1)

mitigate information asymmetry problems related to the identity and reliability of trading partners. However, an additional trading hazard that is a major cause for concern among potential users of e-commerce is privacy. In a recent survey, for example, over 70% of respondents said that they were reluctant to divulge personal or financial information to online businesses ("Fraud..." Card News, 6/2/99). Intermediation such as that discussed above does not directly mitigate these concerns – indeed e-commerce firms in general and intermediaries in particular have arguably exacerbated the privacy problem. Since e-commerce intermediaries are conduits of information connecting many buyers and sellers, they accumulate vast amounts of potentially valuable personal information. This increases both their own incentives to sell the information to other companies, and the incentives of third parties to infiltrate the system and steal information (particularly credit card and other financial information).

Of course information collection and dissemination is not inherently an objectionable practice. Arguably one of the great benefits of e-commerce is that companies can effectively tailor products and services, as well as advertising, to individuals at low cost, based on information collected online; a practice which would ultimately benefit consumers.[25] Amazon.com provides one very simple example of this phenomenon, with their introduction of "purchase circles": The company used personal data about its 10.7 million customers to compile online lists of books and music that people who live nearby or who work with each other were buying. The idea was that browsers would be able to see the buying preferences of people with whom they might have something in common; no individual buyers were identified, nor were actual sales figures given. However, even this relatively innocuous use of personal information raised the hackles of privacy advocates, who described it as "disturbing" ("Amazon Moves to Ease Worry," New York

[25] Consumers apparently agree: "A survey by Privacy and American Business, a research firm, found that 86 percent of 460 adult Internet users questioned earlier this year said they wanted to be able to essentially "trade" their own personal information with Web sites - as long as they were properly informed about how their data were used and were offered benefits for doing so." ("Seizing the Initiative on Privacy," New York Times, Oct. 11, 1999).

Times, 8/30/99).[26]

Consumers' concerns about misappropriation of personal information also include such things as being denied health insurance because of leaked medical information, and credit problems because of stolen identities.[27] In addition, there is great concern about the indirect effects of unauthorized use of personal information, such as massive increases in the amount of "junk" e-mails and other intrusive advertising materials. There is as yet little available evidence to gauge the severity of these "indirect" effects of security or privacy breaches, and as suggested earlier, the concerns about the danger of outright theft of credit card information disclosed online are probably overblown.[28] The concern nonetheless persists, posing a challenge to e-commerce firms to convince highly suspicious consumers of the adequacy of the data security and privacy protection in place.

At first glance, it would seem that intermediaries could solve this privacy "problem" by credibly committing to an "appropriate" level of protection, based on consumers' preferences – just as they are able to commit to providing reliable evaluations of product quality, etc. Failure to actually provide adequate protection would then be punished with the loss of valuable future business. Unfortunately, there are several obstacles that stand in the way of such a solution. First, there is a particularly intractable problem of information asymmetry and information cost – if a company does sell personal information, it is very difficult for a consumer to detect the leak or to identify the source. Similarly, consumers have difficulty in evaluating the technical adequacy of data security

[26] Critics of Amazon.com also pointed out that while Amazon's privacy policy states that the company does not disclose personal information to outside parties, it does reserve the right to do so in the future (NYT, 8/30/99).

[27] For their part, businesses are concerned primarily with leakage of intellectual property through online transactions -- ranging from copyright material to important cost information, etc. These concerns become particularly salient in business-to-business transactions.

[28] It has also been pointed out many times that giving credit card information to a vendor online is probably much safer than handing over your card to a waiter who disappears with it into a backroom for several minutes.

systems. Second, there is still significant disagreement concerning property rights in personal information, particularly in terms of protection against "indirect" effects of misappropriation. As a consequence, there is uncertainty surrounding the legal sanctions, which could otherwise add teeth to the punishment mechanism, even in an environment with a low detection rate. Finally, the mere existence of an information hoard may attract tax inspectors, lawyers, etc. armed with warrants, forcing disclosure by the company.[29]

Together, these problems mean that it is difficult for firms to credibly communicate their commitment to privacy and security, and the incentives to actually put mechanisms in place that will effectively protect consumers are thereby reduced. For example, in a recent survey conducted by Georgetown University, only 12% of the 364 Web sites sampled were judged to be adequate on all "fair information practices," such as giving users a choice about whether they want data collected, and the means to change that data (in case of errors). This despite the fact that 66% of the sites had a posted privacy policy (Computerworld, 6/17/99).

Quasi-Public Institutions

The main institutional response to the privacy and security concerns of e-commerce consumers that has emerged to date is yet another type of intermediary: one that specializes in certification of the data integrity and privacy systems put in place by e-commerce companies. These programs are loosely based on the "Good Housekeeping Seal of Approval" concept. Member sites have the right to display an online branded seal, in return for a license fee and an agreement to abide by a set of principles regarding privacy and related issues, and to allow auditing of their systems and practices. Interestingly, none of these new organizations is a stand-alone for-profit company. TRUSTe, the first such program, was founded in 1996 by a broad e-commerce industry

[29] Democratic governments recognize the need to protect citizens against politicians and civil servants who abuse official power, but such abuses still arise on occasion, (for example in the McCarthy witch-hunt in the US or the IRA police frames in the UK), so that citizens do not discount the possibility of abuse.

consortium (CommerceNet), a non-profit computer privacy organization (The Electronic Frontier Foundation) and the Boston Consulting Group. More recent entrants include WebTrust from the American Institute of Certified Public Accountants (AICPA), and the Better Business Bureau's BBB Online Reliability seal.

The quasi-public nature of these certification organizations appears to be an effective response to deep skepticism on the part of consumers about whether private companies will honor their privacy rights and offer adequate security against third party intervention. Because organizations such as the AICPA and the Better Business Bureau depend for their very existence on a spotless reputation for objectivity, and their provision of such services extends far beyond e-commerce, the chances that they would abuse the public trust are considered negligible.

Public institutions: Property rights in information and the rule of law

Private and quasi-public intermediaries have, on the whole, been very successful in mitigating the trading hazards raised by the advent of e-commerce. This is reflected in the relatively low level of legislative activity in the US aimed at regulating these markets. Even for the sensitive issue of consumer privacy, the Federal Trade Commission has suggested that "self-regulation is the least intrusive and most efficient means to ensure fair information practices online" and that "Legislation to address online privacy is not appropriate at this time" (quoted in "Net Effect," Wall Street Journal, 7/19/99).

Despite the general consensus that government intervention in e-commerce should only be undertaken as a "last resort," this does not mean that public institutions play no role in supporting the development of e-commerce. Consumers' confidence in the integrity of e-commerce transactions would likely be greatly diminished were it not for the generally strong property rights protection and rule of law in the US. It is precisely because consumers (and producers) believe that the courts are effective in dealing with the more serious cases of fraud, abuse of privacy, etc., that the private and quasi-public institutions described above are effective in creating confidence in the trading system.[30]

Indeed, most of the legislative action regarding e-commerce in the US to date has been aimed at extending existing rules to the new medium, and staving off further regulation. During 1998, the government imposed a three-year US moratorium on new taxation of Internet transactions and approved a global copyright treaty covering material published on the Internet ("As e-commerce grows," Purchasing, 12/10/98). In 1999, legislation has been introduced to clarify and reinforce the legality of electronic documents and "digital signatures." Privacy remains the most contentious issue. The approach taken by Congress, in a bill passed by the House on July 1 (H.R. 10), is to place limits on the sharing of specific types of information (specifically medical information), and to ban certain methods of soliciting information that are viewed as illegitimate (American Bar Association, 1999).[31]

As we move into the international arena, much greater uncertainty surrounds the legal framework in place to deal with electronic contracts and property rights in information in various countries. There are still major questions about the legality of digital documents and the use of cryptography to secure transactions on the Web; not to mention uncertainties about censorship, taxation, and tariffs on electronic commerce. For example, Singapore imposes strict censorship on Internet content. In England, the legality of digital documents is still in question, while in France, the government insists on keeping encryption "keys" in escrow so that it can open documents that it wishes to read (Mills,

[30] This argument, that the institutional environment (public institutions) has an effect on the range of feasible and effective institutional arrangements (private institutions) is by now relatively uncontroversial, but the mechanisms by which this occurs are much less well understood. (See, for example, the comments by Coase, 1992, p. 74, cited in Williamson, 1996. For empirical studies that illustrate complementarities between the institutional environment, private institutions, and investment, see Levy and Spiller, 1994, and Morck, Yeung and Yu, 1999).

[31] Recent cases brought by the FTC may also serve to reduce some of the remaining uncertainty regarding Internet privacy. In one case, for example, the FTC filed a deceptive practices complaint against the Internet company GeoCities. The company sold information collected at its Web site to third-party marketers, despite a posted policy that the information would not be released without a member's permission ("A Cry for Privacy," Computerworld, 5/17/99).

1998). Concerned about the impact of such issues, the World Trade Organization (WTO) has begun to examine trade-related aspects of e-commerce that would fall under the parameters of WTO mandates (Biederman, 1999).

Security of property rights and greater certainty regarding application of the rule of law to digital contracts may be one important explanation for why the US has so far taken the lead in e-commerce. Another reason is the high penetration of Internet usage: Europe, for example, is considered to be five years behind in developing its Internet infrastructure. It has nonetheless been argued that the "hodgepodge of currencies, languages, regulations and tax regimes" is the main barrier to e-commerce in the EU ("Late to the Party," Wall Street Journal, 7/12/99), once again highlighting the importance of the institutional environment in supporting market exchange.

Conclusion: Transactional integrity and the evolution of institutions in e-commerce

In this paper we have argued that realizing the potential benefits of e-commerce depends critically on the emergence of institutions supporting transactional integrity. Predictions of massive "disintermediation" of e-commerce markets are overstated, as they fail to take into account important trading hazards that are inherent to virtual exchange. Credible communication of reliable information in disintermediated markets is undermined due to problems of information asymmetry and information cost, exacerbated by temporal and spatial separation and the ease of entry and exit in e-commerce markets. Concerns regarding privacy and security of information transmitted over the Internet further undermine consumers' trust in the new trading system.

The surprise, therefore, is that these trading hazards have not prevented the rapid growth of e-commerce in the US. We suggest that important private and quasi-public institutions have emerged that mitigate e-commerce trading hazards and reduce transaction costs associated with search, bargaining and transaction execution. Chief among these "new" institutions are private intermediaries, ranging from "infomediaries," that serve purely as

credible communicators of reliable information, to fully fledged e-commerce intermediaries whose services extend to execution of transactions and performance assurance. Where public suspicion runs particularly deep - on privacy and data security issues - quasi-public intermediaries have also emerged, to further enhance the credibility of producers' claims.

Our analysis holds important implications for businesses wishing to capitalize on the potential of e-commerce markets. Credible commitment to honest dealing is a prerequisite of successful e-commerce, yet the characteristics of the Internet may actually undermine the reliability of such commitments. Solving this transactional integrity "gap" represents both a challenge and an opportunity for e-commerce companies.

For existing firms with large established customer bases and solid reputations, the potential for disintermediation is real. And indeed, direct selling by household names such as IBM, Sony, and the major airlines is already a reality. For these firms, the main challenge (apart from the considerable technical challenges associated with adoption of this new "business model") is to guard against the intrusion of "pagejackers" and other fly-by-night imitators, and to quiet consumer fears regarding privacy issues – most effectively by employing the services of the quasi-public institutions described above.

The true potential of e-commerce lies in bringing together consumers and myriad less-well-known, smaller, and more recently established businesses, however; and here the transactional integrity gap looms large. Such businesses (and individual buyers and sellers) are increasingly turning to new e-commerce intermediaries, and there are significant profits up for grabs by intermediaries that can deliver the necessary evaluation and performance assurance activities needed to re-inject integrity into online transactions. It is, as yet, too early to predict winners in this game of establishing integrity through intermediation: even current "leaders" such as Amazon.com have yet to report a profit, suggesting that there may be some racing behavior and over-investment in reputation-building, in anticipation of future rewards. Nonetheless, success for many producers in e-

commerce markets requires that they assess the abilities of these intermediaries and link up with those that can most effectively reduce transaction costs and deliver qualified buyers.

Our focus on private and quasi-public intermediaries should not imply that *public* institutions and the broader institutional environment are unimportant. Rather, we speculate that certain features of the institutional environment – particularly the strength of property rights protection and the rule of law – are crucial in establishing transactional integrity in the economy as a whole; something that is a necessary precursor to the emergence of effective private and quasi-public institutions in e-commerce.

There are several ways in which the research presented here can be usefully developed, to refine and test the logic of our arguments. One such extension is suggested by the last point, regarding the impact of the broad institutional environment. Comparative study of emerging institutions that support transactional integrity in e-commerce in different countries would allow us to gain better understanding of the relationship between public and private institutions, and to provide further pointers for e-commerce companies as they venture abroad.

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