Abstract
The blossoming digital economy provides many golden opportunities for small businesses. However, two sets of issues have a significant impact on competition in electronic markets: one is the cost of technology infrastructure, the other is information asymmetry. These problems may lead to a market of natural monopolies with a few well-established brand names in the digital economy. Therefore, we propose a framework that will help small digital companies grow and compete in the electronic marketplace. Specifically, to address the problems mentioned above, different digital companies can specialize in different core products and collaborate through digital intermediaries’ services, avoiding the need of building an extensive technology infrastructure on their own. Meanwhile, trusted third parties help reduce information asymmetry by providing authentication and reputation services.

Authors
Sulin Ba (sulin@usc.edu) is an Assistant Professor of Information Systems at the Marshall School of Business, the University of Southern California. She is also the co-Director of the Electronic Economy Research Program (ebizlab) at the Marshall School of Business. Her research interests include e-commerce, knowledge management, and virtual teams.
Andrew B. Whinston (abw@uts.cc.utexas.edu) is the Hugh Roy Cullen Centennial Chair Professor of Information Systems, Economics, Computer Science, and Library and Information Sciences, Director of the Center for Research in Electronic Commerce (http://crecc.bus.utexas.edu) at the University of Texas at Austin. He has published over 250 papers in leading academic journals in economics, business and computer science.
Han Zhang (han.zhang@mgt.gatech.edu) is an Assistant Professor of Information Technology Management at the DuPree College of Management, Georgia Institute of Technology. His research focuses on online trust issues and the evolution of electronic markets.

INTRODUCTION
The digital economy made possible by the World Wide Web is growing at an astounding rate. At the forefront of this economy are digital products, which can be assembled, customized, and packaged in almost an infinite number of ways to meet changing customer demands for instant delivery. Software programs, newspapers and compact disks can now be delivered electronically over the Internet. Purchasing airline tickets and managing secure transactions are commonplace online activities. More and more industries – banking and insurance, education, and health care, to name a few – are also beginning to use the Internet to change the way they do business. Over time, the sale and transmission of goods and services electronically will probably be the largest and most visible driver of the new digital economy (Choi et al. 1997). How can small digital companies survive in such an economy? What needs to be done to improve small business’ survivability? In this paper, we look at some issues concerning the nature of electronic markets and digital products, and how these issues affect competition in the digital economy, particularly for small digital businesses.

BIG CHALLENGES FOR SMALL BUSINESS
Economists have long recognized the importance of small business in the economy. The active existence of numerous small business firms, each exercising a reasonable degree of independence, is considered basic to the maintenance of a competitive market (Acs 1999, Beckman 1944). In addition, small companies are the essential mechanism by which millions enter the economic and social mainstream of society: 47% of US firms employ fewer than ten workers (Acs 1999).

A big digital product market offers innumerable business opportunities for small companies. At the same time, it presents particular challenges to emerging businesses. For one, there are investment expenses: the cost structure of technology requires enormous investments in the infrastructure to make it possible to process information efficiently and to handle heavy traffic and deliver satisfactory performance. Once the infrastructure is established, the cost of offering more products decreases, and the company can take advantage of economies of scale. Many consumers associate prestige with size, assuming that large business is synonymous with efficiency and economy (Beckman 1944). Therefore, the more a company grows, the easier it is to win consumer confidence.
and lure business away from smaller firms that lack established identities.

Small businesses in the electronic marketplace also face the two-sided problem of asymmetric information (Akerlof 1970). In a traditional business environment, vendors and customers develop basic trust through eye contact, conversation and handshakes. However, this kind of interpersonal interaction does not exist in electronic markets, therefore, misrepresentation of information remains a concern for both consumers and merchants. In an electronic business setting, Web sites can be counterfeited, identities can be forged, and the nature of transactions can be altered. Where asymmetric information exists, the authentication and legitimacy of business entities and the integrity of business transactions are called into question.

The other side of this problem concerns information about product quality. Online markets offer an abundance of product information, but too many choices and too much information make it difficult for consumers to tell which vendors offer quality products. One possible consequence is that online consumers may only transact with well-established brand names to mitigate the asymmetric information and minimize their risks (Adamic and Huberman 1999, Colvin 1999, Shapiro 1992).

Without the advantage of a strong brand name or the resources to establish a widely recognized online business that can handle heavy traffic from around the world, small businesses may have a hard time acquiring the online trust enjoyed by their big counterparts. Consumers may wonder whether the company is a legitimate business, whether it will deliver the purchased products, whether they can return a poor quality product, or, as in the case of software, whether this company’s products are compatible with other products. Such distrust inevitably prevents the growth of small online players and prevents competition in the electronic marketplace, which, in turn, hinders the innovation that leads to technological change and productivity growth.

Will the cost structure of technology and asymmetric information lead to an online world of natural monopolies? How can small businesses build a trustworthy reputation, develop innovative content, and compete with well-established brand names in the digital economy?

A MIDDLEMAN APPROACH: DIGITAL INTERMEDIARIES AND TRUSTED THIRD PARTIES

In the digital economy, information technologies and open standards make specialization and cooperation possible and help reduce transaction costs among collaborators, shifting resource coordination from a hierarchical approach to a market approach (Malone et al. 1987). Unlike business giants, such as Microsoft and IBM, that have many product lines, small digital companies may have only a few employees and concentrate on a specialized digital product (e.g., accounting software or education programs for specific age groups). In order for these small companies to compete effectively, they will have to develop core competencies and collaborate with each other to construct innovative content tailored to the consumer’s unique taste. In addition, they will need an infrastructure that facilitates collaboration and customization.

Digital intermediaries can provide one cornerstone for such an infrastructure. Serving as ‘middlemen’ between small companies and customers, digital intermediaries contract with numerous small digital companies to procure content of different types, with provision for bundling content from different sources. In this way, they can customize and integrate digital products from a wide selection of small companies, helping customers obtain their made-to-order product. Such flexibility in customization and bundling is the reverse of the bundling concept widely practised now by large companies, wherein products are pre-bundled and customers have very little choice regarding content. Digital intermediaries can facilitate the collaboration and customization that can greatly improve small companies’ quality of product or service, as well as their efficiency, giving them a competitive edge in the electronic marketplace.

How will all these interactions occur? Interactions between customers and digital intermediaries will be mediated by an extensive set of directory and catalogue services and mobile agent-based systems, which are key elements in integrating content and customizing products. Directories, with information on what is available, at what location, and what is included in the content allow intermediaries to procure and assemble content. Catalogues give customers the flexibility to look up and choose the type of products they wish to purchase. Further, the catalogues will provide a vast array of choices that may include various combinations of information components. Success will depend on an adaptive system that can rapidly update catalogues to reflect individual customer preferences, make products available on-demand, and facilitate agents’ communications with one another to ensure fast dissemination and synchronization of information regarding demand and supply.

Figure 1 presents the framework for one application of digital intermediaries – an intermediary of multimedia products for children. For example, the parents can specify at a certain time what education programs to play for their children, what music videos their children can watch, etc. What they get is a customized program bundle that is best suited for their family, instead of a pre-fixed bundle determined by the cable networks, as is currently the case.

There will be competition both at the level of assembling and customizing bundles and at the level of building content components. Intermediaries with expertise in bundling and customizing will compete against each other. An illustration of the role of intermediaries could be drawn from the portals such as Yahoo! (www.yahoo.com), Excite (www.excite.com), and AOL (www.aol.com). Yahoo! is a global Internet communications, commerce and media.
company which plays a role of digital intermediary in electronic markets. As the first online navigational guide to the Web, Yahoo! is one of the most famous brands in the online world. It contracts with many small digital companies – content providers – to supply consumers a more customized product. For example, VerticalOne (www.verticalone.com) is a small company and its core Web service acts as an agent to consolidate, organize and present consumers’ personal account information for confidential viewing and access. In order to make managing finances online as convenient as possible, Yahoo! collaborates with VerticalOne to bring users access to their personal financial account information from a broad range of financial institutions. Yahoo! users get a customized product – they can use their single Yahoo! ID to obtain and view multiple banking, credit card and investment account balances directly on My Yahoo! (http://my.yahoo.com), which is a customized page for individual Yahoo! users. Meanwhile, VerticalOne successfully manages to reach a big market by allying with Yahoo! Similarly, Yahoo! has signed separate agreements with three sports marketing and Web development organizations – Learfield Communications, Enlighten Sports and ISP Sports – to deliver live video and audio on Yahoo!Sports (http://sports.yahoo.com). Yahoo! cooperates with three Electronic Communication Networks (ECNs) – Instinet, Island and Archipelago – to give Yahoo! users access to real-time, aggregated ECN quotes for individual and multiple stocks, as well as for their investment portfolios. Collaborating with small content providers, currently, almost all the portals provide customized pages (e.g., My Yahoo!, My Excite and My AOL) for their users where users can get their favorite information such as TV listings, stock quotes, weather forecasting and so on.

We can also find examples of digital intermediaries in the operating systems field. Red Hat is a company that collects a premium for assembling versions of Linux, a public-domain operating system whose components are otherwise freely available. In the presence of several competing components, Red Hat adds value by assembling components of quality, and saving the user the cost of figuring out what is the best combination. Since the bundles are assembled dynamically, firms will be able to switch to substitutes. Unlike in the case of a static bundle, component vendors will need to be competitive, as components are substitutable. Thus, an incentive system will be in place that ensures maximum utility for end users.

By offering a digital company’s products through their services, intermediaries vouch for the reputation and product quality of that company. The company is therefore spared the expense for extensive marketing in order to build brand reputation, and also uses digital intermediaries to reach more consumers. This saves important resources for product development and innovation. In order to ensure quality to consumers, digital intermediaries must enforce rules on participating companies. These companies must conform to quality rules agreed upon by both parties in order to continue using the services of the intermediaries, who are, in effect, ‘renting a reputation’ to the companies (Chu and Chu 1994). As long-term players in the electronic marketplace, intermediaries have a strong incentive to build and maintain their reputations.

To help customers find trustworthy digital intermediaries and help digital intermediaries find better content providers, trusted third parties (TTPs) provide the following two services: authentication and product quality evaluation (Ba et al. 1999). In an environment where identities can be
easily forged, authenticating becomes a paramount concern for business transactions. Certification authorities (CA) authenticate the identity of each trading party in a transaction by issuing digital certificates based on technological mechanisms such as the public key cryptography and digital signatures. By digitally signing a certificate, a CA vouches for the identity of the public key holder (Ford and Baum 1997). Based on the current CA model, these TTPs trace the history of certificate holders to make certain they cannot change their online identity, and, even if they do, the certificate will state that fact. TTPs tie the management team, key employees, and other critical company information to the certificate and keep track of the companies’ activities, informing users of any significant changes. This level of authentication provides extra protection for consumers and endorses businesses that carry certificates.

What is missing from the authentication services is the certificate holder’s reputation – is the certificate holder a reputable business entity? Does he deliver product and services in the quality represented? A digital intermediary whose identity has been authenticated (i.e., holds a valid digital certificate) can still cheat consumers by selling counterfeit products or products that do not meet the promised quality. To facilitate trust in the electronic market, TTPs will have a function to disseminate information about the digital certificate holder’s reputation (Ba et al. 1999).

For example, BizRate (www.BizRate.com), which calls itself a ‘trusted infomediary’, is a trusted third party that uses information from consumers to keep track of merchants’ reputations. As an independent shopping resource, BizRate.com evaluates merchants using information provided by the merchants’ actual customers according to various service attributes such as price, product selection, on-time delivery, customer support and so on. Only merchants that have undergone a relatively rigorous evaluation by at least 30 customers are denoted ‘Customer Certified’ (Gold) and listed on BizRate.com, so online shoppers can check overall ratings and review descriptions of the online merchants to quickly find the merchants that best meet their needs from BizRate.com. Thus, BizRate.com plays the role of a TTP to certify the service quality of online merchants. We believe that TTPs of similar type will emerge to deal with the reputation of digital intermediaries and digital content providers. Customers can consult the TTPs whenever they plan on shopping in the digital intermediaries. Likewise, the digital intermediaries can also use TTPs’ services to select the best content providers from many content providers in the electronic market.

In the future, a logical step for digital intermediaries (e.g., online portals) is to certify the content provided on their Web sites. They may directly play as a TTP to certify the content, provide insurance, guarantee the content, or they may outsource the authentication and reputation services to some well-established companies such as Verisign (www.verisign.com) or some assurance or accounting companies, which may extend their services in this field. Actually, this is exactly what Amazon.com (www.amazon.com) is doing at its zShops venture. Starting as an online bookstore, Amazon.com has evolved into a full-fledged shopping portal. Currently Amazon.com’s zShops opens its Web sites to any merchant for a monthly fee and, sometimes, a percentage of sales. To promote trust, Amazon.com provides a ‘Rating and Feedback System’ that lets buyers and sellers post comments about the experiences they’ve had participating in transactions with each other. For example, buyers are encouraged to check the seller’s rating before transactions. Moreover, in order to make sure the merchandise the buyer purchased from the seller was described accurately, and the merchandise was sent to the buyer in a timely fashion after payment, Amazon.com offers its A-to-z guarantee. All zShops sales carrying the Amazon.com A-to-z Guarantee logo are eligible for this guarantee. According to certain guidelines, consumers will receive up to $250 of the final closing price of the item. If the consumer used Amazon.com Payments to pay for the purchase, he will be eligible to receive up to $2,500 of the final closing price of the transaction. Therefore, even though the small online merchants do not have any reputation and do not have any financial resources to invest in brand building, by renting Amazon.com’s reputation they use Amazon.com’s zShop services to reach more consumers who trust Amazon.com. Also, Amazon.com’s guarantee programme, to a certain extent, solves the asymmetric information on vendor identity and product quality. Although Amazon.com focuses more on physical goods, it illustrates a possible direction for digital intermediaries to provide similar trust related services regarding digital products in electronic markets.

CONCLUDING REMARKS

We are still at the beginning of an economic revolution. The development of new information technologies provides precious opportunities for small digital business. But these businesses face many challenges in this new competitive setting. Digital intermediaries and trusted third parties may help small businesses overcome some of the online obstacles, but this framework also raises several questions about the implications of strong authentication, the pricing mechanisms for product bundles customized to individual preferences, and the development of technology standards. These issues are of paramount importance to the growth of the digital economy and should be addressed in the near future by both researchers and policy makers.

As technological development progresses, more changes are likely to happen in the economy. How will technology further impact the industrial organizational structure? Will there be any potential shift in the economy, moving away from large-scale international enterprises to small-scale firms competing and cooperating based on their core competencies? Will firms contract in size because the coordination costs are significantly lowered by electronic
commerce technology? At this stage, the framework we put forth is only a conjecture. Clearly, empirical research is needed in this direction. Hopefully, the empirical data in the future will lead to the possibility of validating the framework and examine the change in industrial organizational structures.

References


