A Practice Perspective on Technology-Mediated Network Relations: The Use of Internet-Based Self-Serve Technologies

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Embedded relationships with customers have been key in generating repeat business and economic advantage, especially in business-to-business settings. Such relationships are typically maintained through interpersonal interactions between customers and their providers. Lately, however, firms have been seeking to make their service operations more scalable by offering customers access to Internet-based, self-serve technology. This raises questions about the implications of inserting self-serve technology into embedded relationships. Recent research on the role of information technology (IT) within interfirm network relations suggests that relationships and the use of IT are complementary. However, most of this research focuses on the organizational level and fails to consider the instantiation of these interfirm relations by the actions and interactions of individual actors (e.g., customers and salespeople) representing their respective firms.

In this paper, we explore the implications of using IT within interfirm relations through an analysis of customers' and sales representatives' (reps) work activities and interpersonal relationships. We apply a practice perspective that highlights how macrolevel phenomena such as interfirm relations are created and recreated through the microlevel actions taken by firm members. This analysis reveals that managing the complementarity between relationships and IT in practice is fraught with considerable tension. This study of WebGA, a bricks-and-clicks dotcom, highlights how the use of the self-serve technology made it more difficult for sales reps to build and maintain embedded relationships with their customers. The use of IT altered the nature and quality of information shared by the participants, undermined the ability of sales reps to provide consulting services to customers, reduced the frequency of their interaction, and prompted sales reps to expend social capital to promote customers' technology adoption. These changes produced intended and unintended shifts in the network relations enacted by WebGA and its customers, and raised serious challenges to the viability of WebGA's business model.

Key words: arm's length relationships; electronic brokering; embedded relationships; service strategies; social capital; work practices
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Introduction

Research on the role of IT in mediating relationships between firms in a network frequently relies on a combination of rational actor theories, such as transaction cost economics (Williamson 1975), and relational theories, such as social embeddedness (Uzzi 1997, 1999). Even though these two theories are frequently seen as contradictory in their assumptions about economic behavior (Granovetter 1985), there is an increasing body of literature that recognizes their complementarity (e.g., Adler 2001, Jones et al. 1997). While early IT research relied on transaction cost economics to predict that network technologies like the Internet would substitute embedded relationships with arm's-length relationships (Malone et al. 1987), more recent IT research has highlighted that network technologies and cooperative relationships are mutually reinforcing (e.g., Holland and Lockett 1997, Grover et al. 2002). For example, Kraut et al. (1999) found that the firms most likely to use electronic

networks were those that relied on personal relationships to coordinate with their suppliers. They suggest that effective use of IT for interfirm coordination requires established personal relationships and trust (see also Hart and Saunders 1997). With respect to interorganizational cooperation, Bensaou (1997, p. 112) argues that IT can reduce the physical, spatial, and temporal limitations to interaction that have traditionally hindered effective cooperation.

While these IT studies of network relations have yielded important insights, most have tended to focus on the macro-, interfirm level of analysis. Yet, in practice, interfirm relations are typically instantiated by individual members who enter into boundary-spanning interactions (at the microlevel) to accomplish joint exchange on behalf of their respective firms. Kraut et al. (1999) have noted that it is the relationship between individual representatives of firms that is central in determining the nature of interfirm relations. Similarly, sociological studies have found that the frequency of social interaction among organizational members is one of the key drivers in building and maintaining interfirm linkages (Jones et al. 1997, Yli-Renko et al. 2001). Thus, prior IT research leaves unanswered questions about the implications of network technologies, such as Internet-based, self-service applications, on the quality of individual providers' interactions and relationships with customers. Furthermore, these previous studies do not address how, in practice, organizational members bring the apparently opposing tendencies of embedded relationships (based on interpersonal interactions) and arm's-length relationships (mediated by IT) together into a complementary whole. These are questions that motivate our inquiry.

Most of the prior research on the impact of IT on interfirm relations (e.g., Kekre and Mukhopadhyay 1992, Grover et al. 2002, Hart and Saunders 1997) focuses on what Malone et al. (1987, p. 488) label the *electronic integration effect*; that is, where two exchange partners "use information technology to create joint, interpenetrating processes." In contrast, we will explore the *electronic brokerage effect*, which describes the efficiencies associated with information aggregation so that buyers and sellers do not individually need to contact a large number of exchange partners. The broker, which Malone et al. (1987) conceptualize

as an electronic market, connects buyers and sellers, thereby promoting market structures characterized by impersonal arm's-length relationships. We focus on the brokerage effect because the role of intermediaries in networks is becoming increasingly important in IT-mediated marketplaces, particularly those marked by complexity, uncertainty, and information overload (Anderson and Anderson 2002).

Our research is guided by the following central question: What are the implications of using IT to mediate electronic brokerage relationships that are enacted through the work practices and interactions of actors representing customer and provider firms? To address this question, we adopt a practice perspective, which focuses on people's everyday activities as the unit of analysis, and examines the structural and interpersonal elements that produce and are produced by those activities. Practices can be understood as clusters of recurrent human activity informed by shared institutional meanings (Schatzki et al. 2001). Practices are dynamic and ongoing, and engaged in by people as part of the structuring processes through which organizations and networks are constituted over time (Giddens 1984). Adopting a practice lens requires neither a choice between a macro- or a microlevel of analysis, nor a conflation of the two. Instead, a practice lens directs attention to how macrophenomena are constituted by microinteractions, and how those microinteractions, in turn, are shaped by macro influences and effects.

Figure 1 depicts this general relationship by drawing on a structurational view of social phenomena. Giddens (1984) argues that social structures (or the structural properties of social systems) are enacted through recurrent human action and interaction. Such enactment is mediated through a number of elements (facilities, norms, and interpretive schemes) that guide human action. In applying these facilities, norms, and interpretive schemes in their action, humans recursively produce and reproduce the structures that shape their social action. We see a similar dynamic at work in the case of network relations. Recurrent actions and interactions of firm members (shown at the agency level in Figure 1) draw on a variety of assumptions, expectations, norms, forms, and protocols of interaction, information exchange, reciprocity, and governance (shown as mediating the

Figure 1   General View of Network Relations Among Firms
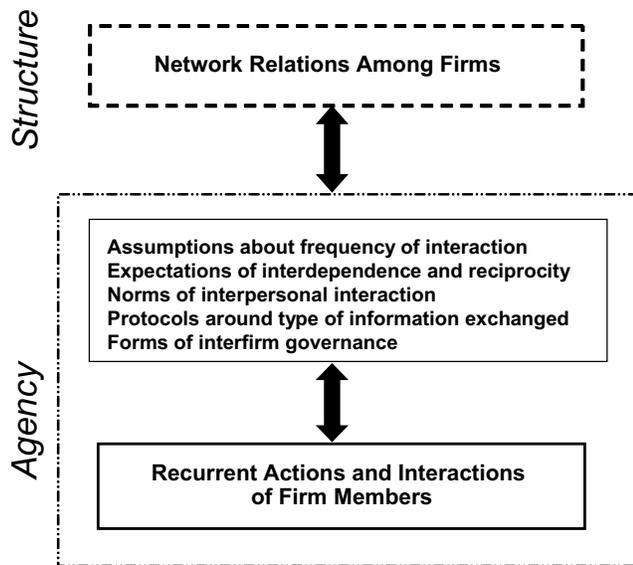
agency and structure levels of Figure 1). By applying these mediating elements, members of interacting organizations constitute the particular network structure that characterizes their firms' network relations (shown at the structure level in Figure 1).

To explore how the use of IT instantiates network relations among firms, we use a practice perspective to analyze data from an empirical field study of a bricks-and-clicks broker operating in the group health insurance industry (WebGA, a pseudonym). We draw on key concepts from literatures in sociology, strategy, service operations, and information systems, and use these to situate and elaborate on the general model. As the following section demonstrates, we found such concepts as brokerage relationships, social embeddedness, social capital, and service interactions particularly useful in this regard.

Concepts for Analyzing Network Relations

Given our focus on electronic brokerage relations (Malone et al. 1987), brokering is a central concept in this research. It has been defined as a structural arrangement in which one actor mediates exchanges between two other actors who are not directly linked (Fernandez and Gould 1994, Uzzi 1999). Gould and Fernandez (1989) and Fernandez and Gould (1994)

identify five different types of brokerage configurations by examining differences in activities and interests of the actors involved in the network relations. Three of their five brokering types—liaison, gatekeeper, and representative—are particular relevant to our discussion of IT-mediated network relationships.

In the *liaison* brokerage arrangement (see Figure 2a), all the actors have different interests, and there are no allegiances among them. This is indicated in Figure 2a by the dotted lines that encircle each participant. In this liaison arrangement, the broker is seen to be both independent and unbiased. In contrast, representative and gatekeeper brokers (see Figures 2b and 2c, respectively) engage in an alliance or affiliation with another actor to mediate exchanges with a third party. In the *representative* brokerage model, the broker's interests tend to be aligned with the sup-

Figure 2   Types of Brokerage Arrangements (Fernandez and Gould 1994)

(a) Liaison Brokerage Arrangement

(b) Representative Brokerage Arrangement

(c) Gatekeeper Brokerage Arrangement
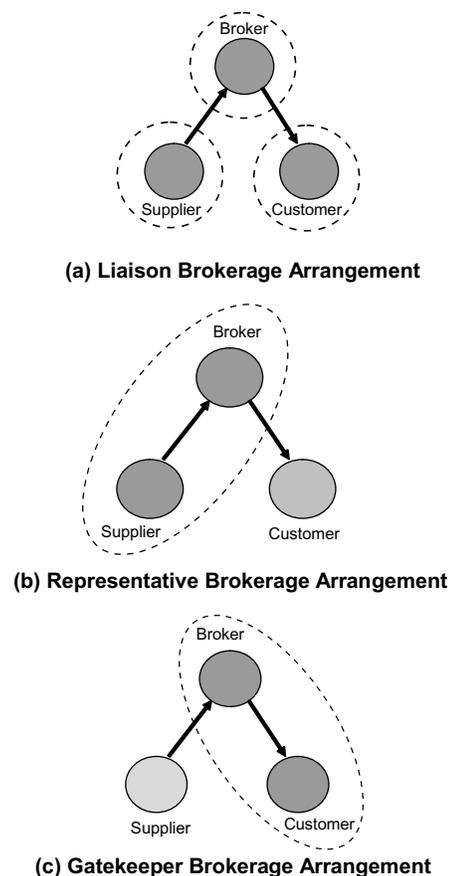
plier for whom the broker acts as a representative. In the *gatekeeper* brokerage model, the broker's interests tend to be aligned with the customer or buyer. As a gatekeeper, the broker gathers information from a third party and manipulates it (e.g., through aggregation, filtering, sorting, and editing) before distributing selective content to the customer. The dotted lines encircling pairs of participants in Figures 2b and 2c represent the mutual interests they share.

Two other concepts that are useful for examining network relations are social embeddedness (Granovetter 1985) and social capital (Coleman 1988). Both concepts offer insights into the quality of network relations, rather than the structural configurations that characterize the network. *Social embeddedness* refers to the extent to which all human action (including commercial exchange) takes place within a web of social attachments such as friendship and kinship (Uzzi and Gillespie 2002). In the context of interfirm relationships, Uzzi (1999, p. 482) defines social embeddedness as "the degree to which commercial transactions take place through social relations and networks of relations that use exchange protocols associated with social non-commercial attachments to govern business dealings."

Socially embedded relationships are often contrasted with arm's-length relationships, which are seen to be more impersonal and instrumental, involving the transfer of nonredundant, public information and codified knowledge (Hansen 1999), and often relying on formal contracts between the parties to curb opportunism (Poppo and Zenger 2002). Socially embedded relationships, in contrast, are seen to be more personal and collaborative, involving the sharing of private, situated information and tacit knowledge (Hansen 1999), and relying on social, informal contracts between exchange partners (Poppo and Zenger 2002). As Uzzi (1997, 1999) argues, the result is that socially embedded relationships provide important economic benefits that are not available in arm's-length relationships.

Network relations that are socially embedded entail expectations and norms associated with the web of social attachments governing the interaction. These norms form part of the *social capital* operating in any social setting (Coleman 1988). In embedded relationships, the social capital that is generated tends to take the form of mutual trust, goodwill, obligation, and reciprocity (Adler and Kwon 2002). Once developed, this social capital can be exchanged for other capital, including human capital and economic capital (Bourdieu 1986). For instance, customers who are in an embedded relationship with their suppliers may use their providers' sense of obligation to get special treatment such as expedited service, while providers may rely on the loyalty of their long-standing customers to charge less competitive prices.

Social capital differs from other forms of capital in that it is not the property of individual actors but is embedded in the relationships among actors. As such, the parties in a relationship hold social capital collectively, with neither party having ownership rights over it (Burt 1997). This suggests that social capital is a relationship-specific, "sticky" asset, which is neither completely fungible (Coleman 1988) nor easily transferable (Nahapiet and Goshal 1998). Thus, if employees leave a firm, it is likely that the goodwill and sense of obligation they have built up with particular customers will leave with them. Furthermore, social capital increases rather than decreases with use (Adler and Kwon 2002), and it tends to deteriorate when social relationships are not developed or maintained (Nahapiet and Goshal 1998).

One additional framework that can help us further unpack interfirm relations is Gutek's (1995) taxonomy of service interactions, which is based on the nature of linkages between customers and providers. Gutek (1995) identifies two main types of service interactions: service relationships and service encounters. *Service relationships* are characterized by tight linkages between customers and providers, with customers engaged in repeated service engagements with the same identified provider. Both customer and provider expect to interact with each other in the future. It is this expectation of an indefinite number of future interactions that encourages both parties to cooperate for their mutual gain. Axelrod (1984) referred to this as "the shadow of the future." If the future casts a sufficiently long shadow, no formal contract or managerial oversight is required to govern a service relationship because both parties cooperate out of mutual obligation; that is, on the basis of an implicit social contract. Such service relationships are clearly embedded and can be expected to generate social capital over time.

In contrast to a service relationship, Gutek (1995) argues that a *service encounter* represents a service strategy in which customers engage in repeated contact with a service organization rather than an identified service provider. In such relations, individual customers do not expect to interact with a particular service provider more than once. An example of this is a call center for airline reservations or computer support. Because neither the individual provider nor the individual customer expects to interact with the other in the future, there is no "shadow of the future" to prevent either party from acting in opportunistic or self-interested ways. Because of the lack of repeated interaction between customers and providers, the exchange of privileged information and tacit knowledge is unlikely, as is the development of trust and reciprocity. Service encounters, thus, are usually arm's-length relationships that generate little or no social capital.

Putting together the notions of service strategies, social capital, and social embeddedness with the Fernandez and Gould (1994) brokerage typology, we can make some observations about the connections between interpersonal interactions and firm-level brokerage arrangements. In socially embedded network relations, we might expect the interactions between members of the transacting firms to be characterized by a history of collaboration and mutually dependent actions, shaped by assumptions of recurring exchange, expectations of interdependence and reciprocity, the generation of social capital, the sharing of privileged and situated information, and the use of informal social contracts (see Figure 3a). In arm's-length network relations, we might expect the interactions between members of the transacting firms to be characterized by impersonal contact and shaped by assumptions of nonrecurring exchange, expectations of independence and nonalignment, norms of self-interest and opportunism, the absence of social capital, the exchange of public information and explicit knowledge, and the use of formal written contracts (see Figure 3b).

The theoretical scaffolding depicted in Figure 3 establishes some provisional connections among the nature, quality, and implementation of network relations, but does not yet address the role of IT, particularly as it is used to mediate relationships among firms and their members.

Figure 3   Types of Network Relations
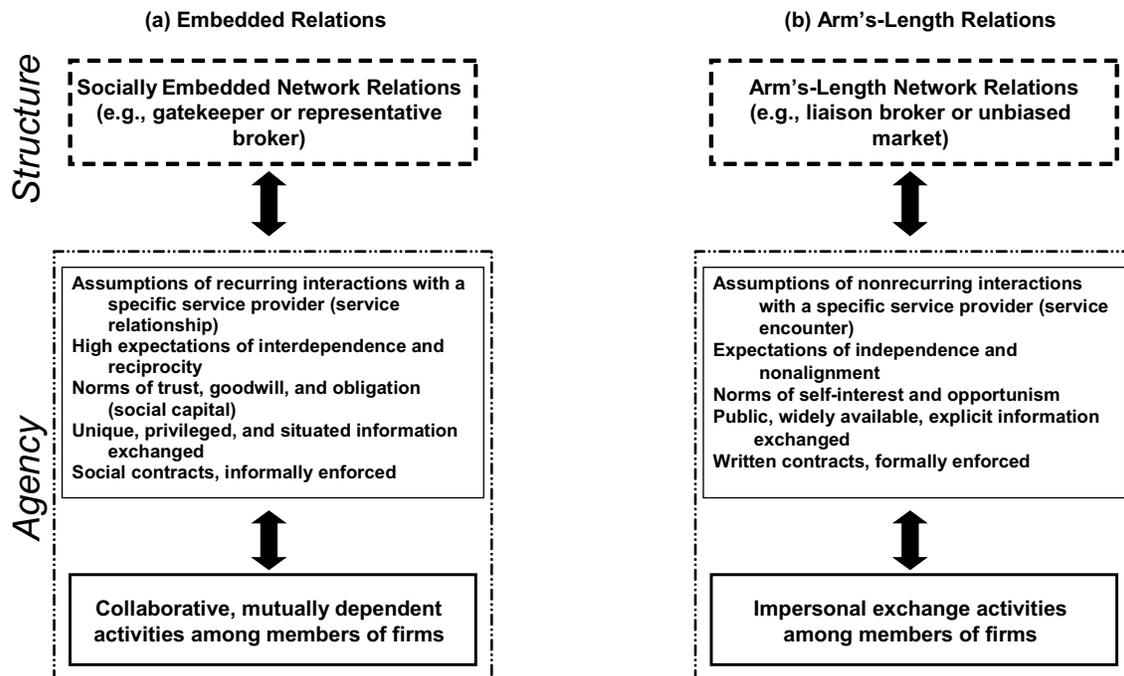
Malone et al. (1987) were among the first to theorize about the impact of electronic networks on the structuring of economic activities.[1] Based on empirical observations of the evolution of brokers such as Sabre and American Hospital Systems, Malone et al. (1987) predicted that electronic markets would undergo a number of shifts. In particular, they argued that network technologies, which make bias more overt and visible, would facilitate the move from biased to unbiased market arrangements, and then from unbiased to personalized market arrangements. In unbiased markets, customers are likely to experience information overload, thus making more personalized displays of information more desirable.

Grover et al. (2002) suggest that the use of IT in buyer-supplier relationships leads to increased cooperative behavior between firms. They argue that because IT reduces task uncertainty by automating and integrating interorganizational transactions, the likelihood of opportunism is reduced. Furthermore, the information processing capacity of relationships is increased as routine communication tasks and data exchanges are automated and monitored. This releases trading partners from having to regulate operational exchanges, thus enabling them to engage in more cooperative activities, many of which require interpersonal, if not face-to-face, interactions.

As noted earlier, existing IT research examines technology-mediated shifts in interfirm relationships at the macrolevel, and does not take into account the recurrent microlevel, interpersonal interactions that necessarily underlie network relations. Empirical research is thus needed to explore the microfoundations of the role of IT in network relations. We address this in our field study, which investigated the use of IT to mediate the everyday work activities and boundary-spanning interactions engaged in by individuals as they instantiated their firms' network relations.

Research Methods

The firm we studied, WebGA, is a "general agent"[2] in the small group health insurance market. Before describing the data collection and analysis techniques we used, we offer an overview of the research site.

Research Site

As a general agent, WebGA contracts with health insurance carriers to provide information about their respective insurance plans to independent insurance agents.[3] WebGA specializes in the small group health industry and provides independent agents with sales advice, sales material such as enrollment forms and benefits packages, and "proposals" for health insurance plans from a variety of carriers. WebGA's business model is an example of what Weill and Vitale (2001, p. 182) describe as an "intermediary," in that WebGA owns customer relationships (with agents) and customer data (about the agents and their clients) but not the customer transactions, which occur between the health insurance carriers and the small businesses. Both agents and general agents earn revenue from the carriers. Agents are compensated by carriers through a percentage-based commission on every "case"[4] they sell, while general agents receive a percentage-based "override" from the carrier on cases sold by agents and "written through" the general agent. Adapting Weill and Vitale's (2001) representation scheme, we depict WebGA's business model in Figure 4.
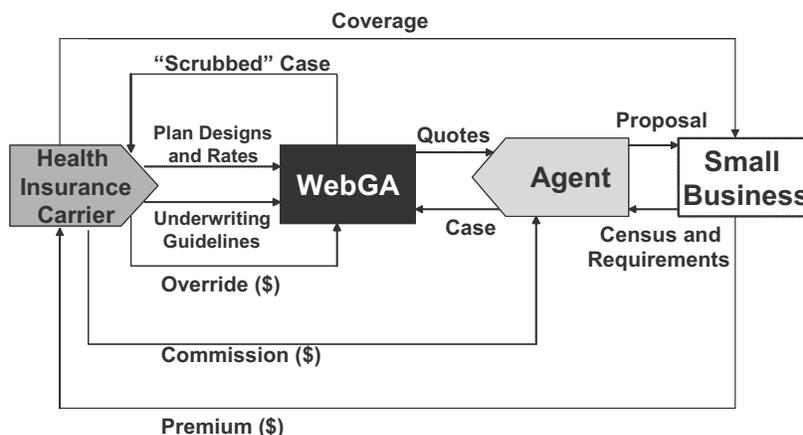
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[1] There are some interesting parallels between Malone et al.'s (1987) discussion of the electronic brokerage effect and Fernandez and Gould's (1994) typology of brokerage arrangements. First, the unbiased electronic market of Malone et al. (1987) is similar to the liaison brokerage arrangement posited by Fernandez and Gould (1994), in which the interests of the broker are aligned with neither the supplier nor the buyer. Second, the biased electronic market of Malone et al. (1987) can be seen to resemble Fernandez and Gould's (1994) representative brokerage arrangement where embedded relationships characterize the interactions between the broker and the supplier. Third, the personalized electronic market of Malone et al. (1987) is akin to the gatekeeper brokerage arrangement presented by Fernandez and Gould (1994). In such a personalized market, buyers are provided with decision aids ranging from simply sorting the information in accordance with decision criteria to sophisticated artificial intelligence tools.

[2] Double quotes signify industry-specific terms or terms used by participants in the field.

[3] The independent insurance agents were referred to as "brokers" within WebGA and the industry at large. To avoid confusion regarding WebGA's role as a broker as well as the concept of brokering used in this paper, we refer to the independent insurance agents as "agents."

[4] A "case" is the application for a specific health insurance plan by a small business.

Figure 4   WebGA's Business Model

WebGA was founded in the late 1970s as a traditional general agent (TradGA). It embraced technology early, and its custom-built technology, which generated multicarrier quotes and managed proposal and case information, won a Microsoft technology award. In 1999, TradGA became a dotcom company, and renamed itself WebGA. At this point, WebGA extended its technology investments, deciding to more aggressively utilize the Internet to "provide a web-based infrastructure to support and rationalize the highly fragmented and inefficient distribution of employee benefits to the rapidly growing small business (100 employees or less) market."[5] Industry estimates suggested that the small group health market would represent $115 billion by 2000, and that the use of Internet technology could reduce insurance distribution costs by 60%, amounting to about 2% of every dollar spent on health insurance.

Despite its interest in rationalizing the small group health insurance market through the use of Internet technology, WebGA recognized the importance of embedded relationships in its industry, especially those between its sales reps and agents, and between agents and small business owners. It thus developed what it termed an agent-centric strategy of "helping [agents] sell more health insurance" by making them efficient and effective through the use of web tools. The web technology central to WebGA's strategy was a self-serve, online quoting engine. Instead

of agents faxing or e-mailing "census"[6] information to their WebGA sales rep, which the sales rep would use to generate proposals "in house," agents could go online and select from all available plans the ones they wanted to include in a consolidated "proposal" for their clients (small businesses). The online quoting engine then generated a proposal in the form of a portable document format (pdf) file (and from August 2001, an Excel spreadsheet) that was e-mailed to the agent almost immediately. This proposal was customized with the client's name and address, and presented the various plans from different carriers in a consistent, easy-to-compare format.

In addition to making agents more efficient, WebGA also expected its online quoting system to make its internal operations more scalable and cost effective. Given that carrier overrides typically amounted to less than 5% of the annualized premium, WebGA looked for operational efficiencies and higher sales volumes. Thus, WebGA sales reps were expected to use the time they saved when agents used the self-serve quoting system to build business by recruiting new agents to sell "through" WebGA. WebGA also offered incentives to sales reps to migrate their agents to the online quoting system. Commissions to sales reps for cases sold from an "Internet-originated proposal" were about 1.5 times the commission earned on proposals quoted in house.

[5] Quoted from WebGA's business plan.

[6] A "census" refers to the details about the type and location of the small business, desired effective date of coverage, and number and composition of members to be covered by the health insurance plan.

During the time of our research, about 40% of proposals were quoted online. Thus, a large number of quote requests were still being routed the traditional way, which entailed agents requesting quotes from their sales reps via phone, fax, or e-mail. In addition to quoting the plans requested specifically by the agents, the reps relied on their experience and knowledge of the market to quote plans that they deemed appropriate. Thus, the traditional, in-house quoting process included the sales rep's active involvement, consultation, and advice giving.

All of WebGA's services were free for the agents.[7] However, in return for its services, WebGA expected agents to sell cases "through" WebGA. This was because WebGA only earned a carrier override on the cases that were submitted to insurance carriers on agents' behalf. However, for the most part, there was nothing preventing an agent from submitting a case directly to a carrier (when such channels were available), even after getting an online quote from WebGA or consulting with a WebGA sales rep. Thus, WebGA sales reps actively sought to develop strong relationships with their agents, hoping to foster a sense of obligation and reciprocity that would dissuade agents from "cutting WebGA out" when it came to submitting sold cases.

From the agents' perspective, developing relationships with WebGA sales reps was also beneficial. The pace of change in the health insurance industry was so fast (with frequent changes in plan designs, rates, and regulations) that most agents found it hard to keep up, especially because they typically worked alone. Their desks were generally piled high with mostly unread brochures, policies, newsletters, and trade magazines. As a result, agents turned to carrier reps and WebGA sales reps for information and market intelligence. For instance, agents frequently asked their WebGA reps which plans were most competitive.

As of March 31, 2000,[8] WebGA had more than $1 billion in annualized premiums under management.

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[7] This had also been the case before the implementation of the Internet-based, self-serve technology, when TradGA had provided services to brokers through the use of phone, fax, and face-to-face media.

[8] Throughout 2001, WebGA continued to cite year 2000 financial numbers both internally and externally.

It had 18,000 agents signed up for its service, and had sold health insurance to over 65,000 small businesses covering more than 450,000 lives. WebGA had contracts with over 100 insurance carriers, offering a variety of health, dental, and life plans, and it offered multiple products in 50 states. In May 2001, WebGA employed about 350 people full time (including 90 sales reps) across 21 sales offices in 9 states.

Data Collection and Analysis

The data were collected in an ethnographic field study conducted between May and December 2001, approximately two years after the introduction of the Internet-based, self-serve technology. The first author spent seven months full time in WebGA's headquarters. She observed people in various departments at work, sat in on meetings of the senior management team, and shadowed sales reps on their visits to agents and clients. She conducted numerous informal interviews with WebGA participants, and 19 semistructured phone interviews with sales reps located at offices other than the corporate office. She also conducted phone interviews with 80 of WebGA's agents, and spent a day observing operations in a small, two-agent brokerage office. In addition, she reviewed documentation generated by the management team and sales reps and interacted with the self-serve technology being made available to agents online.

The purpose of the ethnographic study was to understand the role and influence of WebGA's self-serve technology on the organization's work practices, including its temporal and communicative practices. Soon after entering the field site, however, the question of IT mediation of customer-provider relationships emerged as a key theme. For example, in the initial strategy meetings that the ethnographer attended during her first week at WebGA, the tension inherent in the firm's strategy of attempting to build complementarities between the traditional agent-sales rep relationship channel and the self-serve technology channel became apparent. During a discussion in which the senior management team was trying to identify WebGA's competitive advantage, the vice president (VP) of marketing maintained that the firm's technology was the source of WebGA's competitive advantage. Furthermore, he believed that WebGA's success hinged on the scalability of its business model. As

noted in the following fieldnotes from that meeting:

> [The VP of marketing noted that] the practices that the sales teams were engaging in were not efficient and not scalable. They were not leveraging technology, but throwing people at the problem. His argument was that this would not make WebGA a company that investors would be interested in once they were ready to go public (excerpt from fieldnotes, May 14, 2001).

In contrast, the three regional VPs of sales viewed WebGA's "local face" as its competitive advantage:

> [The three regional VPs of sales] were very active throughout the meeting. They commented on what the agents wanted, what did or did not make sense in their market, etc. It was interesting that each of the regions has unique ways of operating, offers slightly different services, has different competitors with different strategies, has different opportunities, etc. . . . This seems to be the reason all three of them are opposed to centralization; they are vehement proponents of local knowledge and local relationships (excerpt from fieldnotes, May 14, 2001).

For the VPs of sales, relationships with agents were central to WebGA's success. Indeed they trained their sales reps to do "relationship selling," as they believed that the "first objective in selling is to lead with the relationship, not the product" (excerpt from fieldnotes, May 15, 2001). Thus, from the very beginning of the ethnographic fieldwork, tensions between the self-serve technology implemented as a global solution and service relationships implemented at a local level were evident in discussions about WebGA's business model and its competitive position. Consequently, we paid particular attention to the way in which these tensions were manifested in the daily work practices of the sales reps, and how they dealt with them in their interactions with agents.[9]

Our data analysis proceeded with an interpretive reading of the fieldnotes, documents, and interview transcripts. With respect to analyzing the observational data, the main questions we sought to answer were: How and why do the work practices and interactions of sales reps and agents differ when agents use WebGA's self-serve technology? Because WebGA

offered its customers both the "traditional" and the self-serve method of transacting, both modes could be observed within the same setting. Our primary focus in analyzing the sales rep interviews was to understand the sales reps' views of the self-serve technology and its mediation of their work and relationships with agents. This analysis also explored what techniques the sales reps found useful in getting agents to quote online and what challenges they faced in this endeavor. Our analysis of agent interviews focused on understanding the agents' mode of interacting with WebGA, whether through interaction with sales reps, the self-serve technology, or a combination of both.

Enacting Network Relations in Practice

As depicted in Figure 4, WebGA served as an intermediary between insurance carriers and agents. Using Fernandez and Gould's (1994) typology, we can see that WebGA played the role of a representative broker for insurance carriers (marketing carriers' health care plans to agents) and that of gatekeeper broker for agents (marketing those carrier plans that were the most likely to lead to successful sales for agents, thus generating revenue for both agents and WebGA). While there was the possibility of a direct link between some carriers and some agents, this depended primarily on the agreements that carriers had with general agents. Some carriers did not use general agents. Of those that did, some relied exclusively on general agents to represent their plans to agents, whereas others relied on a combination of their own sales reps and those of a general agent. WebGA had some exclusive agreements with carriers, which ensured that, based on such criteria as group size, plan type, or territory, all agents had to go through WebGA to write particular plans. While the network structure did not prohibit direct carrier-agent relationships, WebGA clearly served as a broker in facilitating information flow and transactions between those carriers and agents who would otherwise not interact (Uzzi and Gillespie 2002).

Our data analysis revealed that WebGA's gatekeeping brokerage service to its agents consisted of two sets of activities: quoting and consulting. *Quoting* involved matching available carrier plans to the requirements of the small business client, as specified by the agent. This included the quoting of different carrier plans

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[9] However, this theme was not the exclusive focus during data collection. Time was also spent outside the sales area to gain insight into the role of the self-serve technology within other parts of the organization.

based on the client's census information and the formatting of those plans into an integrated proposal so that the agent and the client could make meaningful comparisons of different plans' costs and benefits. Quoting represented a rather impersonal activity in that it entailed the programmatic manipulation of regulated, explicit information that WebGA had automated internally before it became a dotcom.

Consulting, in contrast, involved a collaborative coproduction of proposals and sales. It typically included the following set of activities: The sales rep recommends and modifies the agent's selection of plans so as to generate a proposal that includes the plans the agent is most likely to sell; the sales rep reviews the proposal to assess the appropriateness of the plan selection and the competitiveness of the rates; the sales rep advises the agent on her/his sales strategies; the sales rep joins the agent on sales calls—either physically or virtually (e.g., via speaker phone)—to small business owners; and the sales rep enrolls the agent's group.

In WebGA's *traditional* service model, the activities of quoting and consulting were engaged in cooperatively by agents and sales reps, and these activities were tightly integrated. It was, thus, difficult to clearly separate the two activities in practice. In creating the *self-serve* service model by making its quoting system (previously limited to internal use) available to its customers via the Internet, WebGA separated quoting and consulting into two distinct service activities. While both the traditional and self-serve service models were available and operating concurrently, WebGA instituted a number of financial incentives and policies to encourage sales reps to migrate their agents to the self-serve model.

The separation of previously integrated services into the distinct activities of quoting and consulting directly affected the work of both agents and sales reps. When agents used the self-serve service model, they initiated service through WebGA's online quoting activity, whereas in the traditional model, initial contact involved interaction with sales reps and typically included some consulting. In using the online quoting system, agents were prompted to search for viable carrier plans on their own, and it was typically only after the sales rep had been alerted by the quoting system that an agent had run an online

quote that the more situated and embedded consulting activities could begin through what was known as a "follow-up" process. The use of the self-serve technology thus triggered a quoting-then-consulting sequence, which replaced the integrated consulting and quoting service that characterized the traditional service model.

This shift in WebGA's service activities led to changes in work practices and interactions, which influenced the opportunities available to the individuals to build interpersonal relationships and ensure quality service. This directly affected the way in which social capital, a currency key to WebGA's success, could be built and maintained. Ultimately, these changes engendered intended and unintended shifts in the network relations enacted between WebGA and its customers.

Shift in Work Practices and Interactions
We identified four primary changes in the work practices and interactions of agents and sales reps as a result of using the new self-serve technology: (i) a sense of information overload for many of the agents, (ii) the displacement of the sales reps' consulting activities, (iii) a reduction in the frequency with which sales reps and agents interacted, and (iv) the expenditure of social capital by sales reps to promote their agents' adoption of WebGA's self-serve technology.

Incurring Information Overload. Use of the new self-serve technology had significant information overload implications for the agents. The online quoting system did not give agents the ability to quote, only particular carriers or certain kinds of plans. Instead, all the carriers and all the plans available for a given zip code and "effective date" (i.e., date on which the policy is in force) were listed alphabetically by carrier name on the screen from which agents had to select the plans that they wanted to include in their final proposal. This listing was typically tens of screens long.

This technology design (i.e., providing a comprehensive display of plans) reflected the contractual arrangements WebGA had with its carriers. As a representative broker, WebGA was expected to market its carriers' plans equitably to as many agents as

possible. Thus, the reason for listing plans alphabetically instead of by price (which the agents would have preferred), was that carriers did not want to be "spreadsheeted"; that is, have price be the main comparison criterion between their plans and those of another carrier.

Given that the online quoting system was broadly accessible, WebGA designed it to treat (as they believed) all carrier plans without bias or preference. While the carriers apparently benefited from this design (because it exposed agents to all available carrier plans), the agents reported being immobilized by the sheer volume of information with which they had to deal. Information overload was particularly problematic for agents who were not well versed in the health insurance industry (e.g., life insurance agents who occasionally sold health insurance). Both WebGA sales reps and agents commented on the following problems associated with the design of WebGA's online quoting system:

> SALES REP: But when they [agents]...get 10,000 quotes...then they say, "Well, shoot, I don't know," you know. They get a [carrier] plan with four different options for the same plan. You know, maybe it's a different co-pay. Maybe it's a different co-insurance.... When they get it back from me, they get probably two quotes from each carrier, [but when] they go online there is like 50 from each carrier, so they don't know which ones they want.

> AGENT: ...it's confusing once I get the quotation. I'm not certain what I've got in my hand. When somebody hands you 20 pages of information, most of the time—especially with somebody with as limited knowledge as I've got—[it's] information overload. All I want is a piece of paper saying that this is the best thing I see. And I don't ever get that.

The problems evident in these comments were avoided in the traditional service model where quoting and consulting were tightly linked. Through the collaborative, private interactions between sales reps and agents, the sales reps were able to customize their quoting and consulting activities in ways that served agents' interests. As WebGA was obligated to treat all the insurance carriers that it represented equitably, its highly public online quoting system did not allow for this kind of customization. Consequently, the agents using the self-serve technology were now exposed to all possible carrier plans, which afforded them greater access to information, but also served to overwhelm them through information overload.

Displacing Consulting Activities. With the self-serve model, sales reps only got involved late in the sales cycle because agents proceeded directly to online quoting and only subsequently (or not at all) interacted with the sales reps for some consulting. With agents going directly online to quote, it was harder for the sales reps to gain the rich, contextual information that allowed them to formulate the kinds of insights that were part of their embedded consulting activities:

> SALES REP: When you take the quoting and that first part [out] of it, you kind of lose the one-on-one that you get with [the agents]. We like to talk to the [agents] if a quote request comes in and [ask] "What do they [the client] have, what are they looking for, do they like HMOs or..." you know. It's a good way to just at least start the communication [about] the group that they're currently working on. If they take that group and they go onto the Internet and they start to quote and it's cumbersome or they can't get something or they don't know that certain plans may be more competitive than others, they may [incorrectly] quote what they think we have and we may lose a sale. And it's a little more difficult [to advise agents on a proposal] when we don't have a piece of paper in our hands that we can call them [about] and say "This looks really good" or "we think we can beat this."

While the loss of contextual information made it more difficult to interact with a specific agent on a specific case, the consequence of separating consulting and quoting activities had more far-reaching ramifications. As intermediaries, the WebGA sales reps occupied a position that allowed them to become very knowledgeable, not only about carriers' strategies and practices, but also about the strategies and practices of the agents they served. This private knowledge represented a key resource for the sales reps to develop social capital with other agents. For instance, one of the WebGA sales reps, who was serving a state in which carriers were "max loading" (i.e., pricing the groups at the maximum allowable rate), advised his most valued customers to only present their clients with the maximum rates, rather than following customary practice and presenting them with the standard rates (which, by law, were 66% lower than the maximum rates). The logic behind this revision of

the standard sales practice was that clients would be pleasantly surprised by a lower-than-anticipated rate if their group was not rated up. If their group was maximum loaded, they would already be prepared for the high rates and would be less likely to abandon their intention to buy health insurance. The sales rep had obtained this idea from one of his agents and he was strategically passing it on to other agents with whom he had good relationships.

The displacement of consulting activities by online quoting also meant that sales reps could only identify errors and omissions late in the sales cycle. By interacting with agents during the quoting process, evaluating the mix of plans being rated and inspecting their proposals, WebGA sales reps had traditionally been able to head off such problems as erroneous rates and the quoting of inappropriate plans. With online quoting, such quality assurance measures could occur only after the online quote had been completed. This meant that the agent might have presented (or even sold) an inappropriate plan or an incorrect rate to a client before the sales rep had the opportunity to catch the error. The following account illustrates this problem:

> SALES REP: We had a problem recently with the quoting engine because we're different again than other states. We don't put in the home zip codes for the members, for the employees. And the census asks for that information, so the [agent] working off our website puts that information in. [Also], they might be quoting a Colorado office, with two or three people in Florida. Well, you can't quote that on our website. I've got to get that directly from the carrier. Yet, the system releases a rate and the case is sold, and it's sold incorrectly. Then we have to go back and fix it. That's frustrating for us.

An incorrect rate typically sabotages the conclusion of a sale. Furthermore, it puts both the agent and WebGA at risk of losing the sale altogether because the client might decide to forego health insurance or give the business to another (more competent) agent. As WebGA's sales reps have long since learned, an error that harms the agents' financial success as well as their reputations with clients constitutes a breach of the agents' trust in both the sales reps and WebGA. Once this trust is broken, it is unlikely that the agent will continue to do business with WebGA. Thus, any

loss of trust threatens to sever the sales rep's relationship with the agent.

Most agents were very concerned about their "errors and omissions" exposure and the risks associated with presenting erroneous information to clients. As a result, some agents resisted WebGA's new online service offering, because they believed it shifted too much responsibility onto them. Consider the following interview excerpt:

> AGENT: And my company personally discourages [the use of online quoting software]. They don't want us being responsible for running rates.
> INTERVIEWER: Oh, OK. So, that's sort of a company-wide policy?
> AGENT: It's kind of an unofficial one.
> INTERVIEWER: Why is it that they don't want you running rates?
> AGENT: Liability. If the bid should be wrong for whatever reason, it's not on our head.

These agents continued to use the traditional quoting process of e-mailing or faxing the census information to their sales reps in the hopes that this would protect them from making damaging errors. By assuming responsibility for the quality of proposals, sales reps earned the agents' sense of obligation and goodwill, which helped to build the social capital that was so crucial to their firm's success. For some agents, the relationship with a sales rep was an important factor in the decision to do business with WebGA, as is evident in the following comment:

> AGENT: To be honest with you, probably the reason I use WebGA as opposed to [a competitor], which I used to use quite a bit, is—the carriers are pretty much the same, online quoting is pretty much the same—it's my rep. I like my rep, [Name of rep], and he's doing a good job for me.... Without him, then I'd probably still be going to [the competitor].

Assuring the quality of a proposal—the appropriateness of the plan selection, the completeness of the information, and the accuracy of the rates—was particularly challenging in the online environment, where quoting was separated temporally from consulting activities. This separation and the consequent displacement of consulting activities not only made it more difficult for the WebGA sales reps to build and maintain social capital, but also increased the risk of errors and the possibility of severing existing relationships with agents.

Reducing the Frequency of Social Interaction. WebGA was keenly aware of the fact that some agents could submit cases directly to carriers or through a different general agent, thus robbing it of its override income. For this reason, WebGA instituted a policy whereby sales reps were required to "follow up" on each proposal that had been quoted online. This was intended to ensure that agents' interactions with the self-serve technology were matched by interactions with their WebGA sales reps. Despite these procedural measures, however, the frequency of social interaction between sales reps and agents—and thus the opportunity to build and maintain socially embedded relationships and social capital—declined. As one sales rep noted:

> SALES REP: Well, I don't talk to them nearly as much. [LAUGHTER] The ones that quote online, I barely hear from them, you know, unless they have questions on a quote that they received.

During the follow-up phone calls and e-mails, sales reps asked the agents whether they had "gotten everything they needed" from the online technology and whether there were any questions that the sales rep could answer for them. The sales reps also used the follow-up process to conduct a "status check," which entailed asking the agents about the plans they were going to recommend, how confident they were that the client would buy from them, and ultimately whether the agents had been successful in their sale and which plan their client had selected. Many sales reps complained that they wasted much time trying to reach the agents to do this follow up. They found themselves repeatedly leaving unreturned voice mails and writing unanswered e-mails.

Many agents, especially those knowledgeable about the health insurance industry, had few incentives to respond to a sales rep's follow-up inquiry. The agents had essentially received the information they required from the online quoting system, and unless they desired specific assistance, the sales rep's inquiries and attempts to provide consulting were not regarded as value adding. This was particularly true if an agent had lost the sale or if she/he was not planning to submit the case in question through WebGA.

To remind agents of their obligation toward WebGA, sales reps could "cut them off," which meant revoking an agent's access to the WebGA online quoting engine. This was seen as a measure of last resort, a way of getting the attention of those agents who repeatedly "abused" WebGA's services. Before the implementation of the self-serve technology, abuse constituted ongoing requests for proposals without a sale. The rule of thumb followed at the time was that agents were allowed 10 quotes without a sale before they were in danger of being denied service. While this cutoff policy remained, the implementation of the online quoting system prompted an additional criterion: continued online quoting without responding to sales reps' follow-up messages would constitute grounds for being cut off.

The challenge that sales reps faced with respect to follow up was also related to the perception—prevalent among those agents using online quoting most extensively—that relationships with sales reps were constraining (Schultze 2003). The agents who used the online system to generate the majority of their proposals preferred the self-serve channel to the interpersonal channel partly because the online quoting system did not generate a sense of obligation. As the following remark highlights, agents felt less beholden to technology than to a person who had labored on their behalf:

> AGENT: I have always been a shopaholic and I've always felt guilty about going to my [WebGA] reps because there would be years where I wouldn't give them business. I'd get their stuff. They'd be high [in their rates] and that would be that. And I think it's unfair for the person that I'm shopping.... I wanted the information, but I wasn't giving them the business.... But it kind of eliminates that need now because now I can go to the Internet and do it myself. And so, I am less reliant upon a direct relationship with the [WebGA] rep to get the quotes out.

Agents' view that use of WebGA's self-serve channel exempted them from obligation is tied to two beliefs they held. The first is their perception that most everything on the Internet is "free." The CEO of WebGA recounted the story of one agent who had been cut off for using the online quoting system without writing any business through WebGA. This agent had subsequently threatened to sue WebGA for denying him his "constitutional right" to access a "free service." The second is agents' belief that if they do the quoting work themselves, WebGA does not expend any effort, and thus does not deserve to earn

an override. This belief is reflected in the following concerns raised by WebGA's sales employees as they grappled with the implications of agents using the self-serve technology:

> SALES MANAGER: I'll tell you right now, dealing with [agents in this northeastern state], the minute they realize that they're doing 100% of the work, they're going to come looking for some of our money in the form of override.

> SALES REP: The advantage is, yes, [agents] do a lot of things on their own [and] I can focus on what their needs are outside of that. But, on the other hand, they become so self-sufficient that they may think, "I'm not so sure what your value is any more. I'm doing everything myself." I guess it means I just take them to more ball games, more lunches, more dinners, or more happy hours.

Despite WebGA's attempts to match the use of the online channel with interpersonal follow ups to maintain the frequency with which agents and sales reps interacted, the follow-up procedure was only partially successful. The WebGA sales reps faced substantial challenges in building and maintaining the kinds of relationships in which agents felt obligated to reward WebGA for its service. Indeed, some within WebGA were beginning to question sales reps' ability to generate social capital in the new environment of self-serve brokering, in which the rep played less and less of a role. The sales manager and sales rep quoted above both suggested that WebGA would have to rely increasingly on financial capital (e.g., carrier overrides and ball game tickets) to ensure that agents would continue to write business through WebGA.

Expending Social Capital to Promote Technology. The online quoting system—its content, design, and operation—was managed by a central IT group, and the sales reps were unable to customize the system by region- or customer-specific criteria. The sales reps also felt that they had inadequate input into what plans were quoted by the system. As the following comment highlights, this meant that the sales rep's recommendations with respect to plans were sometimes at odds with the system's output:

> SALES REP: There's so many ancillary products [on the online quoting engine] that that's where they [agents] get into a lot of trouble . . . . [For example, this carrier] isn't even a good product in [this state], but

[agents] are quoting it and selling it, and then I'm saying "No, no, no . . . it's not a good product for your clients." I wish it wasn't on there.

Faced with such contradictory messages, agents were likely to question the credibility of the system, the sales rep, or both. Not surprisingly, some agents were reluctant to migrate to the self-serve technology. Additional reasons for agents' resistance to using the new online channel included a preoccupation with more pressing business issues, an unwillingness to be responsible for the system's output, and a reluctance to upgrade their computer infrastructure. The following remarks by sales reps indicate some of these barriers to agents' adoption of the self-serve technology:

> SALES REP: These poor [agents] are trying to do their business and fight their renewals and make some money. And carriers are challenging and the rates are so high. And then we're also trying to show them, "Just take a step back for a minute and look at how you run your business. Here are some tools for you." . . . And unfortunately, the income and the renewals and everything take 90% of the time. . . . it's hard [for us] to bring up the technology.

> SALES REP: We already have e-mails [from management] saying, "Find out whether the [agent] has Windows 97 or Windows 2000. And, if they don't have that, [the new Excel-based quoting engine output] is not going to work." . . . So, now, the [agent] says, "Wait a minute. Now, we've got to figure out if we have all these things in order for us to use your quoting system? Why don't I just fax it to you [as I always did] and you do it and send it back to me?"

The sales reps were keenly aware of their agents' concerns regarding WebGA's technology initiatives, and many of them questioned the value of the self-serve technology for their agents. Nevertheless, as representatives of WebGA, they were expected to promote WebGA's technology and agents' adoption of it. Indeed, WebGA provided its reps with financial incentives to migrate their customers to the online quoting system. And in some sales regions, a quota was built into this financial incentive: 50% of all quotes should be "Internet originated."

Trying to balance corporate expectations with their sensitivity toward their customers' situations, the sales reps drew on their social capital to get their agents to quote online. Some explained that WebGA had set new performance goals that measured sales

reps on the percentage of proposals generated by the agents themselves. In other words, these reps asked their agents to quote online as a favor to them; that is, as part of the social contract inherent in their relationship:

> SALES REP: And our ultimate goal as salespeople is just to make our goal. I might be able to get people to quote online because I can tell them, "you know what? I get paid substantially differently if you quote it online versus if we do it through the office." And they might quote only for that reason based on my relationship with them.... I don't tell them that I get paid more. How I present it is that I get brownie points.

While it would seem that convincing agents to quote online and to make time for the requisite training would require a one-time expenditure of social capital, the sales reps actually found themselves drawing on their social capital whenever WebGA released a new technological innovation or made major revisions to its online quoting system. Despite corporate marketing campaigns and training programs that accompanied the launch of new or significantly improved technologies, it eventually fell to the WebGA sales reps, as part of their daily work, to promote the new technologies and to get the agents to adopt them. Thus, each major technology change set in motion another round of social capital expenditure, as illustrated by the following sales reps' comments:

> SALES REP: Every time we go through something that requires more training, we have to do so much hand-holding and damage control [with the agents].

> SALES REP: And it's also, don't forget, those [agents] that are top producers have been with me for three or two years. So I've gone through all the Internet website changes, and I think at this point they're kind of sick of it. Because every time they get used to it and comfortable with what is there, it changes again.

The sales reps grew increasingly skeptical of the quality of new technology and felt that, in their efforts to promote the technology, they were in danger of damaging their relationships with their customers. Some sales reps reported that they had lost customers because of the emphasis WebGA placed on its (flawed) technology.

> SALES REP: Our technology is probably some of the best in the industry. The fear factor, if you will, is that, whenever we do something new, it doesn't always get

tested as well as it should before it hits the streets. In WebGA, we're well aware of that, when that happens, then we have a lot of cleanup problems.... Well, a little over a year ago, we launched the [agent] home page, and I actually worked pretty closely [with it], because I was trying to do what I was told, ...so I actually did help with a lot of testing on it, found a lot of errors in it, and the stress load of that was extreme. We were supposed to go out, get [agent] home pages set up for people. There were phenomenal problems with it, there were phenomenal problems with our quoting engine at that time, [and] we got to the point where [agents] just said, "You know, I don't want to have anything to do with you any more." ...We did lose some market share there that I have not been able to regain.

WebGA's corporate interest in staying competitive by regularly releasing new technologies and demonstrating the viability of its technology-oriented business model were somewhat at odds with the sales reps' objectives of serving their agents' best interests, an expectation inherent in their traditional consulting-oriented, socially embedded relationships with agents. Sales reps believed that their promotion of a sometimes faulty and regularly changing technology cast doubt on their intention to honor the social contract embedded in their interpersonal relationships. As the following story illustrates, it certainly undermined the sales reps' credibility with the agents:

> SALES REP: A couple of years ago...they came out with a proposal system. And we were told that, "Hey, this is the best thing since sliced bread. You've got to go out to your [agents] and sell it, show all your top people. The top people have to be using it, blah, blah, blah, blah." You know, we learned it, went out, and sold it to them. And it ended up being a flop. So, now, when we're coming out with this [online quoting] thing, the [agents] still remember that. "Hey, I remember when you were here two years ago. You tried to sell us that system. And it didn't work." So, the bottom line is sales people really shouldn't be going out and really showing this system and everything. We should have a separate person that's in our region. And all they do is go around [to] the [agents], make sure they have the right equipment, the hard drive, the software.... And let me do what I do best, [which] is build relationships and bring in business.

This sales rep's observation reveals the inherent tension in requiring sales reps to both build and maintain relationships, and promote and troubleshoot

the self-serve technology over which they have no effective control. Not only did sales reps rarely have the expertise or capacity to engage in technology-related tasks, but such activities also took away their time and attention from "what they do best: build relationships." In a recursive irony, sales reps were being asked to facilitate the use of a technology that was undermining their relationship with agents.

A key implication of the sales reps' need to promote the online quoting system, as well as other technology initiatives, is that the sales reps had to spend the social capital that had accumulated in their relationships with agents to satisfy the corporate mandate of technology diffusion. This meant that sales reps found it difficult to maintain agents' trust and their own credibility when WebGA's technology strategy was at odds with their social contract to act in agents' best interests.

Shift in Network Relations

As we have seen, the separation of WebGA services into the distinct activities of quoting and consulting generated a number of changes, both intended and unintended, in the sales reps' and agents' work practices and interactions. These changes directly affected the nature and quality of the relationships between WebGA sales reps and agents, and thus the network relations enacted between WebGA and its customers.
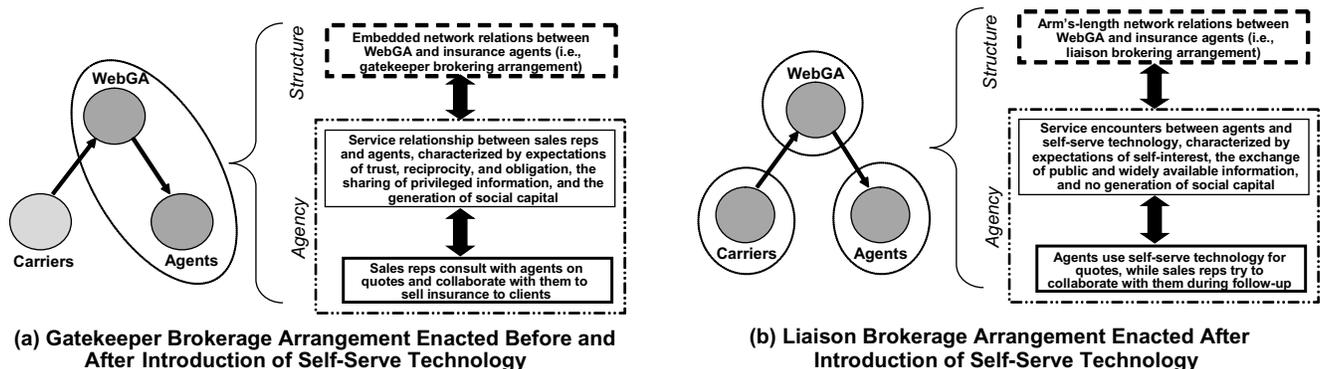
In the traditional service model, WebGA had served as a gatekeeper broker to its customers, the independent agents (see Figure 5a). As such, it controlled the flow of information from carriers to agents. This meant that, in addition to aggregating quotes from a variety of carriers, WebGA might recommend a certain carrier to an agent based on claims payment history or indicate which of the available plans was the most competitive in the agent's region. Such collaborative exchanges of privileged information tended to be done informally, in the situated and integrated consulting and quoting interactions that occurred between WebGA sales reps and agents. These interactions reflected and reinforced the embedded relationships being enacted by agents and sales reps, while building and maintaining social capital within those relationships.

As agents went online to generate their own proposals, WebGA was unable to provide them up front with the kind of situated and privileged information they had shared in the past. Given its contractual obligations to carriers and the accessibility of the online quoting system, the information WebGA made available through the web medium was limited to explicit and nonproprietary information. The online system was thus restricted in its design and implementation to facilitating the impersonal transmission of programmatically manipulable information.

Consulting activities (if they occurred at all) were conducted after the fact, at which point they were often too late to avoid problems. The result was that consulting, which had been an integral part of the service relationship in the traditional service model, now became optional in the self-serve model (at least from the perspective of many of the agents). And in so doing, the service relationship that had existed between agents and specific sales reps shifted to a service encounter transacted between agents and

Figure 5   Brokerage Arrangements Enacted by WebGA and Its Customers

(a) Gatekeeper Brokerage Arrangement Enacted Before and After Introduction of Self-Serve Technology

(b) Liaison Brokerage Arrangement Enacted After Introduction of Self-Serve Technology

WebGA's self-serve technology. The result was the enactment of a different (liaison) brokering arrangement between WebGA and its customers, one represented by arm's-length relationships that did not build or maintain the social capital that had previously been generated in the embedded relationships between agents and sales reps (see Figure 5b).

Use of IT to Mediate Network Relations

Because interfirm relations are essentially instantiated in the daily actions and interactions of individuals acting as firm representatives, we have argued that understanding network relations must include an understanding of how these individuals get their work done and sustain the relationships necessary for economic exchange. The objective of our research was to explore network relations from a practice lens and to examine how work practices (both customers' and providers') and interactions (between customers and providers) were influenced by the implementation of a network technology that mediated brokerage relations.

The firm we studied, WebGA, introduced an Internet-based, self-serve technology to make its service more scalable and cost effective. In doing so, it also wanted to preserve the long-standing, socially embedded relationships existing between its sales reps and independent agents, as these interpersonal relationships (and the social capital accruing within them) were critical to WebGA's revenue generation. Our practice-based analysis reveals that the use of the technology altered the nature and quality of information that was shared by the participants, undermined the ability of sales reps to provide consulting services to agents, reduced the frequency of their interaction, and prompted reps to spend their social capital to promote agents' technology adoption. These changes led to a shift in the network relations being enacted between WebGA and its customers, transforming WebGA's role from a gatekeeper to a liaison broker in the electronic arena.

In its implementation of the self-serve technology, we see WebGA attempting a strategy of complementarity. That is, it used the online technology to try and generate economies of scale and efficiency,

while simultaneously endeavoring to sustain embedded relationships and build social capital with its agents. It attempted the latter by instituting a "follow-up" procedure that encouraged interaction between sales reps and agents after the agents had used the self-serve technology to generate quotes. While recent IT research has demonstrated the complementarity of using IT and interpersonal relationships to manage interfirm exchange relations (e.g., Bensaou 1997, Kraut et al. 1999, Gover et al. 2002), these studies have not examined what it takes to make such complementarity work in practice, especially within the same customer-provider dyad. This study of WebGA suggests that making complementarity work is both difficult and uncertain, particularly when the technology in use supports impersonal and arm's-length linkages. We also show that a complementarity strategy can generate significant unintended consequences for relationships and the social capital within them.

The findings reported in this paper suggest a number of important implications associated with the use of Internet-based, self-serve technology. Primarily, we believe this study can shed some light on the influence of IT on embeddedness (Granovetter 1985, Uzzi 1999). A detailed model of the antecedents and consequences of embeddedness is offered by Uzzi (1997, p. 62). This model suggests that embedded relationships depend on voluntary contributions, face-to-face interactions, and reciprocity to generate the trust, joint problem solving, and exchange of proprietary and tacit information that are characteristic of such strong ties. Our findings reflect directly on a number of these proposed relationships.

First, Uzzi (1997) emphasizes face-to-face interaction in his model. However, our data reveal that a number of media (e.g., phone, e-mail, and fax) were used to support interpersonal communication and embedded relationships between network participants. This raises the interesting possibility that use of contemporary media may also be effective in facilitating embedded relationships, and in building and maintaining social capital.

Research on organizational communication has generated the opposing findings that electronic media may be insufficiently "rich" to facilitate interpersonal ties (Daft et al. 1987, Trevino et al. 1987), and that

use of electronic media can facilitate effective interpersonal exchanges (Boczkowski 1999, Markus 1994, Orlikowski and Yates 1994). This difference in expectations suggests that much might be learned from empirical research that explicitly examines how the use of different electronic media enable and constrain the building of social capital in the context of embedded network relationships. In particular, this study suggests that e-mail, phone, and fax were used to support interpersonal communication within embedded relationships, while the self-serve technology was used to support impersonal communication within arm's-length relationships. It is, of course, possible for technologies such as e-mail, phone, and fax to be used for impersonal communication, and for a self-serve technology to be configured so as to accommodate personalization. Thus, it is particularly important to understand how a network technology is designed, how it is being used, for what purposes, by whom, and within what contexts.

Second, with respect to the IT mediation of network relationships, this study shows that use of the self-serve technology negatively influenced the conditions of embedded relationships proposed by Uzzi (1997). We found that the voluntary contributions of participants, the quality and frequency of their interactions, as well as the extent of their commitment to reciprocity all decreased as a consequence of using the new self-serve technology. Following Uzzi's (1997) model, such changes should negatively influence the components of embedded relationships (trust, joint problem solving, and exchange of proprietary and tacit information). Indeed, we found that such negative consequences were attributable to participants' use of the self-serve technology. Specifically, we found that the trust generated in interpersonal relationships was undermined by the arm's-length relationships that resulted from customers' use of self-serve technology. Furthermore, we saw WebGA's sales reps spending the social capital that had built up in their relationships with customers to promote the firm's technologies, and also risking their credibility by endorsing unstable and unreliable technologies.

Third, this study suggests some important implications for social capital when self-serve technology mediates embedded network relations. Uzzi (1997) does not directly address the role of social capital in

his research, although it is implicit in his discussion of the components of embedded relationships. By making this linkage more explicit and articulating the role of IT in these relationships, we can suggest the following associations:

(i) Where use of IT reduces trust in the network relationship, participants will begin to spend social capital in an attempt to repair the relationship. If the use of IT continues to reduce trust, social capital may become so depleted that the relationship is lost altogether.

(ii) Where use of IT in a network relationship reduces the exchange of privileged and situated information, there is a decline in the opportunities to create and sustain social capital.

(iii) Where use of IT reduces the necessity of and opportunity for joint problem solving, there is less collaboration among the participants, and thus a challenge to the value of social capital within interfirm relations. For firms that depend critically on such social capital (as in the case of WebGA), the use of IT to mediate network relations may undermine the viability of the firms' business models more broadly.

In the light of these associations, it is interesting to note that IT research on the complementarity of network technologies and personal relationships (e.g., Bensaou 1997, Grover et al. 2002) suggests that the automation of routine, interpersonal communication positively affects interfirm relations, because such automation frees up organization members to spend more time on communicative acts that require interpersonal, and maybe even, face-to-face contact (e.g., exception handling and problem resolution). This logic appears to be based on the assumption that the social capital accumulation that occurs in a few intensive, problem-solving interactions is equivalent to the accumulation that occurs in numerous routine interactions. However, this assumption is challenged by Nahapiet and Goshal's (1998) claim that social capital declines with disuse and Jones et al.'s (1997) finding that the frequency of social interactions is a key driver in the creation of social capital. It is also challenged by our finding that a decline in customer-provider interaction quickly led to a weakening of relationships. Based on this study, we would expect social capital to be more sustainable in an environment of frequent, routine interactions than in one

of infrequent, complex interactions. However, this is clearly a question that deserves further research.

Finally, we believe that this research highlights the value of studying network relationships through the daily activities and interactions that instantiate them. Adopting a practice perspective, we were able to obtain an understanding of how the use of WebGA's online quoting system generated multiple consequences for interpersonal relationships, social capital, and the enactment of network relations. These are consequences that were not anticipated or understood ahead of time by WebGA or in the literature. The practice perspective also afforded us a means of weaving together a number of theoretical concepts posited by a variety of literatures including strategy, sociology, service operations, and information systems. As these concepts have tended to be used at different levels of analysis (network versus firm versus interpersonal), they have often not been integrated within the IT literature. The practice perspective, informed by a structurational lens, has allowed us to propose and use a theoretical scaffolding (Figures 1 and 3) that was particularly useful in making sense of WebGA's experiences (Figure 5).

Conclusion

Research on interorganizational systems increasingly recognizes the complementarity of rational and relational theories, focusing on such areas as buyer-seller relationships (Bensaou 1997, Grover et al. 2002), virtual organizing (Steinfield et al. 1995, Kraut et al. 1999), and network governance (Jones et al. 1997, Poppo and Zenger 2002). However, our research has identified numerous tensions and unintended consequences inherent in a service strategy that attempts to complement service relationships with self-serve technology. We found that the introduction and use of a network technology that was designed to deliver service through impersonal interactions had important implications for the embedded relationships comprising a firm's service strategy. Because network relations are enacted through the work practices and interactions of customers and providers, the use of the self-serve technology by customers led to arm's-length relations at the firm level. For a firm relying on embedded relationships and social capital to generate revenue, such an enactment raised serious challenges for the viability of its business model. These challenges and unintended consequences are likely to emerge whenever firms deploy IT without considering the microlevel practices and social interactions that enact their macrolevel business strategies and network relations.

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