

# Adaptation by Small Organizations to Changes in the Nature of Competitive Advantage as E-Commerce Becomes Primary Interface

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## ***Abstract:***

*The rapid development of e-commerce as the primary interface between providers and their customers, both business and consumer, has brought challenges to small manufacturing and services and not-for-profit providers.*

*This presentation will examine the adaptation of three small organizations through these changes. The organizations include a small ski manufacturer, a paratransit provider, and an office supply purchasing service for nonprofits. Each will be analyzed in terms of the countervailing effects of web technology on their ability to provide individualized service and/or human touch and their ability to compete with larger providers of the same products (goods and/or services).*

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One characteristic of small organizations and startups is that they may not have established an effective supply chain flow. The process of delivering services requires good upstream and downstream connections. The emergence of electronic commerce technologies and the consequent changes in business practice have created some apparent shortcuts into the competitive arena and have also created some threats to the niche strategies and special distinctions entrepreneurs and smaller organizations use as their differentiators. If one starts with the concept of electronic commerce as solicitation, negotiation, and transaction through the Internet, then some of the advantages and vulnerabilities can be exposed. Later, when electronic commerce is expanded in definition to include all kinds of interactions, other dimensions of the effect of electronic commerce on the standing of new entrants and small players will emerge.

The first effect we have noticed is ease of market entry as a supplier. Whereas large organizations had longstanding relationships with a single strong supplier or a list of competitors prior to the emergence of electronic markets and e-brokers, the possibility exists for a small provider to enter a bid or offer a particularly attractive package of goods or services that might, at least temporarily, override these relationships. For example, a

small maker of engine air filters can compete with the large independents like Fram or, perhaps, an in-house maker like Mopar. It appears that geographical, size, and habit barriers are being reduced by open electronic markets as purchasing professionals are under pressure to reduce costs. Concurrently and importantly, certifications, such as ISO and QS, are available to assure parity in supplier relationships.

The same is possible in consumer markets, where large corporations' advantages gained by elaborate promotion-distribution systems have been eroded by the instant connection to other providers, who used to be too far away, too specialized, or too small. The inroads these smaller organizations make can be either through their own site or capable search or intermediary sites. The larger organizations that thrived in long, linked supply chains, are perfectly capable of using the e-commerce tools in addition to their conventional systems, and many large retailers are available directly through the Internet. The current demise of so many "dot.coms" has been, to some extent, attributed to the ability of established conventional providers to add web connections to their existing channels. Along those same lines, the e-based businesses often were started without a good business base and were not viable even in a welcoming market.

Where the entrepreneurial entry sees the other edge of the sword is the capability of large firms to invade geographical or niche markets served by small competitors by appearing in their markets through web sites. Under the old market rules, a large provider like Ciba-Geigy or 3M might command a huge proportion of the adhesives market, but the cumbersome nature of their sales and distribution chains permitted smaller providers geographic or niche shelters to deal with smaller clients or special needs. With the advent of Web-based commerce, small transactions and specialty relations are possible even for the largest providers.

When the definition of E-commerce is expanded to include any internet-facilitated interactions, the set of effects on entrepreneurial strategy becomes quite large. Given the broadest concept of electronic commerce, the concept of computer integrated functions within one organization linked to other organizations is the background for strategic changes in startups and small organizations. Since the first days of electronic data interchange (EDI), corporations have begun to integrate supply chain operations through the internet. For example, Wal-Mart developed a system whereby they would initiate a single purchase order for an item from a supplier and then feed digested information to that supplier indicating how rapidly the product was selling and when to ship product to the warehouse or store to maintain stock. From the manufacturers end, Procter and Gamble receives raw data from point of sale at client outlets and determines for itself how to maintain product levels in stores. Similarly, General Motors and Chrysler provide their suppliers with production plans and expect JIT arrival of parts.

This change in concepts erodes other competitive advantages of smaller organizations. The flexibility or ability to customize that smaller organizations might use to gain advantage over large competitors with long value chains is meeting the movement toward mass customization. Assemblers of computers born with 1-800 phone linkages are easily suited to the new rules, and the manufacturers of big-ticket items are struggling

to take advantage of the market change. Ford Motor Company is touting an effort to make automobile buying an e-commerce experience (*Financial Times-London*, February 29, 2000). Ford's claim is that, through their system, customers' buying decisions will reach the factory floor and change manufacturing schedules rapidly enough to provide the car of one's choice at a reasonably convenient time and location..

The structural adjustments that these changes dictate are substantial. Without a perceptible diminution in demands for quality, organizations are being required to provide flexibility in product mix and in delivery flows. But enterprise computing systems, including flexible manufacturing systems and linkages to employment decisions are diminishing the "closeness" advantage of smaller organizations. Incidentally, our interviews with Ford salespeople indicate a long history of such efforts and little success.

The mixed opportunities and concerns brought on by electronic commerce are best illustrated by citing three different organizations and their experiences competing in electronically facilitated markets.

The first is a small manufacturer of specialized consumer goods. Igneous Skis is an emerging producer of high-performance skis in a market dominated by large, broadly advertised brands. The second is a paratransit provider. The Urban Rural Transportation Alliance (URTA) is a not-for-profit transporter of disabled, indigent, and elderly citizens who need responsive transportation to regular and ad-hoc appointments. The third is a broker-like purchaser of normal and unusual supplies and small equipment for small organizations. The Purchasing Manager works by telephone, fax, and the Internet to obtain best prices and delivery arrangements for small organizations that do not have the skill, time, or power to obtain incidental office goods at low prices.

### **Igneous Skis**

Igneous, Inc. is a small producer of downhill skis for the athletes who jump off cliffs and speed down powder faces. This "extreme" area of the sport is now called freeskiing. This creates a niche for the entry of a small designer-manufacturer, and the two strategic differentiators of this organization are that the skis are custom crafted for the user and that they are more durable than competitor's mass-manufactured skis. They perform well in use, but have not gained substantial market share through four years on the market.

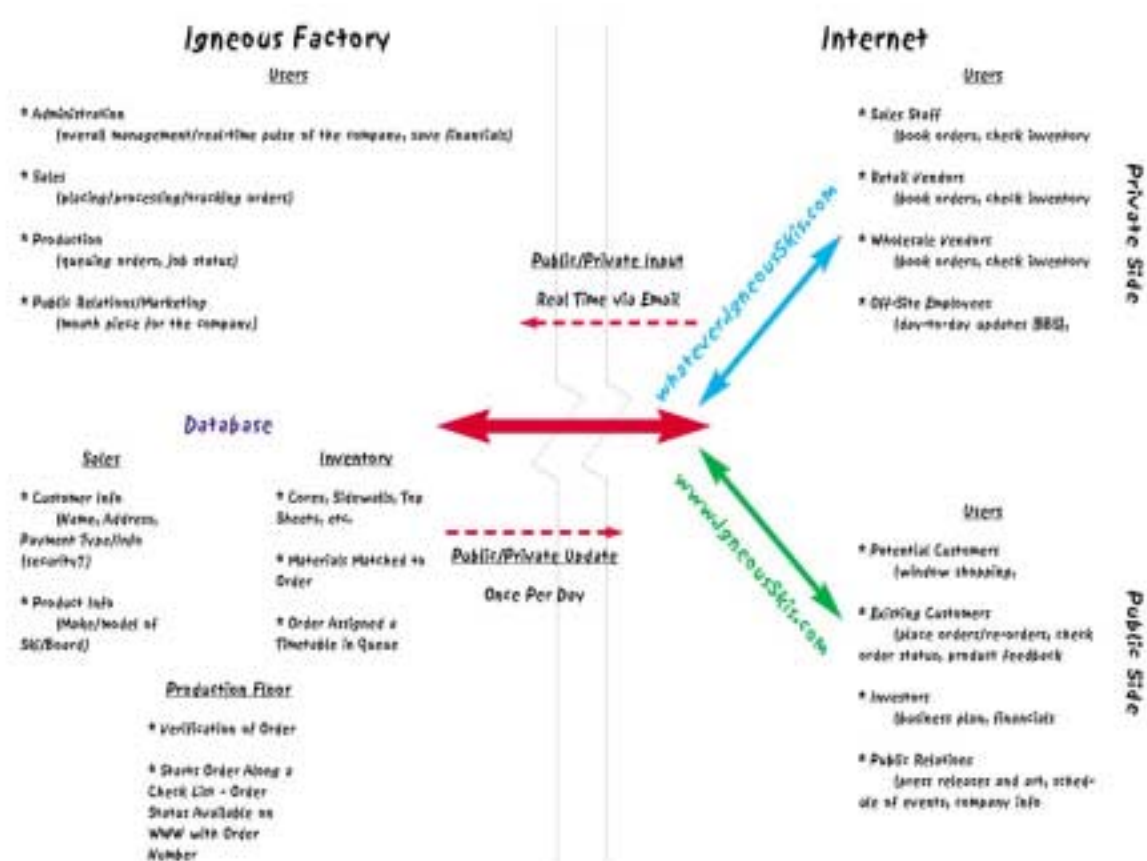
Each pair of skis is made to the customer's skiing ability, strength, and style of skiing, terrain choice, and snow conditions most skied. The characteristics that can be built into the skis include flex, side cut, width, torsion, and length. Three of the members of the Igneous Team are trained to interpret an individual's characteristics from phone contact, and an expert system has been designed to translate answers to Web interface questions (see Figure 2) into ski characteristics and fit the particular pair of skis into the production schedule.

At low, unprofitable levels of output, cutting, assembling, pressing, and tuning each pair of skis to suit the buyer was not difficult and provided experience for the

factory and exposure for the brand name. The skis have been positively reviewed in the trade literature and the company has received other positive publicity, including high placement in the national freeskiing competitions by the independent skiers who have chosen Igneous skis (including the Canadian National Championship). Purchases of materials are made from intermediaries who can breakdown drums of resins, tons of maple, and huge minimum purchases of other materials for resale to small companies. Igneous does not shop the web for materials.

In the fall of 2000, Igneous was poised to attack the market with its new program of web-based sales integrated with the manufacturing scheduling software. At the modest scale (1000 pairs) that was projected, there were few obstacles to success. The conceptual diagram created by the management of Igneous and their web-master is attached as Figure 1.

**Figure 1 Customer-Production Integration Plan**

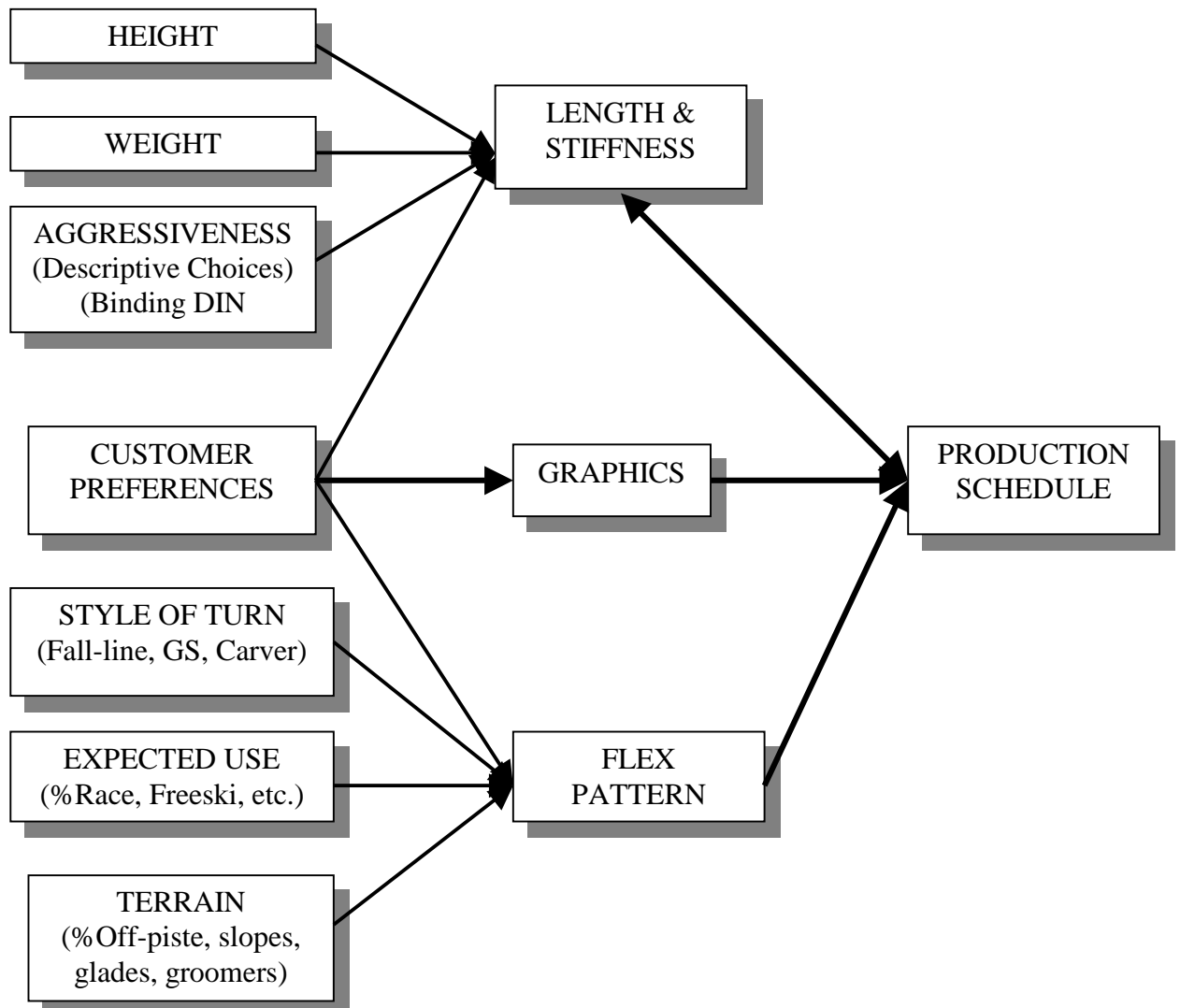


The web site is in place and the order form is designed for linkage to the production system. However, shortage of capital has prevented Igneous from operating

at even the modest production level that would require the use of their integrating software. However, the issues considered here are still exposed and will be measured by survey data. Preliminary results (and intuitive interpretations) indicate that the part of the consumer public who are customers of this individual sports company and others like it are very comfortable making decisions through the expert system involved on their site. It is activated by answers to a set of about ten branch-type questions. Figure 2 is a diagram of the logic from the interface that the buyer sees on [www.igneousskis.com](http://www.igneousskis.com).

In reviews of ten customers who actually ordered skis, somewhat corroborated by the Igneous staff, seven came to the web site as a first contact. Of those seven, three made their entire purchase decision through the internet (includes e-mailed questions), two used the telephone, but only to make and confirm an order that had been created on the web, and the other two required substantial interaction with the experts at the plant. Incidentally (but probably not significantly) one person who did not use the web knew the owner and didn't even consider using the Internet. That individual reported that they would have been comfortable with web use.

**Figure 2 Interface Logic for Igneous Skis**  
(Actual interface withheld as proprietary)



## URTA

The Urban Rural Transportation Alliance (URTA), though a service provider and a not-for-profit, has a relationship with e-commerce that is similar to Igneous Skis. URTA has an off-the-shelf transportation scheduling system that is linked to a database generated by phone, and the Board of Directors is urging the management to connect it to the web-interface that was designed by local undergraduate students. It is management's contention that most of the individuals who use their services are either uncomfortable or incapable of changing from a phone system to a web-based reservation system. Furthermore, URTA does not fit one of the situations that are the center of inquiry for the authors in that they do not want to compete in the global marketplace.

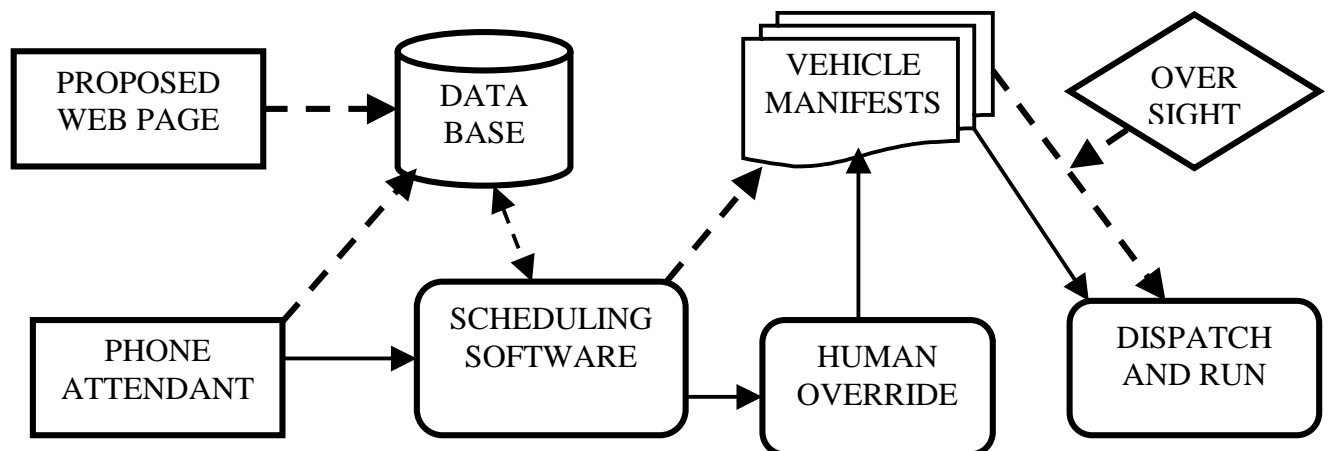
To make the current system able to handle the repeat and unique demands that are placed on it daily, URTA mandates forty-eight hours notice of need. The current system truly requires eighteen hours lead time to adjust the software-generated schedules to the information that is currently only known by the dispatchers. Last minute rides are subject to space available on nearby vehicles.

The system proposed by the students could rewrite the manifests for the drivers and vehicles up to the hour that they departed in the morning, and change route plans as riders are added and subtracted in real time. The web interface is unnecessary in the older model, as there is plenty of time to work with schedules between the reservation deadline and the printing of the drivers' manifests. With the new model, clients could submit for rides at any hour of the day and virtually up until the time they needed rides.

Where the situation with URTA meets the issues of this paper is its competitive advantage. Individuals and non-profits that service the needy populations can choose to place their reservations with URTA, provide their own transportation or contract with a profit-seeking enterprise that runs the county fixed-route bus system and carries proximal (within  $\frac{3}{4}$  mile of fixed route) handicapped passengers as mandated by the Americans With Disabilities Act (ADA). This is a large company that provides various transportation services for Baltimore City and the counties that surround it. URTA's strategic differentiation comes from personal attention, both on the phone and in the vehicles.

### FIGURE 3 SCHEDULING FLOW AT URTA

(Proposed flow follows dashed lines)



URTA is also a custom provider and can accommodate special needs. The web linkage is viewed by the organization as a betrayal of that personal service, and the system should probably take the form of a 24/7 web interface and a single phone attendant. That individual can enter reservations into the system for those who don't own or will not use the system. Figure 3 is a diagram of the flow generated by the URTA system.

What will be reduced is the current capability to change the manifests by overriding the machine prepared schedule to provide the driver of choice or make some other accommodation for a rider. Many of the common types of exceptions can be included in the schedule criteria (e.g. matches of vehicles with needs or accommodating emotional difficulties). However, it is not uncommon for a job coach for a developmentally disabled client to call URTA to report that the client is having emotional difficulties and should not be placed on a particular vehicle, because it has too many passengers on it or would take too long to get that client home. The larger service provider has less flexibility in this regard.

Adjusting equipment and drivers is difficult, so the web-interfaced scheduling system has some real risks of service breakdowns, but URTA should expect to gain considerable market share as a result of shorter lead times and instant acceptance of reservations. It should expect to lose little of its customer base from having more difficulty overriding its manifests. It should be noted that the system is not expected to give immediate schedule commitments, as the manifests should be fluid until all customers have had an opportunity to register. It is likely that URTA will be looking eventually to methods for providing real-time commitments.

### **The Purchasing Manager**

The third organization to be considered is a small service provider that competes with large office supply companies as well as office supply buying services. The Purchasing Manager (TPM) of Columbia, MD acts as purchasing agent for small organizations and maintains a data base for its customers as well as a bid record from all potential purveyors of goods and services that these organizations might use. This small company is a niche provider; soliciting businesses from not-for-profits in its immediate area and providing similar services for other organizations outside the niche as it became convenient for user and provider. However, the development of a web-based expert system has made it able to compete in the larger market. It plans to provide the same purchasing services for larger organizations as it does now for a single food chain and a mid-sized advertising company.

Its emerging customer base includes mid-sized and large corporations. It provides its original interface for the small not-for-profits that were its original customers. Its older customers may still call-in or fax requests for goods and services that are not the periodic needs that TPM automatically purchases and has shipped to them. They may also use the interface provided on the web, which provides them the historical data and

budget compliance information that they need and provides an expert system to help them manage their supply chain for items which are normally not their principal business unit materials or service providers. For example, a construction contractor would not ordinarily use TPM to purchase roof trusses or roofers, but might use it for computers and cleaning staff as well as print cartridges and paper.

TPM is now global in both its purchasing resources and its customer base, but is still small relative to major players in brokerage and retailing. Except for the original base of small organizations, TPM has shed its small company mantle and cannot be viewed as a small or local provider for its customers. The loss of advantage as a local provider of a service is inevitable in markets such as purchasing. Dot-coms anywhere in the world can purchase and effect delivery to compete with a local supplier.

Buying volume is still a potential price driver in the markets where office purchasing and retailing companies operate, but the competition is so well served by the web, that considerable advantage can be delivered by a well designed expert system and good strategic choices. As an update, The Purchasing Manager has withdrawn from competition on the Web and only sells the interface and purchasing information software it developed. It uses the Web as a supplemental tool with its current base of small customers.

Perhaps, what it discovered was that Staples.com and other existing major providers of products could invade its market space more readily than it could make inroads into their markets.

In all three of these cases, the newer technologies worked against them in three ways. First, they lost local advantage, as larger and “foreign” companies could provide local services for their customers and, by virtue of new flexibility, simulate the responsiveness of local companies. Second, by virtue of their automated interfaces, they stood to lose some of the personal touch that distinguishes them from their competitors. Third, and most difficult to measure, is the alienation of customers who are not able to use the newer systems may have created a distance from the customer that will require some repair.

E-commerce has yet to provide market share advantage for URTA, and neither Igneous Skis nor TPM feel that they obtained equal or superior footing by virtue of the reach of the web. Should they reach some kind of parity, both companies face the potential of large contract offerings that their resources cannot handle. All three organizations originally derived their largest gains with the ability to integrate web connections with expert systems, scheduling software, databases, and machines. These were not so much means to compete with larger firms as ways of providing better service to their customers. None of the companies has yet seen the promised benefits of these electronic commerce innovations.

Further investigation of these phenomena will include a sampling of customers and providers. It will measure the loss of business due to competition on the Internet,

new flexibility of larger competitors, and customer resistance. It will, more importantly, measure gain in market share that results from more responsive systems and larger reach. The results of this study are expected this summer, and we expect to present results at the POMS 2002.