Seizing the Opportunity: Exploiting Web Aggregation

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Executive Summary

There is a new phenomena emerging that can provide significant value to businesses that seize the opportunity or threats for those caught unaware. Web aggregators are entities that collect information from a wide range of web sources, with or without prior arrangements, and add value by providing post-aggregation services. Aggregators have become easier to construct due to new technologies, so we predict they will soon emerge in industries where they do not currently exist – and hundreds already do exist in areas such as financial services, retail, and telecommunications. Like it or not, aggregators will use your web-based information to create new information collections that will affect your current business model, branding, and relationships. Aggregators will change the way your organization operates and the way global e-commerce develops.[2] It is a wise organization that considers its e-strategy, prepares for aggregators, adds aggregation capabilities to its internal and external operations, and fully understands whether it should aggregate or be aggregated.

Why Be Concerned With Web Aggregators?

Imagine you are head of a large, well-established industry giant. Your attitude toward the Internet has shifted from thinking of it as a fad to treating it as an important force in your industry. You have decided to make your product information and ordering available online. After all, your customers are requesting this, and you want to leverage your brand name and your brick-and-mortar assets. After investing heavily in building your online presence, you believe you are ready for this marketplace.

But are you really ready?

On the horizon, unbeknownst to you, is a fast-emerging new entity; it plans to overturn your familiar business landscape. This shopbot-like web aggregator can selectively extract information from your web site, couple it with data from other sources (including your competitors), and handle the necessary fine-tuning to make intelligent comparisons between your and your competitors' offerings.

DealTime.com (see Figure 1) is one example. On a recent comparison-shopping trip, DealTime.com determined that it was less expensive and faster to purchase Reilly and Brown's finance text book, *Investment Analysis and Portfolio Management,* from Amazon.com rather than from A1books.com. If A1books.com's revenue model is based on distributing its products online, the aggregator is likely to dramatically reduce A1books.com's volume and narrow its margins. Furthermore, if A1books.com's business model is based also on making profits from advertising sales, lead generation fees, or better customer data, the aggregator may be seriously reducing these revenue sources as well.

Aggregators can collect information from *cooperating* and *non-cooperating* sources because new web-based extraction tools allow them to easily and

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[2] Although many of the cases studied here look mostly at the Business-to-Consumer sector, aggregation activities will play an even more important role in the Business-to-Business side of eBusiness.

**Figure 1: Online Book Comparison
(Source: www.DealTime.com)**

Where Will You Buy?

Investment Analysis and Portfolio Management,
5th edition, by Reilly and Brown, 1996. Hard-
cover. ISBN: 0030186838. List Price: $107.50.

- Available at A1Books.com for $103.90, includ-
  ing shipping and sales tax, in 5-10 days.

- Available through Amazon.com for $96.79,
  including shipping and sales tax, in 3-7 days.

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transparently gather information from multiple
sources with or without the permission or knowledge
of the underlying data sources.[3]

Furthermore, aggregators can more easily extract,
compare, and analyze information due to the emerg-
ing eXtended Markup Language (XML) family of
standards (e.g., XML, RDF, XML-Schema). They
can also automatically compare information (such as
book prices, bank balances, shipping rates, and intel-
ligence information) using mediation technologies,
which let them determine differences in semantics or
the "meaning" of data.[4] And they can make strate-
gic use of aggregated information using agent tech-
nologies, which are programs that use an aggregated
information database to perform services on a user's
behalf.

Aggregators, by themselves, are not new. What has
changed, with the advent of the Internet and recent
developments in technology, is their ability to
emerge overnight, at minimal cost, and without the
need to establish partnerships with the various data
sources. As a result, incumbents are often caught
off-guard and stumble in their panicked response.

A number of types of aggregators already exist in
several industries. They include information man-
agement services (to help users manage relationships

more effectively), consumer education shopbot ser-
vices (to compare different products) in the book
selling and overnight delivery industries. In their
study of a similar phenomenon, which they called
"navigators," Evans and Wurster concluded that this
is "the battlefield on which competitive advantage
will be won or lost."[5] We agree.

What are Web Aggregators?

Here are definitions of a few terms used in this arti-
cle.

Aggregator

A web aggregator is an entity that can *transparently*
collect and *analyze* information from multiple web
data sources. In the process, the aggregator resolves
the semantic or contextual differences in the infor-
mation, such as differences in prices extracted from
sites that use different currencies or include or ex-
clude shipping charges.

As this definition suggests, web aggregators have
three important characteristics:

Access Transparency – An aggregator appears to be
a normal user to a data source – simply accessing the
information.

Contextual Transparency – An aggregator resolves
contextual differences so it can make effective com-
parisons.

Analysis – Instead of simply presenting data as is, an
aggregator uses post-aggregation analysis to synthe-
size value-added information.

It is important to note that, under this definition,
search engines, such as Google and Lycos, and per-
sonalized web portals, such as MyNetscape or My-
Yahoo, are not aggregators. Similarly, web-based
malls, category e-stores, and community-based web
sites do not fit this category. Although these web
sites amass different information, they provide little
contextual transparency or analysis.

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[3] Firat, A., Madnick, S., and Siegel, M. "The Caméléon Approach to
the Interoperability of Web Sources and Traditional Relational
Databases," *Proceedings of the Workshop on Information Tech-
nology and Systems,* Brisbane, Australia, December 2000; Mal-
chik, A. "An Aggregator Tool for Extraction and Collection of
Data from Web Pages," MIT Master's Thesis, 2000.

[4] Goh, C., Bresson, S., Madnick, S., and Siegel, M. "Context Inter-
change: New Features and Formalisms for the Intelligent Integra-
tion of Information," *ACM Transactions on Office Information
Systems* (17:3), July 1999, 270-293.

[5] Evans, P. and Wurster, T.S. "Getting Real About Virtual Com-
merce," *Harvard Business Review* (77:6) November 1999, pp. 85-
94.

Table 1. Examples of Aggregator Types and Sources		
	Comparison	**Relationship**
Inter-Organizational	Compare book prices or shipping costs of alternative suppliers	Consolidate all one's frequent flyer or financial accounts
Intra-Organizational	Compare manufacturing costs in multiple plants	Consolidate all information about each customer from the company's separately maintained web sites across functions (accounting, service) and geography (domestic and international).

Aggregator Types and Data Sources

Aggregators are used to build *integrated information collections* for many purposes, such as forming *comparisons* and managing *relationships.* These collections can be built from information sources inside an organization (*intra-organizational*), between organizations (*inter-organizational*), or both.

Comparison type aggregators focus on collecting information about specific goods and services for evaluation. Shopbots, used for purchasing books, music, and electronics, are good examples.

Relationship type aggregators form new information collections based on their relationship with aggregatees. For example, financial account aggregators (Yodlee, VerticalOne, CashEdge) are being adopted by major financial institutions (Chase, Citibank, Merrill Lynch) and non-financial institutions (CNBC, AOL).[6] These organizations give their customers the ability to manage all their financial relationships through a single aggregator.[7] Examples of these *aggregator types* and *sources* are shown in Table 1.

As we discuss below, advanced hybrid aggregators can combine several types and sources in a single application.

Aggregatee

An aggregatee is an organization whose information could be collected by an aggregator. Ultimately, aggregators also become aggregatees, because once they provide their services over the web, another aggregator can aggregate their information. We refer to such an aggregator as a *mega-aggregator.* Likewise, as we will see below, many aggregatees may also become aggregators.

After-Aggregation Analysis

After-aggregation, or post-aggregation, refers to the services and analyses applied to a collection of aggregated data. Currently, most aggregators provide a majority of their value merely by creating and providing access to their aggregated information collections (i.e., consolidated financial accounts, frequent flier accounts, competitor prices). But aggregators can extract even greater value from this wealth of information through after-aggregation analysis. For example, although it is very interesting to view all one's financial accounts in a single online report, the real value of such a collection comes from the ability to provide advice (e.g., asset allocation) or to act on the information as an agent for the account owner (e.g., automatically move money from one account to another to maximize return). Finally, privacy issues aside, the owner of an aggregator (i.e., the entity that offers the aggregation service) has valuable information it can use to selectively offer products, tailor marketing, and better understand its business.

Aggregation Examples

One of the best ways to understand aggregation is through examples. Here are several aggregation ex-

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[6] As a measure of the projected impact of aggregation, two studies predict a high penetration of account aggregation services: Marenzi, O. "Account Aggregators, Screen Scrappers and Online Financial Services," Report by Celent Communications, March 2000; "Account Aggregation 2.0," *Online Banking Report*, Issue 63, August 2000.

[7] Pan, H. "Integrating Financial Data over the Internet"*, MIT Masters Thesis, 1999.

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Figure 2: From the US Airways Website (emphasis added)

"US Airways provides Dividend Miles account information for the benefit of its Dividend Miles members. Access to this information is subject to the rules in the Dividend Miles Membership Guide and the liability limitations provided for this website. In addition, by using this site to access your Dividend Miles account, you agree that you will use this site in a manner consistent with the Dividend Miles Membership Guide and **you further agree not to allow access to this site to any third party by revealing your access code to any third party for any reason**. Failure to comply with the foregoing restrictions on the use of this site shall be grounds, in US Airways' sole discretion, for the termination of your access to this site and/or your membership in the Dividend Miles program."

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amples with different capabilities. These examples will be very useful later in presenting aggregation opportunities and strategic options.

Relationship Aggregation: Managing Reward Programs via MaxMiles

MaxMiles (www.maxmiles.com) runs a web-based reward management program to help frequent travelers better manage the rewards they earn from airlines, hotels, and car rental companies. Users provide their account and personal identification numbers for all their reward programs to MaxMiles and authorize it to access and analyze their data. In return, MaxMiles provides its customers with a consolidated statement that shows, among other things, the number of points they earned for each account and the number of points that will expire at each date. Users of the MaxMiles service immediately benefit. They do not have to manually keep track of a plethora of passwords and they can view all account activities through a single consolidated statement.

In addition to the standard account statement, MaxMiles offers additional after-aggregation services. For example, it can identify flight segments that possibly were not properly credited. It will deduce that some flight segments may not have been properly posted if, for example, the account data does not show an inbound segment for each outbound flight. This is something no individual airline could do if the trip involved multiple airlines. In the not-too-distant future, MaxMiles expects to offer more personalized account statements that help users take advantage of special offers for which they are interested and eligible.

MaxMiles currently provides its service both to businesses and individual consumers. While the specific revenue from each business partner is not disclosed, individual consumers can sign up for MaxMiles for $2.95/month. The following web portals, travel agents, and reward programs have partnered with MaxMiles:

- AOL and Excite offer the MaxMiles service through their web portals.
- Advanced Travel Management, Journey Corp, Internet Travel Network, and Microsoft's Expedia, offer MaxMiles online mileage management reports through their travel agent sites.
- Hyatt Hotel provides the MaxMiles service for its Diamond and Platinum members.
- XTRA On-Line and Sabre integrate the MaxMiles technology into their travel reservation products.

Interestingly, because MaxMiles does not have to partner with the reward programs to serve its clientele, a wide range of relationships has developed. Some reward programs, such as the Hyatt Gold Passport Program, actively partner with MaxMiles by outsourcing the task to reduce costs and leverage the company's technology to better serve its customers. On the other hand, US Airways initially took a defensive and hostile attitude. In its click-wrap contract, the airline explicitly prohibits flyers from revealing their password to a third party (see Figure 2). US Airways intended to prevent MaxMiles from encroaching on its business. MaxMiles countered by requiring users to give it Limited Power-of-Attorney, as part of its registration process.[8]

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[8] As of this writing, although there have been several controversies, there are no definitive legal decisions with regard to aggregation. Some of the current legal issues are discussed in Zhu, H., Madnick, S., and Siegel, M. "Information Aggregation - a Value-Added E-Service," *Proceedings of the 5th International Conference on Technology, Policy, and Innovation – Theme: Critical Infrastructures*, Delft, The Netherlands, June 26-29, 2001. A de-

There are a number of important issues to consider about this aggregator. First, MaxMiles interposes itself between customers and frequent flier programs, the aggregatees. This is important because it may require aggregatees to change their business model as the aggregator replaces a direct relationship with their customers. Aggregatees may choose to cooperate and provide data or financing for preferential treatment (e.g., listing special offers on MaxMiles). They may cooperate to get access to strategic data. For example, MaxMiles is gathering knowledge about how everyone flies, rents cars, and stays at hotels. This set of information is extremely valuable to aggregatees. Aggregatees may also choose to outsource their frequent traveler programs. Or they may be more combative and try to limit access to the data. Regardless of their response, aggregators can significantly impact aggregatees' business and change their relationship with customers.

Comparison Aggregation: Selecting a Carrier Through Intershipper

DealTime, as briefly described earlier, provides comparisons of products, such as books. As a different example, Intershipper (www.intershipper.net) demonstrates both price and non-price information-comparison aggregation services. Given a package source, destination, and weight, Intershipper compares shipping options from multiple carriers (e.g., Fedex, UPS, DHL).

Intershipper also has two additional services. First, it provides a list of the closest drop-off centers for all the carriers. This feature is useful to individuals who do not want to wait around for a scheduled pickup. Second, Intershipper shows when a package is estimated/guaranteed to arrive, based on sender's and recipient's zip code and the package's weight. In essence, Intershipper acts as an intelligent assistant, helping users select the best carrier, not just by estimated cost but also by other such factors as expected and guaranteed delivery times. Since the information Intershipper collects is available on the carriers' web sites, Intershipper has not needed to form explicit partnerships with the carriers to provide its services. This case will be discussed in more depth below.

Combined Relationship and Comparison Aggregation: Universal Financial Aggregator

As a research experiment, in 1998 we developed the Universal Financial Aggregator (UFA), a demonstration aggregator that would provide integrated access to all one's financial accounts that are accessible online. Instead of seeing only individual accounts or only the accounts from a single institution, users could instantaneously view all their financial accounts across multiple institutions through an integrated, personalized balance sheet. In addition, a UFA would help users manage their plethora of logins and passwords. In this regard the UFA was a *relationship* aggregator, similar to MaxMiles.

To illustrate how rapidly aggregation services can emerge, commercial versions of this aggregator, now called Financial Account Aggregators, appeared in late 1999 from companies, such as Yodlee (www.Yodlee.com), VerticalOne (now merged with Yodlee), and CashEdge (www.cashedge.com).[9] In June 2000, Chase, which had been an aggregatee, announced that it would become an aggregator by working with Yodlee, and would provide financial account aggregation services to its customers. Today, such financial account aggregation services are offered by most major financial services institutions (including Citibank, Chase, Wells Fargo, Merrill Lynch, Fleet Bank, and Fidelity) as well as by non-financial institutions (such as Yahoo, AOL).

With a total picture of a user's financial situation, a financial account aggregator can use its knowledge of other financial products to help the user optimize his or her finances. For example, our experimental UFA incorporated a money market comparison aggregator that scoured the Internet for the best interest rates, consistent with the user's aggregated financial status. In fact, since our aggregator also aggregated other money market rate aggregators (i.e., Bankrate.com and Bankquote.com), we called it a *mega-aggregator*. This capability also made the UFA a *comparison* aggregator, similar to DealTime. Its *after-aggregation* service incorporated *analysis* – evaluating potential additional earned interest by moving funds – and it could act as your *agent*, facilitating the movement of funds. So the UFA has been an example that combines *relationship* and *compari-*

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tailed analysis of the legal issues is being produced in a subsequent report.

9 Marenzi, O. "Account Aggregators, Screen Scrappers and Online Financial Services," Report by Celent Communications, March 2000; "Account Aggregation 2.0," *Online Banking Report*, Issue 63, August 2000.

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son type aggregations. Some of the high-end commercial financial account aggregators have announced their intention to offer such after-aggregation analysis capabilities in the near future.

Aggregators of all types will affect companies in a wide range of industries. We have examined several hundred examples in the retail, telecommunications, and financial services industries.[10] Early aggregators focused on price comparison. Emerging aggregators focus on relationships and creating and analyzing information collections. In addition, from our UFA experiments, we see that much more functionality and value can be provided by combining aggregation types. In many instances, the result will be a relationship aggregator providing added after-aggregation value through comparison aggregators.

Using Aggregation to Improve Business

Today, barriers of entry to new aggregators are much lower because new web-page extraction tools, context-sensitive mediators, and agent technologies have greatly reduced the time, cost, and effort to construct aggregators.[11] Furthermore, organizations do not need aggregation capabilities in-house. Aggregation service providers license or rent the technologies, so non-technology companies can easily incorporate such services. With the advent of the Internet, many firms have outsourced their technology needs to service providers to benefit from the providers' economies of scale. Hyatt Hotels and various travel agents, for example, have licensed the MaxMiles technology instead of building and maintaining their own aggregation services.

Once one company in an industry provides a useful aggregation service, the others are often compelled to follow. For example, when Chase provided free financial account aggregation, most of the other major financial institutions did the same – mostly by licensing or renting the service from such providers as Yodlee and VerticalOne.

There are many ways a business can exploit aggregation opportunities to its benefit. Aggregation can be used to keep customers, acquire new ones, improve information processing efficiency, generate

sales leads, leverage existing customer trust, find suppliers, and understand a market.

To keep customers and acquire new ones. To date, one of the major impacts of aggregators has been their ability to add value to customers' online experiences. For example, relationship aggregators build and maintain customer relationships. Financial services organizations would much prefer customers to access accounts through their own web site rather than through an aggregator's – which might be provided by a third party or even a competitor. This is why financial account aggregation is becoming the "ATM machine of the 21st century." If you do not offer it, your customers will go elsewhere.

Organizations that can add even more value via after-aggregation services will differentiate themselves and place themselves in the best position to keep their existing customers and acquire new ones. In the examples of MaxMiles, Intershipper, and Financial Account Aggregation, the customer relationship has proven to offer the greatest opportunities and concerns for aggregatees.

To process information more efficiently. For manufacturers of information goods, such as Bank Rate Monitor (www.bankrate.com), there is an interesting twist. Aggregators may represent a more efficient model of production. Instead of building their information goods by establishing costly agreements with each data source, aggregators can add and integrate new data sources rapidly and without agreements. More importantly, they may collect information in more ingenious ways, such as offering a service and observing consumer buying patterns. New aggregators may, in fact, displace original manufacturers of information goods that do not seize the opportunity.

Even businesses that are not manufacturers of information goods can use aggregation to better manage their information. Relationship aggregators, for example, can support Customer Relationship Management (CRM) applications, or financial account aggregators can manage a multiplicity of bank accounts, checking accounts, credit cards, certificate of deposits, and money market accounts for a business.

To generate sales leads. Partnering with a comparison or relationship aggregator can help businesses increase sales. *Lead generators* "aggregate [users] … according to their profiles, preferences, and other criteria, translate this data into specific product and service needs, and then direct [users] to vendors

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[10] Readers interested in additional case studies should visit the Home of Aggregator Research Web site at context2.mit.edu/aggregation. Included at that site is a list of over a hundred aggregators found in Europe, North American, and Asia.

[11] Firat, et al., 2000 ibid; Goh, et al., 1999 ibid.

whose offerings meet those needs."[12] For example, DealTime.com first identifies possible vendors for a desired book, and then it can direct buyers to the best web site to make the purchase. A financial account aggregator could direct individuals to new and more appropriate investment opportunities.

Not only do lead generators provide businesses with additional customers who are ready to buy, they can more importantly help vendors design better personalized products. As Bakos points out, "Increased selling effectiveness comes from being able to design appropriate products to address the needs of individual consumers, and from being able to identify the moment when a customer's purchasing decision is most likely to occur …"[13]

Sales generators can even provide consumers with structured products tailored to their individual needs by transparently creating and managing a custom bundle of offerings for a particular user. In much the same way that investment banks design products to suit a particular company, we will see aggregation businesses providing tailored, bundled products, such as integrated vacation packages that combine travel, hotel, special events, and equipment rentals. As another example, a transaction coordinator can offer college students bundles of textbooks that match their classes, sourcing the books from various sites and coordinating their delivery, all transparently to the students.

To leverage existing customer trust. While trust has always been important in doing business, it will become even more critical in electronic commerce. Absence of face-to-face contact between buyer and seller, and the ease with which a small (or illegitimate) outfit can appear large (and legitimate), puts small, unrecognized new entrants at a great disadvantage. Historically, retailers have provided face-to-face trust for small producers. It makes sense, therefore, for well-known retailers to build or invest in an aggregator and leverage its brand image to *facilitate transactions* through escrow services, quality guarantees, and extensions of credit. CNET's certification program, for instance, automatically extends CNET's name and legitimacy to small and relatively unknown retailers.

To find suppliers. Buyer-oriented aggregators can serve as *purchasing agents*, searching for the best

provider. These buyer agents "help [consumers] get maximum value from their information profiles by using choices they have made in the past to deduce which product or service would best match their current needs, and then finding the vendor that can deliver the preferred product or service at the cheapest price."[14] These agents could even create aggregated products.

As MaxMiles illustrates, aggregators can help users manage multiple relationships. More importantly, they can generate more personalized recommendations than individual organizations, once they have the needed personal information. In these cases, buyers can build and maintain their own aggregators, *subscribe to the service* of an aggregator, or even pay aggregators a *commission on savings.* TPN Register (www.tpnregister.com), a joint venture between GE and Thomas Publishing Company, allows buyers to post design and engineering specifications for bids by suppliers. "The system allows its users, especially from smaller companies, to find low bidders among suppliers that might not consider them via traditional channels."[15]

To understand a market. Aggregators are well positioned to collect detailed and highly valuable market information not available to individual aggregatees. By simultaneously accessing and integrating information from multiple sources, aggregators can understand a market better than its participants. While a company's web site can gather information about its customers, it does little to inform the company about its *non-customers*, that is, those who take their business elsewhere.

For example, Intershipper knows which carrier each user ultimately chooses, and it knows which users use UPS for all packages over one-pound between Boston and New York and Fedex for other shipments. The shippers do not have this information. Consequently, aggregators can sell summarized and aggregated information to individual firms. Of course, such information providers existed before the Internet. IMS America collects, aggregates, and repackages data from hospitals for sale back to those same hospitals, so they can see how their operations compare with their peers. As the cost of collecting and integrating information falls, aggregators will increasingly provide after-aggregation market knowledge in different industries.

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[12] Hagel III, J. and Rayport, J.F. "The New Infomediaries", *The McKinsey Quarterly* (4), 1997, pp. 54-70.

[13] Y. Bakos, "The Emerging Role of Electronic Marketplaces on the Internet", *Communications of the ACM* (41:8), 1998, pp. 35-42.

[14] Hagel and Rayport, 1997, ibid.

[15] Segev, A., Gebauer, J. and Farber, F. "Internet-based Electronic Markets," *EM - International Journal of Electronic Markets* (9:3), 1999.

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Strategic Relationships Between Aggregators and Aggregatees

Based on our observations, aggregators' strategies are often emergent, rather than planned. They can appear as new entrants in an industry or as new divisions in an existing organization. In the initial phase, aggregatees may be just beginning to formulate their online strategy so they are turning themselves into aggregation targets without realizing the consequences of their actions.

Aggregators often emerge quickly and catch aggregatees off-guard. For example, an existing office supply product provider might build an aggregator to obtain market intelligence on competitors' product pricing – without the aggregatees' knowledge.

Then, once the aggregator realizes it might be able to sell that information, it develops a more mature strategy and strengthens its relationship with the aggregatees. Formal partnerships can reduce an aggregator's integration costs, and aggregatees may gladly pay for preferential treatment. In such cases, the aggregator is a "financially independent aggregator with collaboration," while the aggregatees are "collaborating aggregatees."

Aggregatees who view an aggregator's strategy as a threat may develop their own aggregator. Others may seek to control the existing aggregator through ownership. Still others may work with incumbent aggregatees to create a better balance-of-power, if they face a well-funded competitor. In all these cases, the aggregators are financially dependent, either on a single aggregatee or a consortium of aggregatees.

In general, the different states of aggregation can be characterized by (1) the preference given an aggregatee, (2) the amount of financial control over the aggregator, and (3) the number of participants in an agreement. Table 2 summarizes the different relationships. Each is discussed in the Appendix.

Table 2 presents the progression of aggregator/aggregatee relationships in a linear fashion, proceeding from "no aggregator" to independent aggregator to collaborative aggregator. However, these strategic relationships are dynamic and multi-dimensional. An aggregator can just as easily establish partnerships with or without investment from industry incumbents. Similarly, an aggregator that begins life as a subsidiary of an incumbent can be divested to become a financially independent aggregator.

Table 2: Summary of Different Relationship States Between an Aggregator and an Aggregatee

Aggregator	Aggregatee
No Aggregation	
• Non-aggregator	• Aggregatee – but no aggregation yet
Aggregation Without Partnership	
• Financially Independent Aggregator	• Unsuspecting Aggregatee
Aggregation with Partnership	
• Financially Independent Aggregator with Partial Collaboration	• Collaborating Aggregatee
• Financially Independent Aggregator with Limited Alliance	• Collaborating Aggregatee Member of a Limited Alliance
• Financially Independent Aggregator with Equal Degrees of Collaboration	• Collaborative Aggregatee
Aggregation with Ownership	
• Financially Dependent Aggregator Owned by a Dominant Aggregatee	• Dominant Aggregatee
• Financially Dependent Aggregator Owned by a Consortium of Aggregatee	• Consortium of Aggregatees

Comparing Strategic Interactions: Intershipper Versus iShip

Intershipper provides a good example of how aggregator and aggregatee relationships and business models can evolve over time.

BITS, Inc., the parent of Intershipper, began as an independent company. Its main source of revenues came from selling network equipment online and hosting online storefronts for various merchants. BITS built Intershipper to allow its online storefront customers to rapidly compare shipping prices across multiple shippers, for free. A spread of ten times in shipping rates was not uncommon. Table 3 shows some estimated shipping rates for a one-pound package from Cambridge, Massachusetts to Arlington, Virginia; they vary from $3 to $125. Traditionally, obtaining such comparative rate information was difficult.

Intershipper became an aggregator; the carriers were the aggregatees. When one of the unsuspecting carriers realized what had happened, it became furious and had its corporate counsel write a letter demanding that Intershipper cease and desist from aggregating its information. Since Intershipper had several other carriers it could aggregate and it did not want to incur legal expenses, it agreed to remove the carrier from its list. Some six months later, the carrier's business development managers decided they wanted to be back on Intershipper's listing. So they asked to be readmitted. Intershipper agreed.

BITS realized that Intershipper might be useful to customers beyond its captive online storefronts. To attract users, BITS let them access Intershipper for free, supporting the cost of operations by both selling advertising space and licensing its service for a fee to other web sites that need to ship goods.

Despite the large number of advertising-supported web sites, few earn a profit. Moreover, seeing how the UPS-owned competitor, iShip, was better funded and could possibly compete even at a loss for a much longer period of time, Intershipper needed to change its strategy. This was the situation when we last interviewed Intershipper.

What are Intershipper's options? One is for Intershipper to leverage its position as an intermediary and dole out preferential treatments in return for fees. We believe this is a shortsighted strategy because maintaining biased relationships will encourage other shipping carriers to introduce their own aggregators, which will increase competition.

At the moment, Intershipper contrasts nicely against iShip. Intershipper is an independent aggregator whereas iShip is not. Thus, carriers other than UPS should have a vested interest in supporting Intershipper and its independent status.

As it now stands, UPS has advantages over its competitors because it controls iShip. UPS can determine, for example, the factors, location, and time of comparison, and it knows more about the industry than its competitors. It knows exact conditions – route, price, package, and type of user – under which a particular competitor was selected. We argue this is highly useful market data not available elsewhere.

Intershipper, being an independent aggregator, can provide the same level of information to the other carriers. Instead of each building its own aggregator, we think Intershipper's better option is to get the

Table 3: Some Rates for Sending a One-Pound Package from Cambridge, MA to Arlington, VA (Source: www.intershipper.net)

Carrier Service	Date Delivered	Rate
RPS Ground	8/17 (Guaranteed)	$3.25
UPS Ground (Commercial)	8/17 (Guaranteed)	$3.25
U.S.P.S. Priority Mail with Confirmation	8/16	$3.55
FedEx Priority Overnight w/ Sat. Delivery	8/14 (Guaranteed)	$30.50
UPS Next Day Air Early AM	8/16 by 8:30 AM (Guaranteed)	$43.50
FedEx First Overnight	8/16 by 8:00 AM (Guaranteed)	$45.50
UPS Next Day Air Early AM w/ Sat. Delivery	8/14 by 9:30 AM (Guaranteed)	$53.50
BAX Guaranteed Overnight	8/16 by 5:00 PM (Guaranteed)	$125.00

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other carriers to jointly invest in it, to get the benefits UPS enjoys with significantly less risk.

Legal and Policy Issues

Organizations rushing to put their information on the Internet are just beginning to realize the impact of aggregators using that information. Many are not prepared for open comparison with competitors, the disintermediation that can occur, or the lost opportunity from not harvesting competitive information. Senior executives have only recently begun talking about aggregation strategies. Yet, aggregation will play a significant role in most enterprises, both private sector and government.

As a result, legal and political issues are emerging. For example, various types of legislation are under consideration in the U.S. (e.g., Coble Bill, Bliley Bill, Gramm-Leach-Bliley Act), which address who and how web information can be re-used. International laws will also affect the location, operations, and future of aggregators because those not allowed in one country may simply operate in another.

Research is exploring the impact of regional and global legal, economic, and cultural issues on the development of local and global aggregators.[16] The outcome of these domestic and international actions may influence the development of aggregators. But, in spite of some high-profile challenges to some aggregators (e.g., eBay vs. AuctionWatch and Bidder's Edge), most challenges seem doomed to fail simply because customers will demand access to information through aggregators.

Conclusions

Let us go back to "the head of a large and well-established industry giant" introduced at the beginning of this paper. What might his or her organization learn from this discussion? This research demonstrates that *everyone can be impacted* by aggregation. Everyone with useful information on their web sites is likely to *become an aggregatee*. In response, or to preempt the opportunity, some may *become an aggregator* as well. Thus, aggregation strategy must

be part of e-business and core business strategic planning.

Aggregation is *not a disappearing dot-com phenomenon*. Aggregators create new and valuable information spaces, important to organizations in many business areas. In fact, in some industries, such as financial services, the key providers of financial aggregation services are the largest, most established companies (e.g., Chase, Citibank, Merrill Lynch).

Although *comparison aggregation* (e.g., DealTime, MySimon) might be the most common type of aggregation service today, other types, especially *relationship aggregation*, are likely to be even more important. Furthermore, as seen with the Universal Financial Aggregator (UFA) example, it is possible to *combine multiple types of aggregators* to provide totally new services.

Because the impact is so widespread and significant, the aggregation phenomena will change, and will continue to change, business relationships and create new partnerships. The need to share information and gain value from these new information spaces will result in both established and newly created organizations working together in new ways. The wealth of knowledge to be garnered from the new information spaces, the after-aggregation analyses, and the new relationships that evolve will change the way organizations do business. Organizations that ignore the potential impact will be hurt by those that take aggregated information into consideration.

Thus companies should look upon aggregation as both a threat and an opportunity. The airline industry should think about what could happen if MaxMiles becomes the primary frequent-flyer aggregator, and thus owns all the information about who flies where and when. Likewise, a computer retailer with no brand recognition should think about becoming a certified merchant of CNET-owned computers.com, to gain a level playing field with retailers that are spending millions of dollars in advertising.

Like it or not, aggregators will use your web-based information to create new information collections that will affect your current business model, branding, and relationships. Aggregators will change the way your organization operates and the way global e-commerce develops. It is a wise organization that considers its e-strategy, prepares for aggregators, adds aggregation capabilities to its internal and ex-

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[16] Zhu, H., Madnick, S. and Siegel, M. "Information Aggregation - a Value-Added EService", *Proceedings of the 5th International Conference on Technology, Policy, and Innovation – Theme: Critical Infrastructures*, Delft, The Netherlands, June 26-29, 2001.

ternal operations, and fully understands whether it should aggregate or be aggregated.

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Appendix: Aggregator / Aggregatee Relationships

No Aggregation

The *No Aggregation* state is the base case and is probably the accustomed state for most firms. Each incumbent with an online presence is an aggregatee, and provides a target for consolidation; but no active aggregators exist yet. The more inefficient the information dissemination and the more difficult it is to compare like products, the more likely an aggregator will emerge to eliminate the inefficiency.

Aggregation Without Partnership

Financially independent aggregator / unsuspecting aggregatee. These aggregators generally access widely available information that can be extracted without an aggregatee's knowledge, so there is no *a priori* need to establish a partnership or arrangement between the two. In fact, aggregatees usually cannot differentiate between normal users accessing their information and an aggregator accessing the information (using a user's password, if necessary).

In Intershipper's case, as noted above, one carrier sent a letter threatening legal action, then changed course. These actions demonstrate that many aggregatees are completely unprepared for aggregation in their industry.

Aggregation with Partnership

Although some aggregatees engage in a hostile relationship with an aggregator, others will choose to

build mutually beneficial partnerships. Such partnerships may facilitate the aggregator's data extraction and also allow it to obtain information not yet on the web. For example, Intershipper has access to publicized shipping rates, but not customer-specific negotiated rates. Partnering with aggregatees is one way for Intershipper to get this data.

In this *aggregation with partnership* space, the entities can have bilateral relationships negotiated one-to-one, or they can opt for an industry-wide relationship with equal treatment to all. Or a selective group can build a limited alliance, with only specific aggregatees as members. Depending on the relative sizes of the aggregatees, the fragmentation of the industry, and antitrust concerns, one form of partnership may be preferable to another.

Financially independent aggregator with partial collaboration / collaborating aggregatee. To differentiate a relationship, an aggregator may leverage its intermediary position and give preferential treatment to an aggregatee in return for a fee. Or an aggregatee may differentiate itself from its competitors through a special relationship. For example, on its Computers.com Web site, CNET differentiates individual retailers through a certification process. CNET-certified retailers receive preferential listings and may appear more credible to consumers.

Financially independent aggregator of a limited alliance / collaborating aggregatee member of a limited alliance. When an industry has a high degree of rivalry, the participants may avoid partnerships with competitors. Aggregatees may seek to sharply limit an aggregator's list of potential partners.

Financially independent aggregator with equal degrees of collaboration / collaborative aggregatee. On the other hand, an aggregator may value its long-run neutrality over short-term gains from doling out preferential treatments. Such aggregators that want to serve as electronic marketplaces or in an advisory role must maintain their impartiality at all times. They are likely to provide equal collaboration to all aggregatees.

Aggregation with Ownership

Similarly, aggregatees may decide to strengthen and lock in their partnership with an aggregator through direct investment. Again, the options parallel those before: an aggregatee can form a consortium to invest in the aggregator or invest on its own.

Financially dependent aggregator owned by a dominant aggregatee / dominant aggregatee. An aggregatee can decide to invest in an existing aggregator or even preemptively launch its own aggregator. For example, UPS decided to launch its own aggregator called iShip. This allows UPS to maintain more control over who is included as its competitor, how UPS will be compared against them, and how the comparison will be made. By owning the aggregator, UPS can access information about how users of the aggregator ship. This can provide UPS with a tremendous strategic advantage.

Financially dependent aggregator owned by a consortium of aggregatees / consortium aggregatee. To counteract the possibility of a single aggregatee dominating an aggregator, a group of aggregatees may form a consortium and make equal investments into an independent aggregator. For example, three large steel manufacturers – LTV Steel, Steel Dynamics, and Weirton Steel – built Metal Site (metalsite.net) as a neutral marketplace for their industry. This action eliminates competitive bidding for the aggregator's preferential treatment and provides the consortium of aggregatees with control over the aggregator.[17]

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[17] Segev, et al., 1999, ibid.