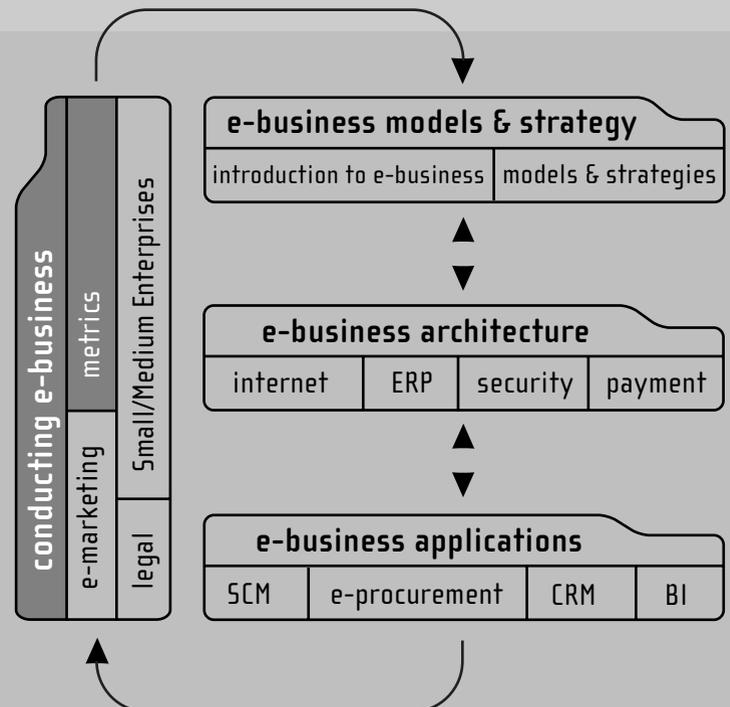# Metrics for Performance Measurement in E-Commerce

LEARNING OBJECTIVES

When you complete this chapter you should be able to:

1. Explain the benefits that metrics provide to an e-business.

2. Identify and describe the importance of the major types of metrics.

3. Explain how traffic metrics can help an e-business assess its internal processes.

4. Explain how marketing-oriented metrics can help an e-business plan its marketing efforts.

5. Identify the major types of financial metrics.

6. Identify other performance metrics.

7. Describe the major sources of information for creating performance metrics.

conducting e-business

metrics

e-marketing

legal

Small/Medium Enterprises

e-business models & strategy

introduction to e-business	models & strategies

e-business architecture

internet	ERP	security	payment

e-business applications

SCM	e-procurement	CRM	BI

Introduction

The focus of this chapter is measurement of e-business performance. E-business performance can be measured in several ways, ranging from measures of traffic on an e-commerce site, to measures of customer behaviour, and ultimately, to measures of e-business effectiveness. One of the great benefits of the internet is that it enables tracking and measurement of business activity. In this chapter we will consider the benefits provided by well-designed metrics, what aspects of e-commerce can be measured, and what are the sources of information for such measurements.

Benefits of Metrics

Management and measurement go hand in hand. Commonly heard expressions in business are, "If you don't measure it, you cannot manage it" and "If you don't measure it, it doesn't get done."

Metrics can help an entity to better understand its business model—to understand the customer base and thereby better target the content of the e-commerce website, to better target promotions and discounts, product placements, up-selling and cross-selling, and to better manage price points.

Metrics can serve as a communication device to provide guidance to the personnel who are assigned the responsibility for achieving strategic objectives on what they are expected to do, since implicit within metrics are the variables that must be acted upon to positively affect those metrics.

Metrics also act as an incentive to motivate certain types of performance. We all pay attention to the things for which we know we are going to be held accountable. So if you are given marks for a task in a course, then you're more likely to do that task than an optional task for which there are no marks assigned. If a sales agent is paid a higher commission for certain types of sales than others, then the agent is more likely to focus on generating those sales.

Metrics provide a basis for analyzing performance. In the absence of metrics, performance assessment would be based primarily on qualitative observations of behaviour. Such observations could be haphazard and subjective, resulting in performance assessments that are biased or indefensible. Also, they could focus unduly on easily observed or surface aspects of behaviour rather than on desired outcomes. For example, metrics can be used to determine whether promotions are actually working. Every time an entity has a promotion, it is giving something of value away in order to attract business, hoping that the new business attracted will pay for the promotion. Simply observing that a great deal of effort went into planning and organizing a series of weekly promotions does not provide the entity with knowledge of the effectiveness of all that activity. If the entity doesn't keep track of the outcomes of promotions in terms of increased traffic or revenue, it will never know whether its promotions add value, or are simply a drain on value. The Canadian Snapshots box describes the use of metrics for assessing the maturity of e-government services.

Another important benefit of metrics is that they provide a basis for holding people accountable. They provide guidance as to what tasks ought to be performed, motivation to do those tasks, and subsequently, a standard against which performance can be evaluated and rewarded and non-performance can be addressed.

Aligning Metrics with Business Objectives

Measurement should align performance with objectives. If an entity has set objectives and knows how to measure them, then this is an indication that it knows how

to link its activities to its business objectives. Accordingly, the metrics that are established in this way provide part of the roadmap to achieving strategic objectives; they define the actions required to meet objectives. For example, if an e-business wishes to grow its customer base then it can establish a metric of traffic volume for its e-commerce site such as the number of visits per week during the campaign to attract customers. Such a metric immediately focuses attention on bringing traffic to the website and entity personnel will be focused on tactics to achieve this objective. The effectiveness of chosen tactics will be assessed by the number of visits per week that resulted, aligning the activities with the objectives.

An e-business may have different objectives at different times in its life. For example, maximizing traffic might be an objective early on when an e-business is trying to get established and it just wants to get attention from potential shoppers. However, maximizing traffic may not necessarily lead to maximum profit; in

Canadian Snapshots

Using Metrics to Rate E-Government Maturity

According to a research study by global management consulting firm Accenture Ltd. (released Tuesday May 4, 2004), Canada has placed number one out of 22 countries globally in e-government maturity for the fourth consecutive year. The study found Canadian e-government practices ranked first in all categories including service breadth, service depth, and customer relationship management, earning 80 percent out of a possible score of 100—13 percent better than its closest challengers Singapore and the United States.

Accenture studied the e-government practices of 22 countries including Canada, Australia, the United States, the United Kingdom, Singapore, Brazil, France, and Germany.

Accenture researchers in the countries used the internet to obtain access to and use 201 services that national governments typically provide in the human services; justice and public safety; revenue; defense; education; transport and motor vehicles; regulation and democracy; procurement; and postal sectors. The researchers

focused on the functionality, quality, and maturity of services offered. Services were categorized into three levels—publish, interact, and transact—reflecting the level of service maturity. Services also were evaluated on the basis of the extent to which the government used customer relationship management (CRM) to manage their customer (citizen and business) interactions. Scores in these areas were combined with 70 percent weighting allocated to service maturity and 30 percent weighting to CRM to derive an overall rating for the maturity of e-government services.

Additionally, telephone interviews were conducted with senior executives in agencies with customer-facing responsibilities for welfare, immigration, revenue, licensing, and employment services in a subset of the target countries. This research was supplemented with information about the e-government environment in each of the countries, including the details about the country's e-government program, recent political and legal developments related to e-government, and other details about the

processes being used to implement e-government.

According to Graeme Gordon, an Ottawa-based partner with Accenture's government practice in Canada, the nation has earned its top spot based on the fact that its e-government vision is predicated on customer centricity and a "whole of government" approach, which incorporates the different levels of government to deliver the best possible service to the user community.

"Canada's action plan is built on a solid foundation of fact based on the known information from the customer base," Gordon said. "It regularly surveys citizens and businesses for indications of attitudes and needs, and the processes [Canada] has appear to be the most extensive compared to other countries in the survey, in terms of gathering and understanding the needs of the citizens."

Canada also actively markets its e-government services. It advertises on TV and radio, and places ads in airline magazines and newspapers to get citizens to use its portal, canada.gc.ca.

However, despite Canada's leading role in e-governance, the study found that advances in maturity on the whole are slowing down around the globe and even countries like Canada—with the most advanced e-government practices— have a long way to go to achieve dramatic results.

Government of Canada
www.canada.gc.ca

Questions

1. Should the Canadian government be spending tax dollars on external consultants to evaluate e-government services? Why?
2. What are the strengths and weaknesses of the scorecard used to evaluate e-government maturity?
3. How can metrics be used to address the finding that advances in e-government maturity are slowing down?

SOURCES: Carly Suppa, "Study: Canadian E-Gov Maturity Ranks First Globally," *The Industry Standard* (May 5, 2004), **www.thestandard.com/article.php?story=20040505163338275**, accessed May 25, 2004; "The Government Executive Series: eGovernment Leadership: High Performance, Maximum Value," research paper, **www.accenture.com/xdoc/en/industries/ government/gove_egov_value.pdf**, accessed May 25, 2004; "eGovernment Leadership: Engaging the Customer Study," press release, **www.accenture.com/xd/xd.asp?it=enweb&xd=newsroom\ epresskit\egovernment\egov_epress.xml**, accessed May, 25 2004; Eric Chabrow, "Canada Is Still No. 1 in E-Government Rankings" *InformationWeek* (May 6, 2004), **www.informationweek.com/ story/showArticle.jhtml?articleID=20000010**, accessed May 25, 2004.

fact, it may lead to losses because there might be significant customer acquisition and promotion costs associated with generating that traffic. But during the business startup phase, maximizing traffic may be a legitimate objective and the costs involved may be considered an investment for the future.

Although traffic is definitely a key metric for e-commerce, even more important is the conversion of traffic into customers. By customer we mean an entity that fulfills the main objective for the site, which could be content consumption, lead generation, sales or customer support. For example, for sites that provide content, traffic alone might be an insufficient measure of content consumption. Instead, the average length of visits, the average number of page views per visitor, and net subscriptions (new subscribers minus cancellations) could be useful metrics. For lead-generation sites, useful metrics might be white paper downloads, number of opt-ins for future e-mail contact, and average length of visit.

For a product sales site, maximizing revenue could be the main objective. Maximizing revenue is not the same as maximizing traffic, because maximizing traffic is focused on getting visitors to a site, whereas maximizing revenue is focused on selling products and services by converting visitors into buyers. For example, generating traffic but not having the products that customers want in stock would not help generate revenue. So having a revenue maximizing objective would focus attention on products and services as well as traffic. Revenue related metrics such as sales per visitor rate the website's success in converting visitors to buyers.

For a customer service site, two paradoxical goals are to have more traffic on a self service site than on more expensive call centre sites, but progressively less traffic and shorter visit times on both types of support sites, with constant or increased levels of customer satisfaction.

Increasing market share is a little different than maximizing sales because it involves competition. Metrics of market share by definition involve competing with others, trying to take some of their business. That is a very different objec-

tive than simply creating sales. For example, an entity can attempt to generate sales through joint advertising with a competitor. Such an approach could increase the size of the sales pie, but the entity's share of the pie may not get any bigger.

Minimizing transaction costs is an objective that is aimed at reducing the costs of doing business. At the startup phase of a business or launch of a particular product or service, it might be beneficial to provide a significant level of support to customers through dedicated call centre support and so on. But that support translates into significant transaction costs. Over time, the objective would be to minimize those costs by reducing the number of people in support functions or keeping the same number of people but putting through much more business activity. A metric such as cost per visitor would focus attention on transaction costs.

Maximizing return on investment (ROI) deals with earnings relative to the investment incurred to develop an e-commerce site. That could be an important objective as an e-business matures. During the dot-com bubble the conventional wisdom was that entities were supposed to spend a lot of money maximizing traffic and sales, without worrying about return on investment. Huge sums of money were spent on developing e-commerce sites and on advertising to attract customers to e-businesses that never generated a return on the huge investments made. Metrics that recognize that expenditures on e-commerce sites are investments will focus on return rather than income alone. A marginal income stream could satisfy revenue and expense metrics but might not satisfy requirements based on ROI.

In summary, objectives must be linked to strategy and must be specific. If they are vague it will be difficult to establish metrics for assessing their level of achievement. And if an entity doesn't know how to measure an objective, then it won't know how to deliver it.

Limitations of Metrics

Although metrics can help a business achieve its strategic objectives by guiding, motivating, and holding personnel accountable for their actions, metrics also have limitations that should be recognized. For example, when strategies change rapidly, as is the case for many startups, metrics can quickly become irrelevant or even misleading. Some measures may be ambiguous or susceptible to faulty analysis and interpretation. For example, website stickiness may be good in some circumstances and bad in others.

Also, it is important to recognize that measurement can be costly, consuming the time of key personnel or funds if external sources of information are used.

Online measures are vulnerable to tampering by insiders or external parties as well as eavesdropping and therefore the data sources should be safeguarded against unauthorized access. A case in point is Air Canada's contention that certain WestJet executives accessed and used performance measures posted on Air Canada's intranet to gain an unfair competitive advantage over Air Canada on certain routes.[1]

Soft metrics are sometimes not as well accepted as hard data, but may be as important. Hard data may reflect attributes that are easy to measure rather than the most important attributes. Also, some metrics may need to be subjective; for example, supervisors' ratings of their employees, visitors' ratings of their overall experience on a website, and so on.

What to Measure

Now that we have considered the value of measuring performance, let's consider what aspects should be measured. There is much that is still not well understood

about various metrics and the metrics that are "in" on one day may be "out" on another. Nevertheless, there are several broad categories of measurements that should be considered for use in assessing performance of e-commerce units:

- traffic and site usage metrics
- marketing metrics
- financial metrics
- other performance metrics
- multi-dimensional scorecards

Traffic and Site Usage Metrics

Traffic Metrics The earliest form of online business measurement related to traffic measurement. While such measures can be very crude, they can provide a surprising amount of useful information about traffic volumes, site usage, sources of traffic, and visitor attributes.

Traffic is the most basic unit that financial backers, advertisers, and affiliates look for. In the early days of e-business, companies spent any amount necessary to generate interest in or traffic on their sites, because this translated into financial support, share price growth, and so on.

Site traffic analysis can help determine the volume of traffic on a website, as well as which sections of a website are visited, when they are visited, by whom they are visited, and where the visitors came from. Traffic volume can be measured in a variety of ways: hits, page views, ad views or banner impressions, visits, and unique visitors.

Hits The oldest traffic metric involves measuring hits. A **hit** is counted anytime that something is requested from the web server. It can be a page, a picture, or just a link to another location. Anytime that you click on a page, that would be called a hit. A hit is a very broad piece of information. When somebody creates a hit, you don't know what they looked at and what they saw. Also, a single web page can account for a dozen hits if it has many photos, while a text-only page could generate just a single hit. As a result, the relevance of hits for measuring traffic on a website has been questioned and alternative measures of traffic volume have been widely adopted.

HIT
Each download of any information from a website.

Page Views The next type of information that is used is a **page view**, which occurs when an entire page of information is downloaded. That would be considered more valuable because all of the information that is displayed on that page would be viewed, or at least presumed to be viewed, by the user.

PAGE VIEW
Each download of an entire page of information.

Ad Views, Ad Impressions, or Banner Impressions **Ad views**, ad impressions, or banner impressions are a more focused measure of the number of times a page with a banner ad or other advertisement is viewed during a period of time. This measure would be particularly useful to advertisers who pay for a specified number of such views as part of a marketing campaign.

AD VIEWS
A measure of the number of times a page with a banner ad or other advertisement is viewed during a period of time.

Visits A **visit** is not just a single page view, it's a whole collection of pages that are viewed by a single user during a period of time—usually 30 minutes. By gathering all of those pages into one unit, called a visit, that is identified with a particular user, an entity can get better information than by looking at thousands of potentially unrelated hits.

VISIT
A collection of webpages a visitor views in a time period while on a website.

Unique Visitors The number of non-repeating visitors in a specific timeframe measures the volume of activity in terms of purported individuals, although it is really

Figure 12.1   WebTrends Dashboard

Illustration of a WebTrends dashboard.
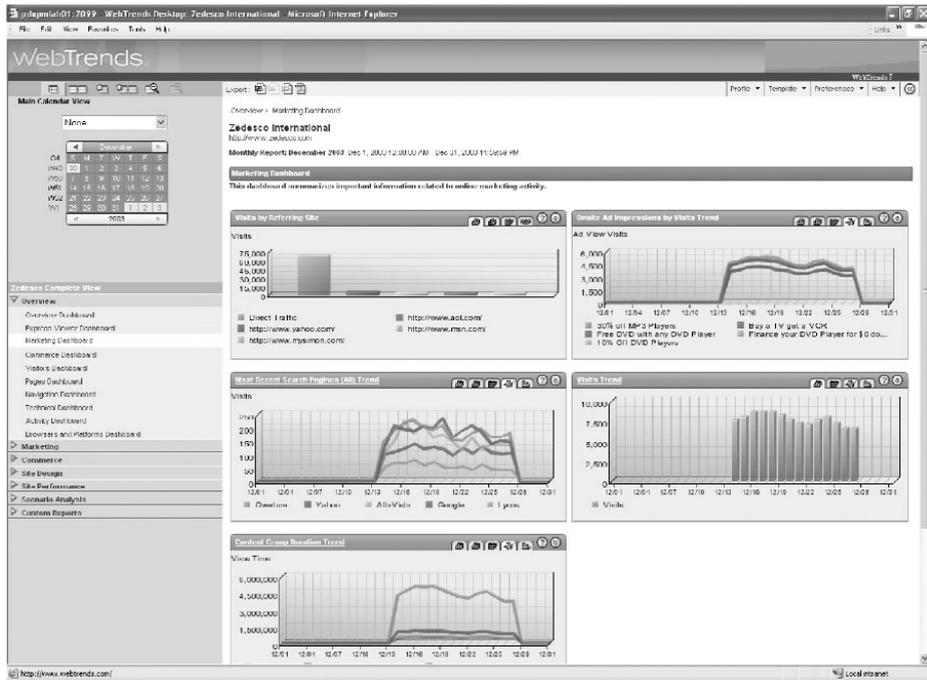
computers (i.e., IP addresses) rather than individuals that are counted in this type of analysis (i.e., many individuals may share a single computer or a single IP address).

Traffic analysis tools normally rely on the IP address to group various hits and attribute them to the same user. However, proxies and "floating" IP addresses make this method inaccurate. Since it is possible to store the content of a cookie in the log file, some tools allow for more precise tracking by assigning a unique ID in the cookie, then dumping the cookie content to the log file at every hit, thereby being able to more accurately track the user session.

Traffic analysis tools are available as shareware as well as formally licensed software. For example, StatCounter offers shareware traffic analysis tools whereas NetIQ Corporation offers licensable software such as WebTrends (see figure 12.1).

StatCounter
statcounter.com

Site Usage Metrics Traffic is a general indicator of a site's potential; however, to obtain meaningful insights, the analysis must get deeper. Site usage metrics help an e-business assess the effectiveness of its e-commerce website. The "Marketer's Common Sense Guide to E-Metrics"[2] uses the analogy of the leaky bucket to describe the sales losses that result from a poorly designed website. Website traffic is like water that fills a bucket. Website design problems are like holes that permit visitors to escape without fulfilling the sales objectives of the website. Site usage analysis can help trace the losses at various points in the pathways through the website from entry point to exit and help eliminate the holes that permit "leaks" instead of converting visitors into buyers.

Site usage can be analyzed spatially or temporally. Spatial usage analysis can identify visitor behaviour according to:

- *top entry pages*—pages most commonly entered
- *top exit pages*—pages most commonly exited from (exit pages can represent leakage from a website, indicating premature exit by visitors)
- *most visited pages*—pages most frequently visited
- *least visited pages*—pages least visited
- *single visit pages*—pages only visited once (these may represent trouble spots in the website)
- *paths within site*—most common paths taken by visitors (these may represent design problems if the most common path does not lead to successful completion of an e-commerce transaction or other site objective)

Temporal site usage analysis can identify traffic by month, week, day of week, and hour of day. Such breakdowns can be useful to correlate with the timing of promotions or website changes to determine their efficacy. In fact, most traffic measurements should be reported for a specified and consistent time period to ensure comparability of metrics.

Marketing Metrics

The purpose of marketing measurement is to help market the entity's products and/or services better. With the advent of CRM systems, collaborative filtering, and personalization tools, sophisticated customer-focused methods have been developed for gathering important marketing information. We will discuss marketing measurements under four main headings:

- referrer analysis
- location analysis
- customer profile analysis
- shopping basket analysis

Referrer Analysis Web server log files contain information about a visitor's previous URL. Referrer information can also be purchased from infomediaries such as DoubleClick. From this information, it is possible to determine where traffic is coming from and thereby measure the effectiveness of advertising campaigns. If an entity is advertising on a website but not receiving traffic from it, then the advertising expenditure may not be effective. Conversely, if the traffic is coming from places where the entity is not advertising, then it should consider what factors may be responsible for attracting that traffic.

Location Analysis Location analysis involves a breakdown of customer behaviour by geographical origin. Location analysis has great importance for marketing, since some promotions/advertising have regional reach. Location metrics can also help assess the performance of managers of different geographical regions and the effectiveness of local marketing efforts in generating traffic and revenues. In the absence of explicit data, rough location can be inferred by IP address; however, proxies pose a severe limitation to this method. Increasingly, user surveys or visitor registration are used to obtain information such as location and, of course, purchasers provide their location as part of their shipping information.

Customer Profile Analysis Customer profile analysis involves a breakdown of visitor behaviour by profile attributes. We have previously discussed user behaviour analysis in chapter 11 in connection with marketing and advertising. This section continues that discussion by focusing on analyzing user behaviour relative to the

actions taken by an e-business to attract visitors and to persuade them to purchase goods and services, provide information, or otherwise contribute to the objectives established for an e-commerce website. As we have already noted, the internet allows real-time or quasi-real-time sampling of a target audience. New visitors come in to an e-business website as "anonymous," but are immediately profiled by their actions. Every action is recorded in the web server log file. By interacting with the e-commerce site, visitors provide information that can be used to form "user profiles," which in turn can be used for marketing purposes such as selecting what products to display, etc.

The entity's marketing efforts can be significantly aided by creating a profile of the typical user or classes of users, by tracking attributes such as age, gender, household income, average purchase, total purchases, etc. Customer profile data can be derived from data provided by customers explicitly or inferred from the implicit information inherent in the customer's attributes or behaviour. *Explicit information* is surrendered by the user when subscribing to a service, making a purchase, completing a survey form, etc., for example name, address, and marital status. *Implicit information* can be inferred from the user's actions and/or purchase history, for example favourite colour, age group, or preferred topics. Such inferences may require the use of data mining tools to identify key patterns of interest to the entity. For example, if a customer buys three red shirts and only one blue shirt, the implicit information is that the customer prefers the colour red to blue. A system may not have explicit gender information about a customer. However, if the customer purchased male fashions then the system could conclude that the customer is male. These types of inferences are obviously fraught with all kinds of limitations, but nevertheless, data mining tools attempt to make such inferences.

User profile analysis can help an entity assess whether it is reaching its target audience and, thereby, the efficacy of its marketing campaigns.

Shopping Basket Analysis Shopping basket analysis involves a breakdown of the items purchased in a sample transaction. Shopping basket analysis can help develop an understanding of customers' purchasing behaviour and customers' value reasoning. *Itemsets* are sets of items that appear together in many transactions. Knowledge of itemsets and their frequency can be used to improve product placement or for cross-sell and up-sell. For example, by using shopping basket analysis, a company may offer a recommendation to a customer such as, "Customers who purchased X, also purchased Y" that you see on Amazon.com. Shopping basket analysis can help an entity assess and predict product demand and, thereby, the efficacy of its marketing campaigns.

Financial Metrics

Financial metrics track revenues, expenses, return on investment, and shareholder value creation.

Revenue Revenue streams in a typical e-business include the sales revenue from products and services, advertising revenue (e.g., $3 CPM), affiliate commission (e.g., 15 percent of order generated for an affiliated site via a clickthrough or other referral), and database marketing (e.g., customer name sales to others for $10 to $1000 per name).

Sales analysis involves a breakdown of revenue streams per period, product category, referrer, time of day, etc. Sales analysis can be extended to identify top selling products, least selling products, and product margins. It can also include a

breakdown of sales by shopper profile, demographics, geographical location, etc. Advanced sales analytics can involve analysis of product clusters, purchase patterns, shopping basket analysis, and the prediction of future sales based on the patterns observed.

Expenses Expense metrics include fixed costs, operating costs, and marketing costs. Fixed costs include infrastructure costs and operating costs. Infrastructure costs include store development (e.g., $250 000–$1 million), catalogue development (e.g., $5–$10 per stock-keeping unit or SKU), store hosting services (e.g., $50 000–$200 000 per year). In addition, credit card companies typically require a merchant account deposit which can range from $10 000–$50 000. Although it is not really a cost, it nevertheless requires a cash outflow.

Operating costs include site maintenance, advertising/promotion, marketing, and operations. Variable costs include product/service costs, per unit licensing costs, commissions on clickthrough sales, etc., and distribution costs for non-electronic goods or services.

Return on Investment (ROI) Return on investment is calculated as (**Revenues – Expenses)/Assets**. A strength of this metric is that it combines three key financial measures into a single composite metric. A weakness is that it omits non-financial measures such as customer service, operational quality, and innovation. Calculating ROI is simple; however, deciding what numbers to quantify can be difficult. The difficulties arise when economic benefits of e-business endeavours are intangibles such as customer service, competitiveness, communications, and content management.[3] These softer benefits (intangibles) are much harder to measure, but firms such as GE Capital IT Solutions are working on ways to factor intangible benefits into its analyses of e-commerce initiatives to create a more effective and accurate measure of payback; for example, conducting customer satisfaction surveys either directly or over the internet to learn how customers are interacting with their systems.[4]

Other Performance Metrics

Other performance metrics can be used to assess the performance of internal e-business units as well as the performance of e-business partners ranging from IT service providers such as ISPs and website hosting services to other outsourcing service providers such as transaction processing services, logistics service providers, payment processors, and others. For example, performance metrics may relate to network availability, system response time, transaction processing accuracy, transaction processing timeliness, responsiveness to requests for system changes, help desk effectiveness, security incident handling, customer satisfaction, degree of innovation, and so on. Typically, such metrics are embedded in service level agreements that define performance criteria tailored to the services being provided, as well as penalties for non-performance.

Multi-Dimensional Scorecards

Multi-dimensional scorecards bring several metrics together to create a multi-dimensional measure of performance. Such scorecards can be created externally, as illustrated by the Watchfire and Gómez scorecards referred to in the E-Strategy box. Or, they can be created internally using approaches such as the balanced scorecard.

Internal Scorecard The best known prescription for internal scorecard creation is the balanced scorecard format developed by Robert Kaplan and David Norton

E-Strategy

Watchfire Acquires Gómez Scorecard and Website Assessment Business Unit

On March 8, 2004, Watchfire Corporation, a provider of software and services to manage online business, announced the acquisition of GómezPro, the benchmarking and website assessment services business unit of Gómez Inc., the Internet Performance Management Company. The acquisition extended Watchfire's growing portfolio of online business management solutions and financial services offerings and expertise. Gómez, in turn, was able to focus on internet performance management.

Gómez, named after its founder, offers products and services to Global 1000 companies to improve the effectiveness and profitability of their internet operations through improved performance monitoring, measurement, and analysis. Founded in 1997, Gómez has provided performance measurement, benchmarking, and competitive insight to help build successful e-businesses. Gómez publishes widely accepted indices that measure relative internet performance in many industries, including financial services, e-tailing and

hoteling, which adds context to individual site performance.

Significant growth in its Internet Performance Management services (bookings increased 82 percent in 2003) prompted Gómez to focus exclusively on this business. Gómez sought a partner intent on extending GómezPro services to meet clients' heightened demand for broader and deeper website functionality and usability assessments.

Watchfire provides Online Business Management software and services to manage the online brand and risk of online business. Four of the five most valuable brands in the world and over 200 enterprise customers, such as AXA Financial, SunTrust Banks Inc., ChevronTexaco, and Dell rely on Watchfire to optimize their online business investments and to help them gain competitive advantage. Watchfire's alliance partners include IBM Global Services, PricewaterhouseCoopers, Mercury Interactive, CA, Microsoft, Interwoven and Documentum. Watchfire's headquarters are in Waltham, Massachusetts.

Watchfire's solutions help protect an organization's online brand and help enable privacy, regulatory, and accessibility compliance by automating the manual process of identifying website issues. Watchfire's quantitative site analysis, combined with rigorous best practices from GómezPro and internet performance data from Gómez, creates a powerful offering. The synergies derived by this combination provide customers a more complete offering to improve the effectiveness, usability, and functionality of their online business.

"To better manage their online business, customers are demanding consolidated solutions that bring together multiple web measures," said Peter McKay, president and CEO of Watchfire. "Watchfire and Gómez are leaders in their respective markets, with particular expertise in financial services. GómezPro's experience and technology complements Watchfire's market leading online brand and risk management capabilities, and enables us to expand our offering and provide our customers the most full featured services available."

Watchfire Corporation
www.watchfire.com

Gómez Inc.
www.gomez.com

Questions

1. Why would firms hire Watchfire to rate their e-commerce websites?
2. What strategic advantages do you see in Watchfire's acquisition of Gomez scorecard and website assessment units?
3. Why would Gomez give up its scorecard and website assessment units?

SOURCES: Gomez Inc. website, **www.gomez.com/**; "Gomez Inc.: A Look at One of the Major Players in the Web Rating Business," **www.realtor.org/webintell.nsf/0/ e0988fd68e653c4386256aa9005a48a1?OpenDocument**, accessed December 3, 2004; Lauren Gibbons Paul, "Browser Beware," *Inc.com*, **www.inc.com/magazine/20010615/ 22794.html**, accessed May 25, 2004; "Watchfire GómezPro Industry Benchmark Services," **www.watchfire.com/resources/gomezpro-industry-benchmark.pdf**, accessed May 25, 2004; "Watchfire Acquires Gómez Pro Scorecard and Website Assessment Business Unit," **www.gomez.com/main.aspx?m=6&s=4&sub=1&aid=9641**, press release, accessed May 25, 2004.

Figure 12.2 Example of a Balanced Scorecard for an E-Business

Financial Metrics	Customer Metrics	Internal Process Metrics	Learning and Growth Metrics
· Online revenue per customer	· Level of service delivery	· Availability of systems	· Staff productivity & morale
· Cost per online customer	· Satisfaction of existing customers	· Volume of transactions processed	· # of staff trained in new services
· Cost-efficiency of e-business processes	· # of new customers reached	· # of errors	· Value delivery per employee

out of a concern that business managers were overly focused on financial metrics and were insufficiently motivated or guided by other performance metrics such as customer satisfaction that would determine the entity's long term success.[5] While financial metrics are important, they represent the financial results of marketing operations and other actions taken that should also be measured and assessed. A good set of metrics should incorporate measures of those actions rather than ignoring them. Kaplan and Norton created a "scorecard" with four major sections: customer, internal process, learning and growth, and financial performance. The idea is that a small number of metrics must be identified in each of these four areas to guide and motivate managers to focus on long term drivers of business success.

Customer-oriented metrics include market share, traffic analysis, shopping analysis, acquisition cost, awareness, and satisfaction/loyalty. Internal process metrics include innovation, efficiency, effectiveness and economy of e-business operations, and system reliability. Learning and growth metrics address employee capabilities and motivation. Financial metrics focus on revenues, expenses, and return on investment (ROI).

In summary, the balanced scorecard approach involves taking measurements in four different areas rather than focusing solely on financial performance measures, as illustrated in figure 12.2.

Since it is not solely financial, it gives personnel a balanced perspective on the actions required to achieve strategic objectives. The main difference between scorecards used by different entities would be which metrics are selected in each of the four categories and how well those metrics align with the entity's strategic objectives—in other words, how well they guide and motivate personnel to take specific actions that will lead to achievement of those objectives.

External Scorecards There are numerous organizations providing scorecard services on the internet. For example, the Watchfire GómezPro scorecard referred to in the E-Strategy box considers 150 or more different variables to arrive at a rating of an e-commerce website's quality. To create the quality criteria, Watchfire GómezPro first reviews all of the features and services that are delivered online (and to some degree offline) across an industry. While practices can vary across industries, Watchfire GómezPro typically identifies criteria in at least four categories:

1. **Ease of use:** demonstrations of functionality; simplicity of account opening and transaction process; consistency of design and navigation; adherence to proper user interaction principles; integration of data providing efficient access to information commonly accessed by consumers.

2. **Customer confidence:** availability, depth, and breadth of customer service options, including phone, e-mail, and branch locations; privacy policies, service guarantees, fees, and explanations of fees.

3. **Online resources:** availability of applications for specific products; ability to look up account information for each product; ability to transact in each product online.

4. **Relationship services:** online help, tutorials, glossary, and FAQs; advice; personalization of data; ability to customize a site; re-use of customer data to facilitate future transactions; support of business and personal needs such as tax reporting or repeated-buying.

Unlike services such as BizRate that base their ratings on consumer feedback, Watchfire GómezPro relies on its analysts to assess the various features of each website and make the decisions on each of the criteria. The company believes its experts have the capabilities to "define the elements of quality in the internet delivery of services." This methodology of using analysts is the exact opposite from BizRate, which uses consumer surveys to compile ratings. The overall result of the rating process is a scorecard, with each website given a ranking between 1 and 10, with one being the lowest, and 10 the highest.

Watchfire GómezPro believes that it is able to maintain objectivity across firms and create objective and comparable rankings by making metrics very objective and unambiguous; for example, a site either offers Saturday telephone customer service or it does not. The rankings are posted on the Watchfire GómezPro website. High scoring companies also often post their Gómez rankings prominently on their website.

Sources of Information

Users browsing the website, users clicking on banner ads, users interacting with surveys and polls (see discussion of Greenfield Online in the New Business Models box on page 262), shoppers making product selections, shoppers making purchases, shoppers contacting customer service—all these customer activities can be tracked and analyzed to better understand customer behaviour and align the design of the e-business with customer behaviour. The data for all the analyses discussed in this chapter is available from four main sources. The most obvious place is user-stored data found in cookies and wallets. The next most used source is the data found in web server log files. A third key source is the transaction databases that record information about sales. A fourth source is user profile databases created by the entity or infomediaries.

Click-Stream Analysis

CLICK-STREAM ANALYSIS
A method by which a user's path through a website can be tracked and analyzed.

Click-stream analysis is a method by which a user's path through a website can be tracked and analyzed. The key here is to analyze the data to identify important trends such as difficulty in finding specific sites or information, searches that yielded no results, or constant "back" movement through the site. By analyzing click-stream data, an e-business can identify website design errors, which can be corrected before other customers run into them. In other circumstances, click-stream analysis may be correlated with other factors about the customer, such as demographics or business industry, that may lead to the discovery of trends related to specific target markets. For example, the correlation of user registration data, such as industry type, or other offline information, with click-stream analysis may lead an organization to the conclusion that its website is not organized in a manner well suited to particular industries. The site could then be reworked to better suit specific industries or a specialized design could be developed to address this problem.

E-Business in Global Perspective

Nielsen//NetRatings

Nielsen//NetRatings (NetRatings) was founded in July 1997 to track audience exposure and behaviour related to online advertising. All of the products and services are designed to assist companies in making critical business decisions regarding their internet strategies and initiatives. It is an infomediary that builds on the economic value of information about people's internet behaviours and is one of the leading providers of internet audience measurement and analysis in the United States and around the world.

Products and Services

The products and services provided by NetRatings include NetView, an internet audience measurement service; AdRelevance, an online ad measurement service; @Plan, a target-marketing platform for internet media planning, buying, and selling; webRF, a comprehensive media reach and frequency planning tool; and custom research and analysis on a variety of internet-related subjects. These services are designed to help customers make informed decisions regarding their internet

strategies. For example, information provided by NetRatings about the size of specific target groups and their gender or age characteristics can help clients determine which sites are best to advertise on depending on their target audience. The products are sold primarily on an annual subscription basis.

NetView Service

This service provides comprehensive reports about online audiences to internet advertisers, agencies, marketers, and publishers using advanced tracking technology. These clients make use of such audience information to strategically plan and deploy their online advertising and marketing efforts towards specific target groups. NetView classifies websites according to content rather than technical structure so that a client can easily analyze information in a logical user-friendly manner. NetView measures all activity in what it calls the "Digital Media Universe" which includes web-based traffic, internet applications and browser data, and even meas-

urement of AOL proprietary channels. Further, the Digital Media Universe also encompasses the measurement of instant messaging such as MSN Messenger, media players, media sharing applications, web phones, news and information toolbars, connected games, weather applications, auction assistants, and shopping assistants. NetView has a list of 33 predefined reports that it produces for clients but also has the capability to produce reports for user-specific queries. Reports can cover a myriad of areas including demographics targeting, audience profile, daily or hourly traffic metrics, average usage, access locations for websites, and even loyalty and retention of users. A client can specify exactly which reports it wishes to receive on a regular basis and have the most current information delivered to them each week or each month.

NetRatings offers products and services in 17 countries. As a result, it currently tracks over 70 percent of the internet usage around the world.

Nielsen//NetRatings
www.nielsen-netratings.com

Questions

1. What are the strengths of NetRatings offerings?
2. Do you see any weaknesses in NetRatings' global reach?
3. Are there any threats that could dislodge NetRatings from its apparent globally dominant position?

SOURCES: Nielsen//NetRatings, "Products and Services," **www.nielsen-netratings.com/ mktg.jsp?section=ps**, accessed May 24, 2004.

Cookies

Click-stream data is enabled by a number of technologies. **Cookies** are small text files stored by a website on individual computers that allow the site to track the movements of a visitor.[6] Cookies are often added to an individual's computer the first time that a site is visited and can track a great deal of information, such as time

COOKIES
Small text files stored by a website on individual computers that allow the site to track the movements of a visitor.

spent on a site, passwords, shopping cart information, preferences, and the most recent site visited. The use of cookies can personalize a website, by remembering the user's profile and organizing the presentation of the websites. Privacy concerns have often been raised about cookies; however, many people are satisfied that they are not harmful and do not invade privacy. The primary concern over cookies is the fact that they are stored on the user's computer and can potentially provide information regarding other sites visited, preferences, and shopping habits. However, information in a cookie is not generally readable by anyone except the entity that placed it there; it is typically numbers and letters that would mean nothing to anyone except when it is combined with the information that is already stored on the web server side. The use of cookies as an online technology has become standard practice but will continue to evolve as privacy concerns are worked out.

The privacy concerns tend to relate to the use of cookies to analyze the user's shopping habits and create targeted marketing. For example, after searching for several books related to golfing on Chapters.ca, a user may notice that the banner ads on the site are for several golf-related products and that featured books the next time the user visits the site are golf-related. The personalization of websites by this means can be beneficial to the user but to some is too intrusive to be acceptable. Privacy concerns are considered more fully in chapter 13.

It is important to note that data stored in a cookie can be easily erased by the user, or the user can decide not to accept cookies at all. Therefore, cookies are often used to store non-critical data such as personalization for anonymous users, login information (login name only, not password), the date the user last logged on, and so forth.[7]

Electronic Wallets

Electronic wallets are a more elaborate version of cookies, because a cookie may only have two or three items of information whereas a wallet could contain quite a bit more information. Electronic wallets initially provided a more secure method to transmit credit card information over the internet, but have evolved to more general uses as well. An electronic wallet could contain the user's credit card number, name, address, ship-to address and so forth. Having that information available in an electronic wallet would be particularly useful for a frequent shopper because it would eliminate the necessity of having to retype that information each and every time the user wanted to buy something. Also wallet information could be kept very secure at a specially designated storage location that is neither at the online store nor on the user's own computer (where it could be perhaps read by someone who has access to the computer). The use of an authority for storing digital wallets can provide both security and convenience when shopping.

There are two or three different versions of wallets that are competing to become the standard that governs everyone's use. In the end there may be two or three different types of wallets, and some may be stored locally on the user's computer, whereas others, particularly ones involving financial transactions, might be stored at the bank. For example, a user's wallet could be stored at the Royal Bank in a database. If the user was shopping at Chapters.ca, then, instead of Chapters requiring the user to type in a list of information it would ask the user for his or her key. Chapters would use that secret key to contact the bank, which would in turn use it to process the payment transaction, and then transmit payment directly from the Royal Bank to Chapters and deduct the amount from the user's account. Encryption techniques would make sure that when they provide the key, users can send the key but they can't read the key.

Web Server Log Files

Log files contain details of every action that has occurred on a website, and are one of the most widely used data sources for traffic analysis. Web server log files are text files stored in the web server. Every line represents a "hit" containing the following information: HTTP request, date, time, OS, browser type, and referrer URL. The referrer URL is the source that that request came from. This information is very useful. With just this little information an entity can determine where a visitor came from, whether it was a referral from a banner ad or another advertising vendor. Other information that can be retrieved from the log includes, for example, which browsers people are using (for example, Internet Explorer, Netscape, Opera, etc.), which operating systems are being used (for example, Macintosh, Windows, Unix, Solaris or Linux), which computing platforms, etc.

Log file analysis is the process of analyzing information regarding the movements of users throughout a site based upon data captured in server log files, and can be carried out by a number of means including basic database techniques or advanced internet-based products such as those offered by WebTrends (see figure 12.1 for an illustration of a sample WebTrends display).

Log files are often used for other purposes, not just for performance analysis. Log files are often used to recover from a system failure. If a server crashes while processing a transaction, the log file can be used to reprocess the transaction or at least to get the system back to the state it was in before it crashed.

Web Bugs

Web bugs (also known as clear GIFs) are image files embedded into a web page that can track user movements without the user knowing. Essentially, web bugs are clear images or images that blend in with the background of a page you are viewing. The web bug sends information to a server (belonging to the company itself or an advertising firm) each time you request a new page and thus tracks your movements. This allows the analyzing firm to understand your movements throughout the site and is one method of capturing click-stream data.

Transaction Database

A transaction database is the accounting data file that keeps track of the items that were sold, the quantity, the means of settlement, the terms, the date, and so on. This type of information can be useful for understanding shopper behaviour; however, the richness of the information contained in such a database is implementation-specific. As in the case of user profile data, there will be explicit data reflecting the transaction, and implicit data inferred by analysis of the user's behaviour. Such inferences may require the use of business intelligence or data mining tools to identify key patterns of interest to the entity.

User Profile Database

The user profile database contains information about visitors and shoppers. (There are many more visitors than there are shoppers.) The database can contain explicit data provided by users, for example, information about their address, their name, or their age, if they answered requests for this information on forms or provided information in their wallet. The database could also have implicit data, data that is inferred by analysis of user characteristics, as described previously. Such inferences may require the use of data mining tools to identify key patterns of interest to the entity.

LOG FILE
A file stored on a web server containing details of every action that has occurred.

LOG FILE ANALYSIS
The process of analyzing information regarding the movements of users throughout a site based upon data captured in server log files.

WEB BUGS (CLEAR GIFS)
Image files embedded into a web page that can track user movements without the user knowing.

New Business Models

Greenfield Online

Greenfield Online Inc. was founded in 1994 to serve the online data collection needs of more than 300 marketing research firms by gathering consumer opinions through online research surveys and focus groups. According to the company, "We realized that the internet is an ideal environment for consumers to speak out and be heard as they can participate at their leisure—rather than respond to ill-timed or intrusive telephone surveys. As one of the first in marketing research to recognize the value of online interviewing, we offer a state-of-the-art system of hardware and software designed specifically to:

- create survey instruments that incorporate the types of questions and features required to execute complex research methodologies
- operate a real-time web-based reporting capability
- maintain secure and redundant systems
- launch fully functional recruiting/panel websites internationally
- profile, in detail, the Greenfield Online panel of 1.7+ million member households and manage multiple sample sources

Last year, General Mills conducted 20 percent of its research online. That number is projected to grow to 60 percent next year because of the company's belief that the web produces up to a 50 percent cost-savings and speeds up research up to 75 percent." "Surveys that used to take four weeks can be completed in 8 to 10 days," says Gayle Fuguitt, Vice President of consumer insights at General Mills.

Greenfield Online
www.greenfield.com

Questions

1. What are the apparent strengths of Greenfield Online's offering?
2. Are there any threats that could dislodge Greenfield Online from its leadership position?

SOURCES: www.greenfield.com/

Infomediaries

Infomediaries are organizations that monitor, analyze and report on web activity for a fee. There are numerous organizations that track important metrics ranging from traffic on the web to e-business performance to industry performance to financial reports. The best known traffic analysis entity is NetIQWebTrends. Market research is provided by organizations such as BizRate, comScore Networks, ACNielsen (see the E-Business in Global Perspective box on page 259), Gomez, and Watchfire (see the E-Strategy box on page 256). Analyst reports are available from market research entities such as Forrester Research, Jupitermedia Corporation, Aberdeen Group, Frost & Sullivan, and IDC. Finally, financial information is available from EDGAR Online Inc., Standard and Poor's, and other providers.

Chapter Summary

The internet enables an unprecedented degree of activity measurement. E-business performance can be measured in several ways, ranging from measures of traffic on an e-commerce site, to measures of customer behaviour, and ultimately, to measures of e-business effectiveness.

Performance metrics linked to specific objectives can help management achieve its strategic objectives by providing guidance, motivating performance, analyzing outcomes, and holding personnel accountable for their actions. However, metrics must be synchronized with business realities, should be unambiguous, and should involve a reasonable cost.

Metrics used to assess performance of e-commerce websites fall into five main categories: traffic and site usage metrics, marketing metrics, financial metrics, other performance metrics and multi-dimensional scorecards. Traffic metrics can be based on hits, page views, ad views, and visits. Site usage metrics can be spatial and temporal measures of traffic in various sections of an e-commerce site. Marketing metrics provide information about sources of visits, visitor shopping behaviour, user profiles, and product purchase patterns. Financial metrics provide information about revenues, expenses, and return on investment. Other performance metrics measure website availability, processing integrity, service quality, and so on. Multi-dimensional scorecards attempt to bring a number of metrics together for use in performance assessment to prevent the excessive focus on one particular category of metrics.

There are many sources of information for metrics, including clickstream data, cookies, electronic wallets, web server log files, web bugs, transaction databases, user profile databases, and infomediaries.

Key Terms

ad views   *(p. 251)*
click-stream analysis   *(p. 258)*
cookies   *(p. 259)*
electronic wallet   *(p. 260)*
hit   *(p. 251)*

log file   *(p. 261)*
log file analysis   *(p. 261)*
page view   *(p. 251)*
visit   *(p. 251)*
web bugs (clear GIFs)   *(p. 261)*

Tools for Online Learning

To help you master the material in this chapter and stay up to date with new developments in e-business, visit www.pearsoned.ca/trites. Resources include:

- **Review Questions and Exercises**
- **Problems for Discussion**
- **Recommended Readings**
- **Updates to Case Studies and Textual Material**
- **Streaming CBC Videos with Cases**

Endnotes

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