

The Big, the Bad, and the Beautiful

Size comes in three flavors — scale, scope, and network. Choose wisely from the menu.

by Tim Laseter, Martha Turner, and Ron Wilcox

Wal-Mart Stores Inc. dominates the retail industry. The Microsoft Corporation controls the market for PC software. General Electric

Company has generated superior returns for decades. Each one ranks, on the basis of annual revenues, as the largest company of its type. Are they succeeding because they are large, or are they large because they are succeeding?

Consider three New Economy survivors: Amazon.com Inc., eBay Inc., and Cisco Systems Inc. During the Internet boom, companies pursued growth and size as key elements of their business strategy. Most failed in that pursuit. Were the few that succeeded simply lucky, or did they understand something that their competitors did not?

Size does matter, but only if you understand why and use that knowledge to create a competitive advantage. Three theories support the bigger-is-better argument: scale economies, network effects, and economies of scope. Each theory derives its logic from a different

source and applies only in certain circumstances. Pursuit of size without a clear understanding of these concepts can lead to oblivion rather than dominance.

Scale Economies

The theory of increasing returns to scale, or scale economies, dates to the beginning of the 20th century and a set of British economists, including Alfred Marshall, A.C. Pigou, and Nicholas Kaldor. Building upon Adam Smith's original observations, these economists reasoned that larger companies would achieve productivity advantages due to greater opportunities for division of labor.

Technically, a scale curve measures production costs as a function of facility capacity. Plotted on a logarithmic scale, the slope of the curve shows the fixed percentage reduction in cost for each doubling of capacity. Businesses with operations that offer significant economies of scale, such as wafer fabrication for integrated circuits, have steep scale curves where costs drop significantly when facility capacity increases — which is why the Intel Corporation and other chip makers regularly



invest upward of a billion dollars in new higher-capacity facilities.

Other businesses, such as apparel-producing plants, exhibit very limited scale economies. Since there is little opportunity to automate the process of sewing a dress or shirt, a larger apparel plant simply contains more sewing machines. A plant with 200 sewing machines run by individual operators doesn't produce shirts and dresses much more cheaply than one with only 100 machines. There is little value in having a bigger apparel factory.

Wal-Mart now ranks as the largest company on the planet. Although retailing, in general, has relatively limited opportunities to benefit from economies of scale, Wal-Mart has prospered by leveraging scale where it matters. For example, a Wal-Mart store building does not offer dramatic scale economies. A 100,000-square-foot store costs slightly less to build per square foot than a 50,000-square-foot store, but not enough less to provide a big competitive advantage. A retail distribution network, on the other hand, exhibits significant scale economies by enabling a business to exploit a lower cost trade-off among facility costs, inventory costs, and transportation. Wal-Mart's distribution network dwarfs its smaller retail competitors' networks and produces a 1 to 2 percent margin advantage by our estimates. Given the thin margins in retail, this advantage is significant.

Amazon.com has sought, and in some cases achieved, scale economies. Its distribution network, although a fraction of the size of Wal-Mart's, ranks among the largest networks for fulfilling direct customer orders (rather than moving full cases and pallets as a traditional

retailer does). But, frankly, the scale economies in fulfillment remain relatively marginal. Amazon's key source of scale has come from its ability to amortize its massive investment in the Web shopping engine across multiple categories and also across service contracts with partner companies like Toys "R" Us Inc., the Target Corporation, and Circuit City Stores Inc. The cost of building and maintaining a user-friendly online shopping interface has proved to be beyond the means of many Amazon competitors.

Pursuing size under an assumption that you will gain scale economies in businesses with flat scale curves offers no advantage and can in fact lead to decreasing margins if the incremental size is gained through lower prices. And even where a steep slope is possible, scale advantages don't just happen. A company must seek them out and exploit them. Examples like Wal-Mart and Amazon highlight the specific sources of scale and how companies have gained competitive advantage from it.

Network Effects

Network effects came to the fore of business strategy during the height of the Internet boom to justify the phenomenal valuations of dot-com startups. Stock analysts applied the logic that the value of a network grows proportionately to the square of the number of users, a property of networks asserted by Bob Metcalfe, developer of Ethernet, a technology for connecting computers in a local area network, and the founder of the 3Com Corporation. Following what became known as Metcalfe's Law, a company's value quadrupled when the number of users doubled. Or if the number of

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users quadrupled, the value grew 16-fold. Given the exponential growth of the Internet population, the projected value gains were simply astronomical.

Unfortunately, even though a customer connects to a company's Web site via a computer network, the business itself does not necessarily exhibit network effects. To better understand why, we need to return to the economic arguments that predated the hype.

Economists noted the existence of "network externalities" in their research covering everything from ATMs to electricity to software. Formally, a network externality occurs when the value of participation in a network depends on how many other parties or which parties already belong to the network. Accordingly, a network effect is a

phone required no special training to use, and, accordingly, the network grew to encompass many individual users. And, as more individuals acquired telephones, the value of having a phone increased for everyone connected to the network. More recently, the Internet has produced the same effect.

Economists argue that a market leader can gain a monopolistic position from the network effect by erecting "switching barriers." A competitor with a smaller network has trouble enticing customers to join its alternative network because it offers lower network value. Microsoft's dominance of the market for personal computer operating systems and ultimately PC application software offers an excellent example. Although alternative operating systems such as Unix, Linux,

Among Internet-based companies, eBay exhibits the most powerful network effect. As more people list items for sale on eBay, the site attracts more buyers. The more buyers who bid on an item, the greater its value to the seller. This, in turn, attracts more sellers. For comparison, consider that Amazon.com has the same number of customers as eBay, but its business model generates nominal network effects. Amazon customers benefit from the product ratings of other customers, and the acquisition of more customers improves Amazon's ability to mine its sales data to create customized purchasing recommendations, but the impact of this network effect is relatively small compared to eBay's.

As the early leader in creating an auction community, eBay built a network unmatched by others. The site claims to have had 28 million active customers in 2002, and it offers about 16 million listings in its 27,000 categories on a typical day. UBid Inc., the second largest auction site, claims 3 million registered users bidding on its rotating stock of 12,000 branded products in 16 categories.

Even though uBid compares itself to eBay, its inherent business model offers less of a network effect. Since eBay primarily auctions used products, its customers tend to be both buyers and sellers. Competitor uBid auctions new branded products from a small base of dedicated sellers. This means the more customer-bidders there are joining the network, the higher the realized price will be on the network. This benefits the small population of sellers, but harms the disproportionately larger community of buyers.

In other words, sometimes a

Sometimes a network, however large, produces little value. Ill-advised pursuit of rapid growth can lead a company to its demise.

demand-side argument for size versus the supply-side argument for scale economies.

Reflect on the early days of the telephone. In 1876, after participating in a demonstration call between Washington, D.C., and Philadelphia, President Rutherford B. Hayes commented: "That's an amazing invention, but who would ever want to use one?" President Hayes failed to understand the network possibilities of the nascent tool. A phone connecting a central user in one city to another offered little advantage over the existing telegraph technology. But unlike telegraphy, a tele-

and Apple OS have challenged Microsoft's DOS and Windows systems, none have displaced them — even though some proponents claimed their alternatives offered superior functionality. Why? Because PC users value the ability to exchange files with other users without risk of compatibility problems. The largest network (in this case a virtual one) offers more value to the user. Similarly, the large base of Windows users drives application developers to tailor their products to Microsoft first. This also creates greater value for the users of the dominant network.

network, however large, produces little value. Many dot-coms focused on growth in customers as a key strategic tenet under the false assumption that size always translates into competitive advantage from scale economies and network effects. Such was the expectation of the ill-fated “last-mile delivery” companies Webvan, Kozmo, and UrbanFetch, but in reality their costs were largely variable and their customers didn’t get incremental value from an increase in the customer base. (See “The Last Mile to Nowhere: Flaws & Fallacies in Internet Home-Delivery Schemes,” by Tim Laseter et al., *s+b*, Third Quarter 2000.) Here size added little advantage, and ill-advised pursuit of rapid growth led to their demise.

Economies of Scope

The third theory supporting the size argument, economies of scope, concerns the benefits achieved by offering more than one product or service through the same organization. Economies of scope can affect both supply and demand.

General Electric captures demand-side benefits through its ability to bundle services from its financing unit with products from manufacturing units. For example, GE has long allowed its customers to finance the multimillion-dollar purchase of its jet engines via a leasing arrangement from GE Finance. More recently, GE has pursued a service strategy of selling “power by the hour” so that an airline doesn’t buy a specific engine. Instead, a customer pays for access to a rotating stock of engines serviced and maintained by GE. On the supply side, GE Appliances combines with GE Motors and GE Aircraft Engines to

purchase sheet steel in larger quantities for lower prices.

The most powerful economy of scope at General Electric, however, is probably the least tangible: Its vaunted management development system. The company can provide a breadth of experiences to its managers, who ultimately transfer best practices across disparate divisions. For example, Six Sigma, the analytical improvement process, was viewed largely as a tool for high-volume manufacturing operations until GE proved it could be applied across its wide range of businesses, including broadcast network NBC and finance arm GE Credit.

Cisco Systems offers a New Economy example of a strategy based on economies of scope. Originally a focused producer of Internet routers, Cisco launched what ultimately became a massive expansion of scope with its acquisition of Crescendo Communications in September 1993. From this initial expansion from routers to switches, Cisco made 39 additional acquisitions through 1999 and now boasts a full line of network equipment as varied as modems, wireless local area network equipment, and optical switches. Cisco thereby captured economies of scope by putting more products through the same organization. It loaded the new products into the plants of its existing contract manufacturers, and its sales organization could then offer complete solutions to its partner customers. These economies of scope helped Cisco build its dominant position as a supplier of the infrastructure of the Internet.

Such product line expansion does not necessarily lead to economies of scope. If Cisco had not consolidated the manufacturing

activities of its acquisitions and enabled its sales forces to offer complete solutions, it would have captured little advantage from the broader product line.

In fact, economies of scope can be negative as well as positive. Empirical research has demonstrated the value of “focused factories,” which were first described by Harvard Business School professor Steven Wheelwright in the early 1970s. Arguments for focusing on core competencies, or more colloquially “sticking to one’s knitting,” stem from a recognition that multi-line businesses suffer from “costs of complexity.” (Sometimes described by the misnomer *diseconomies of scale*, the disadvantages of size are more appropriately viewed as *dis*economies of scope.)

The ill-fated diversification strategy of Sears, Roebuck and Company in the 1980s offers a prime example of a failed attempt to capture economies of scope. Sears, which had owned Allstate insurance since the 1930s, set out to build a consumer-oriented financial-services business by acquiring the real estate broker Coldwell Banker & Company and the stock brokerage firm Dean Witter. The company would accrue economies of scope by locating the stockbrokers within the Sears stores and by sharing information across business units. After all, the purchaser of a new home likely needs new appliances and homeowner’s insurance, too.

Unfortunately, the expansion led to what marketers call perceptual incongruity. Consumers accepted that Sears was a great source for appliances and power tools, but failed to accept that it could offer equal expertise in financial services. Furthermore, the added complexity

of managing the disparate businesses drained the attention of Sears management. And the core department store business began to struggle. Ultimately, Sears reversed its diversification strategy and sold off its nonretail businesses in the early 1990s.

As these examples demonstrate, neither product line expansion nor business diversification automatically generates economies of scope. Economies of scope accrue only to companies that identify and capture synergies while simultaneously managing the risk of added complexity. Thus, scope expansion provides a powerful but double-edged sword. Broader scope can provide supply-side and demand-side advantage. But increased complexity can confuse consumers and distract management from the core value proposition of a company. Although a multiline company should seek synergies across unrelated business units, beware a company that tries to justify an expansion strategy purely on the basis of economies of scope.

Defense vs. Offense

So, returning to our opening question, does size drive success or does success drive size? Although the three distinct theories described above propound solid arguments for the advantages of size, we believe that more often than not, success generates superior size rather than vice versa.

Although Wal-Mart posted \$244 billion in revenues in 2002, its revenues in 1983 were a mere \$4.7 billion, about one-eighth those of then-dominant retailer Sears. Not until 1990 and 1992, respectively, did Wal-Mart pass the Kmart Corporation and Sears in total revenues.

Wal-Mart grew to a dominant position because it offered a superior customer proposition. As it grows, it certainly leverages its size for further advantage — but it didn't gain its dominance simply through the pursuit of size as a strategic objective.

In fact, size may offer a more effective defense than offense. The General Motors Corporation, Wal-Mart's predecessor in defining American business, provides ample evidence of the lingering, but continually fading, value of size. GM passed Ford Motor Company as the No. 1 global producer of automobiles in 1931 and became such an icon that Charles E. Wilson, a former GM executive, proclaimed before a congressional committee in 1952, "What is good for the country is good for General Motors, and what's good for General Motors is good for the country." Today, GM remains the largest producer of automobiles in the world by revenues, but ranks eighth in profits among vehicle producers, behind Toyota, Volkswagen, Daimler-Chrysler, BMW, Peugeot, Renault, and Honda (rankings based on an average of 2001 and 2002). Toyota has less than half the sales of GM but nearly four times the profits. Size may provide an advantage, but size without profitability is of limited value.

Size certainly offers benefits to the companies that understand and exploit it. But size alone offers a relatively weak basis for a corporate strategy. A small company that executes well offers far more potential than a large, feeble one. In the end, it's not the size that matters, but how you use it. +

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