

## Computer business or monopoly?

This is a continuation of last month's column, in which I introduced the New Lanchester Strategy<sup>1</sup>—a method for out-guessing the Starbucks coffee-crazed marketers in Seattle. This also ends the miniseries on the Info Age, which attempted to define a handful of principles governing the current transition from post-industrial to information society.

### How to keep score

The computer business is like one big Monopoly game with a global playing board. However, in place of the die and the Community Chest cards, the computer business game uses the scientific approach pioneered by Lanchester, Koopmans, and Nobuo Taoka. The rules of the game are simple yet surprising, especially when applied to hardware and software companies. The path to the winner's circle is shown in Figure 1.

Companies with market share in excess of 73 percent are said to hold a monopoly share of the market. It is not necessary to achieve 100 percent, 90 percent, or even 80 percent to win the game. In fact, it may be dangerous to exceed 70 percent, because according to the New Lanchester Strategy, several things happen when a company's market share exceeds 73 percent:

1. It becomes difficult to stimulate more demand.

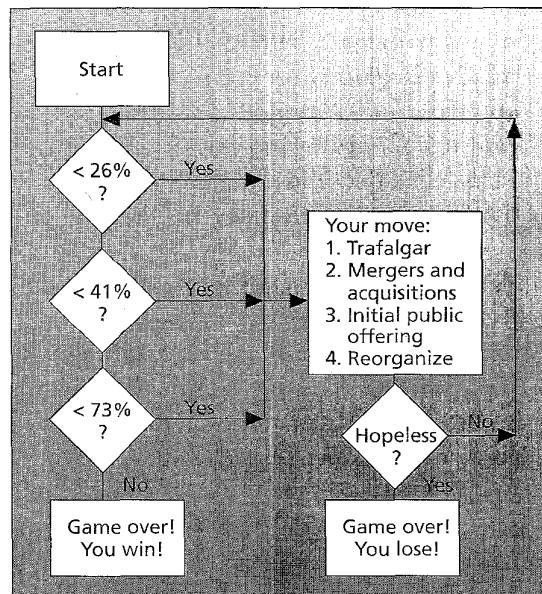


Figure 1. The rules of the game. The game ends as soon as someone gets 73 percent of the market.

2. The company invites competition from other industries or specialty companies.
3. The correlation between market share and profitability disappears.

Does Microsoft's 80 percent market share of the PC operating system segment put it in jeopardy?

When a company's goal is to dominate its competitors, it usually attempts to gain at least 50 percent of the market. The New Lanchester Strategy refutes this, saying that only 41 percent is needed. Therefore, the target of a market leader should be to capture more than 41 percent of the market. Why? The gap in profitability between the market leader and its rivals widens when the leader's market share exceeds 41 percent but is less than 73.9 percent.

A company is secure in its leadership if it is the only company to achieve a 41 percent market share. McAfee Associates recently achieved 41 percent market share of the PC network-management-suite market by merging with Saber Software Corp. McAfee is clearly using mergers as a strategy for achieving market leadership.

A company with more than 26 percent of a market but less than 41 percent is considered a player. To maintain its position as a competitor, such a company must stay above the 26 percent minimum.

A firm's viability as a profitable company weakens if its market share dips below 26 percent. This is the case with all manufacturers in the desktop PC industry (see Figure 2). No PC manufacturer owns more than 26 percent. Companies in this category are called unstable players; that is, a company's position can be easily reversed by a competitor.

Once a company's share exceeds 26 percent, it begins to break away from the crowd. Its profitability increases along with its market share. From Figure 2 it is clear that the desktop PC industry is unstable. None of the players are leaders, and none show any trend toward capturing a higher market share.

### Using strategy

We might wonder why one or more of the PC companies shown in Figure 2 haven't adopted a strategy to break out of the pack and strive for 41 percent of the market. In fact, they have. Rumors continue to circulate about a takeover of Apple Computer by IBM, HP, Canon, or some unexpected bidder from Japan or Europe. Even in its current state of disarray, Apple remains a strong competitor, placing number one in US market share and in the top three of the world.

The theory assumes a constant-size market, but in reality most computer industry markets are rapidly expand-

ing. Therefore, unstable players, like those found in the rapidly expanding PC business, are less likely to feel threatened by a sub-26 percent share, because competition is not as important as shipping product. However, when market expansion slows or stops, unstable players must either surpass their competitors or merge with one another to exceed the 26 percent threshold. Market stagnation will cause a shake-out of unstable players.

Figure 1 suggests some strategies for making a move in the game. The Trafalgar Strategy, discussed below, is named after the Battle of Trafalgar, in which Lord Nelson defeated a much larger fleet by focusing his small band of warships on the weakest point of the French and Spanish armada. The other strategies are well known: mergers and acquisitions, IPO for using other people's money through a stock offering, and that old favorite, reorganization of the company.

### Shooting-range theory

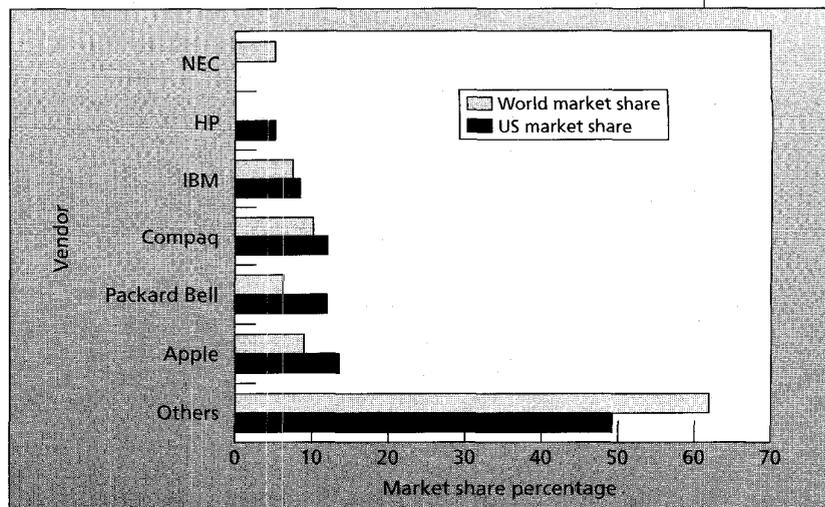
When a company wants to take away other companies' business, it might use the Trafalgar Strategy to target a single competitor's weak point. Finding and targeting an opponent's weakness is called finding the shooting range. According to the shooting-range theory

1. In a two-company battle between companies A and B, if A has a market share three times that of B, A is in an irreversible position. Conversely, if A has a market share less than three times that of B, then either A or B may see its market share reversed.
2. In an  $m$ -way battle among companies  $A_1, A_2, \dots, A_m$ , any two companies that are within  $\sqrt{3} = 1.7$  of one another—that is, each other's shooting range—may have their positions reversed.

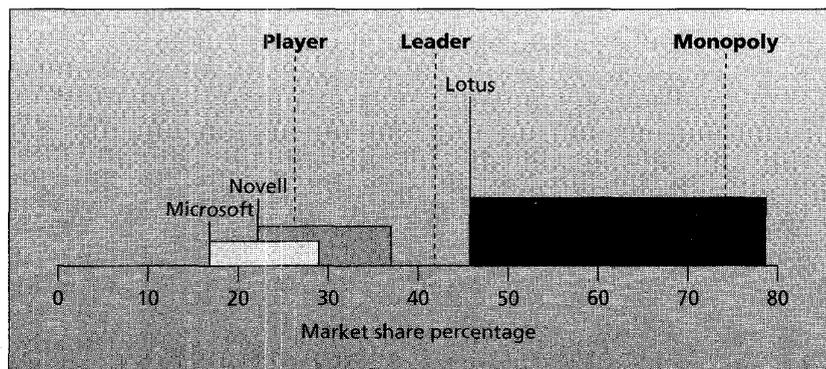
The PC industry is ripe for reversals. Strategists can use a shooting-range diagram like those in Figures 3 and 4 to analyze their chances of gaining share. In these diagrams, 1.7 is used as the shooting range (shaded areas to the right of company name).

Shooting-range theory is a kind of game theory. Accordingly, the visually impaired can use a game theory matrix like that shown in Tables 1 and 2 to plan their competitors' downfall.

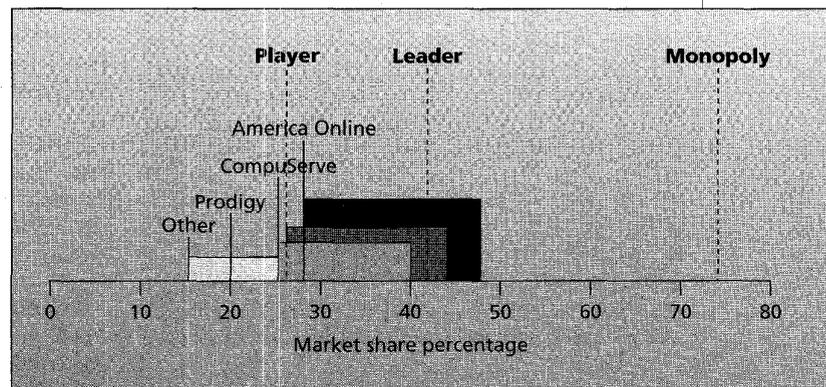
In Table 1, for example, the first row and column contain the name of the competitor. The second column contains the market share for each company. The diagonal



**Figure 2. Market shares of the top PC vendors in the US and the world. All are unstable; none are players, leaders, or a monopoly. The largest category is "others," with 48 percent of the US market and almost two thirds of the world market.**



**Figure 3. Shooting-range diagram for groupware market. Lotus is clearly a market leader with Notes; in fact, monopoly is within shooting range. Microsoft and Novell are unstable players. Both are within range of becoming a player.**



**Figure 4. Shooting-range diagram for on-line services market. America Online is the only player, but it is not a market leader. AOL is within shooting range of both CompuServe and Prodigy; moreover, leadership is within shooting range for CompuServe. All "other" players are unstable and not within shooting range. It is perhaps too late for some "other" services, such as Microsoft Network, to enter this market and become a leader.**

**Table 1. Merger and acquisition matrix for the groupware market.**

Company	Market share %	Microsoft	Novell	Lotus
Microsoft	17	<i>Unstable</i>	Player	Leader
Novell	22	39	<i>Unstable</i>	Leader
Lotus	46	63	68	<i>Leader</i>

**Table 2. Merger and acquisition matrix for the on-line services market.**

Company	Market share %	AOL	CompuServe	Prodigy
AOL	28	<i>Player</i>	Leader	Leader
CompuServe	25	53	<i>Unstable</i>	Leader
Prodigy	20	48	45	<i>Unstable</i>

**Table 3. The portables market is unstable. No single vendor is a player. What does the shooting-range theory recommend? (Source: International Data Corp., first quarter of 1995.)<sup>2</sup>**

Company	Market share %
Toshiba	15
NEC	13
Compaq	12
IBM	10
Apple	8
AST	7
Dell	2
Epson	2
Other	36

**Table 4. Nobody leads the Unix market, but Sun is a player. (Source: Dataquest, 1995.)<sup>3</sup>**

Company	Market share %
Sun	27
HP	16
Santa Cruz Operation	12
IBM AIX	9
Digital Unix	7
Silicon Graphics	4
Other	25

is marked with the label corresponding to the company's current status. Thus, Microsoft's share of the groupware market is 17 percent, which makes it unstable, and Lotus has 46 percent, which makes it a leader.

The numbers lying below the diagonal are the sums obtained by combining the shares of the row + column companies. Thus, if Lotus and Novell were to merge their

groupware products, they would achieve 68 percent. The label above the diagonal designates the result of a merger. Hence, Lotus plus Novell equals a leader.

A reading across the rows of Table 1 suggests that Microsoft can go from unstable to player by buying Novell's market share, and become a leader by buying Lotus's share. Unfortunately, IBM is not interested, but Novell may be willing to sell off its Groupwise product to Microsoft. Conversely, Lotus cannot end the game through a merger, because none of the combinations add up to 73 percent.

Table 2 shows that all on-line companies except AOL (America Online) are unstable. However, a merger of any two would propel the resulting business into a leader position. AOL has the least to gain by a merger, but if in the future the market stagnates, merging may be advantageous. Right now, a merger is unlikely for leadership status because the market is expanding too rapidly.

**Where do you want to go today?**

The data presented thus far is rather obvious. There are some less obvious markets that may prove surprising, however. It is always good to start the new year with questions that challenge the popular wisdom. The following analysis is designed to make you think.

**Shocker #1.** From Table 3, we can conclude that Toshiba, NEC, or Compaq should merge their portable-computer divisions. The resulting business would be a player. If all three merged, they would fall short of being a leader.

**Shocker #2.** From Table 4, we can conclude that HP should buy out the Santa Cruz Operation instead of Apple. The resulting merger would make HP a player just like rival Sun, but it would not place HP in a leadership position.

**Shocker #3.** From Table 5, we conclude that the game is over in several markets: In color prepress Macintosh won; in word processing and spreadsheets Wintel won. The game is *nearly* over in home edutainment and desktop publishing: Wintel is winning. But the game rages on in video and image editing.

**Table 5. Platform market shares within various software segments. (Sources: SPA = Software Publishers' Association figures for first half of 1995; GD = Griffin Dix.)<sup>3</sup>**

Platform	Color prepress professionals (GD)	Motion video production/playback (GD)	Word processors (SPA)	Spreadsheets (SPA)	Integrated software (SPA)	Home edutainment (SPA)	Desktop publishing (SPA)	Illustration/image editing (SPA)
DOS			3.6	2.5	2.2	7.6		
Wintel	19.8	52.2	90.0	91.3	64.5	68.2	70	47.9
Mac	76.2	43.5	6.4	6.0	33.2	24.0	30	52.1
Unix		4.3						

**Shocker #4.** From Table 6, we conclude that the Macintosh is the leading Web publishing platform and that nobody dominates the Web server market.

**Shocker #5.** According to Table 7, Adobe leads in 2D but lags in 3D. Autodesk is a player in 3D but not in 2D. A

merger of Adobe and Autodesk would form a monopoly of the image-editing segment of the software market and end the game.

**T**he next time you read about a merger between two fierce competitors in the computer industry, remember the Lanchester Strategy and the rules of the game. The winner is the one that ends up with a 73 percent market share. Using other people's money to buy companies is perhaps the easiest way. But it all depends on where you want to go—up or down?

**Table 6. Platform market shares of Internet Web servers and Web publishers. (Source: Mirai.)<sup>2</sup>**

Platform	Web servers	Home page publishing
Wintel	14.2	28
Mac	17.0	41
Unix	31.4	25
Other	37.4	6

**References**

1. S. Yano, *New Lanchester Strategy*, Lanchester Press, Sunnyvale, Calif.
2. "Top Portable Vendors," *Information Week*, Oct. 16, 1995, p. 44.
3. "No One Dominates the Unix Market," *Information Week*, Oct. 16, 1995, p. 54.
4. "New Looks for Media 100 and After Effects," *NewMedia*, Oct. 1995, p. 29.
5. A. Mello, "State of the Mac," *MacWorld*, Jan. 1996, p. 17.

**Table 7. Image-editing market shares. Notice that Adobe is a leader in 2D but not in 3D and video; Autodesk is the only player in 3D, but nobody is a leader; and purchase of Wavefront, recently acquired by SGI, would have propelled Adobe to player status in 3D. (Source: NewMedia.)<sup>4</sup>**

2D tools	Market share %
Adobe Photoshop	50
Fractal Design Painter	25
Alias Sketch	9
Wavefront Composer	9
Other	7
3D and video capture tools	Market share %
Autodesk 3D Studio	32
Alias	20
Adobe Premier	15
Wavefront Gameware	12
Microsoft Softimage	10

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