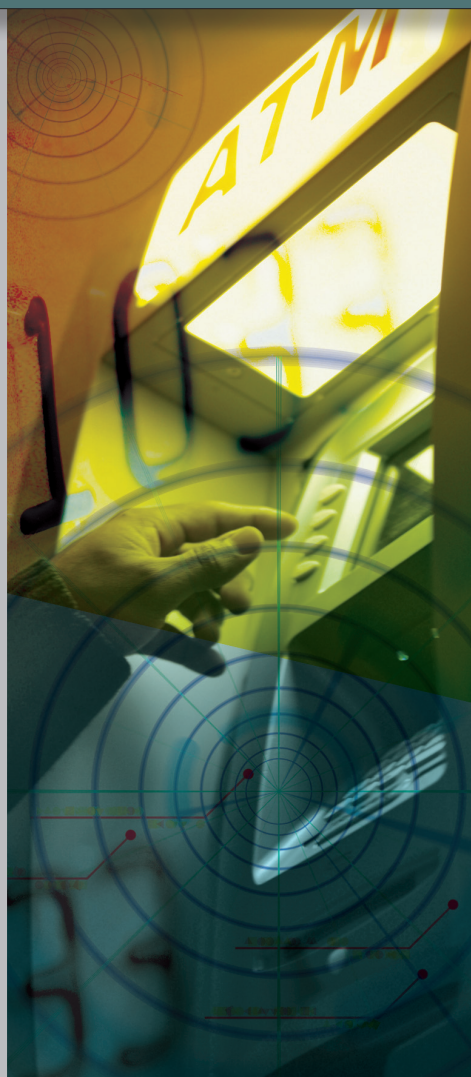
A.T. KEARNEY

ATM Banking + Game Theory = Profits

Turning ATM networks into profits and competitive advantage



What do outdoor advertising, retail networks and game theory have in common? They are all areas retail banks can tap to optimize their ATM networks. Since the rapid global proliferation of ATMs began in the 1980s, banks have reduced costs significantly while serving their customers better. Today's challenge is to improve the effectiveness of this channel. What is the right location for your ATMs? How can you use "economic value" to build an optimal network structure? When should banks compete, and when should they cooperate?

When automated teller machines (ATMs) first became popular more than 20 years ago, banks and their customers gained clear advantages. Distribution costs fell dramatically as ATMs replaced overhead-heavy bank branches, while returns on investment grew rapidly as the cost of new machines was balanced easily by reductions in branch staff. Customers were happier, too, as money became more easily accessible.

Although the market for ATMs has matured, we have found plenty of avenues banks can still take to make ATMs more profitable. We recently analyzed two banks—one in the United Kingdom and one in the United States—and discovered that ATM location had a significant impact on revenues. By using more detailed data and borrowing advanced theories from outside of banking, including game theory and advertising, we found that optimized ATM networks can improve profitability and increase competitive advantage.

Location, Location, Location

Our research has found that the best-located ATMs generate three to seven times more volume than those in less-traveled locations. While volume is not the only criteria for determining productivity—lower-volume ATMs in remote locations can help meet service requirements or increase market share, for example—the size of the gap demonstrates the potential to increase profitability. Simply put, banks can create significant value by improving their lowest-performing ATMs. For a U.K. bank with 2,500 ATMs, we found that improving the location of its lowest performing ATMs generated the equivalent of 45 extra withdrawals per day, creating $19 million more in revenue per year.

Bank executives rarely see ATMs as profit centers, and the revenue attributable to ATMs is often not obvious. While foreign fees (those charged when a customer uses a different bank's

ATM) are usually pretty clear, "on-us" transactions (a customer using the home bank's ATM) offer more indirect advantages, such as attracting new customers and keeping existing ones happy. By combining foreign fees and applying a nominal value to on-us transactions, we found that top-performing ATMs generate between $30,000 and $60,000 more per year than the lowest performers.

How do banks realize this potential? That's where science comes in.

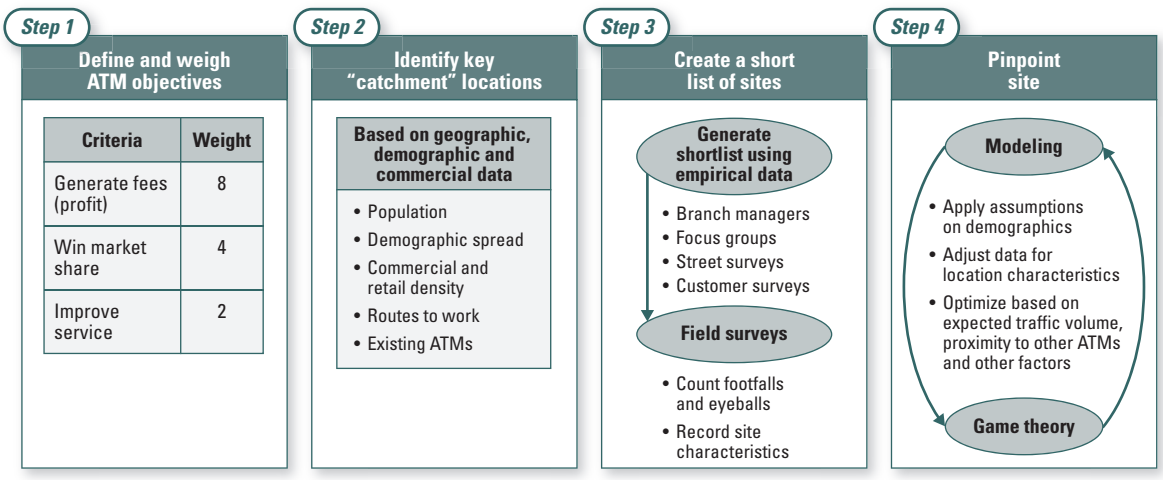
Applying Science to ATM Locations

Few banks have explored the science behind ATM locations. Part of this is practical: When determining ATM locations, most banks use more general geographic and demographic divisions such as ZIP codes and municipal boundaries. While these divisions tell you where people live, work or shop in a particular area, they don't get down to the granular level necessary to predict traffic flows, or explain how people get from one point to another. And when site selection is determined by distribution teams that are also responsible for channel performance, decisions are often dominated by personal bias and conventional wisdom rather than firm data about traffic flows, user behavior and competitive dynamics.

To help banks get more from their ATMs, we have developed a four-step approach that borrows heavily from retail, outdoor advertising and game theory *(see figure 1):*

1. Define and weigh ATM objectives. ATM success is about more than maximizing profits. It requires defining and weighing competing priorities, including generating more fees, adding new customers and improving service to existing customers. In different areas and market segments, you must adapt to customers' different priorities. For example, in areas where customers are price-sensitive and will walk past several banks to use their home bank's ATM just to avoid out-of-network fees, providing convenience and visibility are priorities. Conversely, in areas where consumers are less price-sensitive and analysis suggests these customers are worth more to the bank, adding ATMs may be the better move.

Figure 1
Four steps to determining ATM locations



Source: A.T. Kearney analysis

2. Identify key "catchment" locations. Where are the most customers, and how does this match against your current ATM locations? Demographic, geographic and commercial data, from readily available public and commercial sources, will help determine whether you should add, move or eliminate ATMs and where there is the greatest unmet need.

By relocating its lowest-performing ATMs, a bank could increase revenues by more than $19 million a year.

Many banks already use elements of these first two steps to determine ATM locations. However, the quantitative analysis often stops here, and project teams are left to scout for appropriate sites, negotiate rights and recommend a short list of locations for a distribution executive to approve. However, you can gain a greater competitive advantage by digging deeper, going beyond the high-level results of these first two steps, to factor in other areas that can improve profitability. These factors are discussed in the next step.

3. Create a short list of potential sites. Predicting human traffic across huge geographic areas is possible, but the price of doing so is often not worth the effort when determining ATM locations. Instead, we recommend a hypothesis-driven approach that analyzes sample sites.

Begin by selecting a short list of sites for deeper analysis—you can identify these locations by talking with branch managers (best in rural areas), creating focus groups of existing customers (to improve service) or target customers (to attract new customers), and using location scouts. This last tactic is best in cities with many centers of dense population but relatively little information about the residents.

After selecting candidate sites, you can borrow from outdoor advertising techniques to gather empirical data about existing ATMs in those locations. For instance, field surveys can measure traffic flows and determine if certain locations are possibilities for ATMs. The surveys help gauge relevant site characteristics and demographic information, such as security, visibility, availability and rental costs, signage, proximity (to other ATMs and types of retail), and access to parking. Deeper data, such as propensity for ATM usage, anticipated foreign card transactions and the impact of nearby ATMs, will help determine whether or not a site is appropriate.

4. Pinpoint sites. In the fourth step, the information from the last step is adjusted to account for site characteristics such as access issues, and then grouped with other sites with similar characteristics. This provides the expected economic value from each candidate ATM site.

Game theory can now be used to improve decision-making and, by extension, profitability. Game theory is a branch of mathematics in which mathematical techniques are applied to real-life competitive situations. By predicting how competitors will react to different situations—calculating where a chess opponent will move his knight if you move your rook—you can make better business decisions *(see sidebar: Making a "Next-To" Move on Competitors on page 5).*

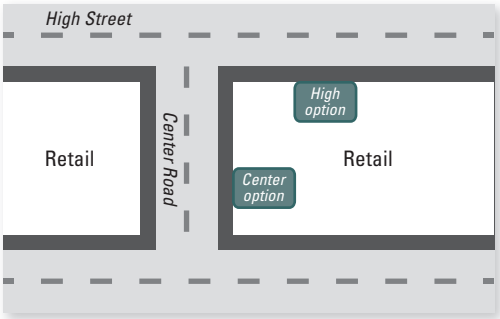
Let's look at a "game" to illustrate how game theory can help banks locate new ATMs. First,

let's assume there are two banks, Alpha Bank and Beta Bank. Both banks have a choice of two ATM sites, on High Street, which has higher traffic, and Center Road, which has less. Everything else being equal, how many ATMs should Alpha Bank invest in, and where should it locate them?

Current approaches would typically suggest placing an ATM on High Street, the higher-traffic street that would seem to guarantee positive returns. And as figure 2 demonstrates, without considering the actions of their competitors, both banks would generate thousands in new revenues from placing new ATMs on High Street.

This is where game theory provides a deeper analysis. Consider the payoff matrix in figure 3, which shows how revenues would change depend-

Figure 2
Without considering competition, the potential revenues from new ATMs are significant *Illustrative*



ATM location	Additional revenues (US$ thousands) Beta bank	Alpha bank
High Street *(own customers)*	70	50
Center Road *(own customers)*	40	30
High Street *(foreign customers)*	20	28
Center Road *(foreign customers)*	12	16
Cost per ATM	-40	-40

Source: A.T. Kearney analysis

Figure 3
Game theory allows comparison of potential net revenue at each ATM location *Illustrative*

Alpha Bank net revenues (US$ thousands) \ Beta Bank net revenues (US$ thousands)	Center Road only	High Street only	Both locations	Neither location
Neither location	59 / -22	60 / -22	62 / -32	0 / 0
High Street only	38 / 19	38 / 16	42 / 4 (B)	-31 / 46
Center Road only	37 / 16	42 / 18 (C)	36 / 7	-31 / 47
Both locations	37 / 0	35 / 16	30 / 0 (A)	-56 / 44

(A) Because of the competitive situation, Alpha makes no money with ATMs at both locations.

(B) Alpha's economic contribution increases only marginally, while Beta does much better.

(C) Game theory helps both banks avoid the traps of scenarios A and B and maximize their revenues.

Source: A.T. Kearney analysis

ing on each bank's possible actions. Let's say that Alpha Bank locates an ATM on High Street. Using game theory, we reason that Beta Bank is likely to anticipate Alpha's strategy and place ATMs on High Street and Center Road. According to the matrix, Beta would maximize its return at $42,000, while Alpha would see only $4,000 in net revenues.

In fact, using the matrix, the smartest move for Alpha Bank would be to locate one ATM at Center Road, thereby increasing its pay-off to $16,000—much higher than placing one on the busier High Street. How does that happen? In this scenario, because two ATMs on Center Road would not generate enough revenue to be worth it, Beta Bank would respond with only one ATM, on High Street, to maximize its returns. The two banks would achieve an equilibrium outcome, and Alpha Bank would increase its yearly returns by $14,000 for this location. If it achieved this level of progress in half of its 2,500 ATMs, it would add $17.5 million in revenues.

Final site selection of ATMs requires combining game theory modeling with other local conditions your distribution and frontline teams have discovered in their research. For example,

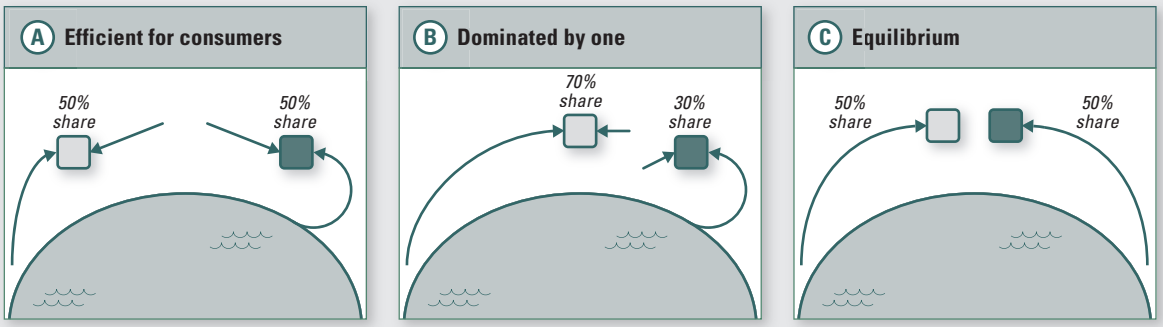
Making a "Next-To" Move on Competitors

How does game theory apply to business? The classic example of two ice cream stands on a beach can help explain it.

Take a look at the figure below, which assumes two identical ice cream stands with an evenly distributed customer base. In diagram A, the two stands divide market share by being the most convenient to the largest number of customers on both sides of the beach. In diagram B, however, one owner realizes that by moving to the center of the beach, he can eat into his competitor's market while continuing to dominate his own. Diagram C shows the natural way his competitor will respond—by moving next to him in the middle of the beach. That way he will still dominate his market while also competing against his rival. In the end, both sides will have access to the most customers.

This example has real-life parallels—a McDonald's next to a Burger King on a busy street, for example—and also demonstrates some of the pitfalls that occur when competitors act in their own interests rather than customers.' In the ice cream example, while the two stands reach competitive equilibrium, the majority of customers will probably have a longer walk to get ice cream on those hot summer days.

Figure: The three stages of competition for two ice cream stands on a beach



Source: A.T. Kearney analysis

some ATMs at low-traffic locations may generate more customers than usual, because card users are accustomed to using them; these locations may require a different strategy.

Compete or Cooperate?

For the two banks in our exercise, the payoff is an extra $60,000 per year, but more revenues may be possible by thinking outside the box. For example, by sharing ATM resources and locating one on High Street and one on Center Lane, the two banks could generate an extra $110,000 a year, nearly double the equilibrium outcome. This outcome would be best for the banks and most convenient for customers. On the other hand, competing rather than cooperating offers compelling benefits—the chance to win more market share, increase brand presence, retain customers and attract new ones poorly served by competing banks.

This does not mean that all banks should collude to create a single ATM network. This is clearly implausible as larger banks would be ceding their scale advantage to smaller banks. But selective cooperation could help determine when to compete and when to cooperate. Think about a food court inside a mall—dozens of restaurants clustered in one place. In the right situations, the "hubbing effect" would be a win-win situation for everyone.

Top-performing ATMs generate $30,000 to $60,000 more per year than the lowest performers.

Science + Intuition

ATMs may seem like old news as the market is almost completely saturated across the globe. What more could be done to generate new ATM revenues? But our research has proven otherwise. By adding science to intuition—examining hard data to go along with the typical softer factors—and using lessons from advertising, retail and game theory, banks can further optimize their ATM networks, increase revenues and build competitive advantage.

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