



Using Databases

8.1 Types of Databases – 158

- 8.1.1 Categorization Based on the Information Included in the Databases – 158
- 8.1.2 Categorization Based on the Nature of the Underlying Marketing Activities – 162
- 8.1.3 Categorization Based on the Database Technology – 163

8.2 The Benefits of Marketing Databases – 164

- 8.2.1 The Ability to Carry Out Profitable Segmentation – 164
- 8.2.2 Retained Customers and Repeat Business – 164
- 8.2.3 The Ability to Spot Potentially Profitable Customers – 164

8.3 The Uses of Marketing Databases – 164

- 8.3.1 Uses that Directly Influence the Customer Relationship – 164
- 8.3.2 Uses that Directly Influence Other Business Operations – 165

References – 167

Overview

Stephen Spielberg's 2002 blockbuster movie *Minority Report* shows a future in which marketing is instantaneous and remarkably personalized. In one of the most indelible sequences of the movie, Tom Cruise's character is walking through a shopping mall where the advertisements address him by name and flaunt products specific to his individual preference (CRM Technology in *Minority Report* movie, 2002). Though we are decades away from such interactivity in marketing, the premise is the basis for Customer Relationship Management – being able to accurately predict customer's purchase behavior and utilize that information to create efficiencies in marketing expenditure. The great leap forward that has made previously unimaginable scenarios, such as this, even remotely possible has been the ever-expanding capabilities of databases and their extensive analytical power. Today, companies gather information about their customers, store it in databases, analyze the data, make marketing decisions, and implement marketing programs based on the results of the data analysis on scales previously only possible in science fiction.

In 2011 Watson, the super computer developed by IBM, defeated the two most celebrated Jeopardy! champions in a three-

day cumulative event. The significance of this feat lies in its relevance to database management. Imagine a person who could retain a virtually infinite amount of data, retain it in perpetuity and recall it instantaneously. As per initial expectations, the applications of Watson in business have started to emerge with the first commercial application instituted by Memorial Sloan-Kettering Cancer Center in New York in the area of lung cancer treatment (Upbin, 2013). Other recent applications of Watson include weather monitoring for The Weather Company/WU (Jancer, 2016), and tax preparation services for H&R Block (Moscaritolo, 2017). Future applications of Watson are promising in virtually every industry where databases are used. The companies that utilize technologies such as Watson will find a tremendous source of competitive advantage, vis-à-vis their competitors that fail to adopt such technologies. With ever expanding databases, efficient data mining and analysis will continue to be the catalyst of competitive advantage.

In this chapter, we provide an overview of different types of databases and how they differ in terms of their function, information included, and technology. We also illustrate how companies use different types of databases and how they benefit from using different databases effectively.

8.1 Types of Databases

The types and nature of databases depend on the criteria we use to group databases. If we do not limit the discussion to marketing or customer database, databases used in companies can first be categorized using their main business functions. By doing so we would have the following:

- Databases managing business operations (e.g., account payable database, cost accounting database, order processing database, payroll database).
- Databases supporting decision-making activities (e.g., marketing databases, product development database, advertisement/promotion databases).

Databases can also be categorized according to the following criteria:

1. Information included in the databases
2. Nature of the underlying marketing activities
3. Database technology

8.1.1 Categorization Based on the Information Included in the Databases

There are four types of databases:

1. Customer databases
2. Prospect databases
3. Cluster databases
4. Enhancement databases

Let's look at each of these in turn.

Customer Database

The customer database is the core of any marketing database and an invaluable asset for any firm. Marketers typically use customer databases to identify and profile the most valuable customers and communicate with them in ways likely to elicit a customer response. Think about this the next time you use a loyalty card at a grocery store. Your purchases are stored in a large database and that information is used to target coupons that are printed on the back of your receipt! In general, the following information may be included in customer databases:

- **Basic information:** Name, address, ZIP code, and telephone number.
- **Demographic information:** Age, gender, marital status, education, number of people in household, income, and so on.
- **Psychographic information:** Values, activities, interests, preferences, etc.
- **Transaction history:** What transactions have the customers conducted? How frequently do they purchase? How much did they spend? How were they acquired?
- **Other relevant information:** Inquiries and referrals, satisfaction, loyalty.

In addition to firms collecting data at the point-of-purchase, some companies buy large amounts of data from third party affiliates. Several companies gather and sell data from public and private sources across the United States. These data allow the companies (buying them) to market their products to specific customer segments to achieve higher net marketing contribution. Some companies selling databases and database solutions are

Axiom, D&B, and Prizm. The following examples of customer databases provide an insight into how businesses in the real world use data:

- **D&B Hoovers:** This analytics solution helps companies with improving sales and related insights. This solution integrates real-time business intelligence, sales, and marketing investment information to identify prospects. Then the solution assists companies in targeting the prospects for potential sales by integrating them in the CRM platforms. Some of the information tracked by this solution's global database include prospect summary, competitors, industry developments, business trends, and company financials, among others.

InfoBase® Consumer Enhancement from Axiom:

This solution contains in-depth demographic and behavioral information about consumers in Australia. Some of the data being tracked includes income, net-worth, and products and services being used, among others. The benefits of using this solution includes customer analytics, ROI maximization, sales lead generation, optimal marketing message creation, and maximizing customer profitability. Research studies such as Kumar, Zhang, and Luo (2014) and Shah, Kumar, Kim, and Choi (2017) have incorporated data from Axiom (in addition to the original dataset) related to customer demographics, socio-demographics, and customer online usage habits to add more depth to the insights generated. ▶ CRM at Work 8.1 highlights how adblocking software can impact customer marketing campaigns.

CRM at Work 8.1

No Ads, Please!

Getting through to customers is a challenge every marketer encounters. The increase in usage of adblock software is adding more concern to marketers in this regard. A recent survey of over 4000 internet users in the U.S. by PageFair shows that the practice of adblocking is not showing any signs of slowing down, despite the migration to mobile browsing. The survey found that men in the U.S. are 34% more likely than women to use adblock software on computers. Further, the suburban and

urban internet users are 17% more likely to use adblock software on their desktops than those in the rural areas.

Why does adblocking happen? The survey found that security concerns and interruptive content to be the leading causes for this practice. Further, nearly 65% of the users surveyed said that they came to know about adblocking software through friends/family/colleagues (37%), and the internet/media (28%).

Companies have recognized this issue, and have come up with «adblock walls» that bars adblock users from entering the website

unless they disable the adblock software. The survey found that nearly 90% of the adblock users surveyed have encountered such a wall. Of which, 74% of the users said they left the website when they encountered such a wall. This seems to indicate that the content provided by the website using an adblock wall is not unique enough to make the users disable the adblocking software. That is, the users are likely to find that information elsewhere, and thus continue to use the adblock software.

Source: PageFair (2017).

We should note that not only active customers, but also inactive customers should be included in customer databases. Data from active customers help marketers learn what has been done well in the past, and data from inactive customers help to identify what needs to be improved. For inactive customers, the following additional information would be important to document:

- How long have the customers been inactive?
- How long have they been active?
- What was their purchasing pattern when they were active?
- How much did they spend?
- How they were initially acquired?
- Why are they inactive?

Prospect Database

Prospects are noncustomers with profiles similar to those of existing customers. The prospect database should include as much information about prospects as the customer database does about customers. For obvious reasons, however, the prospect database does not contain any transaction history data. Marketers can use a prospect database to design marketing campaigns to target prospects with the intent of acquiring them as new customers. Marketers should carefully analyze the channels through which the prospects prefer to receive information—whether they are newspaper/magazine readers, TV viewers, radio listeners, or catalog purchasers. By doing this, marketers can effectively utilize all advertising media to achieve a higher response rate.

In order to achieve the best response rate, marketers also need to segment prospects just as they segment customers, so that they can position the company's differentiated products to the prospects' specific needs. Large-scale promotions to all the prospects should be implemented only after the prospect list has been tested on an experimental basis and has proved to be promising.

Examples of some prospect databases used in the industry follow:

- **InfoBase List:** Companies interested in marketing their products to new prospective customers would find this useful. The InfoBase list offers a collection of U.S. consumer data available in one source for list rentals covering 126 million households and 190 million individuals.

- **Harris Selectory Online:** This is a prospect database from D&B that helps companies find new customers. Such a database allows companies to:
 - Qualify developing sales leads.
 - Contact the decision maker best suited to hear their sales pitch.
 - Research potential opportunities.

Cluster Database

Cluster databases include information about relatively small *clusters*. These clusters could be defined based on geographic reference groups (such as a ZIP code area), affinity groups (e.g., clubs and associations), and lifestyle reference groups. People in the same cluster tend to have common or similar interests, attitudes, purchasing habits, and preferences. Based on the proportion of existing customers in each of these clusters, companies can identify the clusters to which prospective customers belong. Also, depending on the membership of prospective customers in specific clusters, firms can customize their marketing communications, thereby increasing the efficiency of marketing efforts. Prizm is a good example of cluster databases.

The Prizm database segments every U.S. neighborhood into 62 distinct areas. Companies can use these databases to identify their potential future customers, locate them, and determine how to reach them in the most effective way. Every Prizm database is categorized into groups, each group having several clusters. Some of the groups in the Prizm databases follow:

- **S1 (Elite Suburbs):** The five clusters in group SI are the nation's most affluent Social people.
 - **UI (Urban uptown):** These clusters include high concentration of executives and professionals.
 - **CI (City Society):** The three clusters of group CI make the upper crust of America's second and satellite cities.
 - **T1 (Landed Gentry):** The clusters in this group are made of multi-income families having school-age kids and are headed by well-educated executives and professionals. This is the fourth most affluent group in the United States.
- CRM at Work 8.2 highlights the use of cluster databases.

CRM at Work 8.2**American Express and Database Clustering**

American Express is a good example for database clustering. Take a moment to think about the types of data collected by your credit card company. Your purchase behavior spread across many different products, aggregated into a single database creates a great opportunity for clustering with the use of efficient database slicing techniques.

For instance, consider the case of Brian – an avid traveler. He has used his American Express Gold Card to purchase all his airline tickets. All his tickets have been for round trips, and in coach class. Based on his demographic information and other purchase-related attributes, American Express

has categorized Brian into the «budget traveler» cluster. After a few years, Brian's income increases and he decides to purchase a first class ticket. Soon after this purchase, American Express revisits his customer information and determines that his behavior could be on the verge of change. Therefore, they offer him with an invitation to apply for a Platinum Card. The outcome of this invitation would help American Express determine if his behavior is related to a transition in behavior or merely a one-off purchase. If Brian signs up for the platinum card, American Express determines that he has changed from the «budget traveler» cluster to the «premium traveler» cluster. Having transitioned to this new cluster, Brian is likely to be provided with several cross-selling

offers for other premium services from American Express.

Accurate database clustering is one-part information assimilation and one-part information adaption. It is important for marketers to understand that customer databases evolve over time, and that customers will move between the various clusters as determined by their purchase behavior. Those who believe that customer cluster exists in static isolation will undoubtedly misuse database clustering. Rather an evolving and moving clustering system allows customers to move freely in and out of clusters as is warranted by their purchase behavior.

Source: Rust, Moorman, & Bhalla (2010).

Enhancement Database

An enhancement database is used to transfer additional information about customers and prospects. An overlaying process is used that eliminates duplications. Enhancements may include demographic and psychographic data, transaction history, changes in address, changes in income levels, privacy status, and new product categories bought recently.

For instance, InfoBase^R Enhanced-InfoBase^R provides a large collection of U.S. customer information such as telephone and address data, mail-

ing lists including hotline files, e-mail data, and so on in one single source. The InfoBase^R Enhanced provides the ability to append the latest demographics, socioeconomic and lifestyle data to your existing in-house customer database. A consumer goods company could use this data to better target its advertising and marketing campaigns, expand brand reach, improve acquisition and retention rates, and increase profitability.

► CRM at Work 8.3 highlights the use of enhancement databases.

CRM at Work 8.3**County Drain's Enhancement Database**

County Drains is a rapidly expanding drainage services company that has built its business model around the strengths of its customer relationships and looks to strengthen those relationships, providing the bedrock of growth for future growth.

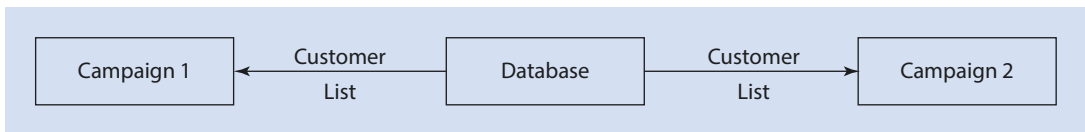
While County Drains has always prided its self on its exemplary customer service, its customer base was expanding at such a rate that its system of spreadsheets and

manual processes were beginning to be squeezed into antiquity. County Drain needed an adaptive database that would allow it to continue its premium customer service even with the tremendous growth the firm was experiencing. The objectives for the database system were:

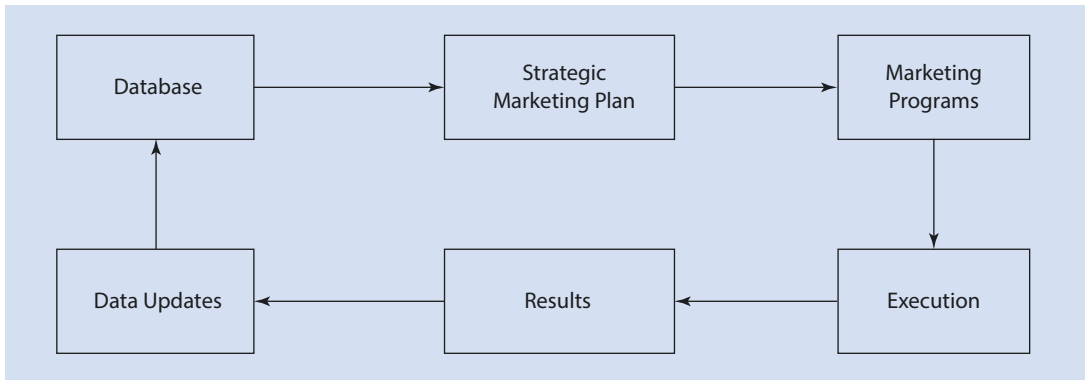
- Creation of a centralized source of data.
- An easy, logical system that the staff would quickly adopt.
- Improvement of all data; historic, current and new.

The CRM program chosen for the project was GoldMine Premium Edition, which allowed them to accomplish each of their three stated goals. The system not only allowed County Drain to continue with its premium customer service, it allowed the firm to be more proactive with its customers providing even more relevant services while also increasing their revenues; a win-win for the customer and the firm.

Source: Concentrix (2017).



■ Fig. 8.1 Passive database



■ Fig. 8.2 Active database

8.1.2 Categorization Based on the Nature of the Underlying Marketing Activities

There are two types of marketing databases – passive and active.

Passive Marketing Database

A passive marketing database involves generating a customer list and then storing this list in the database. Future marketing efforts target the same customers in the list. The database is only a mailing list passively storing information about acquired customers, and has no active influence on the company's strategic marketing decisions. Passive databases are often used in smaller companies that lack the resources to actively track customers and update databases. Rather, these firms periodically purchase third party mailing lists from data vendors. ■ Figure 8.1 illustrates a layout of a passive database.

As ■ Fig. 8.1 shows, the database uses the same customer list for different marketing campaigns. Any of the customer databases can be used as a passive database wherein a company keeps buying a new and updated customer database every time it needs customer information for campaigns. The campaign results from a past campaign hold no significance in this case.

Active Marketing Database

In contrast, marketers can use an active database to develop strategic marketing plans. Every individual marketing program designed to carry out the plan will then be data-driven. After marketing programs are executed, the results are used to update the database. The updated database can then be used to help marketers adjust or redesign the strategic marketing plan. ■ Figure 8.2 illustrates a layout of an active database. Active databases allow for customer segmentation and clustering due to constant updating. ► CRM at Work 8.4 highlights the use of an active database.

CRM at Work 8.4

Best Buy's Athena Database

Best Buy is constantly updating its in-house customer database called

Athena, named after the Greek goddess of Wisdom. As with all well-designed databases, the upgrades were focused on making them

relevant, so that targeted and customized messages can be sent to its customers, as opposed to mass mailers. The targeted messaging

was made possible by an accurate tracking of prior purchase behavior/ browsing history of their customers. The impact of the Athena database was witnessed during the 2015 back-to-school season.

Traditionally, the retailer had sent out a generic message that promoted everything from blankets to stationeries to refrigerators for the entire customer database. Athena, however, helped Best Buy identify students, likely-to-be-students, and the parents of likely-to-be-students based on online and offline interactions. These identified

customer segments were then sent back-to-school promotion emails with items that had been identified for promotions. In other words, customers that did not fall into any of the three groups did not receive these customized promotion emails, or were not likely to even know of a back-to-school sale. Similar promotional campaigns were implemented for the back-to-college and Labor Day periods for distinctly targeted customer groups. In essence, campaigns were being run in parallel, as opposed to running one single mass campaign.

Thanks to the well thought-out campaigns, the retailer realized a 17% increase in online comparable store sales during the second quarter of 2015. Further, the company did not spend money that they would have on TV or print ads and reinvested it into managing and upgrading Athena. The savings and upgrades have enabled them to use Athena for their future plans that includes redesigning their wedding registry program.

Source: Berg (2015).

8.1.3 Categorization Based on the Database Technology

Databases can also be categorized according to their underlying technology. Please note that the term *database*, in this context does not refer only to marketing databases.

Hierarchical Database

A hierarchical database is useful when search queries are standard and routine, but require high-speed processing. Hierarchical databases are preferred in the banking, airline, and hotel industries. In hierarchical databases, all information pertaining to a customer will be in a master record. Hence, cross-referencing from other data sources is not needed.

A hierarchical database is organized in a tree-like structure, similar to that of a family tree. In fact, the different levels of the hierarchy are even referred

to as a *parent/child relationship*. Figure 8.3 provides a visualization of this concept for a custom millwork business.

As Fig. 8.3 illustrates, a custom millwork business may choose to design and maintain their database according to their product offerings. In this case, the millwork business has designed their database with three levels in their hierarchy. The first level is about the nature of the millwork – moldings or window work. The second level is about type of molding or window work. The last level is about the choice of wood and design in their millwork. Here, a search query such as «mahogany hardwood moldings» or «French casement windows» is likely to return the customer records pertaining to these products with very little processing time. Depending on the nature, size and scope of the business, the millwork business can choose to add more levels to the hierarchy to accurately capture information regarding their customers.

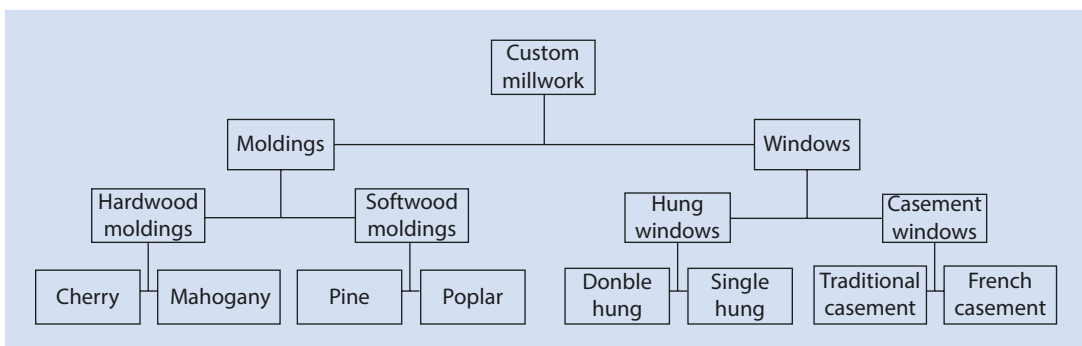


Fig. 8.3 Example of a hierarchical database

Databases used in mainframe technology typically are hierarchical databases. They are huge in size and are still used as databases supporting critical applications in some medium- to big-sized corporations.

Inverted Database

Inverted databases are suited for direct marketing applications because they have the speed of a hierarchical database and also the flexibility to respond to unanticipated questions. It is also easy to add new elements to an inverted database as and when updated information is acquired. Some of the commonly used inverted file systems are Model 204, Adabas, and Computer Associates' Datacom/DB. These vary in their processing speeds and flexibility in the implementation environments.

Relational Database

Relational databases are composed of many simple tables. Users can create queries to extract information from these tables and recombine it. This capability means that when compared to other types of databases, relational databases have the greatest flexibility. However, this flexibility also means the speed of processing is somewhat slower. Databases like Oracle, SQL Server, and Microsoft Access are all relational databases. Each one of these has different interfaces and capacities. Its use in organizations today depends on the size of the database marketing initiative. Oracle and SQL Server are capable of handling medium- to large-sized companywide marketing programs while Microsoft Access is used for smaller-sized database marketing initiatives.

8.2 The Benefits of Marketing Databases

Companies that efficiently use their marketing databases can expect the following benefits.

8.2.1 The Ability to Carry Out Profitable Segmentation

Customers can be classified into different groups, depending on their buying behaviors. Frequent buyers need to be treated differently than occa-

sional buyers. First-time users should be approached differently than repeat buyers. Marketing databases allow us to analyze customers and classify them into different groups. Different marketing programs can then be executed and implemented for different groups or segments.

8.2.2 Retained Customers and Repeat Business

Retaining existing customers has become one of the important goals of many companies' marketing practices. Marketing databases enable marketers to determine the critical factors which influence the degree of customer satisfaction; and to develop effective campaigns accordingly to retain as many existing customers as possible at the lowest possible cost.

8.2.3 The Ability to Spot Potentially Profitable Customers

With marketing databases, the company can profile its own customers, and then use lists and media surveys to locate potential customers with the same profile, and are therefore expected to contribute significantly to the company's revenues because of their higher response rates and willingness to buy premium products.

8.3 The Uses of Marketing Databases (Jackson & Wang, 1994)

8.3.1 Uses that Directly Influence the Customer Relationship

- **Identify and profile the best customers:** By tracking customer transaction data, marketers can conduct recency, frequency, and monetary value (RFM) analysis or develop sophisticated models to identify customers who are of greatest value to the company.
- **Develop new customers:** Armed with the profile of the company's best customers, the company can find new customers with the characteristics of the best customers.

Marketers could target not only the new users of the product/service but also competitors' existing customers.

- **Deliver customized messages consistent with product/service usage:** With customer transaction history data and customer service data, marketers can track customers' feedback to the specific products and services, and find out what pleased or displeased them. Then, the company can design specially customized marketing messages consistent with the product/service to promote their products and or services.
- **Send follow-up messages to customers for post-purchase reinforcement:** Cross-sell products/services. The company can identify customers' other needs based on their demographic, lifestyle, and behavioral characteristics, and then sell them other products/services that satisfy their needs.
- **Ensure cost-effective communication with customers:** A marketing database enables marketers to classify customers into high potential, medium potential, and low potential groups. After evaluating the monetary value of these customers' potential, marketers will be able to determine how much the company should invest on communicating with these customers.
- **Improve promotion result:** Marketers: can achieve better promotion results by targeting the customer groups who are most likely to respond (e.g., loyalists, prospects with best customer profiles).
- **Personalize customer service:** Knowing when, where, and what the customers purchased, the company can communicate with the customers to get their feedback, and then personalize the customer service delivered to them.
- **Stealth communication with customers.** Marketing databases provide the opportunity for one-on-one communications with each customer without the competitors' knowledge.

8.3.2 Uses that Directly Influence Other Business Operations

- **Evaluate and refine existing marketing practices:** By analyzing customer data, marketers can assess the effectiveness of all the aspects of the existing marketing practice, including strategy, planning, budgeting, campaign design, implementation, customer communication, and so on to identify shortcomings and suggest improvements.
- **Maintain brand equity:** Match brands with customers who fit the brand profile and keep communicating with those customers using specially designed brand-building messages.
- **Increase effectiveness of distribution channels:** Customers' transaction data and customer service data can tell how existing distribution channels work and how to make them more effective.
- **Conduct product and market research:** In a customer-centric company, product, and market research must focus on customer needs. Marketing databases provide a unique resource of information on customer needs.
- **Integrating the marketing program:** A complete and integral marketing database can track all marketing efforts toward a customer. Marketers will be able to avoid duplicate, supplemental, and misdirected communications. It also helps marketers determine any overlapping between marketing programs targeted at different customer groups.
- **Create a new valuable management resource:** A marketing database could be used to support not only the traditional marketing practices, but also a wide range of other business functions such as advertising, product R&D, distribution, customer service, and so on.

Summary

Effective database analysis is important for successful CRM. Databases can be categorized based on their main business function—databases managing business and databases sup-

porting decision-making activities. In addition, databases can also be categorized based on the information included in the databases, the nature of the underlying marketing activities, and database technology. Based on the infor-

mation included in the databases, databases can be classified as customer, prospect, cluster, and enhancement databases.

Customer databases identify and profile the best customers and communicate with these customers to elicit a response. These data allow the companies to market their products to specific customer segments to achieve higher net marketing contribution. Data from active and inactive customers are important to ensure efficient marketing function. The prospect database includes information on noncustomers with profiles similar to those of existing customers. It can be used by marketers to design marketing campaigns to target prospects with the intent of acquiring them as new customers. This is done after carefully analyzing the channels through which the prospects like to receive information. Cluster databases include information about small clusters based on geographic reference groups, affinity groups, and lifestyle reference groups. An enhancement database is used to transfer additional information on customers and prospects avoiding duplications.

Based on the nature of the underlying marketing activities, marketing databases are categorized into active and passive. A passive database is a customer mailing list that passively stores information about acquired customers for targeting future marketing efforts, and has no active influence on the company's strategic marketing decisions. An active database is used by marketers to develop strategic marketing plans. After marketing programs are executed, the results are used to update the database. The updated database can be

used to help marketers adjust or redesign the strategic marketing plan.

Databases can also be categorized into hierarchical, inverted, and relational databases. A hierarchical database is useful for routine and standard queries which need high-speed processing. These have all the information pertaining to a customer in a master record and are typically used in mainframe technology. Inverted databases are suited for direct marketing applications on account of their speed, flexibility, and ease of updating. Relational databases have the greatest flexibility but lower speed of processing. Marketing databases allow marketers to analyze customers and classify them into different groups and, accordingly, implement different marketing programs for each group. These databases also enable marketers to determine the critical factors influencing customer satisfaction and take measures to retain existing customers at lowest cost. They also help marketers in identifying potentially profitable customers using lists and media surveys. Using marketing databases, marketers can identify individual customers of greatest value to the company. Other uses of marketing databases include developing new customers, delivering customized messages consistent with product/service usage, and effectively communicating with customers in the form of feedbacks on purchases, promotions, stealth communications, and so on. Maintaining brand equity, increasing effectiveness of distribution channels, as well as conducting product and market research are other uses of marketing databases that directly influence business operations.

? International Perspectives: Did You Know?

1. The ► data.gov website operated by the U.S. government serves as a repository for thousands of datasets on a wide range of topics such as consumers, manufacturing, and finance, among others. At the time of this writing, the website hosts more than 190,000 datasets, all of which are made public and free to use. Similarly, Research Data Australia provides access to publicly available data that are categorized by major subject headings.
2. The level of technology available is closely linked with the deployment of customer databases and the ability to obtain customer-level data and insights. A 2015 study by Experian found that marketers in Spain, France, Australia, and New Zealand identified technology as one of the leading challenges faced by them in customer management. However, Japanese marketers were more confident in their technology (as compared to other countries), but found achieving a unified customer perspective to be a bigger challenge (Experian, 2015).

? Exercise Questions

1. What are the various ways to categorize databases?
2. How are databases classified based on the information they contain? Are these different classes of databases complements or substitutes?
3. Assume you are the marketing manager for a local US bank in Texas. Your assignment is to target prospects in Oklahoma (small to medium sized businesses). Go to the website of Axciom (► <http://www.axciom.com>) or Dun&Bradstreet (► <http://www.dnb.com>) and determine the cost of obtaining ten variables of firmographic information on these firms.
4. List some of the key uses of marketing databases. Provide an example for each of those.

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