Dataquest

1997 Dataquest Research Methodology

Dataquest Guide

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Chapter 1
Introduction

Fundamental to the way Dataquest conducts its research is the underlying philosophy that the best research and analysis uses appropriate methodology. Such methodology includes a balance between primary and secondary data collection; between supply-side, vendor-based analysis and demand-side, consumer-preference analysis; between focused, industry-specific research and coordinated, "big picture" analysis; and between the informed, insightful perspectives of experienced industry professionals and the rigorous, disciplined techniques of seasoned market researchers. Ultimately, this leads to a balance between data and analysis—the combination of which provides unique insight and maximum tangible value to our clients.

The purpose of the Dataquest Research Methodology Guide is to provide a clear and concise overview of Dataquest's research methodologies. This guide discusses research methodology as it pertains to vendor-based research, user-based research, and market forecasting.

Each methodology is discussed separately for explanatory clarity. In no way does this organization imply that one type of research is done in isolation of the other types. For example, vendor-based research, user-based research, and market forecasts all rely on the services provided by both primary and secondary research. Also, results from vendor-based research and user-based research are inputs to market forecasting. Indeed, the free flow of information among the different research specialties creates synergy that is key to Dataquest's research methodology.

Dataquest is committed to a rigorous research methodology. Dataquest applies accepted market research techniques to the dynamic world of changing technology, fluctuating business conditions, and evolving client needs. The methodologies described in this document serve the multiple needs of our clients in a constantly changing marketplace.

Chapter 2
Research Methods

Dataquest recognizes the importance of a variety of information sources and the impact they have on the value of the services we provide. Dataquest conducts primary market research as well as secondary research to produce timely, detailed, and accurate analyses of high-technology marketplaces. The combination of these two research approaches yields a rich pool of data that can be used to answer specific questions, to produce market statistics, and to analyze and forecast industry trends.

Primary research can be distinguished from secondary research in the following important ways:

- Primary information is first-hand data collected by the researcher. Secondary research is information that already has been published and typically is bought for research purposes.

- Primary research is custom research in areas where data or information does not previously exist. On the other hand, much of the secondary information has been compiled and published for some particular purpose other than market research.

- Primary research is proprietary data and available on a selective basis. Secondary research is public information and is more readily available.

Dataquest views primary and secondary research as complementary components in its data gathering, drawing on each to produce vital information for high-technology markets.

Primary Research

Dataquest relies heavily on primary research as a means to collect original data. Primary research is conducted with end users in business, households, government, and schools; and with product vendors, suppliers, manufacturers, and distributors. Primary information is collected by Dataquest's in-house field interviewing groups as well as by industry analysts worldwide.

There are three basic interviewing methods used by Dataquest: telephone interviews, mail surveys, and personal interviews. The method used is determined by the objective of the project.

Telephone Interviews
Dataquest uses telephone-based field interviewing for much of its primary research. This method is usually employed when the study design requires a large, randomly selected sample from a population, when eligibility is difficult to determine (necessitating many contacts for a completed interview), when the interview is relatively short, or when face-to-face contact is impossible or unnecessary. In some cases, questionnaires are faxed to the respondent prior to the telephone interview.

Telephone interviewing is conducted regularly by Dataquest's in-house field interviewing groups in San Jose, Singapore, and the United Kingdom. The charter of Dataquest's field interviewing groups is to collect and ensure quality data in a timely and cost-effective manner. These objectives are possible because of the following competitive advantages unique to Dataquest's interviewing group:

- Dataquest uses interviewers who specialize by industry, ensuring consistent, high-quality information.

- Dataquest has complete access to information-gathering resources.

- Dataquest experiences increased productivity because of industry contacts and knowledge of technologies.

Dataquest's San Jose facility conducts interviews in North America, South America, Japan, and Asia/Pacific. Interviewing in Japan is also conducted from Dataquest's Tokyo office. Dataquest's Primary Research Centre, located in the United Kingdom, conducts interviews in 12 languages throughout the European region.

Central location interviewing has many advantages. It allows for central monitoring to ensure that correct interviewing procedures are being followed. Furthermore, if a respondent requests clarification on the meaning or intent of a question, it can be handled on the spot.

Dataquest's field interviewers participate in a briefing on each project prior to implementation. Interviewers are trained specifically in handling open-ended questions and questions that ask for "other" responses.

Mail Questionnaires

Dataquest uses mail questionnaires infrequently for the following three reasons:

- Low response rate—Mail surveys have a lower response rate than do personal or telephone interviews. The danger with low response rates is that those who return the questionnaires may be "different" from or not representative of the universe of respondents, thereby introducing bias.

- Accuracy—There is no interviewer in mail surveys who can explain the purpose of the project, clarify the questions, or resolve any problems. Respondent confusion about the questions can adversely affect survey accuracy.

- Time—It takes several weeks to conduct a mail survey, and most clients cannot wait that long.

Mail surveys cannot be used for an unstructured study in which the interviewer formulates the questions as the interview progresses. Personal and telephone interviews are more flexible in that they can be terminated or altered at any point, whereas mail surveys are inflexible.

Paper and pencil questionnaires are used in some specialized situations such as trade conferences and other group meetings.

Personal Interviews

Personal interviews are less structured and more intensive than phone interviews. There is a longer and more flexible relationship with the respondent, resulting in data that has more depth and richness.

There are two basic types of personal interviews: nonstructured and semistructured. Nonstructured and semistructured interviews differ in the amount of guidance given by the interviewer. In the nonstructured interview, the respondent is given considerable freedom to respond within the bounds of topics specified by the interviewer. In semistructured interviews, the interviewers have a specific list of topics to cover with the respondent.

Focus groups are another form of personal interviews. Focus groups consist of eight to 12 people who gather for two to three hours with a trained group facilitator to discuss a product, service, organization, or other marketing entity. The participants are paid an honorarium for attending. The meeting is held in a focus group room equipped with a two-way mirror for filming and observation. The group facilitator encourages remarks from the participants, while at the same time focusing their discussion. The comments are tape recorded and analyzed.

Secondary Research

Dataquest recognizes the importance of secondary research in all its analytical and intelligence functions. Although secondary information alone does not answer complex market research questions, secondary research has major advantages and roles in the market research process. Dataquest uses secondary information for the following:

■ Provide basic working knowledge of industries

■ Gather facts about the technology, products, and applications

■ Monitor developments

■ Explore new territory or emerging technologies

■ Gain insight for preliminary analysis

■ Signal need for primary research

■ Gather information quickly and at a lower cost than primary research

In conducting secondary research, Dataquest employs a methodology to ensure that appropriate information is obtained to meet the diverse needs of its researchers. With a process-oriented approach, Dataquest is not only able to achieve time and cost efficiencies but is also able to focus on finding the desired data from the pool of secondary information that exists. This process can be summarized as follows:

■ Define the topic and data points to be collected

■ Select secondary sources to search

■ Conduct information search through multiple sources, using the Internet, electronic databases, CD-ROMs, and print resources

■ Assemble and review information from all sources

■ Present results of the information gathered

Because an impressive amount of secondary information exists concerning high-technology industries and the companies within these markets, Dataquest's researchers routinely use secondary research in the following key areas:

- Market sizing

- Validating estimates

- Cross-checking information, such as market share

- Checking trends that influence markets

- Checking company growth rates

- Verifying shipment totals and pricing information

- Supporting assumptions used in forecasting

Because our researchers and analysts are expected to review all types of information to keep abreast of market trends and industry events, Dataquest understands that access to information is a crucial part of the market research process. Dataquest has invested substantial resources to ensure that current information is available and accessible by all research staff.

The secondary research process is managed by professional librarians who understand how and where to get the secondary information necessary to support the needs of analysts and researchers. Dataquest's librarians are expert not only in searching all types of information sources but also in selecting and obtaining key resources that researchers need on a frequent basis. The librarians work closely with the research staff to answer the complex questions that arise during the course of our market research.

Each major Dataquest location maintains a library facility that typically offers a comprehensive collection of information sources covering the full range of high-technology companies, markets, and industries tracked by Dataquest. Sources of secondary information typically used by Dataquest include the following:

- Articles in the general business and trade press

- Financial information from annual reports and other SEC documents

- Company and product directories

- Company press releases and product literature

- Government reports, statistics, and economic data

- Trade association data

- Credit reports

In-house research collections are supplemented by online database services including the Internet, Dialog, Lexis/Nexis, Dow Jones, Newsnet, Data-Star, and CompuServe. Other specialized databases from such companies as Dun & Bradstreet and Thomson Financial are also available to the research staff.

The benefits of buying secondary information on CD-ROM were recognized a number of years ago, and Dataquest became an early adopter of this information format. Today we have numerous CD-ROMs available in the library and on the local area network for retrieving financial information, trade press articles, product information, and company profiles. Because of the high information content and ease of use of these products, these resources are used heavily by our research staff.

Dataquest has also made a significant investment and commitment to supplying every analyst with current secondary information on the desktop. Our analysts use a state-of-the-art electronic information filtering system, which delivers real-time information feeds from such companies as Dow Jones and Company, Business Wire, PR Newswire, and Ziff-Davis Publishing Company.

Chapter 3
Vendor-Based Research

Each year, Dataquest tracks the shipments and revenue of thousands of vendors worldwide. This research helps Dataquest maintain a dynamic database of product shipments by company, and product consumption by region of the world.

Dataquest conducts product market share surveys on a quarterly, semiannual, or annual basis. The annual market share research actually includes two phases: a preliminary phase and a final survey. The preliminary estimates are completed by the end of the calendar year being reported, and the results are summarized in a report released early in the new year. Preliminary vendor rankings are featured in a Dataquest press release. Final market share estimates are prepared during the first quarter, and the results are published in a reference report released in the spring.

Dataquest believes that the estimates presented in its market share documents are the most accurate and meaningful statistics available. While Dataquest takes care in gathering, analyzing, and categorizing its data, clients must be aware when they interpret the estimates presented in the market statistics documents of the definitions and assumptions that Dataquest uses. Other companies, government agencies, and trade associations may use slightly different definitions of product categories and regional groupings, thereby reporting different results. These differences should be kept in mind when making comparisons between data provided by Dataquest and data provided by other suppliers.

Dataquest's Methodology

Dataquest's vendor-based research incorporates both market sizing and market share research activities.

Market Size

Market size is defined as the universe of all companies competing in a market. The universe of companies is based on a core list of companies that Dataquest has developed over time. Each year, Dataquest checks the list to add companies previously not included and to delete companies no longer competing in the market.

Dataquest uses its proprietary market sizing bibliography as a foundation for market sizing research. The market sizing bibliography describes sources of information that identify companies participating in various markets. These sources include industry associations, business and financial sources, and other secondary sources. Dataquest analysts search these sources to develop a list of companies that is as comprehensive as possible. Special attention is devoted to identifying companies not included in our previous data collection.

Once the universe of companies in an industry is identified, researchers estimate the approximate size of each company. Size is one of the variables used in identifying a company as a leading vendor and as a company that Dataquest will track in greater detail. The largest companies are usually

considered to be leading vendors in an industry. In addition to size, identification of a company as a vendor that merits more detailed attention is based on our ongoing relationships with industry contacts and industry events.

Smaller companies in each market are also noted. Shipments and revenue for smaller companies are estimated using the same general procedures applied to larger companies. The data from smaller companies is usually aggregated and reported as "other companies." These estimates are incorporated into overall market size statistics.

Market Share

The purpose of market share is to estimate the presence of a leading vendor in a product market. Market presence may be measured in terms of unit shipments or revenue. Market share is critical for companies to assess their absolute and relative position in a market and thus to develop appropriate competitive strategies.

Definitions

The Dataquest market definitions books are the corporatewide reference for segmentation and definition of technologies and markets. Definitions explain Dataquest's understanding of technologies. Segmentation refers to the way in which a market is divided into different dimensions, including companies, products, regions, distribution, applications, and user environments. These dimensions are illustrated in Figure 3-1. The segmentation and definitions found in the Dataquest market definitions books are used consistently throughout Dataquest's products and within all Dataquest's worldwide offices.

Dataquest has defined regions of the world for the purposes of tracking and reporting markets, companies and products, and company production and consumption. Those regions are North America, Western Europe, Eastern Europe, Japan, Asia/Pacific, Latin America, and Middle East/ Africa. The country composition of these regions is presented in the Dataquest market definitions books and in Appendix B of this document.

Shipment Estimates

Dataquest prepares estimates of shipments for each product and company prior to market share data collection. Shipments are estimated at the most disaggregate level possible (such as by company, by product, or by region). These initial estimates are based on the following:

■ Company year-to-date performance

■ Validating information, such as press releases, Wall Street news items, industry contacts, and online sources

■ Dataquest forecasts of product revenue and shipments, by product and by regional market

Initial estimates represent Dataquest's best estimate of company performance during the previous year. The estimates are treated as confidential.

Figure 3-1
Dataquest's Research Dimensions


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                                          ┌──────────────┐
                                          │ Manufacturers│
                                          └──────┬───────┘
                 Provide                         ▼
                                          ┌──────────────┐
                                          │ Raw Materials,│
                                          │    Goods     │
                                          └──────┬───────┘
                 To                              ▼
                                          ┌──────────┐
                                          │ Vendors  │
                                          └────┬─────┘
                 That Ship                     ▼
                                          ┌──────────┐
                                          │ Products │
                                          └────┬─────┘
                 To Various                    ▼            From Various
                                          ┌──────────┐
                                          │ Regions  │
                                          └────┬─────┘
                 Through                       ▼
                                          ┌──────────────┐
                                          │ Distribution │
                                          └──────┬───────┘
                 For Use In                     ▼
                                          ┌──────────────┐
                                          │ Applications │
                                          └──────┬───────┘
                 In Specific                    ▼
                                          ┌──────────────┐
                                          │  End-User    │
                                          │ Environments │
                                          └──────────────┘
                                                                 976930
```
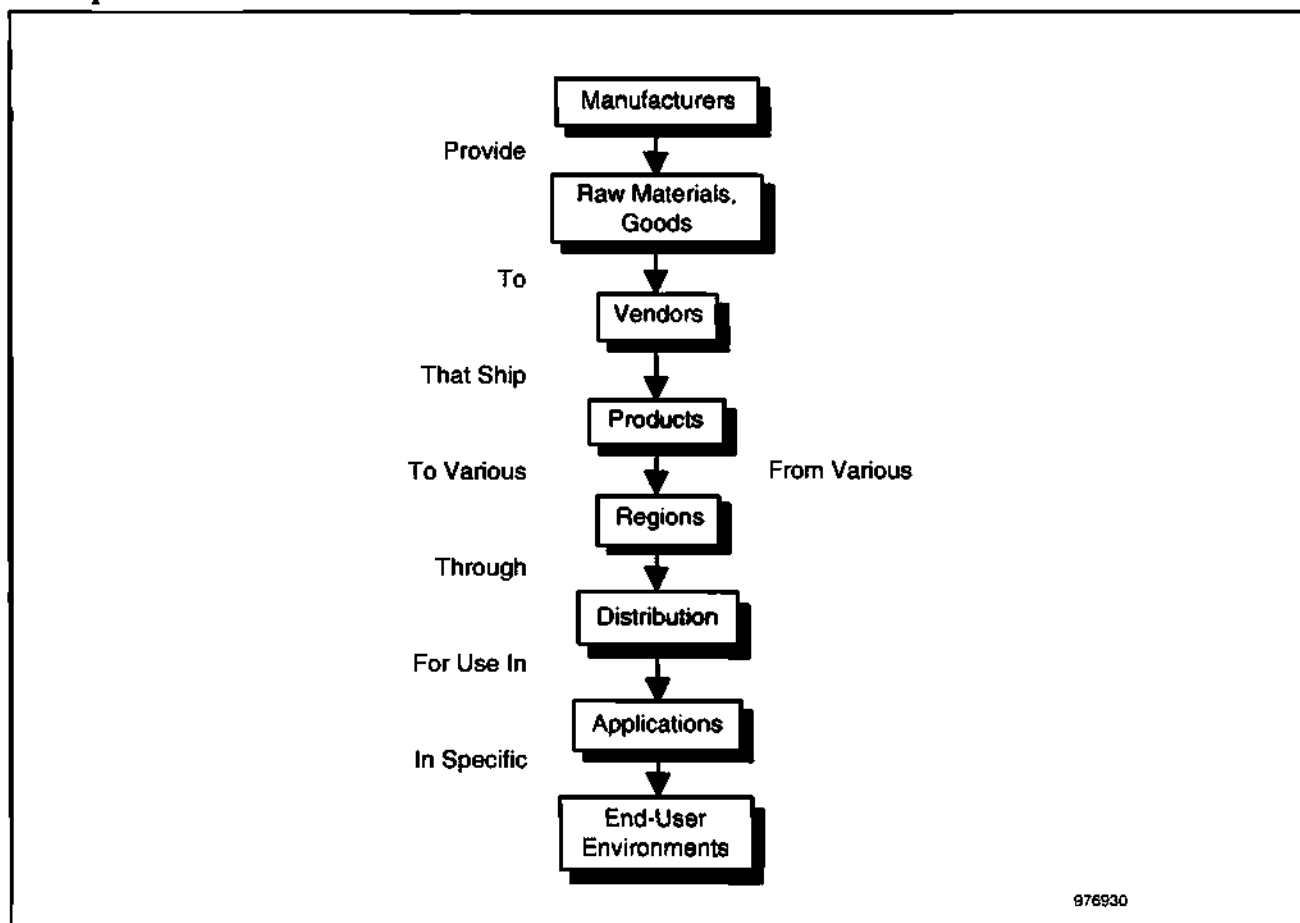
Source: Dataquest (October 1997)

Data Collection

Data collected in our vendor surveys is used in a bottom-up analysis defining market revenue, market size, and market share. Market share data collection involves virtually all Dataquest researchers and interviewers. Dataquest estimates of product shipments and revenue for the year are provided to each company. The company is asked to respond to Dataquest with revisions or corrections as appropriate.

The accuracy of information provided to Dataquest varies. Some companies are known for consistently reporting accurate numbers, whereas other companies are less uniform in their reporting practices. With experience, analysts become familiar with the different and varied reporting styles of the companies involved.

Dataquest analysts cross-check all information with the goal of defining the most accurate estimate possible. This effort requires the ability to integrate information from different sources. It relies on the analyst's ability to perceive and process information provided indirectly. The skill and sensitivity of the individual researcher is a critical element.

Collection of top-level aggregate data (worldwide and regional unit shipments and revenue) from a vendor is the responsibility of the Dataquest office located within the same region of the world as the vendor being surveyed. Collection of bottom-up disaggregate data (regional and country shipments of each vendor) is the responsibility of the Dataquest office located within the region of consumption. The rationale for this division of labor is that the Dataquest office located within a particular region is best suited to perform data collection tasks related to manufacturers located within that region. The local Dataquest office is also most able to comment on facets of consumption within that region, regardless of the location of company headquarters.

For example, analysts in Dataquest's San Jose headquarters are responsible for data estimation and collection for North America-based vendors and their worldwide and regional shipments. Similarly, analysts in Dataquest's European offices estimate and collect data on worldwide and regional shipments for European vendors; the Dataquest Japan office is responsible for the estimates and collection of worldwide and regional shipments for Japanese vendors; and the Dataquest Asia/Pacific offices estimate and collect the worldwide shipments data for vendors in the Asia/Pacific region. This assignment forces a reconciliation between Dataquest's analysts and Dataquest's offices, resulting in a single worldwide estimate for any given product.

Once the vendor-based data is collected, it is compiled into a single, market-specific database. Subsets of the data based upon the region of consumption are then furnished to Dataquest's regional offices. The regional analysts examine their specific regional consumption data (worldwide vendors' shipments into their regions) and compare the estimates to the results of their individual regional data collection efforts.

This methodology capitalizes on the advantage provided by Dataquest's regional analysts. It supports regional analysts, by strength of their location, in collecting data from vendors based within their region. Furthermore, it allows for differences in regional pricing, distribution methods, and application usage, and their effects on the market share estimates. At the same time, this methodology allows the regional analysts to examine the shipment data of worldwide vendors into their region in order to account for differences within their region of the marketplace.

An additional advantage of this approach is the assignment of ultimate responsibility for a particular vendor to a particular analyst. This assignment forces a running dialogue and information exchange among offices.

Quality Control and Validation

All market share data is validated through cross-checks to assure quality, including the following:

- Checking aggregate data against at least two other data points
- Checking large market share changes
- Checking large volume changes
- Checking current trends against historical trends

- Checking against complementary or substitute products
- Checking against installed base
- Checking against other Dataquest data
- Checking company growth rates against competitors

As mentioned in Chapter 2, Dataquest uses both primary and secondary sources to produce market statistics data. Primary research is supplemented with secondary research to verify market size, shipment totals, and pricing information. Either primary or secondary information is used to validate estimates. Where data cannot be collected from primary sources, estimates are checked against secondary sources. Revenue reported in one market covered by a vendor is also evaluated against that vendor's revenue in other markets covered by Dataquest to make sure that revenue is not double counted. Also Dataquest may check with multiple sources at one company to verify data.

The data collected in our vendor surveys is considered public information. The names of respondents are always kept confidential, and all data is published as Dataquest estimates. All respondents are notified of Dataquest policies when market estimates are initially sent.

Companies in the market share survey review Dataquest's initial estimates and respond with their comments or revisions. If a company chooses not to participate in the data collection effort, Dataquest either uses initial estimates or adjusts the initial estimates based on responses by other companies.

The country, regional, and worldwide analysts have a checklist of items that they go through before finalizing the data. A typical checklist is as follows:

- ASP checks
  - Large decrease as compared to previous time period
  - Large increase as compared to previous time period
  - Inexplicable ASPs because of incorrect data entry
- Vendor market share checks
  - Large decrease as compared to previous time period
  - Large increase as compared to previous time period
  - Known market share leader slipping
  - Known market share loser gaining
  - Relative shares across countries within a region
- Technology share checks
  - Any shift toward a disappearing technology
  - Sudden gain in a new technology

- Vendor checks

  - Consistent vendor names according to individual product research guidelines

  - Consistent model and brand names according to individual product research guidelines

  - Missing vendor data for a vendor from the "must-collect" vendor list

  - Missing vendor data for a vendor appearing in the previous period

- Distribution checks

  - Missing channel data

  - Shift in channel data shares

- Market checks

  - Missing market data

  - Shift in market data shares

- Overall data checks

  - Within or outside the worldwide or regional vendor totals

  - Departure from known market factors

  - Correlation between unit and revenue shipments

Documentation

Detailed notes and documentation are maintained on each company surveyed in the market share sample, as well as the supplemental group of companies used to estimate total market size. Documentation includes handwritten notations indicating sources of data and any relevant secondary information.

Quarterly and Semiannual Shipments and Pricing

Dataquest monitors selected companies on a monthly, quarterly, or semiannual basis. Typically, this research and analysis focuses on unit shipments and product pricing of the most important leading companies in a market. Companies selected for this in-depth research have products that meet the following criteria:

- Significantly greater than average growth

- "Bellwether" indicators of future market activity

- Receive disproportionate market-participant attention

The purpose of this in-depth research is to assure that Dataquest estimates are timely and to report important market shifts. This research serves as valuable input for updating expectations of short-range market activity.

Chapter 4
User-Based Research

User-based research serves as a complement to Dataquest's vendor-based research. By focusing on the consumer, user-based research reflects the demand-side of product markets. Dataquest's user-based research includes studies of market penetration, installed base, technology plans, product configurations, product pricing and positioning, customer satisfaction, and new product testing and concept evaluations.

Project Design

The most important aspect of user-based research is to define the purpose of the research. What question does the client want answered? If there are multiple questions, what is the main question? Once the project's purpose is identified, a project plan is prepared to guide research activity. The plan covers the entire range of research activity, including definition of research objectives, questionnaire development, sample design, field interviewing, statistical analysis, and the final report. It also includes a time line and milestones that can be used to assess progress.

Questionnaire Development

Questionnaires are developed in consultation with the project leader or client. Questions are phrased in a form that will facilitate complete and usable responses. Special attention is devoted to minimizing response biases potentially caused by such factors as answer order, question order, generalization, and scaling.

Questionnaires typically contain the following three main sections:

- Introduction and screener page that outlines the purpose of the study and identifies the correct person to participate in the interview

- Specific questions to meet the project's objectives

- Demographic questions that enable the respondents to be grouped together and the data to be analyzed in subsets

Sample Design

Sample design involves definition of sample parameters, determination of the sample approach, and the most appropriate source for the sample. Sample parameters are determined according to the population of interest in the study. For example, a survey of corporate computer use would likely include parameters such as the number of employees and annual sales. A study measuring users' interest level in video games would include sample parameters such as household composition and annual household income.

Once the sample parameters have been defined, a sampling approach is developed. Dataquest uses two types of sampling approaches: probability sampling and quota sampling.

Probability sampling is used for data to be projected to the population at large, such as market penetration data. In this approach, each potential respondent has an equal probability of being selected. A study that requires 200 completed interviews would begin with the names of 1,000 potential respondents if the anticipated response rate is 20 percent.

Quota sampling is an alternative to probability sampling and is used when simplicity and cost-effectiveness are important considerations. In quota sampling, a profile of the population to be studied is developed and quotas are set so that the final sample is forced to fit the main population profile. An example would be a study of U.S. business establishments with results reported by industry. U.S. census data reveals that government institutions represent about 3 percent of U.S. business establishments, services represent 31 percent, manufacturing represents 7 percent, and other businesses represent 59 percent. For a study requiring 500 completed interviews, quotas would be set so that 15 respondents would come from government institutions, 155 respondents would come from services, 35 respondents would be from manufacturing businesses, and 295 respondents would represent other businesses.

Dataquest uses a variety of sampling sources depending on the nature of the research. Databases from Dun & Bradstreet, including Dun's Marketing Service databases of 10 million U.S. businesses, are frequently used. Other sources include UCC1 filings that identify sites with specific computer and telecommunications equipment, and mailing lists from industry trade publications. Dataquest also has proprietary respondent databases that are used for research in specific high-technology markets.

Data Collection

Data collection in end-user research relies heavily on primary research. Dataquest's primary research procedures are described in detail in an earlier section of this document.

Dataquest maintains primary research units in San Jose, California; Singapore; and Egham, United Kingdom. There are also those responsible for primary research data collection located in Hong Kong, Singapore, Tokyo, Seoul, Taiwan, and Westborough, Massachusetts.

Preparation for the primary research includes in-depth briefings with the interviewers to review details of the project, the questionnaire, and procedures for collecting information. At the beginning of the project, preliminary interviews are conducted to validate the effectiveness of the questionnaire. Suggested changes can then be discussed and incorporated into the final questionnaire. The actual interviews are conducted online or with hard copy, depending on the format most appropriate for the objective of the study. Considerable time goes into quality control. The interview process is carefully monitored, and responses are reviewed for accuracy and completeness at all stages of a project.

Data Analysis

Dataquest uses a full range of methods to conduct statistical analysis of user-based data. After data collection is completed, the data is cleaned and prepared for analysis. As a quality-control check, frequency and percentage data are calculated for each response to every question.

Specific cuts of data are determined jointly by Dataquest and the client. Initial tables are produced according to predetermined specifications. Once the initial tables are reviewed, the need for further cuts of data often becomes apparent. An iterative process then occurs in which questions are formulated, additional analyses are conducted, and new sets of tables are prepared.

A variety of data analysis techniques are used to answer Dataquest's research questions. Techniques commonly used include validity and reliability testing, correlations, regression analysis, factor analysis, analysis of variance, and significance testing. Dataquest also measures customer satisfaction and importance ratings using a matrix gap analysis technique. The statistical analysis packages used to analyze data at Dataquest include SPSS, Survey System, and ACA/C13. Data can be converted from the statistical package into Excel format as well. Some clients appreciate this option so that they can conduct additional analyses at a later time.

Chapter 5
Market Forecasting

Dataquest's charter includes the task of forecasting high-technology markets. There are two important benefits of forecasting market activity, as follows:

- Forecasting provides a structured and logically rigorous setting in which to clarify expectations about the future. This structured setting maximizes the likelihood of generating forecasts that are internally consistent.

- Forecasts help reduce business risk by aiding executives in planning strategy and tactics based on likely events and trends.

Dataquest forecasts begin with facts about real-world events. Most generally, facts regarding the real world include level of economic activity, prices, technology characteristics, user demographics, political environment, and other exogenous or outside influences.

Facts lead to data representing observations. Data is broadly classified as either demand-side or supply-side, depending on the side of the market it influences. Empirical methods combine data with economic theory to yield market analysis and forecasts.

Figure 5-1 outlines the key elements and flow of Dataquest's forecasting methodology.

Theoretical Framework, Variables, and Data

High-technology markets are complex; furthermore, high-technology markets generate an abundance of facts. The volume of high-technology publications and information is evidence of this situation. Therefore, before generating a market forecast, it is necessary to reduce the market's complexity to a manageable level with a simplifying conceptual framework, typically referred to as an analytical model.

Dataquest uses standard microeconomic models as the basic theoretical framework for analyzing high-technology markets. These models include the following:

- Models of consumer behavior to analyze the demand side of a market

- Models of production, the company, and the industry to analyze the supply side of a market

- Models of market supply and demand

High-technology markets also yield an abundant flow of facts about real-world events. These facts lead to a set of data, representing observations such as unit shipments, revenue, market share, and average selling prices. Dataquest classifies this data according to broad categories called variables that are grouped as demand-side variables or supply-side variables.

Figure 5-1
Dataquest's Forecasting Methodology
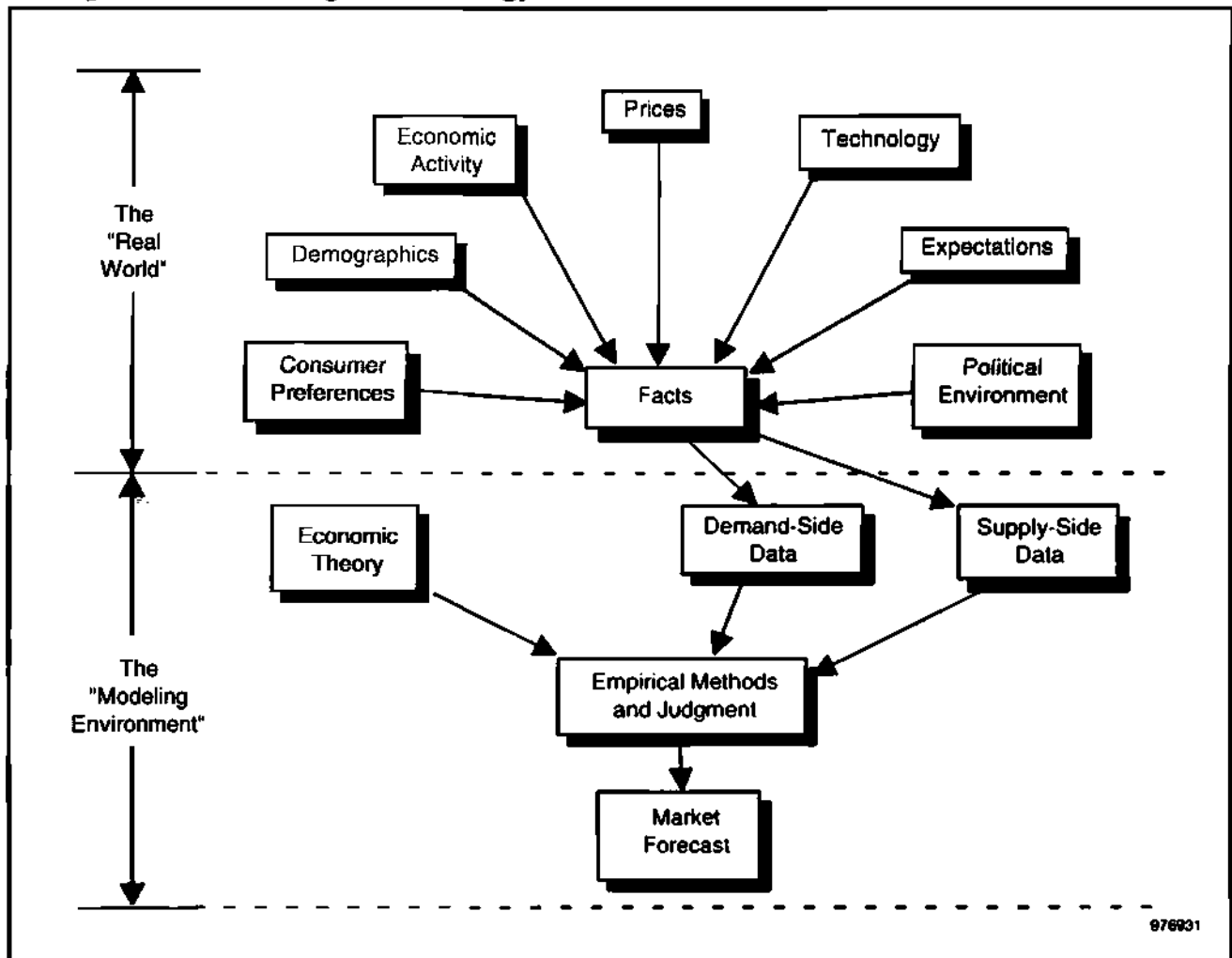
Dataquest includes the following demand-side variables in its product forecasts:

- Overall level of economic and business activity, industry conditions, and related industry conditions
- Prices of substitute products
- Prices of complementary products
- Expected future prices of the product being forecast
- Consumer preferences
- Demographics

Dataquest also includes the following supply-side variables in its product forecasts:

- Production capacity and efficiency rates

- Prices of resources and inputs used in a product's production

- Technological improvements that allow for decreases in the cost of production

- Outside factors that may alter supply or influence a company's production costs, such as trade barriers

Some variables are more easily quantified than others. For example, a country's overall level of economic activity can be measured directly by estimating its gross domestic product (GDP). Product prices and resource prices are normally directly observable as well. Other variables are more elusive and intangible. Information on consumer tastes and preferences may have to be sampled. Likewise, expectations of future products and resource prices are not directly observable but must be inferred. Thus, a variable's consideration does not necessarily imply collection of the corresponding data.

Examples of specific data used in Dataquest forecasts include the following:

- Unit consumption and production

- Consumption and production revenue

- Average selling price (final user price, list price, and manufacturer price)

- Installed base, saturation, and retirements

- Input/output (I/O) ratios and tie ratios

- Market penetration and total available market (TAM)

Supply and demand market models have the added advantage of maximizing the internal consistency of Dataquest's numerous forecasts. By modeling and forecasting the supply side and the demand side of a product, Dataquest analysts are able to check for "market clearing." The principle of market clearing states that whatever quantity of a product is supplied to a market must by necessity find a "home" in the market, either with the final or ultimate user or in inventory, and vice versa. In other words, after the fact, supply equals demand. (This does not imply that planned supply necessarily equals planned demand.) Whatever inconsistencies arise in the modeling and forecasting process must be eliminated or rationalized by changes in inventory levels or prices, or both.

Another check for internal consistency makes use of the high-technology food chain (see Figure 5-2). The high-technology food chain is the simplified conceptual arrangement of the production of high-technology goods according to the order of utilization. In the food-chain approach, each product uses the preceding product as an input to production.

For example, integrated circuits (ICs) are produced from silicon wafers, workstations are produced from ICs, and so on. By checking product flows through the food chain, Dataquest is able to monitor the consistency of its various forecasts at different stages of the food chain. Modeling the food chain also enables Dataquest to forecast possible production bottlenecks and their implications for other product markets.

At the beginning of each forecast cycle, Dataquest assesses current and expected international macroeconomic conditions. In the next stage, given the macroeconomic outlook, forecasts of the electronic equipment systems markets are developed. At this stage, effort is concentrated on the systems markets and the important variables that influence these markets. All other things are held constant.

In the final stage, given the macroeconomic outlook and the systems outlook, forecasts of the semiconductor, software, and services markets are developed. Again, all other things are held constant; feedback from the semiconductor, software, and services markets to the systems markets, and the economy in general, are ignored.

Figure 5-2
The High-Technology Food Chain

Note: Dotted lines refer to feedback flows.
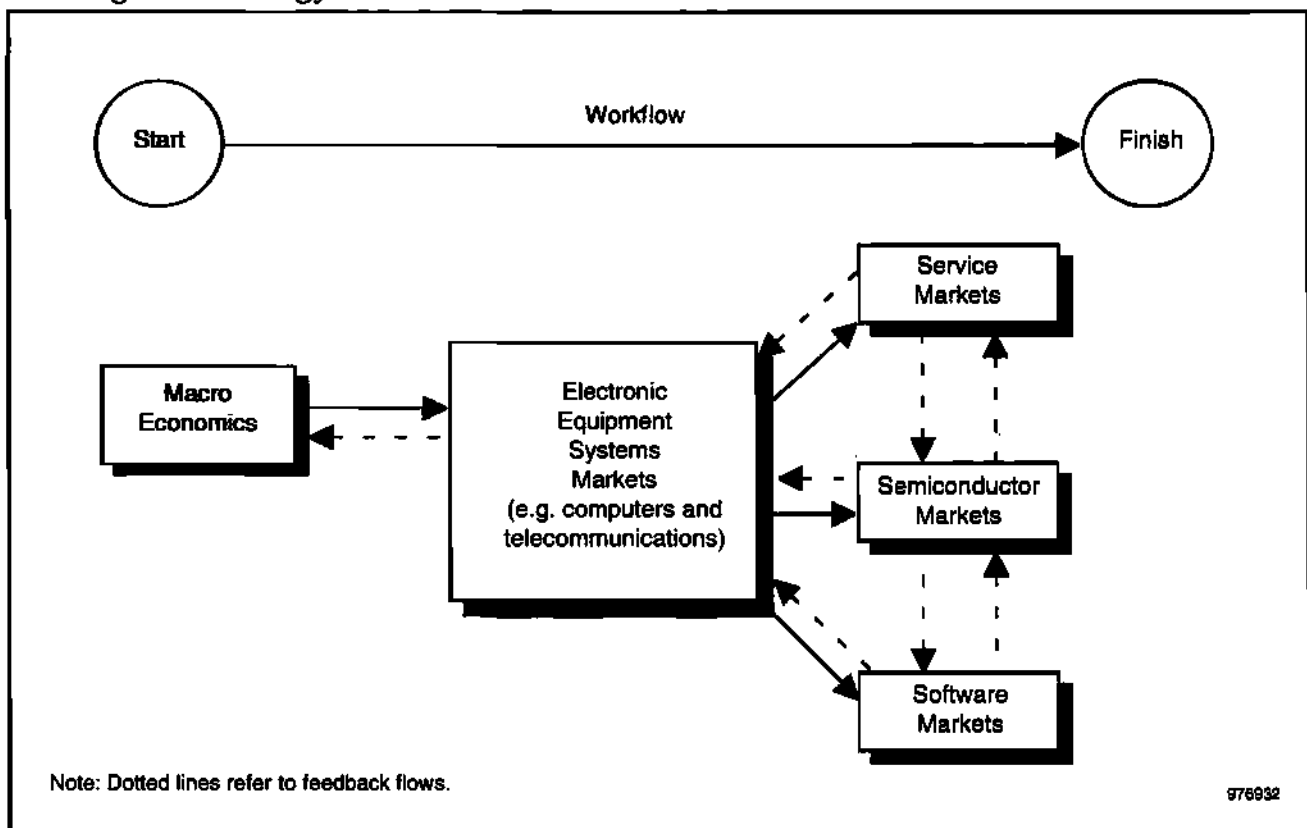
Source: Dataquest (October 1997)

The serial flow of effort just described should not be construed to imply that there is not a free forward or backward flow of communication between, for example, workstation analysts and semiconductor analysts; or lateral communication between, for example, mainframe analysts and personal computer analysts, or between semiconductor analysts and software analysts. The purpose of Dataquest's forecasting framework is to mirror real-world conditions and then to use the approach to logically analyze business conditions and to generate expectations about the future.

The factors or variables that are given or held constant are referred to as forecast assumptions. Forecast assumptions are the conditions upon which a forecast is based. A typical set of forecast assumptions includes expectations about macroeconomic conditions, currency exchange rates, technology characteristics, productive capacity, end-user market conditions, and political conditions.

While some assumptions may be universally applied to all market forecasts (macroeconomic expectations and currency exchange rates), assumptions about other markets may themselves forecast markets further up the food chain. For example, a semiconductor market forecast will use the most recent PC market forecast as a given assumption.

Long-Run Trends versus Short-Run Fluctuations

The basic thrust of the Dataquest forecasting model is that high-technology markets show short-term fluctuations around long-term trends. The long-run equilibrium movements determine the basic trends of the markets as they grow over time. The short-run movements around the long-run equilibrium are referred to as market fluctuations.

Market fluctuations result from unexpected changes in market conditions or from changes in technology. Manufacturers' expectations about future market conditions may differ significantly from actual market conditions. As an example, personal computer manufacturers accumulated huge semiconductor inventories in 1984 and 1985 in anticipation of a boom in PC sales. When actual PC sales fell short of the expected boom, the quantity of chips supplied to the market was greater than the quantity demanded at prevailing prices, and prices fell. Chip producers and consumers revised their plans in light of the new information and market conditions, and the market adjusted accordingly, albeit painfully. Discontinuous changes in technology may be either anticipated or unanticipated.

Seldom, if ever, does a high-technology market settle down to its long-run equilibrium long enough to grow along its trend growth path. Therefore, what we observe over time is a continuously fluctuating market tracing out its trend or long-run growth envelope.

The further into the future one forecasts, the greater the level of uncertainty about the expected state of a market. We have a clearer idea of events that we expect to disturb the market in the short term—and thus give rise to market fluctuations—than we do in the long term. The significance of the trend value in the final year of the forecast is that it is simply the expected value—or midpoint—of an ever-widening confidence interval or envelope. Of the range of possible future outcomes, it is the most likely or probable outcome.

Although Dataquest is constrained to forecasting under conditions of incomplete information, by no means are we completely unaware of all future events. For example, the analysts that monitor technology markets usually have information regarding manufacturing capacity at some future date. Dataquest includes such information in its forecasts.

In summary, the trend or long-range values of a forecast represent the expected value of a probability distribution of likely future outcomes. In the absence of shocks and other disturbances, high-technology markets tend to converge toward a long-run equilibrium growth path.

Empirical Methods

Microeconomic models provide a general conceptual framework to analyze market behavior. The task of forecasting, however, requires more specific, empirical models. No single empirical model or method is necessarily appropriate for forecasting all the different products and services that Dataquest follows. Furthermore, a strong case can be made for using more than one empirical model to forecast a product as a check of the robustness of a forecast.

All Dataquest empirical models combine prior information with sample data to produce forecast estimates. Prior information includes historical data of an industry, product, or market; knowledge accumulated by Dataquest analysts from industry experience; and the collective body of knowledge resident at Dataquest. Sample data consists of information that Dataquest collects and analyzes describing recent events about an industry, product, or market. Sample data is obtained through primary research, technical discussions with industry and company officials, announcements and articles in the trade press, and judgmental data based on knowledge, experience, and professional intuition.

There are four types of empirical techniques commonly used for forecasting at Dataquest, as discussed in the following four paragraphs.

Judgmental Methods

Judgmental methods are useful in situations where past data is scarce, causal relationships have not been identified or quantified, or some other major change has occurred in the forecasting context (such as a war or a trade agreement) that is not accounted for by other techniques. The validity of using these methods by themselves is uncertain, although using them correctly can provide very good forecasts, especially in uncertain environments. The objective of these judgmental methods is to provide logical, unbiased, and systematic quantitative estimates. Examples of judgmental methods include the Jury of Executive Opinion and the Delphi method.

Technological Methods

Technological methods are particularly appropriate for very new technologies with little or no data, or for very long range forecasting. These methods are highly exploratory, and large errors are quite likely. Examples of technological methods include curve fitting, including trend extrapolation; S-shaped curves and envelope S-curves; and analogous data.

Time Series Models

Time-series methods extrapolate past data into the future. The premise is that some underlying pattern exists in the variable being forecast. Examples of time series models include moving averages, exponential smoothing, decomposition models, and Box-Jenkins techniques.

Causal Models

The premise of causal models is that changes in the value of the variable of interest (for example, shipments of Product A) are closely associated with changes in some other variables (for example, the cost of Product B). Consequently, if future values of these other variables (cost of Product B) can be estimated, they can be used to forecast the desired variable (shipments of Product A). Examples of causal models include regression analysis, leading indicator analysis, and I/O models.

Forecast Quality Control

All forecasts must strictly adhere to the following guidelines to ensure internal consistency:

- The same value of a variable must be used throughout Dataquest.

- Analysts may vary the relationship between variables, according to their own research findings, but not the values of the variables.

- Not all variable relationships hold true for all industries; therefore, analysts may specify which sets of data to use.

- Data must conform to Dataquest standard segmentation.

- Final forecasts must be approved before release.

- All preliminary data is clearly stated as such.

- The source of the information and date is always cited.

Ultimately, the most important and toughest quality check that Dataquest forecasts must pass before publication is the test of reasonableness. The test of reasonableness is imposed by the team of experienced Dataquest researchers and analysts. Empirical methods are indispensable to economize the task of generating forecast estimates, but they are no substitute for the seasoned intuition of practical experience.

Chapter 6
Overall Research Process

The preceding chapters have described in great detail the numerous components of market research methodologies practiced by Dataquest. These components, when tied together, form a rigorous research process that is followed by each analyst across all regions and across all product research areas. Figure 6-1 depicts the entire process from the specifications stage to the final client deliverable.

Dataquest firmly believes that in any data report delivery, either at the country level, the regional level, and definitely at the worldwide level, there are four major players involved, as follows:

- Worldwide Research Operations analysts
- Regional and country Research Operations analysts
- Industry analysts
- Client

Each of the four players have varying roles to play in the four stages of research, as follows:

- Specifications—definition, purpose, and overview of the project
  - Understanding the project requirements in terms of the final deliverables
  - Design of the vendor survey forms as a guideline to include estimates for the current time period and actuals for the previous period
  - Review, modification, and design of the database structure
  - Develop, identify, and include new types of shipments, such as new models, new brands, new vendors, and so on
  - Review vendor contacts
- Data collection
  - Conduct secondary research
  - Conduct primary research of the channels
  - Initiate vendor data estimation and modeling
  - Conduct primary research—vendor data collection
- Quality control and analysis
  - Review results for variance from initial estimates and from generally known or assumed marketplace realities
  - Review for large swings in market share, average selling price, and shipments
  - Justify large swings with contract details
  - Check that worldwide totals and regional allocations are within ± 5 percent

- ❑ Model unsurveyed items beyond the primary research cut-off point
- ❑ Compare vendor-supplied data with data from channel and vertical-market surveys
- ❑ Produce vendorwide roll-up across all products tracked to ensure that Dataquest does not produce a revenue estimate exceeding published data

■ Reporting

Figure 6-1
Dataquest Research Methodology Process

Source: Dataquest (October 1997)

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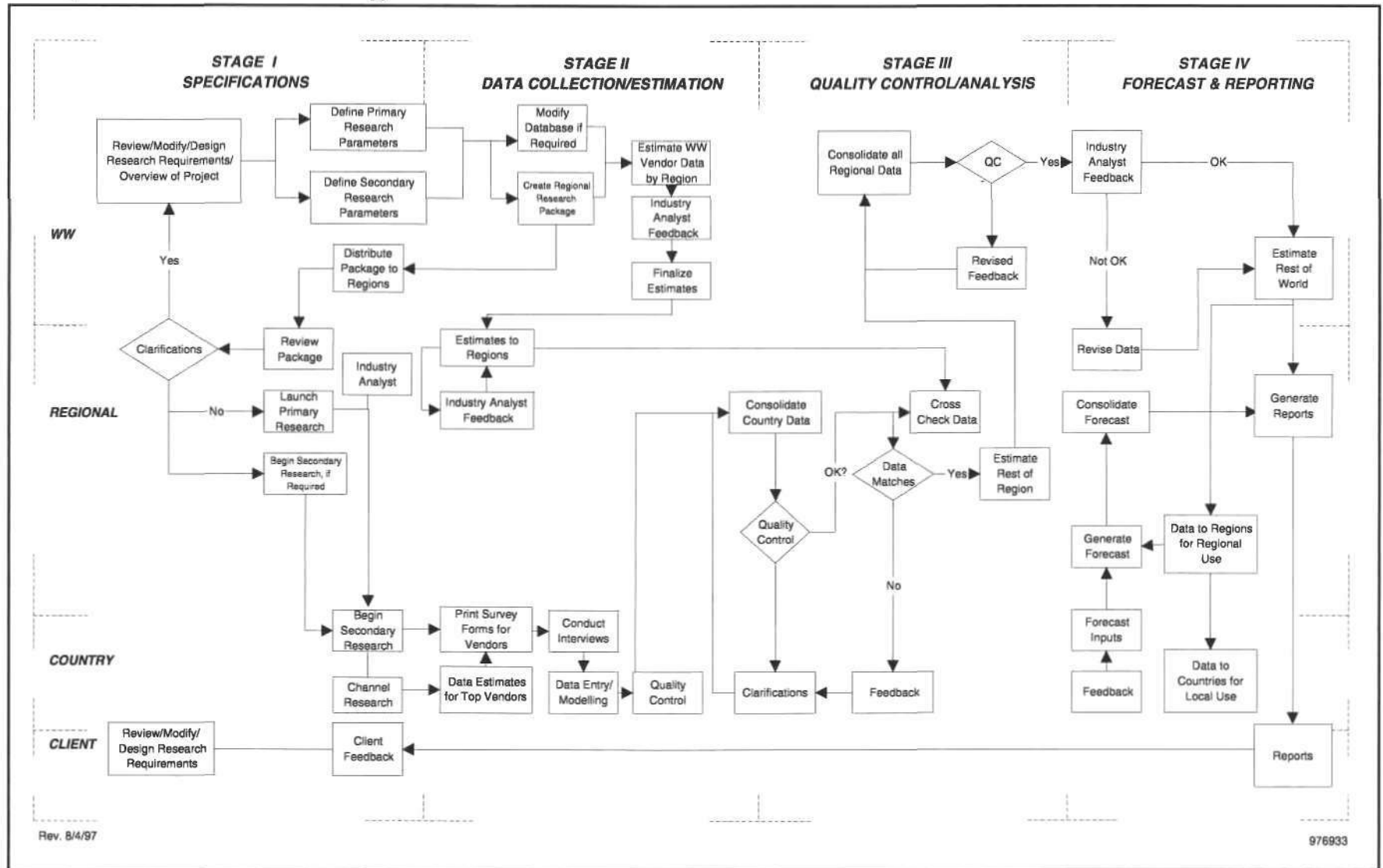
Chapter 7
Summary

When Dataquest clients receive research and analysis with the familiar citation "Source: Dataquest," they receive the end result of a rigorous methodology involving primary and secondary data collection, supply-side and demand-side market analysis, and the cross-industry perspective afforded by Dataquest's uniquely broad and in-depth worldwide coverage of high technology.

Behind the published research is a thorough body of knowledge involving industry professionals and research experts. As a result, Dataquest's clients receive more than simply a single and solitary point of information for planning and decision making. Dataquest provides comprehensive market research to its clients, including the highest-quality vendor-based research, user-based research, and market forecasts.

Appendix A
Currency Conversion _____

As a worldwide company, Dataquest tracks high-technology markets and companies in major regions of the world.

Because most high-technology companies sell their products in more than one country, and because revenue expressed in a variety of foreign currencies simply cannot be aggregated to estimate a worldwide value, we have adopted a common currency—the U.S. dollar—by which to evaluate and compare all markets and all companies. We have chosen the U.S. dollar for the following reasons:

- Since World War II, the U.S. dollar has been the major reserve currency of choice for industrialized nations, although its dominance has diminished somewhat in recent years.

- Dataquest is a U.S.-headquartered company.

Dataquest tracks data in various world regions and routinely deals with multiple currencies and currency conversion issues in all regions. Currencies routinely involved are the Australian dollar, the Austrian schilling, the Belgian franc, the British pound, the Canadian dollar, the Chinese renminbi, the Danish krone, the Dutch guilder, the Finnish markka, the French franc, the German mark, the Greek drachma, the Hong Kong dollar, the India rupee, the Irish punt, the Italian lira, the Japanese yen, the Malaysia ringgit, the Mexican peso, the New Zealand dollar, the Norwegian krone, the Portuguese escudo, the Singapore dollar, the South African rand, the South Korean won, the Spanish peseta, the Sri Lanka rupee, the Swedish krona, the Swiss franc, the Taiwanese dollar, and the Thai baht.

Dataquest also frequently encounters the European Currency Unit (ECU), which is expected to grow in importance as Europe grows closer to establishing the European Monetary Union in 1999. Dataquest has established a database of exchange rates for these currencies relative to the U.S. dollar. Exchange rates maintained in the database are calculated from certified noon buying rates in New York as recorded by the Federal Reserve Bank of New York. Rates are updated monthly based on the arithmetic average of rates prevailing over trading days of the month. Occasionally, Dataquest encounters currencies that are not regularly followed in its exchange rate database. For these currencies, Dataquest develops desired exchange rates from reliable sources comparable to the certified noon buying rates from New York.

Method

Data Collection

Dataquest regularly solicits data from non-U.S. companies in that company's local currency. Thus, data for a Japanese company is solicited in Japanese yen, data for German companies in German marks, and so on. If a company wishes to report data in U.S. dollars, Dataquest requests that the company use the most recent year-to-date currency exchange rate as supplied by Dataquest from its exchange rate database.

Average Currency Exchange Rates

Once data denominated in foreign currency is collected, Dataquest uses the average currency exchange rate for the relevant time period to express the data in U.S. dollars. The average exchange rate for a given quarter is calculated by summing the exchange rates for the three months of the quarter and dividing the sum by three. Similarly, the average exchange rate for a year is calculated by summing the exchange rates for the 12 months of the year and dividing the sum by 12.

The exchange rate used is determined by the precise period of time being evaluated. Most of our historical market sizing and market share data is evaluated on a calendar-year or calendar-quarter basis. However, in evaluating the fiscal-year or fiscal-quarter performance of an individual company, an exchange rate must be calculated for the specific fiscal period under review. For example, NEC Corporation's fiscal year ends March 31. Therefore, when evaluating NEC's financial performance in U.S. dollars, the proper exchange rate would be the average yen per dollar exchange rate for the 12 months beginning April 1 of the previous year and ending March 31 of the current year.

Currency Conversion

Handling historical data reported in foreign currencies is relatively straightforward. Dataquest maintains a database of monthly exchange rates for the currencies of most countries.

Conversion of U.S. Dollar to Foreign Currency Unit

The formula for converting U.S. dollars to other currencies is as follows:

(U.S. Dollar Value) x (Foreign Currency Unit per U.S. Dollar Exchange Rate) = Foreign Currency Unit Value

Example:

If U.S.$1 = Japan ¥120 , then

$200 = ¥24,000

The formula used is: $200 x ¥120/$1 = ¥24,000

Conversion of Foreign Currency Unit to U.S. Dollar

The formula for converting other currencies to U.S. dollars is as follows:

(Foreign Currency Unit Value)/(Foreign Currency Unit per U.S. Dollar Exchange Rate) = U.S. Dollar Value

Example:

If Japan ¥120 = U.S.$1, then

¥24,000 = $200

The formula used is: ¥24,000/¥120/$1 = $200

Exchange rates can be expressed in either of two ways: Foreign Currency Unit per U.S. Dollar, or U.S. Dollar per Foreign Currency Unit. The two are reciprocals of each other. Traditionally, the former is preferred by U.S. analysts for ease of use, as shown in the following example:

Foreign Currency Unit per U.S. Dollar: One U.S. dollar equals 120 Japanese yen.

U.S. Dollar per Foreign Currency Unit: One Japanese yen equals 0.008333 U.S. dollars.

Currency Conversion: Unweighted versus Weighted Exchange Rates

When the pattern of a company's shipments over a given year is unknown, Dataquest believes it is reasonable to assume that the company's shipments were uniformly distributed over the year. As a result, when Dataquest receives annual data from a non-U.S. company for which there is no monthly or quarterly detail, it is assumed the data is distributed across the year evenly. Consequently, Dataquest converts the data to U.S. dollars using an unweighted annual exchange rate based on the simple arithmetic average of the monthly exchanges rates prevailing over the year. However, when the pattern of a non-U.S. company's shipments over a year is known, either because data is collected on a quarterly basis or because quarterly detail is requested for the data, it may be desirable to express the data in U.S. dollars using a weighted average exchange rate based on the chronological pattern of the shipments. A similar argument can be made for data concerning total market consumption or production within a region over a given year where the chronological pattern of consumption and production is either known or unknown.

For any given data, Dataquest bases its choice between using weighted or unweighted exchange rates on several different factors. The most important consideration is the nature of related data to which the data in question will be compared. It is generally undesirable to compare data re-expressed in U.S. dollars by means of different exchange rates. Hence, unweighted exchange rates may be used to convert data for which weighted average exchange rates appear more appropriate because the data will eventually be compared to other data for which only unweighted average exchange rates are appropriate. Dataquest always publishes the exchange rates it uses to convert data denominated in foreign currencies to U.S. dollars and always indicates the nature of those rates.

Weighting According to a Chronological Pattern of Consumption

Where use of a weighted average exchange rate is appropriate, calculation of the rate requires some care. Table A-1 presents an example of a weighted average exchange rate calculation for a Japanese company whose annual data is available by quarter. The table compares the weighted average exchange rate to the unweighted average rate.

Table A-1
Example of Weighted versus Unweighted Average Annual Exchange Rate

	Q1	Q2	Q3	Q4	Year
Shipments in Japanese Yen	10,580	16,125	21,800	28,225	76,760
Shipments in U.S. Dollars	100	150	200	250	700
Percent Total Annual Shipments	14.3	21.4	28.6	35.7	100
Exchange Rate (Yen per U.S.$)	105.8	107.5	109.0	112.9	-
Weighted Average Exchange Rate	-	-	-	-	109.7
Unweighted Average Rate (Arithmetic Mean)	-	-	-	-	108.8

Source: Dataquest (October 1997)

The unweighted average rate is calculated from the arithmetic mean of the quarterly exchange rates according to the following formula:

$(105.8 + 107.5 + 109.0 + 112.9)/4 = 108.8$

Alternatively, it is calculated by the formula:

$(25 \times 105.8 + 25 \times 107.5 + 25 \times 109.0 + 25 \times 112.9)/100 = 108.8$

where 25 reflects an assumed even weight for each quarterly exchange rate.

The weighted average is calculated by the following formula:

$76,760/700 = 109.7$

Alternatively, it is calculated by the formula:

$(14.3 \times 105.8 + 21.4 \times 107.5 + 28.6 \times 109.0 + 35.7 \times 112.9)/100 = 109.7$

where 14.3, 21.4, 28.6, and 35.7 reflect the appropriate weight for each quarterly exchange rate based on actual shipments.

Whereas the unweighted average rate based on the arithmetic mean of quarterly exchange rates implicitly assumes evenly distributed quarterly shipments, the weighted average rate explicitly takes account of the quarter-to-quarter increase in company shipments and adjusts the average annual exchange rate accordingly. In the example, the weighted average exchange rate is above the unweighted average rate. It is also possible for the weighted average exchange rate to lie below the unweighted average rate. Indeed, the two rates will be different so long as shipments within a year exhibit any variability. Once again, the choice between using a weighted average or unweighted average exchange rate to re-express foreign-currency-denominated data in U.S. dollars requires consideration of many factors. As the example illustrates, the choice between rates has consequences not only for the data in question but for any comparisons involving the data with other data.

Weighting According to a Basket of Currencies

Just as it may be appropriate to use a weighted average exchange rate to re-express foreign-currency-denominated data into U.S. dollars when the data is known to vary over time, it may also be appropriate to use a weighted average exchange rate to re-express data that varies across geography. In those cases, the weighted average rate will be calculated from a weighted-average basket of currencies. Dataquest routinely estimates total market consumption and production in multicountry regions where several different foreign currencies coexist. Where data is not detailed by country, Dataquest selects a dominant currency in the region as the basis for converting regional data expressed in that currency into dollars, and vice-versa. Where data can be detailed by country, Dataquest develops a weighted-average basket of currencies based on the countries involved and their share of regional consumption and production when appropriate.

Dataquest's treatment of European data is instructive on this point. Dataquest routinely uses the ECU to denominate data for the European market as a whole. The ECU is a ready-made basket of currencies established by the European Union (EU) . The ECU basket of currencies contains specific amounts of EU-member-country currencies. Each currency's share in the ECU basket is weighted broadly in line with the respective country's GNP and foreign trade. The ECU thus represents a reasonable basis in which to denominate European market data. Moreover, its exchange rate relative to the dollar is in turn a reasonable means by which to re-express European market data in dollar terms. Like the unweighted average in Table A-1, however, use of the ECU implicitly assumes a geographic distribution of consumption and production among European countries. Accordingly, where country-level detail for European data is known, use of a weighted average exchange rate based on a different basket of currencies may be appropriate. Indeed, the ideal basket would include only the currencies of those countries participating in the relevant market activity, weighted according to their share of that activity. Here again, the choice between an unweighted or, better yet, implicitly weighted average exchange rate like the ECU and a weighted or, better yet, explicitly weighted average exchange rate specifically tailored to the data of interest will depend on many different factors. Consideration should not only be given to any effects on the data itself but also to the impact on any comparisons between the data and other data.

Forecasting

Dataquest routinely forecasts both global and regional IT data. Forecasts are typically for five-year intervals that include the current year and the following four years. Dataquest forecasts are generally expressed in U.S. dollars. Normalizing forecasts relative to a common currency not only facilitates aggregation of forecasts across regions but simplifies inter-regional comparisons. Dataquest does not forecast exchange rates as part of its forecasting efforts. Instead, Dataquest uses projections of currently prevailing exchange rates in its forecasts. Forecasting future exchange rates is highly risky given their variability and volatility. But because economists generally believe exchange rates are determined in economically "efficient" markets, it is reasonable to assume that currently prevailing exchange rates represent the best possible prediction of future

exchange rates. Thus, when forecasting non-U.S. IT data, Dataquest assumes that its most recently calculated monthly exchange rates will continue to prevail throughout all future months of the forecast period. Dataquest then derives required quarterly or annual exchange rates for its forecasts based on this assumption. The following example should help clarify Dataquest practice.

Consider a midyear forecast of Japan's electronic equipment production for 1995 through 2000 formulated in July 1996. At the time the forecast was formulated, Dataquest's database of monthly exchange rates contained the following rates:

- January 1996—¥105.75/U.S.$

- February 1996—¥105.79/U.S.$

- March 1996—¥105.94/U.S.$

- April 1996—¥107.20/U.S.$

- May 1996—¥106.34/U.S.$

- June 1996—¥108.96/U.S.$

 Since the monthly exchange rates in Dataquest's database are calculated from daily rates observed throughout a month, a rate for July was not yet available at the time the forecast was formulated. Consistent with this discussion, Dataquest assumed the June 1996 rate of ¥108.96/U.S.$ would continue to prevail throughout all future months of the forecast period; that is, from July 1996 through December 2000. Annual exchange rates for 1996 through 2000 were then derived by simply averaging given and assumed monthly exchange rates for the relevant year. Thus, the annual rate for 1996 was derived by averaging the given rates for January through June and the assumed rate of 108.96 for July through December as follows:

$$(105.75 + 105.79 + 105.94 + 107.20 + 106.34 + 108.96 + 6 \times 108.96)/12 = 107.81$$

Similarly, annual rates for 1997 through 2000 were derived by averaging the assumed rate of 108.96 for all months. Desired quarterly rates would be derived in analogous manner from given and assumed monthly exchange rates for the relevant quarter.

Once again, Dataquest always publishes the exchange rates it uses in its forecasts. Additional information about Dataquest's exchange rate practices and its monthly exchange rate database, including a monthly report from the database, will gladly be furnished on request.

Appendix B
Worldwide Geographic Region Definitions ———

Asia/Pacific Region

Countries Being Covered

Australia, China, Hong Kong, India, Indonesia, South Korea, Malaysia, Singapore, Taiwan, and Thailand.

Rest of Asia/Pacific

American Samoa, Ashmore and Cartier Islands, Baker Island, Bangladesh, Bhutan, Bouvet Island, Brunei, Cambodia, Christmas Island, Cocos (Keeling) Islands, Cook Islands, Coral Sea Islands, Federated States of Micronesia, Fiji, French Polynesia, Guam, Howland Island, Jarvis Island, Johnston Atoll, Kingman Reef, Kiribati, Laos, Macau, Maldives, Marshall Islands, Midway Islands, Mongolia, Myanmar (Burma), Nauru, Nepal, New Caledonia, New Zealand, Niue, Norfolk Island, Northern Mariana Islands, North Korea, Pakistan, Palau, Palmyra Atoll, Papua New Guinea, Paracel Islands, Philippines, Pitcairn Islands, Solomon Islands, Spratly Islands, Sri Lanka, Tokelau, Tonga, Tuvalu, Vanuatu, Vietnam, Wake Island, Wallis and Futuna, and Western Samoa.

Western Europe Region

Countries Being Covered

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and United Kingdom.

Rest of Western Europe

Andorra, Cyprus, Faroe Islands, Gibraltar, Greenland, Guernsey, Iceland, Isle of Man, Jersey, Liechtenstein, Luxembourg, Malta, Monaco, San Marino, and Svalbard.

Eastern Europe Region

Countries Being Covered

Belarus, Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Russia, Slovakia, and Ukraine.

Rest of Eastern Europe

Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Croatia, Georgia, Kazakstan, Kyrgyzstan, Macedonia, Moldova, Romania, Slovenia, Tajikistan, Turkmenistan, Uzbekistan, and Yugoslavia (Serbia and Montenegro).

Japan Region

Japan

Latin America Region

Countries Being Covered
Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela.

Rest of Latin America
Anguilla, Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Cayman Islands, Clipperton Island, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Falkland Islands (Islas Malvinas), French Guiana, Grenada, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique, Montserrat, Navassa Island, Netherlands Antilles, Nicaragua, Panama, Paraguay, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Tortola (British Virgin Islands), Trinidad and Tobago, Turks and Caicos Islands, Uruguay, Virgin Islands (St. John, St. Croix and St. Thomas).

Middle East/Africa Region

Countries Being Covered
None

Rest of Middle East/Africa
Afghanistan, Algeria, Angola, Bahrain, Bassas da India, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Cote d'Ivoire, Djibouti, Egypt, Equatorial Guinea, Eritrea, Ethiopia, Europa Island, Gabon, Gambia, Ghana, Glorioso Islands, Guinea, Guinea-Bissau, Iran, Iraq, Israel, Jordan, Juan de Nova Island, Kenya, Kuwait, Lebanon, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mayotte, Morocco, Mozambique, Namibia, Niger, Nigeria, Oman, Qatar, Reunion, Rwanda, Saint Helena, Sao Tome and Principe, Saudi Arabia, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Syria, Tanzania, Togo, Tromelin Island, Tunisia, Turkey, Uganda, United Arab Emirates, Western Sahara, Yemen, Zaire, Zambia, and Zimbabwe.

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