

STRATEGIC ANALYSIS AND RECOMMENDATIONS FOR XYZ RESEARCH
CORPORATION: A CASE STUDY

By

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To my family.

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Abstract of Thesis Presented to the Graduate School
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This study is a collaboration of efforts between the Food and Resource Economic Department of the University of Florida and XYZ Research Corporation to (1) determine the main forces influencing the behavior of food-testing laboratories participating in the U.S. independent laboratory industry, (2) assist XYZ in developing a strategy and offer recommendations, and (3) generate a separate teaching case study.

Limited information on the industry was available at the beginning of this study. Competitive analysis was used to determine a low level of rivalry in the industry. The low level of rivalry was due to an accelerated growth of the market observed in this relatively young industry. However, most forces were found to work toward high levels of rivalry in the absence of industry growth.

Several interviews and focus groups were conducted at XYZ Research to gain insights into XYZ's competitive advantages and disadvantages. An analysis of the strengths, weaknesses, opportunities and threats of XYZ revealed several competitive

advantages that the company possesses over its rivals as well as some areas of weakness that can be improved. Also, the analysis revealed the existence of numerous potential opportunities facing XYZ, and only a small number of weak threats.

Specific considerations regarding the two alternative strategies proposed by this research (cost-leadership or differentiation) were developed for XYZ together with a set of recommendations on very specific issues the company should address.

The final products of this study include a proposed business plan (based on the strategic analysis conducted for XYZ Research Corporation) and a teaching case study for use in Agribusiness and Human Resource classrooms.

CHAPTER 1 RESEARCH SETTING

This chapter is divided in three sections. Section 1.1 briefly discusses the background and setting of this study. Section 1.2 identifies the main problem and main issues concerning our study. Section 1.3 states both the relevant general and specific objectives.

1.1 Background and Justification

The present and future role of the U.S. land grant university system has been a matter of discussion in the last few years, as the original conditions that provided the impetus for a nationwide cooperative extension system in the 1860s have changed over time. During the formation of the cooperative extension system, a large farm population existed that had unique and distinct characteristics compared to urban households. Farms were also dispersed and isolated, with slow transportation and communications networks. The national concern for food security combined with the needs of farmers, and the need of many agriculture colleges for a constituency and base of support created a demand for agricultural extension (National Research Council 1996). Today, farm families are not dispersed or isolated, transportation networks and communications are rapid and extensive, and farm households are not nearly as different from non-farm households as they used to be (National Research Council 1996). By 1991, education and income of farm households was already, on average, on par with the education and income of non-farm households (Dacquel and Dahmann 1993). The context of the national condition is very different than it was at the time the base for extension was laid.

At the same time, governments around the world have continuously experienced increasingly tighter budgets. As a result of budgetary pressure, many countries have examined alternative arrangements for delivery of extension services, including public expenditure reductions, changes in approaches to generating tax revenue, charges for government extension services, commercialization and privatization (Howell 1985). In the United States, total federal funds for extension were \$439 million in 1995. This represented 29 % of all cooperative extension funding from state, local (including county and private), and federal sources, down from 42 % 20 years prior (National Research Council 1995). According to Le Gouis (1991), three principal policies have been used by governments: (1) public financing by the taxpayer only for the kinds of services that are of direct concern to the general public; (2) direct charging for some individual services with direct return, such as improved income; and (3) mixed funding shared between public and private professional association contributions, for some services where benefits are shared.

Presently, the U.S. land grant university system faces a country with few farmers and many consumers. Farms that account for most of the agricultural products entering commercial markets are highly sophisticated organizations, operating with cutting-edge production and information technologies. Under these circumstances the U.S. land grant system must compete or collaborate with a private sector that shows growing participation in offering extension as consulting services; while at the same time balancing a reduced budget to respond to all farm, rural, urban, and suburban needs.

Some discussions point out the growing similarity of the current role of the land grant system to that of a consulting agency. In which ways and how much does the role

of public universities reflect that of being consulting agencies for different private sectors in the economy? Furthermore, if this is the case, how can both the private and public sector take advantage of this kind of relationship? According to Feller et al. (1987), one way to look at this relationship is to see extension personnel as wholesalers of technical information; and private consultants as increasingly, the retailers. Our study is a result of a public-private partnership between University of Florida and XYZ Research Corporation. We analyzed the partnership for insights in the road to answering the questions stated above.

1.2 Problem Statement

For the last 3 years, XYZ Research Corporation has been performing well financially. Such positive performance has sparked a desire from the company to grow and to improve even further.

The company operates in an immensely complex and not well-defined U.S. independent food-testing laboratory industry. The industry offers food-testing services to food companies under a highly federal-regulated environment. A large number of very diverse firms (ranging in size from small mom-and-pop types of businesses to large multinational multi-site billion-dollar corporations) participate in the industry. Independent private laboratories, in contrast with publicly traded companies, are not required to make readily available to the public their financial situation or any other information. As a result, XYZ Research Corporation's management staff deals with, among other things, a thin market for information on competitors' and industry data (e.g., sales, size) that is needed for planning future moves.

In its struggle to find the best plan of action, XYZ's management team realized the need to address several internal and external factors that were constraining the company

from developing to its full potential as a leader in the industry. XYZ Research Corporation contacted the Food and Resource Economics Department (FRED) in the University of Florida requesting assistance in identifying such internal factors and external industry-issues; and in suggesting ways to improve its competitiveness and growth.

Considering the current issues relating to the present and future role of the land grant university system, our study posed a remarkable opportunity to set an example of public-private partnership arrangements that benefit both the private and public sector. The goals of our study are stated at the end of this chapter in Section 1.3.

1.2.1 Description of the XYZ Research Corporation and of the U.S. Independent Food-Testing Laboratory Industry

1.2.1.1 Description of XYZ Research Corporation

Established in 1967 by Dr. William L. Brown, XYZ Research Corporation is a full-service laboratory based in Gainesville, Florida. The company started out with 20 scientists, and has grown to more than 50 scientists and a \$1.5 million payroll. XYZ Research Corporation conducts daily chemical, physical, and microbiological analyses for its customer base of over 2000 food companies. This includes mostly large (but also small) fast-food chains, mainstream chain restaurants, food retail and wholesale firms, food-processing firms, packing firms, commercial farms, and some companies in foreign countries.

XYZ Research Corporation's organization and major departments are described as follows: (1) Top Management (CEO, Dr. William Brown; Vice President, Mr. Hart); (2) Quality Control; (3) Office Management; (4) Business Development (increasing XYZ's capabilities to include product development, HACCP auditing, and biotechnology

services); (5) Sales and Marketing; (6) Microbiology (tests for presence of pathogens in food, errors in food processes that result in spoilage, and purity of water; and offers regulatory assistance); (7) Research Microbiology (analytical, research, and consulting services); (8) Chemistry (analytical tests for physical properties); (9) Food Chemistry: analytical tests on general nutritional content; miscellaneous properties of foods (pH, flavor, odor, etc); and presence of pesticide residues, additives, and toxins; and (10) Chemistry/Problem Solving (offers problem solving services for any type of food product).

1.2.1.2 Description of the U.S. independent food-testing laboratory industry

Independent food-testing laboratories are part of a large set of very different types of laboratories operating in the United States. In general, independent laboratories offer a wide range of services to several industries. Focus may vary immensely, from dental X-Ray laboratories, to Research laboratories, or Motion Picture laboratories. The SIC has 19 classification numbers that include the word laboratory or laboratories. The scope of our study is limited to independent food-testing and product-development laboratories.

Food-testing laboratories are classified in the SIC under Division I: Services and under Industry Group 873: Research Development and Testing Services. Classification number *8731: Commercial Physical and Biological Research* includes establishments primarily engaged in commercial physical and biological research and development on a contract fee basis. Facilities engaged primarily in food testing fall under classification *8734: Testing Laboratories*. Specifically our interest is subdivision *8734-02: Laboratories—Testing* and *8734-14 Laboratories—Analytical*. Finally, noncommercial research organizations (such as those funded by grants, endowments or contributions) are part of classification *8733: Noncommercial Research Organizations*. When discussing

the independent lab industry our study refers only to section 8731: *Commercial Physical and Biological Research* and the relevant sections of 8734: *Testing Laboratories*. Section 4.1 of our study offers a deeper look into the industry.

1.3 Objectives

1.3.1 General Objectives

Two general objectives will be used as guides to achieve our research goals. They are

1. **To introduce an analytical framework that could be applied to XYZ Research Corporation and to the U.S. independent food-testing laboratory industry.** XYZ Research Corporation approached the Food and Resource Economics Department of University of Florida requesting assistance in identifying ways to achieve growth and improve competitiveness in its industry.
2. **To explore and characterize the multiple mutually beneficial opportunities existent in public-private research partnerships and re-define the expanding-evolving role of the land grant university system to interact more directly with the private sector.** Final output of our study will be both beneficial to the private sector (strategic plan) and educational (case study).

1.3.2 Specific Objectives

Six specific objectives were identified as necessary to effectively carry out our research. They were based on the general objectives mentioned above. These are

1. **To provide XYZ Research Corporation with a detailed description of the economic aspects of the U.S. independent food-testing laboratory industry** and the relations between the industry's demand and factors affecting the U.S. food supply chain. Many factors concerning the whole food supply chain are factors that affect the lab industry and dictate how their demand is generated.
2. **To conduct a strategic analysis of XYZ Research Corporation.** The strategic analysis is composed of several focus groups conducted with employees and management in the company. Output includes employee/management ranked answers on the most important internal resources in the company.
3. **To provide an analysis of the competitive forces** functioning in the U.S. independent food-testing laboratory industry. Strong competitive forces imply increased rivalry and a reduced likelihood for sustaining industry-wide profitability.

4. **To conduct an analysis of the strengths, weaknesses, opportunities and threats (SWOT) confronting XYZ Research Corporation and the U.S. independent lab industry.** Internal strengths and external opportunities reduce the strength of competitive forces, while internal weaknesses and external threats increase the strength of the competitive forces.
5. **To assist XYZ Research Corporation in developing a strategic plan and propose them a set of strategic alternatives** with the purpose of guiding their future development. The strategic plan is a core plan of action based on the competitive force analysis, the SWOT analysis and the strategic plan analysis. The strategic plan is intended to commit XYZ Research Corporation with a set of goals and objectives that will jumpstart their growth from a medium-size profitable company into a true corporation.

CHAPTER 2 LITERATURE REVIEW

This literature review is divided into two sections: Section 2.1 shows the use of strategic analysis and strategic planning in strategic management research. Section 2.2 discusses the influences of economics on strategic management.

2.1 Strategic Analysis and Strategic Planning in Strategic Management Research

Miller and Dess (1996) define strategic analysis as the conjugation of three processes: (1) consideration of the organization's strategic intent; (2) exploration of the opportunities and threats presented in the immediate environment surrounding the organization; and (3) a study of the organization's internal strengths and weaknesses. This definition is very similar or equivalent to the concept of a Strengths Weaknesses Opportunities and Threats Analysis (SWOT) plus any effort to define a company's strategy.

On the other hand; strategic planning is defined by Aaker (1988) as the process of increasing a company's ability to anticipate changes that have strategic implication, by focusing on their immediate market environment to achieve an in-depth understanding of competitors and customers. Also defined by Pearce (1994), as an on-going process based on the implementation and development of better strategies.

Finally, strategic management is described as the on-going dynamic process (involving both strategic analysis and strategic planning) leading to a set of analysis-driven decisions and actions taken by a firm to achieve its performance goals

(Pearce 1994, Peterson 1994). Performance may mean desired level of profits, market share, customer satisfaction, or sales.

Also, according to Zahra et al. (1993), competitive analysis is a process by which firms define and try to understand their industry; identify their competitors; determine strengths and weaknesses of rivals; and anticipate situations and moves. According to Beaver and Ross (2000), for small companies, strategic management is often an adaptive process. Such process is carried out to achieve positional and resource advantages. Decisions are taken from day to day, as needed, which is the way for meeting most small environmental changes. Our study stresses the importance for XYZ, as a medium-large company, in developing a more structured and systematic way of thinking strategically (regardless of what strategy they pursue) to address a rapidly growing industry.

Sorensen, Valqui, and Engstrom (2003, p. 566), performed SWOT-based research to identify the issues constraining European businesses from developing effective strategies to adopt and incorporate Information Technologies (IT) to their operations. Insights and identified issues obtained through the SWOT analysis were used to develop alternative strategies for small businesses. Their research was conducted using the case study strategy. The case involved a small Swedish company referred to as Kirby. The authors state

The SWOT analysis was used simply because the first contact with the firm made it clear that the sales manager had no idea of how to structure the complex situation. As the authors see it, there were not real alternatives to SWOT. With only one participating person, a rather restricted time frame (for interviews and the number of interviews that could be expected), and the authors' ambition to leave behind at least one tool or idea Kirby could work with alone, SWOT seemed as the best option. As mentioned earlier, the application of SWOT was made through several meetings allowing the sales manager to reflect on both the issues and the situation and on the methodological approach for structuring the problem. The time between meetings made up a more productive and interactive analysis. By starting out

discussions one day, the sales manager became more attentive to the SWOT factors discussed, and at next meeting he could always add on new relevant issues. However, it was also clear that the analysis could not have been applied without the technological knowledge of the facilitator. Application of SWOT requires a good information and sound knowledge base to succeed. The sales manager did not have sufficient knowledge especially about the external SWOT factors, and the direct engagement of the facilitator as an expert was a requirement for carrying out the analysis. In terms of using SWOT with an illustrative purpose, it is the authors' perception that the manager did get so much insight into SWOT methodologically that he could be able to apply it himself or take on a facilitator role.

Dyson (2003, p. 631) used SWOT based research to assist in formulating a development strategy for the University of Warwick, UK. In his words

The application links SWOT analysis to resource-based planning, illustrates it as an iterative rather than a linear process, and embeds it within the overall planning process. Lessons are drawn both for the University and for the strategy formulation process itself.

Wysocki (1997) used SWOT analysis and Porter's Five Force framework to develop a strategic plan for Michigan's Public Variety Field and Seed Potato Producers. The SWOT analysis was conducted through several meetings, face-to-face interviews, and surveys; similar to Sorensen, Valqui, and Engstrom (2003).

2.2 Influence of Economics on Strategic Management

Five specific examples of how economics has affected strategic management include: (1) traditional entry-barrier theory yielded the concepts of scale economics and sunk costs, while mobility barrier theory stressed the importance of learning and first-mover advantages in making specialized investments; (2) the notion that high profits are returns to specialized high-quality resources supported by the Chicago school; (3) game theory provided models to analyze (and the basis for understanding) firms' use of preemption, brand crowding, dynamic limit-pricing, signaling, and reputation for toughness to strategically protect market positions; (4) the economics of innovation

brought focus on Schumpeterian competition, intellectual property, and the costs of technology transfer; and (5) transaction costs economics (Rumelt et al. 1991).

Figure 2-1 shows the definitions of sunk costs and scale economies, their potential effect to the industry, and their influence to strategic management. Sunk costs refer to costs that once paid are impossible to recover. The magnitude of sunk costs required to start a business in a given industry represents a barrier to entry for new firms because it increases the size of the initial investment required. It also increases the level of risk associated, by increasing the amount of money that can be lost if the business fails. In terms of its influence to strategic management: (1) established firms do not worry as much for new firms entering the industry (which allows them to concentrate on existing competition); and (2) the rivalry among established firms is higher (the higher the magnitude of sunk costs, the higher the loss associated with going out of business).¹

- **Sunk costs**

Definition: costs that once paid are impossible to recover

Effect: can represent an entry barrier

Influence: 1) barrier allows established firms to concentrate in existing competition
2) increases rivalry among existing competition
- **Scale economics**

Definition: lower costs resulting from mass production

Types: technical, managerial, financial, marketing, commercial, external

Effect: enhances company's ability to engage in price competition

Influence: argument favoring cost leadership strategies

Figure 2-1. Sunk costs and scale economics definitions, effect on the industry, and influence on strategic management theory.

Scale economies occur when mass-producing a good, results in lower average costs. Lower average costs can be caused by: (1) technical economies (making better use

¹ For a detailed discussion of sunk costs see: Baumol, W. J., Panzar, J. C., and Willig, R. "Contestable Markets: An Uprising in the Theory of Industry Structure." *American Economic Review*, 72(1)(1983):1-15.

of equipment); (2) managerial economies (splitting managerial skills among higher levels of output); (3) financial economies (having access to loans with lower interest rates than smaller firms); (4) marketing economies (diluting advertising costs among more output); (5) commercial economies (buying inputs in bulk with discounts); and (6) external economies (e.g., local skilled or low-cost labor). Scale economies affect strategic management decisions by improving a company's ability to engage in price competition.

Also, influencing strategic management is the concept of first mover advantage. First mover advantages give firms access to excess profits created by shocks to the market before any competitors have access to them. Furthermore, first mover advantages offer firms the opportunity to create long-run competitive advantages over competitors (e.g., brand name, customer recognition, control of distribution channels, technological lead). Three types of first mover advantages identified are: (1) technological leadership, (2) preemption of assets, and (3) switching costs.

Technological leadership first mover advantage is related to the concepts of learning curve and experience curve. The learning curve effect states that the more often a task is performed, the less time will be required on each iteration. Wright (1925), first noticed this effect at the Air Force Base in America, where he determined that every time aircraft production doubled, the required labor time decreased by 10% to 15%. The experience curve effect is broader in scope than the learning curve effect, encompassing far more than just labor time. It states that the more often a task is performed; the lower will be the cost of doing it due to increased labor efficiency, standardization, specialization, experience, and technology driven learning (Boston Consulting Group 1972). The Boston Consulting Group strategists examined the consequences of the

experience effect for businesses. They concluded that because relatively low cost of operations is a very powerful strategic advantage, firms should capitalize on these learning and experience effects. The reasoning is, increased activity leads to increased learning, which leads to lower costs, which can lead to lower prices, which can lead to increased market share, which can lead to increased profitability and market dominance. Today we recognize that there are other strategies that are just as effective as cost leadership so we need not limit ourselves to this one path. See for example Porter generic strategies discussed in Chapter 5 (Section 5.1) of this study, which talks about product differentiation and focused market segmentation as two alternatives to cost leadership. To avoid confusion between scale economies and the experience curve effects it is helpful to remember that economies of scale are those efficiencies that arise from an increased scale of production, and that experience effects are those efficiencies that arise from the learning and experience gained from repeated activities.

Schumpeter, defined competition as a dynamic process wherein firms strive to survive under an evolving set of rules that constantly produce winners and losers. His 1912 book on *The Theory of Economic Development* established the links between innovation and competition. His 1928 paper on *The Instability of Capitalism* highlighted the transient character of competition conditions (Tavares 1999). Firms can have an advantage in this game by creating asymmetries in information. In such, creation and protection of intellectual property are also related to the technological leadership first-mover advantage since the experience curve effect is diminished as the inter-firm sharing of technological information is increased. This is an example of a cost of

technological transfer. One factor that can increase the sharing of information is inter-firm mobility of workers.

The second first mover advantage discussed is preemption of assets. Preemption is the appropriation of something in advance of others. For example, firms can gain advantage over competitors by pursuing strategies that enable them to exercise preemption over input factors or intellectual property (R&D and patents).

The third first mover advantage has to do with increasing switching costs. For example; by creating brand loyalty through exclusive quality, or creating artificial brand loyalty through contractual switching costs like airlines do with frequent flier programs.

However, according to Rumelt et al. (1991), the most influential change to strategic management came from Michael Porter's work titled *Competitive Strategy*. Michael Porter's work synthesized into a logical framework the Chicago School's idea that different industry structures are reflected in different industry outcomes or performances as opposed to market power. His well-known and extensively used framework, Porter's Five Forces, is built based on the structure—conduct—performance (S—C—P) paradigm of industrial economics.

The key aspect when formulating a competitive strategy is relating the company to its environment. This environment includes social and economic forces, but mainly the industry or industries in which the firm competes. Industry structures have a strong influence in determining the competitive rules of the game and the strategies potentially available to the firm (Porter 1980). Our study makes use of Porter's Five Forces framework as an aid to understand the forces and behaviors operating in the industry in which XYZ Research Corporation competes.

Summarizing, our study argues that strategic analysis supported by Porter Five Forces framework and a SWOT analysis of the industry are appropriate foundations for the strategy formulation of a firm. In aiding XYZ Research Company to develop a strategy for their business, our study makes use of these tools and data gathering methods (strategic analysis, SWOT analysis, Porter's Five Forces, face-to-face interviews, etc) to accomplish the objectives and goals proposed.

CHAPTER 3 METHODS PROPOSED

This chapter discusses the methods proposed to carry out our study. Section 3.1 shows the alternative strategies reviewed to address our research problem. Section 3.2 defines the case study strategy as the preferred research strategy. Section 3.3 describes the survey tool (interviews and focus groups) used.

3.1 Alternative Strategies for Addressing the Research Problem

Several research strategies used to address social science research include experiments, surveys, case studies, histories and the analysis of archival information. The selection of which strategy is used by investigators depends upon three conditions: (1) the type of research question being asked, (2) the control the researcher has over actual behavioral variables or events, and (3) the focus on contemporary as opposed to historical phenomena (Yin 1994).

Research phases affect which type of research strategy might be selected. Phases can be exploratory, descriptive, or explanatory. Phases differ from each other on the type of research questions they try to answer. Exploratory research is mainly concerned with answering “what” questions. Descriptive research is effective in answering “who” and “where” questions. Finally, explanatory research is meant to answer “how” and “why” questions.

Table 3-1 summarizes the different relevant situations for five alternative research strategies. Each strategy is assessed according to the three conditions mentioned above.

Table 3-1. Relevant situations for different research strategies

Strategy	Form of research question					Requires control over behavioral events?	Focuses on contemporary events?
Experiment			How		Why	Yes	Yes
Survey	Who	What	Where	How many	How much	No	Yes
Archival Analysis	Who	What	Where	How many	How much	No	Yes or No
History			How		Why	No	No
Case Study			How		Why	No	Yes

Obtained from Yin, Robert K. "Case Study Research: Design and Methods." 2nd edition. Thousand Oaks, CA: Sage Publications, 1994.

Questions like "What are your strengths as an independent food-testing laboratory?" are here called "what" questions constituting the exploratory phase of research. Although favoring the use of surveys and archival analysis, "what" questions can be addressed with any of the five research strategies. This study will be using face-to-face interviews and focus groups, and an extensive literature review, to carry out the exploratory research phase.

The descriptive phase addresses "who," "where," "how many," and "how much" types of questions. For example, "Where are most of the independent laboratories located?" "How many laboratories participate in the industry?" or "Who do you consider your main competitors in the industry?" Survey strategies or archival analysis are the best-suited strategies to carry out this phase of the research. Our study will consider the use of face-to-face interviews and focus groups, and archival records from Research Triangle Institute's Food Testing Laboratory Database (FTLD) to carry out the descriptive phase of this study.

Explanatory research is pursued by answering “how” and “why” questions; case studies, experiments, and histories are commonly used to carry out this phase of research. Our study will make use of face-to-face interviews and focus groups, and the case study approach to tackle this phase of the research.

Of all five research strategies, only experiments require the researcher to have control over behavioral variables and events. The type of research carried out in our study lends itself to very little control over variables; thus, conducting experiment-based research is not advised. Meanwhile, the case study and historical archives strategies do not require the investigator to have control over the variables studied and could be used to accomplish the objectives of our study.

However, of these two (case study and historical archives), only the case study approach focuses on the study of contemporary events. Summarizing, the case study is the most recommended approach to address research that presents the three following characteristics: (1) answer “how” and “why” questions, (2) the investigator has little control over variables, and (3) when the focus is on contemporary phenomena with real life context (Yin 1994).

3.2 Case Study as the Preferred Research Strategy

It is argued in this section that the case study strategy is the best suited for accomplishing the objectives of our study as stated earlier. The main focus of the case study research strategy is on understanding in detail the dynamics present in single settings. Study of cases involves meticulous examination of very few persons, items, or entities. Commonly used in medical and psychological research, the case study method is not as frequently used in the agricultural economics profession, though its use is becoming more common in agribusiness research.

The trend in academic research is to use deductive methods of research over inductive methods, whenever possible. A transition has been observed from using case studies of actual situations to develop generalizations through induction, to deductive methods utilizing the falsification method of Popper,² and the statistical methods of multi-variate analysis (Rumelt et al. 1991). Although the case study approach is more effective for inductive research methods, it also has a role to play in deductive research. Typically, case studies involve a combination of data collection techniques; such as archives, interviews, questionnaires, and observation. The grouped evidence collected may end up being qualitative, quantitative, or both (Eisenhardt 1989). While multivariate analysis is good in dealing only with quantitative data sets, the case study approach can be used for all quantitative, qualitative, or mixed sets of data.

3.2.1 Strengths of the Case Study Research Approach

Traditionally, case studies were thought only appropriate for the exploratory phase of an investigation; that surveys and histories were effective for the descriptive phase; and that only experiments were correctly used when doing explanatory or causal inquiries (Yin 1994). The hierarchal framework of research phases reinforced the idea that case studies could not be used to describe or test research propositions. A more current view is that case studies can be used for all three types of research: exploratory, descriptive and explanatory.

The case study method is conceived as a simultaneous treatment and observation process that can be made over a period of time. According to Kennedy (1979), studies of

² According to Popper, you can never demonstrate that something is materially true, but you can demonstrate that some things are false. For a more detailed explanation of Popper's views see Blaug (1992). "The Methodology of Economics of How Economics Explain."

individual cases allow the researcher to learn intricate details and provides insight into the problem being considered, which aids in the process of prescribing a course of action. Casley and Lury (1987) consider detailed insight is required when it is necessary to probe deeply into systems governing behavior or when analyzing the interrelationships among people and institutions to explain attitudes and behaviors.

3.2.2 Concluding Remarks Regarding The Case Study Research Strategy

Our study is based on research that is not designed to be tested with sophisticated statistical analysis or econometric methods. The detailed nature of our research, the limited number of observations, and the lack of specific numerical data prohibit standard hypothesis testing. This research lends itself to the testing of research propositions by in-depth analysis of industry structure, dynamic relationships, and forces influencing behavior in the U.S. food-testing laboratory industry.

The exploratory and ongoing organic nature of our study limits the researcher's ability to predetermine clear methods to test its propositions, and is best addressed by use of the case study research strategy. Yin (1994, p. 102–103) addresses this issue by stating:

Unlike statistical analysis, there are few fixed formulas or cookbook recipes to guide the analysis for novices. Instead, much depends on the investigator's own style of rigorous thinking, along with sufficient presentation of evidence and careful consideration of alternative interpretations.

3.3 Strategic Analysis Interviews and Focus Groups

This section describes the series of interviews carried out at XYZ Research Corporation for purposes of our study. The strategic analysis involved a series of visits to the company to conduct focus groups with its employees and management. Five focus groups were carried out at XYZ Research Corporation. Each session took between three

and four hours. Four of the five focus groups were comprised of employees across the company, involving an average of four participants per session. The fifth session was conducted directly with the CEO, Dr. Brown; and Vice President, Mr. Hart. In total, 17 employees and 2 top managers were interviewed. Participants were selected from each department in the company to make the sample representative. Interviewees were grouped according to their department.

The interview was adapted from a previously developed interview, authored by Dr. Christopher Peterson³ from Michigan State University. Peterson (who enjoys an extensive background in strategic management research) obtained his PhD from Cornell University in 1991, and his M.B.A. from Harvard University in 1981.

The interview involved filling and discussing a questionnaire regarding: marketing, financial, human, operations/production, organizational and information resources in the company (See Appendix A for the complete questionnaire used). Each item in the questionnaire was to be ranked by the interviewee as a weakness or strength for the company. The scale used ranked from 1 (great weakness) to 5 (great strength).

The results obtained from employees were averaged and compared to the average obtained from top management answers. Top management included the CEO and the vice-president of the company. The results were then used to compare perceptions and gain insights into the issues confronting the company.

³ Peterson, H. Christopher. "Strategic Analysis Interview." Personal communication, January 2003.

CHAPTER 4 STRATEGIC ANALYSIS

This chapter contains: Section 4.1 shows an overview of the U.S. independent food-testing laboratory industry, its unique characteristics, and dynamic interaction with the food industry supply chain together with issues surrounding it and factors influencing its demand. Section 4.2 is an application of Porter's Five Force framework to the U.S. independent food-testing laboratory industry is used to analyze the forces affecting the industry. Section 4.3 shows the results gathered from the strategic analysis interviews and focus groups are discussed. Finally, in Section 4.4 the findings from the Strengths Weaknesses Opportunities and Threats Analysis (SWOT) conducted on XYZ Research Corporation are summarized.

4.1 Overview of the U.S. Independent Food-Testing Laboratory Industry

Much of the next section comes from Fanjoy et al. (2001) Food Testing Laboratories Database (FTLD). Fanjoy et al. (2001), from the Research Triangle Institute, used FDA's (1997) definition for private laboratories⁴ to gather data on food-testing laboratories and compiled it into a database that documents several industry variables (e.g., location, economic variables, capabilities, and quality assurance programs). Their research recognizes two limitations: (1) the U.S. food-testing laboratory industry is not well defined which posed difficulties when screening companies that

⁴ The term "private laboratory" refers to those private sector laboratories that conduct testing of regulated products and submit analytical data to the FDA to demonstrate compliance with the FD&C Act. The term includes only those laboratories, which not regulated by Good Laboratory Practices and/or Good Manufacturing Practices. By definition, private laboratories are independent providers of analytical services and are not directly associated with firms utilizing their resources.

qualified as food-testing laboratories from other types of laboratories, and (2) laboratory websites, maintained mainly for promotional purposes and association sources (e.g., American Council of Independent Laboratories—ACIL), do not include economic variables or economic data on sales volume and what was available was hard to confirm. In general, companies do not share such information in a freely manner.

Fanjoy et al.'s research used several screening methods to select laboratories and define the food-testing laboratory population: (1) use of multiple private and federal resources (e.g., company websites, FDA's OASIS), (2) use of a list purchased from *infoUSA* containing 5,000 laboratories that are included in SIC code 8734-02: *Laboratories—Testing* which was filtered by initially excluding laboratories that do not test food or water, (3) grouping of the remaining laboratories in the list into categories by their names and reviewing 5 to 10 examples from each category, (4) giving closer scrutiny to exclude companies containing keywords in their names (e.g., agri, calibration, hemo, terra), (5) use of corroborating sources to reconsider laboratories excluded using the keyword filter, and (6) expert reviews from food science personnel at six universities (Cornell, NCSU, Penn State, Texas A&M, University of California Davis and Virginia Tech).

The final database includes records for 546 companies that test food mostly within, but also outside the United States. Available economic data for 193 of the 546 firms suggests that industry sales volume easily surpasses \$1.3 billion. However, this includes revenues from all activities and services offered by the laboratories, not only from food-testing services.

In Figure 4-1 all independent food-testing laboratories for which data was available were grouped according to their sales volume or sales size. From the 193 available records, the diversity in size of firms operating in the industry is easily observed. Almost half of the laboratories (47%) have a sales volume of \$500,000 to \$2,499,000. Approximately a third (32%) have a sales volume ranging from \$2,500,000 to \$19,999,000. Only four firms showed larger sales volumes. A smaller number of firms (13.3%) fall under the small mom-and-pop type of business with sales volumes of \$1,000 to \$500,000.

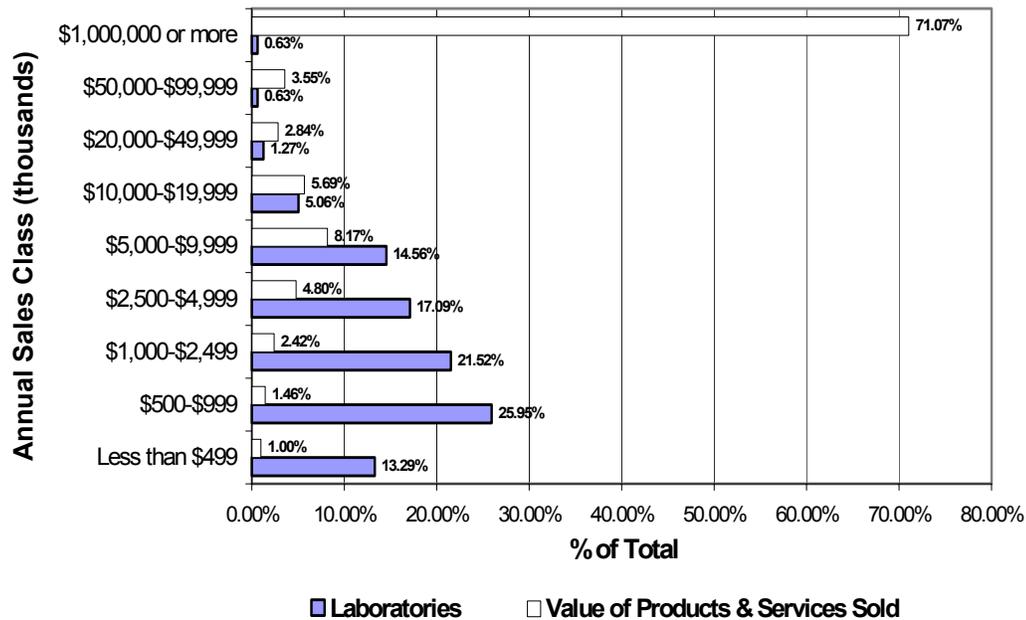


Figure 4-1. Distribution of U.S. independent food-testing labs by sales class: 2001

According to the same data, around 71% of the estimated minimum of \$1.3 billion sales for the 193 laboratories belong to one single company (U.S Filter/Zimpro Incorporated). Filter/Zimpro specializes in offering products, services and solutions for water, wastewater and selected industrial processes to several industries. The rest of the sales in the industry were distributed as follows: Medium-large sized companies (with

sales ranging from \$2,500,000 to \$19,999,000) accounted for approximately 19% of the sales and medium-small sized laboratories (\$500,000 to \$2,499,000) accounted for 3.8% of the sales. “Mom-and-pop” (\$1,000 to \$500,000) businesses contributed less than 1% of the sales. The remaining 6.3% was made by the other three companies with volumes sales larger than \$19,999,999.

Two key competitors in the industry worth mentioning are Siliker Laboratories and Microbac. Table 4-1 shows estimates of Siliker’s sales volumes for its U.S. based locations, Table 4.2 show estimates of Microbac’s sales volumes. Both were obtained using Food Testing Laboratories Database’s economic data. Information for 9 of Siliker’s 11 U.S. locations suggests sales between 33.5 million and 67.5 million dollars. According to the FTLD, sales from 11 of Microbac’s 16 U.S. facilities are between 17 and 39.5 million dollars.

The FDA divides the U.S. territory in five regions. The Food Testing Laboratory Database (FTLD) contains regional location data for 502 of the identified 546 food-testing laboratories operating in the U.S. Table 4-3 shows the number of laboratories operating in each region. The Central region shows the highest concentration with 165 laboratories, while the lowest concentration is seen in the Northeast area, with only 67 laboratories. Such concentration in the Central and Pacific areas may be an indication of where the clients are, showing labs wanting to reduce transportation costs and enhance presence and communication by being close to their clients. On the other hand, it may also be simply related to cost efficiency decisions other than transportation costs, like lower labor costs, lower input costs, or closeness to input industry.

The remainder of this section discusses the nature of the industry (Section 4.1.1). Then, Section 4.1.2 introduces a framework using the U.S. food supply chain to give a clear picture of the U.S. independent food-testing laboratory industry and its complex links and relationships with the food industry. After this, a list and description of the major factors influencing demand in the industry is presented in Section 4.1.3.

Table 4-1. Silliker's sales volume for domestic facilities

Location	Sales volume (thousands)	
	From	To
Illinois	N/A	N/A
Iowa	2,500	4,999
Minnesota	N/A	N/A
Texas	2,500	4,999
Ohio	2,500	4,999
Wisconsin	2,500	4,999
California	10,000	19,999
New Jersey	5,000	9,999
California	5,000	9,999
Georgia	2,500	4,999
Pennsylvania	1,000	2,499
Total	33,500	67,491

Table 4-2. Microbac's sales volume for domestic facilities

Location	Sales volume (thousands)	
	From	To
Fayetteville, NC	500	999
Fort Meyers, FL	N/A	N/A
Hampton, VA	1	500
Venice, FL	500	999
Scarborough, ME	1,000	2,499
Marlborough, MA	N/A	N/A
Corona, CA	N/A	N/A
Hammond, IN	500	999
Maryville, TN	1,000	2,499
Erie, PA	2,500	4,999
Pittsburgh, PA	10,000	19,999
Louisville, KY	N/A	N/A
Camp Hill, PA	N/A	N/A
New Castle, PA	500	999
New Ellenton, SC	500	999
Warrendale, PA	N/A	N/A
Total	17,001	35,491

Table 4-3. Independent food-testing laboratories by region

Region	Number of laboratories
Central ⁱ	165
Northeast ⁱⁱ	67
Pacific ⁱⁱⁱ	105
Southeast ^{iv}	85
Southwest ^v	80
Foreign	87
Total	589

i Central: DE, KY, MD, NJ, OH, PA, VA, WV, IL, IN, MI, MN, SD, WI

ii Northeast: CT, ME, NH, NY, RI, VT, MA

iii Pacific: AK, ID, MT, OR, WA, CA, HI, NV, AZ

iv Southeast: AL, FL, GA, LA, MS, NC, Puerto Rico, SC, TN

v Southwest: IA, MO, NE, KS, AR, OK, TX, CO, NM, UT, WY

4.1.1 Nature of the Industry

Our study identifies two particularities that define and distinguish the U.S.

independent food-testing laboratory industry from other industries in the United States:

(1) the existence of the industry is closely linked to a trend in the food industry to outsource some of the activities required by their business, and (2) most of the demand in the food-testing laboratory industry is generated directly from the requisition from the federal government for food companies to comply with food safety regulations.

4.1.1.1 Outsourcing and the U.S. independent food-testing laboratory industry

Outsourcing is the assignment of work to a third party for a specific length of time with an agreed-on price and service level (Giese 2001). According to International Data Corporation (1999), worldwide outsourcing services is a \$100-billion industry, with sales of \$99 billion for 1998 and expected sales for 2003 of \$151 billion.

The food industry is part of this outsourcing phenomenon, including the existence of the U.S. independent food-testing laboratory industry. Food firms in the U.S. operate in an intensely competitive, highly regulated, and mature industry. Many of these firms

have resorted to downsizing in areas that are not central to their business – for example, laboratory testing. In fact, many labs that today are contract labs are, or were in the past, directly associated with a major food company. Some examples include: R-Tech (Land O’Lakes), Medallion Laboratories (General Mills), TPC Labs (Pillsbury), Northland Laboratories (Sara Lee Corporation), and Covance (once a Ralston Purina Company division) (Marsili 1997).

Compass Consulting International (2004) and Giese (2001) recognize the advantages for food companies from outsourcing. These are

- **It can be a cost effective method of supplementing in-house testing.** Costs associated with maintaining a state-of-the-art analytical food chemistry laboratory are expensive. For example, costs include lab chemists and lab technician salaries and fringe benefits, construction costs, chemical agents, glassware, instruments, and repair and maintenance. Food companies might have temporary needs for a certain test; buying the necessary equipment to never use it again is not an economically wise decision. **Independent labs make a better use of economies of scale** distributing the use of such equipment through many food companies. Outsourcing can also help food companies reduce their overhead.⁵
- **Allows food companies to concentrate in their main business, their strategic assets or core competencies.** For example, a manager in a food manufacturing company such as Kellogg Company or Quaker Oats Company would probably have a hard time in assigning his costly scientific staff’s time to take over analytical tests to comply with FDA regulations instead of using their time in developing new products to capture new markets.
- **Additional expertise.** Large companies can benefit from having access to a vast legion of experienced and knowledgeable human resources. Knowledge and experience of meeting government approvals – such as Food and Drug Administration or U.S. Department of Agriculture requirements – or compliance standards – such as Good Manufacturing Practices (GMPs) and Good Laboratory Practices (GLPs) – can be important assets that labs offer.

⁵ Overhead is an operating expense, more in detail it is the expense of maintaining property (e.g., paying property taxes and utilities and insurance); it does not include depreciation or the cost of financing or income taxes (www.cogsci.princeton.edu).

On the other hand, outside the U.S., most food firms in developing countries are quickly adapting and modernizing themselves to participate in an increasingly globalized world economy. Food firms in these countries resort to outsourcing services to the U.S. independent food-testing laboratory industry mainly for three reasons: (1) many can't afford the kind of personnel and installations needed to do in-house testing, (2) for those that could afford it; the problem is such personnel, installations, and equipment are not easily found in their home countries, and (3) U.S. based independent laboratories would be expected to be more familiar with the regulations and testing needed to import foods to the U.S. There are also potential negatives for a company to consider when outsourcing. These are

- **Sharing of information.** Some food companies are not exactly happy when realizing they have to share test-methods and information with outside labs. Especially when these labs do some work for the competitors.
- **Outsourcing results in losing some control.** For example, food companies may have to depend on independent laboratories' turnover and quickness when priority tests are needed.

4.1.1.2 The U.S. food safety system and the U.S. independent food-testing laboratory industry

Much of this section was extracted from the FDA/USDA's U.S. food safety system Country Report. The section describes the U.S. food safety system and how it influences demand in the U.S. independent food-testing laboratory industry.

The United States Constitution dictates the responsibilities of the executive, legislative and judicial branches with regards to the food safety system. The congress enacts statutes and authorizes executive branch agencies to implement them by developing and enforcing regulations.

The system is guided by 5 principles: (1) only safe and wholesome foods may be marketed; (2) regulatory decision-making in food safety is managed according to risk assessments and is science-based; (3) the government has enforcement responsibility; (4) manufacturers, distributors, importers and others are expected to comply and are liable if they do no; and (5) the regulatory process is transparent and accessible to the public.

The principal federal regulatory organizations are the Department of Health and Human Services (DHHS), Food Drug Administration (FDA), the U.S. Department of Agriculture's (USDA) Food Safety and Inspection Service (FSIS), Animal and Plant Health Inspection Service (APHIS), and the Environmental Protection Agency (EPA).

The FDA is responsible for protecting the public from impure, unsafe, and fraudulently labeled food other than in areas regulated by FSIS. FSIS is responsible for ensuring that meat, poultry, and egg products are safe, wholesome, and correctly labeled. EPA's mission includes protecting public health and the environment from risks posed by pesticides and promoting safer means of pest management.

The major food safety authorizing statutes in existence are the Federal Food Drug, and Cosmetic Act (FFDCA), the Federal Meat Inspection Act (FMIA), the Poultry Products Inspection Act (PPIA), the Egg Products Inspection Act (EPIA), Food Quality Protection Act (FQPA), and Public Health Service Act (PHSA). The Nutritional Labeling and Education Act (NLEA) should also be considered, since it also generates demand for the U.S. independent food-testing laboratory industry.

Regulations are a tool to help FDA in enforcing compliance with food safety acts. Such regulations usually translate into increased demand for food-testing services. For example, on November 8, 1990, President George Bush signed the Nutritional Labeling

and Education Act, which intended to enable consumers to select a healthier diet by providing accurate and reliable information about nutritional content. This act amends the Food Drug & Cosmetic Act and as such falls under FDA's jurisdiction. Taken from Muth et al. (2003), Figure 4-2 gives an overview of the process by which the labeling information and graphics on food and dietary supplement products may be changed as a result of a regulation. Once a regulation is determined to affect a food or dietary supplement product, the manufacturer may conduct analytical testing to decide whether to reformulate the product or re-label it. The manufacturer then chooses between doing analytical testing and reformulation in-house or by outsourcing services from food-testing laboratories.

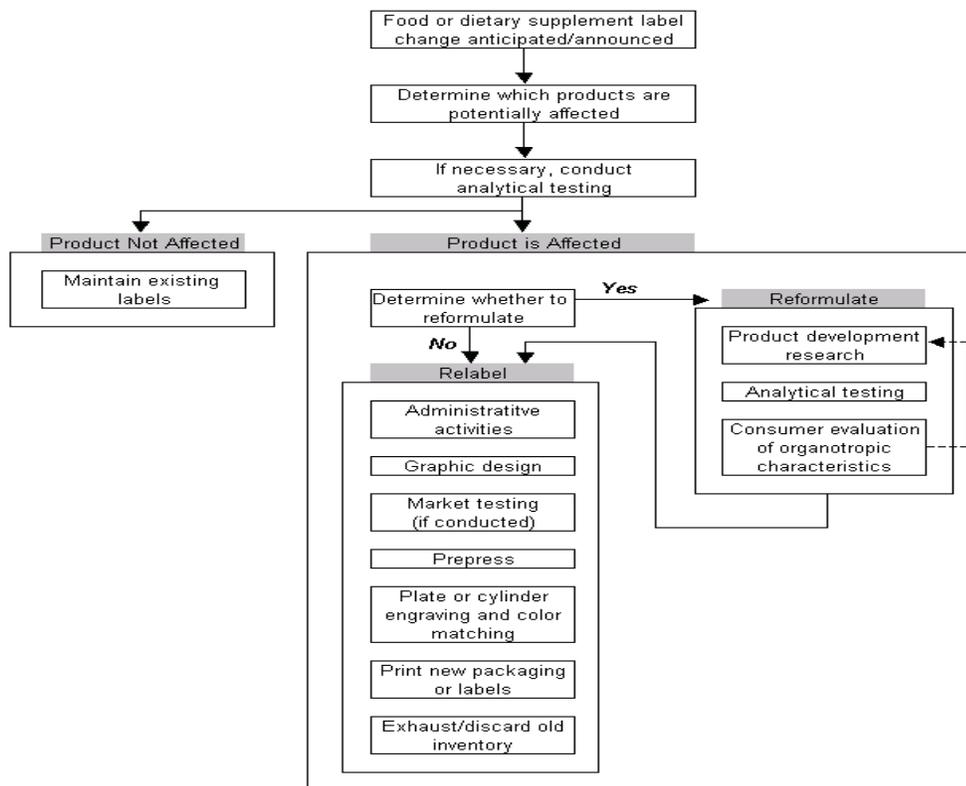


Figure 4-2. Overview of the label change process in response to regulation. Obtained from Muth, K. Mary, Erica C. Gledhill, and Shawn A. Karns. "FDA Labeling Cost Model." RTI Project Number 06673.010. Research Triangle Park, NC: Research Triangle Institute, 2003.

In 1993, the FDA estimated the new NLEA would cost food processors between \$1.4 billion and \$2.3 billion over the next 20 years. A conservative estimate, calculated using FDA's Labeling Cost Model developed in the Research Triangle Institute by Muth et al. (2003), shows that at least 10% of such extra costs for food processors would be for analytical testing. This example shows how demand in the food-testing laboratory industry is closely linked and dependent on the creation of new government regulations. At the same time, government regulations respond to expressed needs and concerns from the public. Examples of food related regulations or statutes responding to public needs are: health concerns and the NLEA, consumer safety related to dietary supplements⁶ and the Dietary Supplement Health and Education Act (DSHEA).

4.1.2 The U.S. Food Supply Chain and the U.S. Independent Food-Testing Laboratory Industry

Supply chains are also known as value chains or demand chains. Supply chains can be defined as all the links involved in managing the flow of products, services, and information in the agro-food system from seed to table (Wysocki 2000a). The U.S. food supply chain and its major alternate marketing channels are depicted in Figure 4-3.

Retail Food Stores are classified according to the North American Industry Classification System (NAICS) under subsection 445 (U.S. Census Bureau 2002). Establishments in this subsection usually retail food and beverage merchandise from fixed point-of-sale locations, they own special equipment for display (e.g., freezers, refrigerated display cases) and employ trained staff for the processing of food products to guarantee proper storage and sanity required by regulatory authority (Food Institute

⁶ Dietary Supplements - Terms such as functional foods or nutraceuticals are widely used in the marketplace.

2003). Supermarkets, grocery stores, convenience stores and fresh produce markets are all included in this sub-sector. For years 1998 to 2001, the industry grew at an annual average rate of 4%. Growth suffered a slump in 2002 (2.8%). Data gathered from U.S. Census Bureau (2003), shows the industry seems to be recovering its growth pace with sales for 2003 that scaled up to \$505,933 millions, a 3.08% growth compared to 2002.

Food Service Outlets (NAICS subsection 722) prepare meals, snack and beverages to customer order for immediate on-premises and off-premises consumption. Full-service restaurants (e.g., Applebee), limited-service restaurants (e.g., cafeterias, fast food), snack bars (e.g., coffee or frozen yogurt shops), food service contractors, caterers and drinking places (retailing alcoholic beverages for on-premises consumption); all fall under this subsection.

Food Manufacturers and food processors (NAICS 311) transform livestock and agricultural products into products for intermediate or final consumption. The industry groups are distinguished by the raw materials (generally of animal or vegetable origin) processed into food products. The food products manufactured in these establishments are typically sold to wholesalers or retailers for distribution to consumers (U.S. Census Bureau). Many multimillion and billion dollar companies comprise the food processing industry. In the period 2001-2002, the top ten food manufacturer companies summed up \$236,302 millions in sales. This includes companies like Nestle S.A. (\$46,628), Kraft Foods Inc. (\$38,119), PepsiCo Inc. (26,935), Diageo plc⁷ (\$16,644) and Mars Inc (\$15,300). Some other companies not included in the top ten are Tyson Foods, Kellogg Co and Sarah Lee Corp (Food Institute 2003). Most food manufacturing companies sell

⁷ Owner of the subsidiary Burger King

their diversified products to wholesaling companies that place them both in national and international markets.

Food producers, manufacturers, and distributors are also under increasing public and regulatory pressure to assure the quality of their product. Without performing analytical tests, the potential for contamination exposure to the consumer is unknown. It only takes one negative event of contamination or a recall to destroy brand image and customer confidence. The result of a recall could translate into millions of dollars in losses for food manufacturing companies. Many of these are very well known companies, all managing very strong lines of brands. Accountants would attribute an important portion of the value of these companies to their goodwill accounts. Brand strength and constant quality are important features for any food manufacturer wishing to stay in the game for a long time. Thus, reliable test results are a must for independent food-testing laboratories that plan on increasing or maintaining their customer base.

Every link in the U.S. food supply chain is required by law to perform some sort of testing activity that ensures their product to be safe and adequate for consumption. The U.S. independent food-testing lab industry has the capability to provide testing and/or research services for all the links involved in the food supply chain. For example: food manufacturers require product development services to speed up some of the steps in placing new products in the market or nutritional content testing to develop labels for their products; processors require chemical-analytical testing to avoid toxin poisoning and comply with maximum levels of pesticide residue; agricultural producers in the beef industry require tests for the presence of Bovine Spongiform Encephalopathy (mad cow disease); retailers and wholesalers are constantly sampled by the FDA to test for

microbiological pathogens (e.g., *Salmonella*, *E. Coli*); food importers require GMO testing to discard worries about contamination from altered species; all levels of the food supply chain require HACCP programs be put in place.

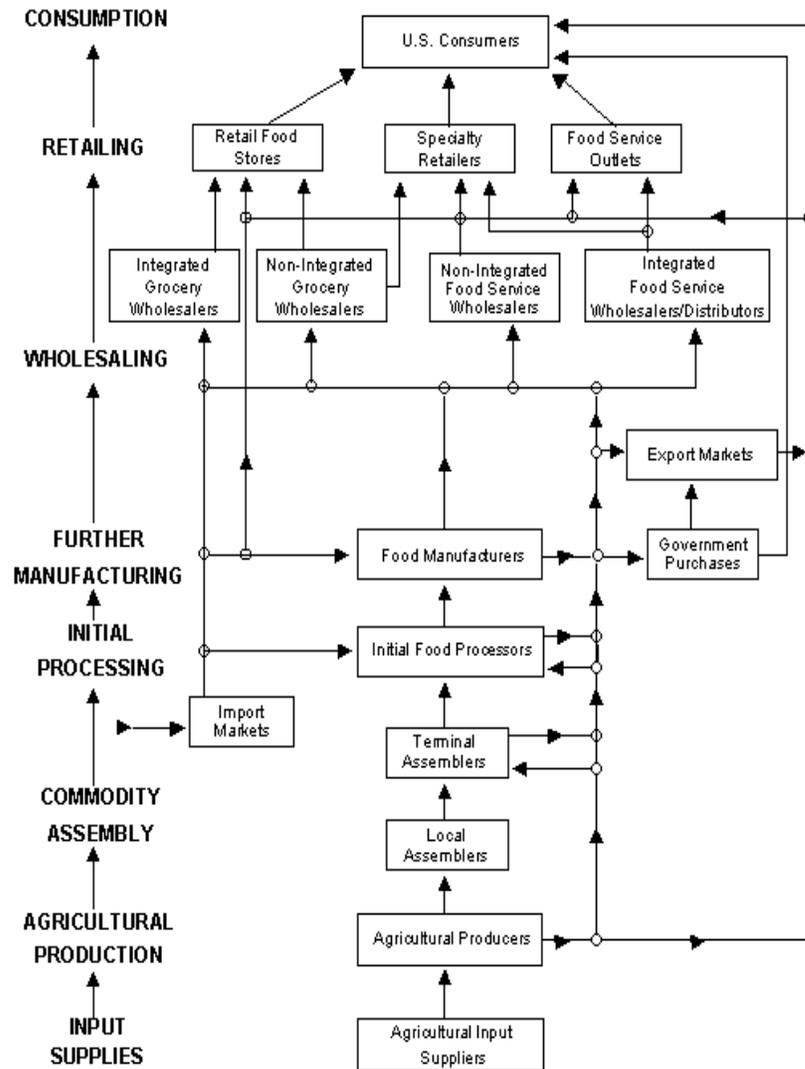


Figure 4-3. Major alternative marketing channels of the U.S. food system
 Obtained from Wysocki, A. "Major Alternate Marketing Channels in the U.S. Food System." *Food Wholesaling & Retail Marketing*. Extension Institute of Food and Agricultural Sciences: University of Florida. No. 2 & 3. (April/May 2000b).

In addition, the FDA's Bioterrorism Act and the USDA's Country of Origin

Labeling provisions mandate that every business entity that comes into contact with food

should know where it came from and where it is going. This one-step backward, one-step forward concept compels the whole U.S. food supply chain to maintain strict records of their output, while the new ability to trace food safety failures to the responsible entity will probably increase the number of food safety tests demanded across the whole supply chain.

With this system in operation; in the case that a food safety failure takes place; it is probably food processors and food manufacturers who take the biggest hit. Retailers might end up having to recall product they had in their shelves; however, there is an option to point fingers backward and the volume of product recalled is minimum compared to the volume that manufacturers would have to recall if found in fault. On the other hand, total product volume and product value from manufacturers is in most cases larger than producers and packers.

4.1.3 Factors Influencing Demand in the U.S. Independent Food-Testing Laboratory Industry

As shown in Section 4.1.1 and Section 4.1.2 of this chapter, the relationships and interactions between the U.S. independent food-testing laboratory industry and the different links in the U.S. food industry are many. A number of factors that influence demand for the laboratory industry and the food industry are

1. **Role of government regulations.** As discussed in Section 4.1.1.2, new regulations translate into increased demand from food companies for services from independent food-testing laboratories.
2. **Public or private research translates into new technologies, new tests, and new services** to be offered by independent food-testing laboratories. For example, on June 2001, USDA's Agricultural Research Service (2001), announced researchers had new information about the genetic makeup of *Listeria*, a bacterium that causes serious food-borne illnesses. Today, laboratories are expectant on FDA's new *Listeria* regulations and ready to make the first move and be the first ones to offer *Listeria* tests as part of their services and products.

3. **Consumer concerns, mainly health concerns in the present.** Consumers play an important role in the development of regulations. They directly affect which regulations are put in place. For example, the NLEA was a response from the government to consumer concerns for eating healthier foods and to be well informed about what they eat. Today, the FDA is responding to consumer concerns about the safety of their foods in the presence of the threat of terrorist acts.
4. **Homeland security and terrorism.** Currently, only state public health laboratories that are part of the Laboratory Response Network (LRN) are permitted to identify or rule out bioterrorism agents in food products. Although independent commercial food-testing laboratories are not allowed to do such testing, the possibility of a terrorist threat has increased the level of alertness and the strictness of all food safety regulations. This of course means more business for independent food-testing laboratories.
5. **International trade regulations and food imports.** Similarly to FDA, article 5 of the WTO's Agreement on the Application of Sanitary and Phytosanitary Measures requires all import restrictions made to protect or improve human health, animal health or phytosanitary condition in any of its member countries, to be based on scientific evidence and risk assessment. Regulations placed on food imports entering the U.S. also generate demand for testing services from foreign companies wanting to place their output in national territory.
6. **New Product Development.** Inside the independent laboratory industry, product development is understood as the analytical testing aspect, stability and shelf life testing, packaging design, and other physical and chemical aspects of the product development process. Many independent food-testing laboratories offer product development services in addition to their list of testing services. The rationale behind this is that food companies spend most of their time and resources in developing their prototype's functional characteristics and the other aspects of product development (e.g., idea screening, concept testing, test marketing, economic analysis, national launching), and would rather outsource the physical-chemical testing and regulatory aspects to independent laboratories. Kotler (2000) gathered information from a large consumer packaged-goods company showing that only 2 of every 64 new product ideas are actually developed into products that are then launched into national markets. Total cost for every 2 products launched was \$13.9 million, including costs of those ideas that never made the market. Up to 11.5% of the costs per idea were due to product development only, while the remaining costs were distributed between idea screening, concept testing, test marketing, and national launch costs. Kotler also mentions another estimate of between \$20 million and \$50 million per new product. The Food Institute (2003), reports that in 2002, 9,632 new food products were introduced into the U.S. market. Using Kotler's numbers means the whole food product development business entails around \$66.9 billion spent by manufacturers on a yearly basis, and \$7.3 billion spent only in the functional, physical and chemical

aspects. How much of this business is outsourced and how much is done in-house is what directly influences demand for independent food-testing laboratories' services. Considering many products can take months and even years of testing and re-testing to be ready for the market, long-term business relations between food companies and independent laboratories can be used by laboratories to secure business.

7. **Labs operating with Accreditations and Quality Assurance Programs suggest reliability and can attract more business.** As mentioned earlier in Section 4.1.2 in this chapter reliability of test results is a very important factor for independent laboratories in maintaining business. Giese (2001) identifies four main factors influencing food companies when deciding which laboratory to choose are: (1) pertinent accreditations and certifications, (2) means to address needs in terms of turnaround and communication, (3) appropriate facilities and personnel to do the required tests, and (4) pricing (see appendix B for the major accreditations in the industry).
8. **Unpreventable catastrophes or incidents that have adverse impacts for the food manufacturing, wholesaling and retailing industries** - for example, the finding of a Bovine Spongiform Encephalopathy (mad cow disease) case in the U.S. - are in fact demand generators and thus good news for the independent food-testing laboratory industry. In such cases, the government develops and implements regulations that restore public confidence in the U.S. food industry, while food companies look back for testing services to regain trust in their brands, comply with new regulations, and bring back customer confidence.

4.2 Forces Influencing the U.S. Independent Food-Testing Laboratory Industry

In a purely and perfectly competitive market, competition among firms in an industry drives the profit rates to zero. According to theory, we should also expect in a perfectly competitive market with unsophisticated firms for profits to be evenly distributed across firms in the industry. However, in the real world competition is not perfect and in most cases firms are not passive price takers. Several studies have affirmed that different industries can sustain different levels of profitability; part of this difference is explained by industry structure. Michael Porter provided a framework that models an industry as being influenced by five competitive forces: (1) Degree of rivalry, (2) Threat of substitutes, (3) Buyer power, (4) Supplier power and, (5) Barriers to entry/exit and threat of entry (Quick MBA 2004).

The next section is an application of Michael Porter's Five Forces framework to the U.S. independent food-testing laboratory industry. Each force is described in detail.

4.2.1 Degree of Rivalry was Moderate

Degree of rivalry is defined as the level of competition observed in an industry. The intensity of rivalry in the U.S. independent food-testing laboratory industry is determined by the following factors and their implications:

- **An accelerated market growth** due to: (1) an increasing number of food safety regulations, (2) a high rate of appearance of new technologies and new tests, (3) increasing health concerns among public and, (4) the globalization of markets a la par with homeland security concerns for terrorist attacks; **decreases the level of rivalry** in the industry.
- **A large number of firms participating in the industry increase the rivalry** because more firms compete for market share. Numerous independent labs compete in the industry for customers.
- **Relatively high fixed costs in proportion to variable costs** results in economies of scale that require independent labs to operate close to full capacity to maximize profits. Laboratory equipment and installations can be very expensive enlarging fixed costs in the form of depreciation creating this economy of scale effect. Within the firm, the need for high levels of production **increases rivalry** among firms that compete to place their output in the market.
- **Low switching costs paralleled with high levels of risk associated for customers when switching laboratories result in increased rivalry within the independent lab industry.** The high level of risk associated for food firms when switching from one lab to another for food-testing results may drive wholesalers to perceive switching costs as high. For example, an erroneous negative result when testing for *Salmonella enteritidis* in meat products may result in illness or even death of many end customers. The monetary loss from dropping sales due to negative image impact and lawsuits filed for the meat wholesaler may scale up to thousands if not millions of dollars. Under these circumstances many wholesaling firms remain with their known reliable laboratories. On the other hand, if the wholesaler has a bad experience with one laboratory, it is very easy and inexpensive for a wholesaler to immediately switch to another laboratory. The level of rivalry is increased from laboratories competing to capture their customer's loyalty with reliable results and better service. Also, in some cases, distance and location of the laboratories may increase switching costs for the wholesaler as a result of increased transportation costs.

- **High asset specificity results in increased rivalry in the U.S. independent food-testing lab Industry.** The industry presents a high level of asset specificity in terms of a limited ability to switch the use of their equipment to an alternative activity if its current activities result in failure. More specifically, human asset specificity.
- **The standardized characteristics of tests themselves limit the level of differentiation possible in the industry and increase the level of rivalry.** One alternative to differentiate is to offer reliable results with faster and more personalized service.

4.2.2 Threat of Substitutes was Low

In Porter's model, substitute products refer to products in other industries.

Economic theory states that a substitute exists when a product's demand is affected because of a price change or introduction into the market of another product. A close substitute product constrains the ability of firms in an industry to raise prices (Quick MBA 2004).

Under this line of thought, it is possible to say that in-house testing represents a substitute product for outsourcing services offered by independent food-testing laboratories. More specifically, the tangible alternative exists for food companies to stop outsourcing and start using their own labs to do in-house analytical and chemical testing in case independent laboratories raise their prices excessively. This factor limits the extent to which independent laboratories are able to increase their prices and widen profit margins.

As a consequence, conditions influencing the level of threat of substitutes result the same as those seen in Section 4.1.1.1 of this chapter as influencing outsourcing decisions. Substitution between outsourcing and in-house testing rests on measuring the advantages from outsourcing (economies of scale, concentration in core business, and additional expertise) against its disadvantages (sharing confidential information and losing some

control). The next list offers a detailed assessment of the threat of substitutes in the U.S. independent food-testing laboratory industry.

- **Currently, advantages from outsourcing outweigh the disadvantages due to high costs of laboratory installations and high need of additional expertise to keep up with changing regulations; this lowers the threat of substitutes.** A growing outsourcing industry reflects the trend from food companies, operating in a very mature and competitive industry, to downsize in areas not central to their business to widen already slim profit margins. Independent labs make better use of economies of scale by distributing the use of installations and testing equipment among various food companies.
- **Substitution of outsource testing with in-house testing is not an option for all companies. Independent laboratories targeting small companies as their main clients do not have to deal with in-house testing as a threat of substitute.** While for large companies in-house testing is an alternative to outsourced testing; for small companies, doing in-house testing is not viable due to a lack of resources.
- **Consolidation and size of operations in the food industry may pose a threat to independent laboratories.** The outsourcing trend in the food industry can be expected to continue as long as it remains reasonable for food companies to outsource testing services relying on the fact that independent laboratories make better use of economies of scale. Consolidation and growth in the food industry poses a threat to the extent of food companies becoming large enough to use their own testing equipment efficiently and close to capacity.

4.2.3 Buyer Power was Highest for Large Manufacturers and Lowest for Small Producers

Porter's theory defines power of buyer as the impact that customers have on a producing industry. Power is defined in terms of bargaining power, the relative strength of buyers/sellers in influencing the forms of exchange in a transaction. Several conditions may incline power to the buyer's (food companies) side: (1) buyers are concentrated, (2) buyers show a credible threat of backward integration, and (3) buyers purchase a significant portion of output. Other factors may incline the balance to the seller's (independent labs) side: (1) threat of forward integration, (2) significant switching costs for the buyer, (3) atomistic or fragmented structure of buyers, (4) producers supply a critical input for buyers.

As discussed in Section 4.1.2 of this chapter, the U.S. independent food-testing laboratory industry interacts with several industries across different levels of the U.S. food supply chain including agricultural producers, processors, manufacturers, imports, and others. According to the factors outlined in the last paragraph, different industries across the food supply chain showing different characteristics will have different levels of buyer power. The following assessment of buyer power in the industry takes into consideration this thought.

- **Independent labs dealing with major food manufacturing companies face a highly concentrated industry. Concentration lessens gradually while going down the food supply chain (see Figure 4-3).** Food processors are less concentrated than food manufacturers, and agricultural producers are less concentrated than food processors.
- **Outsourced testing services are critical for small companies, and not so critical for large companies.** Testing for food safety is mandatory for food companies. Large companies have the option of in-house testing while small companies do not.
- **No threat of forward integration exists; the possibility exists for food companies to integrate backward.** Independent laboratories pose no threat of taking over food companies, but food companies have the option at least of re-incorporating testing laboratories if economically necessary.

In general, independent labs have a wide range of industries to interact with and in which to decide to participate according to their desired bargaining power. Independent labs dealing with major food companies will observe lower bargaining power than those targeting smaller growing companies.

4.2.4 Supplier Power was High

Supplier power refers to the bargaining power of input suppliers over a producing industry. For the U.S. independent food-testing laboratory industry some examples would be chemical agents suppliers, and equipment and technology suppliers.

The Food and Drug Administration's research activities provide the scientific basis for its regulatory decisions. The FDA is constantly coming up with new and better ways to test and ensure food safety. Independent laboratories update their testing services and equipment constantly to keep up with new regulations. Having the latest and most modern equipment is not inexpensive. In general, new technologies are sold in new markets and are offered only by a few companies. In this sense, concentration can be observed on the supplier's side, which shifts some bargaining power away from independent labs.

4.2.5 Barriers to Entry/ Threat of Entry was Low

Competition within an industry is not only affected by existing rivals, but also by the possibility of new firms entering the industry. In a perfectly competitive market, firms should be able to freely exit or entry. However, in reality markets are not perfect. Any factor limiting entry to an industry is called a barrier to entry, and if it limits exit it is called a barrier to exit.

Our study identifies several barriers to entry/exit exist in the U.S. independent food-testing laboratory industry. They are

- **Mandatory and voluntary federal quality assurance programs and certifications function as entry deterring mechanisms.** Food safety is a very important issue for the U.S. government and public. The FDA oversees the effective operation of independent food-testing laboratories to ensure that food results presented to them are reliable and that food is actually safe. The larger the number of laboratories, the harder it is for the government to keep control on them. Programs like the Good Laboratory Practices (GLPs) and Good Manufacturing Practices (GMPs) are examples of several mandatory regulations that independent laboratories have to follow to operate. To some extent this reduces the freedom of entry to the industry.
- **Minimum Efficient Scale and start-up costs are high enough to create an entry barrier.** Economies of scale and large costs involved with owning and operating a laboratory increase the minimum efficient scale needed Minimum capacity-use required to achieve minimum unit costs of production.

- **Loyalty from food companies to laboratories that have proved their reliability makes it difficult for new firms to enter the industry.** Considering the importance of reliable testing results, this factor truly creates a barrier to entry.

4.3 Strategic Analysis of XYZ Research Corporation

This section discusses the results obtained from the focus groups and interviews conducted at XYZ Research Corporation, described in Chapter 3 of our study. Most of the text and ideas discussed are very similar to the Strategic Report Analysis provided to XYZ Research Corporation.

Table 4-4 summarizes the results obtained from the interviews. The first column in the table shows the number of participants that answered each item. The number of participants varies by each item because participants had the option of leaving any item blank if they so desired. The second and third columns show the Average and Standard Deviation obtained from the participants' answers. The fourth column represents the Average from the answers given by the top management (Dr. Brown and Mr. Hart). Finally, based on simple subtraction, the fifth column shows the difference between the Employee Average and the Top Management Average. For example, the difference between the employee assessment of product/service line breadth and depth top management assessment was $-.69$. This means that XYZ employees, on average, scored this item $.69$ (on a scale of 1-5) lower than top management. Large differences (larger than 0.99) are marked with (**) next to the number while medium size differences (larger than 0.5 but smaller than 0.99) are marked with (*). Averages and averages' differences supported with opinions expressed in the focus groups and interviews will be used to gain insight into the issues concerning the company and as an indicator of similarities and differences in perceptions between management and employees.

The rest of this section discusses the results from the focus group interviews according to the following resource areas: marketing, financial, human, operation/production, management/leadership, organizational, and informational.

4.3.1 Marketing Resources

With respect to marketing resources, top management and employees agree in their assessment that customer satisfaction with XYZ's products and services is high and that this represents a strength (average score of 4) for the company. Meanwhile, both employees and management agree the company's ability to gain customers versus competition could be improved (average score of 3). These scores are consistent with verbal information gathered in the focus groups showing a perception of a weakness in attracting customers because of the company's inability to compete on price with some competitors (possibly due to economies of scale differences), but also of a strength in keeping customers by offering quality-personalized service (volume vs. quality).

The average employees' scores for marketing items (6) advertising and promotion activities, (7) product/service pricing, (8) facilities and methods used to sell to customers, and (9) market share, reflect the employees' perception of a deficiency in the marketing area. Employees' averages on grading marketing resources were in general lower than top management's scores.

It remains a challenge for management to deal with this employees' perception. It may be that such perception is due only to a lack of involvement and staff-management flow of information. Or it may be that employees are indeed aware of both a true deficiency and an opportunity to improve marketing activities. Perhaps, the situation can be addressed as a chance to draw ideas from the personnel on ways to improve the company's marketing effort.

Table 4-4. Summary statistics from the XYZ Research Corporation interviews

		Employees		Mgmt.	Employee Ave-
	N=19	Ave	Std Dev	Ave	Mgmt. Ave
<i>I. MARKETING RESOURCES</i>					
1. Customer satisfaction with products/services	19	4.00	0.58	4.0	0.00
2. Ability to gain customers versus competition	19	2.97	0.59	3.0	-0.03
3. Knowledge of market	18	3.72	1.07	4.0	-0.28
4. Product/service line breadth and depth	18	4.31	0.77	5.0	-0.69*
5. Product/service quality in terms of function, image, place, time, possession, ease of use	15	4.17	0.70	4.0	0.17
6. Advertising and promotion activities	17	2.43	1.15	3.0	-0.57*
7. Product/service pricing	19	3.71	0.84	4.5	-0.79*
8. Facilities and methods used to sell to customers	16	2.99	0.83	4.0	-1.01**
9. Market Share	15	3.01	0.64	4.0	-0.99**
<i>II. FINANCIAL RESOURCES</i>					
1. Strong and recurring operating profits	9	3.61	0.56	5.0	-1.39**
2. Efficient asset management	8	3.66	0.66	5.0	-1.34**
3. Strong and recurring return on investment	2	3.60	0.85	5.0	-1.40**
4. Proper balance of debt and equity	1	5.00	N/A	5.0	0.00
5. Strong and recurring return on equity	2	4.60	0.57	5.0	-0.40
6. Strong and recurring cash flow	3	4.40	0.53	5.0	-0.60*
7. Ready access to outside/new funds	4	3.13	1.03	3.0	0.13
8. Well managed customer credit	7	4.21	0.70	4.0	0.21
9. Well managed supplier credit	6	4.45	0.46	3.5	0.95*
<i>III. HUMAN RESOURCES</i>					
1. Adequate number of people to do the work	18	3.14	0.97	3.5	-0.36
2. Adequate quality of people to do the work	17	3.74	1.03	3.0	0.74*
3. Personnel plans	15	2.87	0.40	3.5	-0.63*
4. Job design and descriptions	16	2.76	1.29	3.5	-0.74*
5. Performance standards and evaluation procedures	18	3.08	1.03	5.0	-1.92**
6. Training programs	17	2.94	1.08	3.0	-0.06
7. Good morale as evidenced by absenteeism, turnover, tardiness, complaints, bickering, employee growth and development	19	3.14	1.01	3.5	-0.36
8. Compensation system that promotes performance and satisfaction	19	2.45	0.81	4.0	-1.55**
9. Equitable and competitive pay	18	2.60	0.83	4.0	-1.40**
10. Equitable and competitive fringes	18	2.54	0.78	4.0	-1.46**
11. Appropriate use of teams	15	3.17	0.96	4.0	-0.83*
12. Work ethic of individuals and teams	18	3.87	1.01	3.5	0.37

* Differences larger than 0.5 but smaller than 0.99

** Differences larger than 0.99

Table 4-4. Continued

	Employees N=19	Ave	Std Dev	Mgmt. Ave	Employee Ave- Mgmt. Ave
<i>IV. OPERATIONS/PRODUCTION RESOURCES</i>					
1. Quality of facilities to serve customers	19	3.32	1.01	4.0	-0.68
2. Capacity of needed facilities to serve customers	15	3.14	0.96	4.0	-0.86*
3. Up-to-date and appropriate technology	16	3.07	1.09	3.5	-0.43
4. Effective and efficient physical layout	16	2.56	1.2	2.5	0.06
5. Effective and efficient work flow	15	3.54	0.61	3.0	0.54*
6. Effective and efficient inventory control	12	3.08	1.28	3.5	-0.42
7. Effective and efficient purchasing practices	12	3.48	0.97	3.0	0.48
8. Effective and efficient production practices	16	3.86	0.59	3.0	0.86*
<i>V. MANAGEMENT/LEADERSHIP RESOURCES</i>					
1. Effective management style	17	3.59	0.83	3.5	0.09
2. Timely decision making	17	4	0.81	3.0	1.00**
3. Effective delegation	16	3.47	0.72	4.0	-0.53*
4. Effective participation	16	3.63	0.97	3.5	0.13
5. Effective risk taking	13	3.35	1.11	3.0	0.35
6. Effective leadership	17	3.59	0.81	3.5	0.09
<i>VI. ORGANIZATIONAL RESOURCES</i>					
1. Appropriate mix of resources (people, money, equipment) available	18	3.28	0.81	5.0	-1.72**
2. Resources properly placed to do the job	18	3.33	0.79	4.0	-0.67*
3. Effective interdepartmental communications	19	2.74	0.75	4.0	-1.26**
4. Effective reporting relationships	15	3.53	0.64	4.0	-0.47
5. Firm's public image	18	3.75	0.94	4.5	-0.75*
6. Strong organizational culture (productivity, honesty, dispute handling, tolerance of change)	18	3.5	0.87	4.0	-0.50
<i>VII. INFORMATION RESOURCES</i>					
1. Appropriate financial and cost accounting systems	10	3.25	0.79	5.0	-1.75**
2. Planning system appropriate for internal analysis	10	2.52	0.84	5.0	-2.48**
3. Planning system appropriate for external analysis	7	3.21	0.81	3.5	-0.29
4. Control system that highlights problems and generates corrective action	14	3.36	0.98	2.5	0.86*
5. Information systems that use the best technology available	14	3.46	1.08	4.0	-0.54
6. Effective information for strategic decision making	11	3.32	0.72	4.0	-0.68*
7. Effective information for operational decision making	12	3.46	0.72	4.0	-0.54*
8. Ability to utilize internet and e-commerce	17	3.52	0.74	5.0	-1.48**

* Differences larger than 0.5 but smaller than 0.99

** Differences larger than 0.99

Using verbal information obtained from the interviews, our study identified three repeatedly expressed perceptions on company and industry issues concerning marketing activities: (1) that there is an overwhelming quantity of propaganda and magazine advertising made by the large number of laboratories participating in the industry, and that this compromises the effectiveness of such marketing methods, (2) that highly specialized testing personnel is usually not trained to perform marketing activities; while marketing specialized personnel is unable to effectively promote the company due to their lack of understanding of chemistry, biology and other sciences concerning the companies services and products, and (3) considering the high costs per hour of labor and the personnel's high level of education and specialization, a management type of problem exists on deciding the most economically efficient way to distribute time between testing and marketing activities. For example, how much time should a scientist spend on performing tests and how much on answering the phone?

4.3.2 Financial Resources

The low number of responses obtained from employees suggests that they have little knowledge about the company's profitability and financial performance. However, employees did show at least a little knowledge on the some financial resources, such as strong and recurring operating profits and efficient asset management. Employees rated these as slightly better than average. In general, employees ranked their answers lower than top management.

While it is understandable that management may not wish to make financial numbers public in a privately held company, in some cases the lack of awareness of employees with respect to the company's performance may pose a threat to the

company's morale, motivation, and stability in terms of turnover, and productivity. Managers should monitor this particular issue.

4.3.3 Human Resources

The most recurring discrepancy between top management's perception and employees' perception occurred in the human resource management section. In reference to performance standards and evaluation procedures, a compensation system that promotes performance and satisfaction, equitable and competitive pay, and equitable and competitive fringe benefits, employees rated these human resource management components considerably lower than top management. While top management rated them 4 and 5 (strengths), employees averaged a rating of 3.08 or lower. Although it is expected for employees to feel "underpaid", the depth of this feeling and the lack of motivation resulting from the perception of low pay tied with low ratings for incentives and evaluation implies a serious underlying problem for the company.

Such results show the need to look more closely at the compensation and incentives programs in the company. The decrease in productivity that can arise from a low level of motivation in an organization can adversely impact its performance and profitability. An effective incentive program should produce higher returns by increasing morale and productivity and more than offset the costs of such programs.

When examining responses to: adequate quality of people to do the work, personnel plans, design and descriptions and appropriate use of teams; both top management and employees rated these items as being average at best (with employee ratings slightly lower than top management. Ineffective job descriptions can reduce productivity and efficiency by: (1) over-lapping job duties leading to duplication of efforts, (2) inefficiencies of assigning more people than needed to a given job, and (3) unclear job

responsibilities leading to confusion as to who is responsible for a given area. As expressed in the interviews, the very specific nature of tasks in the company's area of business may make it difficult to implement extremely detailed job descriptions. However, this does not imply that job descriptions should not be used at all. While XYZ Research Corporation does indeed have job descriptions; many middle managers felt these job descriptions could contain more details and expectations. Job descriptions can also be used as evaluation tools by assigning direct tasks and responsibilities to each employee.

4.3.4 Operation/Production Resources

Efficient and effective use of production and operations resources affects productivity in a very direct manner. As a whole, this section received only average grades, meaning it is considered neither a weakness nor strength. Most of the items were answered by more than 75% of the interviewees.

Owners and employees concur in giving average grades to: up-to-date and appropriate technology (item 3), effective and efficient inventory control (item 6), and effective and efficient purchasing practices (item 7). Low scores were given to effective and efficient physical layout (item 4).

According to the interviewees' answers, technology could be kept more up-to-date in the company. As discussed in Section 4.1.1.2 of this chapter, the FDA and other executive branch agencies base each of the regulations put in place on scientific discoveries and the increasing number of better technologies to perform tests. Laboratories have to keep up with the latest technologies to offer tests required to comply with the latest federal regulations. Coping with the latest technologies poses a potential opportunity for having a first-move advantage over other laboratories in offering the

latest and newest tests first. With respect to XYZ, it seems that changing this issue from not being weakness or strength to being a strength, is more a matter of enabling internal company processes that speed up managerial decisions to acquiring equipment than a matter of short cash flows.

With respect to inventory control and purchasing practices, these are two factors that greatly determine a company's cost structure. Assuming XYZ actually faces limitations to successfully compete on a price basis (see marketing resources in this section) with larger companies and that such limitations are indeed a consequence of economies of scale, it results most important for the company to achieve a cost structure that is as efficient as possible. Developing written procedures that regulate inventory control and purchasing practices are recommended by our study as one alternative solution to this issue.

Two items that scored lower by employees than top management in this section were: quality of needed facilities to serve customers (item 1), and capacity of needed facilities to serve customers (item 2). Two items that employees scored higher than top management were: effective and efficient work flow (item 5), and effective and efficient production practices (item 8).

The difference in perception between employees and managers on capacity and quality of installations could be restraining top management from recognizing that current facilities represent a constraint for the employees' and the company's growth. Managers believe installations to be a strength for the company, while employees consider them as average. Some of the employees explained their answers by mentioning the facilities were not initially designed for its current use but instead adapted, and that

this somewhat affects flow and efficiency. All parties recognized that the current physical location of XYZ is not the ideal physical set-up for the business as it has grown. It is possible that top management rated these higher as they are more aware than the employees of the problems associated with trying to move at this time. Employees did recognize there were some EPA issues that were involved in selling the current location that probably prohibited XYZ from selling and moving, but more direct communication may help employees realize why their firm has not moved into different facilities. With a better understanding, the employees may still feel that the physical facility is not ideal, but may lead to increased morale if the employees knew that management would prefer to move to a new location.

4.3.5 Management/Leadership Resources

For this section, only for items 2, timely decision-making and 3, effective delegation, were employees' and managers' averages different from one another by more than a factor of .5. Both groups graded most items in this section as higher than average meaning leadership resources are perceived as strengths of the company. It is interesting to note that employees felt that timely decision making was more a strength (4 on a scale of 5) than top management (3 on a scale of 5). Perhaps this reflects the current level of satisfaction that employees have with decision making, while management would like to see more timely decision making by entry-level and middle managers. One general comment regarding delegation is in order. The average score given by employees was 3.47. Based on a qualitative assessment of the interview responses, most mid-level managers feel there is a great deal of delegation when it comes to long-range goals and objectives. However, these mid-level managers would welcome more flexibility when it

comes to some of the day-to-day decisions such as the handling of customer service requests.

Interviewees expressed a concern towards an excessive concentration of the leadership in the company relying in one single person (Dr. Brown). The question: “What would happen to XYZ if Dr. Brown wasn’t here?” was repeatedly mentioned as posing a threat to the company given the industry’s tendency to pair XYZ’s future success with the presence or absence of Dr. Brown in the company. This included a perception that clients were beginning to prepare for a time when Dr. Brown was no longer with XYZ, and that the clients also did not know what to expect, therefore might be making “contingency” plans to move to other companies. This reiterates the discussed (see Section 4.1.2 and Section 4.1.3) importance of the role played by trust, experience, and reliability in generating demand for a given laboratory operating in this industry. In this case, food companies may observe a large portion of these attributes in the person Dr. Brown, and not in XYZ the company.

4.3.6 Organizational Resources

Top management scored all organizational resources in the company as a 4 (strengths) or higher while the average employee score for each item in the section was 3.75 or lower. Again, personnel in the company recognize the threat of a possible absence of Dr. Brown as constraining the firm’s public image from being a substantial strength to being perceived only as little better than average.

While top management perceived there was an appropriate mix of resources (item 1) and that effective interdepartmental communications were operating (item 3), as seen in their scores of 5 and 4 respectively; employees scored these considerably lower at 3.28 on appropriate mix of resources and 2.74 for effective interdepartmental communications.

Some of the middle managers were finding it difficult to take on marketing and sales roles in addition to the scientific roles they were trained for. There was some discussion regarding the relatively high turnover of entry-level positions that may be a result of a lack of appropriate resources, however, there were no other indications corroborating this issue.

Many of the interviewees indicated that interdepartmental communications were in need of extensive improvement. Interview discussions suggest interdepartmental communication improvements could be made in areas such as: (1) supply usage and replenishment, (2) customer contacts, the needs of customers common to multiple departments, (3) general knowledge of what is going on in each department and how this related to other departments, and (4) the future direction of XYZ Research Corporation.

4.3.7 Information Resources

Effective information resources are crucial for the timely and efficient evaluation of business plans being implemented. Large differences were observed between top management and employees' average scores.

Top management considered that the company makes good use of efficient and effective financial and cost accounting systems, and has an appropriate planning system for internal analysis. In contrast, the employees perceived that financial and cost accounting systems are neither strengths nor weaknesses for the company; and that the planning system represents a weakness. In referring to the current accounting system, one employee statement summarizes the impression received from the employee interviews: "under this system, we are forced to manage to avoid a loss instead of managing to make a profit."

Employees rated the planning system appropriate for internal analysis as a 2.52, while top management rated this as a 5. The general impression from interviews was that many of the current tools were used more to show what went wrong in a given department versus what could go right in the future. Another factor affecting this scoring was a general belief that planning exercises, such as this strategic analysis of XYZ Research Corporation, have resulted in little change to company culture or operating procedures.

A more effective planning system developed and implemented with the participation of middle management could result in better planning and consequently in higher productivity and profitability of each project and the company.

In terms of marketing and increasing business through the Internet, the employees believe there is considerable room for improvement. Many employees believe XYZ Research Corporation needs a more involved web presence.

4.4 Strengths Weaknesses Opportunities and Threats (SWOT) Analysis for XYZ Research Corporation

Internal and external forces affect firms; a way to analyze these forces is to conduct a thorough SWOT analysis. A SWOT analysis can be thought of as a balance sheet where internal strengths represent competitive assets, while internal weaknesses represent competitive liabilities. Opportunities, which are external, are outside-of-the-firm situations that can be taken advantage of via strategic moves to improve a company's competitive advantage over rivals. Threats, also external, on the other hand are factors that increase the influence exerted by competitive forces acting in the industry and tend to reduce a company's profitability (Wysocki 1997).

The next SWOT analysis is based on the information gathered through focus groups and face-to-face interviews with XYZ's personnel (see Chapter 3 for a description of the questionnaire used) and through extensive readings done by the researcher on industry related topics. It also summarizes the findings of this study's discussions regarding the dominant economic traits, key success factors, economic forces influencing the market, and drivers of change in the industry, which were identified and discussed in earlier sections of this chapter.

4.4.1 Competitive Advantages (Strengths)

Competitive advantages, or strengths, are ways of doing business that one company does exceptionally well over its competitors. The term advantage implies that those "ways of doing business" are desirable for companies in the industry. As mentioned at the beginning of this section, strengths are internal to the company. The next list enumerates XYZ's strengths. Strengths were identified with the help of several employees in the company, the managers, and with our study's in-depth analysis of key success factors and forces affecting the industry (see all previous sections of this chapter).

They are

- **Stable financial structure.** XYZ's privileged position in terms of current profitability and stability has sparked their desire to grow. XYZ is a good example of a medium-size company that is very profitable. Currently, the company is free of debts, which offers an advantage in its cost structure and ability to offer better prices in comparison to many competitors that have incurred in debts to expand their business.
- **Reliability and experience** are key success factors in the industry. Food companies will not risk a recall on their products by working with inexperienced and unreliable labs. XYZ has an advantage over many younger laboratories because of its **business longevity of 37 years of experience** in the industry. For example, a client might choose XYZ over other laboratories because of XYZ's years of repeated successful business experiences with known food companies. XYZ has worked for 26 of the 30 largest food companies. Also, as expressed by several people in the company, XYZ's **reputation of offering quality services together**

with Dr. Brown's recognized and renowned position in the industry, make XYZ to be perceived as a very reliable company in the industry.

- **Concentrated broad-based scientific expertise, knowledge base and quality personnel.** Food companies look for labs to be a source for additional expertise. In contrast with multi-site laboratories, XYZ's extensive and complete stock of human resources is concentrated in a single-location. One client-visit or phone call gives them access to all of XYZ's expertise.
- **Broad range of services offers convenience.** XYZ's full-service capabilities offer an advantage over limited-service laboratories when it comes to serving a client. It results more convenient for food companies to use one single trusted laboratory to do all testing instead of using one lab for each test needed. Also, **being a full-service laboratory allows for easier expansion into new areas of business** like nutraceutical, GMO or pharmaceutical testing, compared to limited-service competitors.
- **Proximity to University of Florida** – ability to draw resources (labor, installations) from the university. XYZ's good relations with the university represent access to a source and stock of social and human capital that many of XYZ competitors do not have. Joint-programs and partnerships with the university may enhance XYZ's credibility and reliability.
- **Personalized customer service.** Flexibility with customers (responsiveness), personalized service to customers and care for customer satisfaction, are traits that many too-large corporations lack. XYZ's medium-size operations make it possible for them to concentrate efforts and effectively offer a personalized service to its clientele, something their larger competitors might find more difficult due to their size.
- **Large customer base and established clients.** XYZ has a large list of clients. This poses a competitive advantage over many laboratories that depend on a small number of clients for business. The difficulty observed for new laboratories to establish themselves as reliable entities in the market, increases the importance of already having established clients.
- **ISO-17025 compliant,** biological testing and chemical testing accredited laboratory. The importance of accreditations in generating demand for a food-testing laboratory was discussed in Section 4.1.3 in our study.
- **Laboratory Information Management System (LIMS) and quick turnaround.** XYZ offers their clients with easy and quick access to results for their solicited tests. Verbal information from the interviews estimated a turnaround of only three hours for the Analytical and Food Chemistry division of XYZ.

4.4.2 Opportunities

Opportunities are circumstances over which the firm has no control. If taken advantage of, the result may be reducing the effect of competitive forces over the firm and increasing its profitability. According to Oster (1994), one way a company can earn higher returns than its similar competitors is by recognizing and seizing new lucrative opportunities early, before entry into the industry accomplishes its profit-leveling function. He calls this activity entrepreneurship.

Taking advantage of opportunities means: (1) recognizing them by understanding the industry environment surrounding the firm and (2) developing abilities and strengths within the firm that match up with such opportunities. Below is a list of all the opportunities facing XYZ. Opportunities were identified by our study with the help of XYZ's employees and management team:

- **Growing market** – increasing regulations; appearance of new technologies, increasing trend from the public to consume healthy foods—“smart-eating⁸”—concerns for homeland security, and globalization of markets; all seem to point to a long period of growth in the food-testing market. XYZ is in the right moment to use its financial momentum to grow.
- **Advances in information technology** – (like progress in internet communications) can be used to make test results more accessible to the clientele or to strengthen XYZ's presence in the market by using website promotion. Laboratories that take advantage of this opportunity will probably have an edge on those that do not.
- **Alternative industries to work with** – seafood, imports, food service, food brokers, organic, labeling and audits where all identified by XYZ's employees as alternatives areas of their business into which XYZ could focus to increase demand for their output.
- **Alternative industries to work in** – even though pharmaceutical and nutraceutical testing may be considered a business apart, food-testing laboratories are perfectly capable of performing the analytical process of drug development. For example, Covance is a laboratory that offers services to both the food and the pharmaceutical

⁸ Desire from public to learn about the nutritional components of food before consuming it.

industry. However, a whole different line of laboratories that are dedicated solely to the pharmaceutical industry provide their drug-developing clients not only with services for the analytical testing aspect of their business but also with the clinical related and data analysis services needed in the many stages of clinical trials and the drug development process. For XYZ, seizing this opportunity would mean developing not one but several abilities that would permit them compete against specialized pharmaceutical testing laboratories. The nutraceutical testing business seems more appropriate and closer to food-testing business. Public pressure to the government has resulted in recent approval of nutraceutical product regulations that will generate business for testing laboratories.

- **Increased concern for homeland security** as a result of the recent terrorism threats. As mentioned in Section 4.1.3 in our study, currently only the state public health laboratories that are part of the Laboratory Response Network (LRN) are permitted to identify or rule out bioterrorism agents in food products. However, there is an opportunity for private laboratories to develop collaboration programs with state-owned laboratories. For example, University of Georgia's partnership with the food industry to form the Center for Food Safety (CFS⁹) in Griffin, Georgia.

4.4.3 Competitive Disadvantages (Weaknesses)

Competitive disadvantages are things a company does worse or poorly in comparison with its competitors. A competitive disadvantage makes a firm more vulnerable to industry competitive forces and increases the chances of the firm observing low levels of profitability compared to the average in the industry. Competitive disadvantages observed for XYZ Research Company are outlined below. Again, our study drew from XYZ's personnel feedback to identify the company's weaknesses:

- **XYZ could gain in productivity by improving its benefits & incentives program.** Responses to the interviews carried out at XYZ Research Corporations suggest that there is some room to improve in the area of employee's morale. XYZ is already a lucrative business; improving personnel's morale can further improve its performance.
- **Concentrated leadership.** It seems the company's image and in some ways its performance, as employees expressed in the interviews, relies excessively on the company's CEO. There is a risk in putting all your eggs in the same basket; in this case the risk is the big shock that expects XYZ when the CEO leaves active

⁹ Center for Food Safety Website - <http://www.griffin.peachnet.edu/cfs/>

business. Suggestions for XYZ to prevent this from happening will be discussed in Chapter 5 (Section 5.1) of this study.

- **Weak internal communication & organizational system.** XYZ can gain from developing clear and effective written procedures to perform certain activities like budgeting/planning, inventory control, and purchasing activities. These written procedures may not result so critical for medium sized companies, but they surely increase in importance as a company grows.
- **Improvable Internet presence and non-aggressive marketing.** XYZ can enhance its marketing effort and presence in the market by directing resources into web promotion. In comparison to its competitors, XYZ's website has wide room to improve. Non-aggressive marketing approach leaves XYZ vulnerable to companies with more aggressive advertising.
- **Lack of curb appeal and physical room to expand in current location.** Even though it may not be true to what is in the inside, the outer front face of the building is the first impression the client gets. XYZ lacks the extensive gardens and fancy architecture that some of its competitors use to project themselves to their clients as organized and modern laboratories.
- **Absence of project managers.** Project manager is the name given by the company to a position involving technical and management duties. XYZ's management expressed a difficulty in finding and hiring individuals that excel in both aspects.
- **Absence of a customer service department.** More than affecting the firm's customer service quality, this affects its productivity. According to several employees, by not having a customer service department, the responsibility of giving customer service falls on them. Scientific personnel ends up divided between performing tests and answering the phone.
- **Price competition limitations against a few very large companies.** This is an advantage for larger companies resulting from the ability to lower average costs by distributing fixed costs between larger quantities of output. It does not imply that larger companies are more profitable, stable, or that they offer better services or more accurate results.
- **Being a single location** laboratory may represent a disadvantage against multi-site laboratories in three aspects: (1) to some extent it may limit customer access to the firm and presence of the firm in the market to a smaller geographic area, (2) it may result in higher transaction costs like transportation costs of sending results, and (3) it may increase the turnaround time. However, XYZ's Laboratory Information Management System (LIMS) reduces number two and three.

4.4.4 Threats

Threats are circumstances outside the control of the firm that increase the degree to which the firm is affected by competitive forces and may result in profits decreasing. A firm should develop abilities and set up their strategy to minimize the impact of threats to its business. The following is a list of identified threats facing XYZ Research

Corporation:

- **In-house testing trends in industry determined by equipment costs.** One reason for food companies to outsource for testing services is the elevated costs associated with purchasing and maintaining the needed cutting-edge technology to perform such tests by themselves. If equipment costs drop, the result may be food companies finding it more economically logic to stop outsourcing and do in-house testing. However, considering the fact that cutting-edge technology is usually expensive, it remains very improbable that this threat would materialize.
- **In-house testing trends in industry determined by economies of scale.** Another reason for food companies to outsource is the more intensive use that independent food-testing laboratories give to testing equipment by repeating the same test for different companies. It does not make sense economically for food companies to purchase a machine, perform a test once and then leave the machine in a corner, unused. However, as food companies become larger and internationalize their operations, it may be that output and turnover grows to a point where demand for some tests is large enough to justify purchasing the equipment. If so, that company's outsourcing for those tests would stop.
- **Changes in food regulations.** Although the trend is for regulations to increase and generate more business for testing laboratories, there is always a chance for regulations to take a path that negatively affects the food-testing laboratory industry. For example, the government may decide to increase their control over testing laboratories or may try to reduce the margin of error in food safety tests in the nation by increasing the number and strictness of quality assurance and good lab practice regulations. Failure to comply may result in firms going out of business, and tardiness in complying may result in competitors taking a reliability edge in the industry over XYZ by complying first.
- **Pharmaceutical labs switching more and more into XYZ's type of business.** This is the other side of the opportunity outlined in Section 4.4.2 with regards to food-testing laboratories moving into the pharmaceutical testing business. As well, pharmaceutical testing laboratories are perfectly capable of performing many food related tests. Dealing with this threat would require enhancing and increasing the number of unique benefits—for example, experience in the food industry—which food-testing laboratories have to offer to food companies.

CHAPTER 5 RECOMMENDATIONS AND CONCLUSIONS

5.1 Recommendations for XYZ Research Corporation

The next recommendations are given on the basis of the work and information obtained and presented in our study so far. Each recommendation presents a possible course of action to be addressed by XYZ in the future.

5.1.1 Defining a Strategy

XYZ could greatly benefit from investing time and effort in defining itself and its competitive strategy in a detailed manner. As discussed in Chapter 4 (Section 4.3.1), XYZ does a good job in retaining customers due to its personalized service, but seems to have a hard time getting new customers due to its inability to compete based on price with larger rivals. This assertion was extracted from the data gathered in the interviews.

In his books, *Competitive Strategy* (1980) and *Competitive Advantage* (1985), Michael Porter identifies three generic strategies that firms in any industry can follow. Business theorists often categorize business behaviors using Porter's three distinct strategies. They are cost leadership, differentiation, and focus strategies. Cost leadership involves concentrating in selling a standardized product at low costs targeting the larger portion of a price-sensitive clientele (Wright 1987). Cumulative volume of output, conceptualized by the experience curve, is what allows cost leader strategists to offer competitively priced services to a large portion of the industry's market through a combination of economies of scale, capital-labor substitution possibilities and an incrementally increasing learning curve (Hout, Porter, and Rudden 1982; Allan and

Hammond 1985; Abernathy and Wayne 1983; Boston Consulting Group 1972). Product differentiators offer an industry-wide unique product or service (e.g., personalized and fast, quality service) to the larger portion of a price-insensitive clientele. Finally, focus strategists concentrate in addressing needs of particular buyers in the industry, which are fewer in number (Wright 1987). It is highly unusual, and equally as unprofitable, for a company to attempt to excel at more than one strategy at the same time. For example, Wal-Mart's size allows the company to offer the lowest prices, but it is unlikely to see Wal-Mart aiming to match the highest quality in the industry. Many argue that pursuing two strategies at a time may result in a firm ending up in the middle with no competitive advantage at all.

Wright (1987) further argues that larger firms in an industry with greater access to resources may primarily compete with cost leadership or differentiation strategies. He also argues that small firms, on the other hand may only viably compete with the focus strategy. Using this framework, figure 5-1 shows our study's assessment of XYZ's current position.

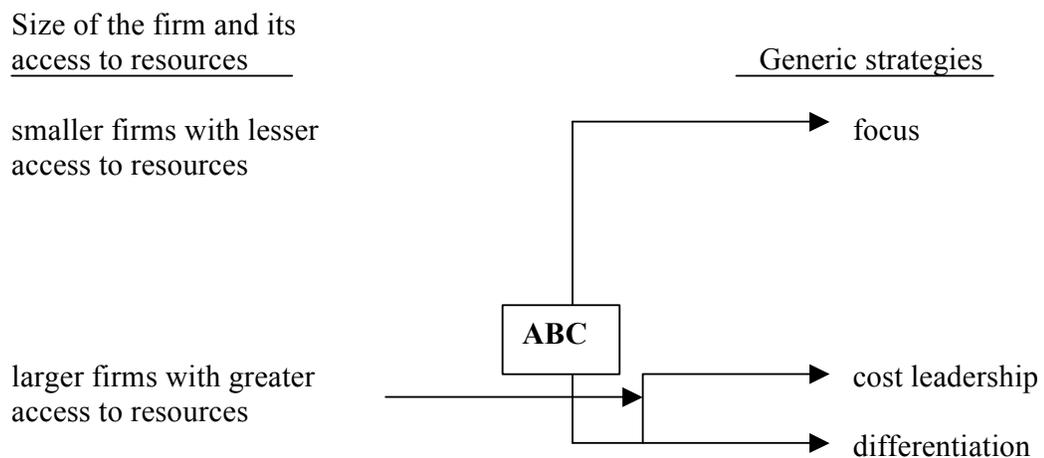


Figure 5-1. XYZ's size position and available strategies.
Obtained from Wright, P. "A Refinement of Porter's Strategies." *Strategic Management Journal* 8(1)(January 1987):93-101.

XYZ's medium-large size operations and privileged financial position allow for cost leadership or differentiation strategies. However, consideration should be given to the fact that defining a strategy involves many important factors. For example, a strategy dictates whom you compete against and how you compete. According to Porter (1980), different strategies imply different organizational arrangements, control procedures, and incentive systems. Considering the importance and wide set of economic and organizational repercussions associated with selecting a strategy, the careful logic-based approach to picking a strategy should involve XYZ choosing that one that best uses its internal strengths and best exploits areas of opportunity in the industry; while minimizing the potential effects of identified weaknesses and probable threats. This is where our study's detailed Strengths Weaknesses Opportunities and Threats Analysis (SWOT) and Porter Five Forces framework step in.

5.1.1.1 Considerations for XYZ choosing the cost leadership strategy

Cost leadership involves concentrating in selling a standardized product at low costs targeting the larger portion of a price-sensitive clientele (Wright 1987). Before taking this road, XYZ should consider the next issues.

- **Other labs would have a first-mover advantage in this strategy.** For example, Silliker Labs already seems to operate under this strategy.
- **What is the level of price-sensitiveness of the clientele?** Our study found information suggesting that other factors might be as important or more important than price for food companies (e.g., reliability in terms of accreditations and accuracy on test results, quick turnaround).
- **Growing to take advantage of economies of scale.** Cost leadership is achieved by having the lowest production costs in the industry; this in turn is possible because of a firm's ability to distribute fixed costs between larger quantities of output. Given the medium-large size of XYZ's operations, becoming cost leader in the industry would require increasing market share or demand and building new facilities to increase output.

- **Growing industry allows for firm's growth.** There is space to grow in the food-testing market. Several factors already mentioned in Section 4.2 of Chapter 4 (increasing regulations, health concerns, new technologies, etc) suggest a long-term period of growth for the industry.

5.1.1.2 Considerations for XYZ choosing the differentiation strategy

Product differentiators concentrate in offering an industry-wide unique product or service to the larger portion of a price-insensitive clientele (Wright 1987). For XYZ, important considerations if taking this strategy include.

- **How to differentiate?** First thing is identifying the value traits desired by food companies on their outsource laboratory of choice. The standardized characteristic of tests does not allow for differentiation on the physical quality of the product other than increased levels of accuracy in results. Differentiation is also possible on the quality-of-service aspect of the product.
- **XYZ's reputation for quality offers a forefront position to pursuing the differentiation strategy.** Results and employees' opinions obtained from the strategic analysis interviews conducted at XYZ Research were presented in Chapter 4 (Section 4.3) of our study. Results show employees' and management's perception of XYZ's output quality as a strength for the company.

5.1.2 Aggressive Strategy-Based Marketing

XYZ can enhance its marketing effort. First, by training a group of employees with the necessary skills to effectively operate in both the scientific and economic areas of the business. Having this versatile people to interact directly with the clients would increase productivity by reducing scientific staff's time on the phone and would probably increase the quality of service offered to the clients. At the present moment, XYZ's management personnel already shows intentions of pursuing this matter by developing Project Managers, which are positions involving technical and management duties. A second way to enhance marketing effort would be by directing and allocating marketing resources (including Internet) into one identified marketing goal and direction based on

XYZ's chosen strategy. Avoiding vagueness in marketing goals will allow XYZ to achieve a more aggressive marketing posture with the same resources used now.

5.1.3 Understanding and Shaping the Customer Base

It would be recommended as a next step for XYZ to proceed in analyzing their customer base as a means to validate the suggested company's performance in attracting and keeping customers. That is: What exactly does the customer base of XYZ Research Corporation consist of? What are the various categories of customers by size, by type of service required, what percent of their business does XYZ Research Corporation get, how often do they purchase, and how much does each type of customer contribute to the bottom line?

Analysis done in our study related to buyer's power and threat of substitutes suggests smaller clients, having no resources to do in-house testing, may result more steady demand than large food companies which at any moment may switch from outsourcing to in-house testing if they feel its economically wiser. It would not hurt XYZ trying to maintain a percentage of their customer accounts destined to this segment of the market. Potentially focusing on serving this group of smaller food companies that may not be a priority for large competitors would leave the door open for XYZ to be the first mover in targeting the segment.

Segmenting the market into different types of clients and analyzing each separately could give the company a lot of insight into better ways of doing business. For example, a trend to generalize foreign food companies as debt defaulters was expressed in the interviews; it would be interesting to group XYZ's customer base using a small- large-or-foreign criteria and analyze profitability from each group. Another interesting criteria to

group and analyze could be type of business or position in the food supply chain (e.g., processors, retailers, manufacturers).

Another important consideration for XYZ and any other laboratory would be remembering not to place all your eggs in one basket. It is impossible to ignore the bargaining power that multi-millionaire food companies are able to exert when doing business. As beneficial as a partnership with one of these companies would be in securing business, it results risky to dedicate yourself almost exclusively to one company. It would be interesting to analyze XYZ's 2000 customer base keeping in mind that a large number of clients contributing evenly to your sales, is a lot safer than creating a dependency by doing business mostly with one huge client.

5.1.4 Decentralizing Leadership

In addition to deciding on the overall company strategy, management of XYZ Research Corporation needs to clearly identify and communicate a transition strategy for the time when the CEO (Dr. Brown) will be less active in the day-to-day management of XYZ Research Corporation. While formulating a transition strategy and finding the appropriate personnel to carry out this transition strategy have been a priority for XYZ Research Corporation management, events have occurred to delay the implementation of this strategy. Clearly communicating the transition strategy to the entire company would reduce uncertainty and employee anxiety, and increase morale, and allow for a better competitive response to questions being raised by current customers and competitor of XYZ Research Corporation.

5.1.5 Development of a New Incentive Program

Employees gave low ratings for incentives and evaluation in the strategic analysis interviews. This implies a serious problem. The extent to which an unmotivated

employee can diminish the productivity of a company is surprising. Unmotivated personnel will result not only in lower productivity but also in a higher rate of turnovers, leading to the costly process of hiring and training new employees. Retaining valued employees must be a top priority for any business hoping to succeed over the long-term.

When developing an incentive program one should consider that incentives can be monetary and non-monetary. Although money often plays an important role in someone's decision to join or leave a company, it ranks no higher than fifth among the most important factors for why employees stay with an organization (American City Business Journals Inc. 2001). XYZ Research Corporation should re-evaluate all of its monetary and non-monetary incentive programs, as changes could be made in both of these areas.

While it is true that when searching for a job, every professional looks for financial security, it is not the only factor. Every person wants to succeed, but being well paid is not the complete definition of success to most people. Five Alternative Motivating

Techniques are:

1. The manager personally congratulates associates who do the job.
2. The manager writes personal notes about good performance.
3. The organization uses performance as a basis of promotion.
4. The manager publicly recognizes employees for good performance.
5. The manager holds morale-building meetings to celebrate success.

All of these address the employee's self-esteem. In other words, the best way to retain valuable employees is by building personnel's confidence, increasing their self-esteem and getting people to think that by being in the company they are not only making money, but also being successful. It is noteworthy to emphasize that although non-monetary incentives should not be the only focus at XYZ Research Corporation, most non-monetary incentives cost little or nothing to implement.

Non-monetary motivators are powerful tools and due to their almost inexpensive characteristics they can have very high rates of return. On the other hand, money can be a dangerous motivator. When rewarding an employee's effort only with money, we may end up teaching our employees to stay just for the money and to expect raises after every achievement or to leave at the soonest, best offer. Development of an incentives program is an important future step stressed by our study for XYZ Research Corporation.

5.1.6 Tuning Up the Organizational Structure and Accounting System

A number of small things could be done to improve performance related to organizational structure and the accounting system. For example, this may include developing clear internal monthly financial reports for departmental managers that effectively communicate monthly performance, including information on how that department contributed to the overhead of the company. As stated in Section 4.3.3 of this study, job descriptions are an important part of evaluation procedures and should be improved and used as a part of the evaluation process (instead of the evaluation process using financial statements). Monthly departmental reports of on-going projects and plans for new projects, a more effective system for handling stocks and supplies, and improved methods for interdepartmental communication would also be helpful in optimizing the company's cost structure and increasing its productivity.

5.1.7 On Building New Facilities

In terms of solving some of the issues mentioned above, moving to a new facility might not be the top priority answer at the moment. Even though both top management and employees would like to move into a new facility, such a move should only take place after the company is clear on what strategy it will follow. It is true that moving to a brand new building will have some effect in the whole company's morale, but it is also

true that if some of the other issues mentioned above are left unsolved this increase in morale will only be temporary.

5.1.8 Management Training Programs

Management training programs and seminars could be organized to build a more versatile scientific personnel. Considering the demanding nature of scientific careers, it is not a surprise to find scientific personnel that is not so well rounded in areas other than their expertise. In fact, science calls for such high levels of specialization. XYZ's business however calls for personnel trained in both management and science, management seminars customized to bring scientists gradually into touch with management skills would surely have enormous repercussions over the company's performance.

5.2 Recommendations for Further Research

Our study identified several factors influencing demand in the U.S. independent food-testing laboratory industry. Other than price, some factors that are expected to influence clientele's demand include: reliability/accuracy of tests, speed of tests' turnaround, experience and promotional effort. However, the order of importance of these factors with respect to each other was not analyzed. It would be challenging very rewarding to pursue customer-preference research for this market. Willingness-to-pay research using surveys or focus groups to gather information from food companies would be one option. Goals of such research would include trying to determine the level of price-sensitiveness of the market, or if price comes before reliability in importance for customers or vice-versa, and test several accreditation programs to probably conclude which one projects more reliability to customers.

5.3 Conclusions

Returning to the Chapter 1 of this study (Section 1.1), the evolving and adapting role of the U.S. land grant system was addressed and to some extent questioned. The next issues were discussed: (1) the U.S. economy has evolved from an agricultural-based economy to a service-based economy, (2) the U.S. land grant system which was created to serve a predominantly, dispersed and isolated rural population, now faces a predominantly urban-suburban, massively communicated and interconnected society, (3) tighter government budgets in many countries have called for new innovative ways to fund and operate land grant systems, including private-public partnerships for projects where benefits are shared, and (4) farms have become more business oriented operating with cutting edge technology.

Shared benefits are observed in this research. First, the private sector benefits from the analysis and recommendations presented in our study. Second, the production of didactic material and opportunity to interact directly with the private sector are benefits for the public sector, in this case, the University of Florida. Nobel Prize Theodore Schultz, in his work *Investment in Human Capital* (1961), showed the immense contribution of human capital to growing levels of national output in many Western countries including the U.S. The output rendered by this research should be measured by the ability of the case study developed to help as a tool in teaching management skills and increasing national human capital by beginning in the classroom.

APPENDIX A
ANALYSIS TOOLS

Table A-1. Performance assessment

Please assess the overall performance of XYZ Research in the following areas. Performance can be low or high based on the current situation, comparison to goals, trends for the future, or the overall satisfaction of company participants.

Customer Satisfaction-ability to attract and maintain customers

Low Performance 1-----2-----3-----4-----5 High Performance

Evidence:

Competitiveness-ability to do better than your competition.

Low Performance 1-----2-----3-----4-----5 High Performance

Evidence:

Productivity-ability to provide products/services efficiently and effectively based on Internal management processes.

Low Performance 1-----2-----3-----4-----5 High Performance

Evidence:

Profitability-ability to attract resources based on level of return to key stakeholders.

Low Performance 1-----2-----3-----4-----5 High Performance

Evidence:

Which performance concerns (if any) warrant strategic analysis and planning?

Table A-2. Internal checklist

Goal: To determine a firm's internal strengths and weaknesses

Directions: For each item below, circle the number on the scale that best corresponds to your honest assessment of XYZ Research's strength or weakness in the indicated area.

	<i>Great Weakness</i>	<i>Great Strength</i>
<i>I. MARKETING RESOURCES</i>		
1. Customer satisfaction with product/services	1----2----3----4----5	
2. Ability to gain customers versus the competition	1----2----3----4----5	
3. Knowledge of the market	1----2----3----4----5	
4. Product/service line breadth and depth	1----2----3----4----5	
5. Product/service quality in terms of function, image, place, time, possession, ease of use	1----2----3----4----5	
6. Advertising and promotion activities	1----2----3----4----5	
7. Product/service pricing	1----2----3----4----5	
8. Facilities and methods used to sell to customers	1----2----3----4----5	
9. Market share	1----2----3----4----5	
<i>II. FINANCIAL RESOURCES</i>		
1. Strong and recurring operating profits (<i>PM*</i>)	1----2----3----4----5	
2. Efficient asset management (<i>TAT*</i>)	1----2----3----4----5	
3. Strong and recurring return on investment (<i>ROI*</i>)	1----2----3----4----5	
4. Proper balance of debt and equity (<i>EM*</i>)	1----2----3----4----5	
5. Strong and recurring return on equity (<i>ROE*</i>)	1----2----3----4----5	
6. Strong and recurring cash flow	1----2----3----4----5	
7. Ready access to outside/new funds	1----2----3----4----5	
8. Well managed customer credit	1----2----3----4----5	
9. Well managed supplier credit	1----2----3----4----5	
<i>*Key financial ratios used to assess these areas</i>		
<i>III. HUMAN RESOURCES</i>		
1. Adequate number of people to do the work	1----2----3----4----5	
2. Adequate quality of people to do the work	1----2----3----4----5	
3. Personnel plans	1----2----3----4----5	
4. Job design and descriptions	1----2----3----4----5	
5. Performance standards and evaluation procedures	1----2----3----4----5	
6. Training programs	1----2----3----4----5	
7. Good morale as evidence by absenteeism, turnover, tardiness, complaints, bickering, employee growth and development	1----2----3----4----5	
8. Compensation system that promotes performance and satisfaction	1----2----3----4----5	
9. Equitable and competitive pay	1----2----3----4----5	
10. Equitable and competitive fringes	1----2----3----4----5	
11. Appropriate use of teams	1----2----3----4----5	
12. Work ethic of individuals and teams	1----2----3----4----5	

Table A-2. Continued

	<i>Great Weakness</i>	<i>Great Strength</i>
<i>IV. OPERATIONS/PRODUCTION</i>		
1. Quality of needed facilities to serve customers	1----2----3----4----5	
2. Capacity of needed facilities to serve customers	1----2----3----4----5	
3. Up-to-date and appropriate technology	1----2----3----4----5	
4. Effective and efficient physical layout	1----2----3----4----5	
5. Effective and efficient work flow	1----2----3----4----5	
6. Effective and efficient inventory control	1----2----3----4----5	
7. Effective and efficient purchasing practices	1----2----3----4----5	
8. Effective and efficient production practices	1----2----3----4----5	
<i>V. MANAGEMENT/LEADERSHIP RESOURCES</i>		
1. Effective management style	1----2----3----4----5	
2. Timely decision making	1----2----3----4----5	
3. Effective delegation	1----2----3----4----5	
4. Effective participation	1----2----3----4----5	
5. Effective risk taking	1----2----3----4----5	
6. Effective leadership	1----2----3----4----5	
<i>VI. ORGANIZATIONAL RESOURCES</i>		
1. Appropriate mix of resources (people, money, equipment) available	1----2----3----4----5	
2. Resources properly placed to do the job	1----2----3----4----5	
3. Effective interdepartmental communications	1----2----3----4----5	
4. Effective reporting relationships	1----2----3----4----5	
5. Firm's public image	1----2----3----4----5	
6. Strong organizational culture (productivity, honesty, dispute handling, tolerance of change)	1----2----3----4----5	
<i>VII. INFORMATION RESOURCES</i>		
1. Appropriate financial and cost accounting systems	1----2----3----4----5	
2. Planning system appropriate for internal analysis (assessing strengths and weaknesses)	1----2----3----4----5	
3. Planning system appropriate for external analysis (assessing opportunities and threats)	1----2----3----4----5	
4. Control system that highlights problems and generates corrective action	1----2----3----4----5	
5. Information systems that use the best technology available	1----2----3----4----5	
6. Effective information for strategic decision making	1----2----3----4----5	
7. Effective information for operational decision making	1----2----3----4----5	
8. Ability to utilize internet and e-commerce	1----2----3----4----5	

Table A-3. Strengths analysis

Directions: Assess XYZ Research's five most important strengths* using the questions from above and your own beliefs about your firm. In the final column, cite specific evidence that supports your believe that the item is a strength or competitive advantage.

Strength	Evidence

*Strength: Something a company does well or a characteristic that gives it an important capability.

Table A-4. Weakness analysis

Directions: Assess XYZ Research's five most important weaknesses* using the questions from above and your own beliefs about your firm. In the final column, cite specific evidence that supports your believe that the item is a strength or competitive advantage.

Weakness	Evidence

*Weakness: Something a company does poorly or characteristic that puts it at a disadvantage.

APPENDIX B MAJOR QUALITY ASSURANCE PROGRAMS

This list was taken from Research Triangle's Food Testing Laboratory Database.

Quality Assurance Programs are divided into four categories: oversight programs, national programs, ISO-related programs, and association-sponsored programs:

Oversight Programs (national and international programs assuring uniform standards of execution for quality programs:

- American National Standards Institute (ANSI)
- Registrar Accreditation Board (RAB)

National Programs (Nationally and state sponsored indicators of laboratory quality)

- Accredited Laboratory Program (ALP)
- Good Laboratory Practices (GLPs)
- Good Manufacturing Practices (GMPs)
- National Environmental Laboratory Accreditation Program (NELAP) or State Water Accreditation
- USDA-Recognized Laboratory for Pasteurized Egg Products
- USDA Recognized
- State Certification

Trade Association-Sponsored Programs (quality programs such as proficiency testing and certified laboratory or analyst)

- AOAC International (AOAC)
- American Association of Cereal Chemists (AACC)
- American Association of Feed Control Officials (AAFCO)
- American Oil Chemists' Society (AOCS)

ISO Related Programs (non-governmental worldwide association of 130 countries to ensure international standardization of several industry sectors)

- ISO 9000 series
- ISO 17025

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