

SAMPLE SYLLABUS

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New York University Stern School of Business

New Product Marketing and Design

Spring 2005

M, W 11:00 am – 12:15 pm

Office Hours: M 4:30 – 5:30, W 3:30 – 4:30

and by appointment

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Introduction

New products and services are vital to the success of all companies. However, innovation is risky and most new products fail in the marketplace. Very often, ineffective marketing is the primary cause of new product failures. Thus, expertise in the marketing and design of new products is a critical skill for all managers, inside and outside of the marketing department. In this course, we focus on the tools and techniques associated with analyzing market opportunities and then designing, testing, and introducing new products and services. Both quantitative and qualitative approaches are covered. In particular, the course covers the new product development process, market entry strategies, how to generate new product ideas, mapping customer perceptions, segmentation, product positioning, forecasting market demand, and product design. The course emphasizes how to incorporate customers and competitors into all of these aspects of new product development. It is intended for students who are interested in working on new product innovations, both in entrepreneurial firms and in established companies.

Course Material on Stern Web Site

A course web site is available through Blackboard, <http://sternclasses.nyu.edu>. This site contains the course syllabus. Other important course material like PowerPoint presentations and handouts will be posted during the semester.

Objectives

1. To understand the new product development process.
2. To learn how to integrate the customer and knowledge of the customer into this process.
3. To learn and apply concepts and tools appropriate for new product development analysis.

4. To develop specific recommendations and action plans for companies facing difficult decisions about bringing new products to market.
5. To go through the new product development process by conceiving and developing your own new product or service.

Readings

Required Books

Packet of Cases and Articles: Available at the NYU Bookstore.

Will and Vision: How Latecomers Grow to Dominate Markets by Gerard Tellis and Peter Golder.

Marketing Engineering, 2nd edition by Gary Lilien and Arvind Rangaswamy. This book covers many common marketing analyses. We will focus on those that are most relevant for new products. The readings and assignments in this book will be done in teams. Copies of the book are available in Bobst library.

Optional Books (either book is useful for background information, but I don't expect you to buy either). Copies of these books are also available in Bobst library.

Design and Marketing of New Products, 2nd ed., by Glen Urban and John Hauser.

New Products Management, 8th ed., by Merle Crawford and Anthony Di Benedetto.

Outside Readings: During the semester, we will discuss relevant articles from the *Wall Street Journal*, *New York Times*, and *BusinessWeek*. These articles will relate current events to the concepts taught in class. I encourage you to bring relevant articles to class too.

Course Grade

Your course grade is based on the following components:

Case Exercises (4):	30%
Group Project: Presentation	15%
Report	30%
Class Participation	25%

Policy for reconsidering grades. If you believe that a mistake was made in grading your assignment, please give me a written explanation along with the original assignment. Since your grade reflects an overall judgment about the quality of your assignment, I will re-evaluate the entire assignment rather than just re-consider one aspect of it.

Course Content

The course uses a combination of:

1. Lectures
2. Cases (four cases will include exercises)
3. Group project
4. Class discussion.

1. Lectures

Lectures will introduce new tools, frameworks, and concepts that are important for conducting a thorough analysis. These lectures will be interactive, so be prepared to ask and answer questions.

2. Cases

Cases are descriptions of real-world business situations that provide opportunities to define and develop new product strategies. Case analyses will illustrate how new product concepts and tools apply to these complex situations. Analyzing cases promotes your decision-making capabilities by developing a process of thinking. *Typically, there is no single “right” answer to a case, but there are many weak answers resulting from inadequate analysis.* Case discussions also provide opportunities to develop your communication skills. Your contribution to each case discussion will be evaluated immediately after each class.

The success of our case discussions is largely up to you. Good case discussions involve interactions among students. Case discussions are based solely on the material presented in each case. Please do not collect any post-case information. Our emphasis will be on the decision-making process at the time of the case rather than on the decision outcome. Since managers must constantly make decisions without all the information they desire, being able to make decisions under these circumstances is a critical skill.

In our discussions, the roles of professor and students are crucial, but very different. My role is to facilitate the discussion, rather than to direct the discussion in a predetermined direction. You (collectively) must raise the relevant issues. I will make sure that all opinions and recommendations have a chance to be raised. Then, I will help the class synthesize the different perspectives and form a framework for decision-making. I will share my views at the end of each case. However, it is important to remember that the purpose of case analysis is not to determine right and wrong answers (except for some of the quantitative analysis, where there will be right and wrong answers). The validity of any recommendation rests on its logic and incorporation of all relevant facts from the case.

In preparing cases, assume that you are a marketing manager or outside consultant who has been given responsibility for the situation described in the case. Do not focus solely on a description of the facts in the case, rather focus on the following three factors: statement of the problem(s) or decision(s) to be made; description of your decisions or recommendations; supporting logic and analyses. Your recommendations should be based on quantitative and qualitative analysis of case data. Your analysis should anticipate potential objections to your recommendations and illustrate its superiority over alternative recommendations.

Case Preparation

1. Skim through the case to understand the basic setting and framework. This will help you to assimilate the facts of the case when you read it.
2. Review all tables and figures.
3. Now read the case and begin to analyze it qualitatively and quantitatively. What are the key issues? What do you recommend? What alternatives did you consider? Why did you select your preferred course of action?
4. Now with a reasonably good understanding of the situation, you should reread the case to incorporate important details that will impact your analysis.
5. In preparing the cases, don't look for a single right answer. Each case will raise a number of issues that need to be evaluated. A good recommendation is one that is based on solid analysis, considers multiple courses of action, and integrates its individual elements.

Note: If you are unable to attend a case discussion and would like to receive some participation credit for your analysis, please give me a write-up of your analysis prior to our class discussion. This write-up should be more detailed than the brief case write-ups (see next page).

Hierarchy of Comments

1. Agreeing with someone else's statement.
2. Describing events in the case.
3. Demonstrating an understanding of the situation/problem in the case.
4. Explaining events in the case and recommending solutions based on analysis of relevant data.
5. Relating your explanations and recommendations to knowledge developed from readings, lectures, and previous discussions.

Case Assignments

Exercises (Group Assignments)

All groups will turn in exercises for the following cases: Conglomerate's New PDA, Positioning the Infiniti G20, Forte Hotel Design, and Johnson Wax. These assignments provide hands-on experience working with tools that are important in new product development. Some or all of these tools should be applied to your group project too. Most of the exercises for these cases are in the *Marketing Engineering* book. For some of the cases, I will give you additional instructions and exercises.

Brief Case Write-ups (Individual Assignments)

For four of the cases, please submit a short write-up (less than one page, double-spaced) describing the 2-3 key issues in the case, your specific recommendations for dealing with these issues, and the results of your analysis that supports your recommendations. These write-ups should be done individually. You may discuss them with your group members prior to writing them up. But each of you should prepare your own write-ups. You may choose any four of the following cases: Airbus, DuPont Kevlar, Innovation at 3M, Aqualisa Quartz, Zenith HDTV, and GolfLogix. The objective of these write-ups is to formalize your recommendations prior to discussing the cases. This leads to more lively discussions and more active learning during class discussions. These assignments will be graded satisfactory or unsatisfactory. I expect that every reasonable attempt at these assignments will be judged satisfactory. You can assume that it is, unless I return it to you. Completion of these assignments is worth 40% of your class participation grade (or 10% of your total course grade).

3. Group Project

New product development is almost always the result of a group effort. Therefore, the ability to work in teams is critical to new product success. Similarly, it will be critical to your success in this course. You should begin to form 5-member teams as soon as possible. Quantitative case exercises and your semester-long new product development project will be done with these teams.

The new product development project will involve a lot of research and teamwork. Your research will likely involve both primary and secondary data collection as well as statistical analysis of that data. I want you to be as creative as possible in terms of generating ideas, developing support for your idea, and preparing a plan for marketing your new product or service.

All projects must be approved by the professor (see Course Schedule for proposal due date).

In determining the grades for your project report and presentation, I will give some consideration to both peer evaluations and feedback from industry experts. These experts will attend the presentations of your projects.

The greatest cause of disappointing team assignments is the inability to coordinate work effectively. Some ways to prevent this occurrence are:

1. Choose team members who can meet at times that are convenient for other team members.
2. Take notes of your meetings so your decisions and assignments are clear.
3. Plan sufficient time to discuss your analyses, make decisions, and prepare the final report.

I am available to help resolve team conflicts, but the final responsibility rests with the team members. Teams are entitled to issue a written warning to any student who is not contributing fairly or constructively. This warning should state the problems and list specific steps to resolve these problems. All other members of the group should sign the warning and you should give a copy to me. At the end of the semester, you will have the opportunity to evaluate the relative contribution of your team members. When problems cannot be resolved with a team member, the other team members can expel this member by unanimous vote. If you are expelled from your team, you will need to complete all assignments individually.

4. Class Discussion

The best learning experiences occur when students participate actively. You must be prepared to discuss all assigned readings and cases. Your comments should reflect a depth of understanding indicative of thorough analysis (including number crunching) and most often discussions with other students prior to class. You should be prepared to articulate and defend your position when called on to do so. *Active participation of all students is required but quality and frequency of comments is more important than duration of each comment.* The ability to speak comfortably to a group is a vital business skill. If you are anxious about public speaking, the only way to get better is to practice. The best way to reduce your anxiety is to be thoroughly prepared.

These are the elements I will consider in evaluating your participation:

1. Are you a good listener?
2. Do you contribute to the learning environment by *sharing your relevant business experiences and those you read about*?
3. Do your comments show evidence of thorough analysis?
4. Do you ask constructive questions of other students that help to deepen everyone's understanding?
5. Do you distinguish between different kinds of data (i.e., facts and opinions)?
6. Are you willing to share ideas and information in a collegial fashion?
7. Are you willing to test new ideas, or are all comments "safe" (e.g., a repetition of the case facts without new insights)?
8. Are you willing to interact with your classmates to help refine ideas?
9. Do your comments build on earlier comments to advance the discussion or are you merely repeating earlier comments or raising points that do not fit into the current discussion?
10. Do your comments incorporate concepts presented in lectures, readings, and earlier cases?
11. Do you make your points succinctly?

Rules of Class Discussion

Putting down legitimate comments (those not intended to be humorous) is not acceptable. Everyone's input, if not repetitious, must be considered valuable and encouraged. Feel free to question or disagree with other students, however, such disagreement must be based on the idea and

not the person. Respect for your fellow students is the *sine qua non* of great discussions and great learning experiences.

Administration

1. You should attend all class sessions, complete all readings before class, and hand in all assignments at the beginning of class. Late assignments will be downgraded. Please minimize disturbances during class, i.e., talking, arriving late, leaving early, etc. Whenever you know in advance that you will miss a class, please let me know. If you miss class, you should get notes from two students to make sure that you do not miss any important material.
2. A blind grading process will be used in the course where possible. Please do not put your name on the case exercises; instead, please use the last four digits of your social security numbers. This process will help to ensure that each assignment is graded solely on its merits.
3. Students are expected to adhere to the school's honor code. Please ask me if you have any questions about how the honor code applies to a specific situation. For this class, the most important aspect to be aware of is that case exercises and the group project must reflect only the work of those people handing in the assignment. For other cases, I encourage you to discuss them with your classmates, although your brief write-ups should still be prepared individually.
4. No extra credit assignments will be given in this course. Please see me right away if you are concerned about your performance in the class.
5. Deviations from the syllabus may be necessary.
6. The Teaching Fellow for this course is Caresse Sakagawa (cas364@stern.nyu.edu).

COURSE SCHEDULE

Date	Topic	Assignment
Course Introduction and Opportunity Identification		
January 19	Introduction: What is New Product Marketing and Design?	
January 24	Airbus A3XX: Developing the World's Largest Commercial Jet (Case Packet)	Prepare Case
January 26	Opportunity Identification: Market Definition and Market Segmentation	Marketing Engineering: Chapter 3 <i>Will and Vision</i> : Foreword, Preface, Chapters 1, 2 Product Development: A Customer-Driven Approach New Product Commercialization: Common Mistakes
January 31	Introduction and Tutorial on Marketing Engineering Software	
February 2	Opportunity Identification: Idea Generation	<i>Will and Vision</i> : Chapter 3 Note on Lead User Research Spark Innovation Through Empathic Design
February 7	Conglomerate Inc.'s New PDA (Marketing Engineering)	Quantitative Exercise
Design Process		
February 9	Design Process: Conjoint Analysis I	Marketing Engineering: Chapter 7, pp. 239-252 <i>Will and Vision</i> : Chapter 4 Analyzing Consumer Preferences
February 14	Design Process: Conjoint Analysis II	New Product Proposal
February 16	Du Pont Kevlar Aramid Industrial Fiber (Case Packet)	Prepare Case
February 21	Presidents' Day Holiday	
February 23	Forte Hotel Design (Marketing Engineering)	Quantitative Exercise
February 28	Design Process: Perceptual Maps	Marketing Engineering: Chapter 4 <i>Will and Vision</i> : Chapter 5 Analyzing Consumer Perceptions
March 2	Innovation at 3M Corporation (Case Packet)	Prepare Case
March 7	Design Process: Customer Measurement Designing for Quality	<i>Will and Vision</i> : Chapter 6 The House of Quality
March 9	Positioning the Infiniti G20 (Marketing Engineering)	Quantitative Exercise
March 14 and 16	Spring Break	Enjoy!
Testing and Forecasting		
March 21	Test Marketing and New Product Forecasting I	Marketing Engineering: Chapter 7, pp. 263-271 <i>Will and Vision</i> : Chapter 7 Researching and Monitoring Consumer Markets
March 23	Test Marketing and New Product Forecasting II	New Product Progress Report <i>Will and Vision</i> : Chapter 8
March 28	Aqualisa Quartz (Case Packet)	Prepare Case
March 30	Advertising and Product Testing	<i>Will and Vision</i> : Chapter 9
April 4	Johnson Wax (Marketing Engineering)	Quantitative Exercise
April 6	Guest Speaker (date may change)	
Product Launch and Life Cycle Management		
April 11	Product Launch	<i>Will and Vision</i> : Chapter 10
April 13	Zenith: Marketing Research for HDTV (Case Packet)	Prepare Case
April 18	Product Life Cycle Management	<i>Will and Vision</i> : Chapter 11
April 20	GolfLogix (Case Packet)	Prepare Case
Course Conclusion		
April 25	New Product Project Presentations Class from 11:00 am – 1:20 pm	Formal Presentation
April 27	No Class – Double Session on April 25	
May 2	Course Conclusion	New Product Project Reports

General Case Study Questions

Airbus A3XX: Developing the World's Largest Commercial Jet

1. Why is Airbus interested in building the A3XX? What are its objectives?
2. How many aircraft does Airbus need to sell in order to break even on its investment? Is this number greater or less than your estimate of total demand for very large aircraft (VLA) over the next 20 years?
3. As Boeing, how would you respond to this situation? How does your answer depend on what you think Airbus is likely to do?
4. Should Airbus commit to build the A3XX? How many orders should Airbus have before committing to develop the plane?

Du Pont Kevlar Aramid Industrial Fiber

1. Develop a reverse income statement by starting with the desired profit and working back to revenue. Then consider the necessary pricing and DuPont's required share of the market. What assumptions are necessary for achieving a desirable financial outcome? Is DuPont worrying about the most important things?
2. Why do you think the executives of DuPont are targeting the tire cord market with this massive investment?
3. If you were responsible for commercializing Kevlar, and knew only what Swank knew at the time of the case, what sort of project plan would you formulate and implement?

Innovation at 3M Corporation

1. How has 3M's innovation process evolved since the company was founded? Why, if at all, does 3M, known as a "hothouse" of innovation, need to regain its historic closeness to the customer?
2. How does the Lead User research process differ from and complement other traditional market research methods?
3. Has the Medical-Surgical team applied the Lead User research process successfully? Why or why not?
4. What should the Medical-Surgical Lead User team recommend to Dunlop: the three new product concepts or a new business strategy? What are the risks to the new Lead User process at 3M? What are the risks to the Medical-Surgical business unit?

Aqualisa Quartz

1. What is the Quartz value proposition to plumbers? To consumers?
2. Why is the Quartz shower not selling?
3. Aqualisa spent three years and €5.8 million developing the Quartz? Was the product worth the investment? Is Quartz a niche product or a mainstream product?
4. Aqualisa currently has three brands: Aqualisa, Gainsborough, and ShowerMax. What is the rationale behind this multiple brand strategy? Does it make sense?
5. What should Rawlinson do to generate sales momentum for the Quartz product? Should he change his marketing strategy to target consumers directly, target the DIY market, or target developers? Should he lower the price of the Quartz? Or should he do something different altogether?

Zenith: Marketing Research for HDTV

1. What should Bruce Huber do? (i.e., what should he recommend to CEO Jerry Pearlman in terms of Market Research for HDTV now and later?)
2. How do you see the situation Zenith is facing? Will HDTV be an uphill battle or a boost for the company (industry)?
3. Is HDTV an innovation? What are the relative advantages and risks of adopting HDTV? Will consumers perceive it to be an innovation? Who will be the early adopters of HDTV?
4. Should Zenith undertake the Aspect Ratio Study? If so, when and what should be the research design? (i.e., should there be any modifications to the proposal?) What are the pros and cons of the existing proposal?
5. How should one assess the market potential for HDTV?
6. What is the market potential for HDTV based on the history of similar innovations? How can customer behavior for color TV help assess the market for HDTV?
7. How should one define scenarios for an optimistic, a most likely, and a pessimistic scenario for HDTV demand from 1992-2000?
8. What are the demands under these scenarios?
9. What is the role of marketing research for innovative high-tech consumer durable innovations?
10. What are the pros and cons of the other proposals for HDTV research?
11. What input from Market Research can help formulate strategy for introducing HDTV?

GolfLogix

1. How does the xCaddie create value? Is it compelling?
2. What is the market potential for the GolfLogix devices?
3. What are the advantages of going through the golf courses? Through retail channels?
4. If you could only choose one of the two channels, which would you choose?
5. Given the option of selling through both channels, what would you do?

Peter N. Golder
Associate Professor of Marketing
Stern School of Business
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Education

Ph.D., University of Southern California
B.S., University of Pennsylvania

Academic Experience

Joined Stern School in 1995
Previously taught at UCLA and University of Southern California

Professional Business Experience

6 years at Northrop and Conoco

Research

Professor Golder's research focuses on a variety of marketing strategy issues including new products, market entry, long-term leadership, and branding. His findings have been featured several times in *The Wall Street Journal*, as well as in *The Economist*, *Advertising Age* and many other publications. His research has won three of marketing's most prestigious best paper awards. One award was for the paper making the most significant long-term contribution to the marketing discipline, judged five years after publication. Professor Golder has received funding from the U.S. government to study competition in international markets. He has presented his research to academic and business audiences at many domestic and international conferences. He has appeared on CBS, CNN, and the *Nightly Business Report* to comment on business news stories and consults with companies on his research specialties. He is the coauthor of *Will and Vision: How Latecomers Grow to Dominate Markets*, which was selected by the American Marketing Association (AMA) as the best marketing book published over a three-year period and by *Harvard Business Review* as one of the 10 best business books of 2001. In 2003, Professor Golder's research was recognized with the AMA's first ever Award for Early Career Contributions to Marketing Strategy, based on his first 10 years of research.

Guideline for Final Report and Presentation

Your report should focus on the development of your idea and the evaluation of its market potential. The topics you address will closely follow the topics in the course. Thus, you should review the readings, lectures, and cases to identify those concepts and tools that are most relevant for your project. Here's a rough outline of the items you should include.

1. The Idea
 - a. Description of product or service.
 - b. What customer needs will be satisfied? What's the link between the needs and the product attributes, e.g., application of House of Quality.
 - c. Processes and analytical models employed to design and develop new product idea, e.g., concept testing, conjoint analysis, focus groups, interviews, lead users, empathic design.
 - d. Remaining assumptions and uncertainties.
2. The Market
 - a. Description of potential target segment(s): needs, benefits sought, usage patterns, importance of attributes, consumer characteristics, size of segment, price sensitivity, etc.
 - b. Evaluation and selection of target segment. You can select more than one segment, but in general, I would prefer more in-depth analysis of one or two segments than a broader discussion of multiple segments.
 - c. Processes and analytical models employed to identify target segment, e.g., cluster analysis, surveys.
 - d. Remaining assumptions and uncertainties.
3. Link between the idea and the market
 - a. Positioning relative to alternative products/services.
 - b. What is the product's core benefit proposition for the target segment?
 - c. Processes and analytical models employed to identify and select positioning, e.g., perceptual maps, surveys.
 - d. Advertising concept to communicate positioning.
 - e. Results of Advertising and Product Testing.
 - f. Test market plans.
 - g. Estimation of market demand – sales forecasting.
 - h. Launch strategy: brief discussion of price, promotion, and distribution for product or service.
4. Summary of lessons learned during the project and what you would do differently on another new product development project.

Your report should be a maximum of 7 pages of text (double-spaced, 12 point font) with up to 10 pages of exhibits. Exhibits should include survey questionnaires, secondary data sources, output from computer software tools, perceptual maps, etc. Exhibits should focus on the evidence that supports the recommendations, descriptions, and conclusions in the text. Each report will address topics to varying degrees, but you should make sure that (i) your conclusions are based on findings from your primary and secondary research and (ii) that you have identified remaining assumptions and uncertainties and thought about ways to resolve these issues.

Presentation

Your presentation should highlight the elements from above that will convince the audience that there is a viable market for your product. You should refer to the analyses that support your recommendations, without going into too much detail. Even if you recommend not launching your new product, it's likely that the product still appeals to some segment, but that segment is too small.

As part of your presentation, you should include:

- Steps in the process of refining and improving your new product concept
- Description of target segment(s) – emphasize the most relevant segmentation variables
- Benefits sought by target segment and how those match the features of your new product
- Your new product's core benefit proposition
- Positioning of your product relative to competing alternatives
- Initial assessment of market potential.

The recommendations you make in these areas should refer to the analyses that you conducted. Also, you should provide some information about the launch strategy for marketing your new product concept.

During the presentations, I will ask each of you to evaluate each product and/or presentation on the following criteria:

- Highest revenue potential (discounting risk)
- Most likely to be funded
- Most creative
- Best analysis
- Most likely to be introduced to market
- Best overall new product concept
- Best presentation
- Best answers to questions
- I'd like to work on the team bringing this new product to market.

These awards criteria are primarily for fun, but I will give some consideration to them in evaluating your presentations (see syllabus p. 5).

In order to provide everyone with an idea of your product prior to your presentation, please submit a one-page summary of your project by April 22 at noon. The page should be broken up into quarter sections containing: (i) a picture, drawing or sketch of your new product (rough sketches are fine) and/or a short description of the product, (ii) a description of the target segment, (iii) a perceptual map highlighting your positioning and core benefit proposition, and (iv) an estimate of the market potential for your new product with some justification for that estimate.

Feedback on Progress Reports and Questionnaires

Secondary research _____
with references _____

Exploratory/Preliminary research _____
(possibly using observation)

Conjoint analysis

Most important/unique attributes, including price _____
Levels or options along those attributes _____

Suggestions: Use software to collect data from group members. For other people, use paper and pencil to collect same data for evaluating attributes and options (even if you don't rank bundles). Please include at least two concepts in your perceptual map analysis.

Cluster analysis

Needs variables _____
Similar products owned/used _____
Demographic data _____
Media consumption _____

Suggestions: Additional needs variables could include benefits, relative importance of benefits or behaviors, usage rate of similar products, willingness to pay, where product is purchased/consumed. Please use consistent rating scales that are easy to use. Ease of use can be evaluated through pre-testing.

Positioning analysis

Include important competitors and/or most likely substitutes _____
Rate new product concept(s), competitors, and/or substitutes on important attributes _____
Overall preference ratings for new product concept(s), competitors, and/or substitutes _____

Suggestions: Use a standard presentation of your new product concept(s) (i.e., sketches, descriptions), so that everyone is given the same information. Collecting data in a spreadsheet or matrix will make it easy to provide. One attribute you should include is customers' perceptions of value or economy. For products that are considerably different from existing products, you may want to collect attribute ratings for the new product after collecting ratings for all of the existing products. Please validate whether perceptions are similar enough across customers or you need to segment the market.

Potential Additional Measures

Current brands/products used to solve same or similar need

Satisfaction with current products

Consumption frequency (to identify heavy vs. light users)

New product/service solves important problem

Purchase intention (in isolation and relative to favorite and/or leading brand)

Uniqueness of concept

Overall/General

Once you have done the conjoint analysis and settled on a couple of product concepts (these can be fairly minor variations), you can collect most of the remaining data from the same group of people. You should pre-screen people for a reasonable level of knowledge in the category before you ask them to complete the questionnaire. I recommend the following order for your questionnaire: cluster analysis questions, perceptual map questions, the additional measures above, and finally the demographic questions. Try to collect a sample that is large enough (40-50) so that you can separate customers into meaningful clusters and consider the possibility that product perceptions vary among these clusters. Please make an effort to collect a representative sample. For some products, I accept that the extra effort will not justify the incremental learning.

Once you analyze the data from your questionnaires, you can evaluate some advertising concepts that reflect the needs of your target segment(s) and your positioning statement(s). This can be done with a convenience sample of potential customers.

Quantitative Analysis in Marketing

Marketing Concepts and Strategies
Prof. Peter Golder

This handout describes some basic quantitative analyses that are necessary to make effective marketing decisions. Good quantitative analysis helps you critique and compare strategies in a *relatively* objective manner, while keeping in mind that many numbers (especially those about the future) are only estimates. Rigorous quantitative analysis can convince others about the value of your recommendations. Keep in mind that quantitative analysis is not an end in itself - it must be used to help you make better decisions about marketing problems.

Note: Some terms in quantitative analysis are used differently by different firms. The descriptions in this handout reflect common usage in marketing courses taught at the leading business schools. *The key is to understand the concepts underlying these terms.* Then, you can easily adjust when a particular firm uses a slightly different definition.

I) Sales

Sales can be defined in terms of units or dollars. Sales in dollars are a firm's revenue.

i) Sales in units: $S_{\text{units}} = Q$, where Q is quantity sold in units.

These units can be packages, pounds, various units of volume, etc.

ii) Sales in monetary value, such as dollars of sales:

$$S_{\text{monetary}} = Q * P_{\text{selling}}, \text{ where } P_{\text{selling}} \text{ is the selling price per unit.}$$

Remember that the monetary value of sales depends on the distribution level where the sales are made. For example, suppose Big Apple Soup Company sells 1 million cans of soup to a supermarket, Gotham Market, for \$2 each, and Gotham then sells them to consumers for \$3 each. Both Big Apple and Gotham have unit sales of 1 million cans, but Big Apple's monetary *manufacturer* sales are \$2 million while Gotham's monetary *retail* sales are \$3 million.

II) Market Share

Market share (MS) refers to the proportion of one firm's sales (S) relative to total market sales (M). Market share is defined as:

i) Share in units is the number of units sold by the firm relative to the number of units sold in the entire market (M_{units}):

$$MS_{\text{units}} = S_{\text{units}} / M_{\text{units}}$$

ii) Share in monetary value is the monetary value of the firm's sales relative to the monetary value of total sales in the market (M_{monetary}):

$$MS_{\text{monetary}} = S_{\text{monetary}} / M_{\text{monetary}}$$

Monetary share can be very different from share in units. For example, if the relevant market includes both low- and high- priced brands of soup, then the monetary share of a low-priced brand will be lower than its unit share. Monetary market share can also vary with the distribution level, as discussed for sales in (I).

As an example, suppose that in 2003 Big Apple Soup sold 5 million cans of soup to retailers for a total of \$10 million, and these retailers sold that soup to consumers for \$15 million. The total market for canned soup in New York City was 20 million cans, which was sold by manufacturers for a total of \$50 million and at retail for \$80 million. Big Apple's market shares in New York are:

$$\text{Share in units} = 5 \text{ million cans} / 20 \text{ million cans} = .25, \text{ or } 25\%$$

$$\text{Monetary share of manufacturer sales} = \$10 \text{ million} / \$50 \text{ million} = .20, \text{ or } 20\%$$

$$\text{Monetary share of retail sales} = \$15 \text{ million} / \$80 \text{ million} = .1875, \text{ or } 18.75\%$$

One of the most important issues in determining market share is to define the relevant market. For example, since Big Apple sells canned soup, is the relevant market all soup, only prepackaged soup, or only canned soup? Typically, you will have to define the market based on your strategic objectives.

III) Margin towards Profit

Margin towards profit reflects the amount of revenue that goes toward profit after subtracting certain costs.

i) Gross margin per unit is the price a firm sells a product for to the next distribution level (which may be a wholesaler, retailer, or the final consumer), less its variable costs per unit (also known as cost of goods sold, or COGS), but not less selling costs (these include promotion, salesforce, etc.) or fixed costs:

$$GM_{\text{unit}} = P_{\text{selling}} - COGS_{\text{unit}}$$

ii) Gross margin can also be expressed as a ratio or percentage. This calculation is done in two different ways:

a) Gross Margin Percentage (Gross margin relative to selling price) is a proportion that compares gross margin to the price a firm sells the product for to the next distribution level:

$$\text{Gross Margin \%} = (P_{\text{selling}} - COGS) / P_{\text{selling}}$$

b) Gross Markup Percentage (Gross margin relative to cost) is a proportion that compares gross margin to COGS:

$$\text{Gross Markup \%} = (P_{\text{selling}} - COGS) / COGS$$

iii) Net margin (NM) is analogous to gross margin, but here the firm subtracts both COGS and its selling costs (but not fixed costs) from the selling price it receives. As with gross margin, net margin can be expressed on a per unit monetary basis or as a ratio, and the denominator of this ratio can be cost (which now includes both COGS and selling costs), or selling price.

Sometimes a firm can have a very high gross margin, but a much lower net margin if it has high selling costs. Selling costs tend to vary from one industry to another, and can be a key factor in profitability.

By the way, note that if price drops by a certain percentage, margin drops by a higher percentage. This is very important to keep in mind when estimating the cost of price promotions.

As an example, suppose Big Apple's variable cost to produce a can of chicken noodle soup is \$1.60 (thus COGS=\$1.60), its selling costs per can are \$.15, and it still sells soup to Gotham Supermarkets for \$2 per can. We can calculate the following:

$$\text{Gross margin per unit} = \$2 - \$1.60 = \$.40$$

$$\text{Gross margin \%} = \$.40 / \$2 = .20, \text{ or } 20\%$$

$$\text{Gross markup \%} = \$.40 / \$1.60 = .25, \text{ or } 25\%$$

$$\text{Net margin per unit} = \$2 - \$1.60 - \$.15 = \$2 - \$1.75 = \$.25$$

$$\text{Net margin \%} = \$.25 / \$2 = .125, \text{ or } 12.5\%$$

$$\text{Net markup \%} = \$.25 / \$1.75 = .143, \text{ or } 14.3\%$$

If Big Apple decreases its wholesale price to Gotham by 5%, which is \$.10, its gross margin per unit drops from \$.40 to \$.30, a decrease of 25%.

Sometimes we do not have enough information on a particular product to make these margin calculations. In these instances we can compute margin by using information from a firm's income statement, which typically reports sales revenue, cost of goods sold, and selling expenses. Note that this will be an "average" margin across all products included in the income statement.

IV) Break-even Volume

Break-even analysis addresses the question: at what volume will total revenue equal total cost? While a firm's variable costs (VC) change directly with quantity, its fixed costs do not. Firms incur fixed costs (FC) to buy new production machinery, invest in research and development, spend money on advertising, etc. Firms need to know how much additional product they need to sell to pay for a fixed cost. Of course, firms want to make a profit and not just break even, but break-even calculations are very useful for providing a benchmark measure of success.

i) Break even volume in units describes how many units the firm must sell to cover its fixed costs (this equation assumes net margin per unit remains constant as unit sales increase):

$$BEV_{\text{units}} = \text{fixed cost} / \text{net margin per unit}$$

ii) Break even volume in monetary sales describes the monetary value of sales the firm must make to cover its fixed costs.

$$BEV_{\text{mon. sales}} = BEV_{\text{units}} * P_{\text{selling}}$$

iii) Break even volume in market share is the additional market share represented by BEV_{units} . This market share can be expressed in units or in monetary value of sales:

$$\begin{aligned} BEV_{\text{unit market share}} &= BEV_{\text{units}} / M_{\text{units}} \\ BEV_{\text{monetary market share}} &= BEV_{\text{mon. sales}} / M_{\text{monetary}} \end{aligned}$$

As an example, suppose Big Apple Soup wants to buy a new canning machine that reduces the metallic taste in its soups. The new machine costs \$100,000, and Big Apple will spend another

\$50,000 in advertising to tell consumers about the taste improvement. Break-even calculations are:

$$BEV_{\text{units}} = \text{fixed cost} / \text{net margin}_{\text{unit}} = \$150,000 / \$0.25 = 600,000 \text{ additional cans}$$

$$BEV_{\text{monetary sales at wholesale}} = BEV_{\text{units}} * \text{wholesale price} = 600,000 * \$2 = \$1,200,000.$$

$$\text{Thus, } BEV_{\text{monetary sales at retail}} = 600,000 * \$3 = \$1,800,000$$

$$BEV_{\text{unit market share}} = 600,000 \text{ cans} / 20 \text{ million cans} = 3\% \text{ additional unit share}$$

$$BEV_{\text{monetary market share at wholesale}} = \$1,200,000 / \$50,000,000 = 2.4\% \text{ additional share}$$

$$BEV_{\text{monetary market share at retail}} = \$1,800,000 / \$80,000,000 = 2.25\% \text{ additional share}$$

V) Creative Quantitative Analysis

The examples provided in this handout are relatively straightforward. Typically, you will have to use some creativity in quantitative case analysis. Four such approaches are:

- i) *Work "backwards" when necessary.* This requires taking information that usually comes later in the distribution channel, or that you derive in other kinds of calculations, and using it to compute "earlier information." For example, while it is more convenient to know the manufacturer's costs and margins, and use this to compute the price the retailer pays, sometimes you may need to "back out" the manufacturer's costs if you know the margin and the price the retailer pays. As another example, you can compute a firm's sales if you know its market share and the total market size. Sometimes "backing out" calculations in this manner is the only way you can determine important information.
- ii) *Combine different information sources and types of analyses.* Often you can answer a question only by using information from different sources. For example, you may need to combine information available from, or relevant to, retailers and wholesalers, or combine information about a market and a particular firm. Furthermore, sometimes you will need to combine calculations involving break even, market share, margin, etc. to answer a particular question.
- iii) *Use sensitivity analysis to recognize uncertainty.* Numbers and calculations look so precise that it is tempting to rely on them with certainty. But remember that many numbers in business are only estimates, especially analyses of the future. You can incorporate uncertainty by using sensitivity analysis to examine different outcomes. For example, you could predict margins for nine different scenarios by using high, medium, and low levels of sales and costs. You could then assign a probability to each level, and thus to each scenario, and use this analysis to calculate not only expected profit, but also the standard deviation of profit and the probability that profit will fall in any given range.
- iv) *Graph relationships between important variables.* Graphs can give you insights into relationships between variables that are hard to understand unless you can visualize them. The computer programs available today make graphing quick and easy.

Evaluation of Team Members

Please evaluate all team members. Your evaluations will be held in strict confidence.

In the space below, please fill in the names of your team members (**including yourself**) and record your evaluation of each. Please sign and return to me in person or in a sealed envelope after your final report is complete.

The peer rating is based on a total of 100 points for all team members. You should award the 100 points based on the following considerations:

1. willingness to carry out assigned tasks
2. ability to meet deadlines
3. cooperation with team members
4. quality of work
5. quantity of work
6. overall contribution to the team.

Team Members

Points Awarded

1.

2.

3.

4.

5.

Total

100

Additional comments (use reverse side if necessary)

Signature _____

STUDENT INFORMATION SHEET

Name: _____

Preferred First Name (if different): _____

Major(s): _____

Please list current or recent employers and briefly describe your work.

Please list the marketing courses you have already taken.

Why are you taking this course and what do you hope to learn?