
LINKS Positioning Strategy Simulation

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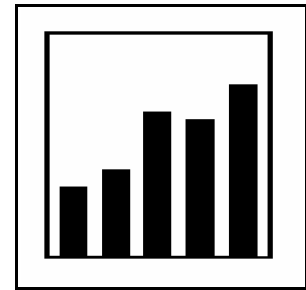
Introduction

"A company can outperform rivals only if it can establish a difference that it can preserve. Competitive strategy is about being different, deliberately choosing a different set of activities to deliver a unique value mix." – Michael Porter

In LINKS, your team manages a firm in the set-top box industry. You'll be competing against other firms in your own simulated industry. Your goal in the LINKS Positioning Strategy Simulation is to improve your firm's long-run financial performance.

As your team assumes managerial control at the end of quarter 3, your set-top box firm's product line consists of two products, a low-quality low-priced product 1 and a high-quality high-priced product 2 ("high-quality" or "higher-quality" to some customers, at least). Both products are profitable at the end of quarter 3, although profitability varies by product and market region.

All firms in your industry have been emulating each other for some time, so your competitors have exactly the same products, priced and marketed identically to your firm's products. While your firm and your competitors have had the identical marketing programs in place throughout quarters 1, 2, and 3, there are some differences in market standing due to the normal randomness inherent in the sales generation process in the set-top box industry.



As you assume managerial control of your firm at the end of quarter 3, these notable opportunities and challenges exist for your firm and for your competitors in the LINKS Positioning Strategy Simulation set-top box industry:

- Your firm now has access to a third product. Product 3 needs to be configured and launched in one or more market regions. Product 3's current configuration is the same as product 1, so there's no reason to launch product 3 as it's currently configured. You already have a well-established product 1 with that configuration. Your management challenge is to work through the product development process and ultimately launch product 3 to contribute positively to your firm's long-run financial performance.
- Two new technological advances present opportunities and challenges. Accessible to all firms in your set-top box industry, these technological advances extend the range of options for configuring your set-top box products:
 - (1) Bandwidth technology now extends to a maximum of 8 terahertz, from the previous technology limit of 7 terahertz.
 - (2) Memory capacity is a new set-top box product attribute (feature-set element). Your management challenge is to assess which, if any, of these technological advances are worth incorporating into one or more of the three products (SKUs) in your set-top box product line. Product reconfigurations would be required to embrace these technological advances, so the associated costs and benefits must be assessed carefully.

Emulating competitors exactly with all products and generate demand programs in all markets hardly seems consistent with achieving superior long-run financial performance. Product reconfigurations and/or generate demand (price and marketing) program adjustments may be needed in your existing product line (i.e., for products 1 and 2). Furthermore, you're not required

to actively distribute your products in all market regions. Perhaps your firm's long-run financial performance can be improved by being more selective and focused in the market regions where you distribute your products.

In addressing these interrelated opportunities and challenges, you need to be mindful of the simulation's prime directive: improve your firm's long-run financial performance. Remember, too, that you're operating in a dynamic competitive marketplace. Your firm's performance will be influenced by how your competitors respond to these issues.

Speed matters in the set-top box industry. Early reconfigurations secure a degree of patent protection, capture first-to-market early volume, and, hopefully, garner profits that accrue for longer than later entrants. Of course, it's not simply being "first" but being early-to-market with a superior offering valued by customers.

Within the LINKS Positioning Strategy Simulation, your team's performance will be evaluated based on a multi-factor, balanced scorecard evaluation system. Your instructor may require a written report of your strategies, tactics, and performance and/or a post-event public presentation of your team's actions, performance, and learnings in this simulation. Details about your particular post-simulation deliverables will be provided by your instructor.

Why Use Simulations?

"I hear and I forget; I see and I remember; I do and I understand." – Confucius

Why use simulations in management education? Why not use traditional classroom lectures, perhaps combined with case studies? Adults learn best by doing. "Doing" involves taking responsibility for one's actions, receiving feedback, and having an opportunity to improve through time. In management education and training settings, management simulations support learning in a non-threatening but competitive environment of the kind that real managers face every day.

Like an airline pilot flight simulator, a management simulator allows rapid time compression, quick feedback to the learner, and is a low-risk process (except to one's ego). A well-designed management simulator can provide the student with a realistic education and training experience in the relative safety of the simulation's operating environment. And, perhaps more importantly, the lessons learned in the management simulator environment occur within hours or days, not the months, quarters, or years associated with real life.

Here are the classic reasons to favor management simulations in adult-learning environments. Compared to traditional lecture/case/discussion educational events, simulations:

- Reflect active not passive participation, enhancing learning motivation.
- Apply key management concepts, especially coordination and planning.
- Demand analysis and decisions in the context of market-based feedback in the presence of thoughtful, vigilant competitors.
- Provide rapid feedback, encouraging participants to learn from their successes and failures within a relatively low-risk competitive environment.
- Provide learning variety through novel learning environments.

Some General Advice About LINKS

"The fight is won or lost far away from witnesses, behind the lines in the gym and out on the road, long before I dance under those lights." – Muhammad Ali

Based on extensive observations of the performance of thousands of past LINKS participants, these general suggestions and summary-advice nuggets are of well-proven value:

- Read and re-read this LINKS participant's manual (there's lots of good stuff in it).
- Regularly think about general business and management principles and how they might relate to and work within LINKS.
- You don't have to know everything about the LINKS set-top box industry at the beginning of the exercise, but you must consistently increase your knowledge base through time.
- "Share toys" (i.e., work at sharing your useful fact-based analyses and insights with all of your LINKS team members). "Knowing" something important personally is only a part of the LINKS management challenge. Exploiting that knowledge effectively throughout all of your LINKS team's deliberations, with and through your whole LINKS team, is the key to harvesting the maximum ROI from your data, facts, analysis methodologies, insights, and knowledge.
- Get the facts and base your decisions on the facts, not on wishes, hopes, and dreams.
- Continually strive to see the whole demand-chain within the LINKS set-top box industry. Don't focus myopically on a single part of the LINKS demand-chain without regard for how it relates to, and is influenced by, other LINKS parts and to the "whole" of LINKS. The source of the "LINKS" name is the simulation's focus on managing the interrelationships, the linkages, among all demand-chain elements.
- Remember the Klingon proverb (for Star Trek fans): "There is no honor in volume without profit." Volume, sales, and market share are easy to obtain, if there are no constraints on profitability. Profitable volume is the "holy grail" in business and in LINKS.

Completion of the LINKS Positioning Strategy Simulation involves the following elements:

- (1) **Pre-Simulation:** Read/study the background information in this document. This will require several hours of time. This background information includes your quarter 1 results so that you'll be able to review your firm's starting position. Your quarter 3 results will be provided to you when the simulation exercise actually begins. You'll be working as part of a team in the LINKS Positioning Strategy Simulation. While there's no need to meet with your teammates prior to the commencement of the simulation, it's important that you be personally prepared when the simulation begins.
- (2) **Within-Simulation:** In each decision round (quarter) in the LINKS Positioning Strategy Simulation:
 - Review your financial and marketing research reports with your team.
 - Analyze your firm's performance. How can you improve your firm's long-run financial performance? What marketing research do you need?
 - One team member inputs your decision variable changes and marketing research orders for the next quarter into the LINKS Simulation Database. This takes about 10 minutes; plan your team meeting time accordingly.
 - Submit your decision inputs for the next quarter by the scheduled time.

The suggested reading strategy for the LINKS participant's manual is to:

- browse through the whole document to get a general feel for this simulation
- read this document once from beginning to end
- re-read parts of this document as necessary during the simulation exercise.

This participant's manual for the LINKS Positioning Strategy Simulation includes a large number of tabular exhibits. To facilitate convenient access to these exhibits for on-going referencing during your LINKS exercise, these exhibits have been included in an Excel spreadsheet. To access/download this Excel spreadsheet, point your favorite browser to this case-sensitive URL:
<http://www.LINKS-simulations.com/PS/ExhibitsPS.xls>

The Marketplace

"Just because the river is quiet does not mean the crocodiles have left." – Malay Proverb

LINKS firms manufacture and market set-top boxes. A set-top box is a high-tech electronics product purchased by individual consumers for home use and by a wide range of businesses for office and manufacturing/operations environment uses. LINKS set-top boxes are "fourth generation" versions which include telephony applications (such as internet-based long-distance calling, interactive video conferencing, and interactive TV), local-area wireless networking, control/monitoring of a wide range of within-area electrical appliances and devices, digital media server, basic virtual reality, and teleportation enhancement capabilities.

Your particular set-top box sub-category is hyperware. Your firm has three products, referenced as "f-p" (for firm "f" and product "p"). For example, product 4-1 refers to product 1 of firm 4. Your manufacturing plant in market region 1 produces finished set-top boxes that are shipped to customers in all market regions served by your firm.

There is one sales channel within the LINKS market regions: a dealer (distributor/retail) channel. The dealer (distributor/retail) channel serves individual consumers who purchase set-top boxes for home use and businesses with set-top box needs. Dealers stock set-top boxes along with an array of other similar and complementary electronic products. Dealers provide point-of-purchase support for in-person shoppers.

Each LINKS decision round is one calendar quarter. There is no known time-of-year seasonality within the hyperware market of interest in the LINKS Positioning Strategy Simulation.

The LINKS currency unit is the LCU, the "LINKS Currency Unit." The LCU is abbreviated "\$" and pronounced Ldollar ("el-dollar"). The "LINKS Currency Unit" (LCU) is a Euro-like multi-country currency. In your travels, you might have currency symbol associated with currencies in Australia, the Bahamas, Barbados, Belize, Bermuda, Brunei Darussalam, Canada, Cayman Islands, Fiji, Guyana, Hong Kong, Jamaica, Liberia, Namibia, New Zealand, Singapore, Solomon Islands, Suriname, Taiwan, Trinidad/Tobago, the United States, and Zimbabwe.



encountered the "\$"

Decisions

"Success doesn't come to you. You go to it." – Marva Collins

In the LINKS Positioning Strategy Simulation, you'll be responsible for these decisions each decision round (quarter):

- **Product Development:** Product configuration/reconfiguration decisions.
- **Generate Demand:** Price, marketing spending, marketing mix allocation, communications positioning, and introduction/drop decisions for each product and region.
- **Service:** Service outsourcing level in each region.
- **Forecasting:** Next-quarter sales volume forecasts for each product and region.
- **Other Decisions:** Firm name.
- **Research Studies:** Ordering specific marketing research studies.

All decisions (except research studies decisions that are only for the next quarter) are permanent standing orders in LINKS. If you're happy with a current decision, no explicit decision change is required.

Set-Top Box Configurations

"Someone's sitting in shade today because someone planted a tree a long time ago." – Warren Buffett

Each of your three set-top box products is defined by a configuration that is expressed as a seven-character code with the following elements and interpretations:

- (1) Product form: "H" for hyperware
- (2) Raw material alpha: 0-9 (number of kilograms)
- (3) Raw material beta: 0-9 (number of kilograms)
- (4) Bandwidth: 1-8 (terahertz)
- (5) Warranty: corporate policy is to offer a 0-quarter warranty (i.e., no warranty)
- (6) Packaging: "1" (standard), "2" (premium), or "3" (environmentally sensitive premium).
- (7) Memory Capacity: 0-3 (disks).

For example, H553010 is a hyperware set-top box with 5 kg of raw material alpha, 5 kg of raw material beta, bandwidth of 3 terahertz, warranty of 0 quarters, standard packaging, and 0 memory disks. Product configuration influences manufacturing and post-sale costs in known fashions (detailed in the next section).

Each product may have only one configuration at a time and that configuration is the same in all market regions. With varying customer preferences across regions, the implication is that trade-offs may be required in meeting customers' heterogeneous preferences. It is, of course, possible to target a product's configuration toward the preferences of particular customers. But, that might be to the detriment of customers in other regions who prefer alternate configurations.

In addition to one epsilon sub-assembly component, set-top boxes in the hyperware sub-category require a gamma sub-assembly component. A variety of suppliers provide sub-assembly components and alternative suppliers' offerings are fully interchangeable in manufacturing. Thus,

since their particular "value" (supplier) doesn't impact configuration, sub-assembly components are not a formal part of the set-top box configuration.

You'll need to conduct appropriate research to assess customers' preferences for alpha and beta in set-top boxes. For bandwidth, warranty, and packaging, "more-is-always-better" for all customers and all markets. However, larger or smaller alpha and beta levels could be preferred by customers in particular markets, channels, and regions. Larger alpha and larger beta values are not necessarily preferred. Set-top box customers may prefer particular alpha and beta levels (not necessarily equal, of course), with deviations from preferred alpha and beta levels resulting in lower-quality customer perceptions.

Product Costs

The goal of your positioning strategy efforts in the LINKS Positioning Strategy Simulation is to improve your firm's long-run financial performance. Product repositionings influence both revenues and costs. Costs are obviously easier to forecast than sales volumes and revenues, since costs arise from within-firm manufacturing functions using existing technology. The following paragraphs provide relevant cost-related information that you'll need to take into account in your repositioning efforts and in your efforts to manage your LINKS firm.

Your input and manufacturing costs for hyperware set-top box products are as follows:

- **Raw Materials:** Raw materials alpha and beta are single-grade commodities purchased at common world prices. In-bound transportation costs are covered by raw material suppliers. All raw materials are always delivered for use within the current quarter's production activities. The current prices of raw materials are \$3/kg for alpha and \$4/kg for beta. Raw materials vendors provide inbound just-in-time transportation as part of their bundled prices, so you never have any raw materials inventory.
- **Sub-Assembly Components:** Gamma and epsilon sub-assemblies cost \$17 and \$24 per unit, respectively. Customers (e.g., your firm) arrange and pay for the transportation associated with in-bound sub-assembly components. Gamma and epsilon sub-assembly components cost \$4/unit and \$6/unit, respectively, for transportation. Sub-assembly component suppliers provide just-in-time service, so you never have to carry any inventory.
- **Labor and Production:** Labor and production costs (per unit) for hyperware products are \$30 and \$20, respectively. Your manufacturing plant has the flexibility to produce on-demand so you never have any finished goods inventory.
- **Outbound Transportation Costs:** Customer shipment transportation costs per-unit for hyperware products sourced from your manufacturing plant in market region 1 are as follows: \$4, \$18, and \$26 per-unit to market regions 1, 2, and 3, respectively.

Costs other than those related to raw materials, sub-assembly components, labor/production, and transportation are detailed below:

- **Bandwidth:** $\$10 + 0.5(T * T * T)$ where T is a product's terahertz rating. Bandwidth of 1 terahertz costs \$10.50 while bandwidth of 6 terahertz costs \$118. You have the engineering capability to include any level of bandwidth in your set-top box products, within the technology range 1-8. Bandwidth is a "more-is-better" attribute. Terahertz is just an industry-specific, generally-accepted metric describing the bandwidth performance of a set-top box. Customers will always prefer more bandwidth, but they might or might not prefer it enough to offset the

additional bandwidth costs. You'd need to conduct appropriate research to assess customer preferences for higher bandwidth levels and then compare that preference to your input costs of providing higher bandwidth.

- **Warranty:** Corporate policy is to offer no warranty with your set-top boxes, so there are no associated warranty costs
- **Packaging:** "1" (standard) packaging costs \$10 per unit, "2" (premium) packaging costs \$14 per unit, and "3" (environmentally sensitive premium) packaging costs \$28 per unit. More expensive, premium packaging presumably has positive generate demand implications and provides greater physical protection during shipping, resulting in somewhat reduced failure rates in the field (i.e., lower failure rates to customers). "3" packaging denotes premium packaging with environmentally sensitive design, construction, and materials.
- **Memory Capacity:** Memory capacity ranges from 0 to 3 with these per-unit costs: \$0, \$10, \$25, and \$45, respectively. Memory capacity refers to the pre-engineered capacity for optional additional memory chips and disks included in the set-top box configuration. Optional memory chips and disks are purchased, installed, and configured by the set-top box customer after (sometimes many months after) the original purchase of the set-top box product. Customers will always prefer more memory capacity, but they might not prefer it enough to offset the additional memory capacity costs. You'd need to conduct appropriate research to assess customer preferences for higher memory capacity levels and then compare that preference to your input costs of providing higher memory capacity.

Reconfigurations

"Get the product out quickly and let the market judge how good it is. You can fix it as you go along." – William R. Hambrecht, Founder/Chairman/CEO, WR Hambrecht & Co.

Any change in the configuration of a set-top box is a product reconfiguration. **A reconfiguration involves a change in one or more of alpha, beta, bandwidth, warranty, packaging, and memory capacity.** Any configuration change incurs charges of \$1,000,000, plus an additional \$100,000 per configuration element that is changed. These costs cover all of the necessary engineering, retooling, testing, and administrative activities related to implementing the reconfiguration request. If you reconfigure a set-top box by changing three of its elements simultaneously, the total associated reconfiguration cost is \$1,300,000. **Reconfiguration occurs immediately, so the next quarter's production involves the reconfigured product.**

Due to the workload associated with a reconfiguration, **you are limited to reconfiguring at most one product per quarter.** This single product reconfiguration may involve changing more than one element of a product's existing configuration.

Patents

"The best defense is to stay out of range." – Military Wisdom During Combat

Patent royalties are payable whenever a reconfigured product lies within the pre-existing protected patent zone for another hyperware set-top box product. The protected patent zone is the sum of the absolute values of the alpha, beta, bandwidth, warranty, packaging, and memory capacity

differences in two product configurations. For example, the product configurations H321110 and H452120 have a patent zone difference of $(4-3) + (5-2) + (2-1) + (1-1) + (2-1) + (0-0) = 6$.

Patent royalties are as follows: patent zone differentials of 0, 1, 2, 3, 4, 5, 6, and 7 points involve patent royalties of \$1,000,000, \$500,000, \$250,000, \$125,000, \$62,500, \$31,250, \$15,625, and \$7,812 No patent royalties are payable for patent zone differentials of eight or more.

Patent royalties are one-time payments made by manufacturers of patent-violating reconfigured products. Patent royalties are only payable in the quarter in which a patent-violating reconfiguration occurs. Royalties are paid by patent-violating reconfigurations to competitors whose patents are violated. That is, one firm's "royalties paid" are another firm's "royalties received."

FAQ

"If we reconfigure immediately by just one 'unit' (e.g., change Bandwidth by 1), what are the patent royalty implications?" Such a minor reconfiguration would violate all other firms' existing patent protection (in that set-top box category), since all firms' products are initially configured identically in each set-top box category. Thus, there would be some fairly substantial patent royalties to pay with such a minor reconfiguration.

Some additional considerations about patent royalties follow:

- (1) No patent royalties are paid by or paid to original quarter-1 product configurations by other firms' quarter-1 product configurations. However, any reconfigurations violating still-existing patents of quarter-1 product configurations are subject to patent royalty payments according to the schedule described above.
- (2) Patent royalties are payable only to pre-existing patents, not to competitors' products reconfigured simultaneously with your reconfiguration (i.e., in the same quarter that you reconfigure a product).
- (3) Multiple patent zone violations are possible on any reconfiguration. The patent royalty payments described above are payable for each patent zone violation.
- (4) Patent royalties (receipts and disbursements) are reported on your "Corporate P&L Statement."

Price Decisions

"Price is what you pay. Value is what you get." – Warren Buffett

You set prices for each actively distributed product in each market region. The dealer channel price is the bulk-rate price for all units purchased for resale by dealers. The custom in the set-top box industry is to quote a single price regardless of order volume. You do not control final selling prices in the dealer channel. Rather, your manufacturer price is marked up by some percentage amount by dealers in the various market regions. You will need to consult current research studies to determine average dealer prices for your products in the various market regions.

Prices affect customer demand in the usual fashion within the set-top box industry. Higher prices are normally associated with lower customer demand. The specific price sensitivities in the markets that you face in LINKS are unknown. You will need to learn about the markets'

responsiveness to price through your experience in LINKS and by exploiting available LINKS research studies.

In addition to the physical costs of producing and distributing updated price sheets, lists, and databases that accrue when a manufacturer changes price (so-called “menu costs”), a range of indirect and non-obvious costs arise with price adjustments.¹

- **Managerial Costs:** A manufacturer must gather information, analyze, assess, and ultimately communicate the logic associated with price changes throughout their firm. Managerial costs presumably increase with larger price changes, since there is more to assess/analyze and more organizational members become involved with larger price changes.
- **Customer-Facing Costs:** When implementing price changes, a communications program must be created and executed to portray a price change in the most favorable light to customers. In a B2B environment, price adjustments potentially involve (re)negotiation with those customers who are resistant to new (higher) prices.

In LINKS, each price change by your manufacturing firm for a product in a channel in a market region results in \$10,000 in costs **plus** \$200 in costs per-dollar change in price (increase or decrease in price) **plus** costs of 0.25% of current-quarter revenues.² For example, a \$75 change in price on a product with revenues of \$4,500,000 in a particular channel and region incurs price change costs of $\$10,000 + (\$200)(75) + (0.0025)(\$4,500,000) = \$10,000 + \$15,000 + \$11,250 = \$36,250$. These price change costs are recorded as “Price Changes” in the “Fixed and Other Costs” section of your firm’s profit-and-loss statements in the quarter in which the price change occurs.

FYI: Price Cuts and Profits

Here are some estimates of the impact on operating profit of a 1% reduction in price, **assuming no change in volume or costs:**

- Food and drug stores: -23.7%
- Airlines: -12.9%
- Computers, office equipment: -11.0%
- Tobacco: -4.9%
- Semiconductors: -3.0%

Across all industries, the average decrease in operating profit from a 1% price decrease was 8.0%, assuming no change in volume or costs.

Source: McKinsey & Co., cited in Janice Revell, “The Price Is Not Always Right,” *Fortune* (May 14, 2001), p. 110.

It's very easy to drop price to attempt to increase demand. However, it's always an interesting question whether that increased demand actually increases profits. Remember, **the price decrease that generates increased demand also reduces your margin on each unit sold.**

¹ Recent published research documents the range of direct and indirect costs associated with price adjustments for a large U.S. industrial manufacturer (more than one billion USD\$ revenues selling 8,000 products [used to maintain machinery] through OEMs and distributors). The authors found that managerial costs are more than 6 times, and customer-facing costs are more than 20 times, the so-called “menu costs” (physical costs) associated with price adjustments. In total, price adjustment costs comprise 1.22% of the company’s revenue and 20.03% of the company’s net margin. {Source: Mark J. Zbaracki, Mark Ritson, Daniel Levy, Shantanu Dutta, and Mark Bergen, “Managerial and Customer Costs of Price Adjustment: Direct Evidence From Industrial Markets,” *The Review of Economics and Statistics*, Volume 86, Number 2 (May 2004), pp. 514-533.}

² Price change costs only accrue for products that are already actively being sold in a region. No price change costs accrue for price changes for a product as it is being introduced into a region (i.e., it was inactive in that region in the last quarter).

More importantly, it's easy for competitors to see and feel threatened by a price change.

Price wars are often initiated by thoughtless price manipulations of naive managers who assume that competitors won't notice, won't respond, or respond ineptly. To provide a fact-based approach for making pricing decisions, please refer to the "Pricing Worksheet" on the following page. Complete this "Pricing Worksheet" anytime you're planning to reduce prices. Review the worksheet details with your teammates. After this review, go ahead with the price decrease if you really think that it's appropriate. Review this "Pricing Worksheet" again after you receive next quarter's financial results to verify whether your assumptions and predictions were reasonable.

Marketing Spending Decisions

A marketing spending budget is required for each set-top box product in each market region. This budget is managed by the relevant region managers in your firm and is used for advertising, promotion, and sales force efforts associated with your products. You are free to allocate funds to marketing spending as you see fit. Spending does not have to be equal in all regions.

Marketing spending is thought to increase customer demand for set-top box products. Past industry practice has been to budget at least \$50,000/quarter in marketing spending in all regions within which a set-top box product is actively distributed. It is thought that marketing spending's impact on customer demand declines at higher expenditure levels, but the precise form of the relationship between marketing spending and sales is unknown. You will have to learn about the influence of marketing spending on sales through your experience within the set-top box industry.

If you drop a product from a region, you must change marketing spending to \$0. Otherwise, marketing spending continues to occur, in anticipation of a future relaunch.

In addition to overall marketing spending decisions for each product/region, marketing mix allocation decisions are also required. Marketing mix allocation refers to the distribution of your specified marketing spending budget across advertising, promotion, and sales force programs in support of each product in each region. Obviously, these three percentages must sum to 100% for each product in each region.

Advertising programs are implemented by your firm's advertising agency in each market region in which your firm operates. Your regional sales managers implement promotional and sales force programs in your market regions. Sales force programs can include both internal sales representatives (company employees) and external sales representatives (independent sales representatives who work for several non-competing companies simultaneously).

Your 6-digit marketing mix allocation (excluding "%" symbols) specifies the 2-digit percentage allocations of your total marketing spending budget to advertising, promotion, and sales force programs, respectively. **You must allocate at least 10% of your marketing spending budget to each of advertising, promotion, and sales force.** For example, the 6-digit marketing mix allocation 113653 specifies that 11%, 36%, and 53% of the total marketing spending budget is allocated to advertising, promotion, and sales force programs, respectively. You are, of course, free to vary your marketing mix allocations across your products and regions, as you see fit.

Pricing Worksheet

This pricing worksheet is designed to provide an analysis framework anytime you are contemplating decreasing prices within LINKS.

Complete the "Before" columns and review the "Before" columns with your team members. Complete the "After" column with actual data from the next quarter, after the results are available. Review the before-after comparison with your team members.

Firm		Product		Region		Quarter	
------	--	---------	--	--------	--	---------	--

		Before Action Analysis, Review, and Forecast		After Action Review
		Last Quarter, Actual	Next Quarter, Predicted	Next Quarter, Actual
	Industry Sales Volume [units]			
*	Volume Market Share [%s]			
=	Sales Volume [units]			
*	Manufacturer Price [\$]			
=	Revenue [\$]			
-	Variable Costs [\$]			
=	Gross Margin [\$]			
-	Fixed Costs [\$]			
=	Operating Income [\$]			

Marketing Communications Positioning Decisions

Each set-top box product in each market (channel and region) has a marketing positioning to guide advertising, promotion, and sales force efforts. Marketing positioning communicates the value proposition that a product offers to customers in a market.

Marketing positioning includes both “how to say it” (competitive positioning) and “what to say” (benefit proposition). LINKS firms select a two-digit marketing positioning code for each product in each market (channel and region).

First Digit: “How To Say It” (Competitive Positioning)	Second Digit: “What To Say” (Benefit Proposition)
Examples of “how to say it” include marketing communications claims of more benefits for the same price as competitors or equivalent competitive benefits but at a lower price.	Examples of “what to say” include marketing communications claims of superiority in product quality, service quality, or availability either individually or in combination.

“How to say it” (competitive positioning), the first digit in a LINKS marketing positioning code, reflects a firm’s decision about whether to focus on benefit(s) exclusively, price exclusively, or explicitly compare benefit(s) to price within marketing positioning. Your firm may use the adjectives “more,” “same,” or “less” to describe your product offering relative to competing products targeted at a specific market segment in a particular market (channel and region).

Different combinations of these competitive positioning options (benefits and price) produce eight meaningful marketplace positions. These eight competitive positioning options, and their associated LINKS codes, are described in the following table. Dominated options, such as less benefits at a higher relative price, are “blacked out” (i.e., infeasible) because they are always inferior to other competitive positioning options.

		“Benefit”			
		More	Same	Less	No Mention
Price	More	1			7 (Exclusive Price Emphasis)
	Same	2	3		
	Less	4	5	6	
	No Mention	8 (Exclusive “Benefit” Emphasis)			

“What to say” (benefit proposition), the second digit in a LINKS marketing positioning code, is an articulation of the specific benefit(s) offered by a product. These benefits are what the customer receives from purchasing and using a set-top box product. For example, a set-top box product might provide benefits because it is better designed to match customer preferences, it delivers a superior service experience, or it is more accessible/available to customers. In LINKS, the specific benefit emphasis possibilities include product quality, service quality, and availability.

- “Product Quality” is perceived product quality, reflecting customers’ perceptions of a product’s configuration and its reliability and performance in actual usage.
- “Service Quality” is perceived service quality, reflecting customers’ perceptions of the

service quality associated with a product. Service quality derives from experiences with a firm's regional call centers.

- "Availability" is perceived product availability, reflecting customers' perceptions of a product's top-of-mind awareness, channel presence, distribution accessibility, ease of access, convenience to purchase, and general presence/prominence in the market place.

A product's marketing positioning may focus on one, two, or all three of these benefits. Note that price is not a benefit to customers, but rather reflects the economic cost incurred to obtain the offering's benefit(s). Price positioning is included within the first part of the marketing positioning decision, "how you say it" (competitive positioning).

Your firm may choose to emphasize Product Quality, Service Quality, and/or Availability individually, in pairwise combination, or collectively in a product's marketing positioning using these benefit(s) proposition codes.³

1	Product Quality
2	Service Quality
3	Availability
4	Product Quality and Service Quality
5	Product Quality and Availability
6	Service Quality and Availability
7	Product Quality, Service Quality, and Availability

Some examples of two-digit LINKS marketing positioning codes follow:

- A LINKS marketing positioning code of 81 is an exclusive benefit emphasis on product quality, presumably related to particular distinctive configuration/design elements of importance to customers.
- A LINKS marketing positioning code of 24 is a "more-benefits-for-same-price" competitive positioning with "benefits" referencing product quality and service quality.
- A LINKS marketing positioning code of 11 is a "more-benefits-for-more-price" competitive positioning with "benefits" referencing product quality. This is a "more-benefits-for-more-price-but-worth-it" kind of marketing positioning.
- A LINKS marketing positioning code of 71 is an exclusive price emphasis, presumably referencing low price compared to competitive offerings.⁴

When marketing positioning changes, various costs accrue to update all advertising, promotion, and sales force documents, materials, graphics, visuals, and media. In total, these marketing creative development costs equal the greater of \$20,000 or 20% of marketing spending for a product in a market (channel and region). These marketing creative development costs are recorded as "Marketing Creative" costs on your firm's profit-and-loss statements.

Introduction/Drop Decisions

You may introduce products into regions not currently active or drop products from regions as you see fit. Introduction incurs a one-time cost of \$250,000. Dropping a product from active distribution in a region incurs no special costs. Introduction costs are recorded under "Introductions" on your financial statements.

³ Exhibit 2 (Volume Drivers in LINKS) provides further details about the drivers of Product Quality, Service Quality, and Availability.

⁴ If you choose an exclusive price emphasis for your competitive positioning (i.e., first digit of 7), then the second digit of the marketing positioning code (benefit proposition) is irrelevant.

If you wish to "activate" a product in a region, you must issue a specific introduction decision. Change the "Active Product?" status to "Yes" to introduce a product into a specific region. To drop a product from active status in a region, change its "Active Product?" status to "No." **You only introduce a product into a region once. Once a product is active in a region, it continues to be active until you make an explicit drop ("No") decision.**

You must explicitly introduce or drop a product from a region, regardless of your marketing spending and your sales volume forecasts. Setting marketing spending to zero does not result in the associated product being dropped from that market region.

If you drop a product from a channel/region, you must change marketing spending to \$0. Otherwise, marketing spending continues to occur, in anticipation of a future relaunch.

Service Decisions

Service outsourcing is provided by reputable call-center service providers in each region. You may freely choose from among the four available service outsourcing options/levels in each region, in addition to level "0" ("None" which implies no service is provided).

The per-call costs and associated guaranteed service quality performance levels ("SQ Guarantee") with each service outsourcing level are detailed below:

Service Outsourcing Level		Region 1	Region 2	Region 3
"Minimum" [1]	Cost/Call	\$6	\$7	\$8
	SQ Guarantee	10%	10%	10%
"Standard" [2]	Cost/Call	\$10	\$12	\$13
	SQ Guarantee	20%	20%	20%
"Enhanced" [3]	Cost/Call	\$16	\$18	\$21
	SQ Guarantee	30%	30%	30%
"Premium" [4]	Cost/Call	\$24	\$27	\$32
	SQ Guarantee	40%	40%	40%

These "SQ Guarantees" are long-run averages. Service-center outsourcers guarantee that perceived service quality won't vary by more than 3% from these averages in any quarter. Costs for call-center service outsourcing are reported as "Service Outsourcing" on your financial and operating reports. With service outsourcing, you automatically receive a summary "Service Center Operations Report" as part of your regular financial and operating reports.

Sales Volume Forecasting Decisions

"No amount of sophistication is going to allay the fact that all your knowledge is about the past and all your decisions are about the future." - Ian E. Wilson

Forecasting prowess reflects understanding of the generate demand drivers of any business. In

LINKS, region-specific sales volume forecasts are required each quarter for each of your products. Administrative overhead costs increase by 1% for every 1% inaccuracy in your sales volume forecasts. For example, a forecast error of 10% (whether positive or negative) increases the associated administrative costs for that product in that region by 10%. The maximum administrative overhead penalty associated with sales forecasting inaccuracy is a doubling of current administrative overhead.

Forecasting accuracy equals $100 \times (1 - (\text{abs}(\text{Forecast} - \text{Actual}) / \text{Actual}))$ expressed in percentage terms, where "abs" is the absolute value function. Thus, a forecast value of 11,000 and an actual value of 8,000 results in a forecast accuracy of $100 \times (1 - (\text{abs}(11,000 - 8,000) / 8,000)) = 100 \times (1 - (3,000 / 8,000)) = 100 \times (1 - 0.375) = 62.5\%$. The minimum possible value of forecasting accuracy is 0.0%. For example, with an Actual sales volume of 8,000, a Forecast above 16,000 results in a forecasting accuracy score of 0.0%.

The following page contains a judgmental sales forecasting worksheet that provides a template for systematically approaching the sales forecasting process. Judgmental adjustments are naturally challenging, but at least you're explicitly taking into account that your generate demand program changes, and those of your competitors, influence your sales.

Firm Name

Your firm may choose a firm name with up to 40 characters. This firm name is printed on the top of all financial, operating, and research reports. Firm names have no cost or known demand-side implications, so you are free to choose (or change) your firm's name as you wish.

Marketing Research Studies

"Time spent in reconnaissance is seldom wasted." – Sun Tzu, 4BC

Research studies requests are submitted along with your other decision variable changes. Although LINKS research studies are ordered prior to the beginning of the next quarter, research studies are executed during and after the next quarter, as appropriate. Thus, research studies reports always reflect the just-completed quarter's experience.

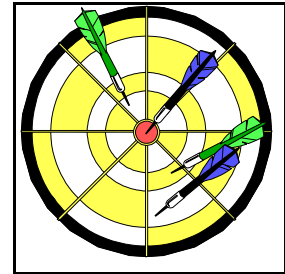
The following research study descriptions include sample output to illustrate the style and formatting of research study output. **These samples are only for illustrative purposes.** The output should not be viewed as providing any specific insight into your particular set-top box industry.

The existence of any particular LINKS research study is not an implicit endorsement that such a research study is important, relevant, or even useful to the management of your LINKS firm. Rather, the inclusion of these research studies in LINKS reflects their real-world existence in a wide variety of industries and product/service categories. You must form your own opinion about the relative merits of these LINKS research studies and, in particular, whether each research study's potential value exceeds its monetary cost.

Judgmental Sales Forecasting Worksheet

Sales forecasting drives everything in demand and supply chains. Unfortunately, sales forecasting is extraordinarily challenging due to the many factors influencing your sales (your current and recent generate demand programs, current and recent competitors' generate demand programs, and exogenous market forces).

Here's a judgmental sales forecasting process that, at a minimum, provides an organizational template to systematically approach the sales forecasting process. Judgmental adjustments are challenging, but at least you're explicitly taking into account that your generate demand program changes, and those of your competitors, influence your sales.



- **Step 1** (the "easy" part): Construct a trend-line extrapolation of past sales realizations based on a crucial assumption: future market and environmental forces will continue as they have existed in the recent past. Be watchful for structural considerations like channel loading (forward buying), unfilled orders, and backlogged orders.
- **Step 2** (the "hard" part): Make adjustments for planned changes in your generate demand programs. The potential impacts of changes in product, price, distribution, communications, and service on your sales must be quantified.
- **Step 3** (the "subtle" part): Account for foreseeable competitors' changes in their generate demand programs. It's easy to overlook competitors in forecasting. Assume that competitors are vigilant and thoughtful and present.

1	Trend-Line Extrapolation of Past Sales Realizations (Base-Line Forecast)	
2	Adjustments For Planned Changes In Generate Demand Program (list specifics, with judgmental estimates of sales impacts <i>[expressed in +/- %s]</i>) Product Changes Price Changes Distribution Changes Communications Changes Service Changes	
3	Adjustments For Foreseeable Changes In Competitors' Generate Demand Programs (list specifics, with judgmental estimates of sales impacts <i>[expressed in +/- %s]</i>) Product Changes Price Changes Distribution Changes Communications Changes Service Changes	
Adjusted Sales Forecast		

Which research studies should you purchase and when? Snappy but uninformative responses would be "purchase only research that you really need" and "it depends." Unfortunately, these responses are not very constructive counsel. Heavy-duty anticipatory thinking is needed before deciding on research study purchases. There are no universal answers about appropriate, needed, and desirable research studies, other than the principle that research is about uncertainty reduction. What don't you know? How important is it to "know" these things? Is there any research that might be conducted in a timely fashion to reduce this uncertainty?

Bruce Henderson, noted strategist, author, and consultant, offers this insightful process-based suggestion for conducting research: *"Define the problem and hypothesize the approach to a solution intuitively before wasting time on data collection and analysis. Do the first analysis lightly. Then, and only then, redefine the problem more rigorously and reanalyze in depth. Don't go to the library and read all the books before you know what you want to learn."* The problem "reanalysis" stage is particularly relevant since that is where research studies may play a role, once you have determined that the information provided in the research may provide useful insight into the problem.

Some generalizations about research studies strategy and tactics are possible:

- Excellent strategy can only be developed based on excellent analysis. Since research provides the raw data for excellent analysis, research should be an important component of your decision-making process. Do not relegate your research studies pre-ordering decisions to the last five minutes of team meetings. Rather, treat research studies ordering decisions as a fundamental part of your whole LINKS decision-making process.
- Plan ahead. To identify patterns and trends, you will need some research on a more-or-less regular basis. A formal research studies plan should be a part of your management planning process.
- Systematize the post-analysis of research studies. This might involve, for example, the continual updating of databases, charts, or graphs to reformat the raw LINKS research

FYI: The Cost of Marketing Research

Marketing research is more often than not underfunded. I continue to be amazed by companies that are extremely averse to spending \$200K on researching a new product that will cost \$40 million to launch — that's 1/2 of 1% of the money at risk. Or why is it so difficult to justify even 1% of the cost of an advertising or promotional campaign on conducting pre-launch evaluations of that campaign at the critical stages of development? There are several credible explanations.

- *One reason is that marketing campaigns too often take on a life of their own, with marketers' egos and reputations perceived to be on the line. To advocates, research is seen as a constraint on their personal prerogatives and creativity. Gunslinger marketers and well-trained, methodical researchers do not mix well.*
- *Researchers often aren't involved in the early planning process for new products or campaigns. Consequently, at the time of budget development, there's no input from the professional researcher as to what should be researched, how it should be researched, and how much it will cost.*
- *In most companies, spending on marketing research is considered an expense, not an investment in risk reduction. Until we develop and can agree on measures of return on marketing research investment, the marketing research function will continue to suffer the fate of short budgets and yo-yo staffing.*

Source: William D. Neal, "Getting Serious About Marketing Research," *Marketing Research: A Magazine of Management and Applications* (Summer 2002), p. 26.

- studies results into more meaningful and useful forms.
- Share insights derived from particular research studies with all of your LINKS team members. These may require research studies' "experts" to assume coaching roles with research studies "novices." This is a natural state of affairs. Given the complexity of LINKS, it is not possible to be an "expert" on everything.

Research Study #1: Benchmarking - Earnings

"Every accomplishment starts with the decision to try." – Anonymous

Purpose: This research study provides earnings benchmarks for your set-top box industry. The current-quarter earnings, cumulative-to-date earnings, and current-quarter dividends of each firm in your industry are reported. In addition, a variety of financial market statistics are reported.

Information Source: These data are based on public information.

Cost: \$500.

Sample Output

```

=====
RESEARCH STUDY # 1 (Benchmarking - Earnings)
=====

```

	Current Net Income	Cumulative Net Income	Current Dividends
Firm 1	2,974,292	5,788,265	892,287
Firm 2	3,472,461	6,234,171	1,041,738
...			

Financial Market Statistics [stock price, shares outstanding (millions), earnings per share, dividends per share, market capitalization (\$millions)]

	Firm 1	Firm 2	Firm 3	Firm 4
StockPrice	120.00	131.80	117.63	123.96
Shares	2.0M	2.0M	2.0M	2.0M
EPS				
DPS				
MarketCap				
...				

Research Study #2: Benchmarking - Balance Sheets

Purpose: This research study provides summary balance sheet benchmarks for your industry. These balance sheets must be requested for specific firms in your industry.

Information Source: These summary balance sheets are provided by your research supplier based on public information.

Cost: \$1,000 per firm.

Additional Information: These summary balance sheets contain the level of information available from public sources.

Sample Output

```

=====
RESEARCH STUDY # 2 (Benchmarking - Balance Sheets)
=====

```

FIRM 2 BALANCE SHEET

```

-----
ASSETS
-----

```

Cash	3,999,248
Marketable Securities	3,404,352
Finished Goods Inventory	0
Plant Investment	100,000,000
Total Assets	107,403,600

```

-----
LIABILITIES AND EQUITIES
-----

```

Corporate Capitalization	100,000,000
Dividends, Current Quarter	-1,082,785
Dividends, Cumulative Prior To This Quarter	-2,090,183
Loans	0
Retained Earnings, Current Quarter	3,609,285
Retained Earnings, Cumulative Prior To This Quarter	6,967,283
Total Liabilities and Equities	107,403,600

Research Study #3: Benchmarking - Product Development

Purpose: Current configurations are reported for all actively-sold products. The last quarter in

which each product was reconfigured is reported, with quarter "0" referencing reconfigurations which occurred prior to quarter 1.

Sample Output

Information Source: These research study results are based on reverse engineering efforts by your research supplier.

```

=====
RESEARCH STUDY # 3 (Benchmarking - Product Development)
=====
Product 1-1H Configuration: H351020 [reconfigured in quarter 6]
Product 1-2H Configuration: H738011 [reconfigured in quarter 6]
Product 1-3H Configuration: Configuration Unavailable: Product Is Inactive
Product 2-1H Configuration: H111010 [reconfigured in quarter 0]
...
    
```

Cost: \$1,500 per competitor product.

Research Study #9: Benchmarking - Generate Demand

Purpose: This research study provides generate demand benchmarks for your industry. Price and marketing statistics (minimum, average, and maximum) for each product category and market region are provided.

Sample Output

Information Source: This research study is based on information sharing and pooling agreements among all firms in the set-top box industry administered by the Set-Top Box Industry Trade Association.

```

=====
RESEARCH STUDY # 9 (Benchmarking - Generate Demand)
=====
                                     Quarter 55  Quarter 56  Quarter 57  Quarter 58
-----
HYPERWARE
REGION 1
min/ave/max
-----
Price [$]           435 520 657   431 554 689   437 542 662   429 542 662
Mktg [$K]           100 161 300     0 183 300     0 157 300     0 181 326
...
    
```

Cost: \$5,000.

Research Study #11: Benchmarking - Operating Statistics

Purpose: This research study provides a variety of operating statistics benchmarks for your industry. Various "Corporate P&L Statement" figures are reported as percentages of revenues for your firm and for industry-wide minimums, mean,s and maximums. In addition, some call center statistics are reported for your industry.

Sample Output

Information Source: This research study is based on information sharing and pooling agreements among all firms in the set-top box industry administered by the Set-Top Box Industry Trade Association.

```

=====
RESEARCH STUDY #11 (Benchmarking - Operating Statistics)
=====
                                     Firm 8      Minimum      Average      Maximum
-----
P&L OPERATING STATISTICS
Revenues           100.0%      100.0%      100.0%      100.0%
Product Costs      50.7%       44.3%       49.1%       50.7%
Transportation Costs 10.2%       8.0%        9.7%       10.5%
Duties & Tariffs    7.9%        7.0%        8.0%        8.9%
Gross Margin       30.5%       30.5%       32.6%       38.2%
Administrative O/H  5.7%        4.7%        5.6%        6.0%
Marketing          4.5%        3.8%        4.7%        6.0%
Research Studies   .0%         .0%         .0%         .1%
Service           4.7%        3.6%        4.5%        4.9%
Total Fixed Costs  25.7%       22.0%       24.9%       27.2%
Operating Income   4.8%        4.8%        7.8%       13.7%
Net Income         2.9%        2.9%        4.4%        7.3%

CSR CALLS STATISTICS
Region 1           21,059      19,107      19,964      21,059
Region 2           18,485      17,339      18,171      18,930
Region 3           29,680      25,487      27,747      30,611

CSR $/CALL STATISTICS
Region 1           10.73       10.73       11.57       12.99
...
    
```

Cost: \$2,500.

Research Study #12: Market Statistics

Purpose: This research study provides a variety of market statistics for each region for the last four quarters:

- Industry demand (final customer purchases) is reported for the hyperware set-top box category.
- Overall market shares for each firm are provided for each of the last four quarters. These market shares are based on end-user customer purchase volumes and not on manufacturer orders.
- End-of-quarter retail-channel (channel 1) inventory holdings for active products are reported in two ways: units and quarters of inventory (expressed relative to the current quarter's retail-channel sales volume).
- Estimates of dealer-channel margins for active products are reported. "Margin" is dealer-channel volume times the dealer-channel markup.

Information Source: This research study is compiled by your research vendor using a variety of sources.

Cost: \$2,500.

Sample Output

RESEARCH STUDY #12 (Market Statistics)				
	Quarter 11	Quarter 12	Quarter 13	Quarter 14
INDUSTRY DEMAND				
Region 1 Demand	60,231	59,075	59,244	59,165
Region 2 Demand	21,988	23,306	23,136	22,930
...				
OVERALL MARKET SHARES				
Firm 1	18.0	26.6	25.3	20.7
Firm 2	19.5	17.4	18.8	17.9
Firm 3	19.9	19.1	17.6	20.0
Firm 4	21.7	19.8	19.7	19.6
Firm 5	20.9	17.1	18.6	21.8
DEALER CHANNEL INVENTORY [Units]				
Region 1:				
Product 1-1H	2,128	2,260	2,257	2,653
Product 2-1H	2,178	2,377	2,345	2,266
...				
Region 2:				
Product 1-1H	3,853	3,943	3,383	3,818
...				
RETAIL CHANNEL INVENTORY [Quarters]				
Region 1:				
Product 1-1H	0.38	0.33	0.40	0.39
Product 2-1H	0.51	0.37	0.45	0.40
...				
Region 2:				
...				
DEALER CHANNEL MARGIN				
Region 1:				
Product 1-1H	1,459,436	1,608,804	1,743,830	1,244,650
...				
...				

Research Study #14: Regional Summary Analysis

"If you torture the data long enough, it will confess." – Anonymous

Purpose: This research study provides a regional summary analysis for each specified market region, including current-quarter market shares, prices, and perceptions of product quality, service quality, and availability of all active products:

- "Product Quality" is perceived product quality, reflecting customers' perceptions of a product's configuration and its reliability and performance in actual usage.
- "Service Quality" is perceived service quality, reflecting customers' perceptions of the service quality associated with a product. Service quality derives from experiences with each firm's regional service (call) centers.
- "Availability" is perceived product availability, reflecting customers' perceptions of a product's top-of-mind awareness, channel presence, distribution accessibility, ease of access, convenience to purchase, and general presence/prominence in the market place.

Sample Output

RESEARCH STUDY #14 (Regional Summary Analysis)							
REGION 1 HYPERWARE	Volume	Market Share		Price	PQ	SQ	Av
1-1	15,906	9.9-		707+	41	21-	54+
1-2	531	0.3		465	2	19	1
2-1	9,391	5.9		439	9	29+	38
2-2	7,291	4.6		417-	8	41+	23-
3-1r	32,519	20.3+		699+	50+	28	54+
3-2	16,096	10.1		650	34-	18-	43
4-1	13,238	8.3-		670+	32-	18-	10-
4-2	6,881	4.3+		380-	8	9-	12-
5-1	12,162	7.6+		392	9	32+	23
6-1	7,427	4.6		390-	8	39+	12-
7-1r	25,428	15.9+		650+	69+	32+	35+
7-2	13,225	8.3-		653	35	20-	26

Notes:

- (1) "Volume" is sales volume in units.
- (2) Other variables listed above are market share, end-customer price ("Price"), perceived product quality ("PQ"), perceived service Quality, ("SQ"), and perceived availability ("Av").
- (3) Changes of more than 2%, \$20, 2%, 2%, and 2%, respectively, in these variables from the previous quarter are flagged with "+" (increase) and "-" (decrease) signals after the numerical values.
- (4) "r" after a firm#-product# denotes a reconfigured product this quarter.

Information Source: Perceived product quality, perceived service quality, and perceived availability are based on a survey of current set-top box customers. These perceptual ratings are the percentages of survey respondents rating product quality, service quality, and availability as "excellent" on a 4-point "poor"- "fair"- "good"- "excellent" rating scale.

Cost: \$10,000 per region.

Additional Information: Your set-top box manufacturing firm sells to retailers, not directly to final end-user customers. Retailers maintain inventory of your set-top box products as well as selling your products to their customers. Thus, final end-user customers sales volume and market share (for example, as reported in Research Study #14) aren't equal to your firm's sales volume and market share to the retailers due to inventory holdings of retailers.

These results reflect final end-user customer activity. Thus, the prices reported are the prices paid by final end-user customers. These prices include the retailers' markups on the manufacturers' prices.

Research Study #20: Customer Satisfaction

"No sale is really complete until the product is worn out and the customer is satisfied." – Leon Leonwood Bean, founder of L. L. Bean outdoor-clothing company

Purpose: This research study provides customer satisfaction estimates of all products in all regions for the last four quarters.

Information Source: Customer satisfaction is based on a customer survey of current users. Customer satisfaction is the percentage of survey respondents rating their overall satisfaction with a product as "excellent" on a 4-point "poor"-“fair”-“good”-"excellent" rating scale.

Cost: \$10,000.

Sample Output

RESEARCH STUDY #20 (Customer Satisfaction)				
	Quarter 33	Quarter 34	Quarter 35	Quarter 36
REGION 1				
Product 1-1H	23.0	18.8	27.2	25.8
Product 3-1H	16.0	22.8	26.8	23.4
Product 4-2H	25.2	27.2	29.3	20.0
Product 5-1H	31.5	29.5	29.9	21.9
...				

Research Study #23: Concept Test

"The final question needed to come to grips with the business purpose and business mission is: 'What is value to the customer?' It may be the most important question. Yet it is the one least often asked. One reason is that managers are quite sure that they know the answer. Value is what they, in their business, define as quality. But this is almost always the wrong definition. The customer never buys a product. By definition, the customer buys the satisfaction of a want. He buys value. What a company's different customers consider value is so complicated that it can be answered only by the customers themselves. Management should not even try to guess at the answers. It should always go to the customers in a systematic quest for them." – Peter Drucker

Purpose: This research study provides concept test scores for a range of set-top box configurations "around" a specified configuration in a specified region. This research study may be useful after other research studies have been conducted (such as Conjoint Analysis) to search for preferred concepts "around" a specified configuration.

Information Source: This research study is based on end-user customer surveys.

Study Details: These concept test scores are "top-box" scores. They represent the percentage of end-user customers surveyed assessing the hypothetical set-top box concept as being "excellent" on a 4-point "poor"-“fair”-“good”-"excellent" rating scale.

Concept test scan searches are conducted "around" the specified configuration. Here, "around" means that 243 concept tests are executed (subject to prevailing set-top box technology limits), one for each of the set-top box configuration attributes that are tested in concept tests

Sample Output

RESEARCH STUDY #23 (Concept Test)							
Product 1-1	Current Configuration	[Region 1, Channel 1]					
H996020	.9%	[Region 1]					
H885010	1.9%	H885020	2.1%	H885010	2.5%	H885020	3.1%
H886010	2.3%	H886020	2.9%	H886010	3.7%	H886020	3.7%
H895010	2.7%	H895020	2.6%	H895010	2.4%	H895020	2.6%
H896010	2.3%	H896020	2.4%	H896010	3.2%	H896020	3.0%
...							

(alpha, beta, bandwidth, warranty, packaging, and memory disks), varying the values up and down one from the specified configuration for each attribute. **Concept test scores are reported for scanned concepts whose scores exceed that of the designated configuration by at least 1%.**

As shown in the sample output, the concept test score for the specified configuration is reported, along with all of the results for the concept test scanning search around that specified configuration. Only those scanned concept scores exceeding the specified configuration by at least 1% are reported. In this sample output, the configuration H996020 is apparently a rather unattractive configuration in market region 1, thus accounting for the generally low concept test scores for the specified configuration and for all of its scanned variants.

Cost: \$15,000 per concept test per region for up to four concept tests in a quarter. Concept tests beyond four in a quarter cost double the standard cost of \$15,000 (per concept test per channel per region).

Limitations: A maximum of eight (8) concept tests may be executed each quarter.

Additional Information: You need baseline concept test scores to interpret concept test scores. A concept test score of 40% is interesting, but there is no way to tell if that score is associated with a configuration that offers competitive advantage unless you have corresponding concept test scores for existing products that are already on the market. Current configurations or the configurations of leading products are obvious baselines. Of course, you would have to execute concept tests on such baseline configurations (in addition to the hypothetical concepts of interest) if you want baseline-configuration scores.

Research Study #24: Price Sensitivity Analysis

"Any sufficiently advanced technology is indistinguishable from magic." – Arthur C. Clarke

Purpose: This research study provides a price sensitivity analysis for a specific product in a specific region. This research study permits the simultaneous testing of a reconfiguration of an existing, actively-distributed product and an associated price level of the user's choosing. Thus, Research Study #24 is a focused test marketing experiment with user-specified configurations and prices.

Information Source: This research study is based on surveys of customers, using advanced marketing research techniques.

Study Details: These price sensitivity analyses isolate the impact of price on market share, while holding other market share drivers constant (product quality, service quality, and availability).

Nine price levels are used in this research study. With no user-specified price input, these price levels are automatically centered around the current price (the "Reference Price") of the product in each region and channel for which this research study is executed. Values of -20%, -15%, -10%, -5%, 0% (i.e., current price), +5%, +10%, 15%, and +20%, relative to the product's "Reference Price," are used.

If configuration and price are left at their default values ("?...?" and 0, respectively), then Research Study #24 is executed with the existing product centered around the channel-specific

current price of the specified product. Otherwise, the user-specified configurations and prices (with the specified price being the "Reference Price") are used. Market share predictions are provided for all tested prices in Research Study #24.

Research study output includes market share and gross margin estimates in research study requests with no configuration change. With a configuration change, research study output only includes estimated market shares. Users will need to estimate their product and other variable costs (and gross margin) associated with any configuration change.

These "prices" are the final end-user customer prices (the "market price" to final end-users customers), since final customers are the subject of this research study. For an indirect channel (like your dealer channel), dealer prices are used in this research study.

Case Study: Amazon.com

Amazon.com has been charging customers different prices for the same products. For example, it has charged some users \$23.97 and others \$25.97 for a DVD version of "Men in Black." Patty Smith, an Amazon spokeswoman, said the different prices were part of a test Amazon is conducting "to measure what impacts a decision to purchase or not to purchase." Ms. Smith said Amazon test customers are selected randomly and the prices they receive aren't based on any other characteristics.

Source: "Amazon.com Varies Price of Identical Items For Test," *The Wall Street Journal* (September 7, 2000)

Cost: \$20,000 per price sensitivity analysis (per product per region). If you execute this research study for all products and regions in a 2-product and 3-region LINKS environment, the total cost would be \$120,000.

Sample Output With No Configuration Change:

```

=====
RESEARCH STUDY #24 (Price Sensitivity Analysis )
=====
PRODUCT 6-1H PREDICTED GROSS MARGINS IN REGION 1, CHANNEL 1 [HYPERWARE]
Configuration: H353022
Reference Price: 290

```

Market Price	\$ 351	\$ 373	\$ 395	\$ 417	\$ 438	\$ 459	\$ 481	\$ 503	\$ 525
Your Price	\$ 232	\$ 247	\$ 261	\$ 276	\$ 290	\$ 304	\$ 319	\$ 333	\$ 348
Your Cost	\$ 171	\$ 171	\$ 171	\$ 171	\$ 171	\$ 171	\$ 171	\$ 171	\$ 171
Your Margin	\$ 60	\$ 75	\$ 89	\$ 104	\$ 118	\$ 132	\$ 147	\$ 161	\$ 176
Sales Volume	30,577	25,879	21,985	19,002	16,459	14,269	12,513	11,086	10,533
Market Share	9.9%	8.4%	7.1%	6.2%	5.3%	4.6%	4.1%	3.6%	3.4%
Margin Chang	-49.2%	-36.4%	-24.6%	-11.9%	0.0%	11.9%	24.6%	36.4%	49.2%
MS Change	85.8%	57.2%	33.6%	15.4%	0.0%	-13.3%	-24.0%	-32.6%	-36.0%
Net Change	-5.5%	-0.1%	0.7%	1.8%	0.0%	-3.0%	-5.3%	-8.1%	-4.5%
Gross Margin (in \$000s)	\$1,834	\$1,940	\$1,956	\$1,976	\$1,942	\$1,883	\$1,839	\$1,784	\$1,853

These estimated per-unit costs of \$198.11 include these cost components:
 Product Costs \$144.47
 Duties & Tariffs \$ 0.00

Sample Output With A Reconfiguration:

```

=====
RESEARCH STUDY #24 (Price Sensitivity Analysis )
=====

PRODUCT 8-1H PREDICTED GROSS MARGINS IN REGION 1 [HYPERWARE]
Configuration: H111010
Reference Price: 400

```

Market Price	\$480	\$510	\$540	\$570	\$600	\$630	\$660	\$690	\$720
Your Price	\$320	\$340	\$380	\$380	\$400	\$420	\$440	\$460	\$480
Sales Volume	6,508	4,603	4,398	2,778	3,319	2,432	2,564	2,487	1,781
Market Share	10.1%	7.2%	6.8%	4.3%	5.2%	3.8%	4.0%	3.9%	2.8%

```

This price sensitivity analysis involves a product reconfiguration. Margin
Estimates are not provided due to the many cost-related assumptions required
To estimate variable product costs associated with a reconfigured product.

```

Limitations: A maximum of four (4) research studies of this type may be executed each quarter. Each of these price sensitivity analysis research study requests must reference a single product and one or all regions. This research study may only be conducted for products that are already actively distributed in a region. This research study may not be used for products prior to their introduction into a region.

Additional Information: These market share predictions and subsequent estimates of gross margins are based on the assumption that competing products don't change their generate demand programs. Obviously, large price changes will tend to evoke competitive responses.

The reported market shares in Research Study #24 are long-run estimates of market shares if you continue with all of your current customer-facing initiatives (configurations, marketing spending, service levels, etc.) as they are now and so do competitors. Market infrastructure issues (like current inventory holdings of retailers) are not considered. Only your price is "manipulated" in Research Study #24. Thus, these Research Study #24 estimates of market share will not correspond exactly to your current actual market shares (as reported, for example, in Research Study #14).

Research Study #27: Marketing Program Benchmarking

Purpose: This research study provides marketing program benchmarking information for all active products in specified regions. You may execute this research study for one region, any combination of regions, or all regions.

Information Source: This research study is based on analyses conducted by your research supplier.

Sample Output

```

=====
RESEARCH STUDY #27 (Marketing Program Benchmarking )
=====

Marketing Program Spending
Marketing Spending Advertis Promotion SalesFor Pos
-----
REGION 1:
Product 1-1 100,000 34,000 33,000 33,000 37
Product 3-2 150,000 70,000 60,000 20,000 12
Product 5-1 100,000 34,000 33,000 33,000 37
Product 6-2 100,000 34,000 33,000 33,000 37
Product 7-1 100,000 34,000 33,000 33,000 37
Product 8-1 100,000 34,000 33,000 33,000 37
...

```

Cost: \$500 per region plus \$500 per active product in each region.

Study Details: For each active product in each specified market region, product-specific marketing program benchmarks are provided: total marketing spending, advertising spending ("Advertis"), promotion spending, sales force spending ("SalesFor"), and marketing communications positioning ("Posi").

Research Study #28: Marketing Program Experiment

*"I know that half of my marketing budget is wasted,
but I just don't know which half." - Unknown*

Purpose: This research study conducts a marketing program experiment. Inputs include a full marketing program (marketing spending, marketing mix allocation, and positioning) for a product in one or all regions. Outputs include customer perceptions of product quality, service quality, and availability.

Information Source: This marketing program experiment is executed in a small but representative part of the specified market region. This marketing program experiment is executed using your specified marketing program and all other current marketing mix variables of your product and all competitors' products. Your competitors will not be aware of the existence of this marketing program experiment and they have no opportunity to intervene to attempt to influence the results of this experiment. Competitors' marketing decision variables are held constant at their values in the previous quarter.

Cost: \$12,500 per marketing program experiment.

Sample Output:

=====											
RESEARCH STUDY #28 (Marketing Program Experiment)											
=====											
		Marketing Program Inputs						Perceptions			
	R	MktgSp	MktgMx	Adve	Prom	SFor	MP	ProdQ	ServQ	Avail	
Product 4-1	2	200K	502525	100K	50K	50K	73	27.1%	20.1%	23.5%	
Product 4-1	2	100K	343333	34K	33K	33K	12	34.2%	15.9%	25.1%	
Product 4-1	2	150K	202060	30K	30K	90K	37	14.3%	18.3%	43.9%	
Product 4-2	3	100K	343333	34K	33K	33K	37	14.0%	56.5%	42.9%	

Notes:

- (1) In the heading, "R" refers to region, "C" refers to channel, "MktgSp" refers to total marketing spending (in L\$000s), "MktgMx" refers to marketing mix allocation (2-digit %s of total marketing spending allocated to advertising, promotion, and sales force), "Adve" refers to implied advertising spending (in L\$000s), "Prom" refers to implied promotion spending (in L\$000s), "SFor" refers to implied sales force spending (in L\$000s), and "MP" refers to marketing positioning.
- (2) This research study may only be executed for products already actively distributed in a region. Blank results are reported for perceptions for products not actively distributed.

Execution Details: To specify "all" regions within a single marketing program experiment, enter "0" (zero) as the region selection. This, of course, would involve multiple executions of marketing program experiments with consequent cost implications. Marketing program experiments must be executed for a specific product. If you wish to execute multiple marketing program experiments, you must specify them separately for each product.

Research Study #28 (Marketing Program Experiment) automatically includes three experiments for each RS#28 input set. Research Study #28 includes experiments with the specified marketing spending input plus additional experiments with 50% more and 50% less than the specified marketing spending input. These three experiments are included at the standard cost of Research Study #28.

Limitations: A maximum of seven (7) marketing program experiments may be conducted in any quarter. Each marketing program experiment may reference one or all regions.

Other Comments: Marketing program experiments permit an assessment of the impact of marketing spending, marketing mix allocation and positioning on key perceptual outputs (product quality perceptions, service quality perceptions, and availability perceptions). Although not a final outcome measure like market share, sales volume, or profitability, customer perceptions have the advantage of being the direct consequences of a product's marketing program. Final outcome measures like market share, sales volume, and profitability are influenced by many forces, not just a product's marketing program.

Benchmarks are needed to assess the perceptual results in marketing experiments. You can create your own benchmark by testing the marketing program along with variations of interest. While such benchmarking requires the execution of a base marketing experiment (with current marketing spending, marketing mix allocation, and positioning) in addition to the test variations of interest, such benchmarking provides the standard against which marketing program variations may be compared.

Marketing experiments have some randomness inherent in their results. This implies that you would only change your marketing program (marketing spending, marketing mix allocation, and positioning) if a particular marketing program variation yielded a noteworthy change in customer perceptions.

Research Study #30: Conjoint Analysis

"No one tests the depth of the river with both feet." – Ashanti proverb

Purpose: This research study provides a conjoint analysis in one specified market region. Conjoint analysis reverse engineers customers' implicit values (tradeoffs) for underlying product "attributes" (including price). Conjoint analysis is a form of simultaneous concept testing that presents a wide range of statistically designed/determined product/service concepts to customers in customized surveys.

Information Source: This research study is based on customized customer surveys using advanced marketing research and analysis techniques.

Background and Web-Based Readings: If you're unfamiliar with conjoint analysis, please read the tutorial that follows this Research Study #30 description. Also, you might access and read

these brief web-based articles (accessible via these case-sensitive URLs):

- "Understanding Conjoint Analysis in 15 Minutes"
<http://www.sawtooth.com/news/library/articles/15min.htm>
- "Conjoint Analysis: An Introduction"
<http://marketvisionresearch.com/pdf/Intro%20to%20Conjoint%202002.pdf>

Study Details: Conjoint analysis represents the equivalent of executing hundreds or thousands of individual concept tests simultaneously. As a natural extension of concept testing, conjoint analysis has all of the general strengths and limitations associated with concept testing. For example, conjoint analysis (like concept testing) is about customers' stated preferences for hypothetical descriptions of products or services. No real buying occurs in conjoint analysis (and concept testing) research studies. Nevertheless, conjoint analysis has an excellent track record. Many published research studies assess how well conjoint analysis studies predict buying behavior. The results are clear: well-designed and well-executed conjoint analysis studies work!

In LINKS, conjoint analysis "attributes" include set-top box product configuration elements, service levels (Perceived Service Quality), and price. The levels for these attributes are pre-determined; you only have to specify the region for the conjoint analysis study.

- A representative sample of customers for the designated market region are included in the field surveying effort associated with conjoint analyses.
- These "attribute" levels are used in conjoint analyses: alpha levels of 1, 3, 5, 7, and 9; beta levels of 1, 3, 5, 7, and 9; bandwidth levels of 1, 2, 3, 4, 5, 6, and 7; warranty level of 0 quarters only; packaging levels of "Standard," "Premium," and "Environmentally Sensitive Premium"; memory capacity of 0, 1, 2, and 3; service levels of "0%", "10%", "20%", and "30%" (representing various values of Perceived Service Quality); and, four price levels which range from 10% less than the minimum current price in a region to 10% more than the maximum current price in a region.
- The estimated raw conjoint analysis trade-off weights are automatically rescaled to the 0-100 interval for ease of interpretation. Note that these are relative weights only, with the "0" and "100" weights corresponding to relatively low and relatively high attribute-level weights. "100" is not a perfect or even the most desired level, only a highly attractive relative level from among all of those offered to customers within the design of the conjoint analysis study.

Cost: \$75,000.

Additional Information – Estimated Relative Importances: "Relative Importances" (the normalized ranges of the attribute-level weights) are only summaries of the relative variations of the attribute-level weights across each attribute. "Relative Importances" are never multiplied by conjoint weights. In essence, the "weights are the weights" and you are never misled by looking at the conjoint analysis trade-off weights. "Relative Importances," on the other hand, can easily be misleading, since they depend on the attribute-level ranges used in the conjoint study design. Be wary of the "Relative Importances." Always look to the weights. They never lie or mislead providing, of course, that you don't extrapolate too much outside the range of the attribute-levels in the design of the conjoint analysis study.

Additional Information – Estimated Conjoint Utility Weights: Estimated conjoint utilities are only relative in nature. The overall utility for a particular product (configuration, service quality, and price) can be estimated by summing the relevant part-worth utilities. In such calculations, it

may be necessary to interpolate or extrapolate depending on the attribute values for the product.

With an existing product, it is then possible to compare total utility to other possible product configurations, service quality levels, and prices. In that way, it is possible to establish the price premium that other products might command compared to the base product. Do this by choosing prices that equate two products in overall conjoint utility terms. With equal overall utilities, equal market shares might be expected in the long run. It follows that margins could be compared and a search for more profitable configurations could follow.

Specifically, suppose that you estimate an existing product with a known 5.0% market share in a particular channel and region has an overall utility of 350 conjoint utility points. Then, another product configuration, service quality, and price with the same 350 conjoint utility points might be expected to have the same market share in the long run. The estimated margins for the base and comparison products may be compared to determine the most profitable offering. Note that the volumes are identical, so the margins are the key comparison.

Conjoint analysis assesses underlying customer values for products and services (product/service positioning and pricing, in particular). As such, it doesn't explicitly reference already existing products/services. Conjoint analysis is a concept testing style of marketing research, involving the elicitation of customer reactions to hypothetical products/services. Thus, conjoint analysis should

work fine in a new market even though the customers have not yet personally experienced a product/service category. There may be a little more random noise in the conjoint analysis results (reflecting customer inexperience with the category), but the basic pattern of the findings should not be affected materially whether markets are "new" or "old."

Additional Information - \$-Values of Estimated Conjoint Analysis Utility Weights: The \$-values reported in the LINKS conjoint analysis results are a reinterpretation of the estimated conjoint utility weights. These \$-values are calculated from the implicit dollar value of a utility point derived from the estimated price weights, using only the end-points of the price weights from the conjoint results. (This, of course, invokes a linearity assumption, which could be inappropriate especially if there's a wide range of prices included in the conjoint design.) For example, in the Sample Output shown above, the price weights indicate that 100.0 utility points (100.0 - 0.0) corresponds to \$289 (\$457-168), so each utility point equals about \$2.89 in value to customers in region 1 in this Sample Output.

With the \$-value per utility point estimated, the implied dollar value of various levels of the other attributes in the conjoint design are estimated using a base point of \$0 for one of the levels

Sample Output

```

=====
RESEARCH STUDY #30 (Conjoint Analysis )
=====
CONJOINT ANALYSIS RESULTS, REGION 12 [HYPERWARE]

Relative Importances:
Alpha                18.2%
Beta                 14.4%
Bandwidth            17.5%
Warranty              0.0%
Packaging             6.5%
Memory Capacity      7.0%
Service               6.0%
Price                30.4%

Alpha:  Level=1      9.9  [$  0]
        Level=3      9.9  [$  0]
        Level=5     13.1  [$  9]
        Level=7     47.6  [$ 108]
        Level=9     69.9  [$ 173]

Beta:   Level=1      37.2  [$  0]
        Level=3     57.4  [$ 58]
        Level=5     32.8  [$ -12]
        Level=7     13.0  [$ -69]
        Level=9      9.9  [$ -78]

Bandwidth: Level=1    12.4  [$  0]
           Level=2    14.0  [$  4]
           Level=3    16.1  [$ 10]
           Level=4    19.8  [$ 21]
           Level=5    25.4  [$ 37]
           Level=6    34.4  [$ 63]
           Level=7    48.4  [$ 103]
           Level=8    70.0  [$ 166]

Warranty: Level=0      30.1  [$  0]

Packaging: Level=Standard 20.6  [$  0]
           Level=Premium 27.5  [$ 20]
           Level=Prem ES 42.1  [$ 62]

Memory:   Level=0      20.0  [$  0]
           Level=1      24.9  [$ 14]
           Level=2      32.2  [$ 35]
           Level=3      43.1  [$ 66]

Service:  Level= 0%     17.9  [$  0]
           Level=10%    30.1  [$ 35]
           Level=20%    34.6  [$ 48]
           Level=30%    37.6  [$ 57]

Price:   Level=$ 168      100.0
         Level=$ 263      15.7
         Level=$ 339       4.5
         Level=$ 457       0.0
    
```

for each conjoint attribute. The \$-values show the implicit price differential associated with the utility point differential compared to the base case.

For more details about such equivalent-value pricing, you may wish to access the following short article by pointing your web browser at this case-sensitive URL:

<http://www.LINKS-simulations.com/PAPERS/EVP.pdf>

Additional Information - Example Interpretations: Some example interpretations follow for the conjoint analysis results reported in the Sample Output for Research Study #30. In all cases, these interpretations reflect the retail-channel prices reported in region 1 of these Sample Results. **You'd need to remove the retailer markup from these prices to convert them to manufacturer-price equivalents.** For example, with a retailer markup of 50% on the manufacturer's price, these \$-values would need to be reduced by one-third.

- The conjoint weights and the implied \$-values are relative not absolute figures. For example, the estimated conjoint utility weight of 9.9 for $\alpha=1$ means nothing in and of itself; 9.9 only has meaning when compared to some other conjoint utility weight. Differences matter in interpreting conjoint analysis results, not absolute values.
- In the Sample Output, the most preferred beta level is approximately 3. Rather than saying "exactly 3," "approximately 3" reflects that we don't know the conjoint weight for $\beta=2$ or $\beta=4$ since those beta values weren't included in this particular conjoint analysis study design.
- Compared to $\alpha=1$ (with an estimated conjoint weight 9.9), an alpha level of 7 provides 37.7 extra utility points ($47.6 - 9.9 = 37.7$). With an estimated \$-value per utility point of \$2.89 (from the paragraph above), this represents approximately \$108 ($\$108 - 0 = \108) in extra value to customers in region 12. That is, customers in region 12 would be indifferent between the products $\{\alpha=1 \text{ and price}=\$X\}$ and $\{\alpha=7 \text{ and price}=\$X+108\}$ assuming that beta, bandwidth, warranty, packaging, and service quality were equal for both of these products. Here, "indifferent" means that long-run purchasing patterns (i.e., market shares) would be equal.
- Expressed differently but equivalently, reconfiguring a product from $\alpha=1$ to $\alpha=7$ increases the product's value by \$108, so long-run purchasing patterns (i.e., market shares) would remain the same if that reconfigured product had a price of \$108 more than its previous price prior to such a reconfiguration.
- Suppose that an existing product in region 1 has $\beta=5$. A reconfiguration to $\beta=3$ adds $57.4 - 32.8 = 24.6$ extra conjoint utility points which corresponds to $\$58 - (-\$12) = \$70$ in equivalent value. Thus, this reconfigured product could have a \$70 price increase and customers would continue to purchase it at approximately the same rate as in the past (with $\beta=5$ and a \$70 lower price).
- These price-equivalent results must be gauged relative to the associated cost implications with reconfigurations.
 1. Don't just look for the highest estimated conjoint utility weights and reconfigure a product to those values. If costs change by \$100 while the \$-price equivalence of a reconfigured product only adds \$60 in utility value to customers, then such a reconfiguration would be reducing margin by \$40 to retain equivalent overall utility (and long-run market share). Such a situation seems unwise. Rather, continue to search for alternative reconfiguration opportunities where the potential margin increase is positive not negative.
 2. One-time reconfiguration costs and potential patent royalty payments (possibly, to multiple competitors) must also be taken into account when attempting to base

reconfigurations on conjoint analysis results. For example, reconfiguring to improve your product by 10 conjoint utility points (each worth \$2.89 for a total equivalent-value of \$28.90) may not be worthwhile if the product's sales volume is small. 5,000 units of sales volume would take many quarters of time to payback \$1,000,000+ one-time reconfiguration costs.

3. Note that margin increases if product costs decrease. So, a reconfiguration to reduce product costs while retaining the existing overall conjoint utility value is another viable reconfiguration target.
- The conjoint analysis results provided in the Sample Output don't provide the answer to the question "What price should you charge?" That would require "absolute" not merely "relative" customer preference/utility information (and competitive choice simulators, which are not part of the LINKS research study resources). See Research Study #24 ("Price Sensitivity Analysis") for a LINKS research study that provides market share estimates for existing product and for possible new products, respectively.

Additional Web-Based Information: For further details about conjoint analysis, please access the "New Product/Service Management" section (and "Design" sub-section) of the Internet-Based Marketing Readings at the case-sensitive URL: <http://www.ChapmanRG.com/IMR>

Interpreting Conjoint Analysis Results: A Tutorial

Conjoint analysis seeks to measure and quantify customers' values for underlying buying factors, offering attributes, characteristics, and features (performance, quality, and service, for example) and price. In effect, conjoint analysis reverse engineers customers' buying decisions. With knowledge of customers' buying values, important product positioning and pricing questions such as the following may be addressed:

- (1) What buying factors are most important to customers? For example, how important is "service" to customers?
- (2) What buying factor levels are most valued by customers? For example, how important is "service responsiveness - within one hour" to customers?
- (3) How much will customers pay for particular buying factor levels? For example, what is the implicit dollar premium that customers will pay for "service responsiveness - within one hour" compared to "service responsiveness - within one day"?

There's even more to conjoint analysis than addressing just these questions (market share prediction and simulations under various competitive "what-if" scenarios as well as customer segmentation, for example) but a detailed discussion of these advanced issues is beyond the scope of this brief tutorial.

Conjoint Analysis: The Underlying Premise

The fundamental premise in conjoint analysis is that buyers think about and make purchasing decisions based on a brand's underlying attributes or feature-sets. This premise will be more reasonable as the "size" (economic commitment) of the product/service increases. Thus, this is likely to be most reasonable for larger consumer durables and industrial products, or for services involving relatively high prices. Consumer non-durables (low-priced, low-risk products) cause problems for conjoint analysis because buyers may purchase with little thought about underlying attributes, using "buy-it-and-try-it-before-deciding" buying. Of course, laboratory tests, field tests, and test marketing experiments are feasible with consumer non-durables.

An Example

To provide an overview of conjoint analysis, we'll use a simplified version a hotel advance reservation program example. Our focus is on interpreting the results of conjoint analysis studies, not on their design or fielding.

In pricing service variations, it's natural to analyze customers' preparedness to pay premiums for upgraded offerings. For example, in the hotel market place, we might be concerned with pricing basic rooms compared to upgraded rooms with various special features and enhanced services. Of course, there might be many more than just the two buying factors, room price and room type, within a full-scale hotel market conjoint analysis study.⁵

⁵ An early major published conjoint analysis application in marketing involved 50 different hotel buying factors (and a total of 167 levels of these buying factors) associated with business travel and business travelers. This conjoint analysis application was a significant part of the background marketing research and analysis that ultimately led to the launch of the Courtyard By Marriott hotel chain.

Suppose that we had these estimates of conjoint analysis utility trade-off weights from a completed conjoint analysis study. These trade-off weights might be for a single customer. Alternatively, they might represent the average trade-off weights for all customers in a particular segment.

These trade-off weights reflect predictable results patterns. Higher room prices are associated with lower utility and basic rooms are valued less than upgraded rooms. Note the preference for "Upgraded (A)" vs. "Upgraded (B)" room types.

Buying Factor Attributes (and Levels)	Estimated Conjoint Analysis Utility Trade-Off Weights
Room Prices:	
• \$100	100
• \$120	81
• \$140	54
• \$160	0
Room Type:	
• Basic	21
• Upgraded (A)	61
• Upgraded (B)	54

But, have we simply re-discovered the obvious? Yes, but we've accomplished much more. These trade-off weights express customer preferences in quantifiable terms. We haven't learned simply that lower priced rooms are preferred, but we've learned something about the strength of this preference.

One way of summarizing these results is with relative importances, the normalized ranges of the buying factor level weights. For these trade-off weights, the ranges are 100-0=100 (for Room Price) and 61-21=40 (for Room Type). Normalizing these ranges to sum to 100% results in the estimated relative importances of 71.4% and 28.6% for room price and room type, respectively. Given these researcher-designated buying factor ranges ("100" to "160" and "Basic" to "Upgraded (A)"), it appears that room price is substantially more important than room type to these customers **within these buying factor ranges**.⁶

With regard to the specifics of customer preferences, customers prefer "Upgraded (A)" to "Upgraded (B)" rooms. This, of course, isn't the final word on the offering design and positioning problem. If "Upgraded (A)" rooms are much more expensive than "Upgraded (B)" rooms to provide to customers, it might be more profitable to offer only "Upgraded (B)" rooms at a more modest price than "Upgraded (A)" rooms. If "Upgraded (A)" and "Upgraded (B)" rooms cost about the same to deliver, then these results indicate the clear superiority of the "Upgraded (A)" offering. Rather than relying on guessing (i.e., "sound managerial judgment"), these conjoint analysis results provide the hotel manager with solid evidence as to the preferred market offering and the extent to which customers are prepared to pay for various product/service options.

The real managerial payoff from these trade-off weights lies in our ability to estimate price premiums or equivalent-value prices from these results. For these sample results, let's express the room price results in terms of a single trade-off between price and utility. We could be quite sophisticated and fit a regression line through these data. Alternatively, let's just use the end-points and estimate an overall average effect of room price on utility. (This simple approach

⁶ Gauging relative importances via normalized ranges of the buying factor level weights is customary in conjoint analysis studies. This relative importance metric has an intuitively-appealing rationale. If all estimated conjoint utility weights for the levels of an attribute are similar, the range for that attribute's weights is small and the associated normalized range of that attribute's weights would also be small. This implies that these particular attribute-levels are not particularly influential in driving overall customer preferences.

overlooks the possibility of a non-linear relationship between room price and utility.) For these room prices, a range of \$60 (\$160-\$100) is associated with a difference of 100-0=100 utility points. Thus, each utility point is implicitly valued at \$0.60 by these customers.

Given the estimate of \$0.60 per utility point, we can now calculate the implicit price premiums that customers are prepared to pay for upgraded rooms compared to "Basic" rooms:

- For "Upgraded (A)" rooms, the 40 extra utility points (from 21 to 61) translate into an implicit \$24.00 room premium. A customer who is prepared to pay \$110 for a "Basic" room should be prepared to pay \$134 for an "Upgraded (A)" room.
- For "Upgraded (B)" rooms, the 33 extra utility points (from 21 to 54) translate into an implicit \$19.80 room premium. A customer who is prepared to pay \$110 for a "Basic" room should be prepared to pay \$129.80 for an "Upgraded (B)" room.

With these quantifiable results, hotel management is in an informed position to design and price upgraded hotel rooms.

Further Reflections on Equivalent-Value Pricing

Here are some additional reflections about equivalent-value pricing via conjoint analysis.

- The base case offering for equivalent-value pricing should be a widely-demanded offering. It would be risky to base equivalent-value prices on obscure or small-demand brands, since their customers may exhibit peculiar demand tendencies that may not generalize to the broad market of all customers.
- Equivalent-value prices do not take demand or the number of competitive offerings into account. Obviously, this is a limitation. However, the equivalent-value price is merely a price level that results in an offering having an overall value equal to some other offering. That may not be the best possible thing to do, or the best possible offering to which one should be compared. Nevertheless, the equivalent-value price is a relevant reference point, rather like a break-even price level.
- Since the equivalent-value price offers equivalent overall customer value (considering product attributes and price), customers should be indifferent among offerings priced at their equivalent-value prices. Assuming equal awareness and distribution access, approximately equal market shares and sales volumes should follow — by definition. However, a vendor may not be indifferent among alternative product attribute and price bundles. Profitability may differ for alternative product attribute and price bundles, and a thoughtful vendor will search for least-cost equivalent-value options.
- Conjoint analyses quantify the desirability of product or service features, to assess price sensitivity, and to forecast demand and market share. Equivalent-value pricing analysis is another important approach to representing the results of conjoint analysis studies. Equivalent-value prices are not necessarily the "best" possible price, and they certainly aren't the "optimal" price (whatever that means). Nevertheless, equivalent-value prices are key benchmarks about which the thoughtful marketing professional must be knowledgeable. At a minimum, selecting the equivalent-value price leads to a competitive price.

Source: Adapted from Randall G. Chapman, "Equivalent-Value Pricing," *Pricing Strategy & Practice: An International Journal*, Vol. 2, No. 2 (1994), pp. 4-16.

Research Study #31: Self-Reported Preferences

Purpose: This research study provides self-reported importance weights for a variety of generate demand elements for each market region. In addition, self-reported attribute preferences for various levels of raw materials alpha and beta are provided for each market region, as well as alpha-beta positioning maps of customer ideal points for each market region.

Information Source: This research study is based on end-user customer surveys.

Sample Output

Study Details:

These self-reported importance weights are the averages across all survey respondents. Seven-point rating scales are used in this end-user customer surveying, where "1" is anchored by "Not Important" and "7" is anchored by "Very Important."

The self-reported attribute preferences reflect the distribution of customers' self-reported preferences across the range of 0-9 kg. for raw materials alpha and beta.

The positioning maps graphically display customer preferences for alpha-beta combinations for category in each market region. Current product alpha-beta positionings are displayed relative to the customer ideal-points in the market regions.

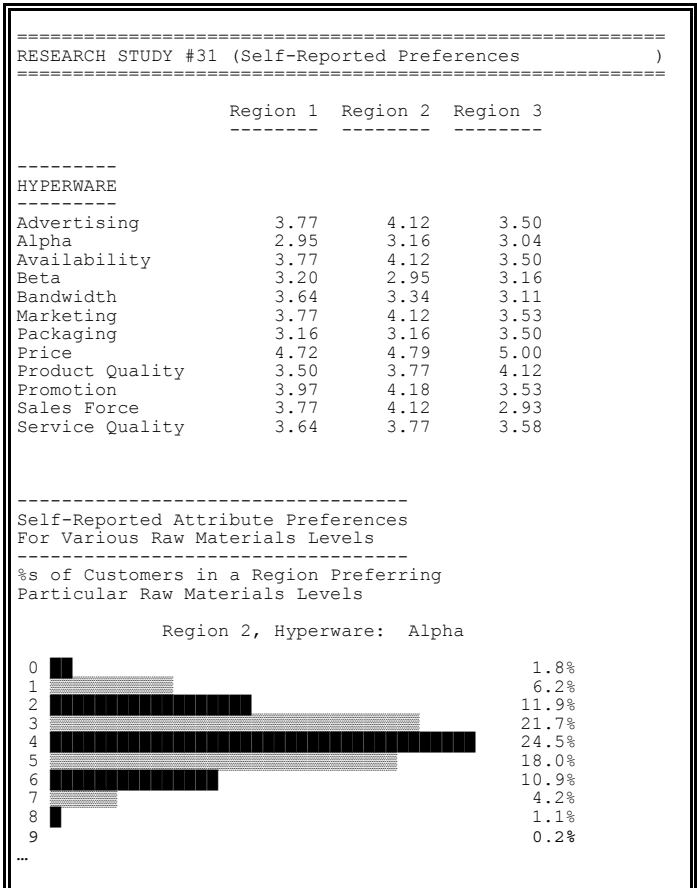
Cost: \$20,000.

Other Comments: Self-reported importance weights are easy things to ask survey respondents. There is, however, considerable debate about the usefulness of such measures.

Customers may have trouble distinguishing low-importance and high-importance elements. Customers may report that everything is important, failing to provide the differentiation that is of interest to marketing managers. It's also not clear how to use self-reported importance weights to predict future buying behavior, since self-reported importance weights aren't developed from actual behavior. Perhaps they're only meant to be directional in nature, identifying only really low and really high importance factors.

Self-reported importance weights and self-reported attribute preferences are of uncertain quality. It's easy for customers to report "what they want" on such survey instruments, but the statistical veracity of these self-reported weights and self-reported attribute preferences has been questioned by many professional marketing researchers.

Additional Information: In this research study, self-reported attribute preferences are reported only for alpha and beta and not for bandwidth, warranty, and packaging. Bandwidth, warranty, and packaging are "more-is-better" product attributes. There's no doubt as to the "best" (most

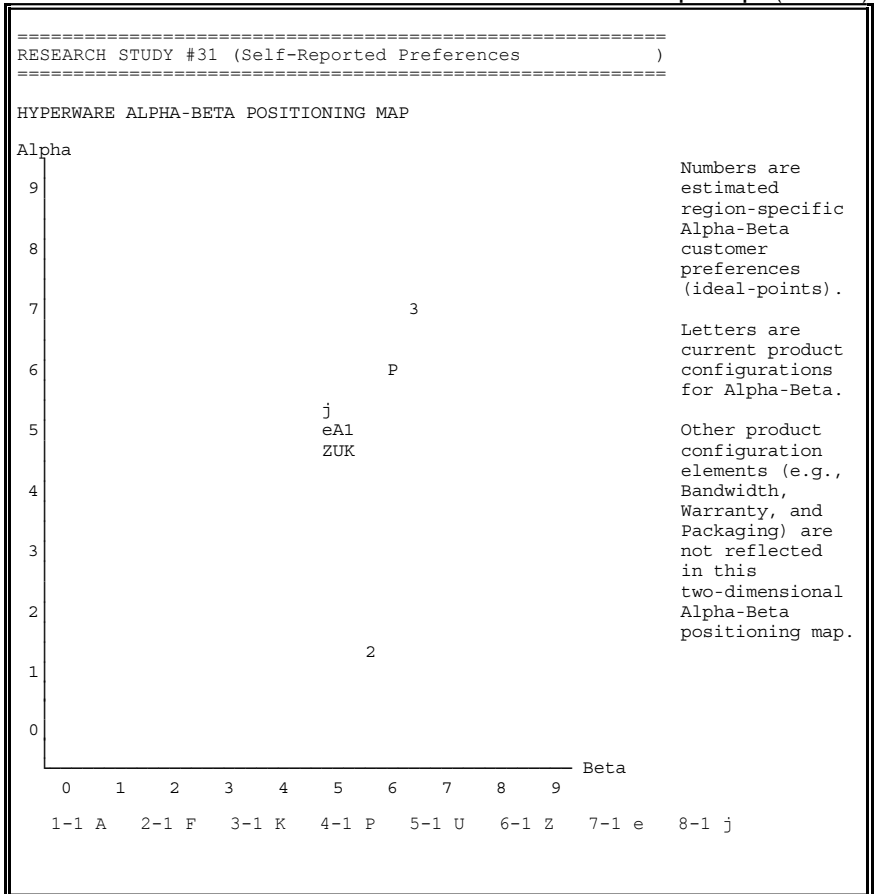


preferred) level of each of these product attributes. Rational end-user customers should naturally always prefer the highest possible level of bandwidth, warranty, and packaging.

The self-reported attribute preferences reported in this research study represent one approach to assessing customer preferences for specific possible alpha and beta levels in set-top box products' configurations. These self-reported attribute preferences provide a general scan of customer preferences across the full range of set-top box technology for raw materials alpha and beta. Based on the results of this research study, other research studies should be executed to refine reconfiguration options and possibilities. For example, after reviewing the results of this research study, one or more research study #23 ("Concept Test") reports might be executed.

Relatively sharp preference distributions for alpha and beta are indicative of homogeneous customers (who all want about the same raw material level) or strong preferences (they are quite insistent about their requirements for raw materials). Relatively flat preference distributions for raw materials signal heterogeneous customers (there is wide variation in customer preferences for raw material levels) or weak preferences (they are tolerant to variations in raw materials).

Sample Output (continued)



Research Study #33: Value Maps

Purpose: Value maps display the relative standing of all actively distributed product in a market region based on perceived benefits (on the horizontal axis) and price (on the vertical axis).

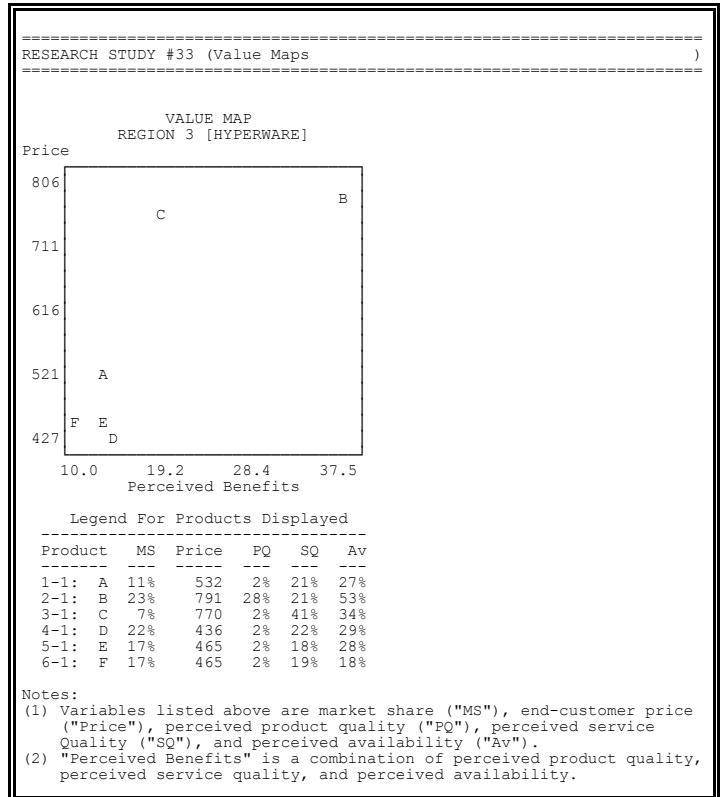
Information Source: This information is derived from other research. Your research supplier uses proprietary weights to combine benefit-drivers (product quality perception, service quality perception, and availability perception) into an overall perceived benefits measure for two-dimensional price-versus-benefits value maps.

Cost: \$3,000 per region.

Other Comments: LINKS value maps display products based on benefits and prices. An equivalent-value line showing customers' trade-offs between benefits and price isn't included. You'll need to superimpose your own equivalent-value line on these value maps.

The equivalent-value line's slope depends on customers' relative weights for benefits and price and it should be drawn with reference to market shares, with the line being closer to larger market-share products.

Sample Output



Research Study #38: Retention Statistics

Purpose: This research study provides retention rates for all actively marketed products in all channels and regions markets for the last four quarters.

Information Source: Retention rates are estimated based on a customer survey of current purchasers of set-top boxes. Retention rates are customers' stated intentions of probability of future repurchase of the just-purchased set-top box.

Cost: \$10,000.

Other Comments: Retention rates are measure of long-run average customer loyalty to a just-purchased product. They are estimates of the average current purchaser's stated intention of probability of repeat purchase. Retention rates are also used by marketing analysts to estimate customer lifetime value (CLV).

Sample Output

```

=====
RESEARCH STUDY #38 (Retention Statistics
=====
                                )

                                Quarter 13  Quarter 14  Quarter 15  Quarter 16
                                -----  -----  -----  -----

REGION 1
-----
CHANNEL 1:
Product 1-1H      60.2      58.3      58.1      58.0
Product 1-2M      39.6      40.5      39.4      38.9
Product 2-1H      60.5      58.2      60.2      60.7
Product 2-2M      41.4      41.1      41.3      40.3
Product 3-1H      59.0      60.0      61.4      57.9
Product 3-2M      39.1      38.8      39.0      41.0
Product 4-1H      58.0      61.3      58.6      60.5
...

```

Interpreting Retention Statistics and Customer Lifetime Value: A Tutorial

Customer lifetime value (CLV) is calculated as the net present value of expected future cash flows over the lifetime of an individual customer. The equation (shown below) explicitly accounts for customer churn or turnover by adjusting the cash flow for each time period by the probability that the customer will be retained (r):

$$CLV = \sum_{t=1}^T \frac{(GM_t)r^t}{(1+d)^t}$$

GM_t = gross contribution margin per customer in time period t r = retention rate d = discount rate t = a time index (e.g., a quarterly time index)
--

Calculating Customer Lifetime Value

The steps in calculating CLV are as follows:

1. Determine annual profit (or cash) flow pattern for customers over time.
2. Establish customer defection/retention pattern.
3. Calculate customer NPV using firm's discount rate.

It is preferable to calculate CLV using gross contribution margin per customer in the numerator. However, in some instances, firms have difficulty assigning their costs to specific customers, so gross contribution margin per customer is replaced by revenue per customer.

Different market segments may have very different cash flow characteristics (that is, different gross contribution margins and retention rates). Hence, it is useful to calculate CLV separately for the typical customer in each market segment.

Interpreting Customer Lifetime Value

The CLV framework is a useful way of thinking about managing customer relationships to maximize shareholder value. From a managerial standpoint, there are three ways for a company to increase aggregate CLV (and consequently shareholder value) next year: (1) Acquire new customers; (2) Increase retention of existing customers; or, (3) Increase gross margin (through cross-selling or changes in cost-structure, for example).

Firms generally consider customers with a high CLV to be most attractive and – if these customers perceive the firm's product to have a high value – it will be profitable for the firm to invest in marketing to them. Firms generally undertake defensive strategies to retain customers with a high CLV who do not perceive the firm's product to have a high value because they are vulnerable and may be lost to competitors.

Recent research has shown that the CLV framework (i.e., using forecasts of acquisition, retention, and margins) can be used to calculate the value of the firm's current and future customer base. Gupta, Lehmann and Stuart (2004) used publicly available information from annual reports and other financial statements to calculate a customer-based valuation of five companies. They

compared their estimates of customer value (post-tax) with the reported market value for each of the companies. Their estimates were reasonably close to the market values for three firms, and significantly lower for two firms (Amazon and eBay). They inferred that these two firms are either likely to achieve higher growth rates in customers or margins than they forecast, or they have some other large option value that the CLV framework doesn't capture.

Sample Customer Lifetime Value Calculation

An auto dealership tracks customers who use its service facility. New customers represent \$50 in 1st-year margins, \$100 in 2nd-year margins, \$125 in 3rd-year margins, and \$100 in margins in subsequent years. The dealership estimates that customers defect at a rate of 20% per year. That is, only 80% of new customers continue to use the automobile dealership's services in the second year, only 60% of new customers continue to use the automobile dealership's services in the third year. etc. Assume the firm's discount rate is 20%. We can calculate the CLV for the average customer as follows:

$$\begin{aligned} \text{CLV} &= 50/1.20 + (100 \times 0.80)/(1.20)^2 + (125 \times 0.60)/(1.20)^3 + (100 \times 0.40)/(1.20)^4 + (100 \times 0.20)/(1.20)^5 \\ &= \$167.96. \end{aligned}$$

Suppose the auto dealership was able to reduce customer defections from 20% to 15% per year. Then, CLV for the average customer would be \$205.10. Thus, a 5% reduction in the rate of customer defections (a 5% increase in the customer retention rate) increases profitability by 22.1%. Note that, in this example, we discount cash flows back to "year 0" and assume there was no acquisition cost at year 0.

Research Study #39: Benchmarking - Product Variable Cost Estimates

Purpose: This research study provides product variable cost estimates of competitive products for your industry. These product variable cost estimates must be requested for one or more specific firms in your industry.

Sample Output

Information Source: These product variable cost estimates are provided via an information sharing arrangement managed by the Set-Top Box Trade Industry Association.

=====				
RESEARCH STUDY #39 (Benchmarking - Product Variable Cost Estimates)				
=====				
	Configuration	Labor	Production	Total
	Cost	Cost	Cost	Product
	-----	-----	-----	Cost
	-----	-----	-----	-----
Product 1-1H	122.43	30.00	20.00	172.43
Product 1-2H	214.32	30.00	20.00	268.32
Product 2-1H	342.47	30.00	20.00	392.57
...				

Cost: \$500 per actively distributed product. When you specify a particular firm for this research study, product variable cost estimates are provided for all that firm's actively distributed products.

Additional Information: As may be noted from the Sample Output, total product (variable) cost is reported for each product as well as the associated cost elements of configuration cost, labor cost, and production cost.

Decision Forms

"The secret of getting ahead is getting started. The secret of getting started is breaking your complex, overwhelming tasks into small manageable tasks, and then starting on the first one." – Mark Twain

Use the LINKS decision forms on the following two pages during your team deliberations to record your decisions in each simulation quarter. Then, input these decisions into LINKS via the LINKS Simulation Database:

<http://www.LINKS-simulations.com>

With the exception of research studies orders (which must be made every quarter), all LINKS decisions are standing orders. (i.e., permanent until explicitly changed). You only need to enter decision changes. If you are satisfied with a current decision, there is no need to change it.

Positioning Strategy Decisions (1 of 3)

Firm	
------	--

Quarter	
---------	--

Product Configuration	Product 1	Product 2	Product 3
Category {"H"}=hyperware}	H	H	H
Alpha {0-9 kilograms}			
Beta {0-9 kilograms}			
Bandwidth {1-8 terahertz}			
Warranty {0 quarters}	0	0	0
Packaging {"1"}=standard, {"2"}=premium, {"3"}=ESpremium}			
Memory Capacity {0-3 disks}			

Generate Demand, Product 1	Region 1	Region 2	Region 3
Active Product? {Yes No}			
Price			
Marketing Spending			
Marketing Mix Allocation			
Positioning			
Sales Volume Forecast			

Generate Demand, Product 2	Region 1	Region 2	Region 3
Active Product? {Yes No}			
Price			
Marketing Spending			
Marketing Mix Allocation			
Positioning			
Sales Volume Forecast			

Generate Demand, Product 3	Region 1	Region 2	Region 3
Active Product? {Yes No}			
Price			
Marketing Spending			
Marketing Mix Allocation			
Positioning			
Sales Volume Forecast			

Reminders:

- (1) Only input changes. If you're happy with the current values of these decisions, leave the appropriate decision entries blank.
- (2) All decision inputs change the existing values to the values that you specify. Do not enter "+" or "-" values. Rather, enter new values only (new values replace the existing value of the decision variable with your designated value).

Positioning Strategy Decisions (2 of 3)

Firm	
------	--

Quarter	
---------	--

Service Decisions	Region 1	Region 2	Region 3
Service Outsourcing			

Firm Name {maximum of 40 characters}	
---	--

Research Studies Decisions

1	Benchmarking - Earnings		
2	Benchmarking - Balance Sheets	Firm(s)?	
3	Benchmarking - Product Development		
9	Benchmarking - Generate Demand		
11	Benchmarking - Operating Statistics		
12	Market Statistics		
14	Regional Summary Analysis	Region(s)?	
20	Customer Satisfaction		
23	Concept Test	Region?	Configuration?
		Region?	Configuration?
		Region?	Configuration?
		Region?	Configuration?
		Region?	Configuration?
		Region?	Configuration?
		Region?	Configuration?
		Region?	Configuration?

24	Price Sensitivity Analysis	Product?	Region?	Configuration?	Price?
		Product?	Region?	Configuration?	Price?
		Product?	Region?	Configuration?	Price?
		Product?	Region?	Configuration?	Price?

27	Marketing Program Benchmarking	Region(s)?
30	Conjoint Analysis	Region?
31	Self-Reported Preferences	
33	Value Maps	Region(s)?
38	Retention Statistics	
39	Benchmarking - Product Variable Cost Estimates	Firm(s)?

Reminders:

- (1) Circle the number of each research study that you wish to order. If additional information is required for a research study, provide that information in the designated space(s).
- (2) Research requests are for one quarter only; reorder research studies each quarter, as desired.

Positioning Strategy Decisions (3 of 3)

Firm	
------	--

Quarter	
---------	--

28	Marketing Program Experiment	Product?	Region?	Marketing\$?
		MarketingMix?		Positioning?
		Product?	Region?	Marketing\$?
		MarketingMix?		Positioning?
		Product?	Region?	Marketing\$?
		MarketingMix?		Positioning?
		Product?	Region?	Marketing\$!
		MarketingMix?		Positioning?
Product?	Region?	Marketing\$?		
MarketingMix?		Positioning?		
Product?	Region?	Marketing\$?		
MarketingMix?		Positioning?		
Product?	Region?	Marketing\$?		
MarketingMix?		Positioning?		

Reminders

Research study requests are for one quarter only. If you wish to reorder a research study in a subsequent quarter, you must reenter that research study request.

Financial Reports

"In a good wind, even turkeys can fly." – Chinese saying

The LINKS Positioning Strategy Simulation begins in quarter 1 with all firms in the identical position (same products, configurations, prices, marketing spending levels, capital structure, etc.). Since there is no randomness in the simulation in quarter 1, all firms are identical as the simulation begins. This starting position obviously facilitates evaluation, since all firms start at the same place. After quarter 1, the decisions of the competing firms in your industry and natural statistical randomness will lead to differences in competitive positions and results.

To provide an overall roadmap for thinking about the drivers of profitability in LINKS, the charts in Exhibits 1 and 2 decompose net income into its underlying components. In Exhibit 1, the principal drivers of net income are revenues and costs. Taxes and non-operating income play lesser roles. Exhibit 2 provides a breakdown of the drivers of volume, one of the two key drivers of revenues. Collectively, these exhibits provide a sense of the DNA of net income in LINKS.

The "Corporate P&L Statement" aggregates product-specific profit-and-loss statements into an overall corporate P&L statement. Some line-items appear on the "Corporate P&L Statement" only, because it isn't possible to unambiguously allocate those costs to specific products in specific regions. Definitions of non-obvious line-items on the "Corporate P&L Statement" follow:

- Administrative overhead ("Administrative O/H") is \$300,000 per quarter per product per region. As noted earlier, forecasting accuracy influences administrative overhead.
- "Consulting Fees" are positive or negative adjustments to income or expenses. Conversations with your instructor/coach are normally without charge, so don't worry about "Consulting Fees" associated with such consultations. "Consulting Fees" represent a convenient mechanism for making adjustments to income or expenses. For example, a research billing problem can be corrected via an appropriate negative "Consulting Fee."
- Corporate overhead ("Corporate O/H") is \$750,000 per product per quarter. This per-product charge is incurred if a product is actively distributed in one or more regions.
- "Duties & Tariffs" are a percentage of the average selling price for finished goods that are imported into any region. If a firm has a manufacturing plant in a region, there are no duties and tariffs payable. The current duties and tariffs rates are 0%, 8%, and 12%, respectively, for regions 1, 2, and 3. By definition, all finished goods sold in market region 1 are "local," since your firm's manufacturing plant is located in market region 1. "Duties & Tariffs" are levied on sales in a market region (orders from customers).
- "Information Technology" records all IT charges including a \$1,000/page charge for all financial/operating reports plus research studies. This charge is per-firm and is not related to the number of team members. Each quarter's charge is based on the previous quarter's actual page counts.
- "Non-Operating Income" derives either from interest earned on "Marketable Securities" (from the previous quarter's "Balance Sheet") or from interest paid on "Loans" (from the previous quarter's "Balance Sheet").
- "Patent Royalties" include patent royalties that your firm pays to other firms, as well as patent royalties received from other firms.

Exhibit 1: Net Income Drivers in LINKS

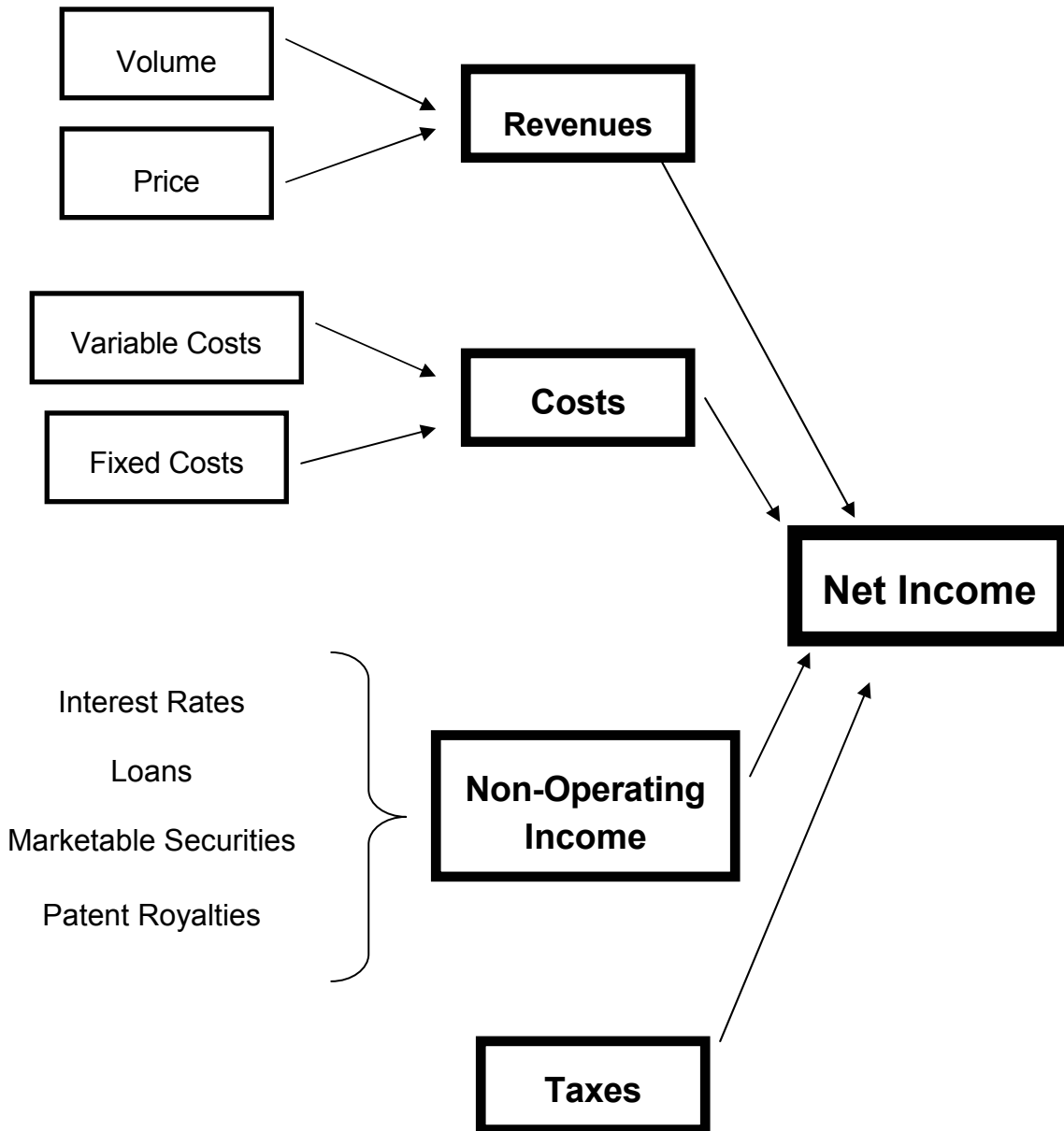
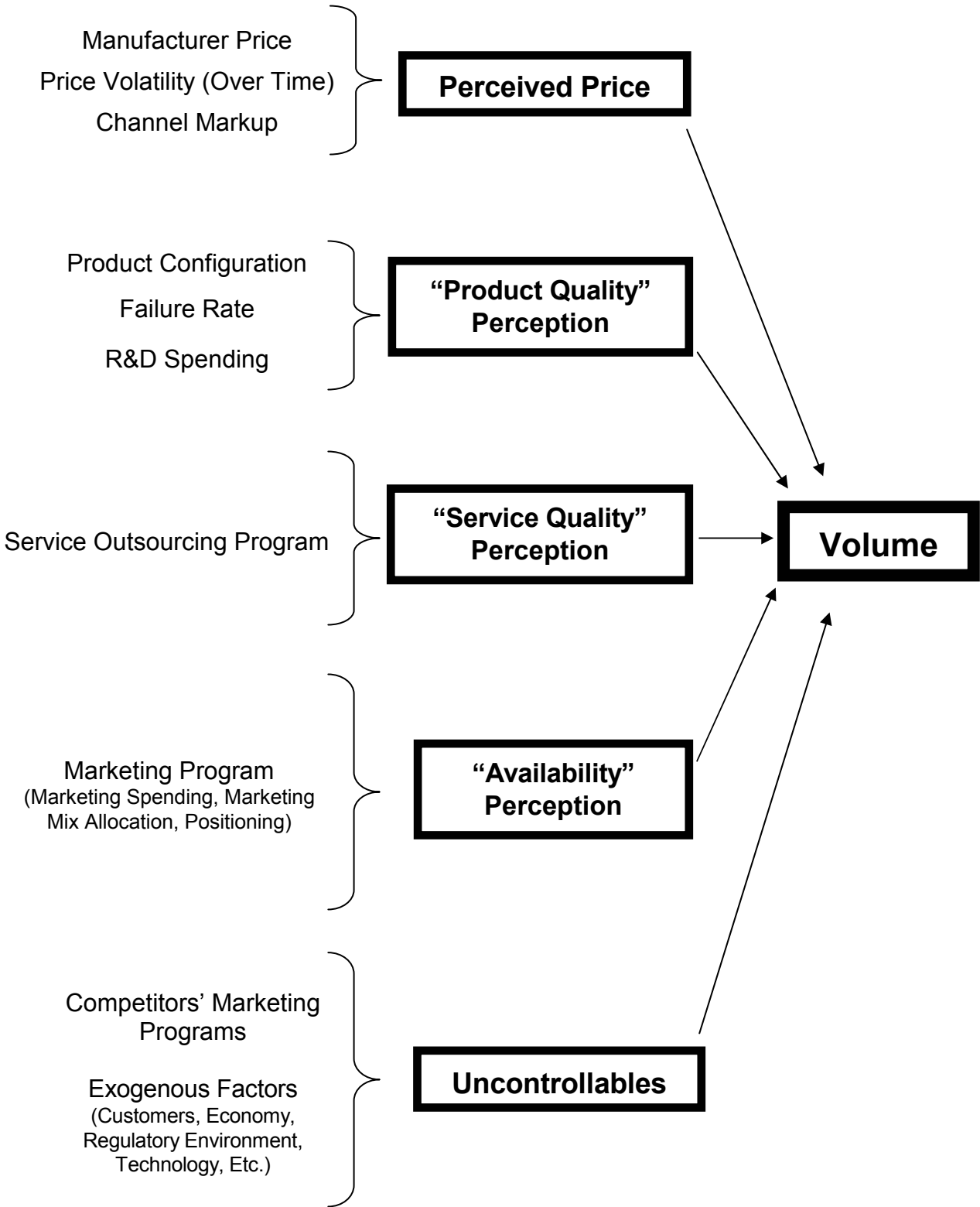


Exhibit 2: Volume Drivers in LINKS



- "Research Studies" reflects the total costs associated with last quarter's research study requests. The current quarter's research studies are executed after the current quarter's financial reports are prepared so research study billings are lagged a quarter.
- "Taxes" represents the corporate taxes payable in the market region in which your firm has its manufacturing plant. Your manufacturing plant is located in market region 1, which has a corporate tax rate of 50%.
- "Total Fixed Costs" is the sum of all fixed costs. "Total Fixed Costs" does not sum correctly down and across since some fixed costs aren't allocated to specific products.

On the "Balance Sheet":

- "Cash" represents your cash balance. Cash in excess of 10% of revenues is automatically invested in short-term "Marketable Securities" which earn 1.5% per quarter in "Non-Operating Income" on the "Corporate P&L Statement" in the following quarter. If cash falls below 5% of revenues, a loan is automatically arranged to increase cash to 5% of revenues. You pay interest of 3% per quarter on "Loans" and this interest payment is recorded as "Non-Operating Income" (a negative value of "Non-Operating Income") in the following quarter's "Corporate P&L Statement."
- "Corporate Capitalization" is the dollar-value of the original capital invested by your shareholders to start your firm.
- "Dividends" are cash payments to shareholders. In any quarter in which "Net Income" is positive, 30% of the "Net Income" is allocated to "Dividends."
- "Plant Investment" represents the dollar-value of your firm's investment in a manufacturing plant to produce set-top box products. The normal per-unit production charges that you pay for producing set-top boxes includes a component to cover the maintenance and depreciation of your plant. Thus, your "Plant Investment" value will also be the same through time.

FAQ

"Are costs expensed at the beginning of the quarter or the end of the quarter? The answer influences our spending decisions, since we obviously don't want to spend money before we have it." Assume that all revenues and costs happen uniformly throughout the quarter. That is, with a 90-day quarter, about 1/90 of the quarter's revenues and costs are attributable to each day's operations. Thus, you do have revenue coming in regularly throughout the quarter to pay for your various within-quarter operating costs. There's no need to worry about within-quarter cash flow issues with regard to covering your operating costs and within-quarter spending. Also, note that you do have access to loans, as necessary, to cover shortages in cash.

The "Forecasting Accuracy Report" provides details of the forecasting accuracy associated with each of your forecasts. Recall that sales volume forecasting accuracy also influences the "Administrative O/H" cost for each of your products in each region. In addition, the sales history for all of your firm's products (product-unit sales by product, channel, and region) for the last six quarters is displayed at the end of this report.



The "Set-Top Box Industry Bulletin" provides current-quarter industry-related information. Information reported in the "Bulletin" includes things that an actual manager in the set-top box industry could easily observe without additional cost or with nominal effort during the course of events that comprise a normal quarter's work.

The following pages provide samples of the standard LINKS financial and operating reports. In addition to these reports, you'll receive the results of any research studies that you order on additional pages after the last page of your financial and operating reports.



These samples are provided to familiarize you with the style and format of the reports that are provided to your firm after each LINKS round. The data reported in these sample reports are only illustrative of reports formatting. These data aren't specific to your particular LINKS industry. Please do not interpret these samples as suggested guidelines or benchmarks for good decisions and performance within LINKS.

If you'd like some further background on interpreting LINKS financial statements, please access Tutorial #1 ("P&L Statements") on the LINKS website and spend 45 minutes or so working through it prior to (or close to) the beginning of your LINKS event.

Performance Evaluation

"If you're riding ahead of the herd, take a look back every now and then to make sure it's still there." – Cowboy philosophy

Profitability measures obviously matter in assessing the long-run performance of a business. However, "other things" are leading indicators of future profitability and root causes of profitability. As you'll note from the details that follow, current performance and change in performance are considered in the LINKS multi-dimensional performance evaluation scorecard.

The LINKS scorecard is perhaps described more aptly as a boardroom-level scorecard. It focuses on top-line boardroom kinds of financial, operational, and customer performance measures and sub-measures. The LINKS scorecard includes the measures and weights described in Exhibits 3-5. Each firm in your set-top box industry submits their raw data to the Set-Top Box Trade Association, which provides your firm's personal scorecard every quarter.

The LINKS scorecard is based on a ranking of performance on each sub-measure. These rank-order comparisons across all competing firms within your industry avoid the undue influence of particularly extreme values of individual sub-measures. This LINKS scorecard is a within-industry performance evaluation system. Comparisons across industries are problematic due to variations in environmental and competitive milieu.

Your firm receives weighted points for each competitor for whom your performance on a sub-measure is better. For example, if your firm's ratio of "Net Profits" to "Revenues" is better than three other firms' ratios, your firm receives 9 points. (Of course, the top-performing firm on "Net Income" to "Revenues" ratio in a 6-firm industry would receive 15 points.) In general, the maximum available points on any sub-measure are $W*(N-1)$ where "W" is the sub-measure's weight and "N" is the number of firms in the industry. Points accumulate each quarter throughout the LINKS exercise.

To avoid an overemphasis on minor quarter-to-quarter variations in the calculation of the ranking of firms on the performance sub-measures in the LINKS scorecard, minor differences in the sub-measures are treated as ties in the calculation of ranking points. The thresholds for differences to be treated as meaningful are listed in Exhibits 3-5 for each sub-measure. For example, differences of 0.2% or less for "Ratio of Net Income to Revenues" are considered to be statistically insignificant, and firms within 0.2% of each other would be treated as being tied. Thus, two firms with ratios of Net Income to Revenues of 4.5% and 4.6% would be treated as being tied in the calculation of ranking position and associated points received in any quarter.

You receive the LINKS scorecard automatically each quarter as the first page of your financial and operating reports. This scorecard provides comparatives to assess how your firm's data compares to the industry averages on every KPI. In addition, historical plots of past performance are provided. Data from the past six quarters are used, to the extent available in your industry's historical archives, to create quarter-by-quarter plots for each of the LINKS performance evaluation metrics. For each metric and quarter, the range of values across all firms in your LINKS industry is shown and your firm's position in these ranges is identified.

Exhibit 3: Scorecard Financial Measures

Sub-Measures	Weight	Sub-Measure Details
Ratio of Net Income to Revenues	3	Current profitability is the best overall signal of business performance, hence its high weight. Firms are "tied" if their scores are within 0.2% of each other.
Change in Ratio of Net Income to Revenues	1	Improvement in profitability is important but less important than current profitability. Firms are "tied" if their scores are within 0.2% of each other.

Exhibit 4: Scorecard Operational Measures

Sub-Measures	Weight	Sub-Measure Details
Forecasting Accuracy	2	Forecasting accuracy is a relatively pure signal of management skill and expertise (in this case, in the area of understanding customers and customer demand generating forces). Firms are "tied" if their scores are within 0.5% of each other.
Ratio of (Marketing + Service Spending) to Revenues	-1	Service spending is service outsourcing costs. Marketing spending is an easy way to boost short-run sales volume without necessarily contributing to long-run profitability. Relative to revenues, spending less in marketing and service is desirable. Firms are "tied" if their scores are within 0.2% of each other.

Exhibit 5: Scorecard Customer Measures

Sub-Measures	Weight	Sub-Measure Details
Change in Market Share	1	Change in market share is an overall measure of customer reaction to the firm's offerings. ("Market share" equals customer purchases in all channels and regions.) Firms are "tied" if their scores are within 0.1% of each other.
Customer Satisfaction	1	Customer satisfaction is a clear measure of customer performance and a long-run leading indicator of repeat purchasing behavior and customer retention. Average customer satisfaction across all products, channels, and regions is used here. Firms are "tied" if their scores are within 0.5% of each other.

Notes: Positive "weights" are associated with sub-measures where "more is better" and negative "weights" are associated with sub-measures where "less is better." "Change" measures are based on quarter-to-quarter changes.

Appendix: Web-Based LINKS Access

With web-based LINKS access, there's no software or files to download, upload, or install. Just point your favorite internet/web browser at the LINKS website to interact with LINKS. Select your particular LINKS simulation variant from the main LINKS webpage

<http://www.LINKS-simulations.com>

and then access the LINKS Simulation Database using your firm's case-sensitive passcode. **You'll be e-mailed your LINKS firm's passcode just before your LINKS event begins.**

LINKS uses e-mail to communicate with all participants throughout LINKS events. Your LINKS instructor provides us with all participants' e-mail addresses, grouped into LINKS teams, before your LINKS event begins.

Please ensure that your preferred e-mail software is configured to receive e-mail messages from these e-mail addresses:

LINKS@ChapmanRG.com
Administrator@ChapmanRG.com
Chapman@ChapmanRG.com
LINKS@LINKS-simulations.com
Administrator@LINKS-simulations.com
Chapman@LINKS-simulations.com
LINKS@LINKS-simulations.info

More generally, please ensure that your e-mail software is configured to receive e-mail from e-mail addresses from domains ending with:

@ChapmanRG.com
@LINKS-simulations.com
@LINKS-simulations.info

You may need to consult your personal information technology advisor ("guru") to ensure that your e-mail software is configured appropriately to receive e-mail from the various LINKS-related e-mail addresses.

If these e-mail addresses and domains are inadvertently "black-listed" or labeled as "spam" within your e-mail software, you won't receive the regular LINKS e-mailings throughout your LINKS event.

- You'll receive e-mail messages from LINKS at the time your LINKS industry is initialized and made public to the participants. This initial e-mailing includes firm-specific LINKS passcodes to access the LINKS Simulation Database.
- In addition, you'll receive an e-mail reminder each morning when there's a game run scheduled for later that day.
- Some other useful reminder and informational e-mail messages will be sent to you during your LINKS event.

If you don't receive these e-mail messages, then either your e-mail address is incorrect within the LINKS Simulation Database (contact your instructor to change your e-mail address) or your e-mail software, e-mail management system, or firewall is "blocking" receipt of LINKS e-mail messages.

While the LINKS Simulation Database works with all web browsers, Microsoft's Internet Explorer is recommended. **LINKS website access requires a Java-enabled browser.** Otherwise, Java-applet buttons won't appear in your browser and you'll be unable to access any LINKS resources.

Output Retrieval After a LINKS Round

You'll be advised via e-mail when LINKS game-run results are available for access via the LINKS Simulation Database. Access the LINKS Simulation Database, enter your firm's passcode, and the next screen provides clickable links to access your Word doc and Excel results.

You may print your LINKS results within your web browser or save your Word-doc results file to your PC for later reference and/or printing. When you print a LINKS results file, you may wish to change your printer's properties to print two pages of output per physical page in landscape format (i.e., "2-up" printing format) to save paper, if your printer has "2-up" printing capability.

Inputs For the Next LINKS Round

When you're ready to input decisions for the next LINKS round, access the LINKS Simulation Database and make your input changes.

In each LINKS round, one team member should be the designated "inputter" for all decision changes and research studies orders. This ensures that the inputting responsibility clearly resides with a single identifiable LINKS team member.

While any number of members of a LINKS firm may access the LINKS Simulation Database simultaneously, only one member at a time can input new decisions. If multiple members of a LINKS firm attempt to make inputs simultaneously, problems can arise; all decision inputs might not be saved successfully on the LINKS server with simultaneous inputs from multiple LINKS firm members. **Any number of 'browsers' may simultaneously page through the LINKS Simulation Database, viewing the current inputs. However, only one member of a LINKS firm at a time can input new decisions.**

You may make some LINKS inputs now and other inputs later. Only your final LINKS inputs at the official input submission deadline for your LINKS industry are included in the next LINKS round.

Hints and Reminders

After inputting decision variable changes on the LINKS decision forms, one team member inputs these changes into the LINKS Simulation Database. Even if you've allocated responsibilities for the overall LINKS management task to specific team members, one team member must be the designated "inputter" in each simulation round. Of course, that designated "inputter" can change from one simulation round to the next. Check your work carefully. Whatever is input will be your team's decision inputs for the next simulation round.

Within the LINKS Simulation Database, current decision values are displayed on the input

screens. You only need to make changes. If you're happy with the current value of a decision input, leave it as it is. All LINKS decision variables are "standing orders" and remain in effect until changed. However, you must input specific instructions each LINKS round for ordering research studies. Otherwise, research studies will be executed only once since "standing orders" don't exist for research studies.

Decision inputs have extensive checking to ensure input integrity, including upper and lower bounds on permissible numeric entries. Invalid entries result in an error message reporting valid minimums and maximums. In addition, there are informative messages routinely reported at the bottom of each web screen. **Execute the "Submit" button after making changes on a LINKS input web screen.** Then, review new reminder, warning, and error messages reported at the bottom of the regenerated web screen after the inputs are processed by the LINKS web server.

"Submit" each webpage's inputs before moving to another input screen in the LINKS Simulation Database. After you "Submit" a webpage's input changes, check for any new reminder, warning, or error messages at the bottom of the refreshed webpage (just above the "Submit" button) before moving on to other webscreens in the LINKS Simulation Database.

Access to the LINKS website requires a Java-enabled web browser. Otherwise, none of the Java-applet buttons will appear on your browser screen and you'll be unable to access any LINKS resources. If necessary, consult your local information technology guru for assistance in enabling Java in your internet browser. Alternatively, use another PC to access the LINKS website, one with a web browser that is already Java-enabled.

FAQ

"If I click the 'Submit' button in the LINKS Simulation Database input screen, are those inputs final?"

"Submit" and other LINKS buttons (at the bottom of any LINKS Simulation Database input screen) save the current decision variables to the LINKS Simulation Database on the LINKS web server. Make any changes desired up to the official input submission deadline for your LINKS industry, including changing inputs that you've previously changed. Input "finality" only occurs at the input submission deadline. The only thing that matters is the final standing of your LINKS decision inputs and research studies orders at the input submission deadline for your LINKS industry.

A specific time deadline will normally exist for each round of LINKS inputs. It's important to be on time! Plan your team's deliberations and your inputting process/timing accordingly.