Course Introduction

Marketing Analytics

Professors Asim Ansari & Kamel Jedidi

Columbia University

Agenda

- What is Marketing?
- Course Structure
- Course Requirements

What is Marketing?

To achieve organizational goals by determining the needs and wants of customers and delivering the desired benefits more effectively and efficiently than competitors
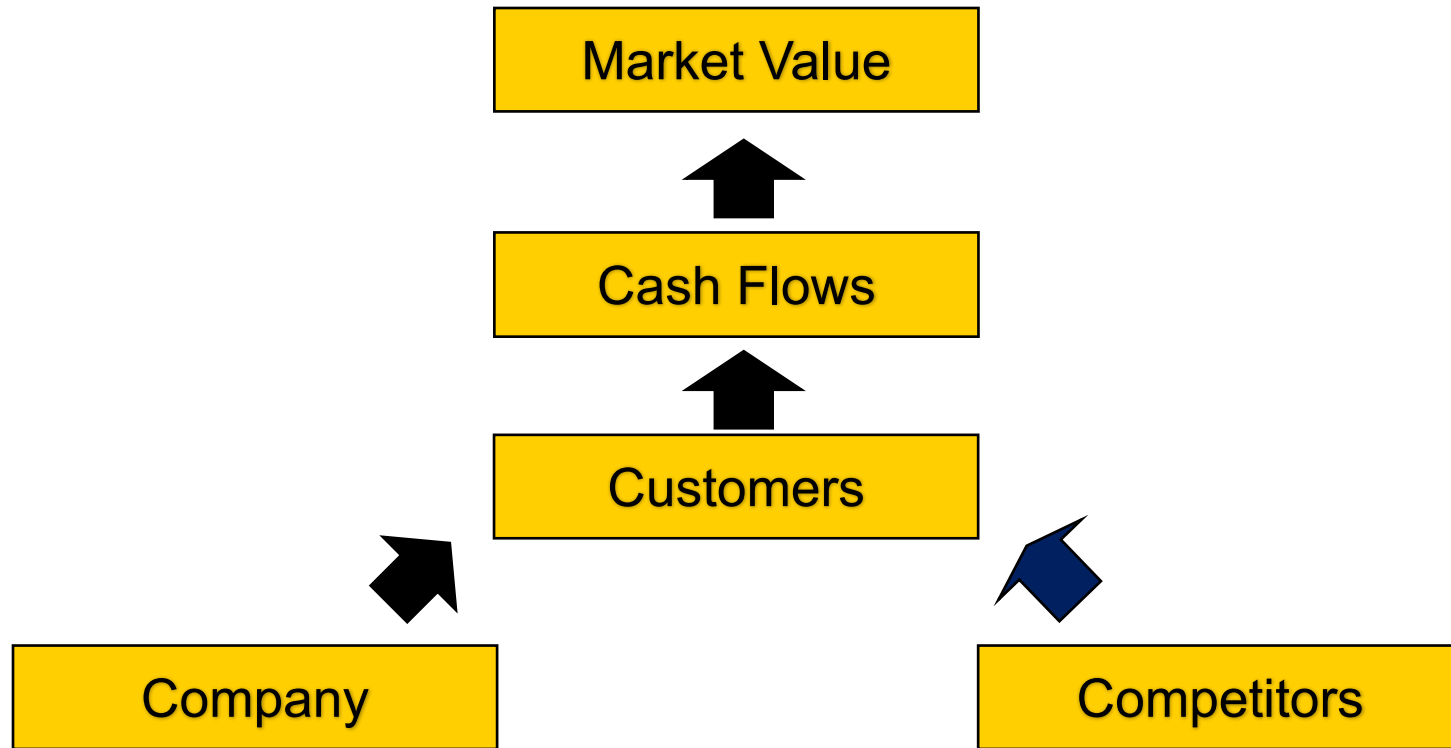
Marketing is the art and science of creating value by designing and manufacturing successful exchanges

- Alexander Chernev

"Everything starts with the customer."

- Lou Gerstner, CEO of IBM (1993-2002)

Marketing and Firm Value

```
                    ┌──────────────┐
                    │ Market Value │
                    └──────────────┘
                           ↑
                    ┌──────────────┐
                    │  Cash Flows  │
                    └──────────────┘
                           ↑
                    ┌──────────────┐
                    │  Customers   │
                    └──────────────┘
                    ↗              ↖
   ┌──────────────┐                ┌──────────────┐
   │   Company    │                │ Competitors  │
   └──────────────┘                └──────────────┘
```

"Creating shareholder wealth is not the purpose of the business. It is the reward for creating customer value."

Michael Tracy and Fred Wiersema in CFO magazine
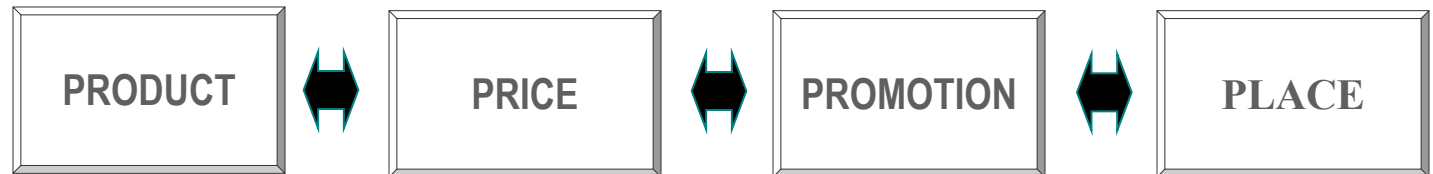
Strategic Marketing Framework

Identify Market Opportunities

CUSTOMER	⬌	COMPANY	⬌	COMPETITION

⬇

Set Strategy

SEGMENTATION ➡ TARGETING ➡ POSITIONING

⬇

Formulate Marketing Program

PRODUCT	⬌	PRICE	⬌	PROMOTION	⬌	PLACE

Outline of Sessions

- **Understanding Consumers**
  - Modeling Perceptions
  - Modeling choices
- **Segmenting Consumers**
- **Customer Lifetime Value**

- **Marketing Decisions**
- **New Product Design**
- **New Product Testing**
- **Pricing Analytics**
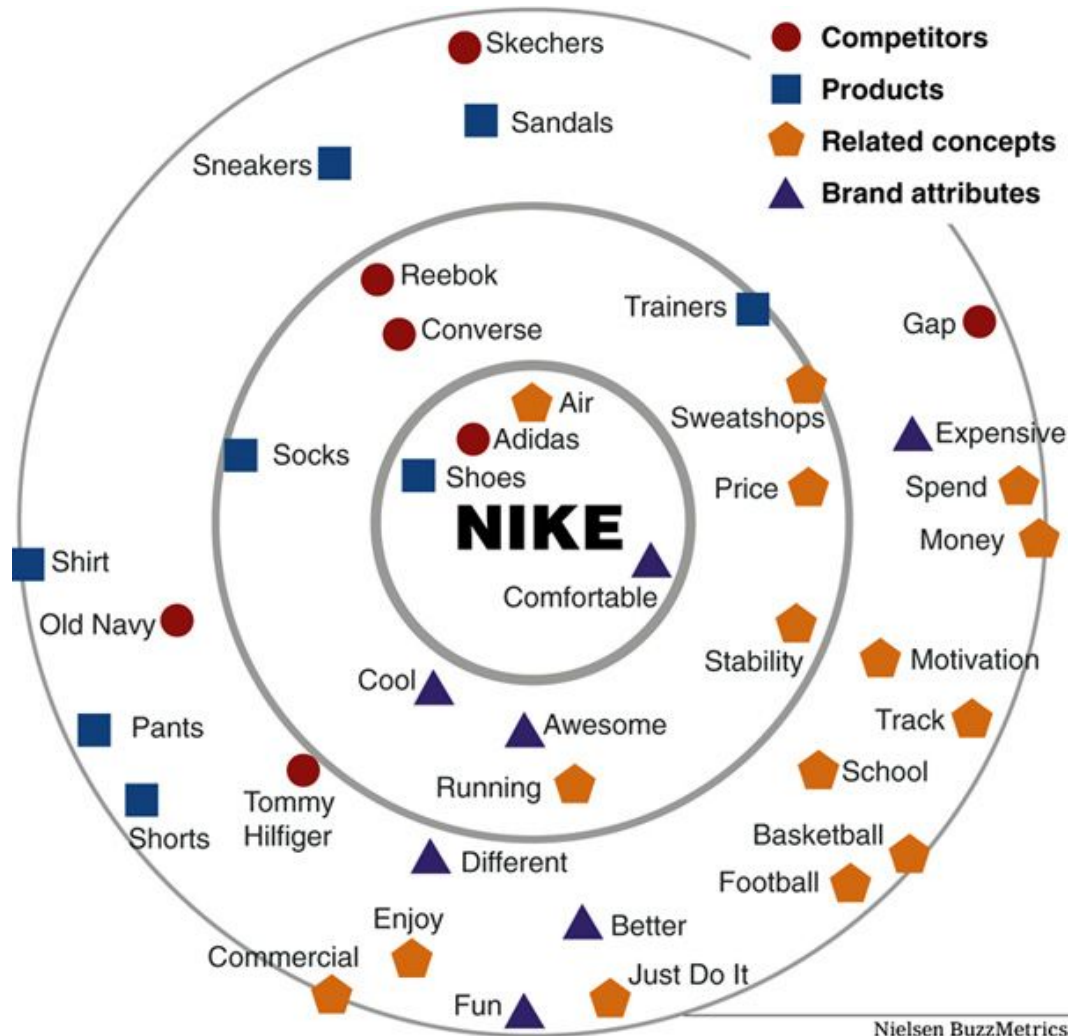- **Advertising Analytics**
- **Modeling Sales Promotions**

Modeling Consumer Perceptions

- Managers need to know how their products are perceived by consumers so that they can (re)position them appropriately

- Perceptual Mapping
  - Factor Analysis

Perceptual Map

Beer Market
Perceptual Mapping

Regular

Full Bodied

Heavy

Popular with Men

Old Milwaukee

Budweiser

Beck's

Meister Brau

Special Occasions

Heineken

Blue Collar

Miller

Good Value

Dining Out Premium

Coors

Budget

Stroh's

Premium

Michelob

On a Budget

Pale Color

Miller Lite

Coors Light

Popular with Women

Old Milwaukee Light

Light

Less Filling

Light
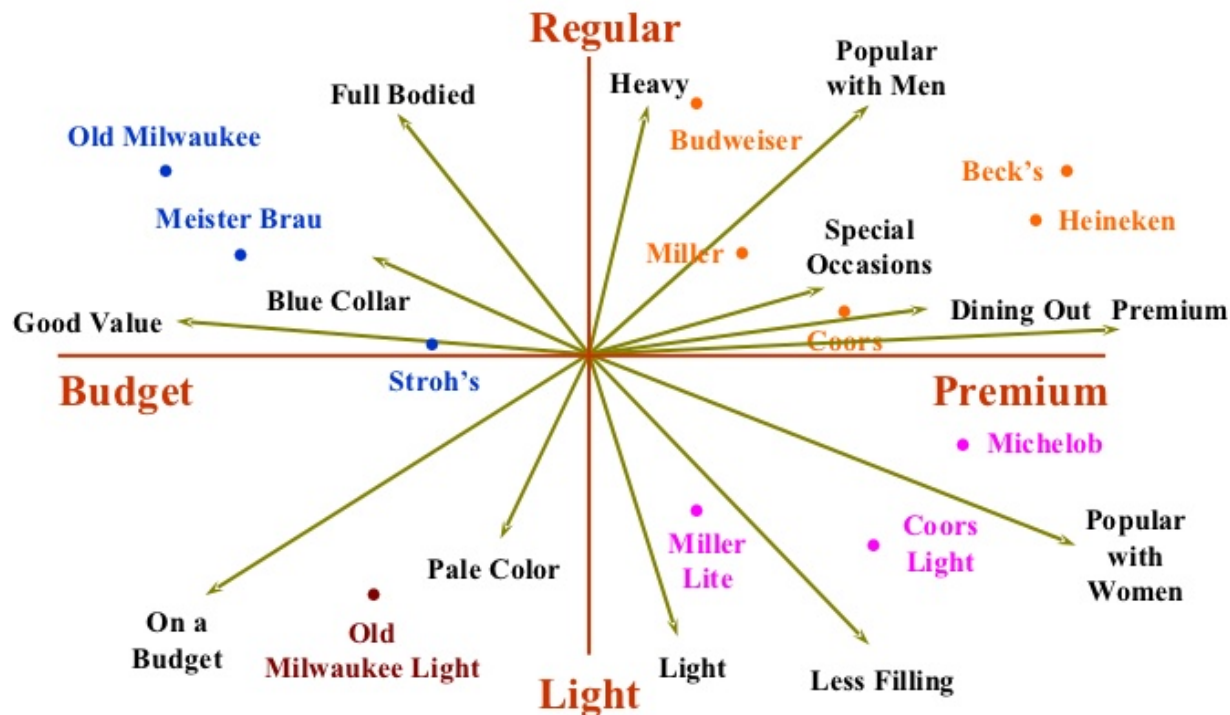
A brand association map drawn from online commentary about Nike

Nielsen BuzzMetrics

Modeling Consumer Choices

- How do consumers choose which brand to buy from a choice set?

- What determines whether a consumer renews a contract or churns?

- Analytics
  - Logistic Regression
  - Multinomial Logit Model

Segmentation Analytics

- Market segmentation is the subdividing of a market into distinct subsets of customers

- Segment members are different between segments but similar within

- Analytics
  - Cluster Analysis
  - Finite Mixture Modeling

Segmentation Analytics

- Attribute importance data collected using the constant-sum method

Attribute	Allocation
Trendy/innovative	
Styling	
Reliability	
Sportiness	
Performance	
Comfort	
Total	100 Points

- Are there different benefit segments? How many segments? How are they different?

Cluster Analysis

```
clust <- hclust(dist, method = "ward.D2")
plot(clust)
h_cluster <- cutree(clust, 4)
rect.hclust(clust, k=4, border="red")
```


Cluster Dendrogram
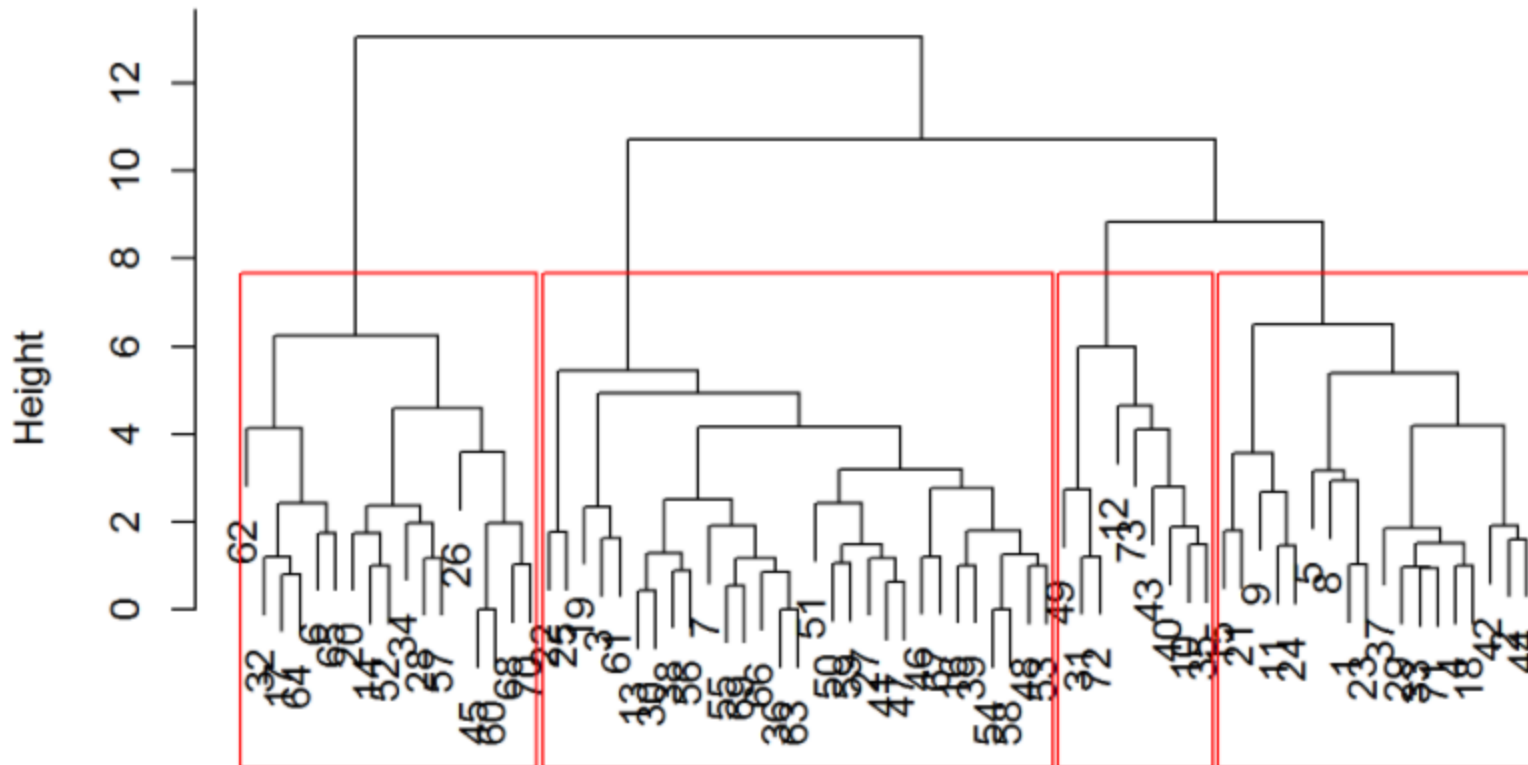
Modeling Customer Lifetime Value

- CLV is the net present value of the future cash flows generated by a customer over the duration of the relationship
  - Customer Acquisition
  - Customer Retention
  - Customer Expansion

Product Design Analytics

- What product features to include in a new product?
  - What price to charge?

- Conjoint Analysis
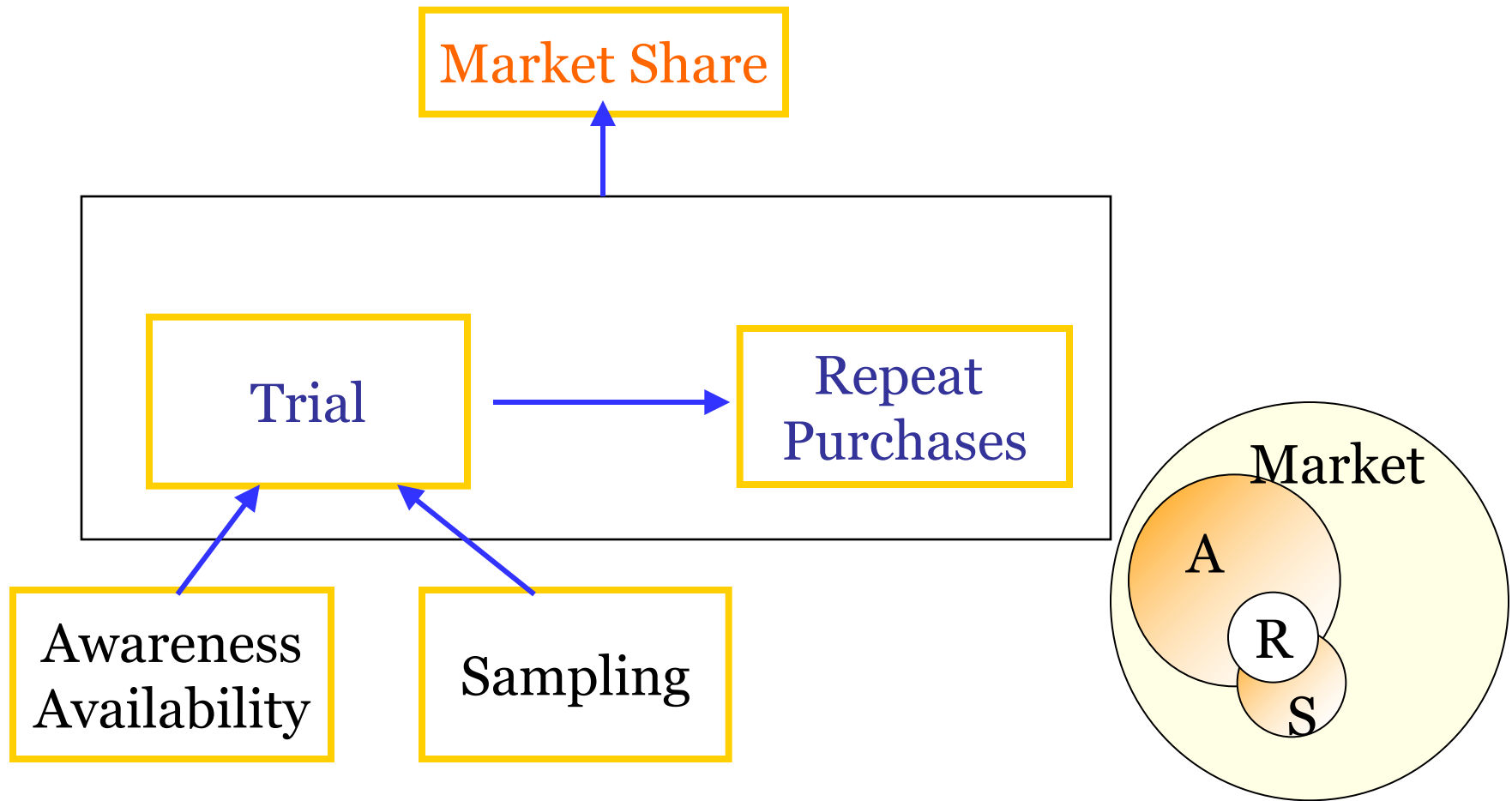 - Product Design
  - Product Line Design

Conjoint Part-Worth Plots
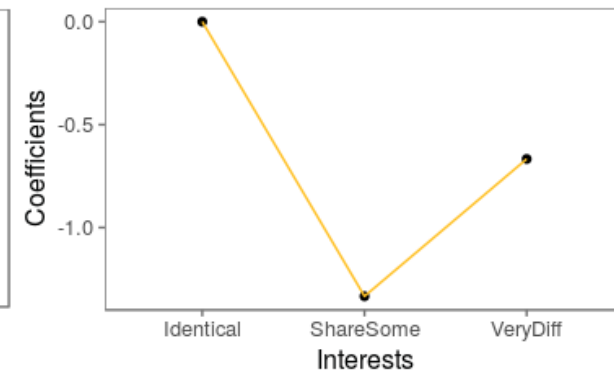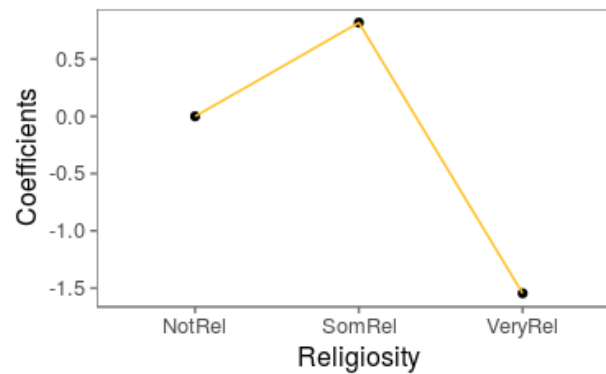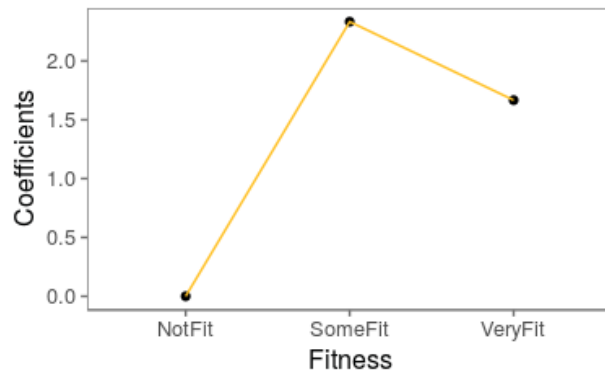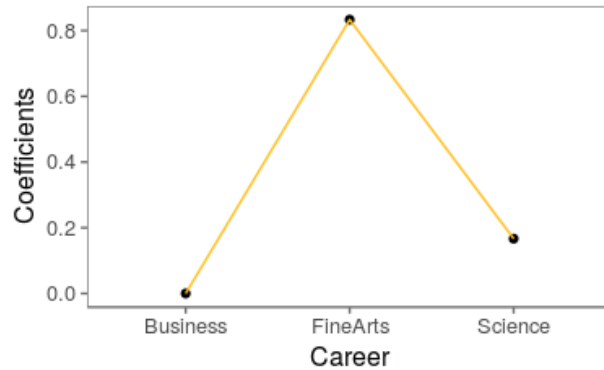
New Product Testing

- What would be the market share of the new product after launch?

- Market Testing
  - Simulated Test Markets

Market Testing: Simulated Test Markets

Market Share

Trial → Repeat Purchases

Awareness Availability
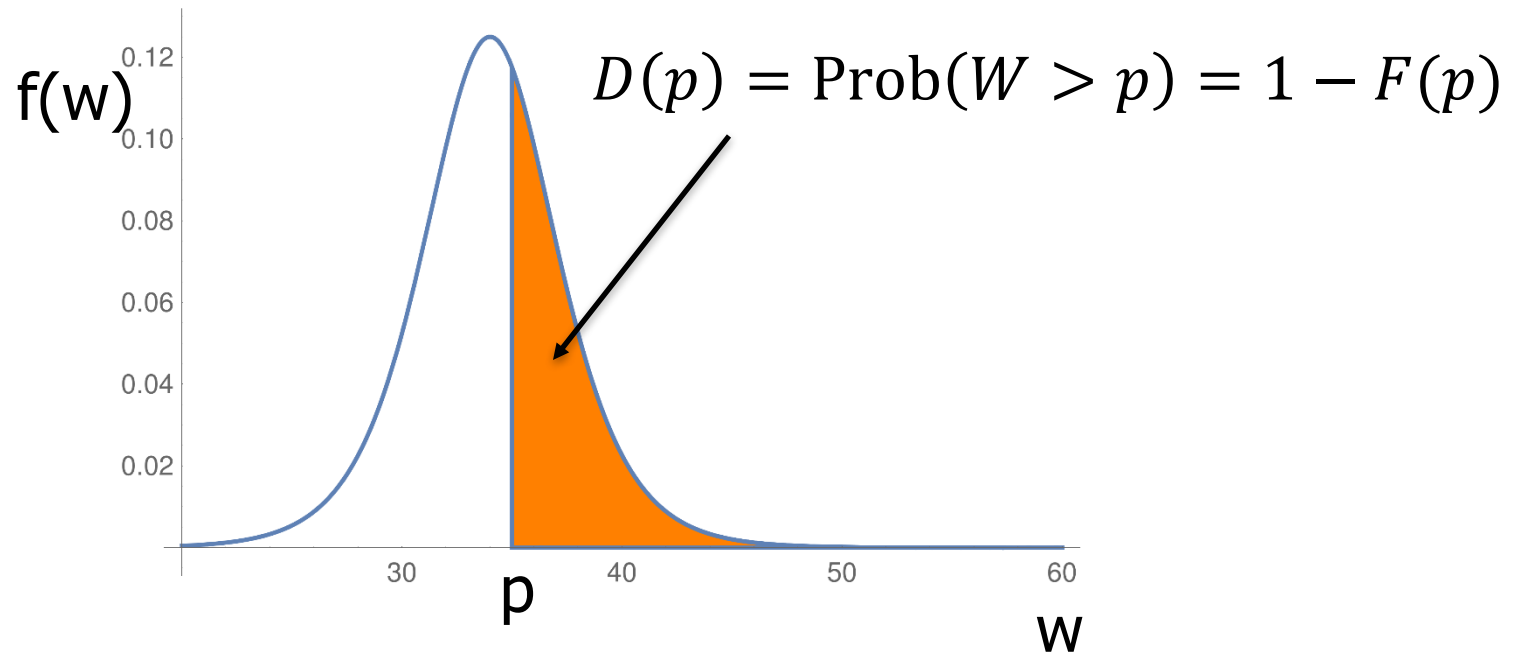
Sampling

Market

A

R

S

Pricing Analytics

- Modeling Willingness to Pay

- Modeling Demand Curves

- Optimal Pricing
  - B2B Bidding Data

WTP & Demand

- The demand at a given price *p* is given by the orange area

$$D(p) = \text{Prob}(W > p) = 1 - F(p)$$

f(w)

w

p

Advertising Analytics

- Companies spend money on advertising to impact sales

- Modeling the sales response function

- Computing the causal impact of advertising

Sales Promotions

- Sales promotions are short term inducements designed to have a direct impact on the buying behavior of end-users and trade

- Assessing the profitability of sales promotions
  - Modeling incremental sales

Course Requirements

- Quizzes
- Assignments
- Final Exam

Customer Analysis

Marketing Analytics

Professor Kamel Jedidi
Columbia University

Agenda

- Customer Analysis
  - Sources of value to consumers
  - Measuring value
  - Using value for marketing decisions

Understanding Customers

- Who are your customers?
  - Buyers vs. users
  - Whoever influences their decisions

- What do they want/need? How do they buy?
  - What do they value when buying products and services?

Sources of Value to Consumers

Psychological Value
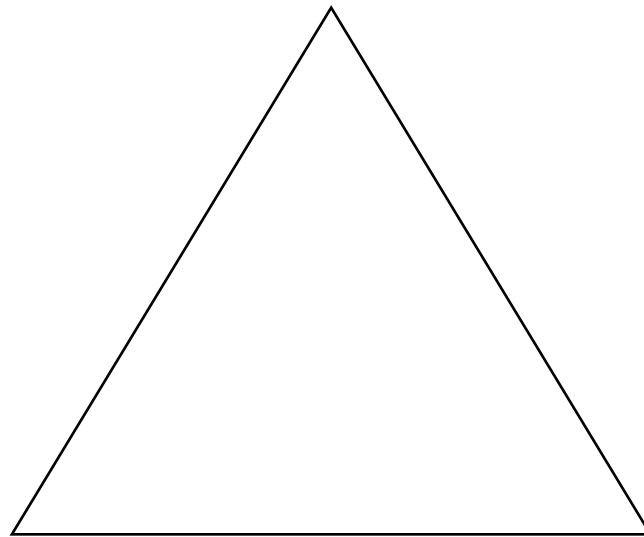
Economic Value   Functional Value

Economic Value to Customers (EVC)

- The total (life-cycle) cost savings from using a new product in place of a current product

- EVC = (Total ownership cost of existing product) – (Total ownership cost of new product)

EVC Example

The chart below shows how compact fluorescent bulbs can save you money:

(Based on 10,000 hours of usage)

	One 18-watt fluorescent bulb	Ten ordinary 75-watt bulbs
Purchase Price	$8*	$8
Electricity cost for 10,000 hours (at 14.7¢ per kilowatt-hour)	$26	$110
Total cost	$34	$118
Over the life of the compact fluorescent bulb, you could save $84.	**TOTAL SAVINGS: $84**	

*Price with Con Edison discount.

Determining the EVC:
An Example

- The XYZ pipe Co. is about to introduce a new kind of pipe made of synthetic materials
  - The primary use of the pipes is in underground irrigation and drainage systems
  - The new pipe is better than the currently available substitute, made by ABC Co.
  - It reduces the chance of leakage from 5% to 1%

- XYZ's pipe costs the company $40 per 100 ft.
  - All pipes are sold in 100 feet sections

Life-Cycle Cost of Using ABC Pipes during their 3 Year Life Span

- ABC pipes sell for $60 per 100 ft. section

- ABC's pipes have a 5% chance of leakage

- The labor and equipment rental cost for removing/replacing a leaked pipe is $200

- 20% of leaks cause flood damage

- Cost of flood damage varies by user:
    - a leak in an orange grove causes damage of $200
    - a leak in an avocado plantation causes damage of $400
    - A leak in a chemical factory can cost more than $5000

Summary of Information

	Substitute (ABC)	New Product (XYZ)
Price ($/100ft)	60	P
Life Span (years)	3	3
Leakage Probability	5%	1%
Flood Damage Probability (per leak)	20%	20%

What is the maximum amount P that an orange grower would be willing to pay for a 100 ft section of the XYZ pipe?

Life Cycle Cost for an Orange Farm that Requires 100 ABC Pipes

	Substitute (ABC)
Cost of Pipes	100 (pipes) x $60 per pipe=$6000
Expected Replacement Costs	5 (failed pipes) x $60 per failed pipe=$300
Expected Labor and Equipment Costs for Failed pipes	5 (failed pipes) x 200 $ per failed pipe
Expected Flood Damage Costs	5 (pipes) x 20/100 x $200 = $200
Expected Life Cycle Costs	$7,500

Life Cycle Costs for an Orange Farm that Requires 100 XYZ Pipes

	New Pipe (XYZ)
Cost of Pipes	100 (pipes) x $P per pipe=$100P
Expected Replacement Costs	1 (failed pipes) x $P per failed pipe=$P
Expected Labor and Equipment Costs for Failed pipes	1 (failed pipe) x 200 $ per failed pipe
Expected Flood Damage Costs	1 (pipe) x 20/100 x $200 = $40
Expected Life Cycle Costs	101P+$240

$$101 \, P + \$240 = \$7500 \quad \rightarrow \quad P=\$71.88$$

Issues in Using EVC

- Customer differences

- Convincing customers

- Other (fuzzy, qualitative) benefits ignored

- BUT, EVC can be useful in
  - Pricing
  - Segmentation
  - New product introduction

Perceived Value

- The value customers attach to different offers based on what they believe they are getting for what they are giving up

- How can you measure perceived value?

Mini-Case: Designing a Rock Climbing Harness
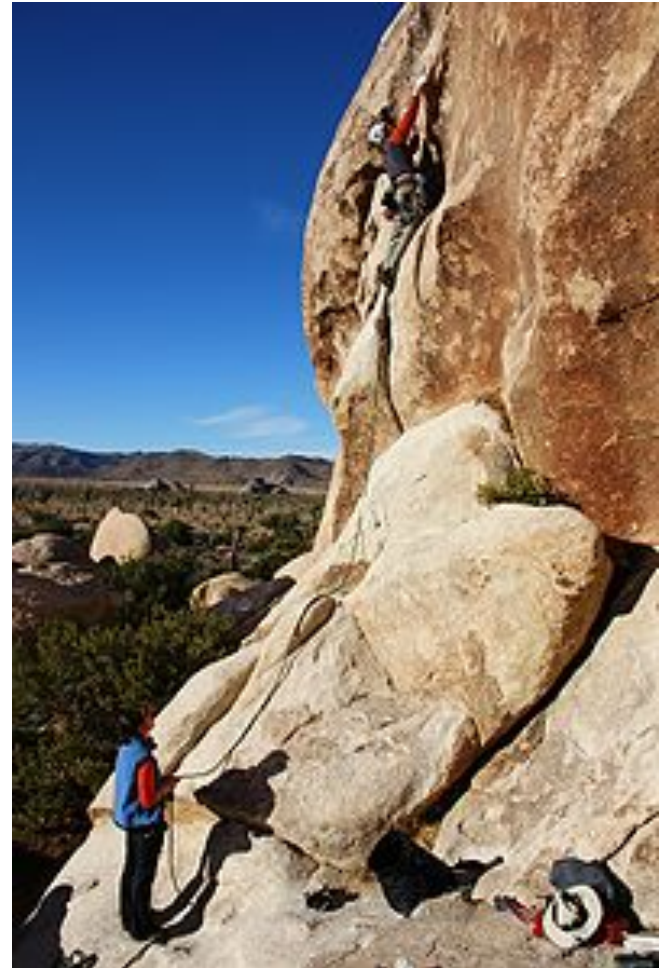
Design Task

The Rock Climbing harness redesign team of Camp USA has been asked to design an improved Rock Climbing Harness made of webbing with buckles and gear loops that will successfully compete with Mammat's and Black Diamond's Harnesses at a price point that represents value to customers.
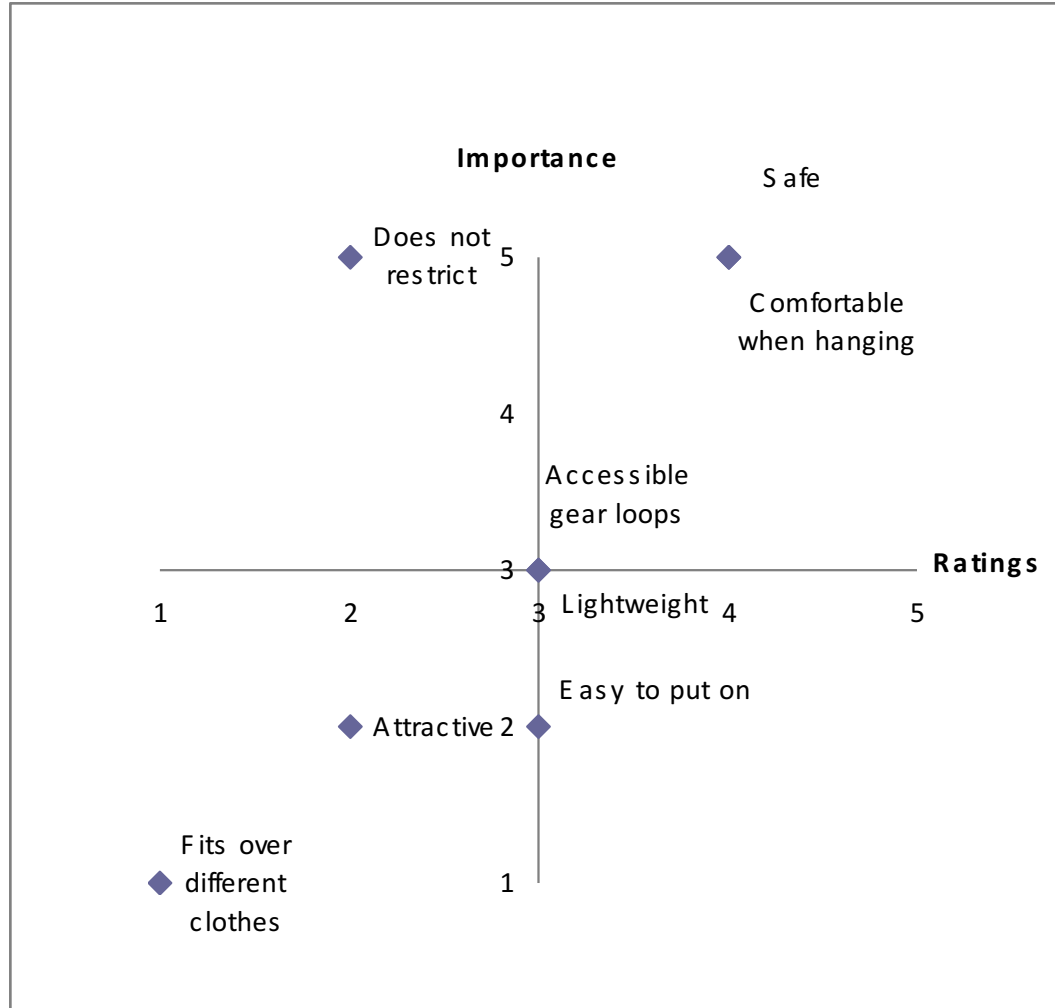
What Do Mountain Climbers Value in a Harness?

Attribute	Importance
Easy to put on	2
Comfortable when hanging	5
Fits over different clothes	1
Accessible gear loops	3
Does not restrict movement	5
Lightweight	3
Safe	5
Attractive	2

How Well Does Camp USA Fare on these Attributes?

Attribute	Importance	Camp USA
Easy to put on	2	3
Comfortable when hanging	5	4
Fits over different clothes	1	1
Accessible gear loops	3	3
Does not restrict movement	5	2
Lightweight	3	3
Safe	5	4
Attractive	2	2

Quadrant Analysis—Camp USA

Importance

Safe

Does not restrict   5

Comfortable when hanging

4

Accessible gear loops

3   Ratings

1   2   3   Lightweight   4   5

Easy to put on

Attractive 2

Fits over different clothes

1

How Does Camp USA Compare to Competitors?

Attribute	Importance	Camp USA	Mammut	Black Diamond
Easy to put on	2	3	3	4
Comfortable when hanging	5	4	3	3
Fits over different clothes	1	1	1	5
Accessible gear loops	3	3	3	3
Does not restrict movement	5	2	2	3
Lightweight	3	3	2	5
Safe	5	4	2	5
Attractive	2	2	2	5

Overall Brand Preference

Attribute	Importance	Camp USA	Mammut	Black Diamond
Easy to put on	2	3	3	4
Comfortable when hanging	5	4	3	3
Fits over different clothes	1	1	1	5
Accessible gear loops	3	3	3	3
Does not restrict movement	5	2	2	3
Lightweight	3	3	2	5
Safe	5	4	2	5
Attractive	2	2	2	5
Weighted Average		3.04	2.35	3.92

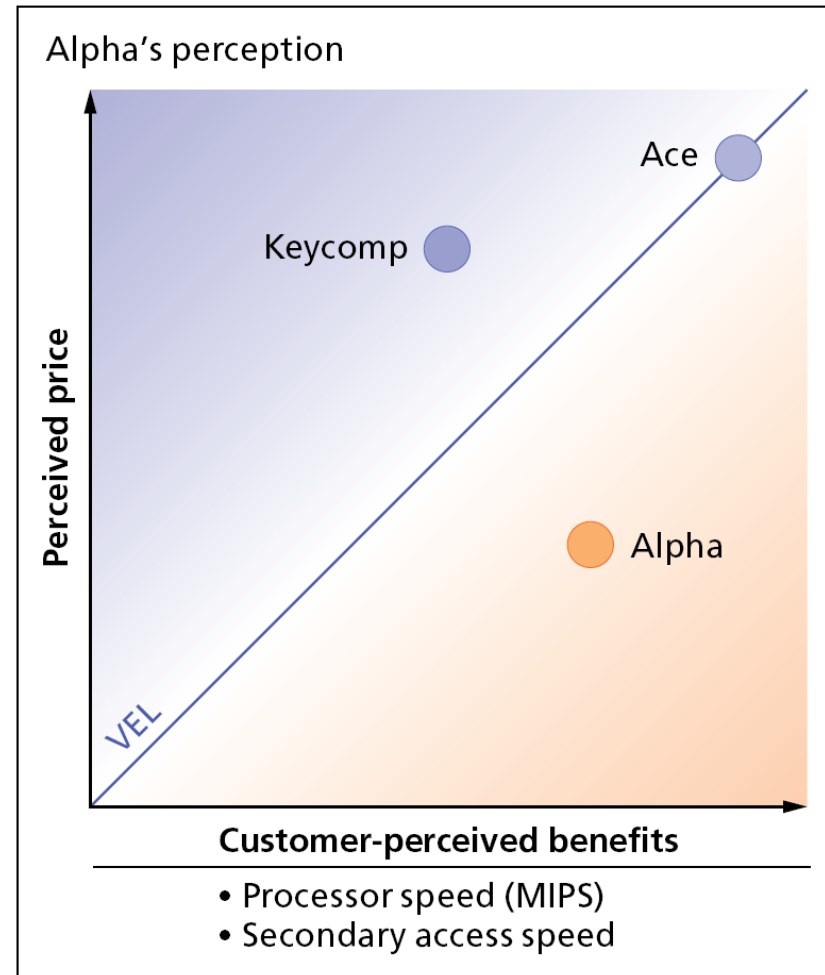Preference for Camp USA=(2*3 + 5*4 + 1*1 + … + 2*2)/26=3.04

Value Map
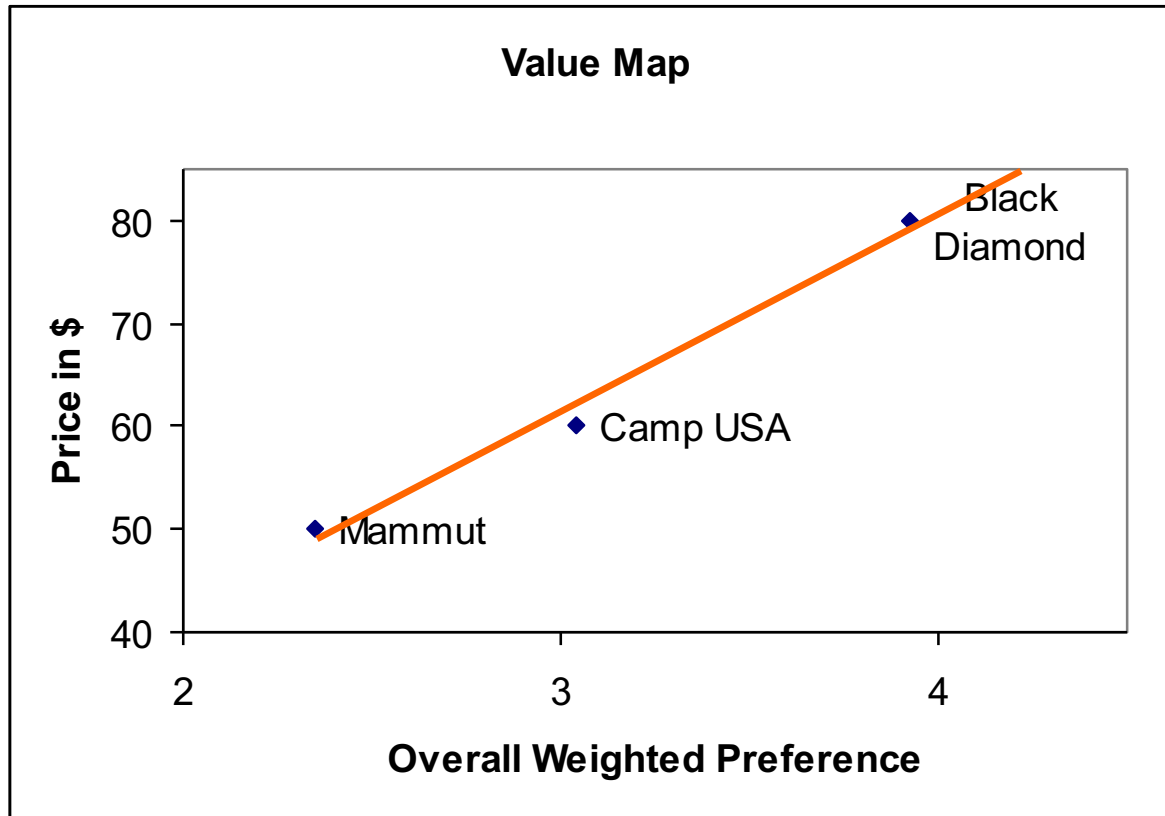
Value Map

Mini-Case: The Alpha Minicomputer Company

Source:
McKinsey Quarterly 1997,
 Number 1

Minicomputer value map

Alpha's perception

Ace

Keycomp

Alpha

VEL

Perceived price

Customer-perceived benefits
- Processor speed (MIPS)
- Secondary access speed

Value Map: The Alpha Minicomputer Company

Source:
McKinsey Quarterly 1997,
 Number 1

Exhibit 4

Minicomputer value map
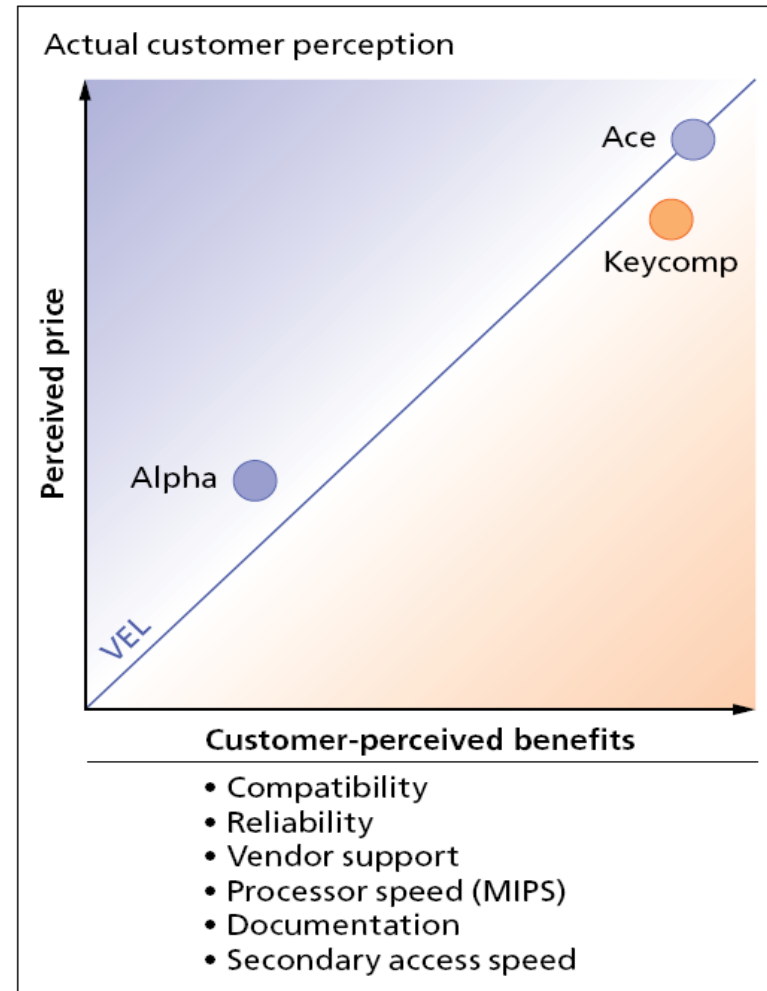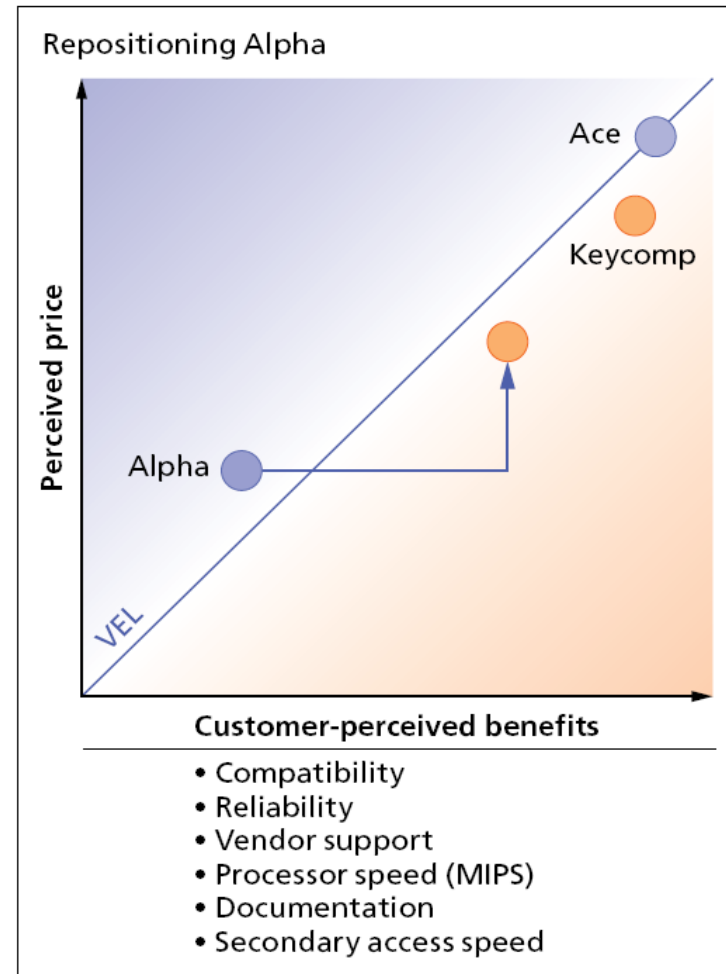
Value Map: The Alpha Minicomputer Company

Source:
McKinsey Quarterly 1997,
 Number 1

Minicomputer value map

Summary

- Customer analysis involves understanding what customers want and how they value the competitive offerings
- Three sources of values:
    - Psychological
    - Functional
    - Economic
- Sustained competitive advantage is the result of creating and delivering customer value either better or more efficiently than competitors