

CRM Analytics for Telecommunications

The WAR Framework

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Contents

- The Telecommunications Industry Market WAR
- The WAR Framework Core Concepts
- Data Mining Techniques X WAR Models

The Telecom Market WAR

Introduction



The Telecom Industry Market WAR

The Three Major Battles

The Voice Battle

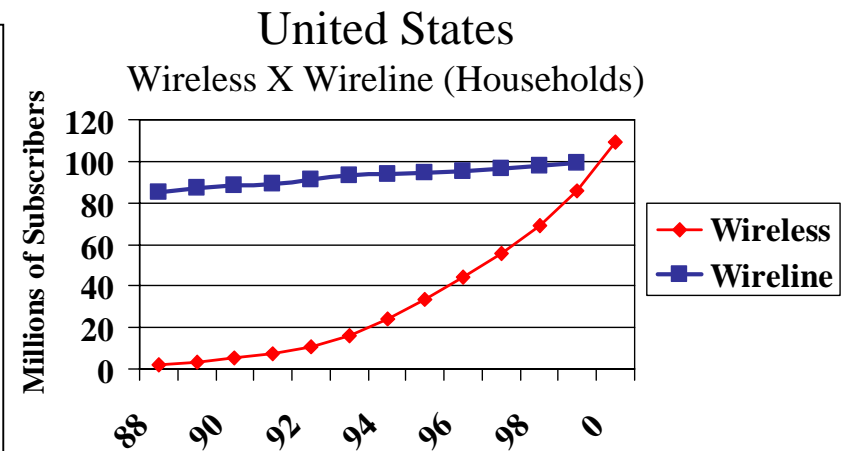
- Wireless Expansion and Evolution Globally and Wireline Losing Pre-eminence Globally

• The Message Battle

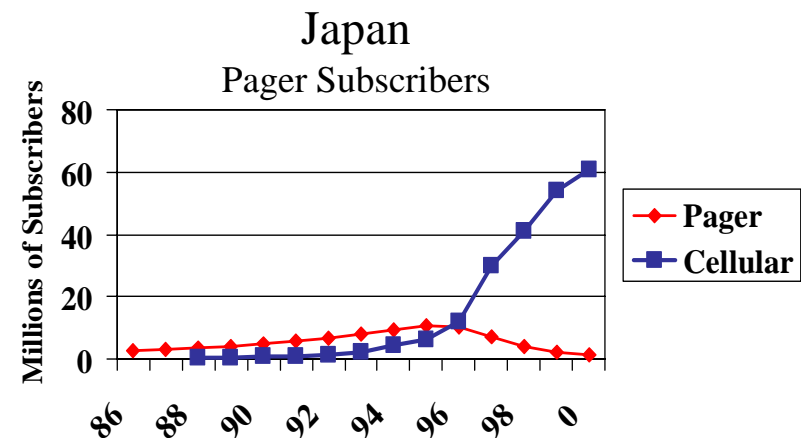
- The Pager Companies have been losing many customers segments for Cellular/PCS companies globally.

• The Data Battle

- Overlapping between Voice and Data Battles (IP Voice)



Source: FCC



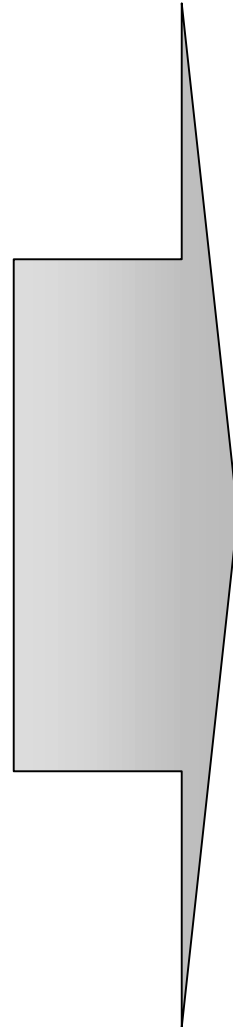
Source: Telecom Council Report



Wireless Marketing WAR

The Romantic Period is Over...

- Mass Acquisition
- No Retention Emphasis
- Bundling Basic Telephone/Voice Functions



- Predatory & Replication Acquisitions
- Strong Retention Emphasis
- SMS/Data Based Value Added Services
 - ecoupons, Matching Maker
 - Commute Data Package
 - Positioning Service

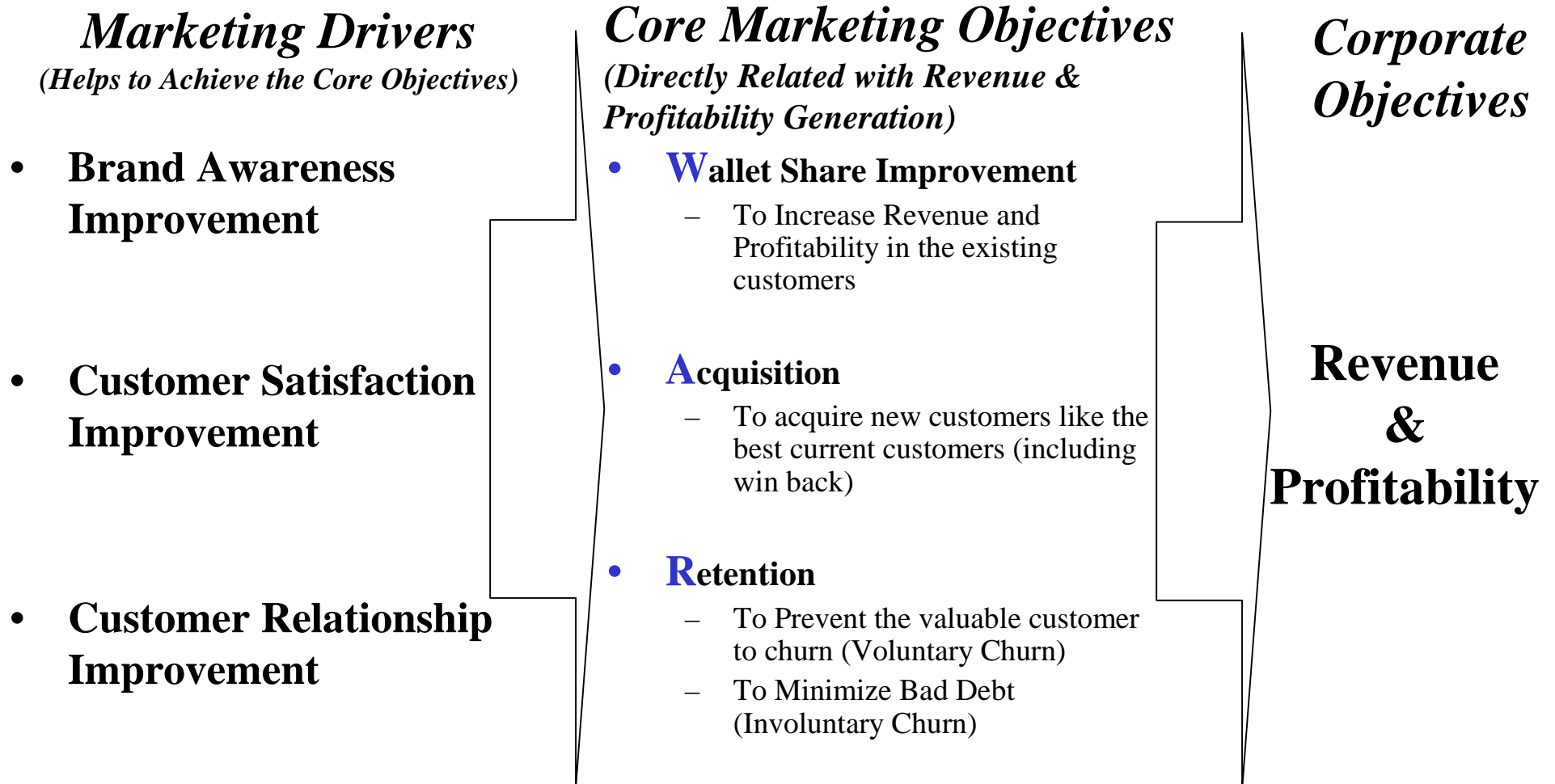
The WAR Framework

Core Concepts



The IBM WAR Framework

1. Three Core Marketing Objectives

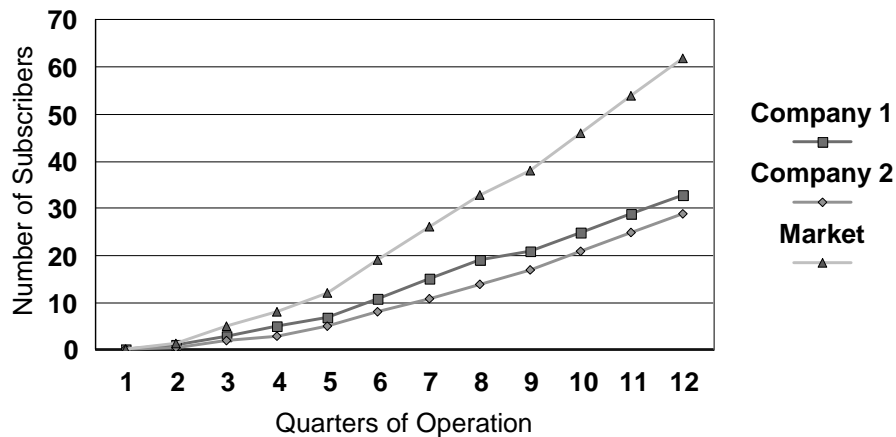


The WAR Framework Core Concepts

2. WAR Dynamic Balance

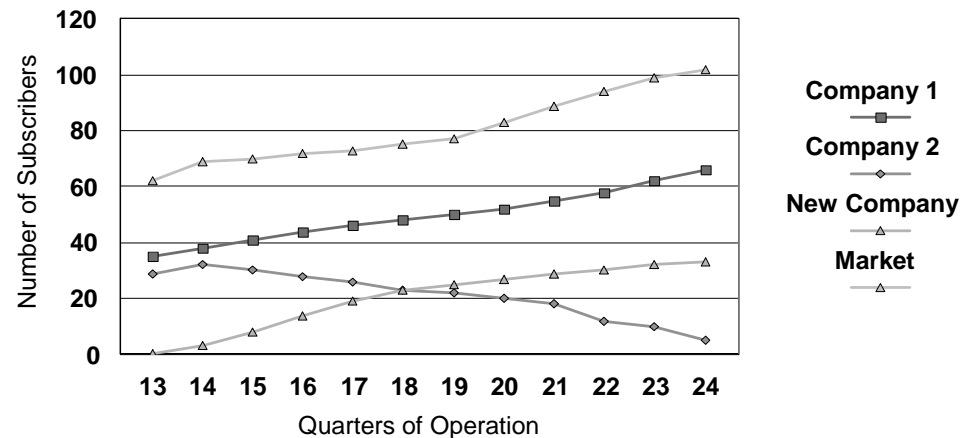
- WAR Dynamic Balance
 - The balance between the three core marketing objectives (WAR) changes for different market situations and evolution stages of the Telecom Company.

The Expansion Phase



Conceptual

The Maturity Phase



Conceptual

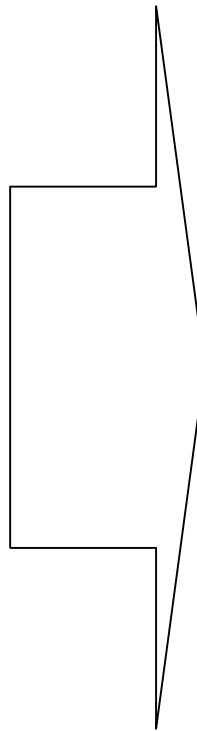


The WAR Framework Core Concepts

3. Business Driven Data Mining Approach

- ***Experimental Approach***

- One of Kind
- Problem Oriented
- Cross Industry



- ***Business Approach***

- Mass Customization
- Business Objective Oriented
- Industry Specialized

The WAR Framework Core Concepts

4. Data Mining Models & Key Performance Indicators Framework

- WAR Data Mining Models
 - The WAR framework permits the mapping between the data mining models and the each core marketing objectives in the Telecommunications Industry.
- WAR Key Performance Indicators
 - The WAR framework permits to create a family of dedicated indicators to measure the performance of each core marketing objective in the Telecommunications Industry.

The WAR Framework Core Concepts

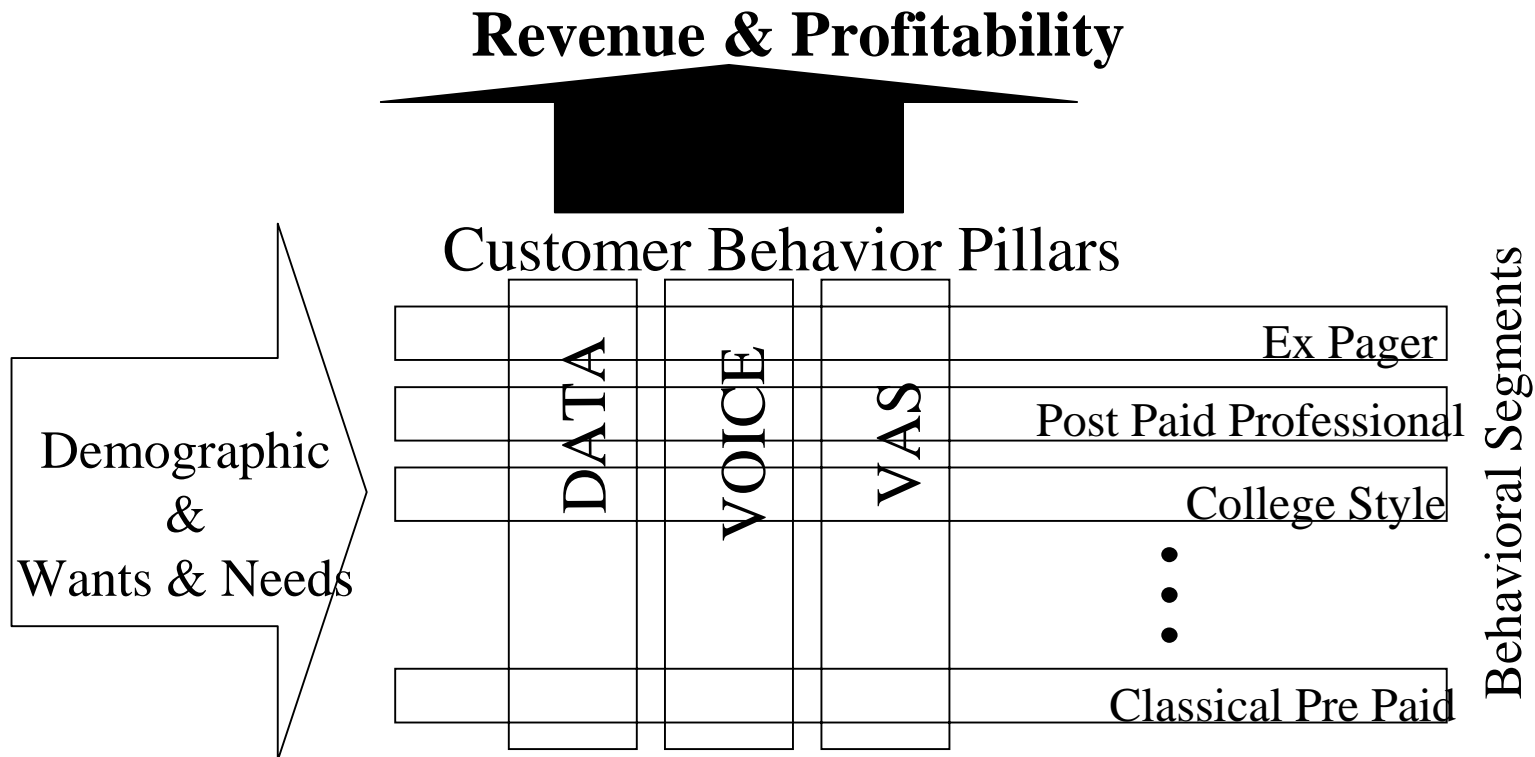
5. WAR Data Mining Models

- **Basic Models** (*Supports all the the others models*)
 - ✓ Extended Behavioral Segmentation Model (*Based in Voice, Data and VAS behaviors*)
 - Customer Value Score (*The substitute for Life Time Value in Telecom*)
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 - What if Analysis & Optimization Models
- **Wallet Share Improvement Models**
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Extended Behavior Segmentation Model

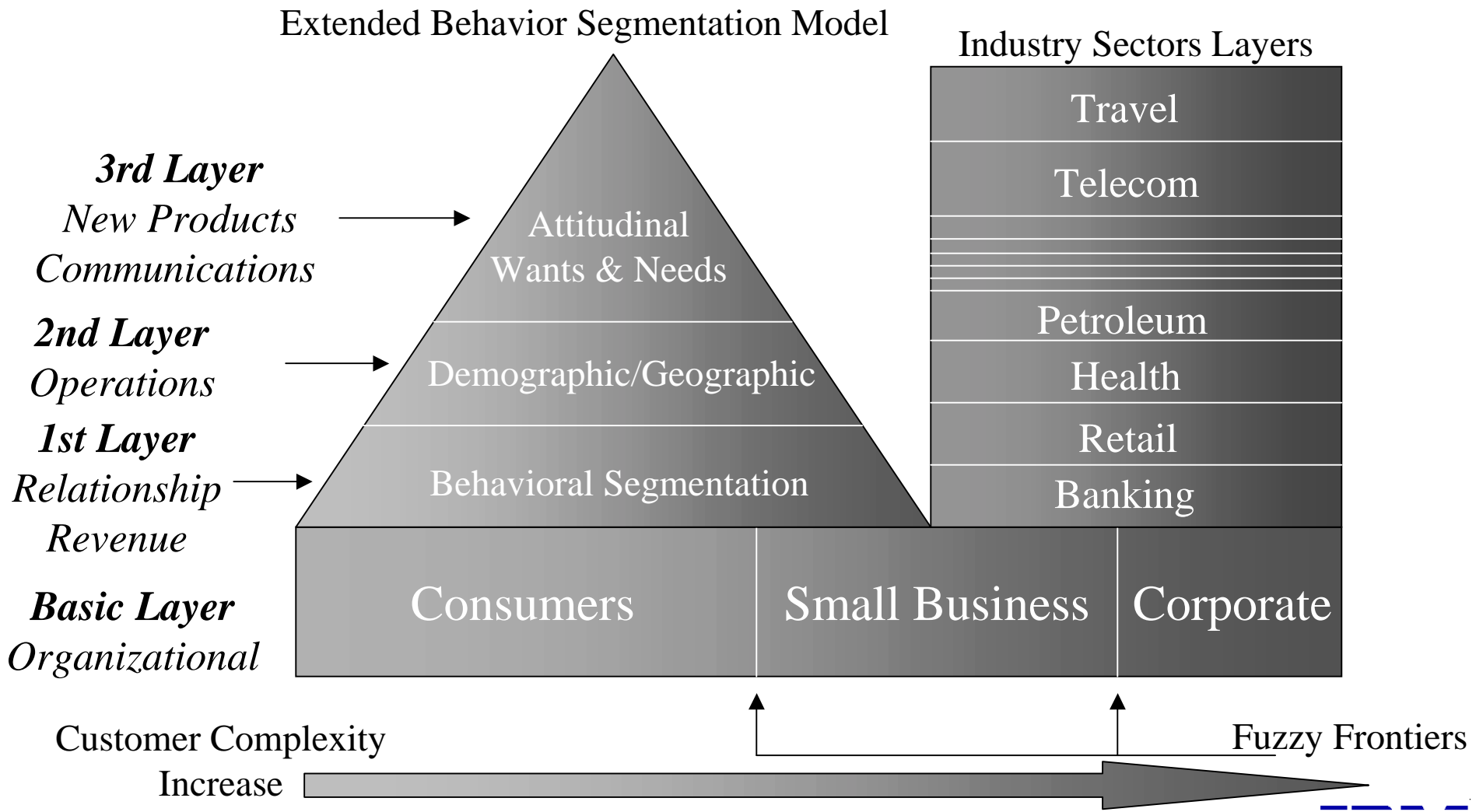
Why Behavioral Segmentation as a first layer?

- Behavioral Segmentation Main Motivations
 - Behavior has a direct correlation with Corporate Revenue and Profitability;
 - The customer's behavior in **PAID** services & products describes who is the customer.



Extended Behavior Segmentation Model

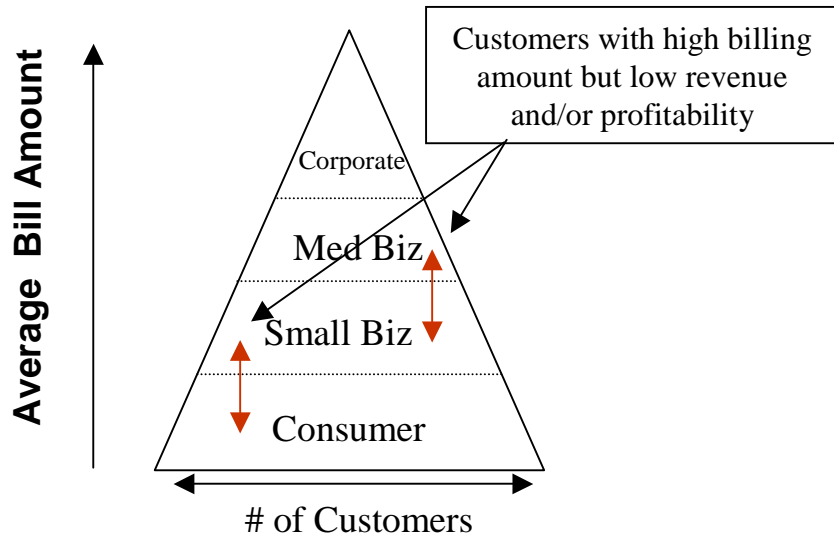
General Schema



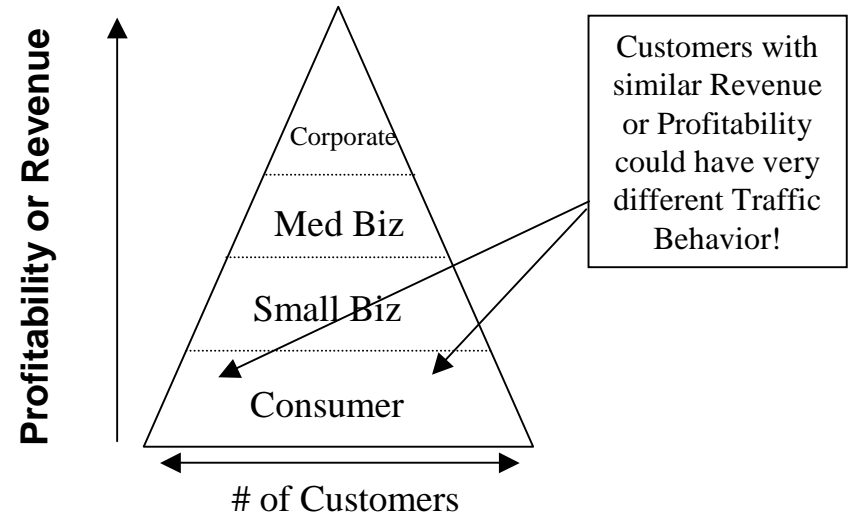
The IBM WAR Analytical Models

Why Behavior Segmentation?

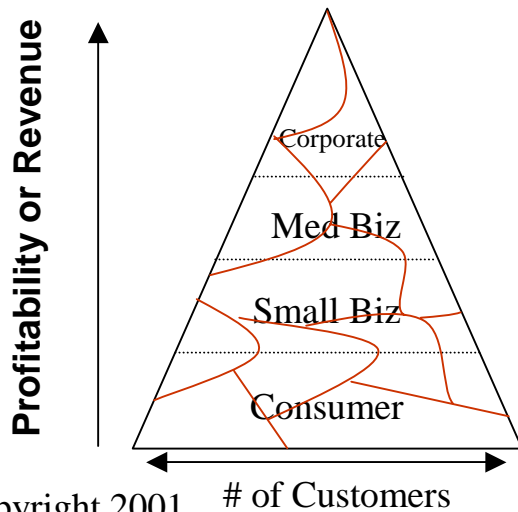
Issue with Month Billing Based Segmentations



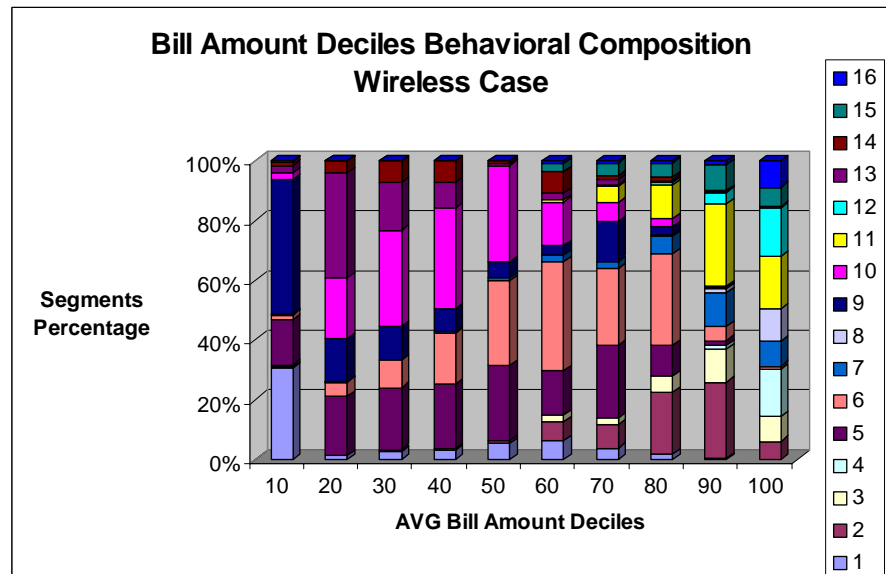
Issue with Rev/Profit Based Segmentations



What Behavior Segmentation is Really Doing...



Bill Amount Deciles Behavioral Composition
Wireless Case



Extended Behavior Segmentation Model

Why Behavioral Segmentation as a first layer?

- Demographic
 - Useless without correlation with the customer behavior;
 - Demographic data is many times not available or reliable.
- Wants & Needs
 - Useless without correlation with the customer behavior;
 - Based in a market survey about subjective concepts and ideas;
 - Very difficult to extend for the complete population;
 - Many times the results are biased by the questionnaire.
- Behavioral Segmentation
 - Based in reliable data from CDR and Billing System
 - Immediately expandable for the complete customer base.

The WAR Framework Core Concepts

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Customer Valuation

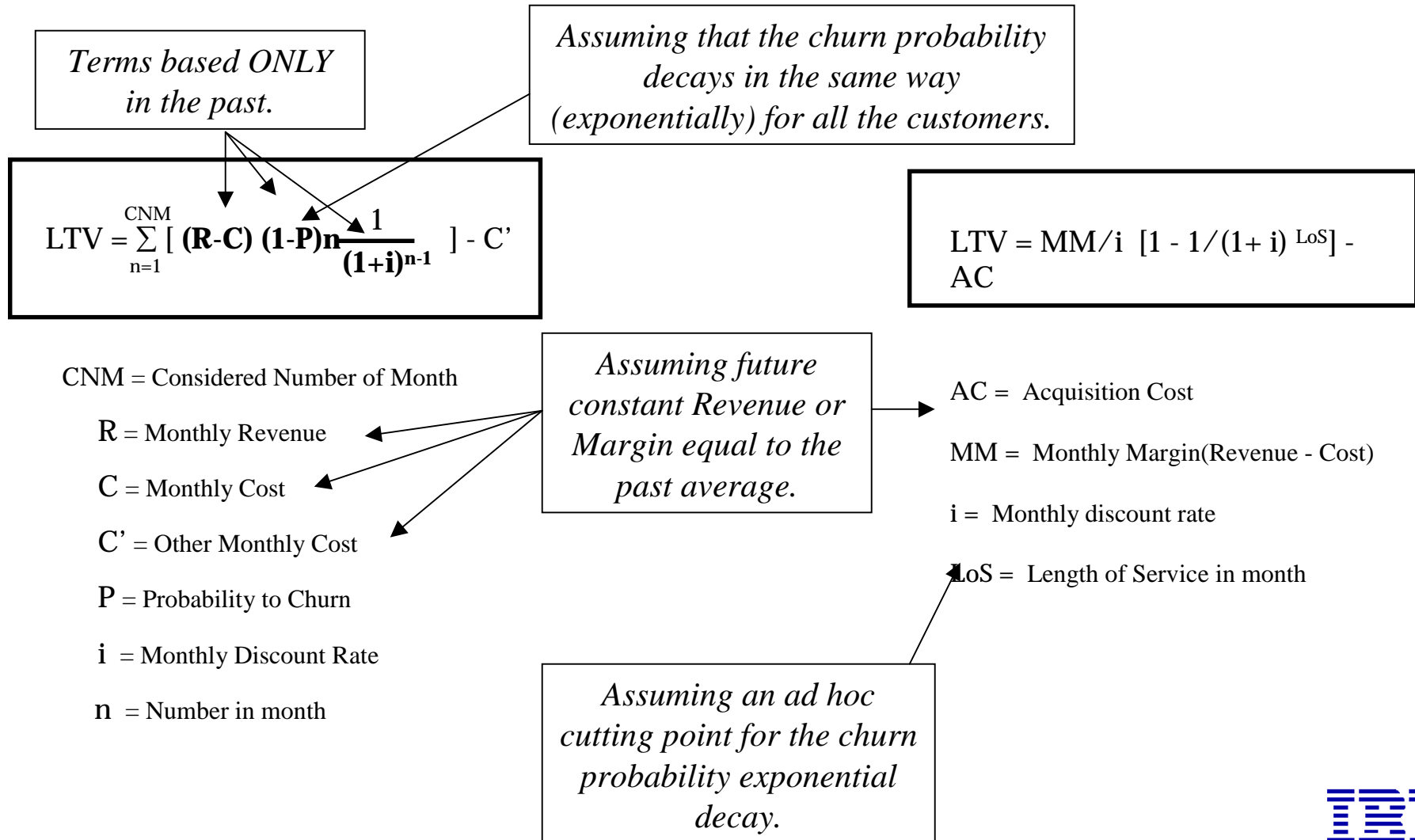
Classical Measures

- Revenue
 - High revenue associated with low profitability is very common.
 - LD users in Cellular (interconnection costs)
 - Business Accounts in General
- Profitability
 - High profitability with low revenue is also common
- Life Time Value
 - Same problems as revenue and profitability associated with no reliability related with the cash flow and churn forecasts



Customer Valuation

Life Time Value Discussion



Customer Value Score

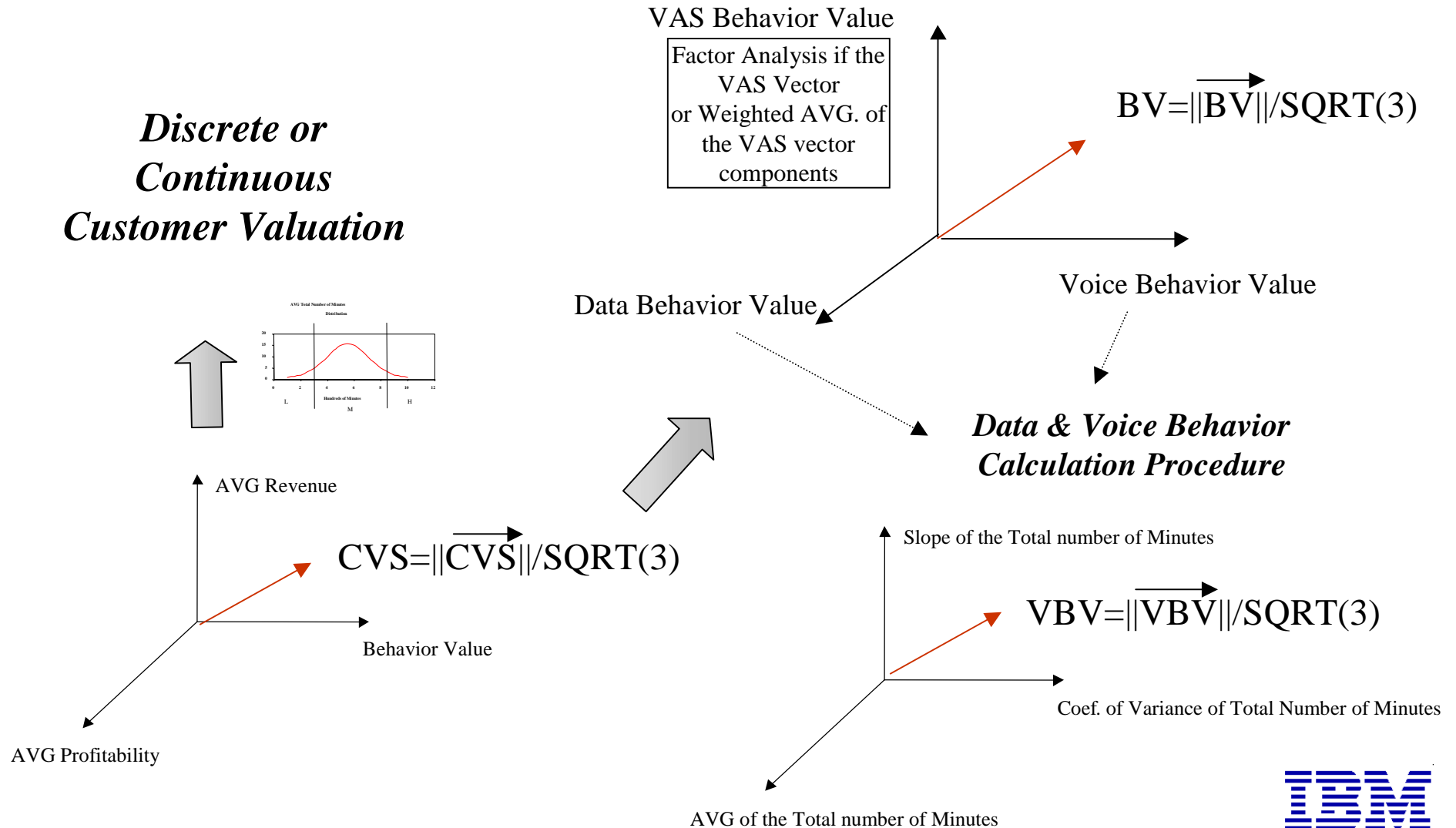
Motivation & Definition

- Motivation
 - We need a **MARKETING** measure not a **FINANCIAL** measure
- CVS Definition
 - Combination of variables representing different customer valuation dimensions.
 - Revenue (Actual or Bill will produce different results)
 - Profitability
 - Behavior Value
 - VAS Behavior Value
 - Voice Behavior Value
 - Data Behavior Value

Customer Value Score

Mathematical Definition

*Discrete or
Continuous
Customer Valuation*



The WAR Framework Core Concepts

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Telecom Econometric Model

Introduction

- Econometric Model for a Wireless Company
- A, B,C and D can be estimated with historical data

$$\begin{pmatrix} \text{ARPU} \\ \text{No_Churners} \\ \text{No_New_Customers} \end{pmatrix}_{t+1} = A \cdot \begin{pmatrix} \text{ARPU} \\ \text{Churners} \\ \text{No_New_Customers} \end{pmatrix}_t + B \cdot \begin{bmatrix} \text{Tariff_per_Sec} \\ \text{Sales_Incentive} \\ \text{T_GRP} \\ \text{Marketing_Inv} \\ \text{Sales_Inv} \\ \text{T_Network} \end{bmatrix}_t + C \cdot \begin{pmatrix} \text{Competitors_AVG_Tariff} \\ \text{Competitors_AVG_Subsidy} \\ \text{Competitor_Total_GRP} \end{pmatrix}_t + D \cdot \begin{bmatrix} \text{Inflation_Rate} \\ \text{Interest_Rate} \\ \text{Employment_Index} \\ \text{KOSPI} \\ \text{Dollar - Exchange_Rate} \end{bmatrix}_t$$

State Variables

Control Variables

Exogenous Variables

The WAR Framework Core Concepts

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The IBM WAR Framework KPIs

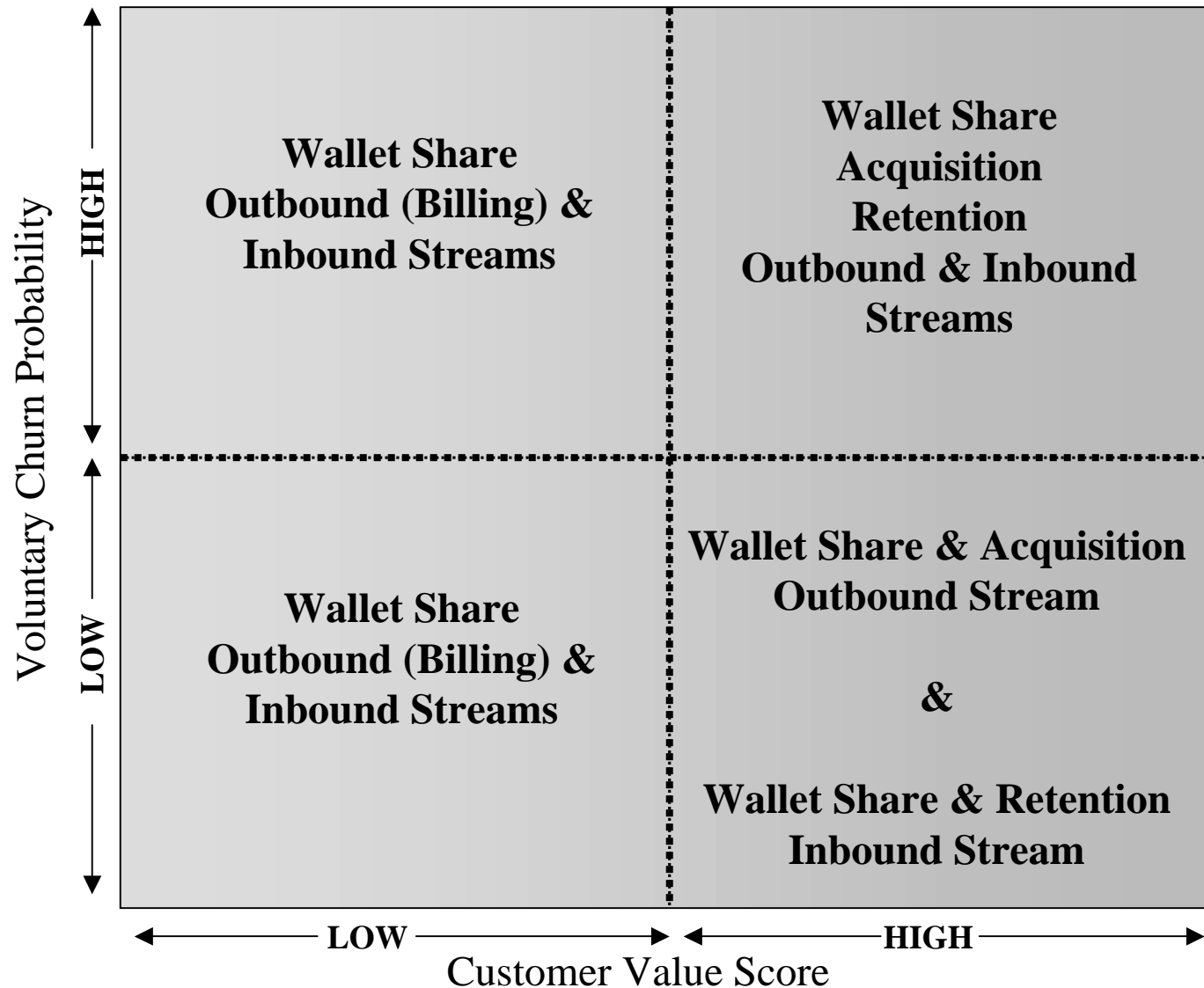
Therefore, the WAR Framework is a natural form to organize the key performance indicators, to support the tracking and control of the three core marketing objectives.

- **Wallet Share Improvement**
 - **VAS Behavior Value**
 - *To valuate the customer VAS behavior*
 - **Voice Behavior Value**
 - *To valuate the customer Voice behavior*
 - **Data Behavior Value**
 - *To valuate the customer Data behavior*
 - **Customer Complexity**
 - *Measure how complex is the customer in the Voice, Data and VAS perspectives*
 - **Customer Value Score**
 - *Statistical combination of Customer Complexity, Revenue and Margin*
 - **Customer Margin Proxies**
 - **STEM Value**
 - *Short Term Expected Margin*

- **Retention Indexes**
 - **Voluntary Churn Probability**
 - **Involuntary Churn Probabilities**
 - **Vulnerability Index**
 - *To measure the customer vulnerability for voluntary churn in incumbents.*
 - **Churn Shield Index**
 - *To measure the customer satisfaction in the major voluntary churn topics*
- **Acquisition**
 - **Replication Index**
 - **Predatory Index**
- **General Indexes**
 - **Call Quality Index**
 - **Customer Sphere of Influence**
 - **Intra-Day Calling Behavior**
 - **Intra-Week Calling Behavior**
 - **Mobility Indexes (for wireless)**

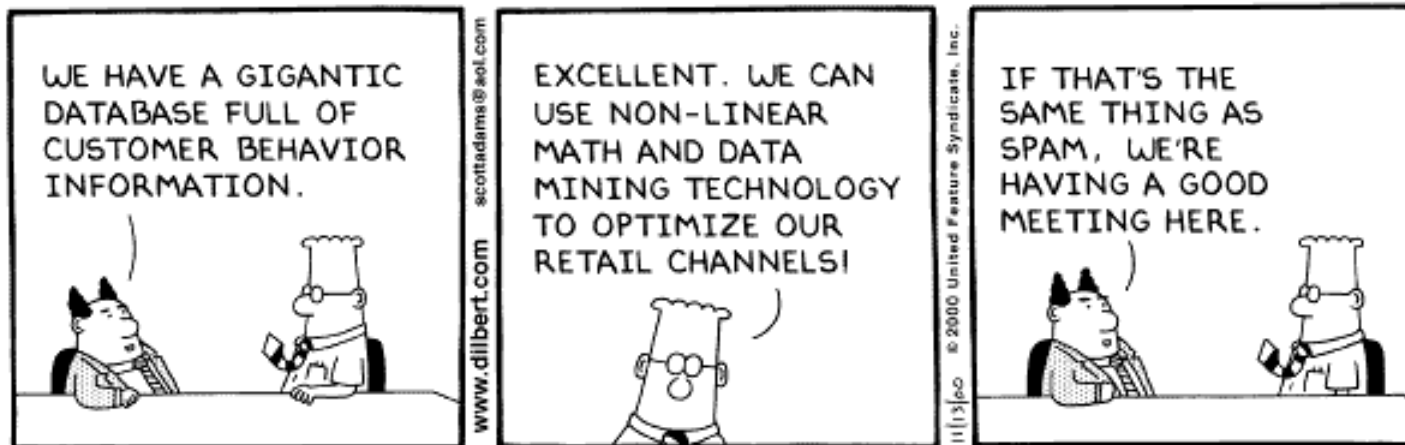
The WAR Framework Core Concepts

7. WAR Game Board



The WAR Framework Core Concepts

9. WAR Campaign Streams & WAR Loyalty Program



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The WAR Framework Core Concepts

9. WAR Campaign Streams

- **Wallet Share Improvement**
 - **Outbound Stream**
 - Up selling and Cross Selling Segmented Campaigns Streams
 - Trigger Based campaigns
 - Campaigns using Billing Inserts
 - **Inbound Stream**
 - Segmented Up Selling and Cross Selling Approach
- **Acquisition**
 - **Outbound Stream**
 - New Users Acquisition Campaigns
 - Predatory Acquisition Campaigns
 - Replication Campaigns



The WAR Framework Core Concepts

9. WAR Campaign Streams

Critical Care Approach

•Preventive Treatment

- Symptom
 - Low Churn Shield Index
- Typical Treatments
 - Actions to improve satisfaction in specific churn related issues.
 - Reward Program to increase retention
 - Branding Programs to increase affinity.
 - Wallet Share Improvement Programs
- Typical Target
 - ALL
- Efficiency Metric
 - Churn Shield Index

•Urgent Treatment

- Symptom
 - High Churn Probability
- Typical Treatments
 - Segmented Retention Campaigns
- Typical Target
 - Customer in valuable segments with high churn probability and high customer value
- Efficiency Metric
 - Campaign efficiency measure
 - Churn Probability

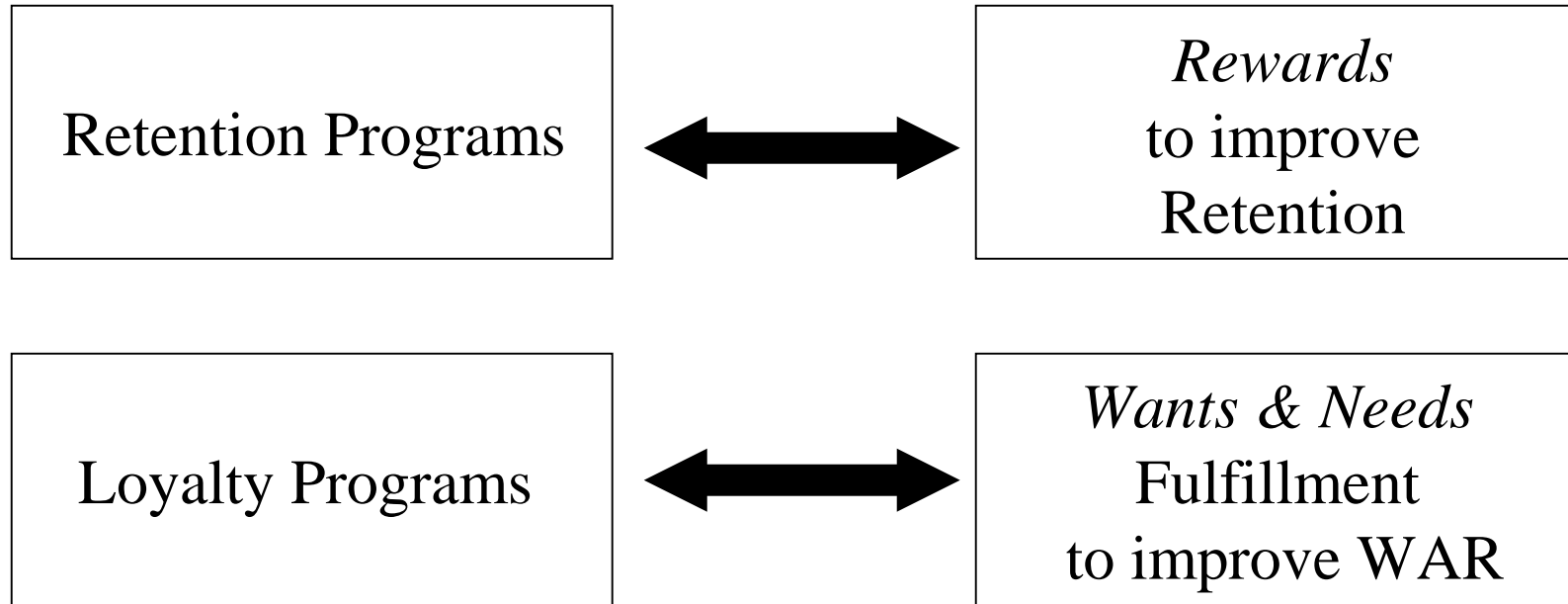
•Emergency Treatment

- Symptom
 - Churn Triggers
 - Eminent Churn
- Typical Treatments
 - Emergency Response Teams
 - Problem Solving Teams
 - Winback Teams
- Typical Target
 - High Valuable Customers
- Efficiency Metric
 - Inbound Call Churn Rate



The WAR Framework Core Concepts

9. WAR Campaign Streams & WAR Loyalty Program



CONCEPTUAL

The WAR Framework Core Concepts

9. WAR Loyalty Program: Critical Care Model

Preventive Care Layer

Customized
Wants & Needs
Based
Loyalty
Program
+
General Reward
Programs

*If the
Preventive
care failed
or was not
applied.*

Urgent Care Layer

Customized
Outbound
Treatment
for
Top N% of the
HH Customers

*If the
Urgent care
failed or
was not
applied.*

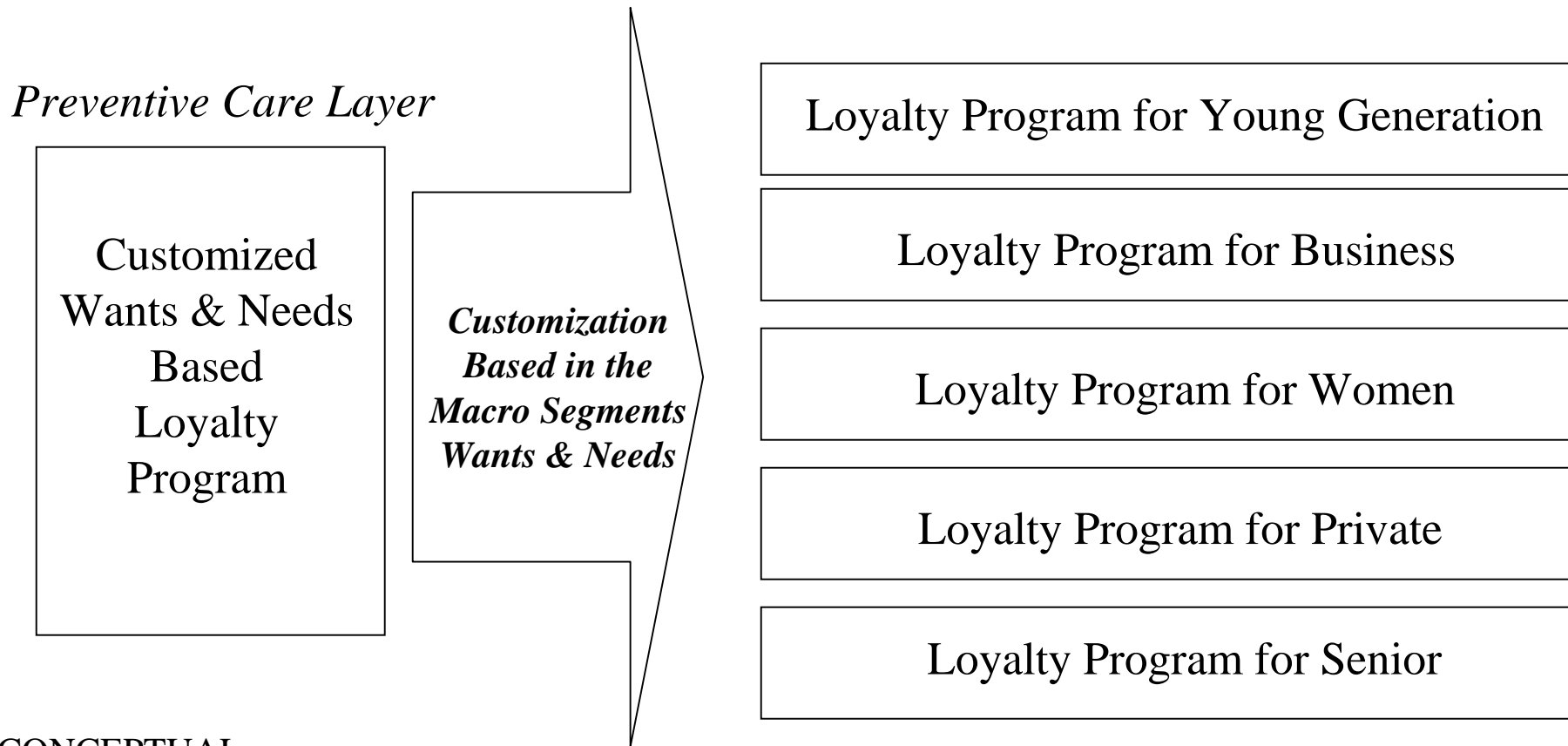
Emergency Care Layer

Customized
Inbound
Treatment
For
High CVS
Customer

CONCEPTUAL

The WAR Framework Core Concepts

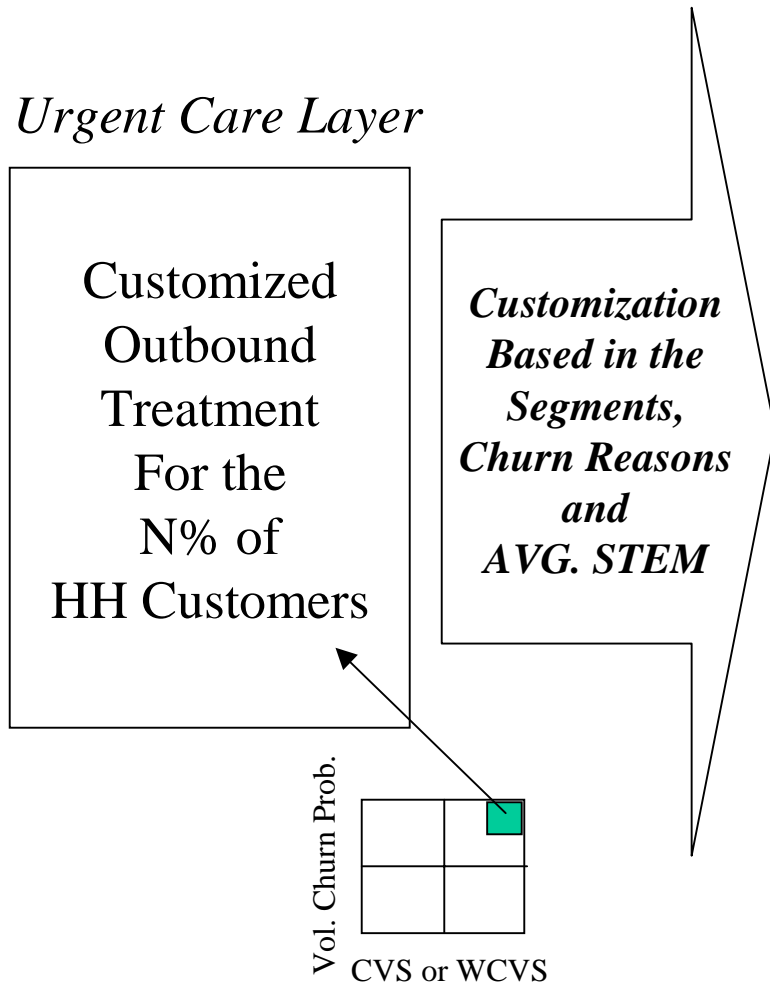
9. WAR Loyalty Program: Preventive Care



CONCEPTUAL

The WAR Framework Core Concepts

9. WAR Loyalty Program: Urgent Care



Treatment Matrix

Segment id	Vol. Churn Reason	STEM Based Treatment
Young Generation	Price per Min	Treatment A1
Young Generation	Handset	Treatment A2
Friends & Family	Min. Price	Treatment B1
Women	Brand	Treatment C
Business	Customer Service	Treatment D1
Business	Call Quality	Treatment D2

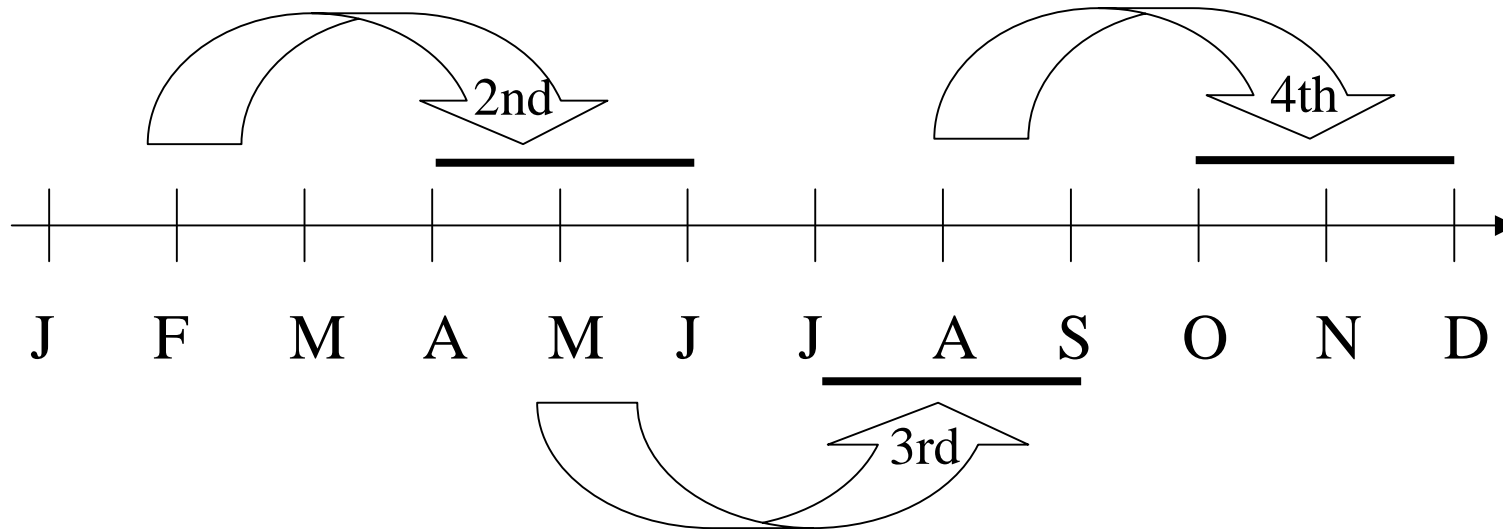
Post Paid Case Analysis

Treatment Matrix

Voluntary Churn Prediction Model (RG)

Characteristics & Lift Chart

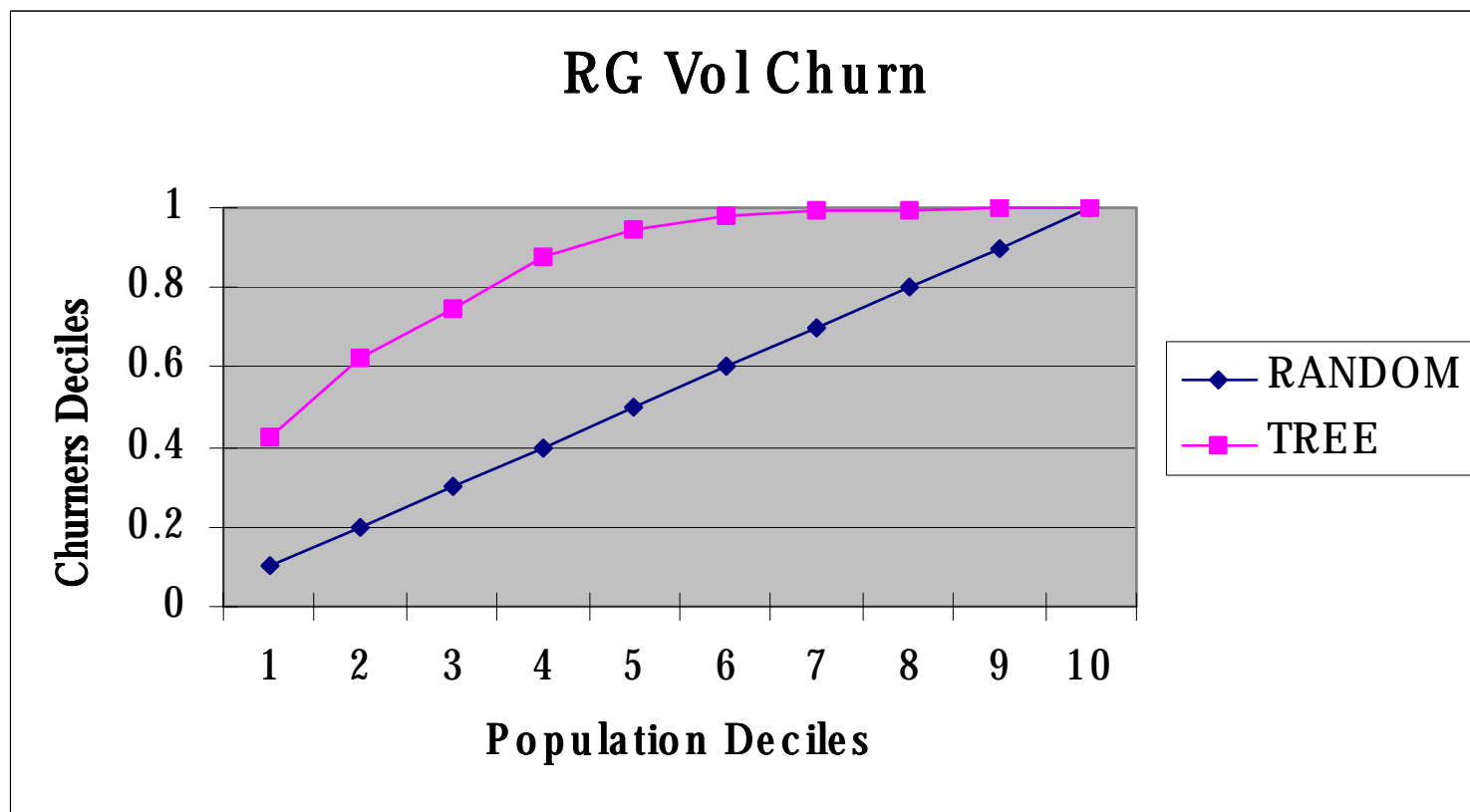
- Quarterly Model Structure



Voluntary Churn Prediction Model (RG)

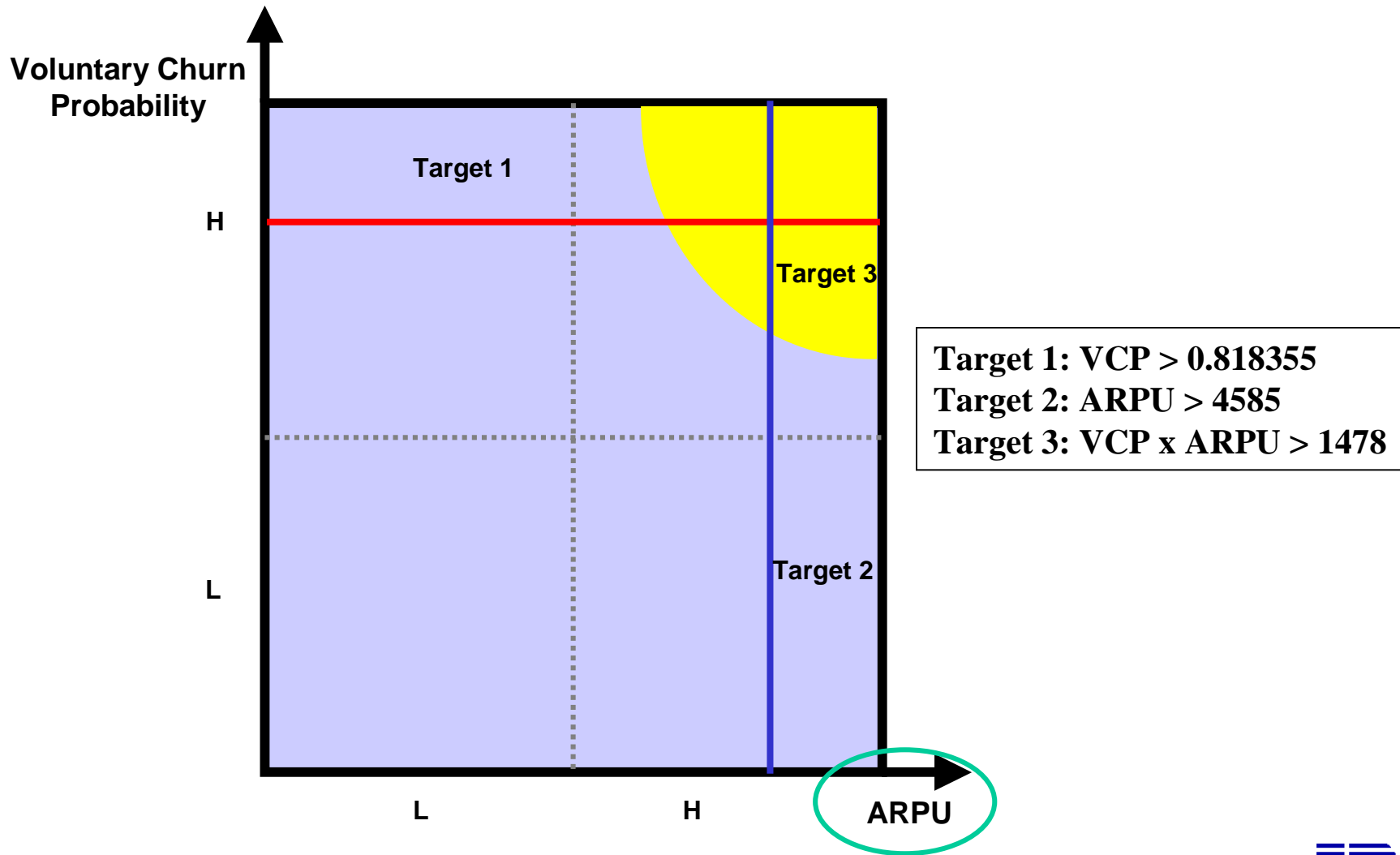
Characteristics & Lift Chart

- Quarterly Model (June, July and August)



Voluntary Churn Prediction (RG)

WAR Game Board – 2% Campaign Targets

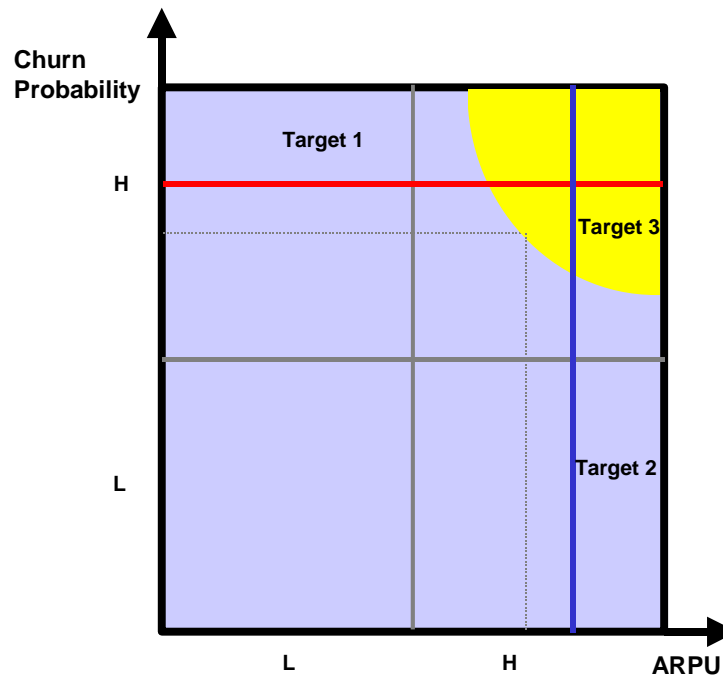


Voluntary Churn Prediction (RG)

WAR Game board – 2% Campaign Targets

Target 1 : Only Churn Score
of churners : 9682
Improvement over Random : 6.77

Target 3 : Churn Score * ARPU
of churners : 3516
Improvement over Random : 2.51

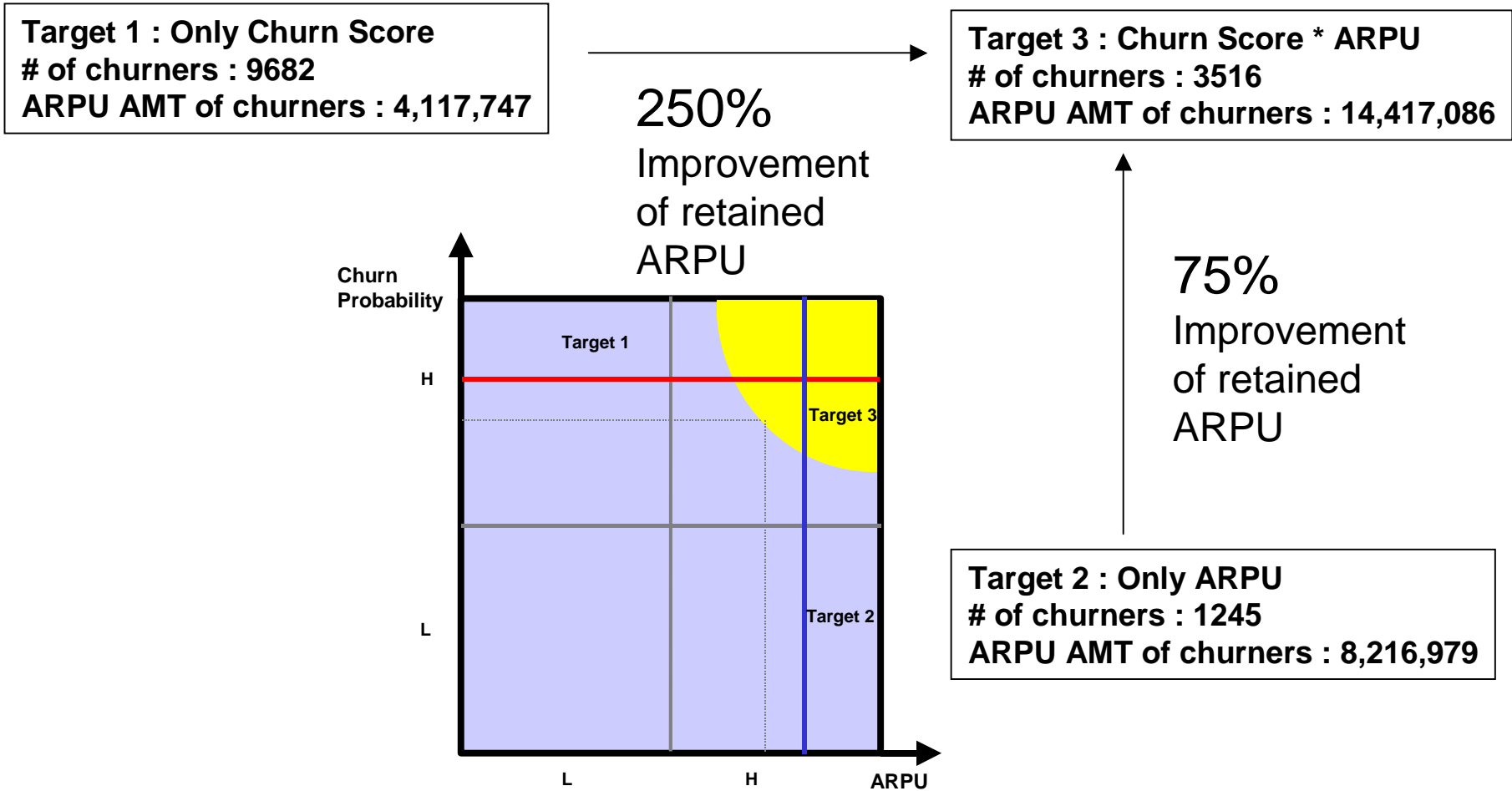


Lift 2.8

Target 2 : Only ARPU
of churners : 1245
Improvement over Random : 0.89

Voluntary Churn Prediction (RG)

WAR Game Board – 2% Campaign Targets



Voluntary Churn Prediction (RG)

WAR Game Board – 2% Campaign Targets

Breakeven point

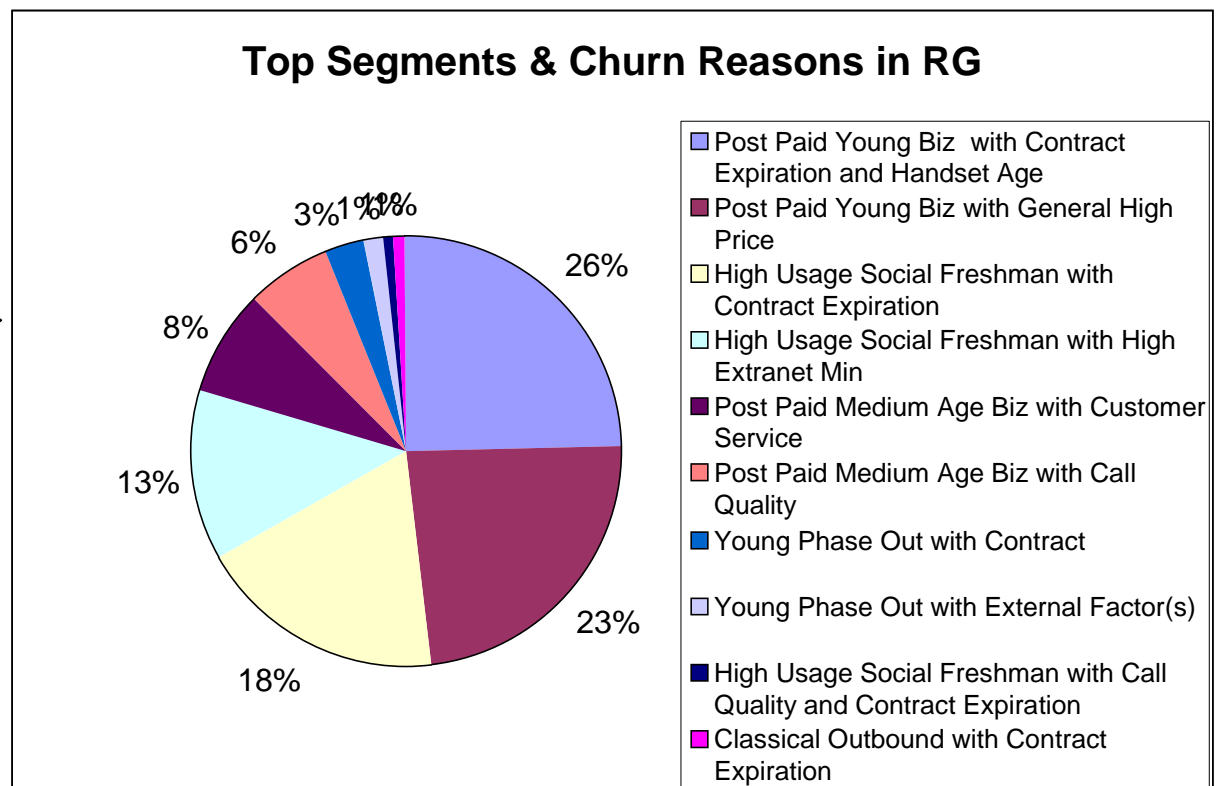
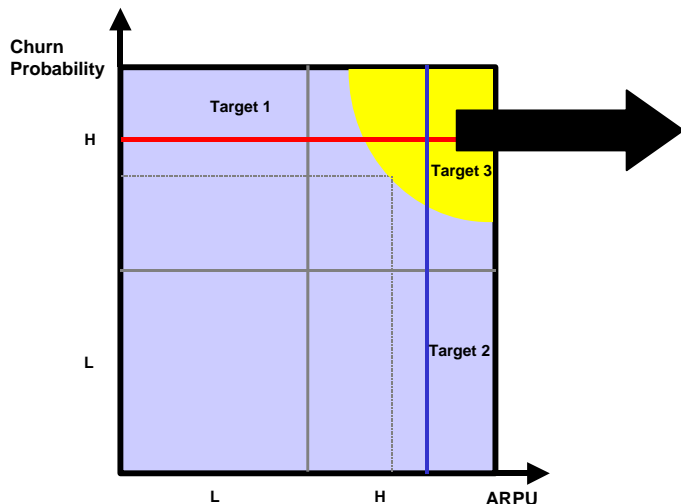
2% Campaign Cost : 45,128 people X 1000 = 45,128,000

Campaign Type	Retained ARPU	Breakeven Point
Target 1 : Only Churn Score	4,117,747	10.9 months
Target 2 : Only ARPU	8,216,979	5.4 months
Target 3 : Churn Score * ARPU	14,417,086	3.1 months

Voluntary Churn Prediction Model (RG)

Major Segments & Churn Reasons in the HH 2%

- Based in Quarterly Model for (June, July and August) 2001



Voluntary Churn Prediction Model (RG)

Major Segments & Churn Reasons in the HH 2%

- High Level Treatment Matrix for RG

Top 90% Segment X Reason	Treatment
Post Paid Young Biz with Contract Expiration and HS age	Contract Renewal including HRP and Loyalty Programs
Post Paid Young Biz with General High Price	Price Plan Optimization
High Usage Social Freshman with Contract Expiration	Contract Renewal including Customized Reward and Young Generation Loyalty Programs
High Usage Social Freshman with High Extra Net Min	Courtesy Call to check External Factor(s) and provide respective treatment
Post Paid Medium Age Biz with Customer Service	Special Customer Service Number
Post Paid Medium Age Biz with Call Quality	Offer based in Free Dropped Calls
Young Phase Out with Contract	Contract Renewal including Customized Reward and Young Generation Loyalty Programs
Young Phase Out with External Factor(s)	Courtesy Call to check External Factor(s) and provide respective treatment
High Usage Social Freshman with Call Quality and Contract Expiration	Contract Renewal including Customized Reward and Young Generation Loyalty Programs with enpahsis in Free Dropped Calls

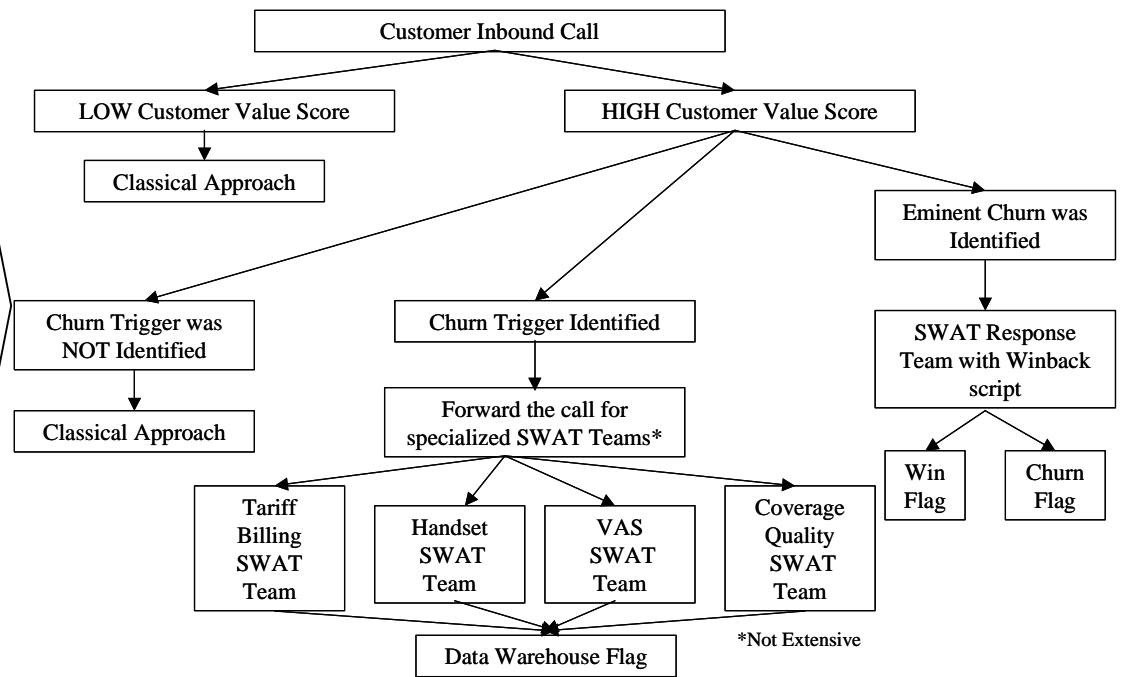
The WAR Framework Core Concepts

9. WAR Loyalty Program: Emergency Layer

Emergency Care Layer

Customized
Inbound
Treatment
For
HH Cell

*Customization
Based in the
Churn Triggers*

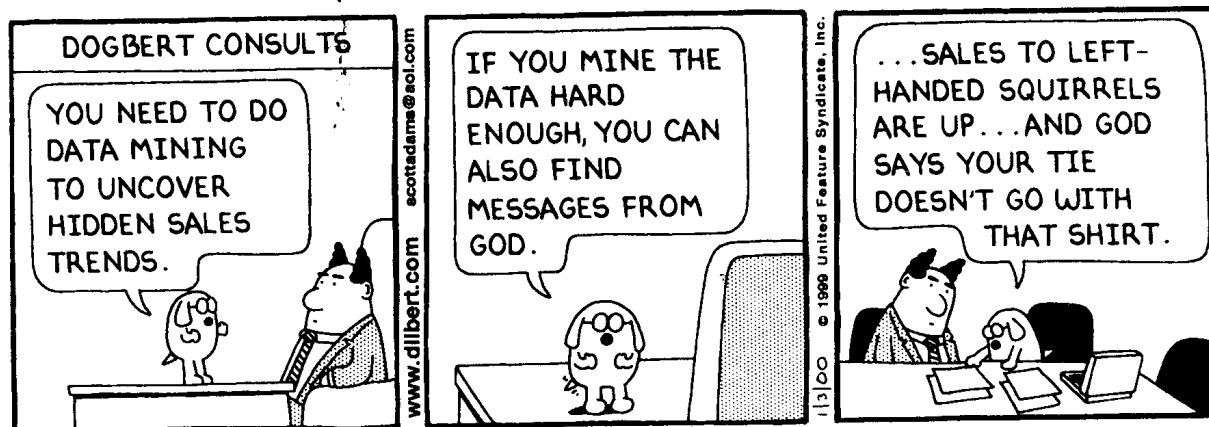


CONCEPTUAL

WAR Models x Techniques

Summary

DILBERT By Scott Adams.



Data Mining Models

Taxonomy

- ***Classical Multivariate Statistics Models***
 - Prediction
 - Classification
 - Dimension Reduction
 - Clustering
 - Time Series Forecast
- ***Machine Learning Models***
 - Unsupervised Models
 - Clustering
 - Association Discovery
 - Supervised Models
 - Classification
 - Time Series Forecast
- ***Optimization***
 - Optimal Control Theory

Data Mining Models

Taxonomy

- *Classical Multivariate Statistics Models*
 - Prediction
 - Multivariate Linear Regression
 - Classification
 - Discriminant Analysis
 - Logistic Regression
 - Dimension Reduction
 - Principal Components
 - Factor Analysis
 - Correspondence Analysis
 - Clustering
 - Hierarchical Cluster Analysis
 - Nearest Neighborhood (K-means)
 - Time Series Forecast
 - Exponential Smoothing
 - Box & Jenkins

Data Mining Models

Taxonomy

- *Machine Learning Algorithms*
 - Unsupervised Learning Algorithms
 - Clustering
 - Kohonen Maps
 - ART (Adaptive Resonance Theory)*
 - Association Discovery
 - Rules Induction
 - Fractal Machines*
 - Supervised Learning Algorithms
 - Classification and Prediction
 - Back Propagation Networks
 - Radial Basis Function Networks
 - Decision Trees CHAID and CART

WAR Data Mining Models

Models versus Data Mining Techniques

	Cluster Analysis (Hierarchical, Kmeans, etc.)	Supervised Neural Nets	Unsupervised Neural Nets (Kohonen, Fuzzy HART, etc.)	Decision Tree (CHAID, CART, etc.)	Dimension Reduction (Factor Analysis, etc.)	Logistic Regression or Discriminant Analysis	Time Series (Box-Jenkins, State Space, etc.)	Association Discovery
Behavioral Segmentation	X		X					
CVS					X			
Bundling								X
Add-on		X		X		X		
Acquisition		X		X		X		
Attrition & Inv. Churn Prediction		X		X		X		
Attrition & Inv. Churn Forecast		X		X			X	
KPI's					X			

