Marketing Analytics: Final Exam – Notes (Lectures, Text & Other)

- *Topic One – Marketing Engineering (ME) Approach (Ch 1)*

- **4Ps**: *Traditional:* Product, Price, Place, Promotion, *Strategic:* Probing (MR), Partitioning (segmentation), Prioritising (selecting TM), Positioning

- **Mktg Spreadsheets:** *Dumb:* no established relationship between planned marketing expenditures (inputs) and associated net revenue; marketing inputs only impact net revenue as cost items; managers must explicitly define objectives and variables (and specify the relationship between these variables) themselves

- *Smart:* MRM equation is embedded to consider the effect of advertising on both sales and revenues and whether changes in advertising expenditure are justified

  Market Response Model (MRM): models applied in marketing decision making to systematically address recurring strategic and tactical marketing decision problems by assessing the opportunity cost of the decision outcomes and describing how customers and markets might react to the corresponding marketing actions of the outcome

- **Three MRM Components**: *1) Inputs (X = Mktg Mix Variables):* controllable (internal) and uncontrollable (external) variables affecting marketing actions, *Examples: Internal:* prices, advertising expenditure, sales volume, *External:* market size, competitive enviro

- *2) MRM:* the link from inputs to measurable outputs of specific concern (within the context of the company enviro), *Examples:* customer awareness levels, product perceptions, profits

- *3) Outputs (Y = Objectives):* measures the firm uses to; monitor existing actions, evaluate performance against objectives and adapt or change depending on performance, *Examples:* % TM who recognise the brand, sales in response to a promotion

- **MRM Conditions / Types:** *No. of Inputs*: 1V: advertising, 2V: price + advertising, *Consideration of Competition*: explicit incorporation of competitor actions or just part of company enviro, *Inputs & Output Relationship:* linear response (specific dollar changes) or non-linear (e.g. S-curve with larger or smaller returns), *Static or Dynamic Situation:* flow of actions and market response over time or a snapshot at one point in time, *Individual or Aggregate Response:* direct marketing and specific sales efforts or overall sum of individual responses, *Demand Level:* direct analysis of brand sales or separate consideration of brand share and total market demand (then derive brand sales

- **MRM Process***: Data Generation, Info,* Insights, Decisions, Implementation, *Info: apply MRM type, incls. Calibration:* how to determine approp values for *Parameters* (related to MRM Type)

- **MRM Types (Decision Making Approaches, use examples):**
  1) Mental Models (Conceptual Marketing): manager uses own mental intuition and personal experience to make judgment calls

- **2) Decision Models (Automated Marketing)***:* uses computer analysis and machine learning processes to make automated decisions and instantaneous changes to marketing inputs (plus examples)

- **3) Hybrid Model (ME: Marketing Engineering):** systematic approach to harness data and knowledge to drive effective marketing decision making and implementation through a tech-enabled and model-supported decision process, *How=Combo of Mental and Decision Models:* combines man and machine power for the possibility of even better decision making by combining managerial judgement with formal decision models (plus examples)

- *ME Trends: Ubiquity of High-powered and Networked PCs*: more powerful and accessible, new ways to process and synthesise info for decision making, *Large Data Volumes:* challenges human processing capacity, use data mining, data only leads to better decisions if new, unique and actionable insights can be generated, *Marketing Activities Reengineering*: decentralised decision making, development of comprehensive CRM / DSS databases, increased focus on segmentation (and even individual personalisation) vs. mass marketing, *Higher Accountability Standards:* justifying marketing expenditure, showing delivery on objectives

- ***Mental vs. Decision Models: Mental Models:*** *Advs:* ability to use own experience and existing knowledge (maybe all that is required for familiar situations), little or no time or money may be required (can be a relatively quicker process)

- *Disadvs:* systematic errors: humans are imprecise information processors in both info analysis and synthesis, management and decision biases affect judgement, potential to 'force' old experience or decisions on new decisions which may not be directly comparable or compatible

- ***Decision Models:*** *Advs:* computers are consistent and reliable info processors, models keep attention focused towards the specific decision at hand (rather than being confused or delayed by other marketing concerns), ability to assess 'what if' scenarios for different outcomes of a decision to make better informed decisions (can assess effect before implementation of any one outcome), hybrid models mean the possibility of better decision making by combining managerial judgement with formal decision models

- *Disadvs:* large volumes of data means more time, money and effort required to generate and select the right / meaningful data both for and from analysis, usefulness depends on the quality of inputs and need to be used properly, decision models still have their own limitations in analysis, decision models may disregard the context or important qualitative aspects of specific decisions

- ***Linear Regression Model (LRM: Basis of Traditional CA), Coding:*** Any coding scheme (dummy or effects), for a variable / attribute with L levels, need L-1 coded variables, effects coding preferred for CA because it's easier to get the linear regression constant

- ***LRM: MRM Example:*** *Simple (One-Variable: 1V) Model: Parameters:* b, a = intercept (sales level when advertising = zero), *Variables:* x=advertising, y=sales volume / level, *Equation:*
  Sales Volume (Y) = a + b * x (Advertising)
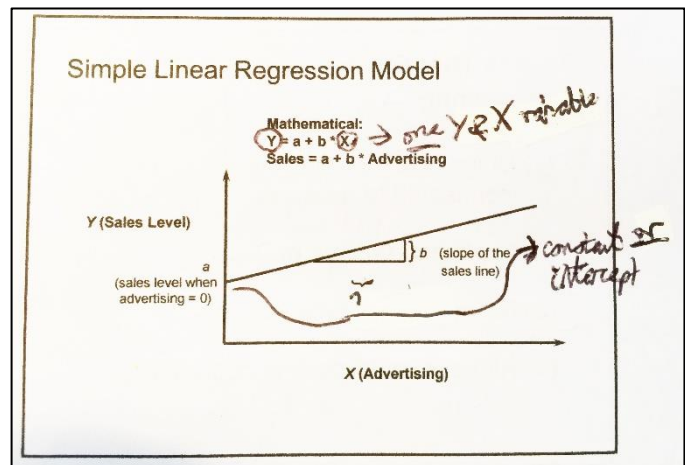
- **Non-Linear Models: 1) Quadratic**: $Y/\hat{Y} = b0 + b1X + b2X^2$, *Notes:* Yhat reaches max. when x is at optimal value = $-b1 / 2 \cdot b2$ (assuming b2 is neg, Yhat = zero and no b0); Finding max. Yhat: $b0 + (b1 \cdot \text{optimal } x) + (b2 \cdot \text{optimal } x^2)$, **2) S-Shaped Logistic Model:** $Y/\hat{Y} = d + a/[1+\exp(-(b+c \cdot X))]$

- **Other Calcs: Price Elasticity of Demand (PED):** PED = % Change in Volume ÷ % Change in Price (=relative change in volume given a relative change in price), Result: inelastic= <1, elastic = >1, any price change leaves revenue unchanged = 1

- **Smart Spreadsheet (Allegro):** MS is function of P, AD, SD, *Formulas*: NP = (P-K)*Q – FME – FOE (always minus for FOE); Q = MD x MS; FME = AD + SD + MR; NMC = (P-K)*Q – FME; Sales Revenue=P x Q; Gross Margin Per Unit: P-K; Gross Contribution Margin: (P-K)*Q; Net Contribution Margin: (P-K)*Q – FOE

- *Notation:* NP=Net Profit, P=Price Per Unit, K=VCPU, FME=Fixed Mktg Expense, FOE=Overheads, MD=sales in units, MS=company MS, AD=advertising, SD=sales force and distribution, MR=research, Q=sales volume, NMC=Net Mktg Contribution

- **MRM Influences: 1) Dynamic (Carryover) Effects:** influence of current marketing expenditure on sales in future periods*, a) Delayed Response Effect:* delay between when current marketing dollars are spent and their resulting future sales impact

- *b) Customer Holdover Effect:* when new customers created by early / initial marketing expenditure remain customers for many subsequent periods, so their later purchases should be credited to the earlier marketing expenditure, incls. Customer Retention Rate (CRR) & Customer Decay Rate (CDR, or Attrition Rate or Erosion Rate)

ANOVA[b] → stat significance

Coefficients[a]

Model		Sum of Squares	df	Mean Square	F	Sig
1	Regression	21.844	3	7.281	13.706	.014[a]
	Residual	2.125	4	.531	bigger = better	
	Total	23.969	7			

→ not sig if >0.05

a. Predictors: (Constant), Time Travel time (X3), Price Return airfare (X2), Airline Airline Name (X1)
b. Dependent Variable: Preference Rating on 0-10 scale (Y)

Using effects coding (1,-1): Sample Preference = 1 x -1.625

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	B0 (Constant)	10.625	.515		20.616	.000
	B1 Airline Airline Name (X1)	-1.625	.515	-.469	-3.153	.034
	B2 Price Return airfare (X2)	-2.375	.515	-.686	-4.608	.010
	B3 Time Travel time (X3)	-1.625	.515	-.469	-3.153	.034

a. Dependent Variable: Preference Rating on 0-10 scale (Y)

Eqn: b0 + b1X1 + b2X2 + b3X3

Partworth (b1x1): $\dfrac{1.625}{(1.625 + 2.375} \times 100$
(% relative importance) $+1.625)$

→ use for comparisons
price is biggest coefficient
= biggest effect / most important variable