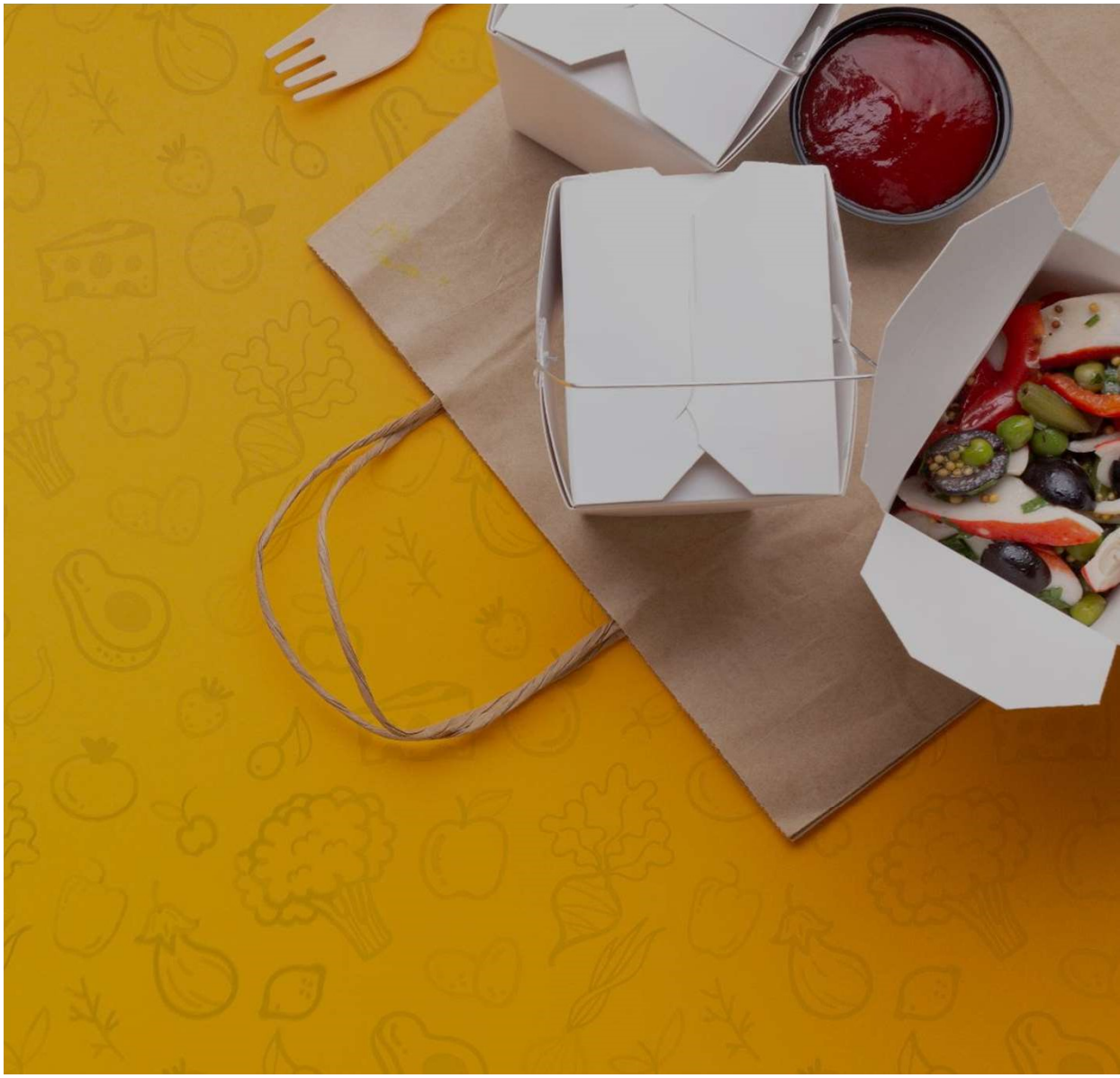
eClerx Digital

Media Mix Model – Overview



Presented to: Delivery Hero

Agenda

1. Introductions
2. Objectives of the POC phase
3. Process and solution overview
4. Business Insights
5. Tool Demo
6. Next steps and potential improvements

Mission Statement

We build a tool to monitor, plan and optimize the allocation of marketing budgets on a channel-level.

Deliverables for POC

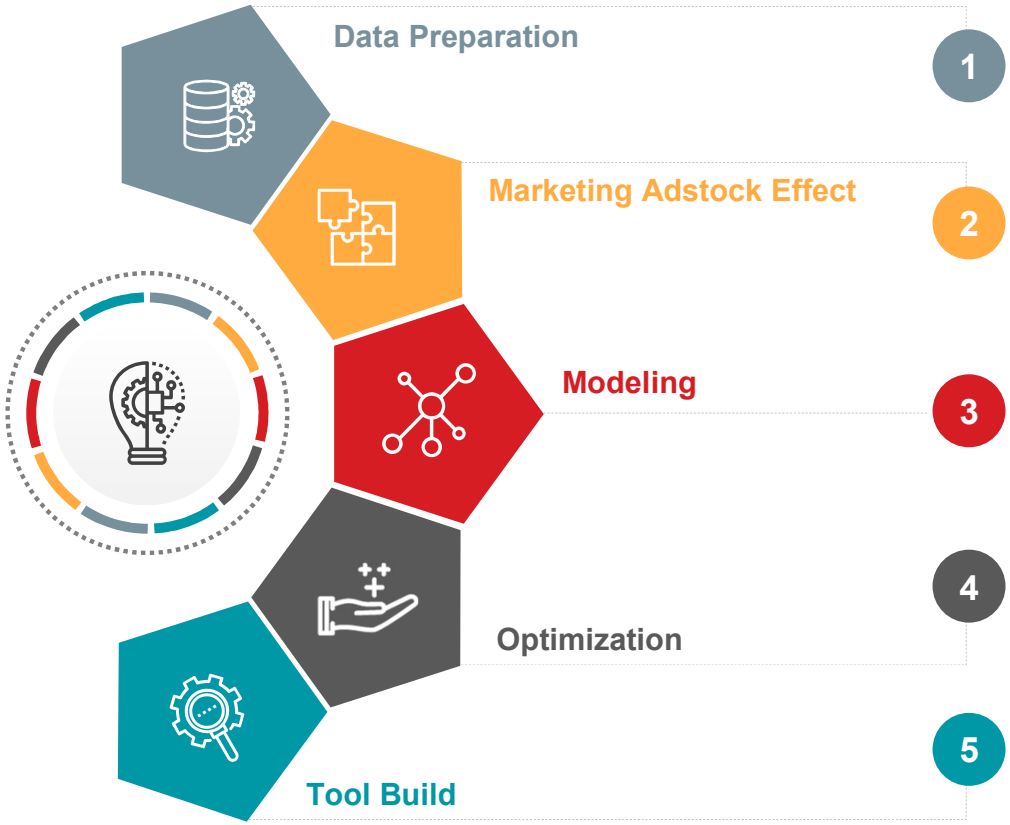
Initial markets: PH, TH, TW, MY

Deliverables	Success criteria	Outcome
Model	• Accuracy • Stability	➢ Accuracy range of 86% to 96% across 8 models ➢ Assessment of stability for > 50 parameters in each model

Web Tool	• Use cases
	  ○ Budget needed to reach target
	  ○ Optimal Distribution of Budget
	  ○ Maximum headroom for growth
	• Available on DH Infrastructure
		➢ Marketing budget optimization tool customized per DH requirements
		➢ Secure application deployed in DH AWS environment
		➢ Scalable and customizable for a global rollout

Code Delivery	• Code is available in DH repository • Code is understood and can be run by DH	➢ Collaborative development with DH teams to align with DH policy guidelines ➢ Can be operated/launched/modified by DH independently

Process overview



1. Collate internal and external data to include marketing spends, app downloads, google search trend, covid indicators etc.
2. Assess prolonged or lagged effect of advertising on consumer buying behavior
3. Develop Time series models to determine relationship of marketing spends with orders and acquisitions
4. Measure impact of channel investments and identify opportunity to increase orders and acquisitions
5. Self service platform for scenario planning and marketing budget optimization

Data Preparation

Marketing Spends Data

- Engineered to weekly spend by using daily spend data and monthly Lucanet Data
- Classification of channels into Top of Mind, Performance marketing and Incentives

Transactions Data

- Daily Orders and Acquisitions aggregated at weekly level

External Data

- Google Trends of search keywords like Foodpanda, Food delivery
- Holiday Flags
- Covid period, # of cases

App downloads

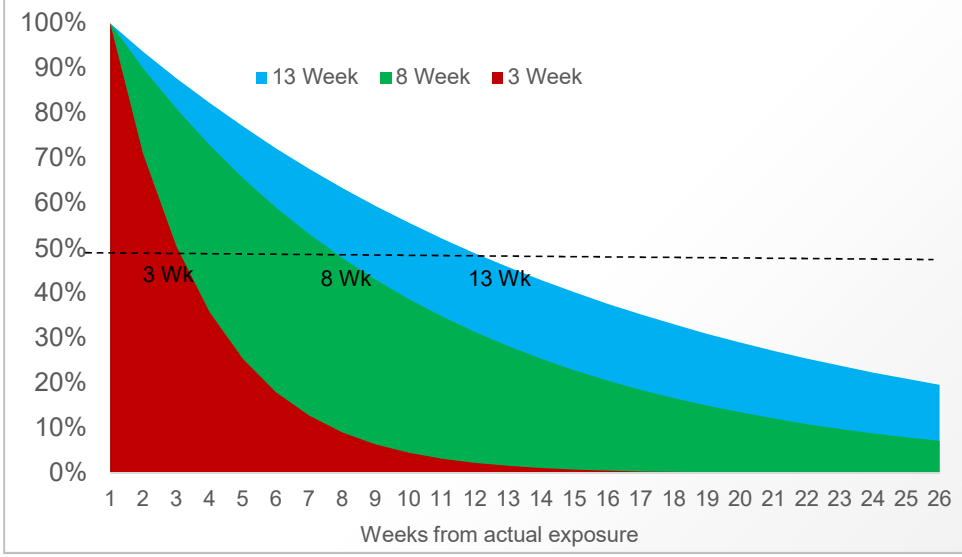
- iOS and android app downloads

- 3.5 years of historical data from Jan'2017 to Aug'2020
- Monthly aggregate of weekly channel spends closely matches Lucanet
- Data treatment techniques applied for improvement of data quality

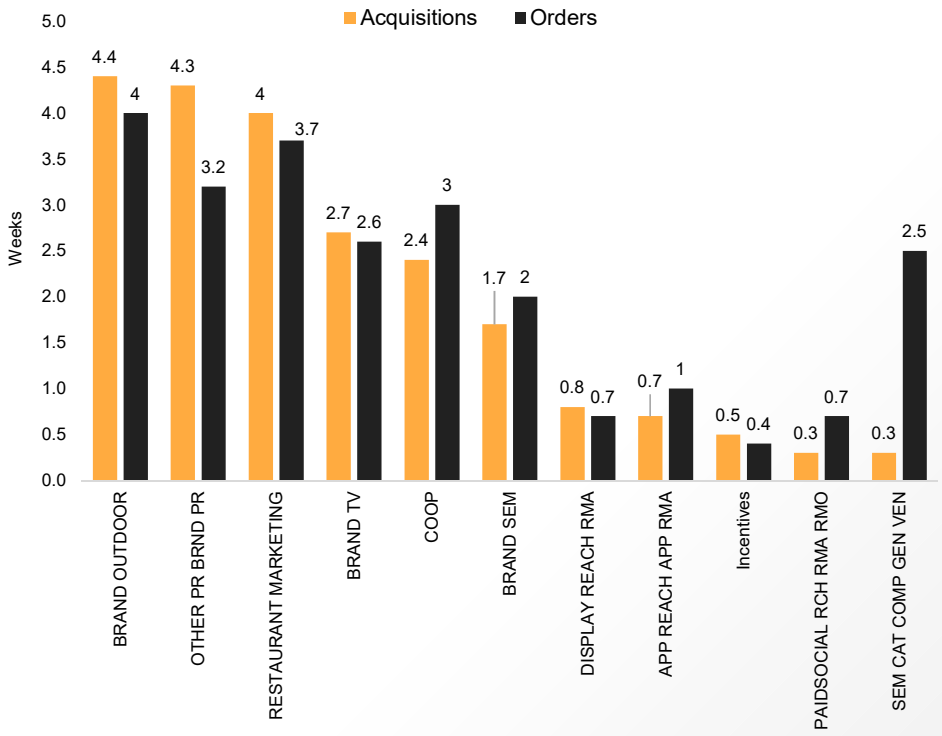
Marketing Adstock effect

Adstock Effect

- Advertising **adstock** or advertising carry-over is the prolonged or lagged **effect** of advertising on consumer purchase behavior
- Half – Life is the duration in which the effect of spend reduces to half of its original week of exposure



Channel Half-Life (MALAYSIA)



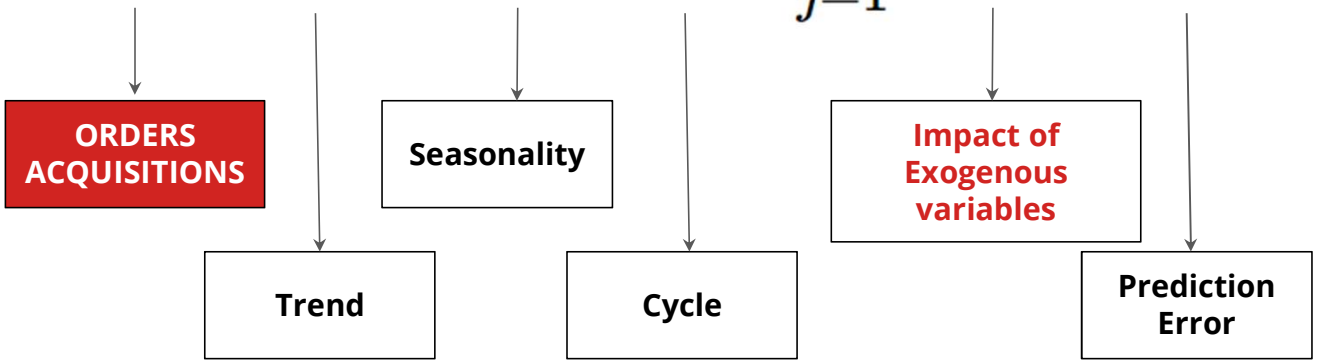
Modelling Approach

Unobserved **C**omponents **M**odel

eClerx has chosen to utilize a UCM model because it enables for a balanced among:

- **Interpretability**
- **Performance**
- **Complexity**

$$y_t = \mu_t + \gamma_t + \psi_t + \sum_{j=1}^{m} \beta_j x_{jt} + \epsilon_t$$



Exogenous variables

- Marketing spends
- App downloads
- Google search trend
- Covid indicators

Appendix

Glossary of Terms

CPA / CPO	Cost Per Order (CPO) – Spend in a Channel / Orders attributed to a channel Cost Per Acquisition (CPA) – Spend in a channel / Acquisitions attributed to a channel
Incremental Marketing	Effect of marking channel in generating short to medium term effect on order / acquisition
Adstock	Prolonged or lagged effect of advertising on consumer purchase behavior
Response curve	A curve showing relationship between marketing spend of a channel and the target KPI keeping all the other business drivers at constant value
Half-Life	Duration in which effect of an Ad channel exposure reduces to half of its value in week of exposure
Headroom	Maximum allowable spends to keep current levels of CPA / CPO

Data Input

Data Source: Lucanet (monthly), Daily spends as available

Marketing Spends	Top of Mind	Performance Marketing	Incentives
	• BRAND RADIO • BRAND TV • BRAND TV • OTHER PR BRND PR • COOP • FLYERS • RESTAURANT MARKETING • OTHER CAMPAIGNS	• PAIDSOCIAL RCH RMA RMO • SEM CAT COMP GEN VEN • SOCIALMEDIA INFLUENCER • APP REACH APP RMA • DISPLAY REACH RMA • BRAND SEM	• Incentives • WOM RAF

Data Source:

Non Marketing Variables	
• Weekly ORDERS – Target variable • Weekly ACQUISITION – Target variable • Holiday Flag • Weather	• Covid • Google Trends • App Downloads

Adstock effect

Channel Half-life

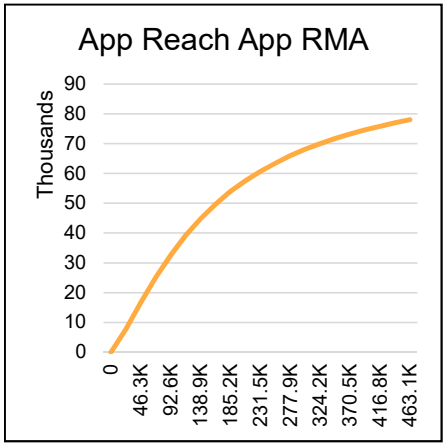
Channel Half-Life (Weeks)

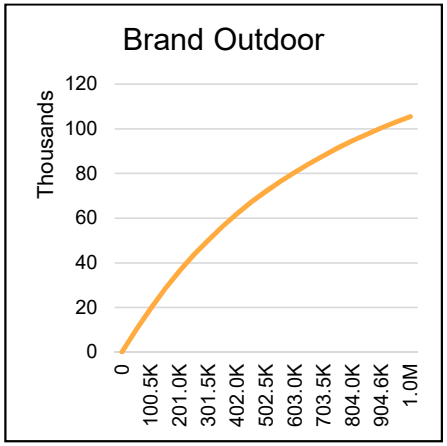
Channel	MY(O)	MY(A)	TW(O)	TW(A)	TH(O)	TH(A)	PH(O)	PH(A)
APP REACH APP RMA	1.0	0.7	2.0	1.3	2.0	0.9	1.0	1.1
BRAND OUTDOOR	4.0	4.4	3.3	5.7	1.9	4.0	5.0	1.9
BRAND RADIO	3.9	3.8			6.0	2.0	6.0	6.0
BRAND SEM	2.0	1.7	2.0	1.8	2.0	1.4	1.9	1.3
BRAND TV	2.6	2.7	4.8	2.9	3.3	2.3	2.8	3.2
COOP	3.0	2.4	2.9	2.8	2.5	0.8	1.4	0.5
DISPLAY REACH RMA	0.7	0.8	1.3	0.7	1.5	1.1	1.5	1.5
FLYERS		1.1				1.5		1.4
Incentives	0.4	0.5	1.0	1.0	0.7	0.8	0.9	0.9
OTHER	4.3	3.4	3.1	2.4	4.3	3.4	4.3	4.3
OTHER CAMPAIGNS	1.1	1.3			1.0	1.1	1.4	1.5
OTHER PR BRND PR	3.2	4.3	4.0	3.6	4.3	2.5	3.7	3.9
PAIDSOCIAL RCH RMA RMO	0.7	0.3	2.5	1.0	2.5	0.3	1.1	0.6
RESTAURANT MARKETING	3.7	4.0	3.3	3.7	4.7	2.8	3.8	4.9
SEM CAT COMP GEN VEN	2.5	0.3	1.4	0.4	2.1	0.4	1.2	0.4
SOCIALMEDIA INFLUENCER	0.9	1.4			1.9	0.6	0.8	1.0
WOM RAF								0.0

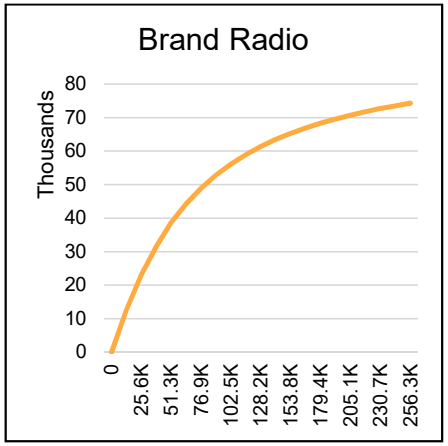
Malaysia

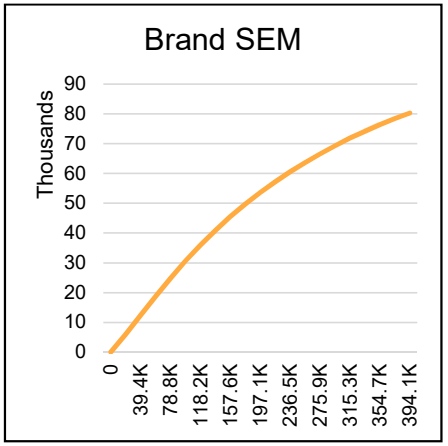
Response curves

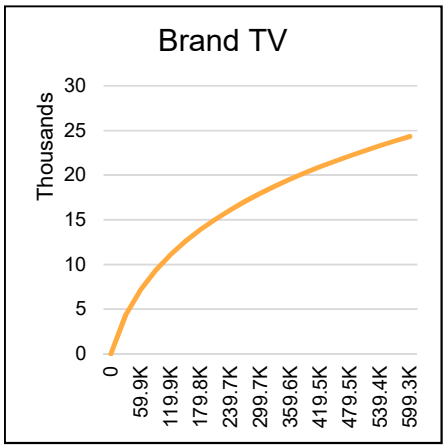
Response curves (Malaysia Q3 Acquisition Channel level)

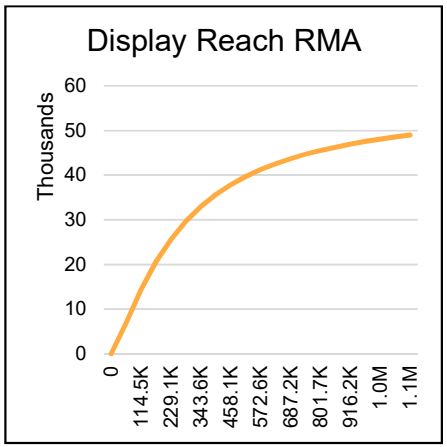


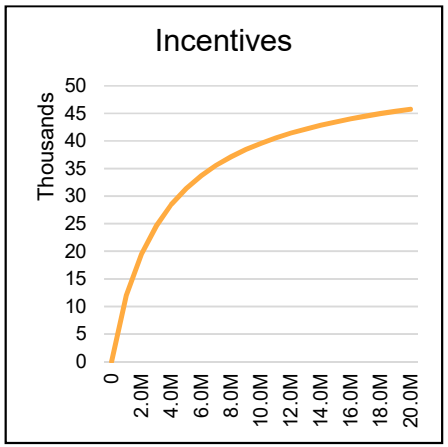


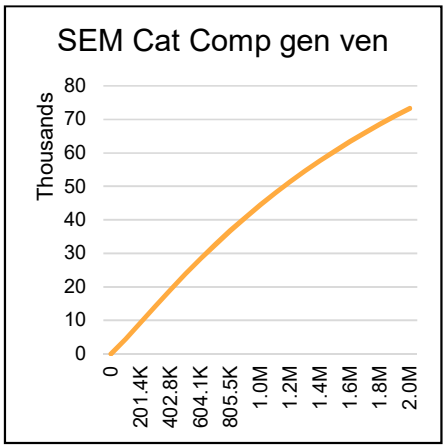




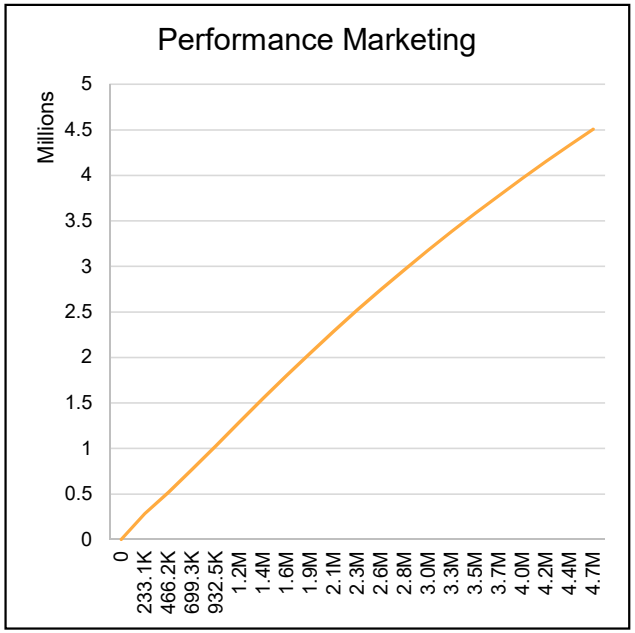


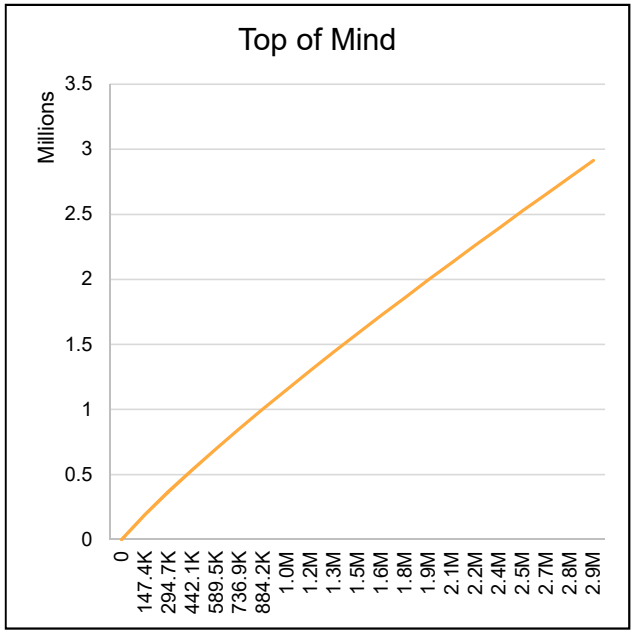


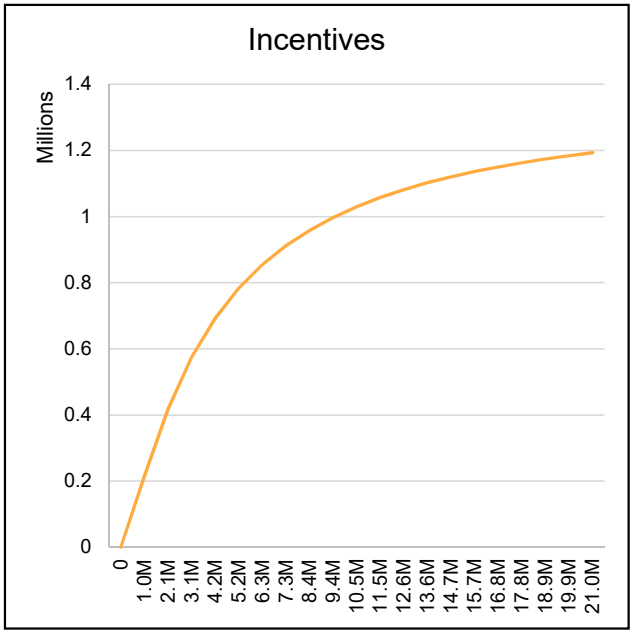




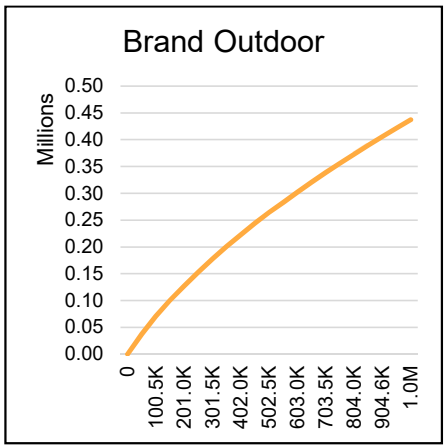
Response curves (Malaysia Q3 Orders Bucket level)

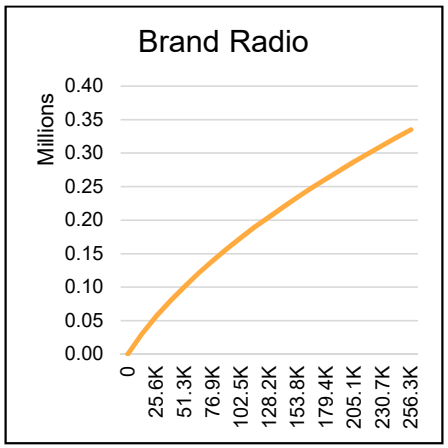


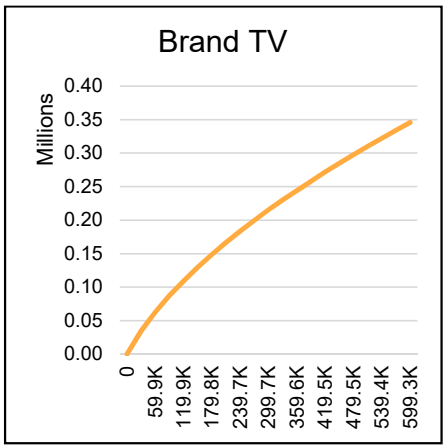


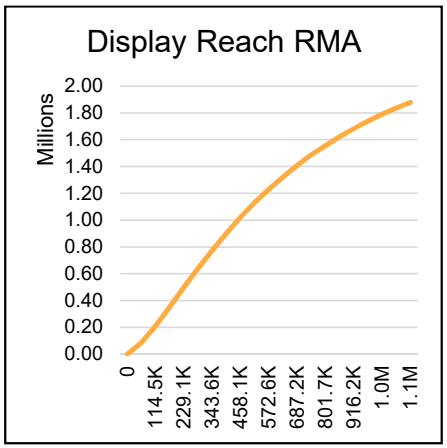


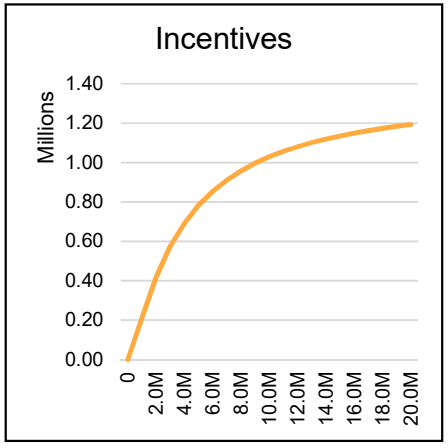
Response curves (Malaysia Q3 Orders Channel level)

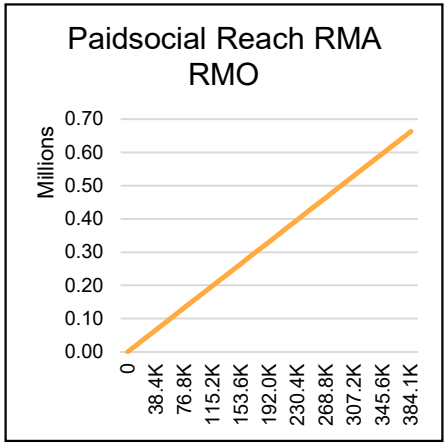


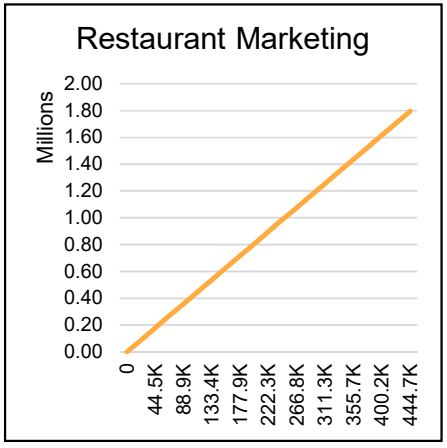


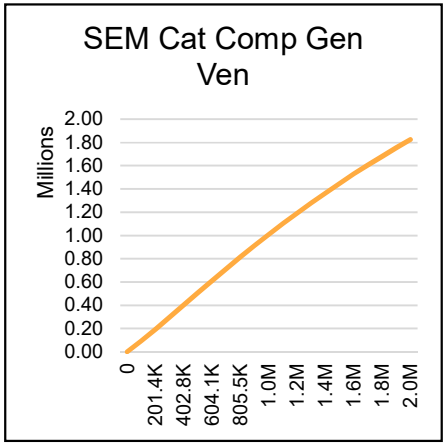








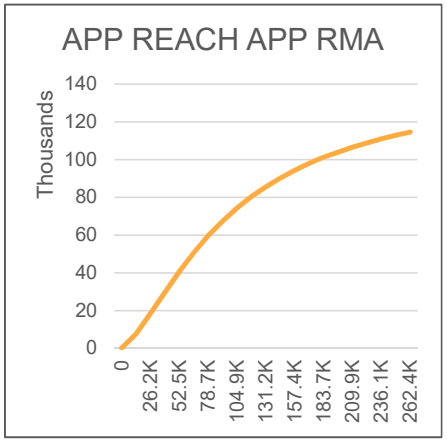


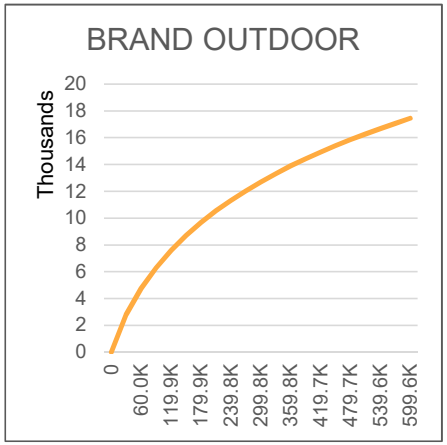


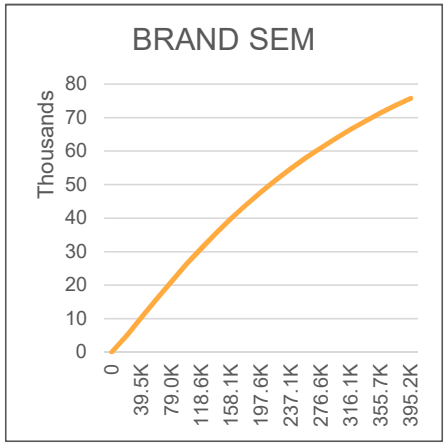
Thailand

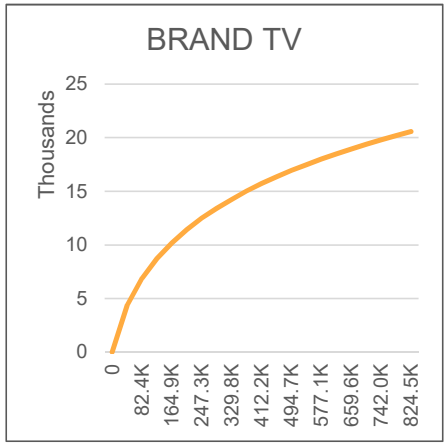
Response curves

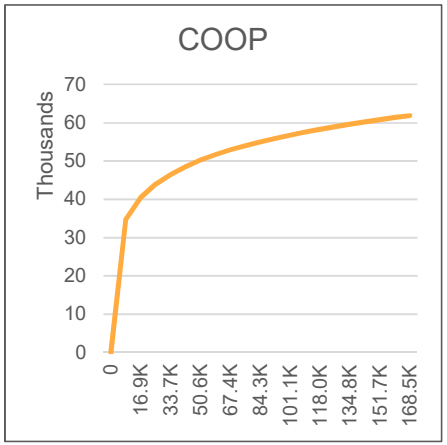
Response curves (THAILAND Q3 Acquisition Channel level)

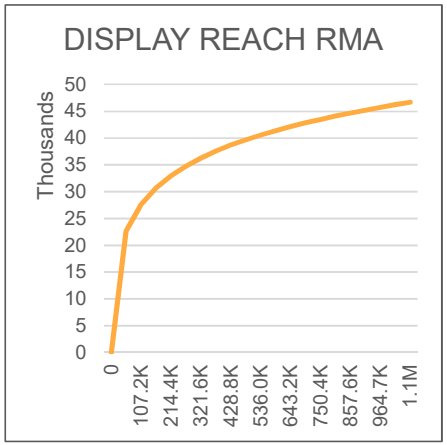


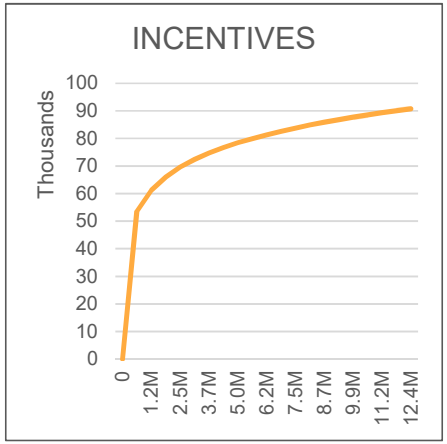


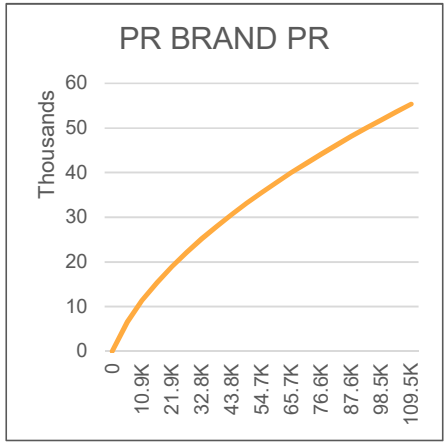




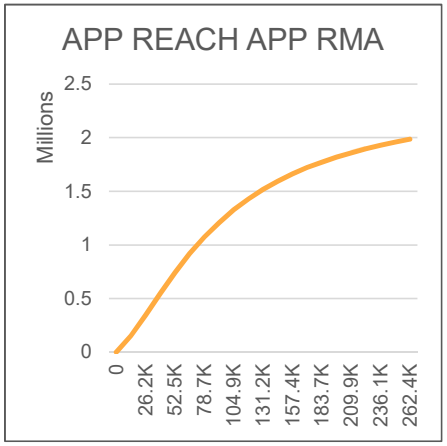


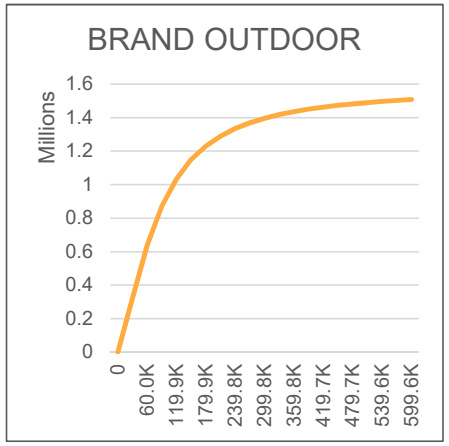


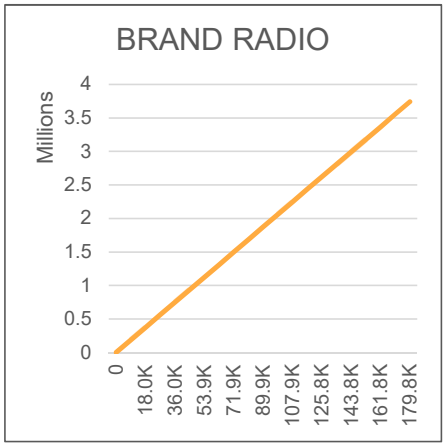


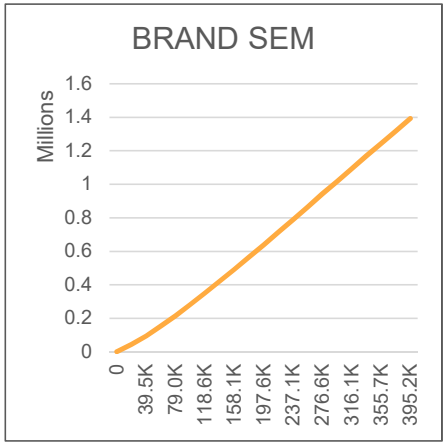


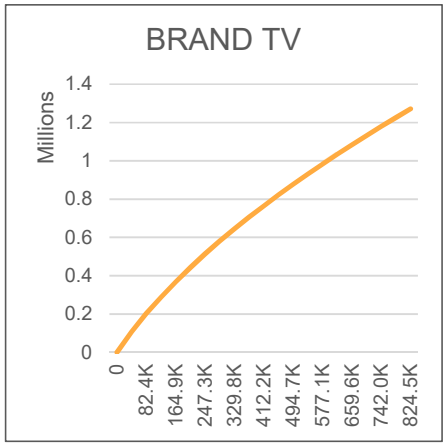
Response curves (THAILAND Q3 Orders Channel level)

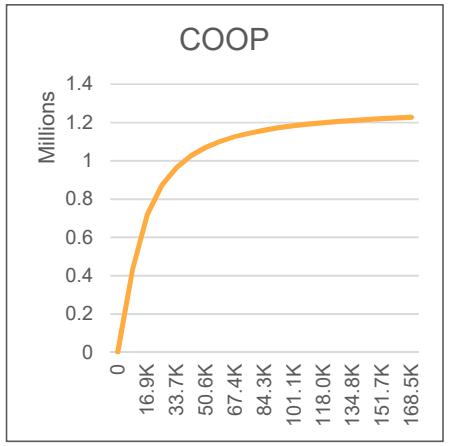


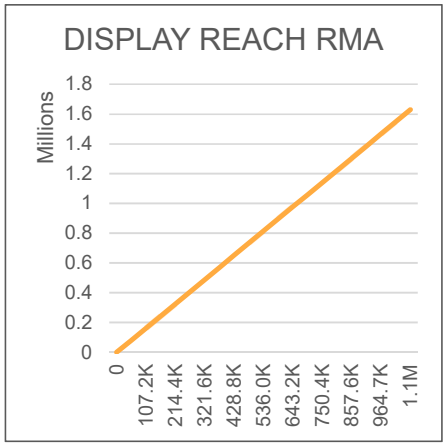


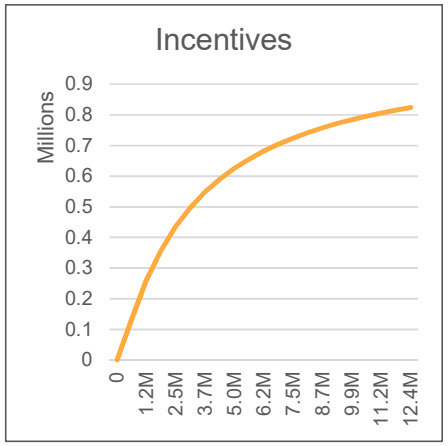








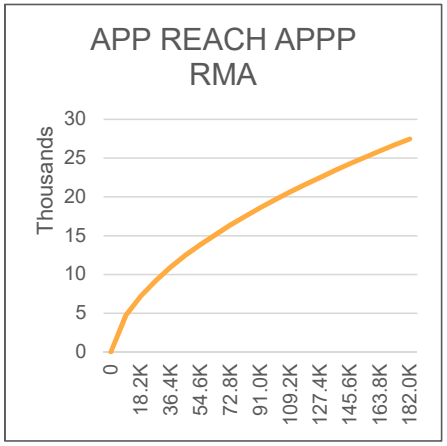


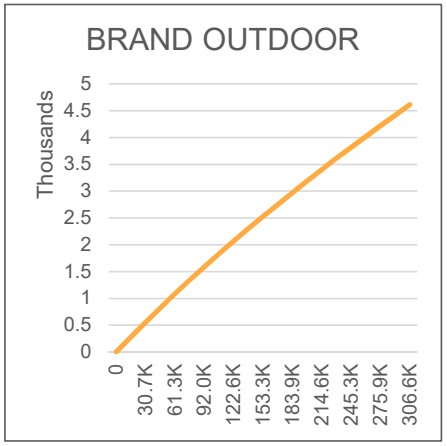


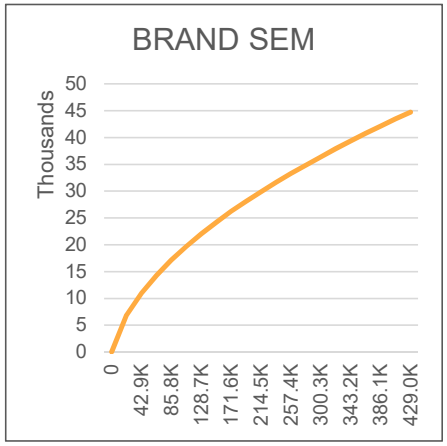
TAIWAN

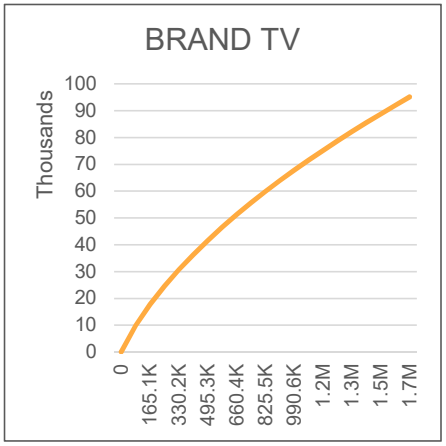
Response curves

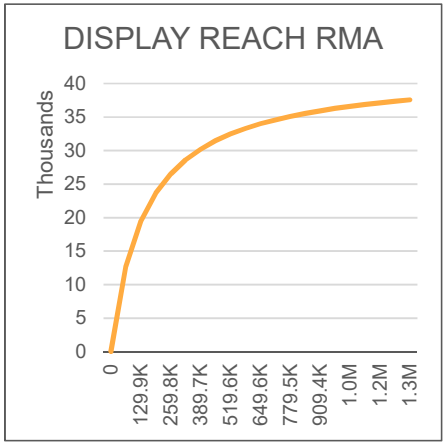
Response curves (TAIWAN Q3 Acquisition Channel level)

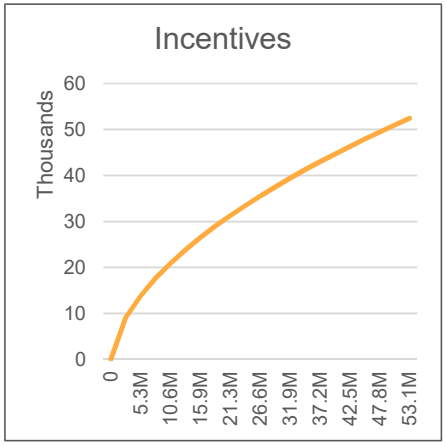


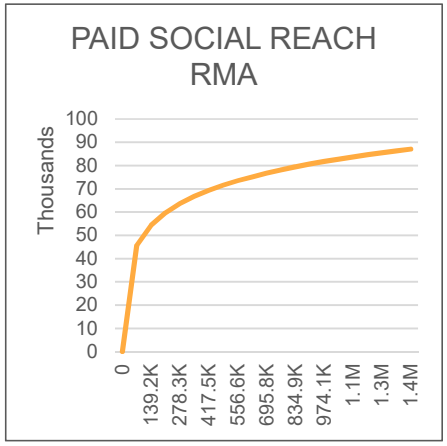


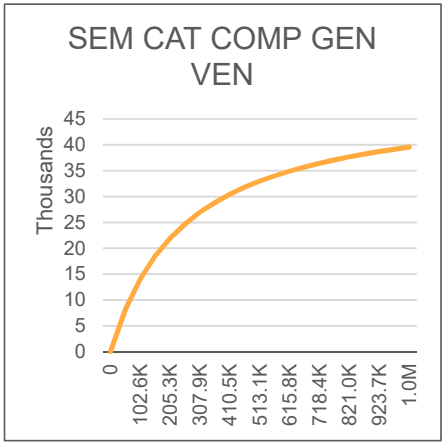




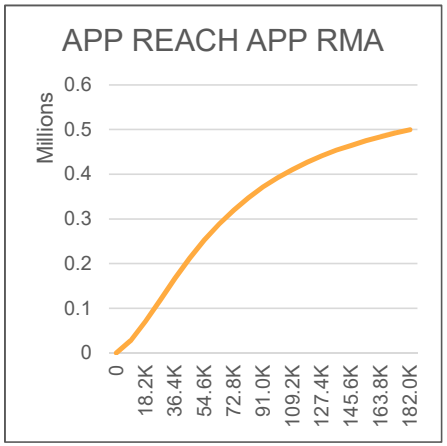


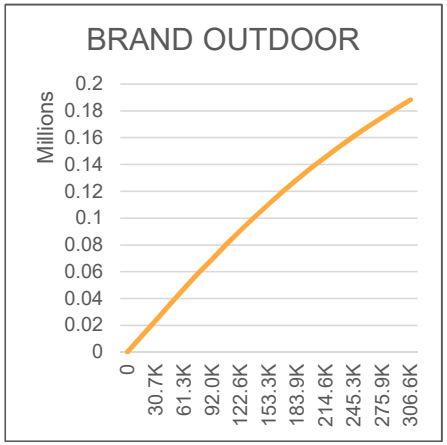


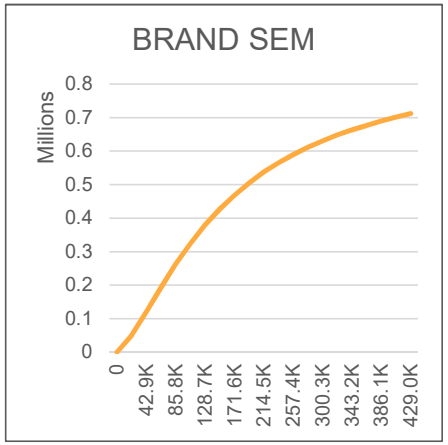


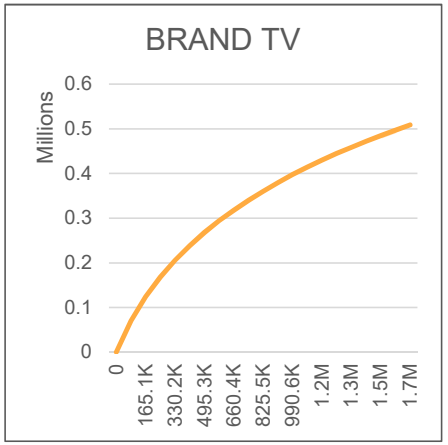


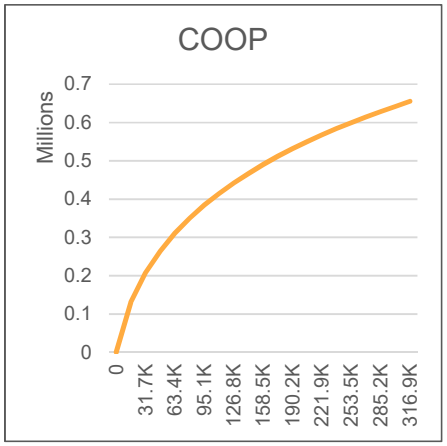
Response curves (TAIWAN Q3 Orders Channel level)

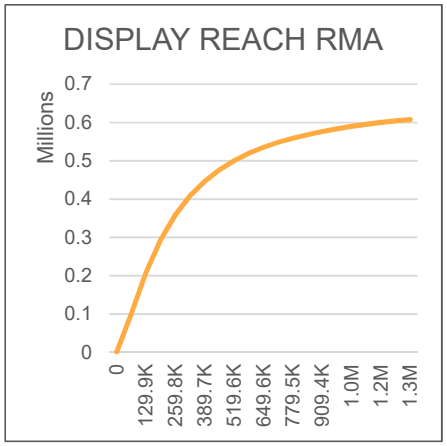


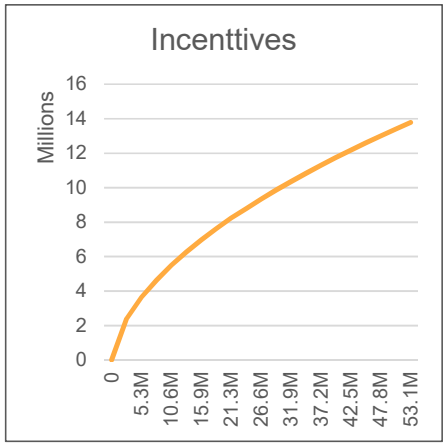


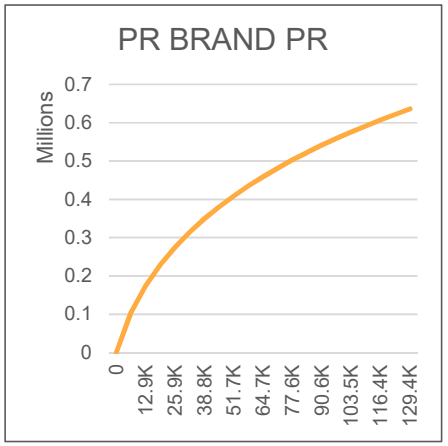








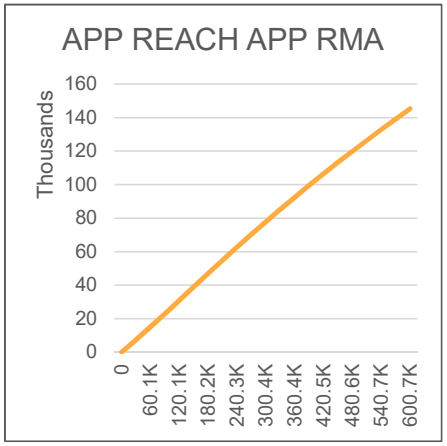


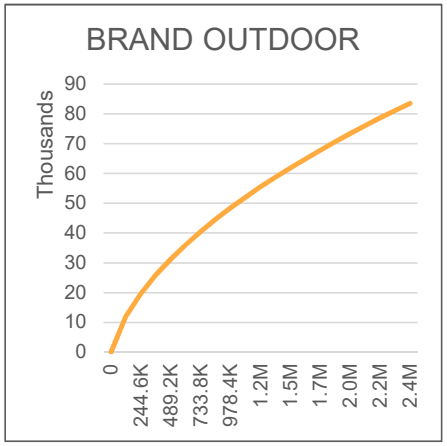


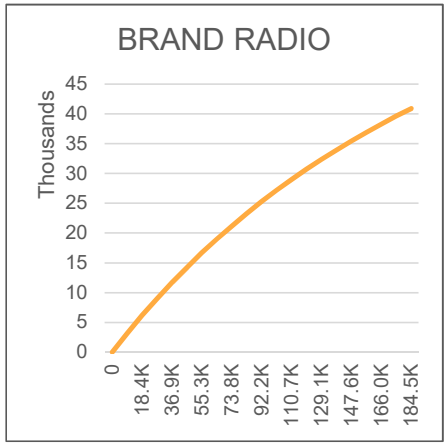
Philippines

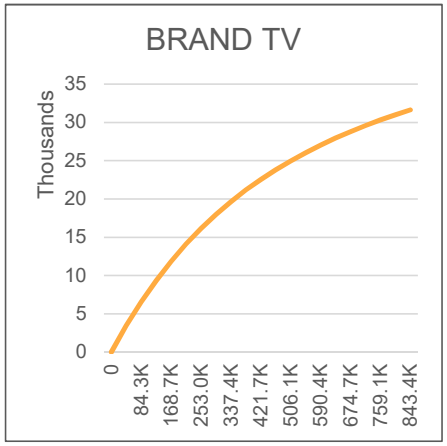
Response curves

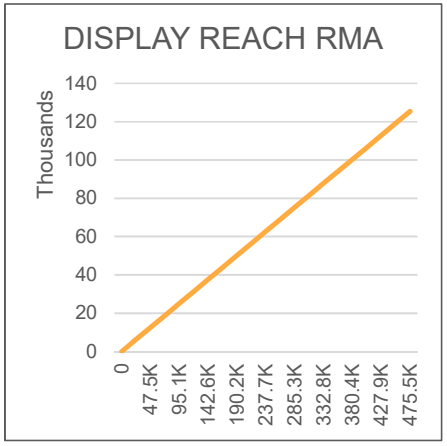
Response curves (Philippines Q3 Acquisition Channel level)

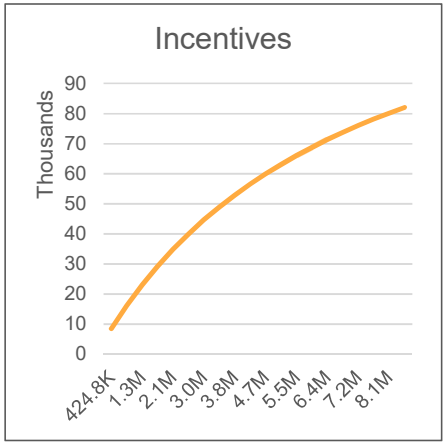


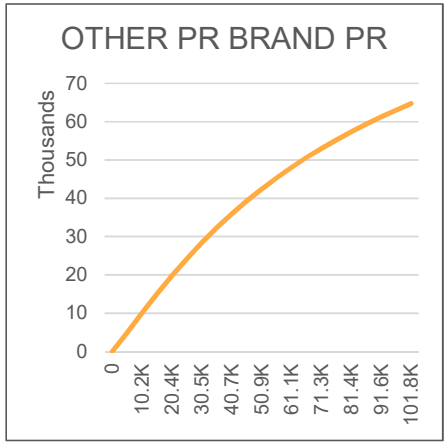


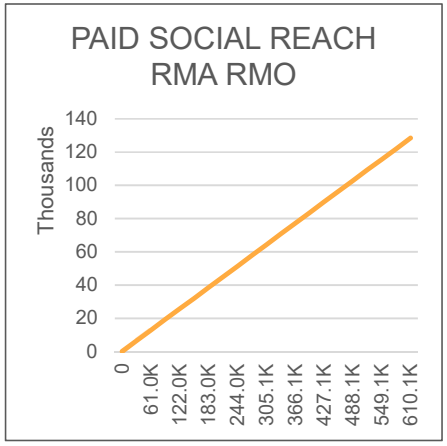












Response curves (Philippines Q3 Orders Channel level)