

neo

Regression with Excel

Digital Analytics Association
New York Symposium 2018

Who is this for?

A digital analytics practitioner who works on media planning/goal setting or is interested in learning more about one-step-further use of an excel

What will you learn?

You will learn about the differences between metrics, KPIs, Benchmarks and Goals and how to leverage excel to set up a simple return on investment goal

What programs do you need?

Excel

Who are the experts?

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Agenda

- Measurement objective
- Metrics, KPIs, Benchmarks, Goals
- Media planning and goal setting
- Summary

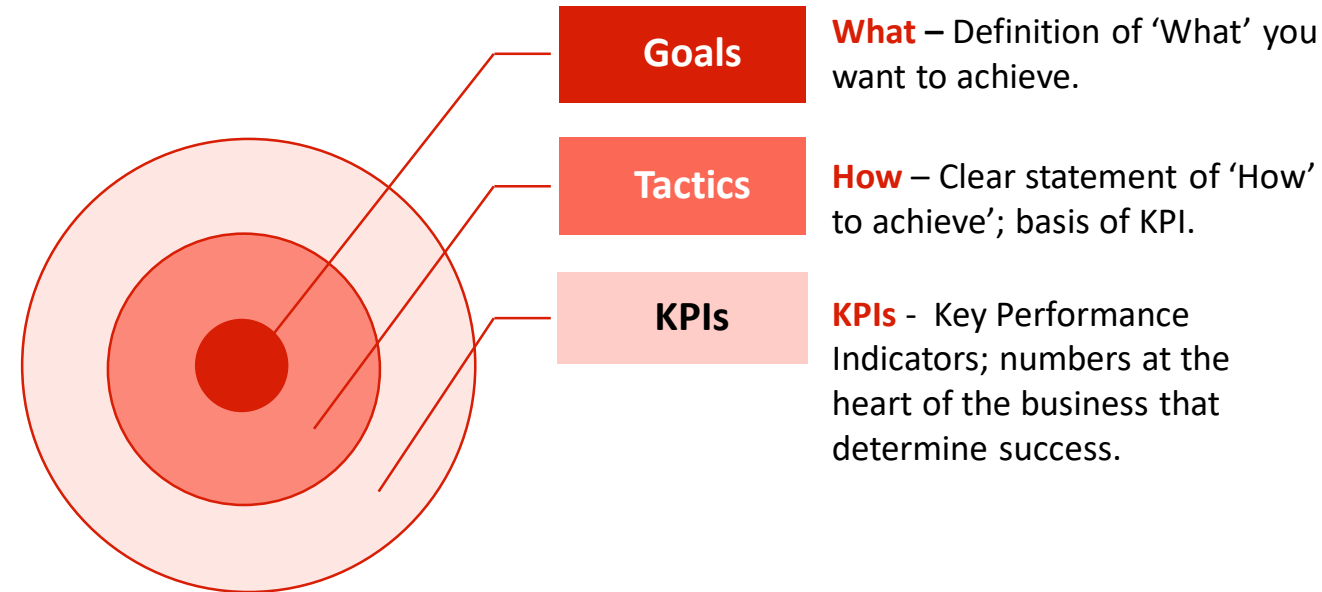
1

Measurement Objective

Measurement Objective

Set Measurement Strategies to:

- Align success criteria with measurable goals & KPIs.
- Set a framework to determine whether the program met its goals and objectives.
- Prove the effectiveness of the campaign.



*What is it supposed to do?
How will we know it worked?*

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Metrics, KPIs, Benchmarks, Goals

Metrics, KPIs, Benchmarks, Goals

Metrics

- Measurable units to prove performance /diagnose /result of your effort.



e.g.

Spend
Impressions
Clicks
Revenue, etc.

KPIs

- Key Performance Indicators, most important success metrics to determine success.



e.g.

ROAS
(Return on Ad
Spend)

Benchmarks

- Reference point for your performance evaluation.



e.g.

ROAS
\$20.00

Goals

- Your target performance for the effort.



e.g.

ROAS
\$25.00

Common Business Question:

What should be the return goal? How do we ensure we're not spending too much?

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Media Planning and Goal Setting

Premise of The Approach

Linear Regression

- Regression analysis is a statistical process for estimating the relationship among variables; specifically, regression helps to understand how typical value of the dependent variable changes when any one of independent variables change.

Historical Data → Future Projections

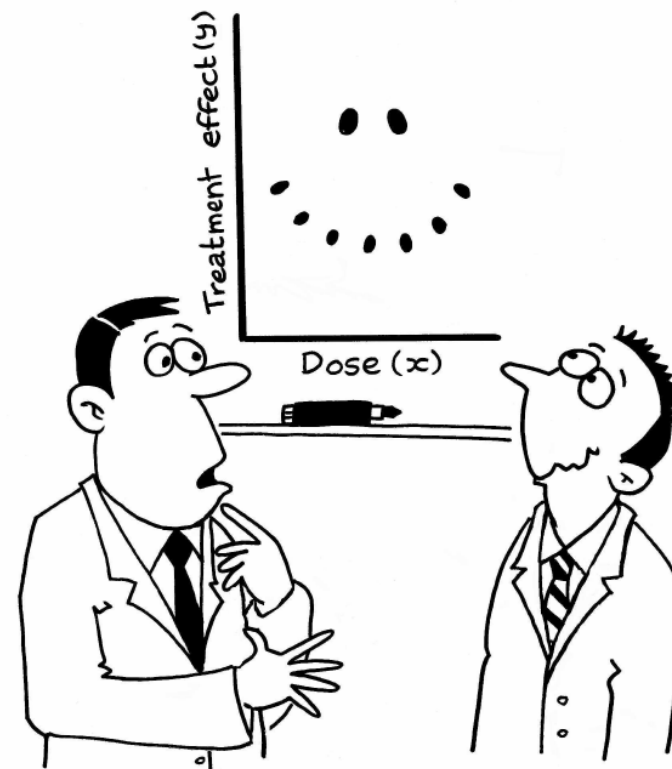
- Using Regression, we can project future outcomes based on historical performance provided that independent variables (drivers) are available to calculate dependent variables (estimates).

Estimates: Return on Ad Spend

- Within Excel, you can perform a simple linear regression.

Drivers: Contributors Are Aggregated

- For simplicity, contributors are aggregated to total ad spend.



"It's a non-linear pattern with outliers.....but for some reason I'm very happy with the data."

<http://jacobjwalker.effectiveeducation.org/blog/>

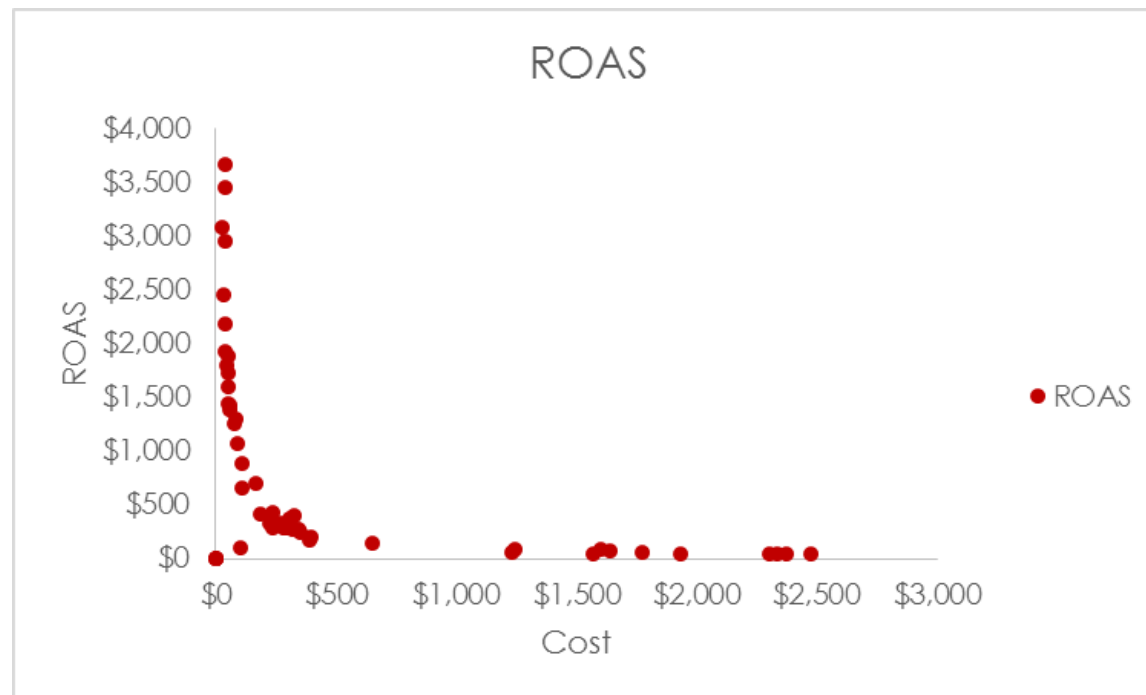
Data Overview

- 2017 Weekly Total Spend, Session, Transaction, Revenue was reviewed.
- QA steps: Sort out any outliers and determine whether to included in the analysis or not.
- Calculate ROAS (highlighted in yellow).

	A	B	C	D	E	F
1	Week of Year	Cost	Sessions	Transactions	Revenue	ROAS
2	201701	165.48	15695	601	116498.47	=E2/B2
3	201702	107.61	15752	491	95637.78	888.7444
4	201703	81.84	15613	537	106341.11	1299.378
5	201704	89.52	17991	505	95814.94	1070.319
6	201705	77.04	16519	529	96957.90	1258.54
7	201706	295.22	16962	436	83621.49	283.2514
8	201707	51.46	17549	506	97075.75	1886.431
9	201708	54.08	17014	450	86820.51	1605.409
10	201709	53.94	16272	538	93022.89	1724.562
11	201710	40.31	16681	443	77848.28	1931.24
12	201711	35.73	16620	459	77884.30	2179.801
13	201712	35.97	17573	493	106158.33	2951.302
14	201713	28.12	17845	477	86748.64	3084.945
15	201714	35.52	18023	411	122892.20	3459.803

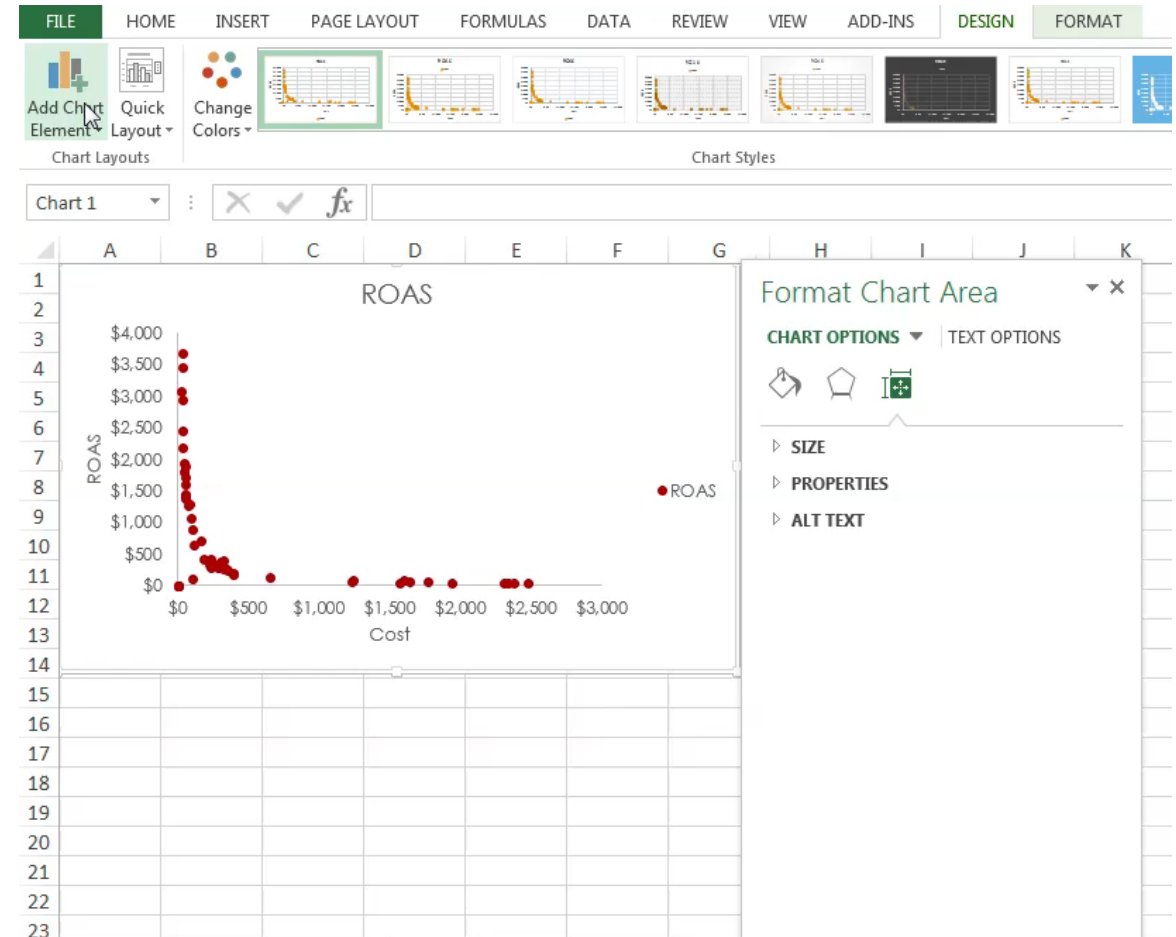
Relationship Exploration

- Explore relationship with a scatter plot with Spend and Return metrics.
 - Series (Legend Entry – y axis) to be ROAS.
 - Category (Horizontal – x axis) to be Cost.



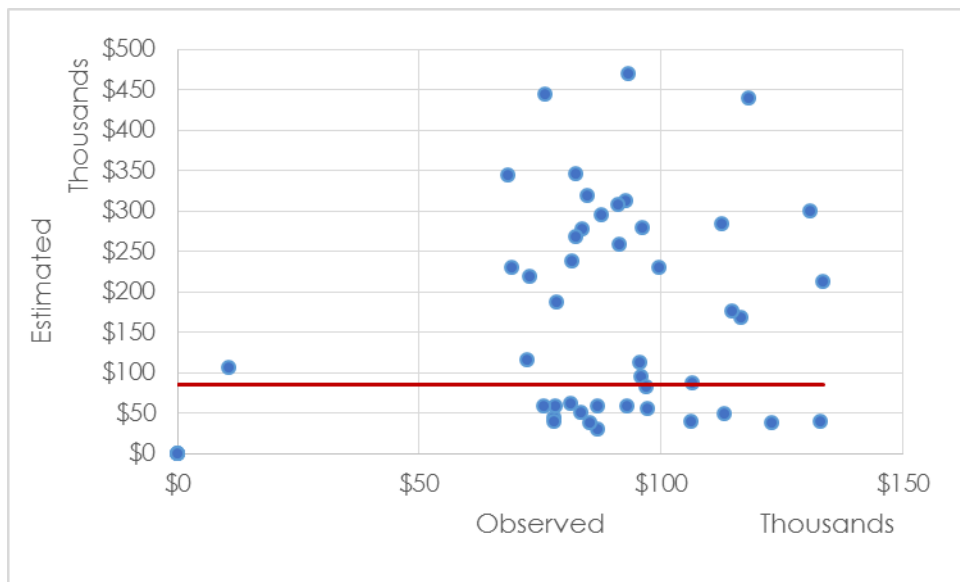
Regression

- For simplicity, relationship between Spend and ROAS is assumed to be linear.
- Add a trend line with 'Equation on Chart' and 'Display R-squared Value on Chart' option checked.
- Linear regression line has an R-Square of 0.22 indicating that the linear model leaves lot of variance unexplained.
 - Linear regression cannot factor in seasonality, which is one of the biggest influencer on ROAS.
 - Other limitations can be if return varies a lot by organic & direct traffic that are not associated with investment (or not directly attributed with cost).



Validation

- Using equation, you can create a scenario planning tool of expected return on the spend.
- Comparing expected return with actual return (%) will show how good of a fit the model is.
 - There are other statistical validation methodology (i.e. ANOVA).
- You can create a scatter plot to show the variances.



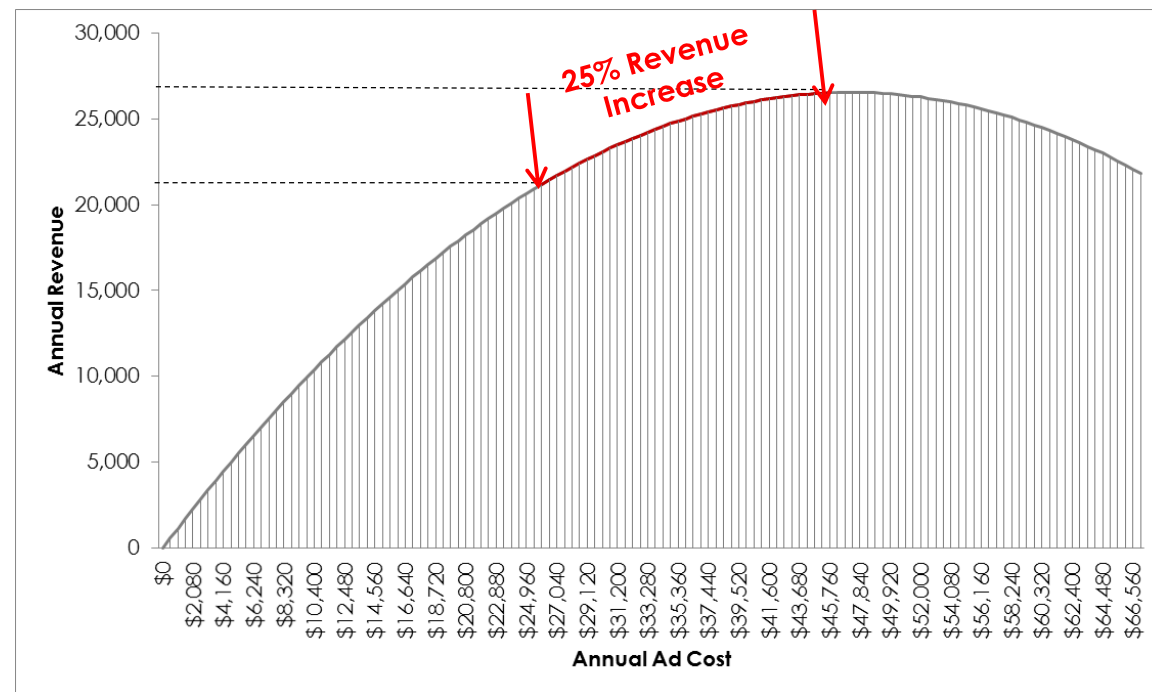
	A	B	C	D	E	F	G	H
1	Week of Year	Cost	Sessions	Transactions	Revenue	ROAS	ROAS (Projected)	Revenue (Projected)
2	201701	165.48	15695	601	116498.47	704.0033	$=(-0.619*B2) + 1124$	
3	201702	107.61	15752	491	95637.78	888.7444	1057.38941	113785.6744
4	201703	81.84	15613	537	106341.11	1299.378	1073.34104	87842.23071
5	201704	89.52	17991	505	95814.94	1070.319	1068.58712	95659.91898
6	201705	77.04	16519	529	96957.90	1258.54	1076.31224	82919.09497
7	201706	295.22	16962	436	83621.49	283.2514	941.25882	277878.4288
8	201707	51.46	17549	506	97075.75	1886.431	1092.14626	56201.84654
9	201708	54.08	17014	450	86820.51	1605.409	1090.52448	58975.56388
10	201709	53.94	16272	538	93022.89	1724.562	1090.61114	58827.56489
11	201710	40.31	16681	443	77848.28	1931.24	1099.04811	44302.62931
12	201711	35.73	16620	459	77884.30	2179.801	1101.88313	39370.28423
13	201712	35.97	17573	493	106158.33	2951.302	1101.73457	39629.39248
14	201713	28.12	17845	477	86748.64	3084.945	1106.59372	31117.41541
15	201714	35.52	18023	411	122892.20	3459.803	1102.01312	39143.50602
16	201715	34.68	16175	466	85348.94	2461.042	1102.53308	38235.84721
17	201716	36.18	16090	525	132744.73	3669.009	1101.60458	39856.0537
18	201717	46.39	18422	467	83309.12	1795.842	1095.28459	50810.25213
19	201718	56.71	16665	573	81221.26	1432.221	1088.89651	61751.32108
20	201719	54.01	14060	496	78081.67	1445.689	1090.56781	58901.56742
21	201720	54.72	17918	469	75718.31	1383.741	1090.12832	59651.82167
22	201721	110.25	15386	446	72170.93	654.6116	1055.75525	116397.0163

Total Return (Actual)	Total Return (Projected)	% Difference
SUM (Revenue)	SUM (Revenue (Projected))	
4531859.18	4529767.45	-0.05%

Diminishing Returns

- Based on ROAS Equation, project how much return is expected per incremental level.
- Remember the data granularity!
 - In this analysis, we used weekly spend and planning annual budget.
- Diminishing return curve suggests to increase revenue by 25%, you need to increase annual spend by 70%.

	Annual Cost		Annual Revenue	
Increase	\$	26,000	\$	21,177,000
10%	\$	28,600	\$	22,409,530
20%	\$	31,200	\$	23,481,120
30%	\$	33,800	\$	24,391,770
40%	\$	36,400	\$	25,141,480
50%	\$	39,000	\$	25,730,250
60%	\$	41,600	\$	26,158,080
70%	\$	44,200	\$	26,424,970
80%	\$	46,800	\$	26,530,920
90%	\$	49,400	\$	26,475,930
100%	\$	52,000	\$	26,260,000



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Summary

Summary & Key Takeaways

- To take benchmarks one step further, consider setting up goals.
- For a simple regression, excel can be a handy tool.
- With regression, you can explore relationship of input variables (independent values) with output variables (dependent values).
- For budget planning, always remember diminishing return and ensure your recommendation is under the tipping point.

Questions?

Thank you!

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