



Conference Presentation  
Intellus GS 245 Rosenblatt Janssen



*Are the McKinsey Order of Entry and “Broken Stick”  
Market Share Models Broken?*

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## Are the McKinsey Order of Entry and “Broken Stick” Market Share Models Broken?

Or are they simply too limited to be useful  
in today’s complex markets?



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# Background, Business Question & Top-Line Results

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# Order of Entry (OOE) Models Have Been Used With *Varying Degrees of Success for Decades* by Pharmaceutical Marketers

- The **McKinsey/MIT Order of Entry (OOE)** and **Broken Stick** models\* have been used for decades to predict long-run market share, referred to as *equilibrium share*; **accurate predictions have been spotty**
- *It is not “news” that these older OOE market share models are insufficient – what is new, is that an approach has been conceived and developed that can help marketers **accurately characterize real-world market conditions, AND, estimate long-run market share based on real-world market data!***

N=	1	2	3	4	5	6	7	8	9	10
1 <sup>st</sup>	1.00	0.58	0.44	0.36	0.31	0.27	0.25	0.23	0.21	0.20
2 <sup>nd</sup>		0.42	0.31	0.25	0.22	0.19	0.18	0.16	0.15	0.14
3 <sup>rd</sup>			0.25	0.21	0.18	0.16	0.14	0.13	0.12	0.11
4 <sup>th</sup>				0.18	0.16	0.14	0.12	0.11	0.11	0.10
5 <sup>th</sup>					0.14	0.12	0.11	0.10	0.10	0.09
6 <sup>th</sup>						0.11	0.10	0.09	0.09	0.08
7 <sup>th</sup>							0.09	0.09	0.08	0.08
8 <sup>th</sup>								0.08	0.08	0.07
9 <sup>th</sup>									0.07	0.07
10 <sup>th</sup>										0.06

The McKinsey model, published in 1986, analyzed the effect of Order of Entry using multivariate linear regression analysis for brands across primarily non-pharmaceutical categories

The Broken Stick model, published in 1962, provided a simplified description of expected market share distributions using rank order statistics in a fixed linear fashion

N=	1	2	3	4	5	6	7	8	9	10
1 <sup>st</sup>	1.00	0.75	0.61	0.52	0.46	0.41	0.37	0.34	0.31	0.29
2 <sup>nd</sup>		0.25	0.28	0.2	0.26	0.24	0.23	0.22	0.20	0.19
3 <sup>rd</sup>			0.11	0.15	0.16	0.16	0.16	0.15	0.15	0.14
4 <sup>th</sup>				0.07	0.09	0.10	0.11	0.11	0.11	0.11
5 <sup>th</sup>					0.04	0.06	0.07	0.08	0.08	0.09
6 <sup>th</sup>						0.03	0.04	0.05	0.06	0.0
7 <sup>th</sup>							0.02	0.03	0.04	0.05
8 <sup>th</sup>								0.02	0.03	0.03
9 <sup>th</sup>									0.01	0.02
10 <sup>th</sup>										0.01

\* Additional research has also been published nuancing these findings over the years (e.g., Regnier & Ridley, 2015), all suggesting that order of entry is the single largest predictor of long-run market share and that it is very difficult to overcome market launch positioning



# Our Results Show That a **Single-Variable Market Share Model** is not Valid nor Reliable?

- One business question is ubiquitous with pharmaceutical marketers and researchers, largely attempting to answer the following question:



## **The Question:**

***“Is it worthwhile to pursue late-entrant opportunities in crowded markets?”  
And if yes, “under what conditions?””***

- Current findings suggest that OOE is still an important predictor of long-run market share.
- ***However, in real-world specialty markets, OOE should not be used as the sole variable to make strategic decisions.***



## **The Answer:**

***“**Yes**, there is significant evidence from more than 20 years of specialty market launches showing that it can be worthwhile to pursue late-entrant opportunities in crowded markets, under a variety of market conditions”***

# Current Findings Based on 200+ Product Analogs

- Our research suggests that **numerous other variables must** also be considered, even more so in specialty markets, that have not been fully addressed by earlier generation OOE/market share models.
- While most marketers **“believe” there are other variables** that must be considered, this research suggests that these “beliefs” **can now be accurately quantified!**

- ✓ *The overall Target Product Profile (TPP) differentiation can impact the long-run level of penetration within a specialty pharmaceutical market*
- ✓ *Specific product attribute(s) have more impact on market share*
- ✓ *The impact of Share of Voice (SOV) on market penetration within specialty pharmaceutical markets is significant; higher than average SOV overcome the negative effect of late entry*
- ✓ *Favorable “market access” can impact short and long-run share*

A large, stylized globe in shades of orange and red is positioned on the left side of the slide. The globe shows the outlines of continents. The background of the slide is a solid dark red color.

# Methods

# Market Share Simulator – Objectives

F|R helped the Janssen team develop a deeper understanding of which variables are the most important the drivers of market share



Investigate numerous predictive independent variables to **better explain the variability** in market share



Explore the **qualitative independent variables** which further **add nuances** to assessing analog characteristics in a market



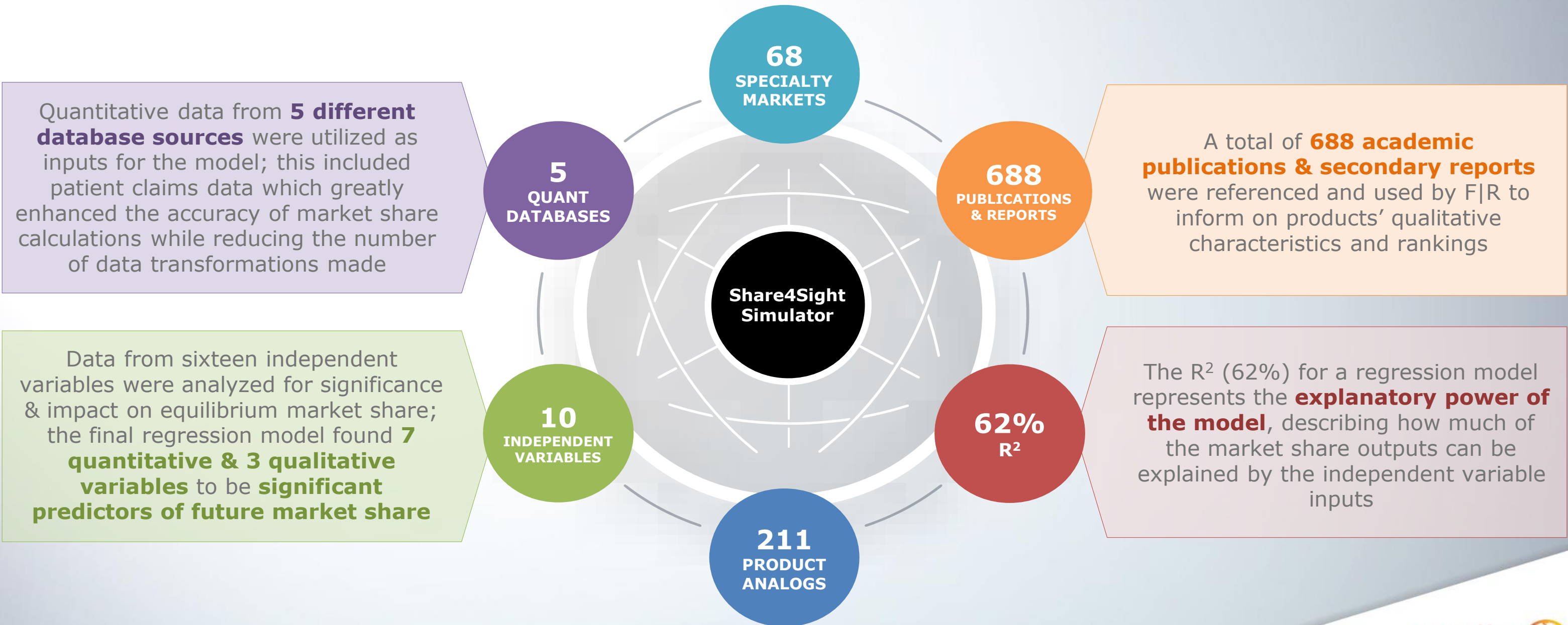
Evaluate first entrant analogs to understand the **market share of the first branded product** into a new or genericized market

Help the Janssen team to develop a **deeper understanding of the drivers and barriers** to market share and enable the creation of **better market forecasts & future opportunity assessments**



# Market Share Simulator – Overview

The simulator was built from the ground up, evolving & expanding data sources with multiple regression modeling to significantly enhance its capabilities





# Market Share Simulator – Specialty Market Overview

JAN & F|R analyzed 211 analogs in 68 specialty markets using 10 independent variables that were found to be significant predictors of market share

- We identified **68 specialty markets containing 125 new entrants between 2010 and 2019 and 86 other market competitors**
- The analysis excluded the following groups of products
  - Excluded Oncology
  - Excluded Primary Care
  - Excluded Infectious Disease
- We tested associations between equilibrium share and an **initial set of 16 independent** qualitative and quantitative variables - of these, **10 were found to be significant predictors** of equilibrium market share
- The vast majority of markets had 5 or fewer identified competitive products; there were some very well-known outliers (RA, psoriasis and others)



# Outcomes & Findings

# Market Share Simulator – Significant Independent Variables

By utilizing multiple regression modelling, F|R identified **10 independent** variables (*plus the number of market competitors*) to be the most significant predictors of market share

- Through multiple regression modelling, it was identified that **10 of the independent variables explored, falling into one of the seven categories below, were found to be significant predictors of market share for the product analogs:**



## Independent Variables

- ✓ *Order of Entry*
- ✓ *Efficacy (Rank & Qualitative)*
- ✓ *Safety (Rank & Qualitative)*
- ✓ *Route of Administration*
- ✓ *Market Access*
- ✓ *Share of Voice (DTC / All Other)*
- ✓ *Company Size*

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# Simulator Examples & Outputs



# The findings suggest that the “Broken Stick” model is not relevant for specialty markets and the McKinsey OOE model has limited value in helping to answer real-world business challenges

**Order of Entry Model (McKinsey)**

N=	1	2	3	4	5	6	7	8	9	10
1 <sup>st</sup>	1.00	0.58	0.44	0.36	0.31	0.27	0.25	0.23	0.21	0.20
2 <sup>nd</sup>		0.42	0.31	0.25	0.22	0.19	0.18	0.16	0.15	0.14
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7 <sup>th</sup>							0.09	0.09	0.08	0.08
8 <sup>th</sup>								0.08	0.08	0.07
9 <sup>th</sup>									0.07	0.07
10 <sup>th</sup>										0.06

**Broken Stick Model**

N=	1	2	3	4	5	6	7	8	9	10
1 <sup>st</sup>	1.00	0.75	0.61	0.52	0.46	0.41	0.37	0.34	0.31	0.29
2 <sup>nd</sup>		0.25	0.28	0.2	0.26	0.24	0.23	0.22	0.20	0.19
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- **When only OOE is considered**, the JAN-F|R model produces very similar results to the McKinsey OOE model
- The Broken Stick methodology appears to be out of step with current real-world data
- **However**, no further analyses can be accomplished using the McKinsey OOE model, such as:
  - What happens if we do not assume equivalent promo SOV?
  - What if the 2<sup>nd</sup> or 3<sup>rd</sup> or later products have superior efficacy, safety or market access position?
  - The new model has the ability to “scenario game” any combination of product & commercial attributes using a highly statistically significant regression predictor model

JAN - F   R PROJECTED MARKET BASKET											Market Shares	
Projected Market Basket	Order of Entry	Efficacy Ranking	Safety Ranking	RoA Ranking	Efficacy (Qualitative)	Safety (Qualitative)	Market Access Ranking	Company Size	Share of Voice (% of spend)		Live	Saved
									DTC \$	Detailing \$		
Product A	1										43.8%	43.8%
Product B	2										31.6%	31.6%
Product C	3										24.5%	24.5%

# The simulator estimates **substantial differences** in expected outcomes for later entrants by **including two additional variables** - SOV and Efficacy

- Considering only OOE, (i.e., with a **similar** TPP and commercial presence) our model estimates that in a 3-product market, a **3<sup>rd</sup> entrant can expect to capture roughly 20% less market share than the 1<sup>st</sup> entrant**
- The model suggests that with a **similar TPP** but an **improved commercial presence**, based only on SOV, the market share of a 3<sup>rd</sup> and would be 8% higher than expected (based on only OOE), the gains coming equally from both the 1<sup>st</sup> and 2<sup>nd</sup> entrant
- Furthermore, with an **improved TPP and improved commercial presence**, a 3<sup>rd</sup> entrant long run share could rival the 1<sup>st</sup> entrant at roughly 36%, and would be 12% higher than expected (based on only OOE), the gains coming equally from both the 1<sup>st</sup> and 2<sup>nd</sup> entrant

Market Share estimates using → **Order of Entry & Differential SOV** (higher for 3<sup>rd</sup> to Market)

PRODUCT (In Market Basket)	Order of Entry	Promotional SOV	~ RESULTS
Product A	1	25%	4% ↓
Product B	2	25%	4% ↓
Product C	3	50%	8% ↑

Market Share estimates using → **Order of Entry & Differential SOV & Efficacy** (higher for 3<sup>rd</sup> to Market)

PRODUCT (In Market Basket)	Order of Entry	Promotional SOV	Efficacy	~ RESULTS
Product A	1	25%	Hist SOC	6% ↓
Product B	2	25%	Hist SOC	6% ↓
Product C	3	50%	Significant ++	12% ↑

*What is interesting with the above examples, as the market share of the 3<sup>rd</sup> entrant increases, due to improved commercial presence and improved efficacy, **the 3<sup>rd</sup> entrant appears to be equally taking share from both the 1<sup>st</sup> and 2<sup>nd</sup> entrants***

# The simulator estimates **differences** in expected outcomes for later entrants by **varying** Efficacy, Safety, Market Access and Company Size (and many other variables)

- The model suggests that with a **similar TPP** but an **improved commercial presence**, based only on Company Size and Better Market Access, the market share of a 3<sup>rd</sup> entrant would be 7% higher than expected (based on only OOE), when competing against smaller firms
- And Finally, with an **improved TPP based on both Efficacy & Safety**, the market share of a 3<sup>rd</sup> entrant would be 6% higher than expected (based on only OOE), with all other commercial considerations being equal

Market Share estimates using → **Order of Entry & Differential Market Access & Company Size**

PRODUCT (In Market Basket)	Order of Entry	Market Access Rank	Company Size	~ RESULTS
Product A	1	3	Small	6% ↓
Product B	2	2	Medium	1% ↓
Product C	3	1	Large	7% ↑

Market Share estimates using → **Order of Entry & Differential Efficacy & Safety** (higher for 3<sup>rd</sup> to Market)

PRODUCT (In Market Basket)	Order of Entry	Efficay (Rank)	Safety Rank	~ RESULTS
Product A	1	3	3	4% ↓
Product B	2	2	2	2% ↓
Product C	3	1	1	6% ↑

*These examples have only **scratched the surface** of the myriad of scenarios and business conditions that can be modelled allowing the researcher to better understand, **and most importantly, quantify** long-run equilibrium market share. Of particular interest is what occurs in 2, 4 and 5+ product markets*



# Why Is This Research So Important?



This research highlights the importance of going well beyond including order of entry as the sole predictor of market share



It also underscores the need to devote significant time to data collection and analysis; the investment in data and research time to review the analogs from both a quantitative and qualitative perspective is non-trivial



**Without question, the results speak for themselves** – when faced with a commercial issue that addresses questions such as: “Should we launch a later entrant?”; “What might our market share be as a later entrant?”; “How will our 1st line OOE market share be eroded by a new competitor with an enhanced TPP or commercial presence?”, and so on... there is no need to operate blindly



**Advanced modeling capabilities and vastly improved available data in the pharmaceutical market research industry can provide answers to these critically important questions**



# Next Steps in the *Share4Sight* Simulator !



This research highlights the results as it relates to the ***largest specialty markets in the US*** pharmaceutical industry. Additional insights are needed for:

- Oncology indications
- Infectious diseases
- Largely primary care therapeutics
- Europe and ROW (to the extent that data exists)



The research methods used in this project are continually improving with the intent to further optimize and maximize the accuracy of the model projections. It would be our recommendation that ***researchers include non-linear and additional causal methods*** to tease out many of the underlying tendencies in the data - for example, the relationship between company size, market size and the extent of promotion (both actual and relative)

# Presenter Information



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Want to learn more?

If at the Institute in-person, come by our table during the meals.

If joining us remotely via the broadcast or watching this on-demand, contact us at [jerry@fosterrosenblatt.com](mailto:jerry@fosterrosenblatt.com)



# APPENDIX

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This used a rigorous objective approach to analyze 211 products in 68 specialty markets, seeking to understand drivers and barriers to market share

**1**  
**Analog Research & Identification**

- Used multiple secondary data sources as the basis of analog identification\*
- An initial set of analogs was filtered using pre-set selection criteria (i.e., non-oncology specialty markets with either a single or multiple NME launch between 2010-2018)
- Identified 211 analogs from 68 markets\*\*

**2**  
**Quantitative Analog Analyses**

- Direct Rx claims data was used for granular calculation of market share of analogs by indications
- Medical data, external sales and unit data were used to enhance the patient claims data
- Promotional data was used to estimate SOV for detailing, DTC and other marketing spend
- Formulary data was used to assess market access

**3**  
**Qualitative Analog Analyses**

- Over 700 peer-reviewed articles and syndicated reports, as well as all product PIs were used to establish the relative value of each product TPP variable
- Clinical trials and meta-analyses were also used to assess the clinical ranking of all products
- Determined each product's clinical differentiation versus the previous entrants

**4**  
**Dashboard and Simulation**

- Performed regression analyses to understand the impact of each variable on peak and equilibrium patient share, and developed share simulation using each variable
- Created a dashboard to summarize the analogs and facilitate analog searches based on different market attributes (e.g., OOE, TPP differentiation, share of voice, etc.)

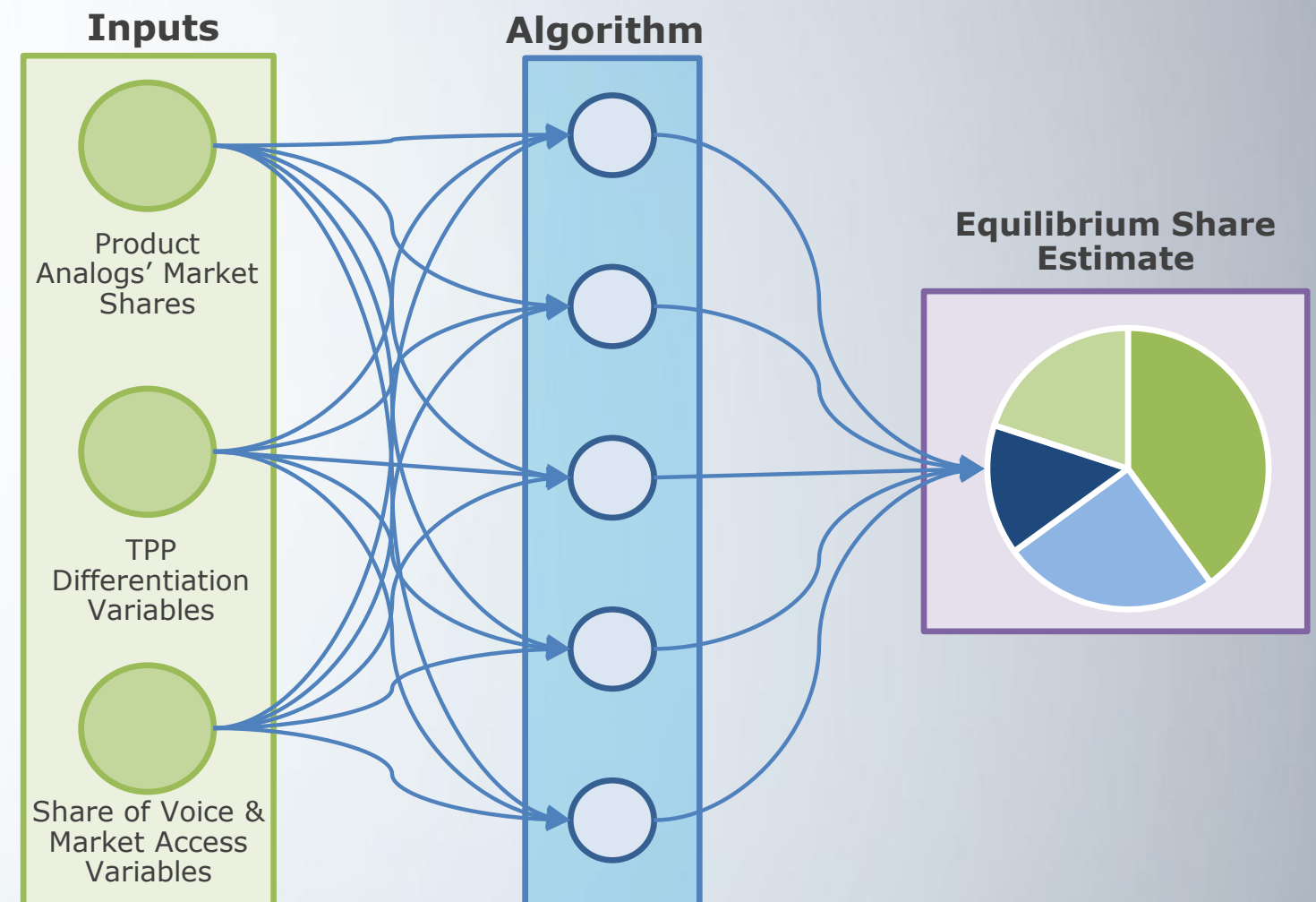
\* Data sources included IQVIA, Symphony Health, Evaluate Pharma, Clarivate, DataMonitor, Global Data)



# Market Share Simulator – Statistical Power

The simulator expands on the prior work in this area with significant improvements in the robustness & explanatory power of the model with an  $R^2$  of 62%

- Market share & extended independent variable analyses using multiple data sources, significantly improves the accuracy, robustness & explanatory power of the market share simulator
  - $R^2$  of 62%
  - This means that the 10 independent variables used in the analysis explains approximately 62% of the variability in the data
  - The predictive power of the model is close to 80% (correlation between actual results and predicted values)
- Most published commercial OOE studies show low  $R^2$  values. Some exceptions (never exceeding 55%) include
  - Hollis, A. (2002) observed  $R^2$  to be between 39% and 53%
  - Shajarizadeh, A et al. (2015) observed model  $R^2$  to be around 55%
  - ***It is important to note however, that these models were built using significantly less product analogs, explored fewer variables contributing to market shares and were shaped after traditional, non-specialty markets***



The simulator incorporates 211 product analogs from 68 different specialty markets