**Innovation**

Objective 1:

Design Digital Advertisement Simulation System (DASS) for modelling digital advertising and its impact on user behavior.

Accomplishments:

1. The simulation was used to test performance of multiple position-based attribution models, commonly used in the industry. Results showed that all attribution models failed to capture true causal value of advertising.
2. The simulation results were also used to compare performance of existing Marketing Mix Models (MMM). MMM estimates were within simulation’s confidence interval.

Objective 2:

Build Marketing Mix models for main Keytruda indications - Lung and non-Lung models to estimate the impact of HCP digital promotions on sales.

Accomplishments:

1. Tested a new data source – HCP level Claims data and multiple variations of modelling dataset from time aggregation to geography aggregation.
2. Compared % sales contribution between original DDD models and Claims models.
3. Created promotion response curves using additional Machine Learning techniques like GAM and Gradient Boost models.

**Core Services**

Objective 1:

Evaluate promotion impact and channel ROI estimates of Lynparza's 2019 DTC campaign.

1. Calculated impact on sales and channel level ROIs of 2019 LYNPARZA DTC campaign with about $5M spend.
2. Assisted in justifying historical investments and determining if additional funds are needed for 2021 with launch of new indications.

Objective 2:

Evaluate impact of 3 DIFICID DET HCP digital campaigns (Intent, Consideration and Fast Start) which were live from Oct'19 - Mar'20.

1. Calculated impact on total sales and channel level ROIs of 3 DIFICID DET HCP digital campaigns along with impact that could solely be attributed to DET activities.
2. Highlighted caveats in current segmentation used in DET campaigns and gave recommendations on how to approach DET campaign development and customer targeting.

Objective 3:

Support Crossix 2019-2020 HCC media analysis for Diabetes, Nexplanon and Lynparza.

1. Supported multiple brand teams (Diabetes, Nexplanon and Lynparza) in estimating ROIs for DTC campaigns at granular level – publishers, audience segments, targeting tactics and multiple paid search campaigns with about $32MM spend.
2. Provided guidance to media and brand teams for 2021 DTC channel mix based on above ROI results.

Objective 4:

Build a Search Engine Marketing (SEM) Performance model to determine CPC ceilings for different Paid Search campaigns (branded, unbranded, etc.) based on multiple ROI scenarios. These CPC values will be used in a pilot campaign for real time bidding for branded/ branded keywords and for Paid Search cost saving.

Objective 5:

Support Nexplanon with their first TV campaign in 2021 with about $10M spend by creating multiple ROIs scenarios based on variations in campaign design.

**COE Development**

Objective 1:

Complete RWDEx training to transition to cloud-based computing for faster analysis/ modelling execution.

**Compliance**

Objective 1:

Carry a meaningful compliance priority, complete all required compliance training on time, and conduct themselves in a manner consistent with the letter and spirit of our policies

Objective 2:

Constructively engage compliance and legal to gain input on business strategies, plans and initiatives.