

# OmniBERT: Transformer-based approach for Omnichannel Next Best Action Recommendation with heterogeneous dataset

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## Introduction/Problem Statement

### What challenge are we solving?

In the pharmaceutical industry, building HCP trust and engagement requires understanding **not just promotional activities but also Non promotional events** like patient events, competitive landscape, formulary control etc. Traditional omnichannel Next Best Action models often struggle to account for these dynamic influences

#### What is Omnichannel NBA?

(AI) Machine Learning based suggestions and recommendations

Optimized sequence of touchpoints across all sales and marketing channels leveraging real-time HCP engagement and preferences



## OmniBERT Methodology/Architecture

OmniBERT uses **longitudinal customer data**—promotional and non-promotional—anchored to a key date and ordered by event sequence (Figure 2)

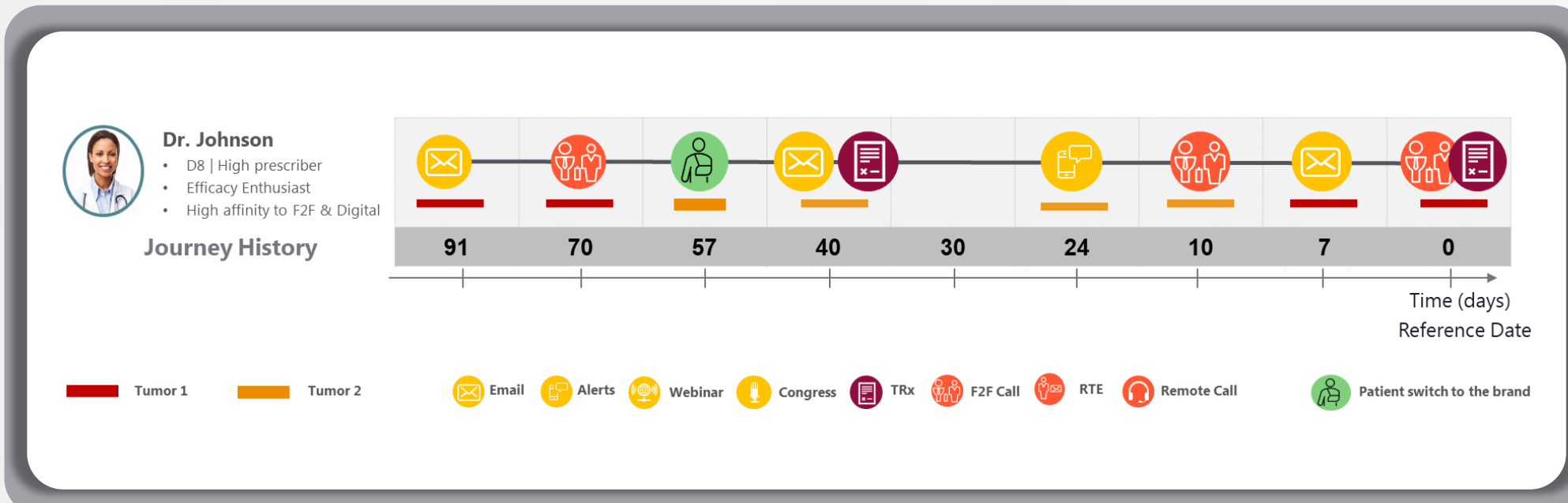


Figure 2: Customer's journey across promotional and non-promotional events

Customer sequences are processed by OmniBERT (Figure 3), generating **embeddings by token, event type, position, and time** from anchor events.

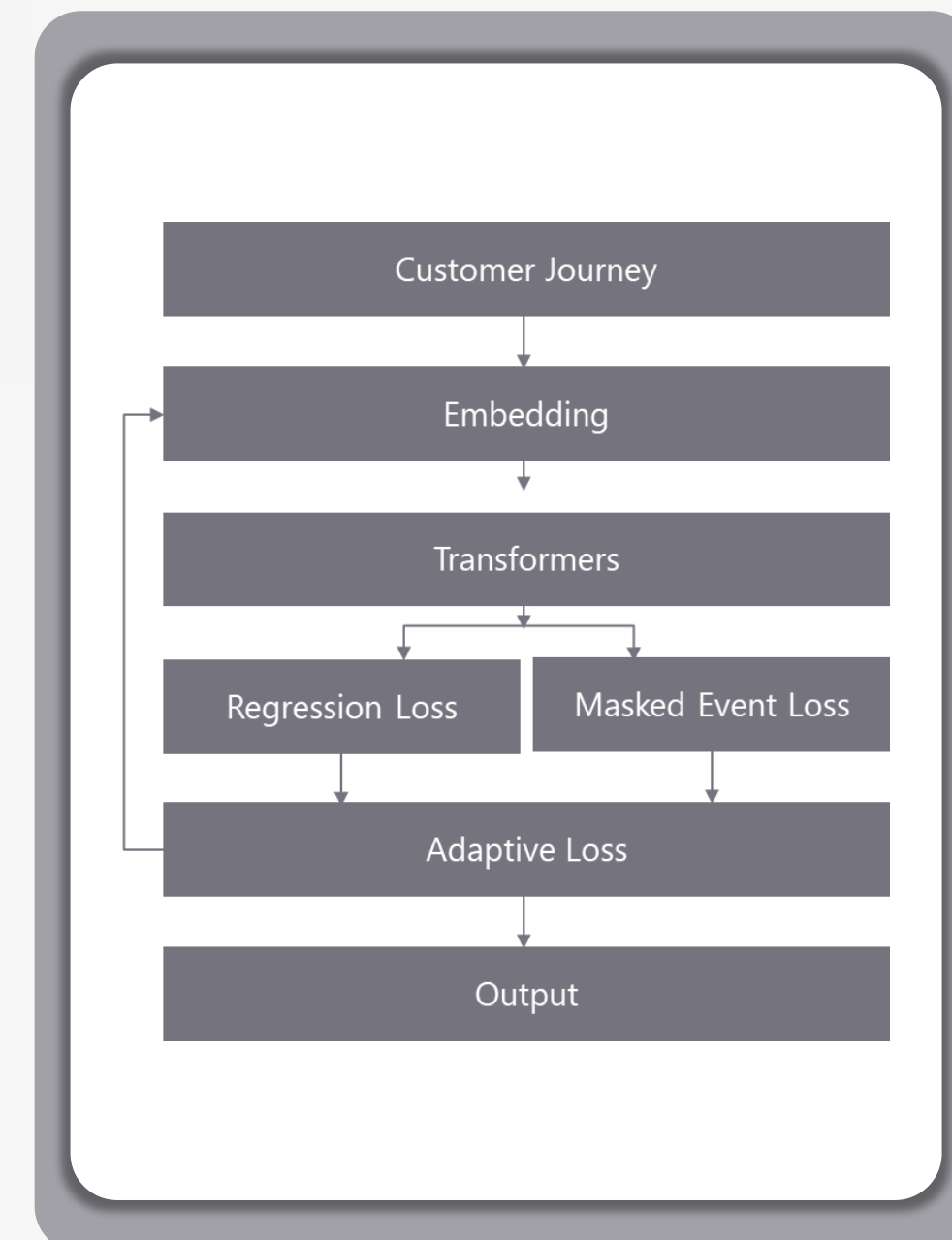


Figure 3: OmniBERT Architecture

- **Token embedding**
- **Type embedding**
- **Position embedding**
- **Temporal embedding**

Figure 4 illustrates this using the customer journey shown in Figure 2.

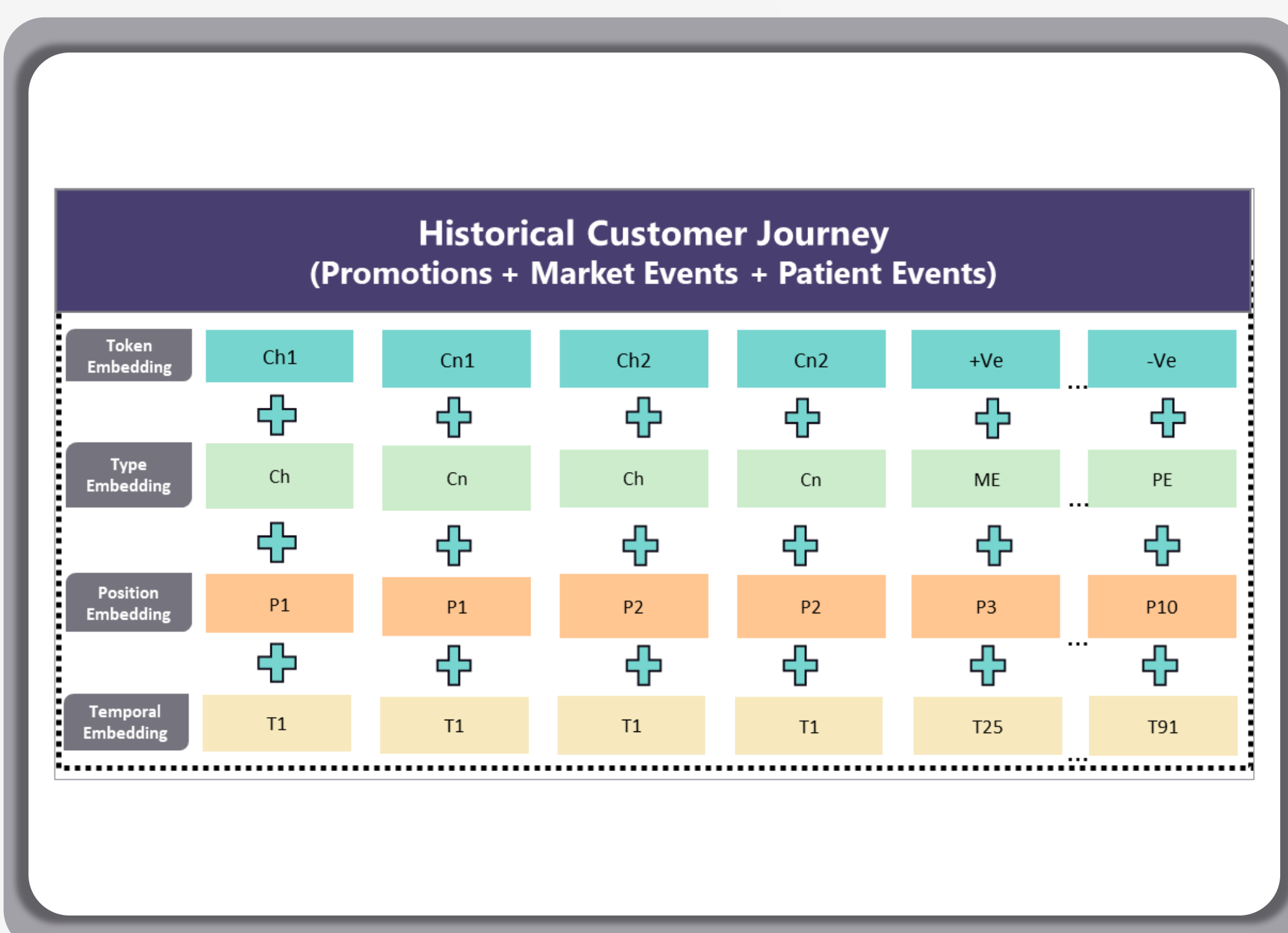


Figure 4: Illustration of input data for OmniBERT

OmniBERT optimizes two loss functions:

- **Masked Event Modeling**
- **Event Prediction (Regression Loss)**

Adaptive weighting of the two losses enhances training convergence



## Results/Impact

- Up to **90% reduction** in model training time
- Upto **5% improved performance** through architecture tuning and **incremental ~5%** via additional data ingestion



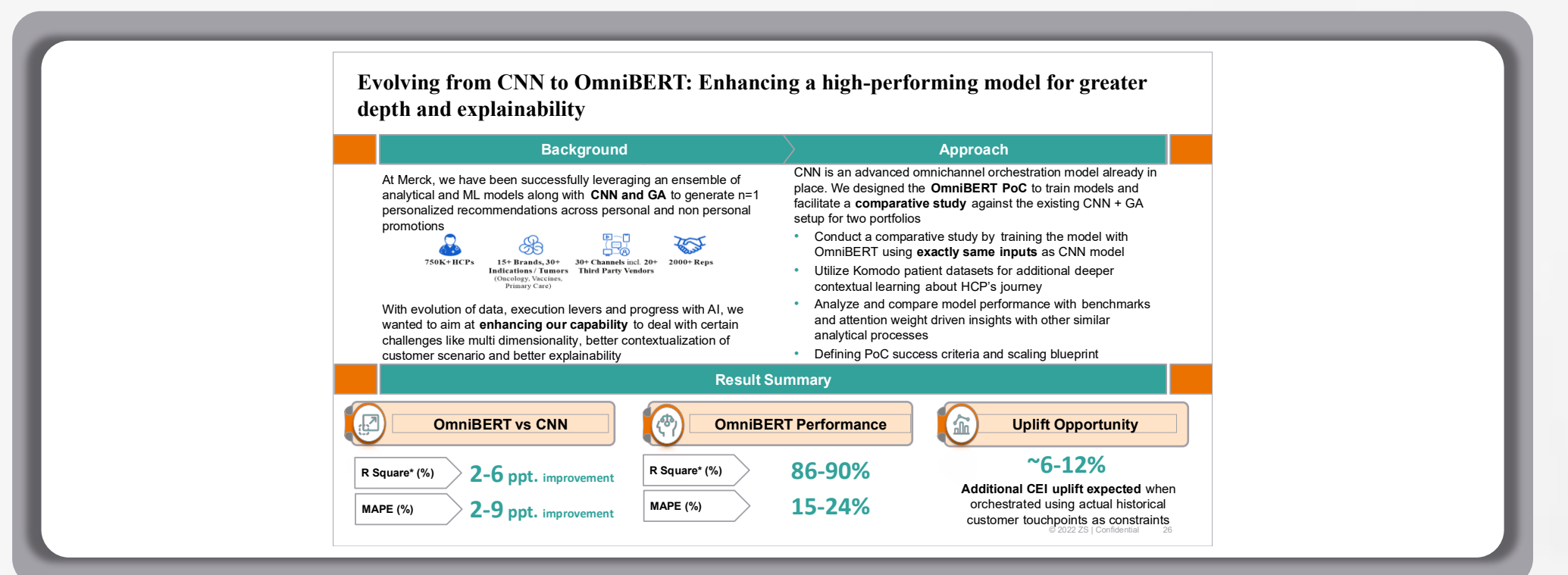
## MERCK & ZS Partnership on OmniBERT Implementation

Merck has been a leading partner in adopting ZS's omnichannel Next Best Action (NBA) innovations. Building on this strong foundation, We collaborated on the OmniBERT implementation initiative.

Together, we:

- Co-defined objective, approach, success criteria, and timeline
- Identified target franchises and incremental datasets to be used
- Developed a comprehensive implementation blueprint and scaling roadmap

This joint effort reflects a shared commitment to advancing AI-driven, customer-centric decision-making at scale



## Innovation Highlights

1. **Enhanced Model Performance**
2. **Better topline uplift opportunities**
3. **Improved Explainability**
4. **Scalability and Adaptability**
5. **360° Customer Context Integration**
6. **Optimized Journey Design**



Some of the benefits over traditional DL models:

Key Criteria	OmniBERT	CNN
Handling Journey Multi Dimensionality	Easy	Complex
Model Performance	Very High	High
Model Explainability	High	Low
Journey Dimension Scaling	Easy	Complex
Optimization Opportunity	Very High	High



## Conclusion/Key Takeaways

- OmniBERT **outperforms** traditional models in NBA
- Integrates promotional and non-promotional data for **better personalization**
- Attention based explainability **builds trust and adoption**
- **Scalable** for future pharma engagement needs



## Future Roadmap

- Integrate **GenAI based explainable** module
- Leverage Market research and other unstructured data (like rep notes) to **augment HCP's context**
- Integrate with GenAI-based content generation for **hyper-personalized** engagement
- Leverage **Reinforcement Learning (RL)** based approach for journey optimization



## Objective

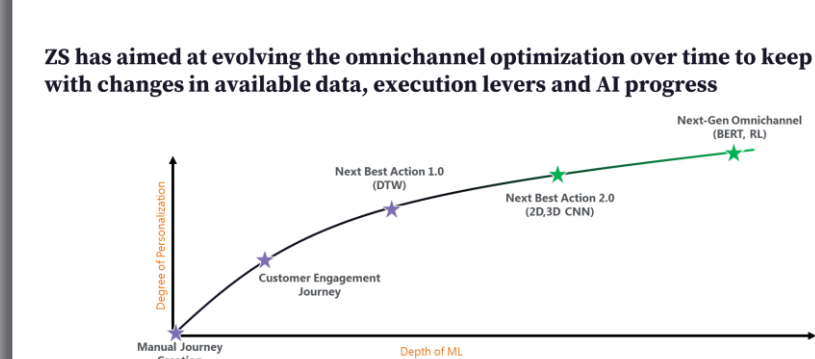
To showcase OmniBERT, a novel transformer-based architecture combined with Genetic Algorithms, designed to generate **optimized next-best-action (NBA)** strategies by learning from **diverse, multi-dimensional** HCP engagement data



## Background

In pharma, **faster, richer capture of non-promotional data opens the possibility** to link such events to Rx behavior—beyond traditional promotion and profile data. However, mining this high-dimensional sequential data is complex. Figure 1 shows how ZS has evolved its omnichannel optimization over time.

Figure 1: Omnichannel Optimization Evolution



Discover  
OmniBERT in  
90 Seconds  
(Scan Me)

