

A large, dark grey, corrugated metal hangar with a massive vertical opening. Through the opening, the nose and cockpit of a white aircraft are visible. In the foreground, a group of people, including several in business attire and some with cameras, are standing and looking towards the hangar. The scene is set outdoors on a paved area.

# From Industrial Big Data to Artificial Intelligence @ Airbus

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**AIRBUS**

# AI and Industry – what, why and when?

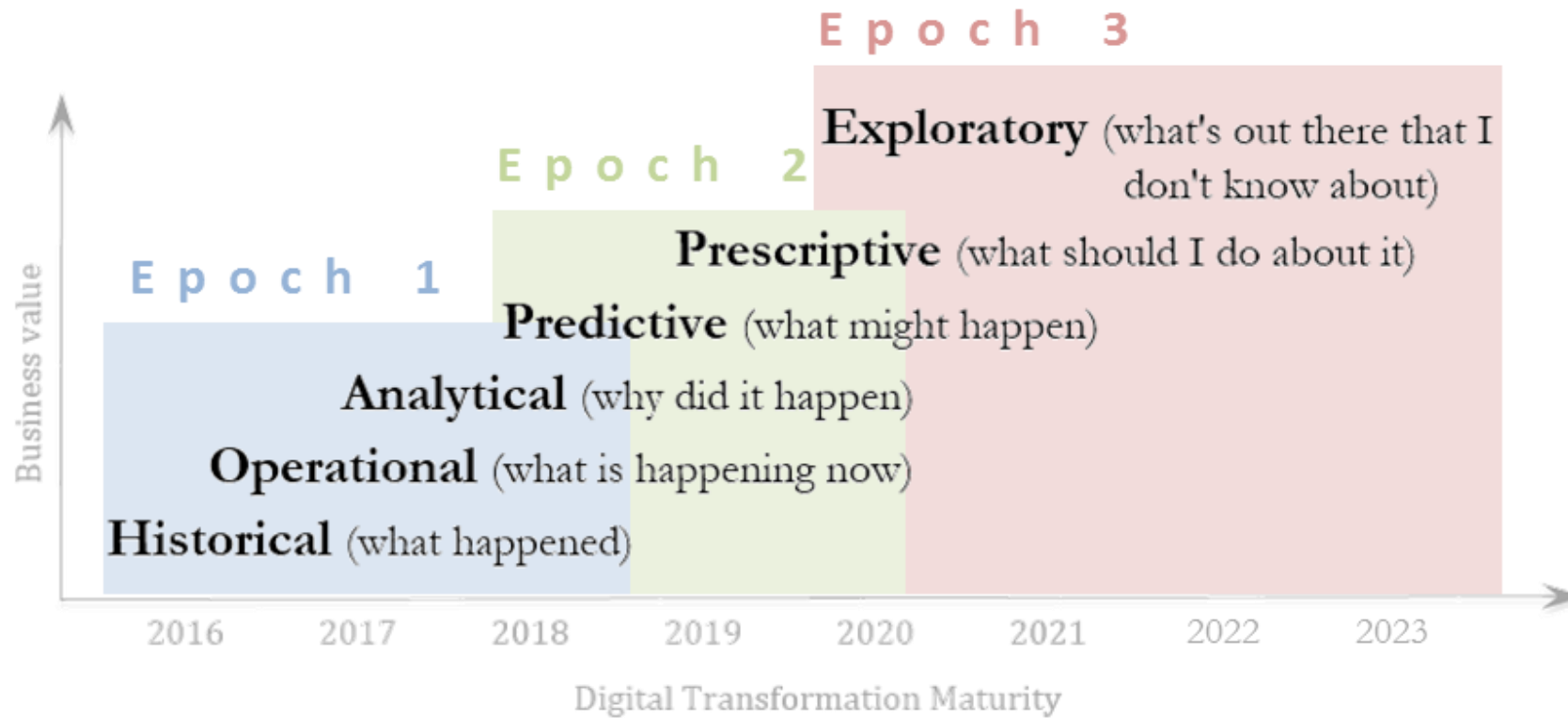
- Why now? -> AI enabled by Data Lake (Big Data) & Cloud (external data)
- AI will push decision making and planning into more complex and judgment-led analysis roles
- From reporting and lagging indicators to forward looking and uncovering new opportunities
- Increased standardization for regulatory and compliance requirements require low-value-added tasks that are ideal for robotic process automation (RPA).
- Central functions and strategic functions (intercompany reconciliations, disclosure, financial analysis, asset allocation, forecasting) – AI and Big Data enable (near-)real time analysis
- Today: AI Natural Language Generation technology can communicate insights hidden in data and generate reports from raw data
- one in four of today's jobs are expected to be impacted by AI technologies by as soon as 2019 (Forrester)

# AI & Cognitive Computing Systems

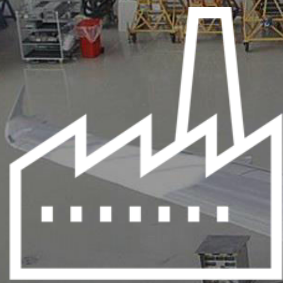
AI & Cognitive Computing enables a new interaction model for exploring **complex and large data-sources** (structured & unstructured, text, images, video, speech, audio, sensors) with **conflicting answers, ambiguous evidences**, and **hard to automate processes**

The ability to learn from data makes AI powerful. No more hardcoding every single possible behavior, **a cognitive system learns and improves with data** (& outcomes). We want to create **Algorithms that can learn, adapt, interact and understand**  
... to carry out tasks in a way that we would consider **“smart”**.

## Evolution of Data Science and its impact on business



# How will industrial artificial intelligence influence us?



Optimized  
production



Innovative  
products



New business  
models

... today just selected aspects

# Before you do AI, you need to master Big Data

Airbus embarked two years ago on a Big Data journey

- Integrate data from multitude of data sources
- flatten structure
- join unstructured & semi-structured data
- create big data lake platform
- > map-reduce, pig, hive, spark to transform data into 'structure on read'

Lighthouse project example

- combine application data, IOT and unstructured reports on non-quality data
- > machine learning to create similarity search

# Similarity Matching for Non Conformities

- Avoid production interruption by finding and fixing repeat issues
- Find root cause of issues quickly
- Re-plan work to keep the line moving
- "Fuzzy matching" of issues based on full text analysis
- Constrained dynamic optimization
- Cumulative program knowledge available to everyone on the shop floor

The screenshot shows a software interface for managing non-conformities. At the top, it says 'Non Conformities' and 'SELECTED NON CONFORMITIES (2)'. There are search and filter options. Below, a list of 128 NCS is shown with columns for SOI number, description, and date. A table below the list shows the relationship between SOI numbers and their counts.

SOI number	Count
VNEP00022000100	1
VCOM57040009000	1
VCOM5704000100000	5
V0267133700000	3
V5451302800100	2
V5338593110800	2
V5756907300100	2
V0369021001000	2
V5754039800000	2
V2527875200900	2

The screenshot shows a detailed view of a non-conformity. It includes a search bar, a list of related items, and a table of evolution. The table shows the version, date, author, and origin of the non-conformity.

Version	Date	Rédacteur	Pages Modifiées	Origine de la création
A0	01/08/2014	Y.BIRONIEN	-	Création suivant la DS V53385812004 Indice C00
A1	06/05/2015	Y.BIRONIEN	5, 8, 11, 14	Intégration DQN NZ0133517

# AI & Cognitive Computing Roadmap





# Epoch 1: Knowledge Layer & smart search

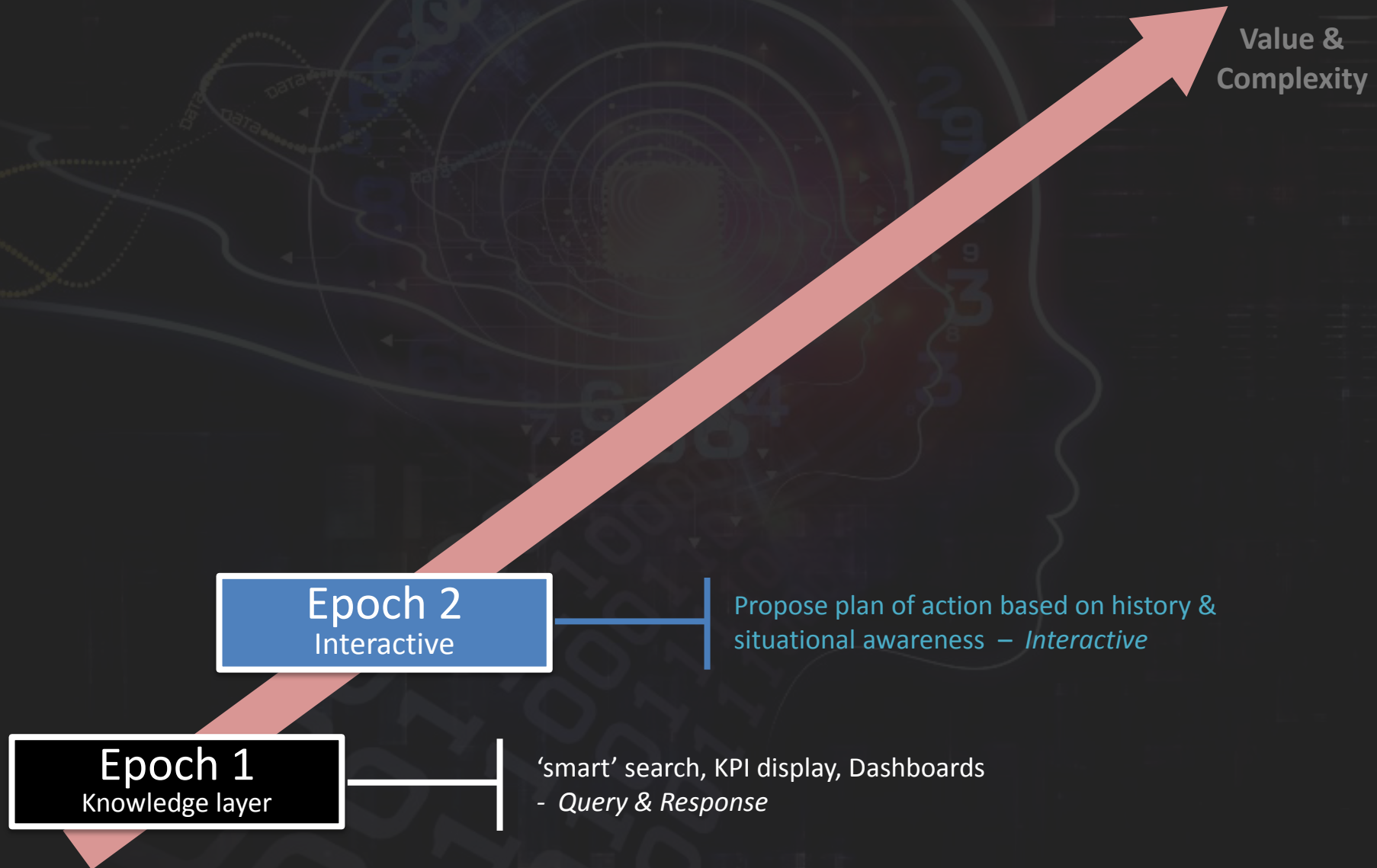
Epoch 1  
Knowledge layer

'smart' search, KPI display, Dashboards  
- *Query & Response*

(Built on Big Data Layer)

- semi autonomous data ingestion, taxonomy & governance
- contextualized knowledge representation of structured, unstructured data, implicit and explicit process data
- smart search, similarity matching, process (semi-)automation
- continuous model update
- outlier & anomaly detection (time series analytics)
- operational optimization based on events and deep learning
- high speed computer vision target recognition

# AI & Cognitive Computing Roadmap



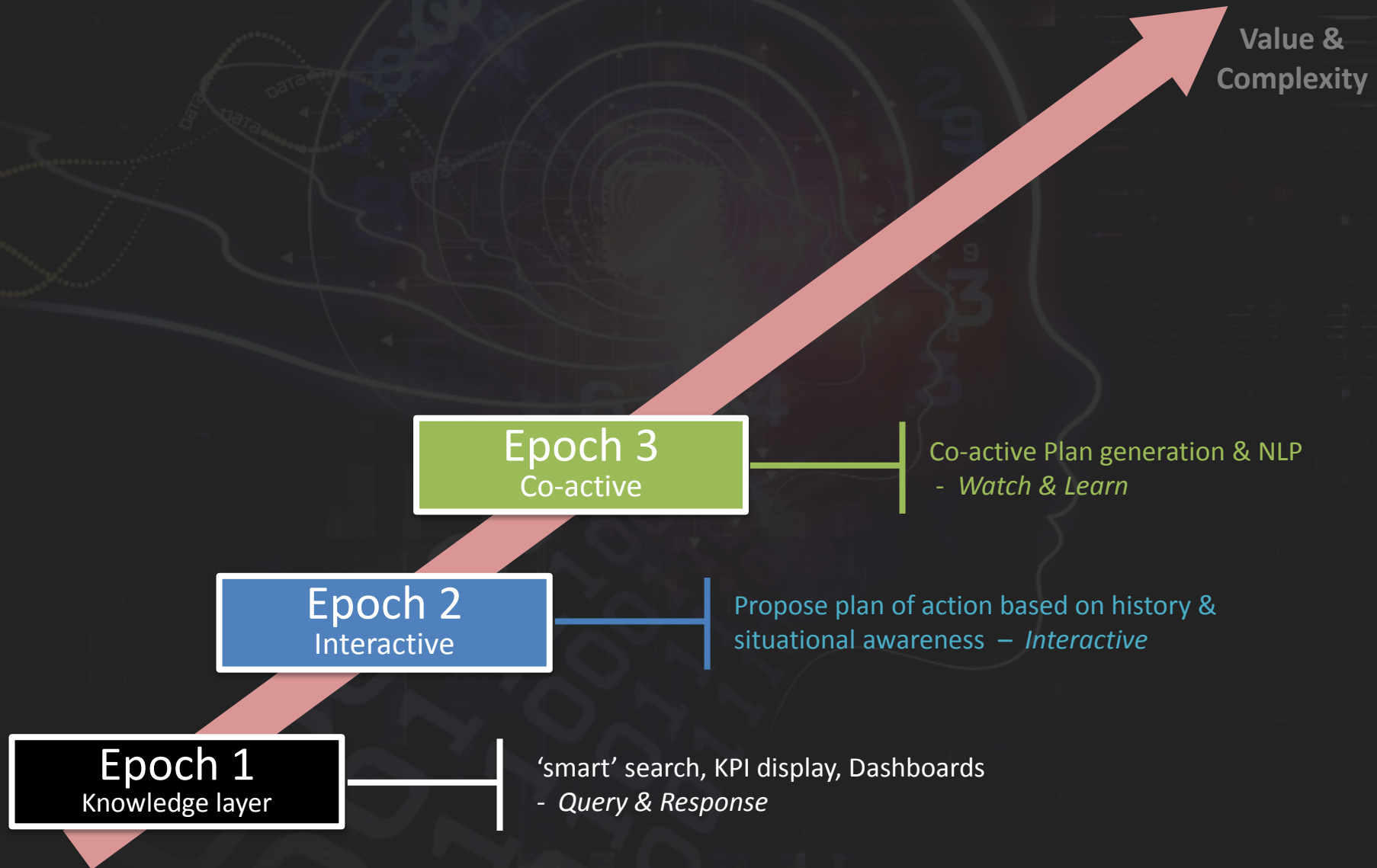
# Epoch 2: Learn from past situations and propose plan of action

Epoch 2  
Interactive

Propose plan of action based on history &  
situational awareness – *Interactive*

- capture of interaction to learn better decision making/support
- bots
- interactive SOI - extract process information from structured documents
- (semi-)automation of interactions with human customer.
- reduction of work for human interaction and workload
- ability to mine interaction to detect potential unknown elements
- first level of decision support and dynamic re-tasking/re-planning.

# AI & Cognitive Computing Roadmap



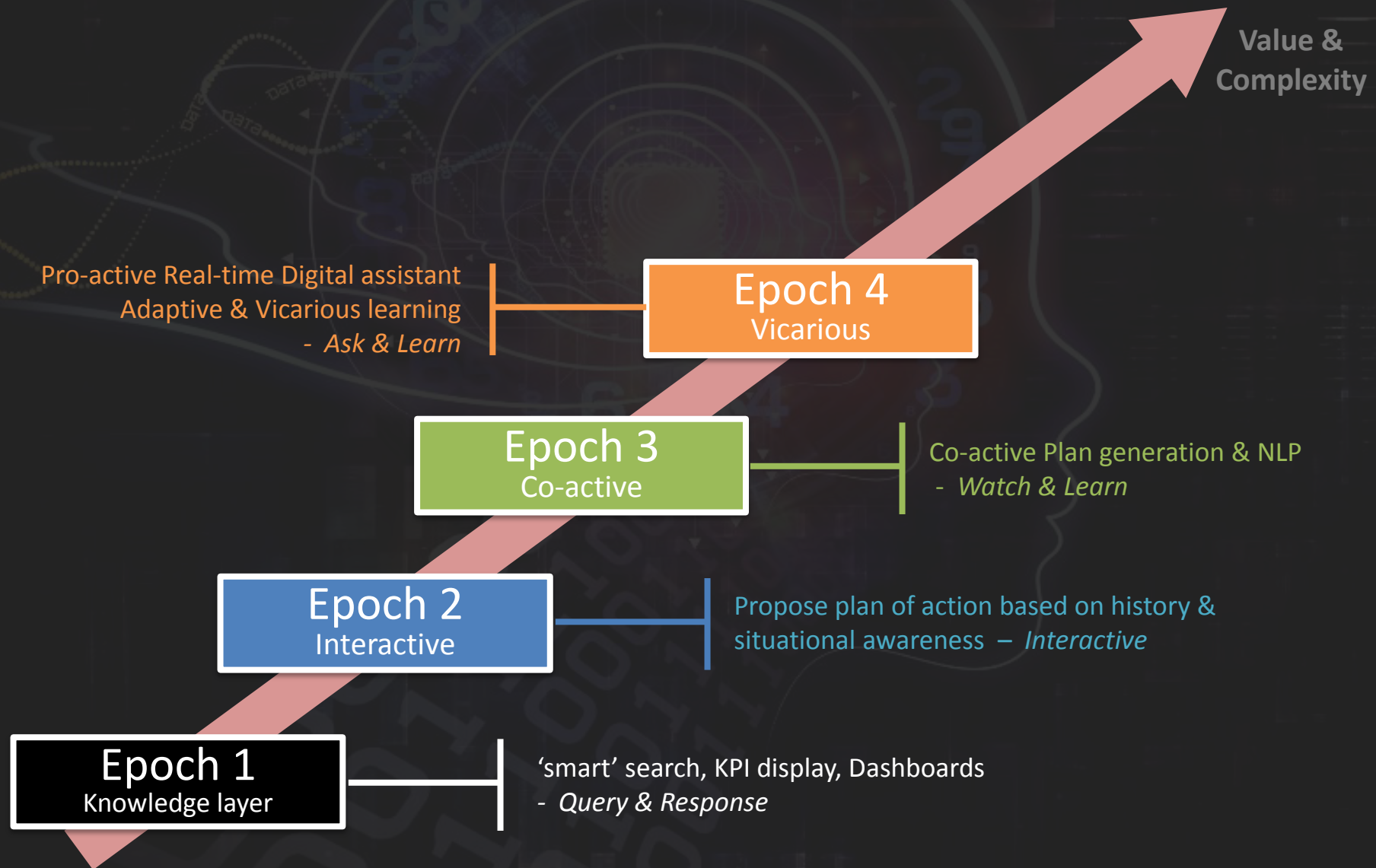
# Epoch 3: Integration of real-time interaction for learning

Epoch 3  
Co-active

Co-active Plan generation & NLP  
- *Watch & Learn*

- virtual assistants - follow and adjust plans if reality starts to deviate.
- first self-learning using adversarial ML, reinforcement ML
- combine classical planning and deep learning for planning & scheduling
- improve feedback from SOI through real-time contextual capture and learn from failures and speed-ups
- reduce quality issues due to non-compliance or omitted task steps
- close the loop enabling 'development for manufacturing'

# AI & Cognitive Computing Roadmap



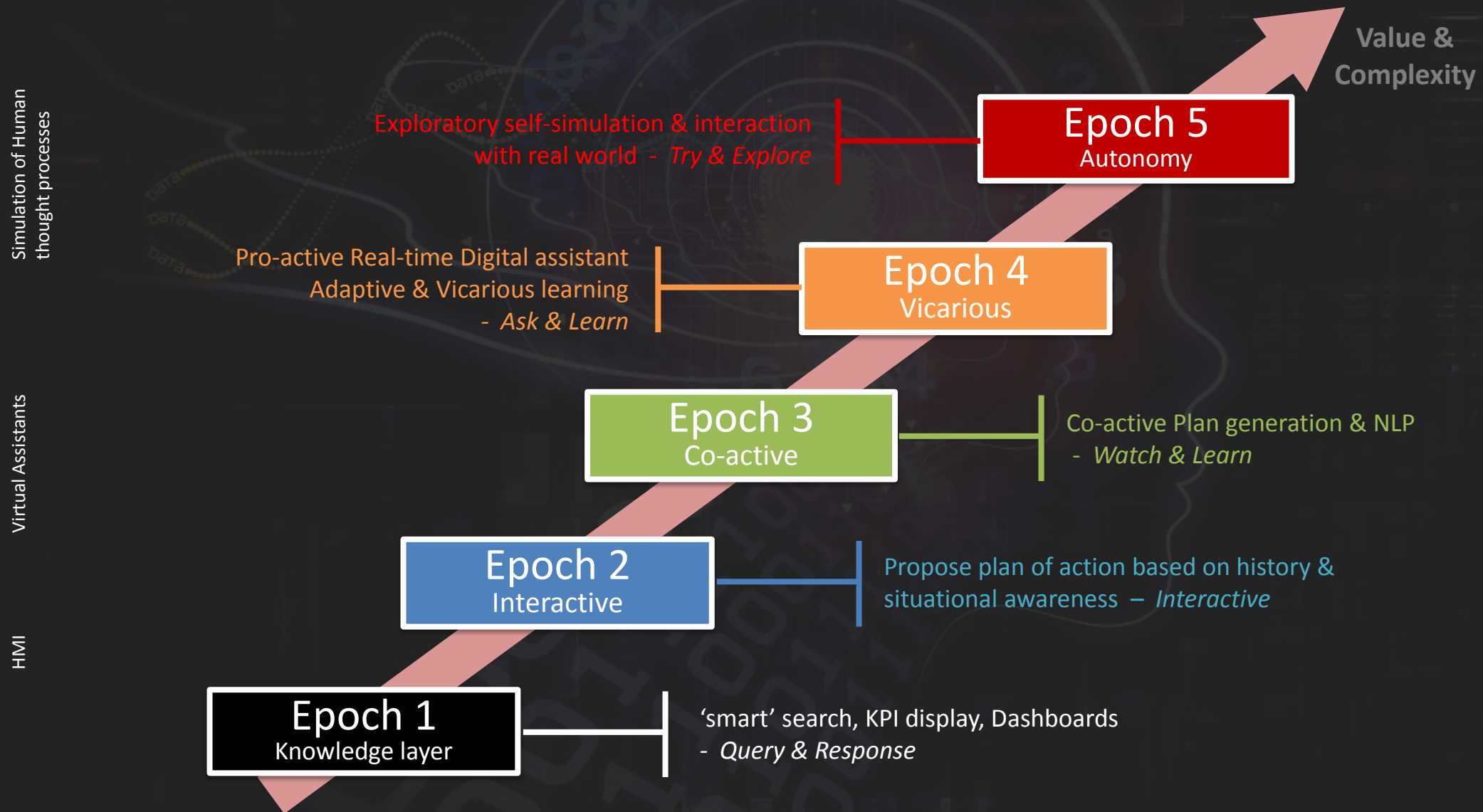
# Epoch 4: Intent Recognition

Pro-active Real-time Digital assistant  
Adaptive & Vicarious learning  
- *Ask & Learn*

Epoch 4  
Vicarious

- detect intentions behind plans and adjust based on that.
- use situational awareness to propose new action plan that maximizes success probability on larger KPI level.
- ability to 'development for operations' – OODA loop.
- self-learning focus.

# AI & Cognitive Computing Roadmap





# Epoch 5: Autonomous Systems

Exploratory self-simulation & interaction  
with real world - *Try & Explore*

Epoch 5  
Autonomy

- adaptive/mission oriented systems
- exploratory intelligence
- self-healing
- fly-by-feel