



Artificial Intelligence in Life Science

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What is Intelligence?

- Four indices of intelligence (Wechsler adult IQ scale):
 - Verbal comprehension
 - Perceptual organisation (knowledge base)
 - Thinking skills and working memory
 - Processing speed
- It defines the way we engage with the world...
 - ...and the way the world engages with us
 - ...as well as the things we can do.

Sense & Store
(Memory)

Think & Learn
(Cognition)

Act

Intelligence

...and making it Artificial

Sense & Store
(Memory)

Take in all the information that is around you

- Across all different senses
- Across all different sources
- Batch and real-time (stream)
- Store it for future use (or consciously discard)

Think & Learn
(Cognition)

In the context of a problem:

- Organise the information
- Understand how it works
- Understand how things relate to each other
- Understand what it means
- Understand what best to do
- Learn from what happens

Act

Act in the way that is currently best aligned with your environment or context and your strategic priorities

Artificial Intelligence

What has Changed? Why Now?

Sense & Store (Memory)

Take in all the information that is around you

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Think & Learn (Cognition)

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Artificial Intelligence

What has Changed? Why Now?

Sense & Store
(Memory)

Take in all the information that is around you

- Access all different senses
- Across all different sources
- Batch and real-time (stream)
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**Data
Explosion**

Think & Learn
(Cognition)

In the context of a problem

- Organise the information
- Understand the context
- Understand how things relate to each other

- Understand what it means
- Understand what best to do
- Learn from what happens

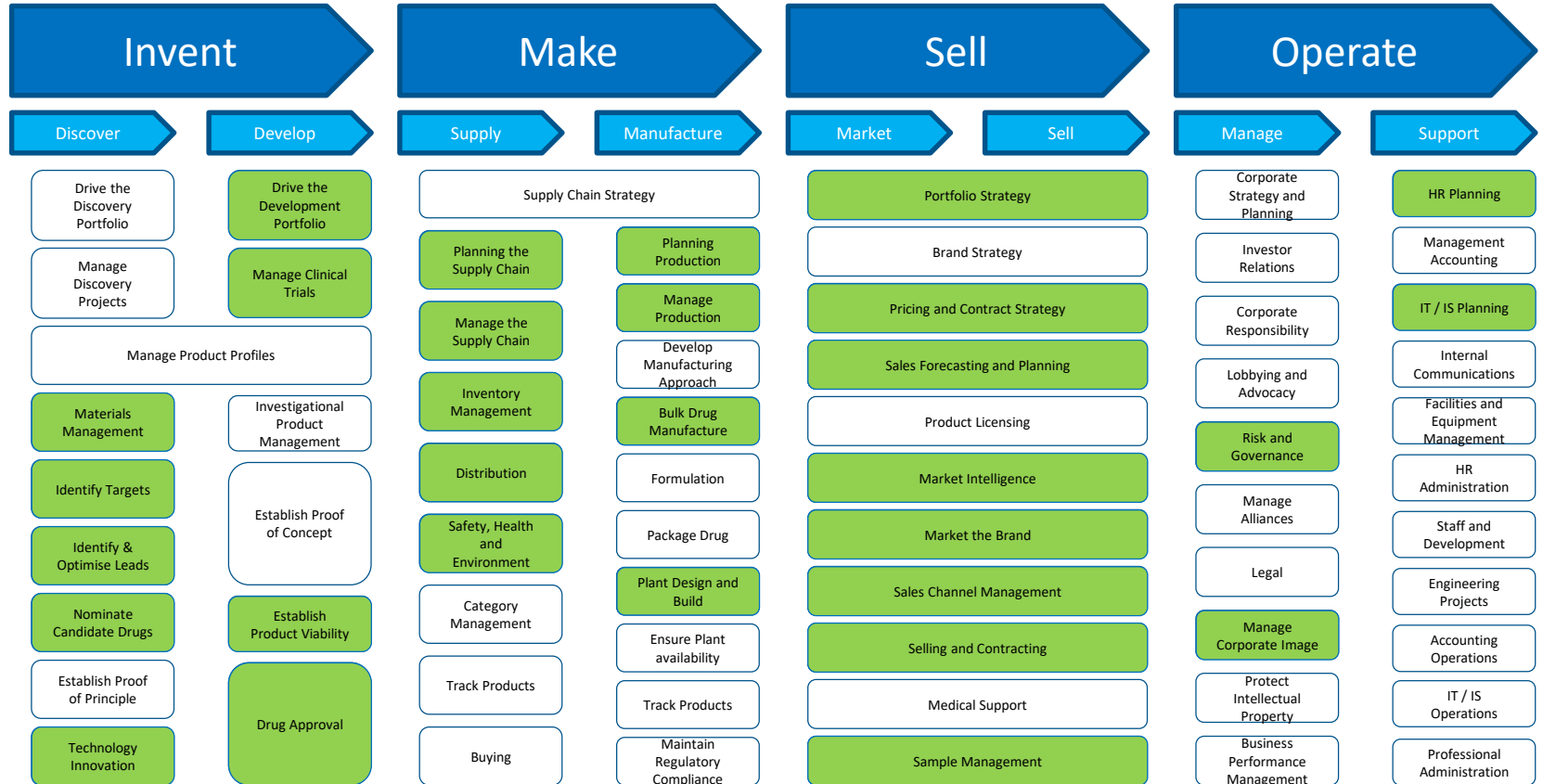
**Compute &
Algorithmic
Explosion**

Act

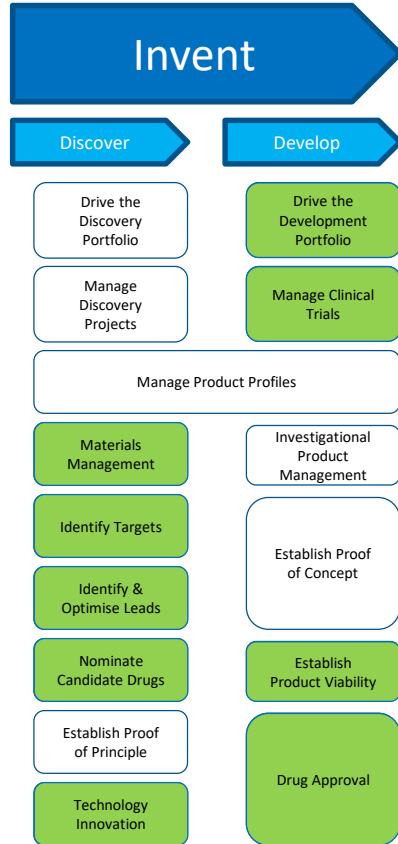
Act in the way that is most best aligned with your environment or context and your strategic priorities

**Constant
need for
Governance**

Where can Artificial Intelligence help?



Where can Artificial Intelligence help?



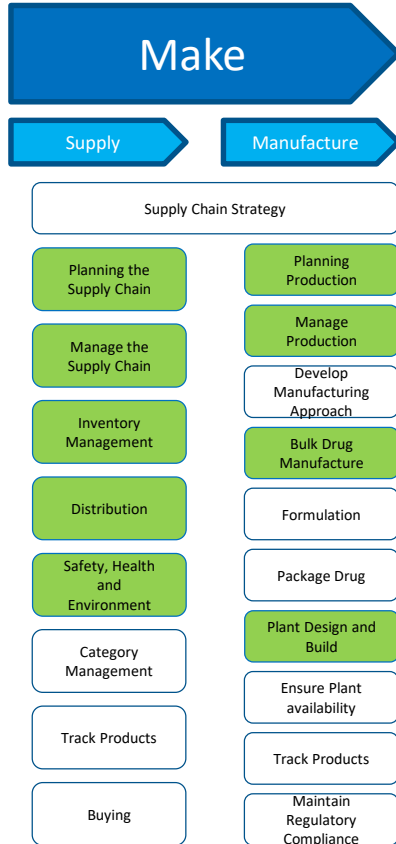
- Data

- Genomics / Proteomics
- Scientific (e.g. antibody fragments)
- Outcomes / Impact from Real-World Data
- Real-time Trial Data
- HELM (Hierarchical Editing Language for Macromolecules)
- Wearables
- Competitive Data

- Impact

- Disease state & target understanding
- Lead selection/ optimisation
- Clinical dose, endpoint selection
- Therapeutic tailoring
- Portfolio management
- Protocol optimisation
- Data-adaptive development plans
- Trial planning and execution
- Portfolio management
- Active safety surveillance

Where can Artificial Intelligence help?



- Data
 - Real-World Data
 - Demand forecast
 - Real-time machine / manufacturing data
 - Real-time product quality data
- Impact
 - End-to-end supply-chain planning
 - Yield optimisation
 - Procurement excellence
 - Network optimisation
 - Quality monitoring

Where can Artificial Intelligence help?



- Data
 - Real-World Data
 - Genetics
 - Channel preference
 - Timing and Voice preference
 - Wearables / location data
 - Efficacy stratification
- Impact
 - Field-force effectiveness
 - Gross-to-net optimisation
 - Commercial spend optimisation
 - Tailored customer engagement
 - Understanding / optimising Real-World outcome

Where can Artificial Intelligence help?



• Data

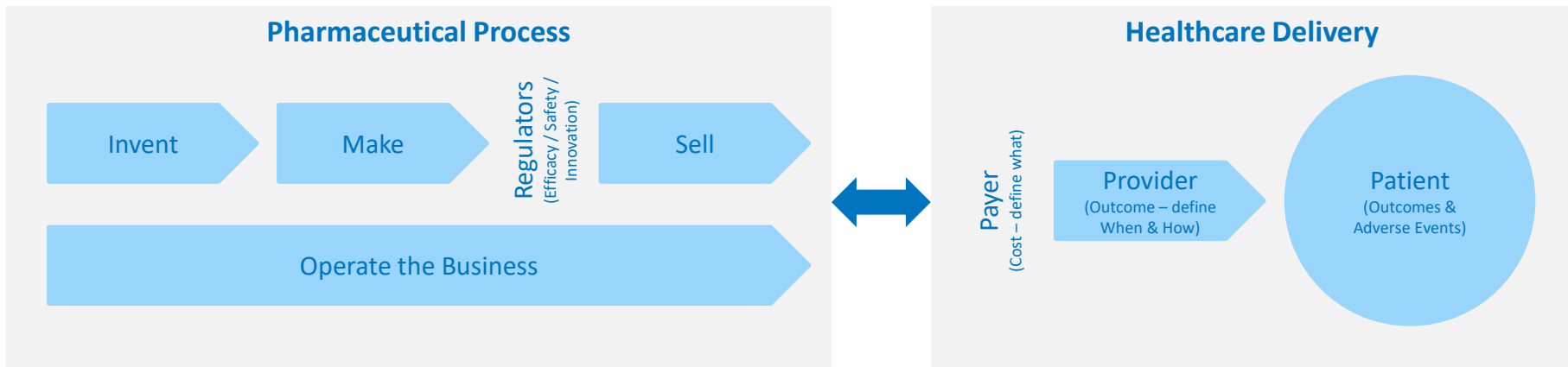
- Electronic Procurement Data
- Employee and Machine Behaviour Data
- Skills and IT capacity forecast

• Impact

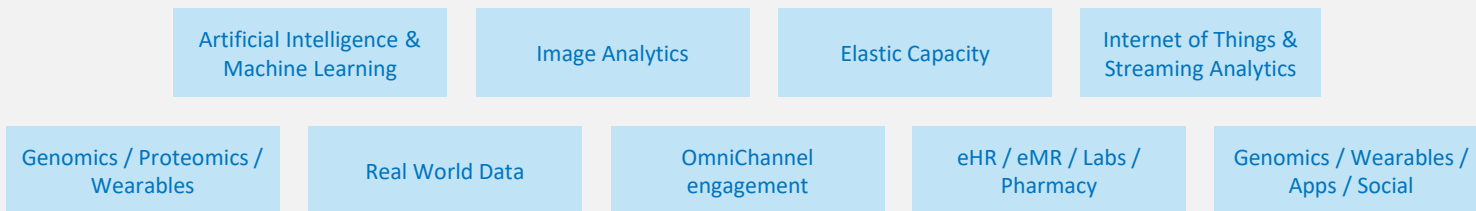
- Human Capital / organisational health
- Forecasting excellence
- Enterprise risk management
- Competitive intelligence

The Pharma / Healthcare Process

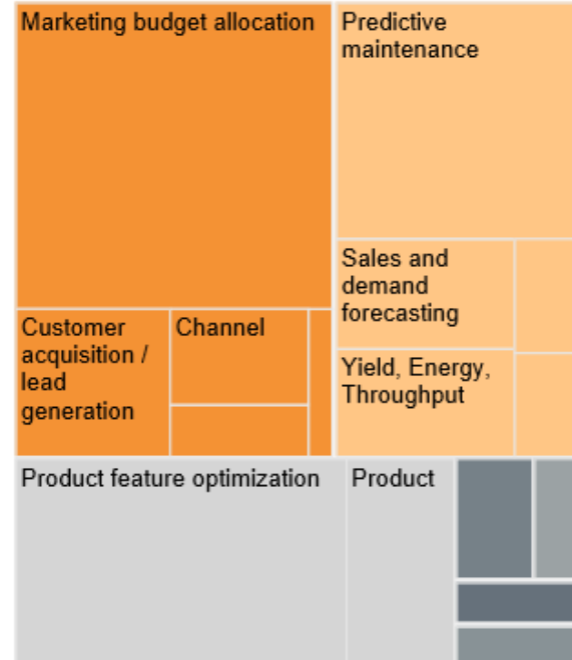
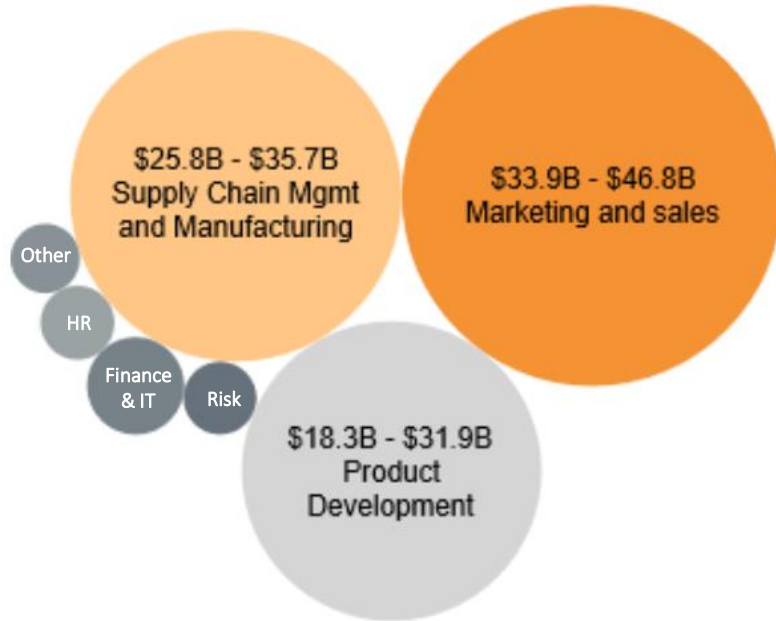
The evolving landscape – seeing clearer & seeing further



New Capabilities and Data in the Landscape



The use and potential impact of AI Pharmaceutical and Medical Products (\$122.4Bn)



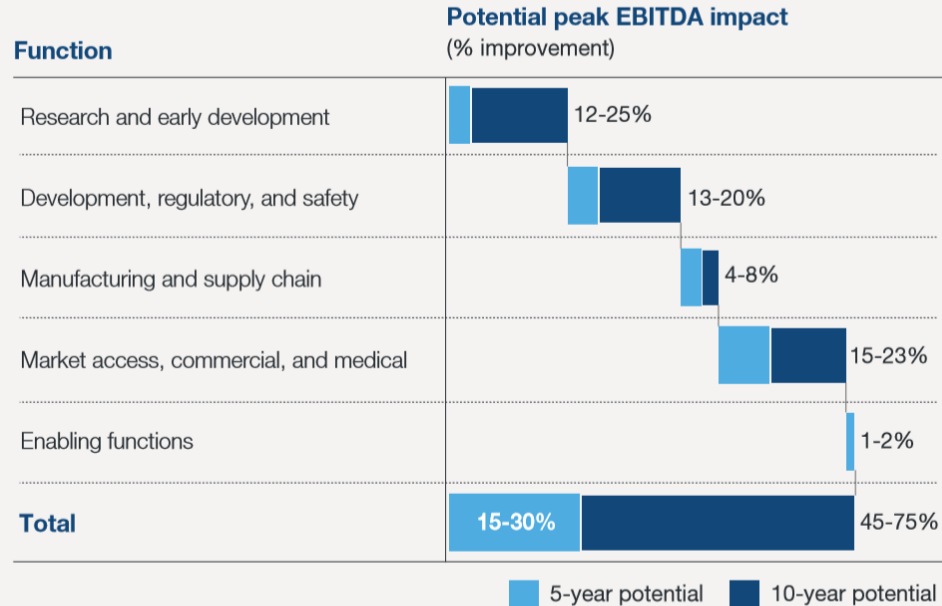
SOURCE: McKinsey April 2018 - Visualizing the uses and potential impact of AI and other analytics

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Impact on EBITDA across the Business

Advanced analytics could improve EBITDA for pharmaceutical companies by 45%–75%



Source: McKinsey analysis of potential based on blinded client information

Summary

- New Data is flooding into the industry
- Compute capacity is exploding – and with Cloud becoming economical

There is opportunity for
Artificial Intelligence
everywhere



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