

# Certificate I: Understanding AI and Machine Learning in Africa

Course AIMLO2: AI and Machine Learning in Africa

Module 3: AI Business Strategy

Lecture 1: Artificial Intelligence for the Real World

**Carnegie Mellon University**  
Africa

# Learning Objectives

1. Identify **three important business** needs that AI can support
2. Summarize a **four-point strategy** for adopting AI
3. Explain why companies perform better by taking an **incremental approach**, rather than a **transformative approach**, to adopting AI in their businesses
4. Explain why it is often a better business strategy to focus on **augmenting human capabilities** with AI, rather than **replacing them**

# Lecture Contents

1. Artificial intelligence and cognitive technologies
2. Three types of AI
  - a) Process automation
  - b) Cognitive insight
  - c) Cognitive engagement
3. Four-step framework for integrating AI technologies
4. Lecture summary
5. Recommended reading & references

# Artificial Intelligence and Cognitive Technologies



ii

**The Tabulating Era**  
(1900s–1940s)

**The Programming Era**  
(1950s–present)

**The Cognitive Era**  
(2011–)

(Kelly, 2015)

# Artificial Intelligence and Cognitive Technologies

Cooperative "living together in intimate association, or even close union, of two dissimilar organisms"

"**Man-computer symbiosis** is an expected development in **cooperative interaction** between men and electronic computers."  
(Licklider, 1960)

Unfortunately, there was little awareness of gender bias in 1960



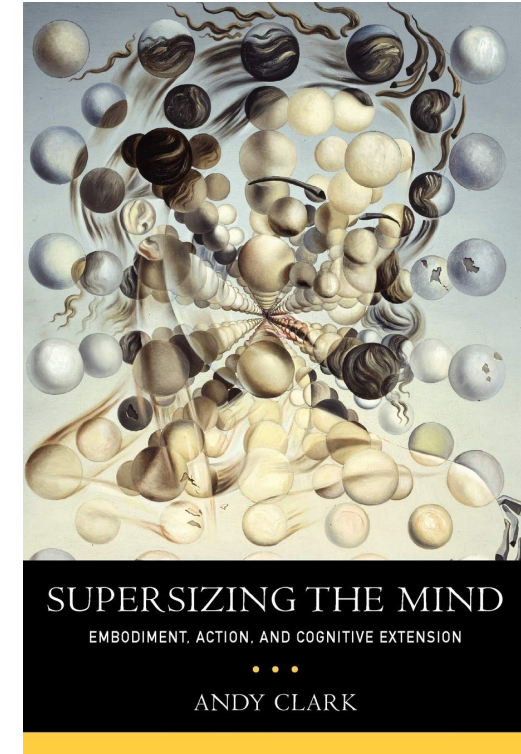
[wikipedia.org/wiki/J.\\_C.\\_R.\\_Licklider](https://wikipedia.org/wiki/J._C._R._Licklider)

# Artificial Intelligence and Cognitive Technologies

- This symbiotic partnership is being realized today through **artificial intelligence (AI)**
- **AI** both **amplifies** and **extends** human cognitive abilities

With AI, we do what we used to do,  
but more quickly, more efficiently,  
and more effectively

With AI, we can also solve problems  
we weren't able to solve before



<https://www.amazon.ca/Supersizing-Mind-Embodiment-Cognitive-Extension/dp/0199773688>

# Artificial Intelligence and Cognitive Technologies

Cognitive technology:

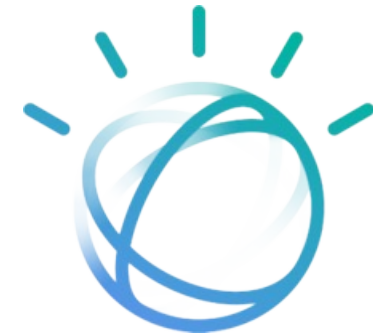
"next generation artificial intelligence"

# Artificial Intelligence and Cognitive Technologies

MD Anderson Cancer Center  
launched a “moon shot” project in 2013

- Use AI to **diagnose** and **recommend treatment** plans for certain forms of cancer
- IBM’s **Watson** cognitive system

Recall that we already met  
Watson in the first course AIML01,  
in Module 1, Lecture 3



Watson's avatar

[https://en.wikipedia.org/wiki/Watson\\_\(computer\)](https://en.wikipedia.org/wiki/Watson_(computer))

The project was put on hold in 2017

- Costs exceeded \$62 million
- Before the system had even been used on patients.



# Artificial Intelligence and Cognitive Technologies

MD Anderson Cancer Center

In the same period, also used cognitive technologies to do **much less ambitious jobs**

- Make hotel and restaurant **recommendations** for patients' families
- Determine which patients needed help paying bills
- Solving staff IT problems

More promising results

- Increased patient satisfaction
- Improved financial performance
- Decline in time spent on tedious data entry by the hospital's care managers

# What's Special about the Deployment of AI in Africa

In a survey of 250 informed executives, 75% believe that AI will substantially **transform their companies within three years**



[https://en.wikipedia.org/wiki/Yin\\_and\\_yang](https://en.wikipedia.org/wiki/Yin_and_yang)

# What's Special about the Deployment of AI in Africa

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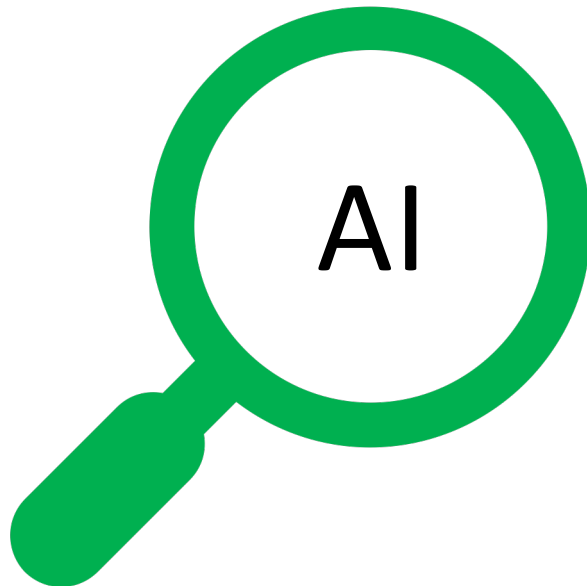


A study of 152 projects reveals that highly ambitious moon shots are less likely to be successful than “low-hanging fruit” projects that **enhance business processes**

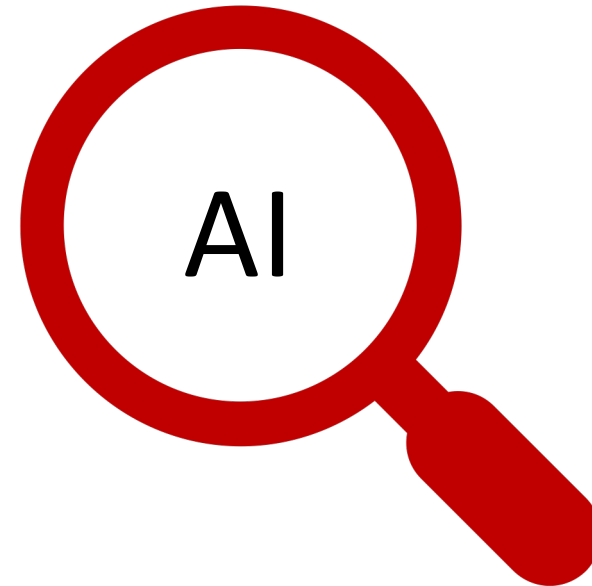
[https://en.wikipedia.org/wiki/Yin\\_and\\_yang](https://en.wikipedia.org/wiki/Yin_and_yang)

# Three Types of AI

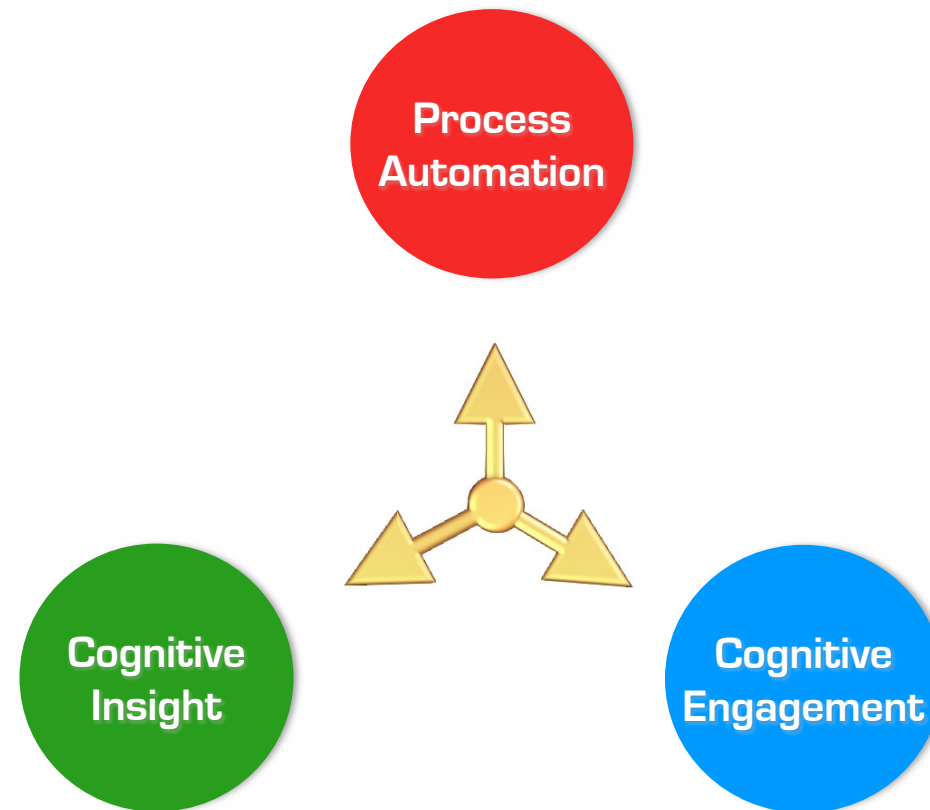
Business Capabilities



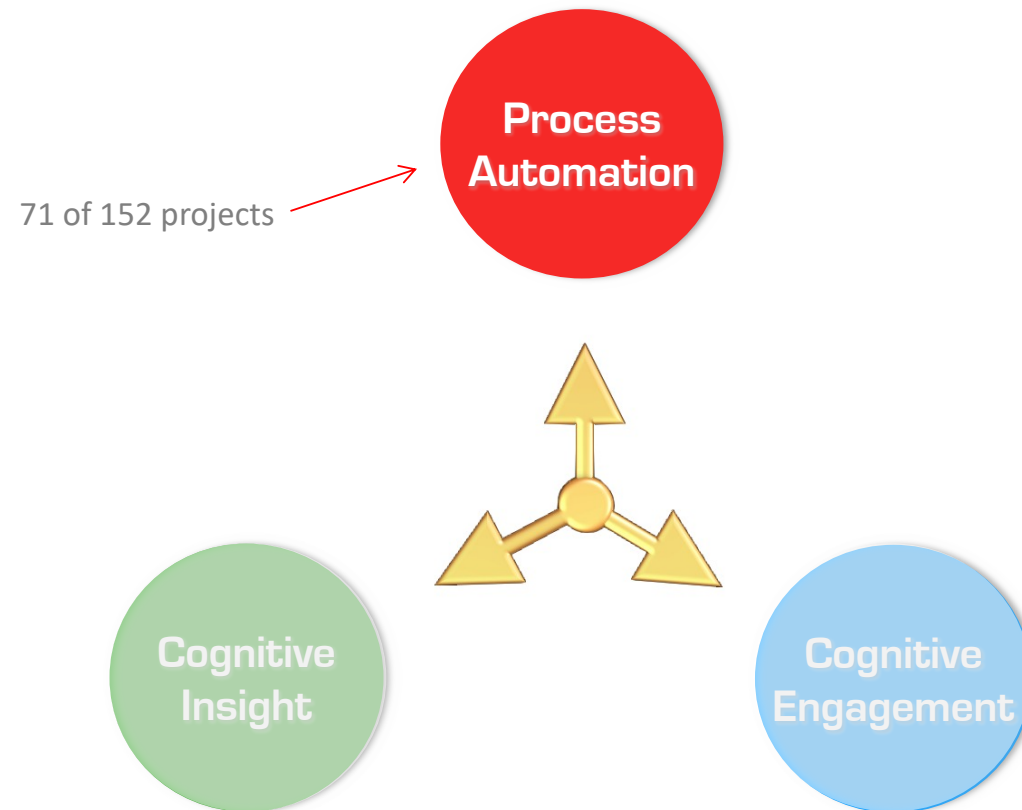
Technologies



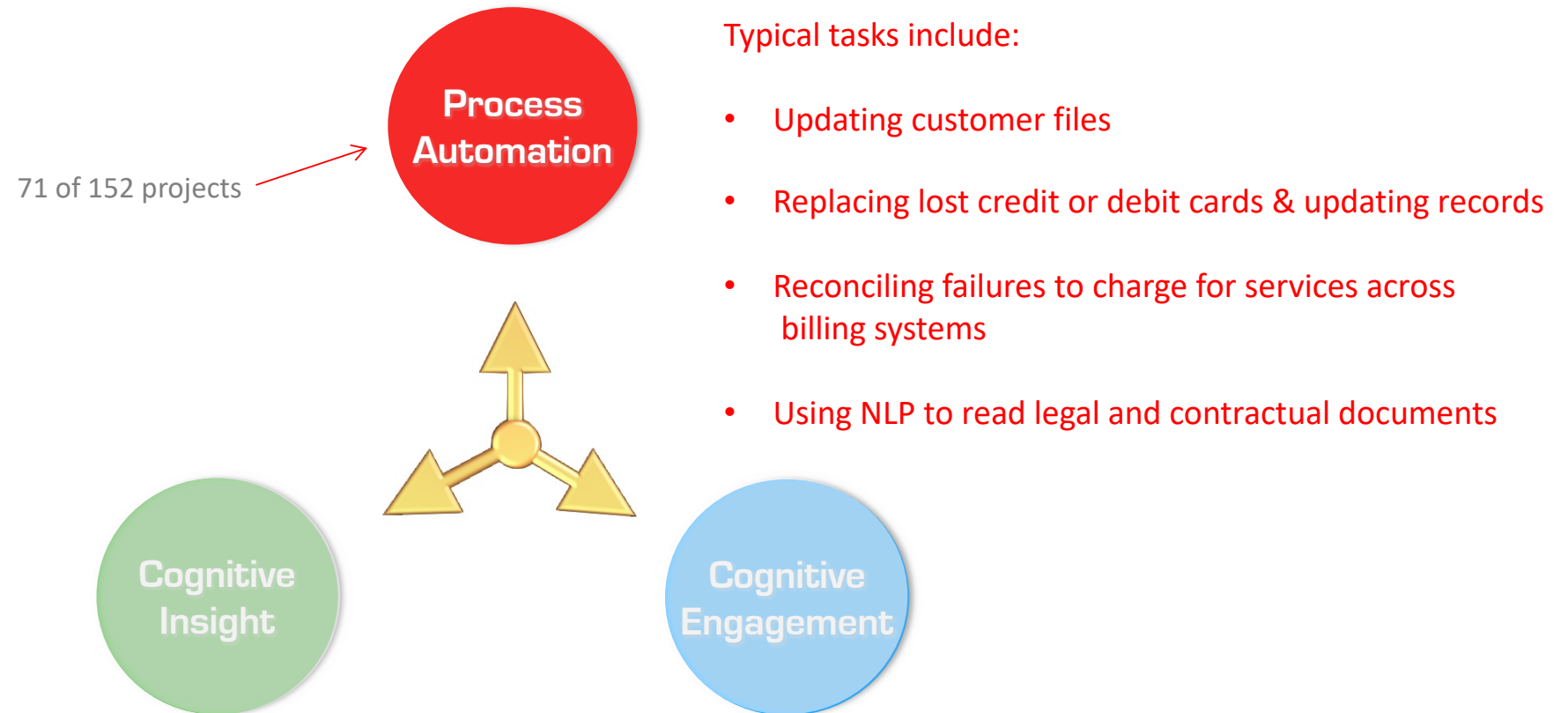
# Three Types of AI



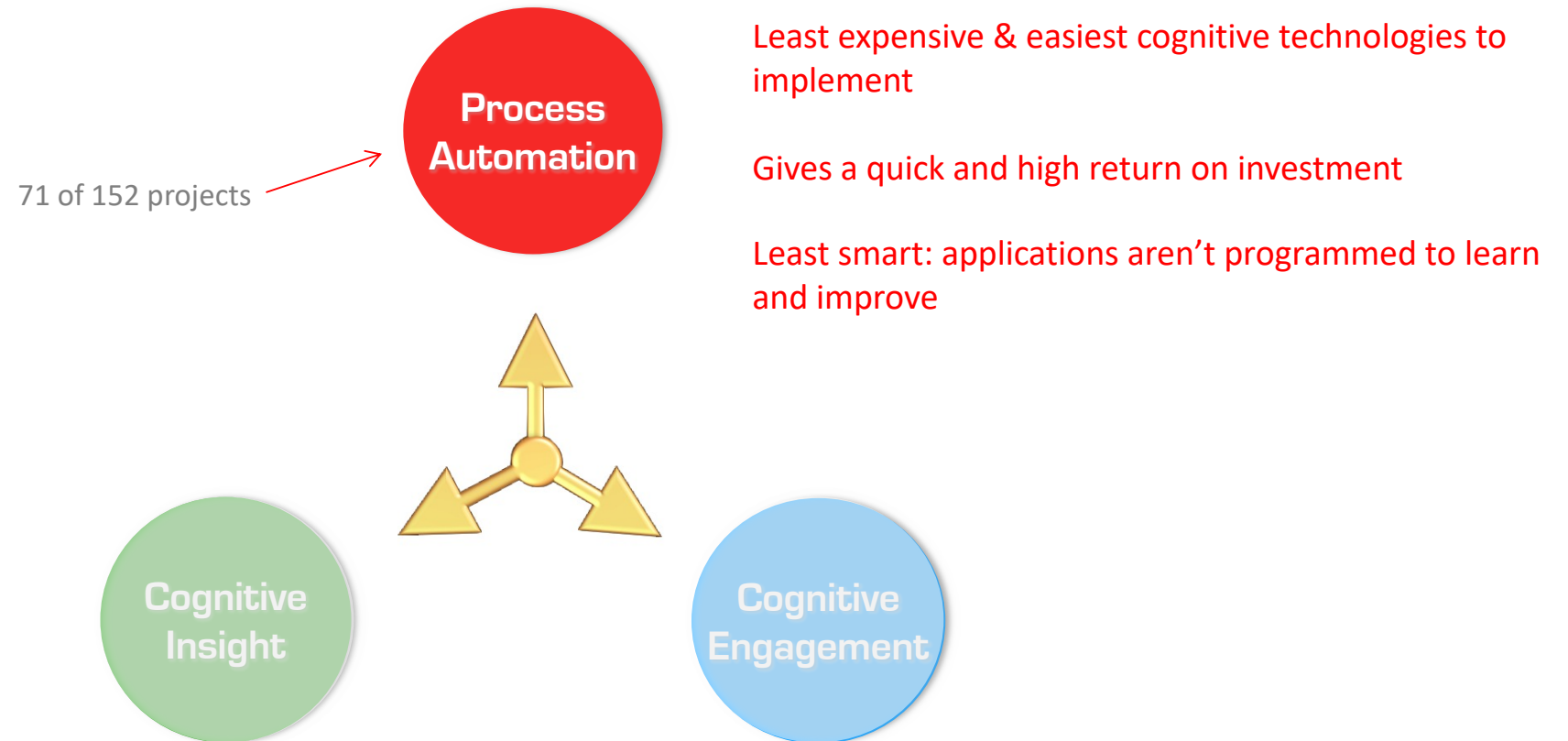
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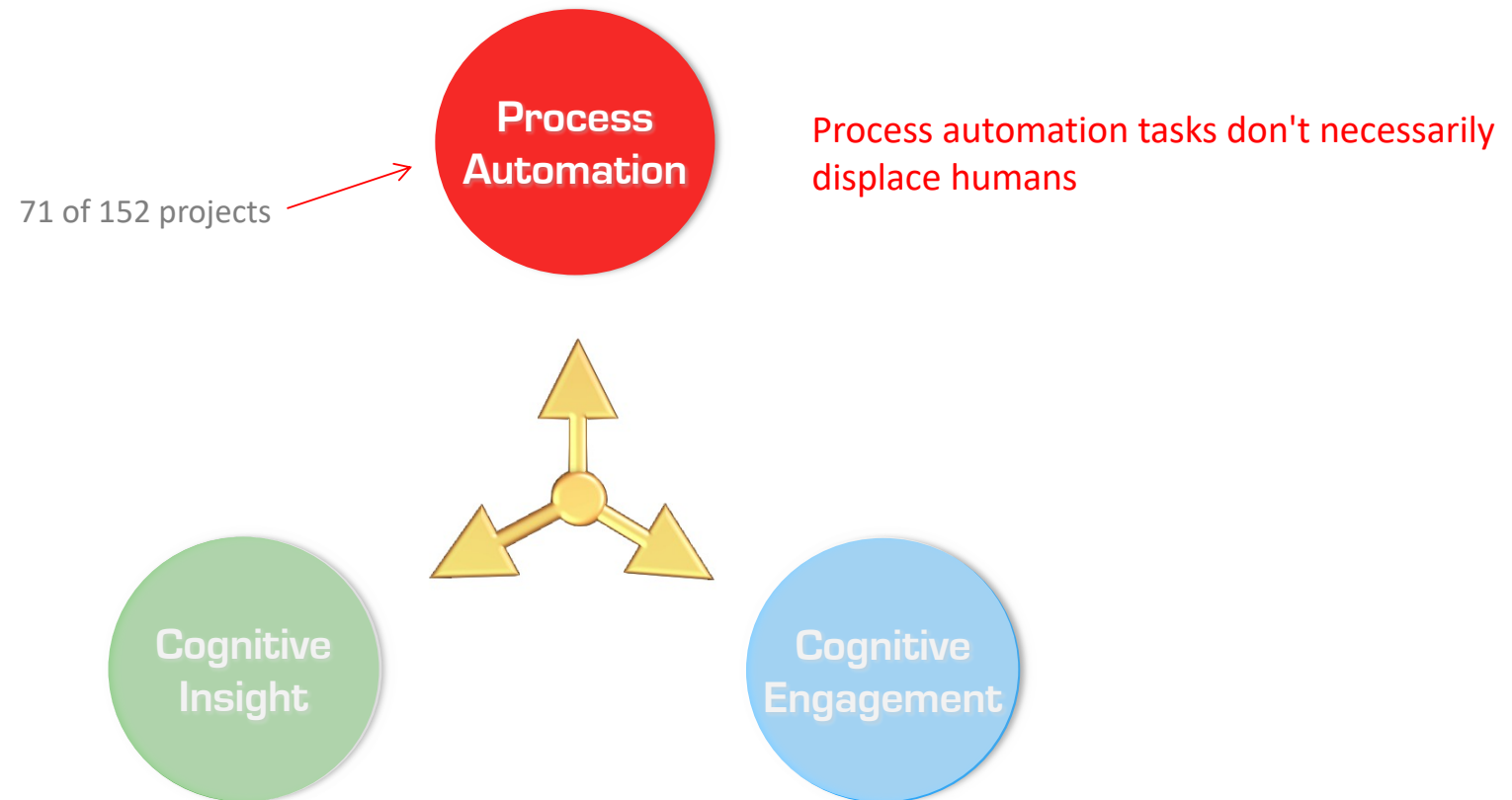


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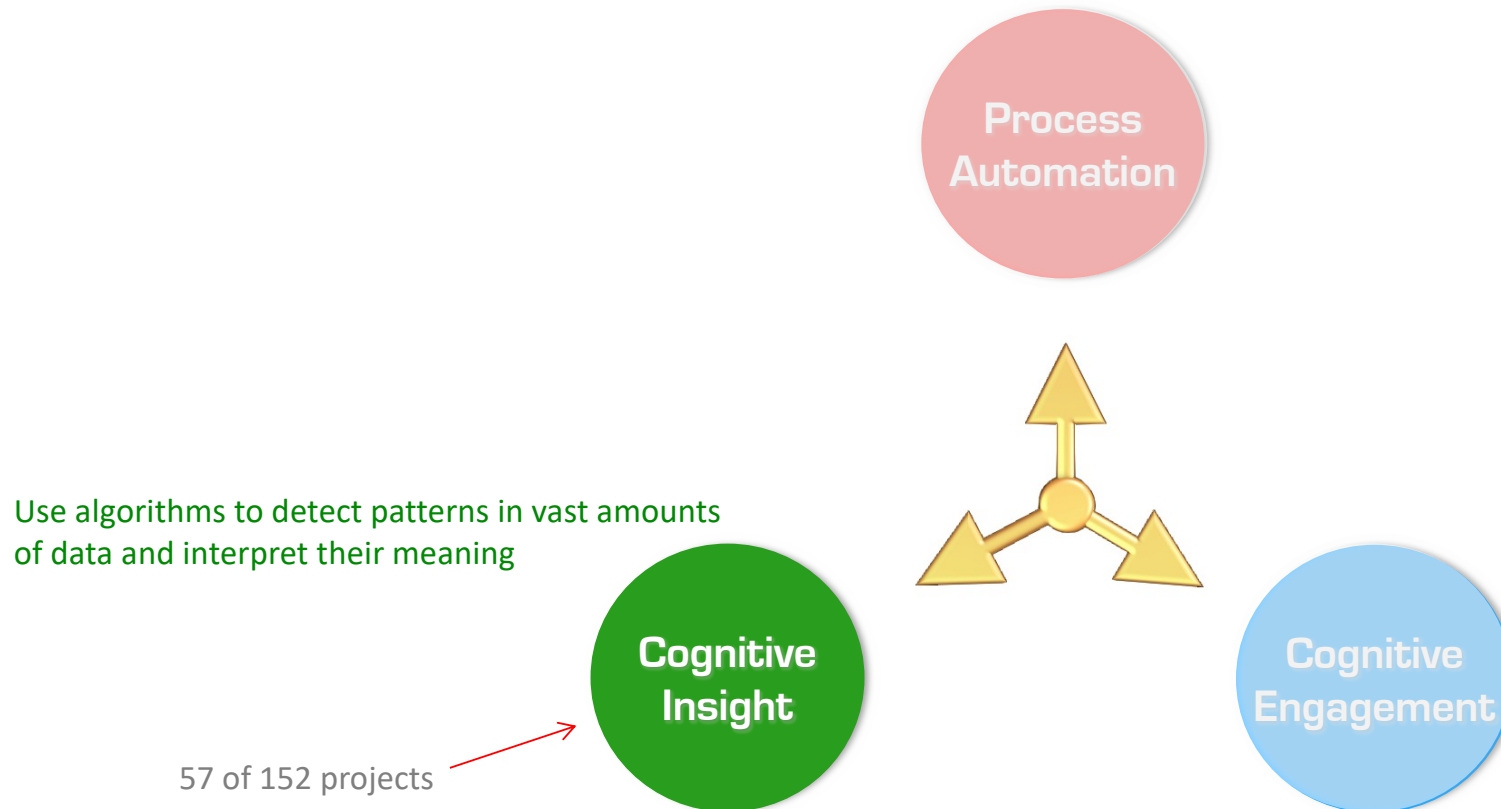




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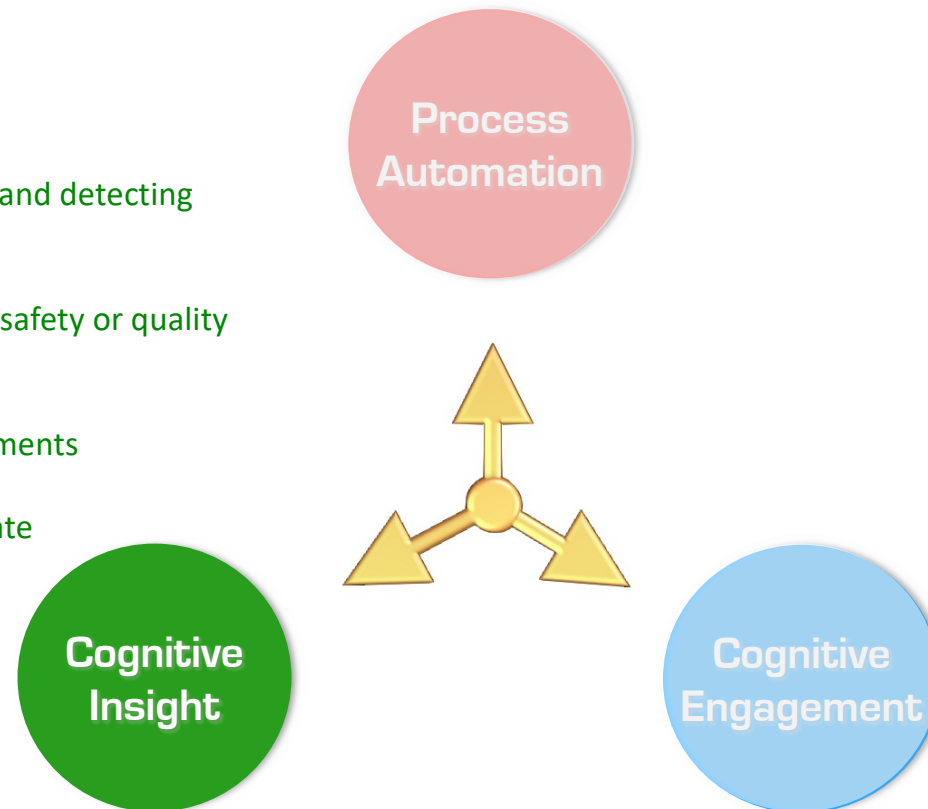
# Three Types of AI



# Three Types of AI

Typical task include:

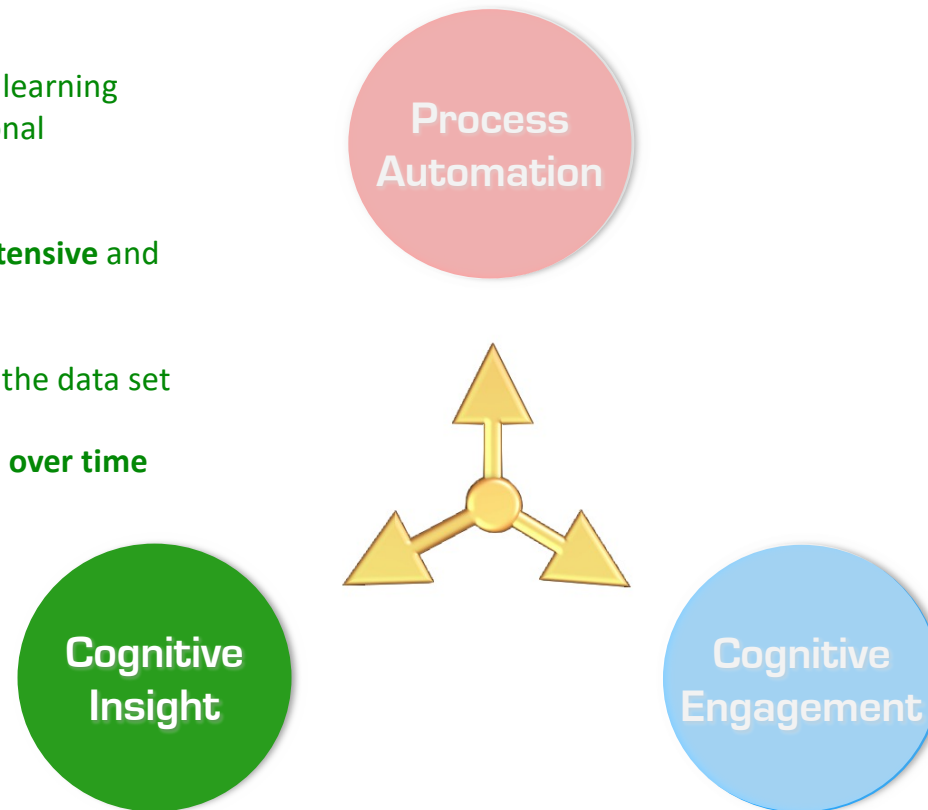
- Predicting what a likely purchases
- Identifying credit fraud in real time and detecting insurance claims fraud
- Analyzing warranty data to identify safety or quality problems
- Automating personalized advertisements
- Providing insurers with more accurate and detailed actuarial modeling



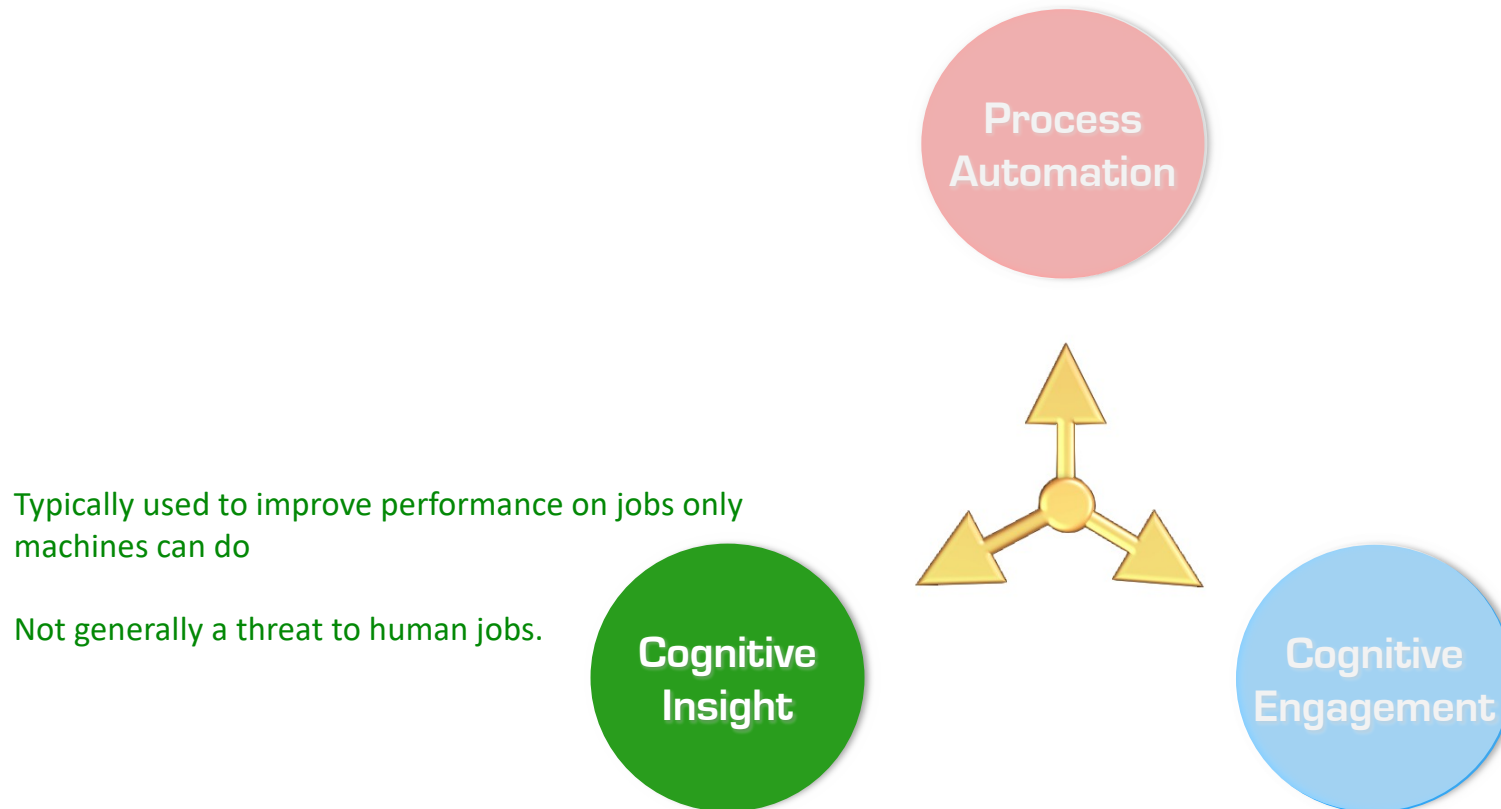
# Three Types of AI

Cognitive insights provided by machine learning differ from those available from traditional analytics in three ways:

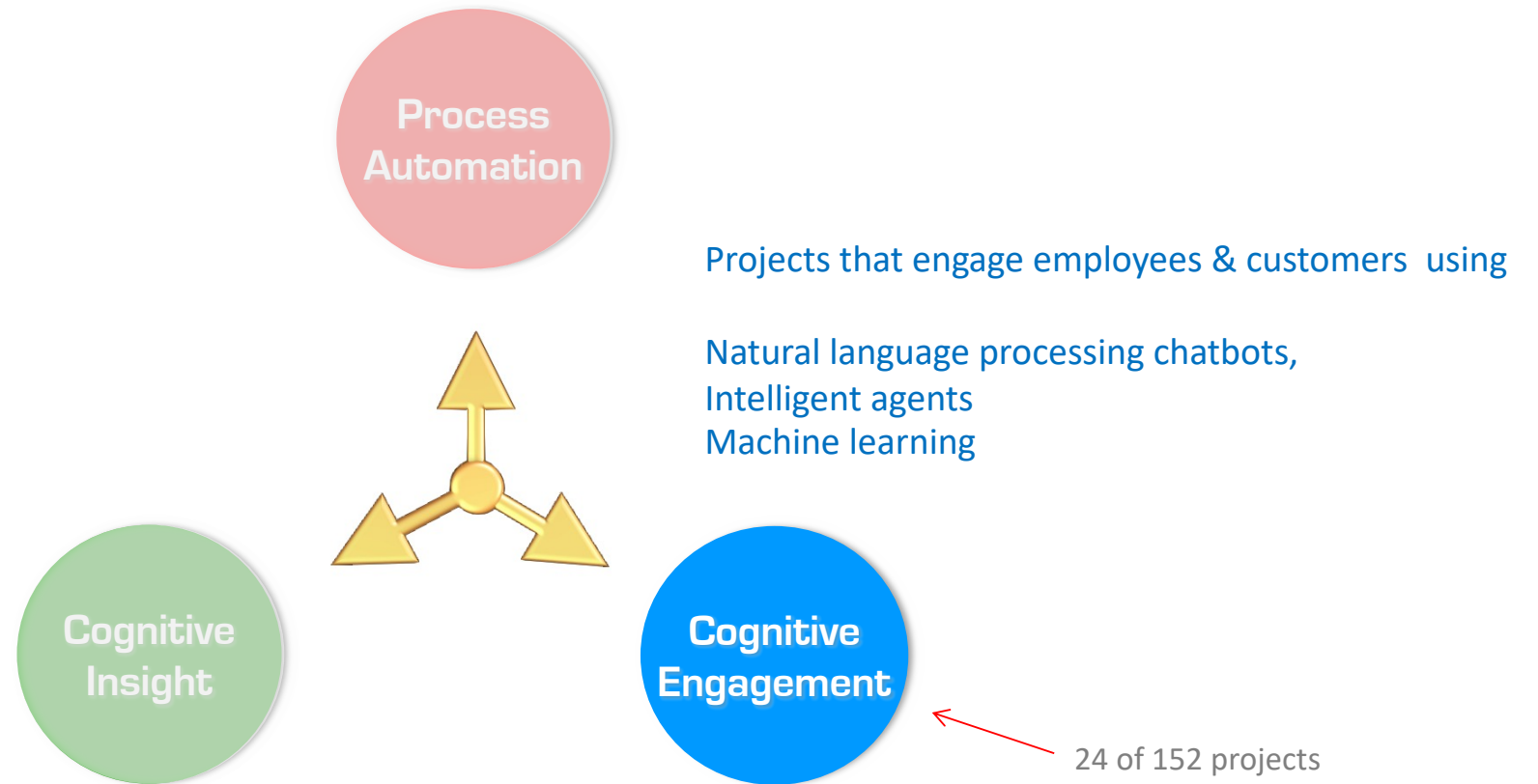
1. They are usually much more **data-intensive** and detailed
2. The models are trained on a part of the data set
3. The models' **performance improves over time**



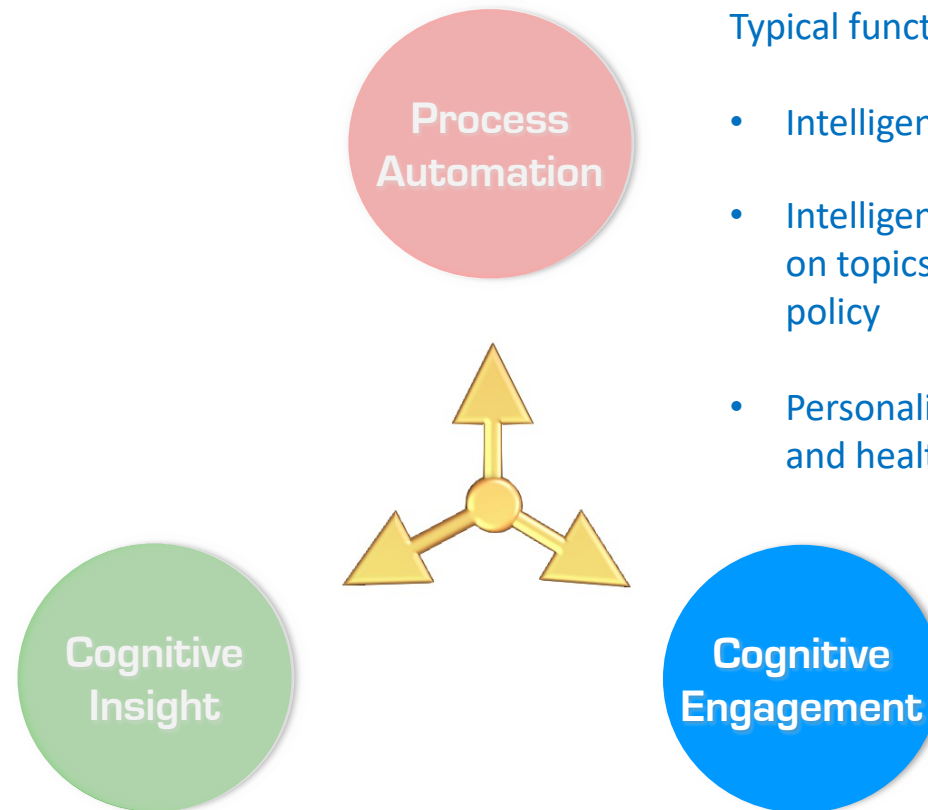
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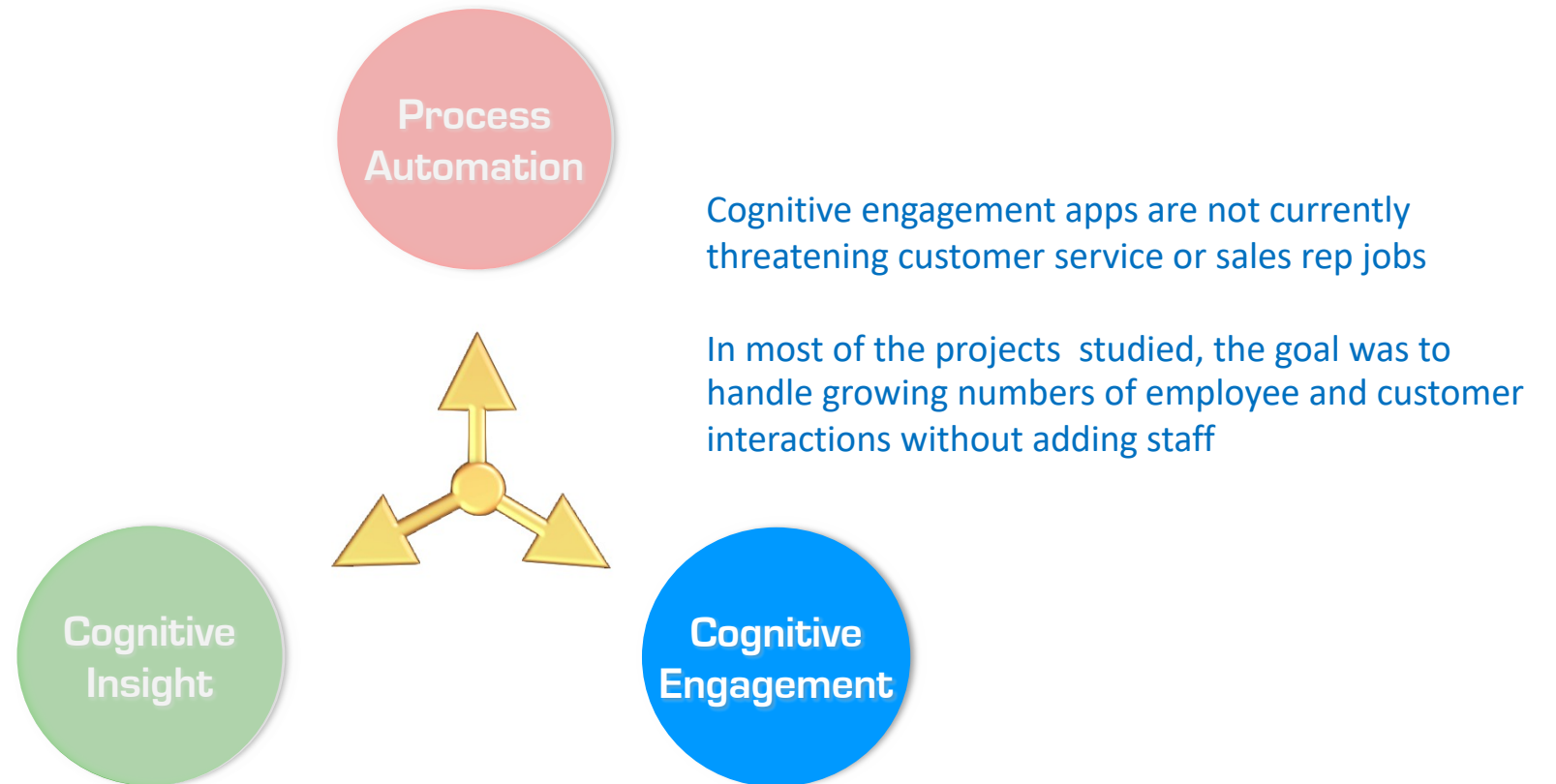
# Three Types of AI



Typical functionality includes

- Intelligent agents that offer 24/7 customer service
- Intelligent agents that answer employee questions on topics including IT, employee benefits, and HR policy
- Personalized recommendation systems for retailers and health providers

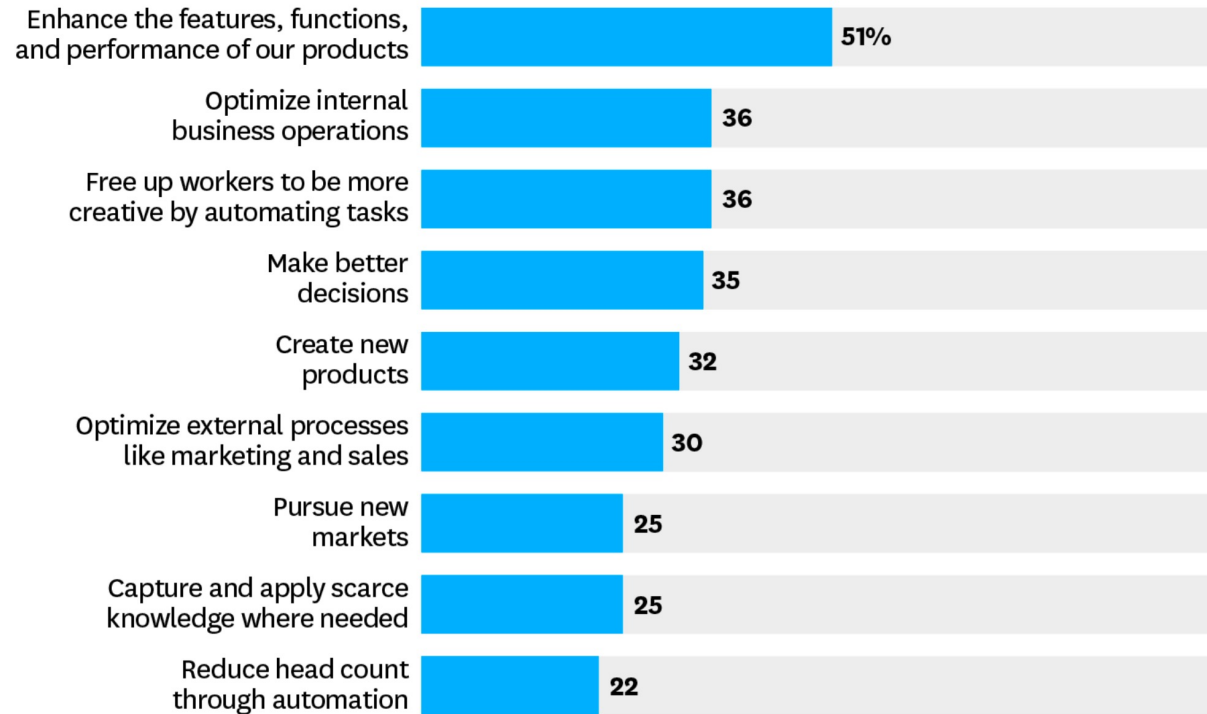
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# Three Types of AI

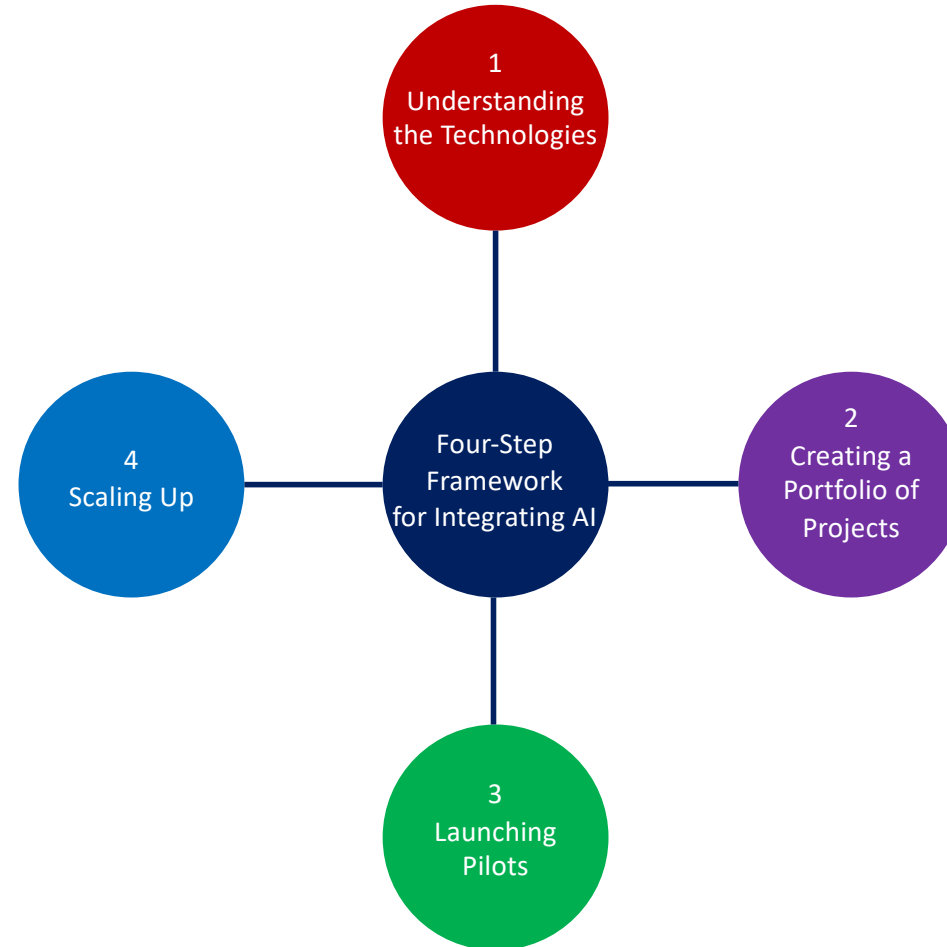
## PERCENTAGE OF EXECUTIVES WHO CITE THE FOLLOWING AS BENEFITS OF AI



SOURCE DELOITTE 2017  
FROM "ARTIFICIAL INTELLIGENCE FOR THE REAL WORLD,"  
BY THOMAS H. DAVENPORT AND RAJEEV RONANKI, JANUARY-FEBRUARY 2018

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# Four-step Framework for Integrating AI Technologies



# Four-step Framework for Integrating AI Technologies

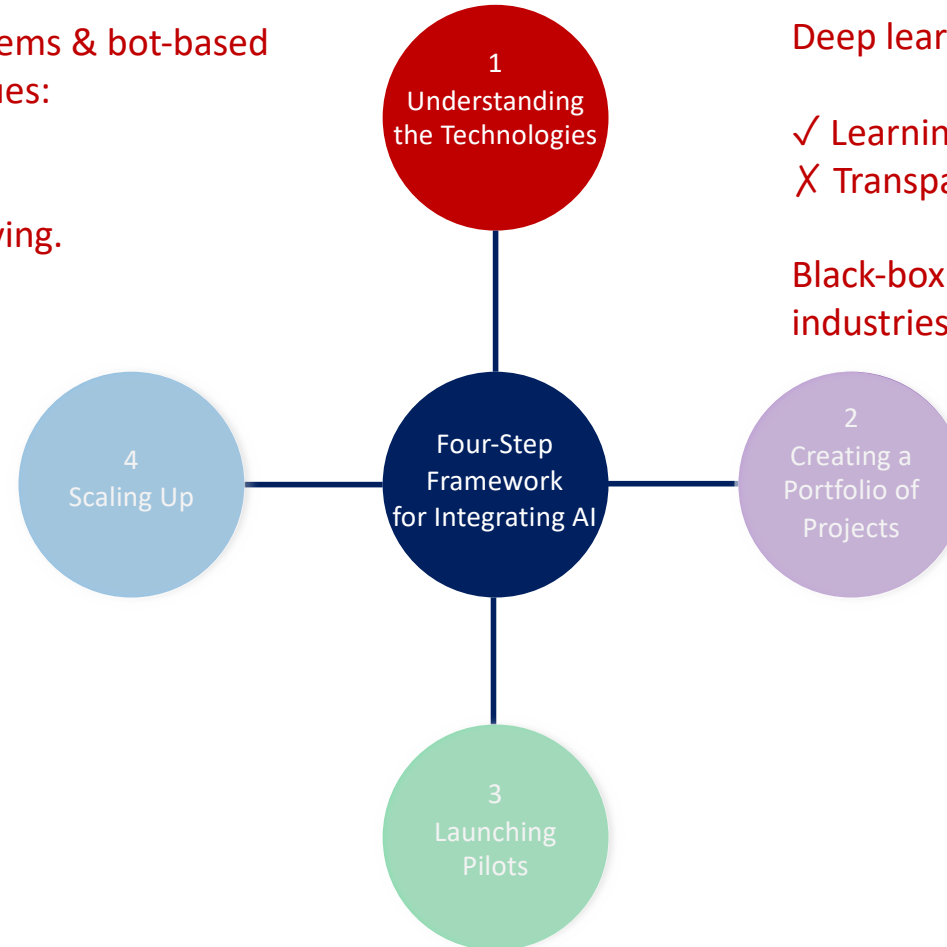
Rule-based expert systems & bot-based (agent-based) techniques:

- ✓ Transparency
- ✗ Learning and improving.

Deep learning:

- ✓ Learning from large volumes of labeled data,
- ✗ Transparency

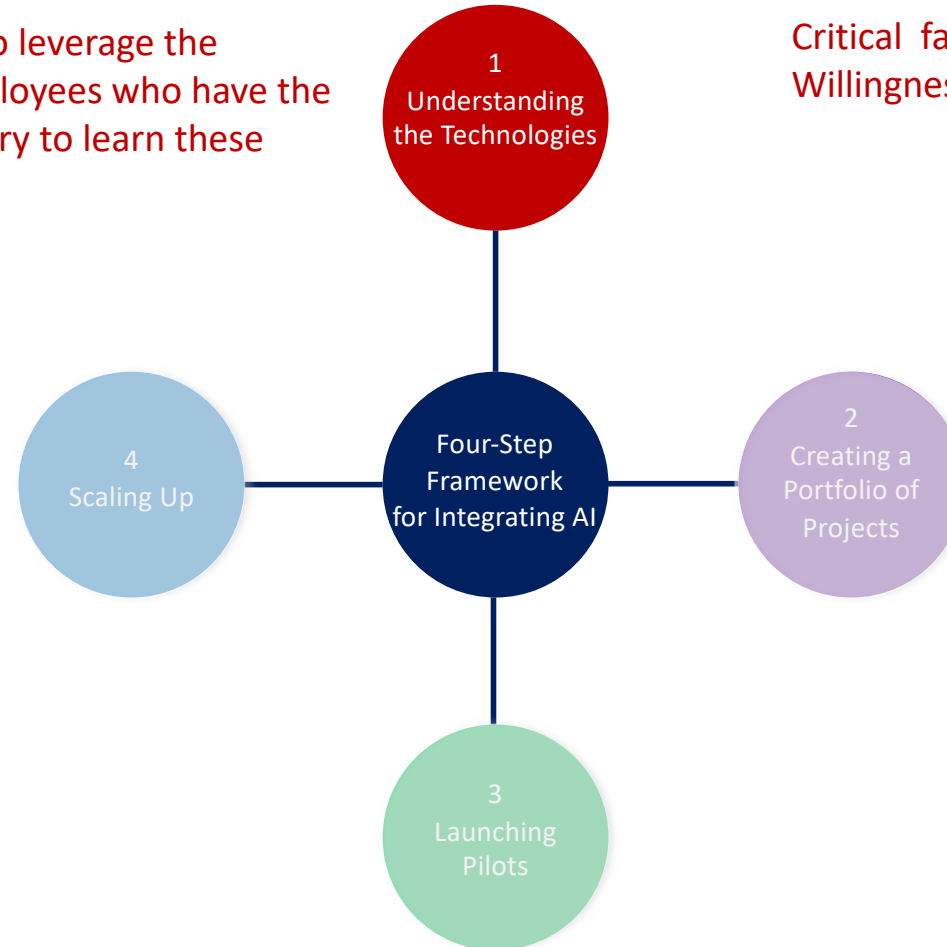
Black-box approach is problematic for regulated industries



# Four-step Framework for Integrating AI Technologies

Companies will need to leverage the capabilities of key employees who have the technical skills necessary to learn these technologies

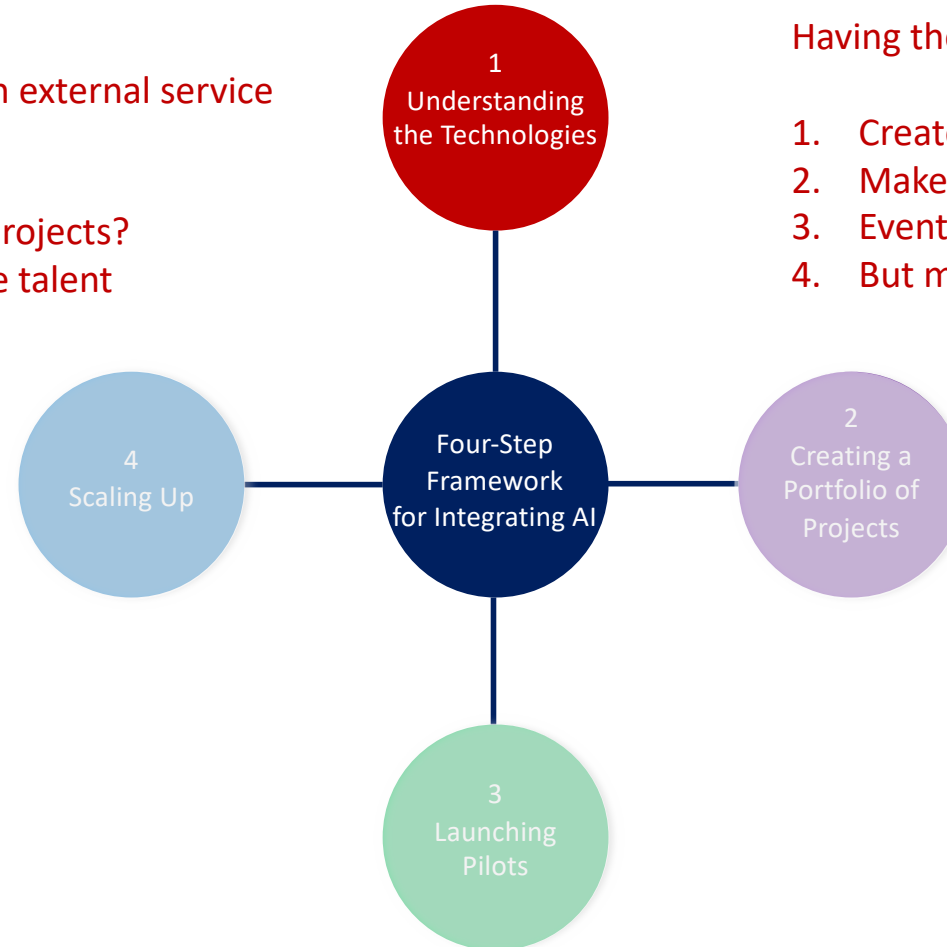
Critical factor for success:  
Willingness of employees to learn



# Four-step Framework for Integrating AI Technologies

No internal expertise?  
Build relationships with external service providers

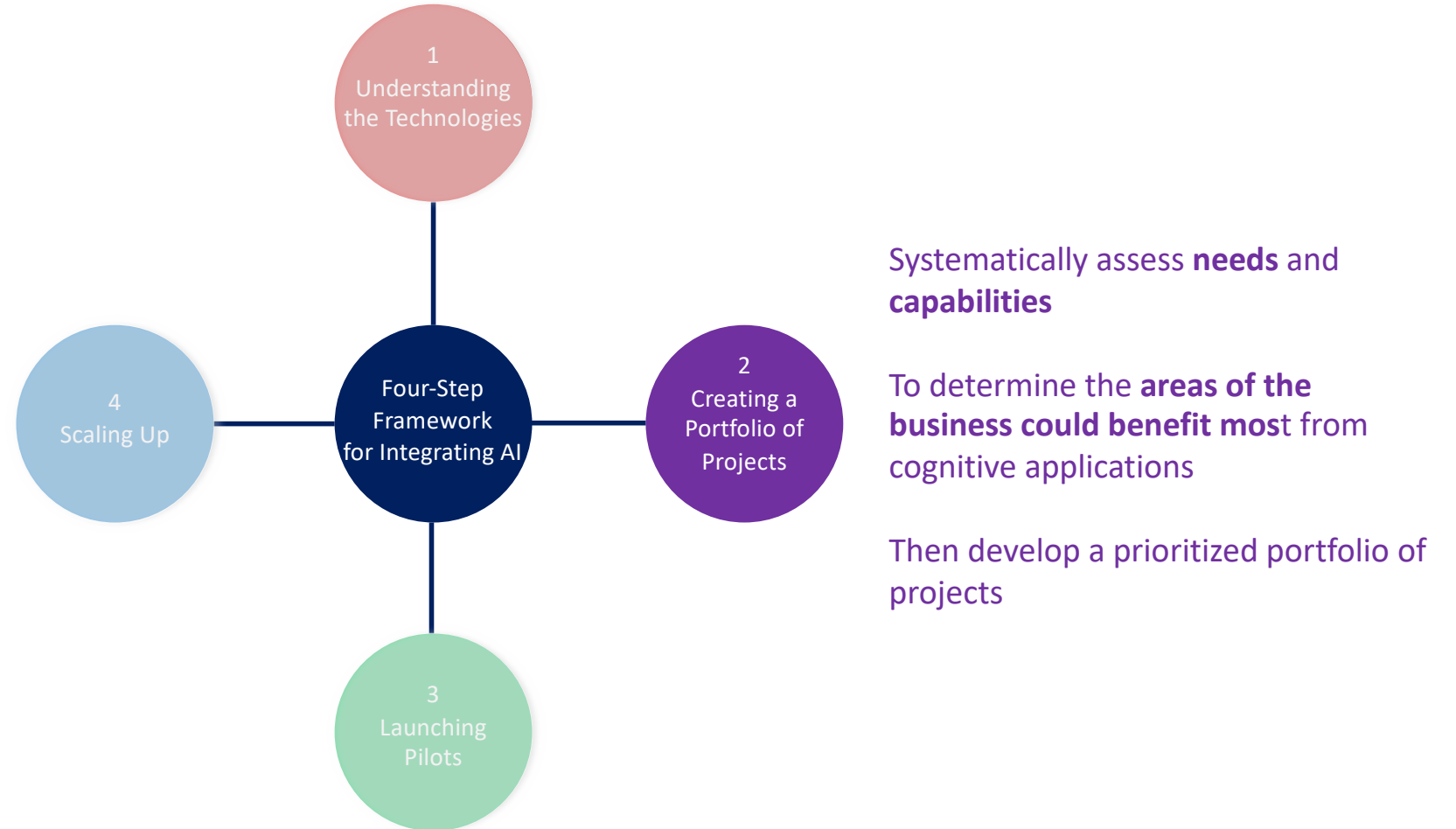
Planning longer-term projects?  
Recruit expert in-house talent



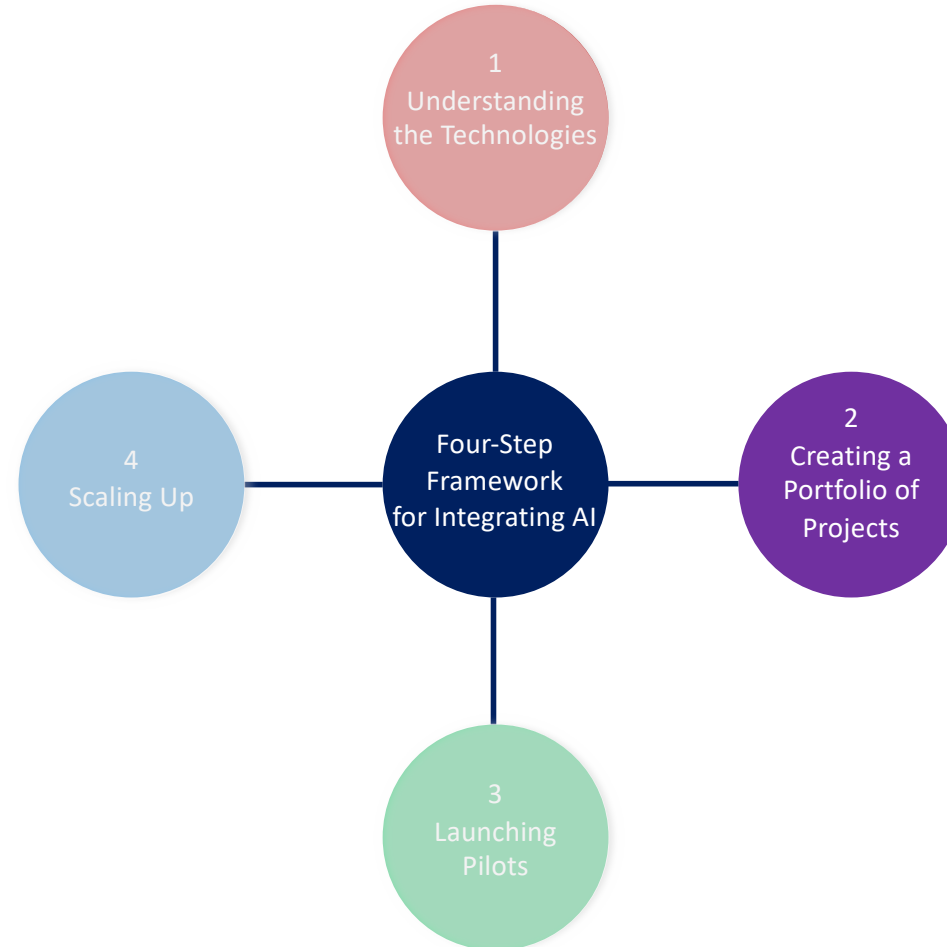
Having the right knowledge and skills is essential

1. Create a pool of experts
2. Make available to high priority projects
3. Eventually dedicate groups to business functions
4. But maintain a central coordination unit

# Four-step Framework for Integrating AI Technologies



# Four-step Framework for Integrating AI Technologies



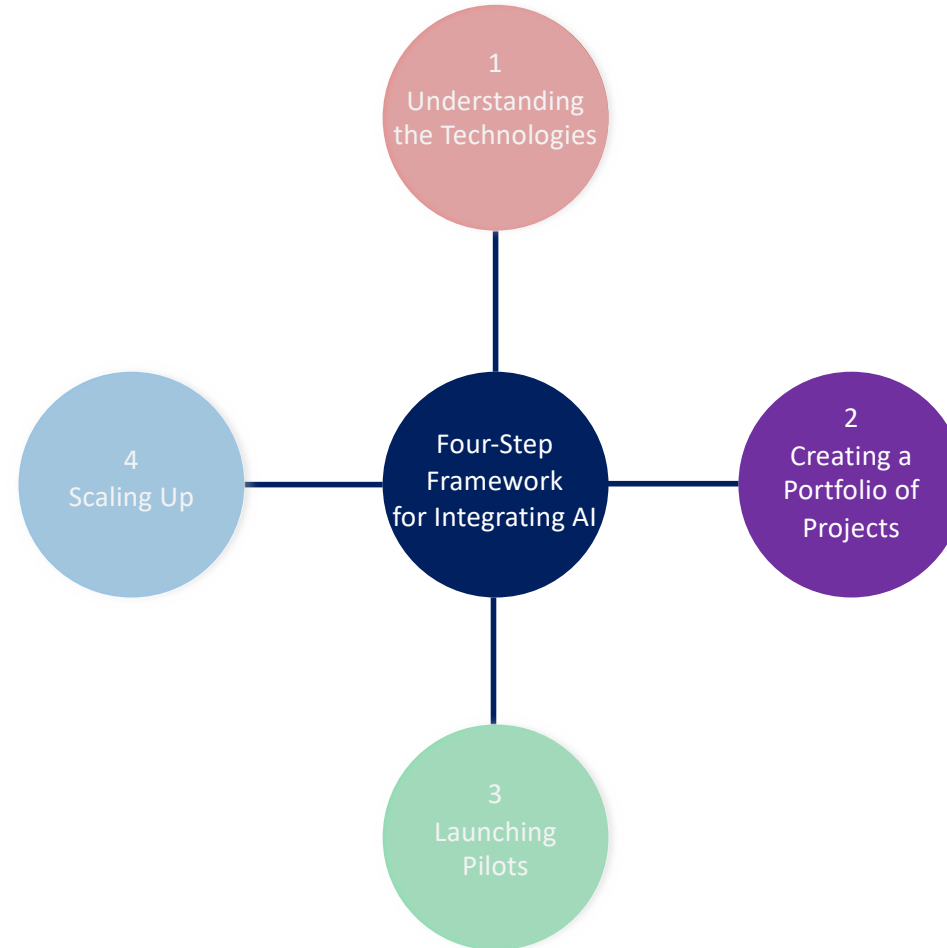
## 1. Identify the opportunities

(a) Bottlenecks in the flow of information identify opportunities for implementing cognitive insights

(b) Scaling up the use of existing knowledge

(c) Inadequate resources to make strategic use of the data that the company collects

# Four-step Framework for Integrating AI Technologies



## 2. Determine the use cases

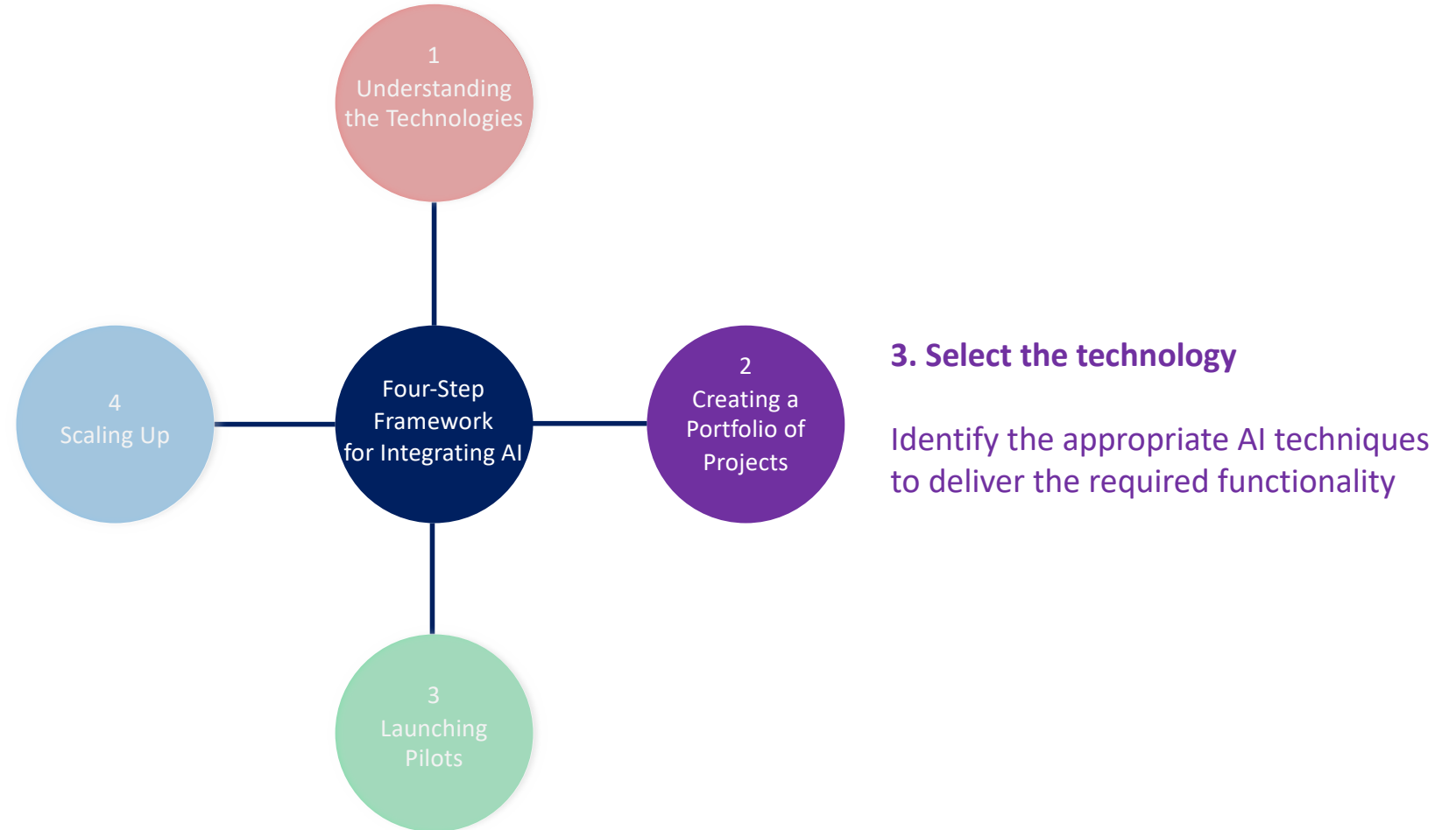
Priority list:

Which offer the most short- and long-term value, in terms of business success?

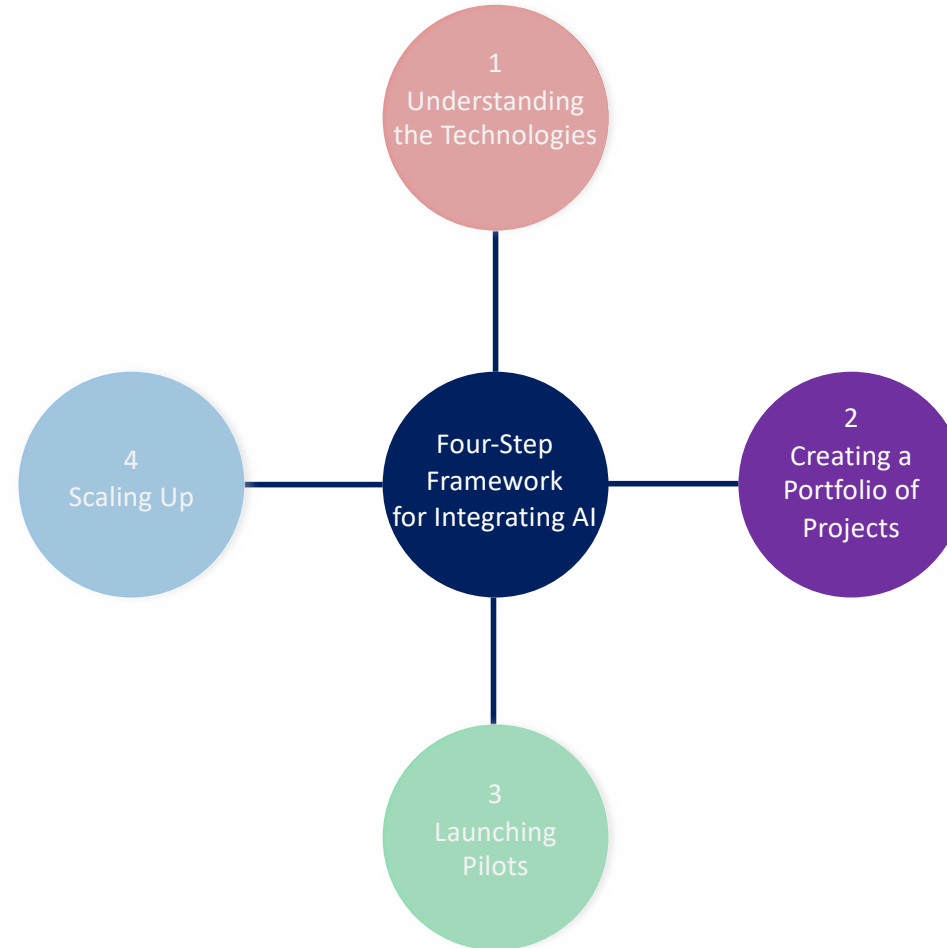
Which offer the opportunity to create competitive advantage?



# Four-step Framework for Integrating AI Technologies

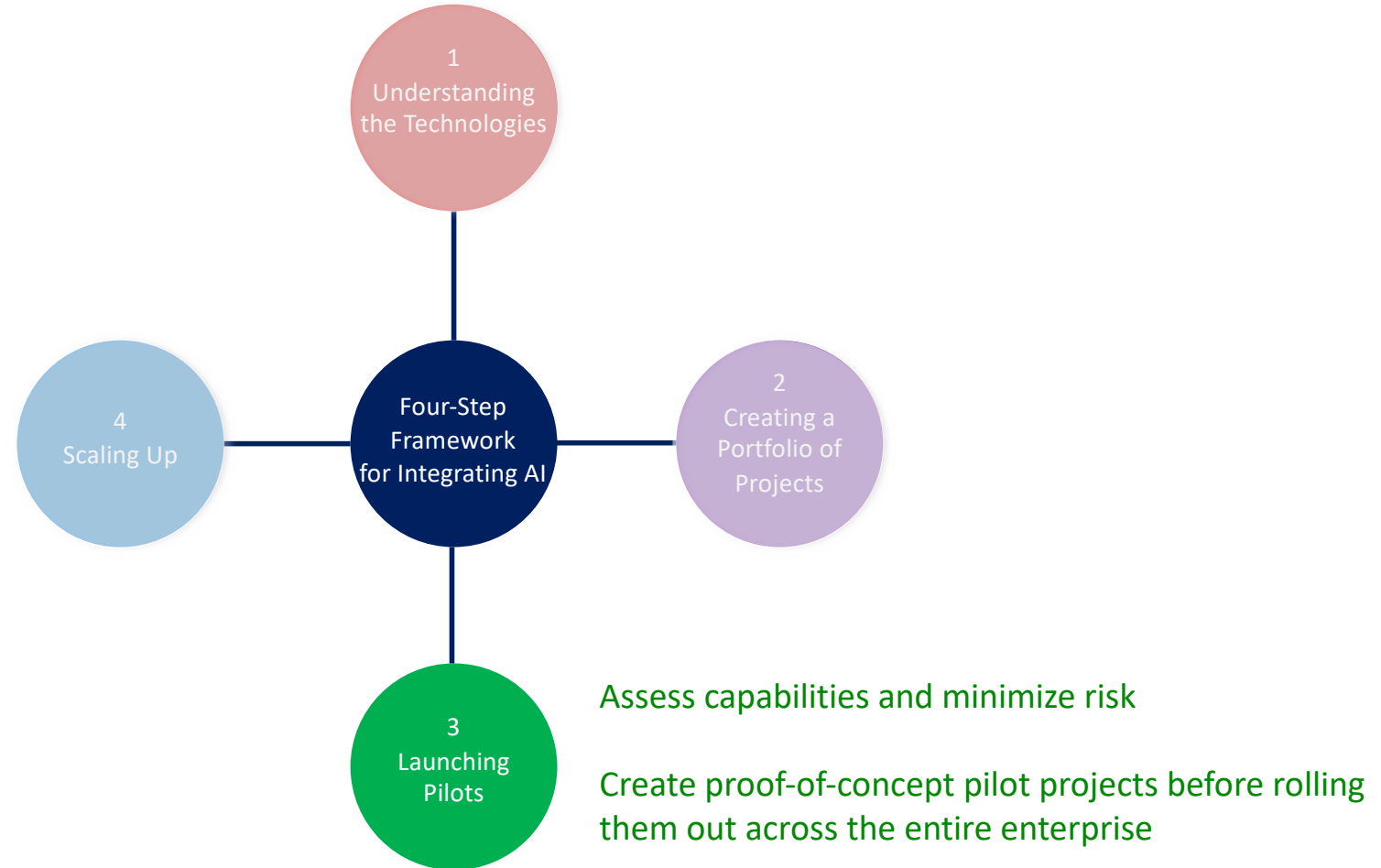


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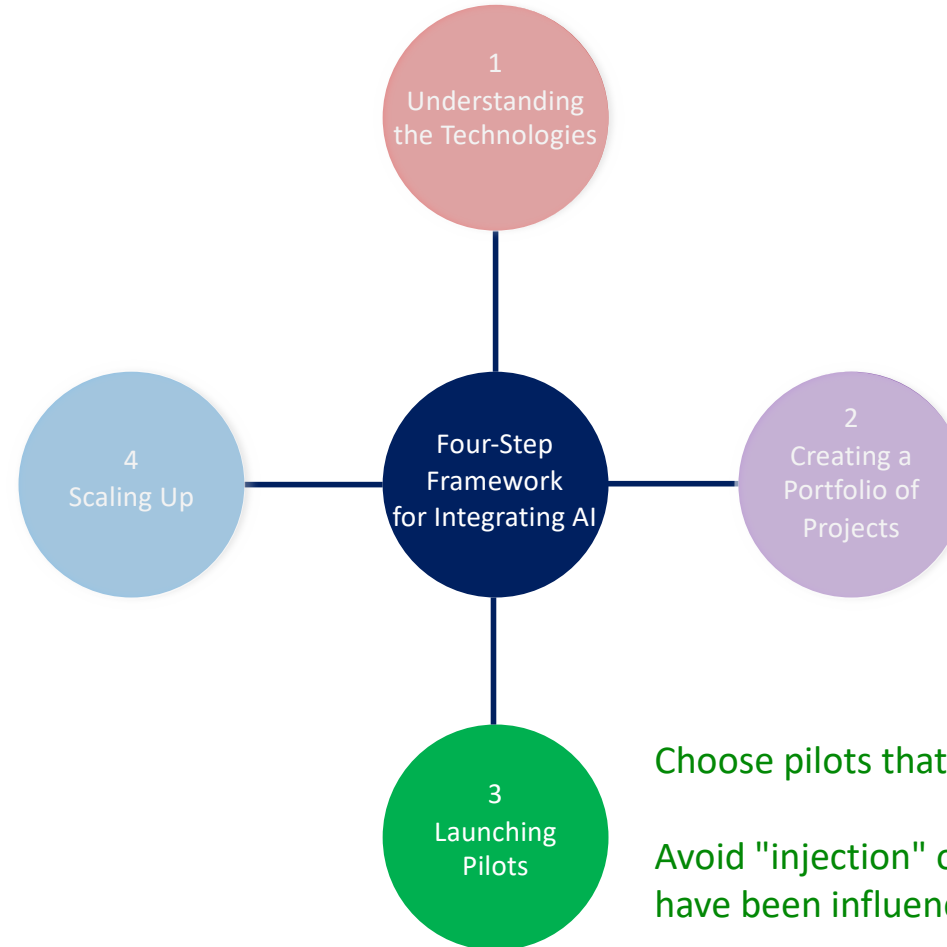


"It's wiser to take incremental steps with the currently available technology while planning for transformational change in the not-too-distant future."

# Four-step Framework for Integrating AI Technologies



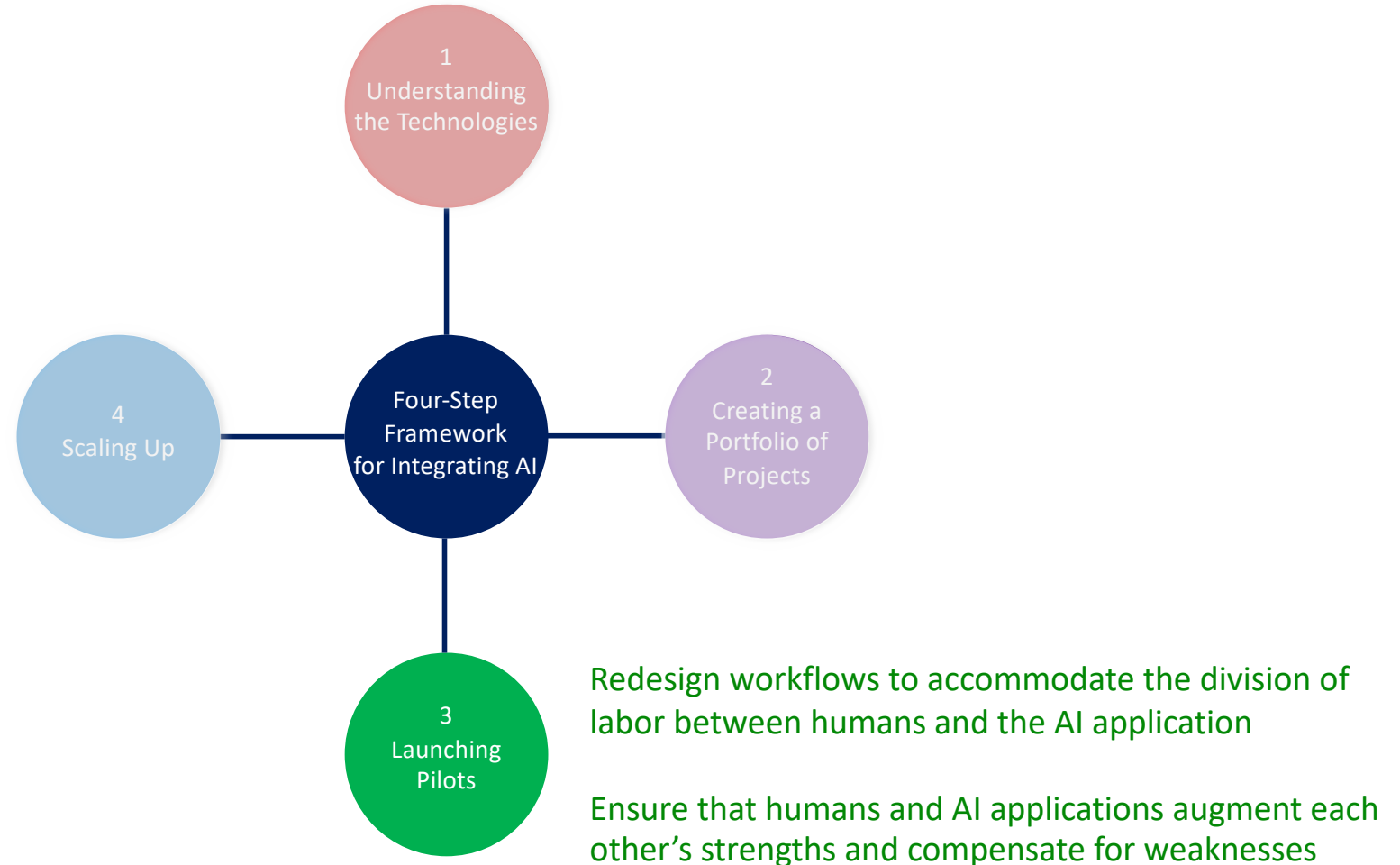
# Four-step Framework for Integrating AI Technologies



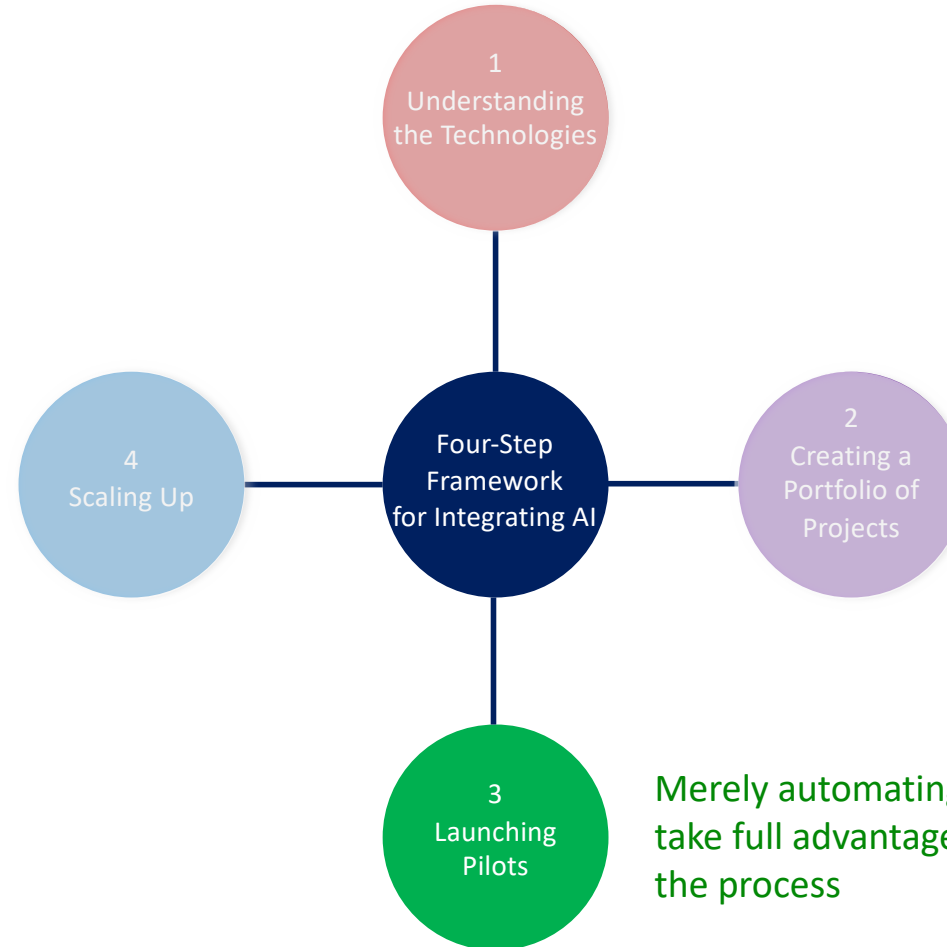
Choose pilots that have high potential business value

Avoid "injection" of projects by senior executives who have been influenced by technology vendors

# Four-step Framework for Integrating AI Technologies

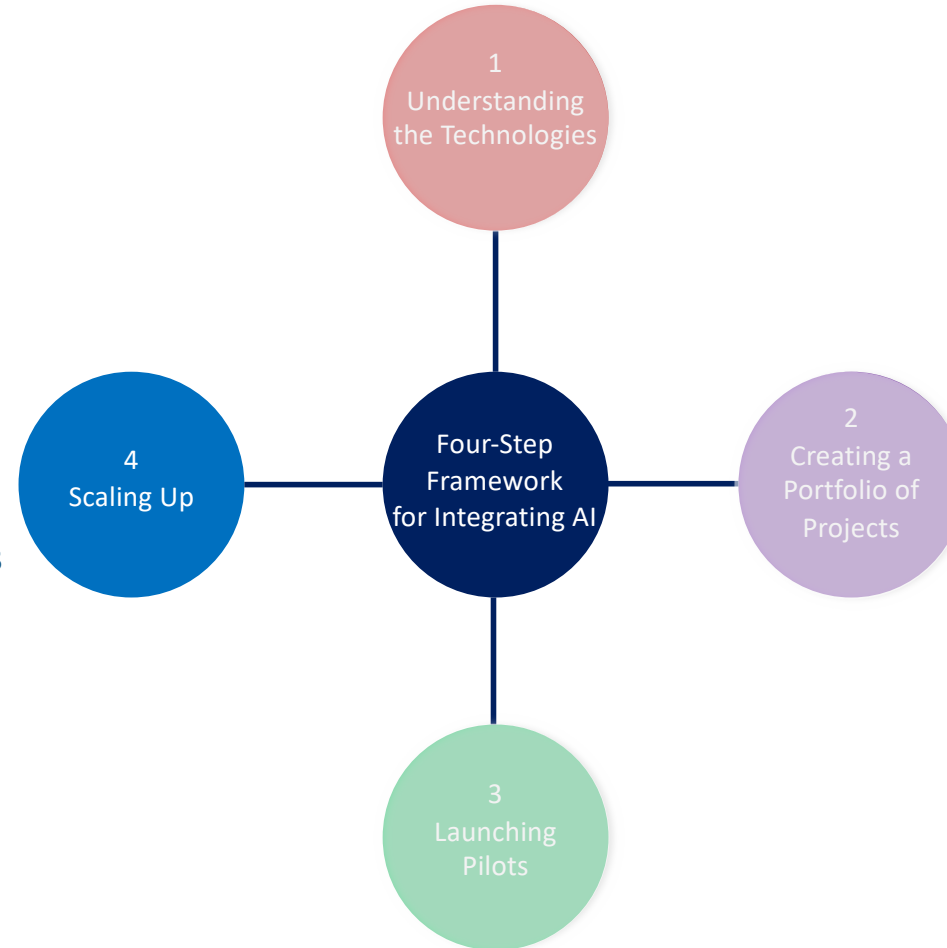


# Four-step Framework for Integrating AI Technologies



Merely automating existing processes won't necessarily take full advantage of the capabilities of AI and improve the process

# Four-step Framework for Integrating AI Technologies

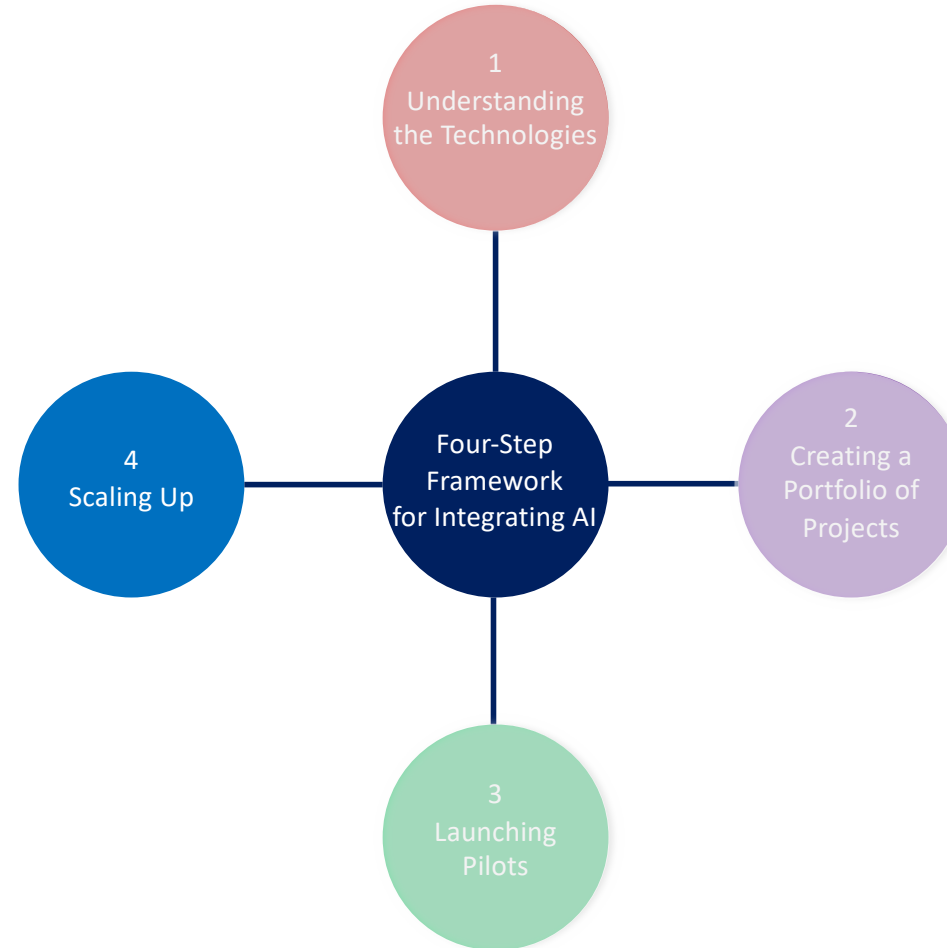


Rolling out a cognitive pilot organization-wide is challenging

It requires

- Collaboration between **technology experts** and **owners of the business process** being automated
- **Integration** with existing processes

# Four-step Framework for Integrating AI Technologies

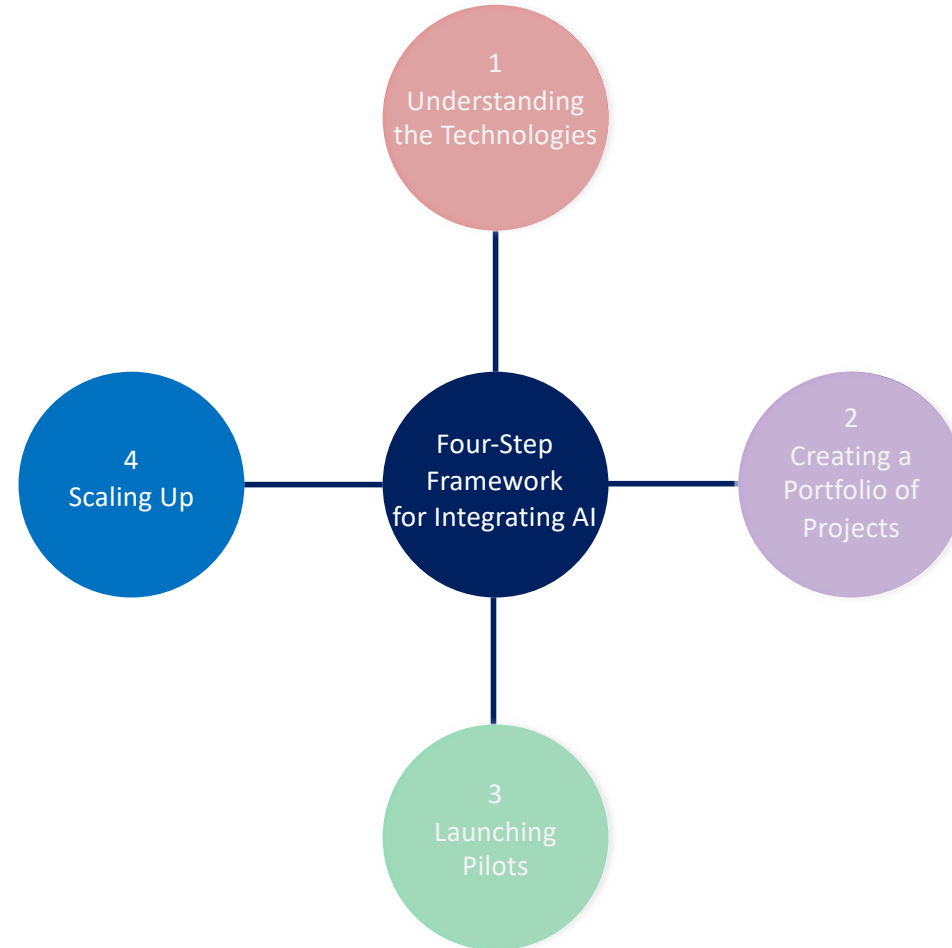


Business process owners need to discuss scaling considerations with the IT organization before or during the pilot phase



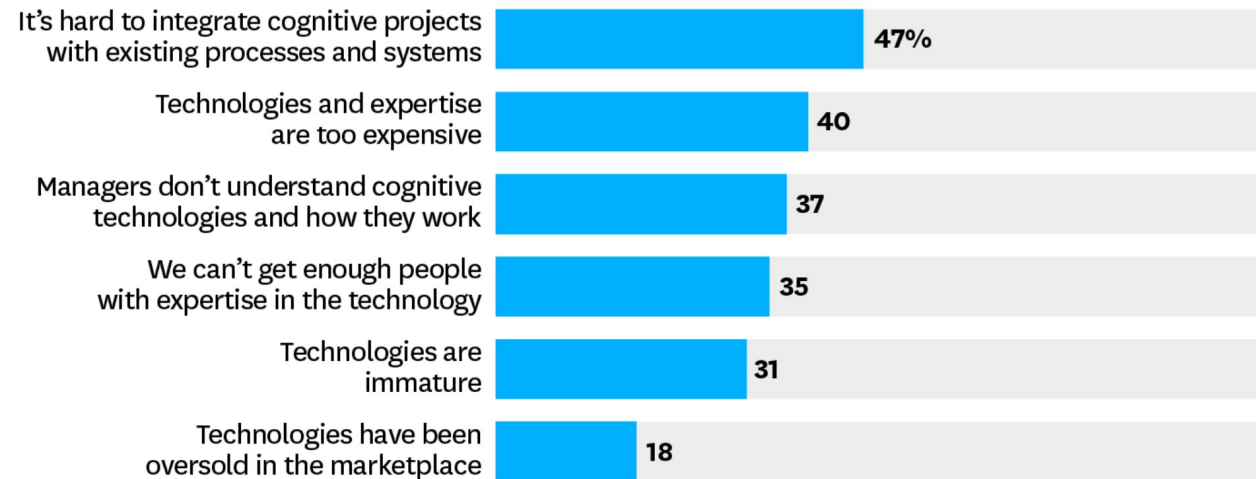
# Four-step Framework for Integrating AI Technologies

Companies may face substantial **organizational change-management** challenges



# Four-step Framework for Integrating AI Technologies

## PERCENTAGE WHO CITE THE FOLLOWING AS OBSTACLES



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FROM "ARTIFICIAL INTELLIGENCE FOR THE REAL WORLD,"  
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# Conclusion

"Cognitive systems perform **tasks**, not **entire jobs** ...

Most cognitive tasks currently being performed **augment human activity**"

(Davinport and Ronanki, 2019)

# Lecture Summary

1. AI supports three types of business application: process automation, cognitive insight, and cognitive engagement
2. The deployment of AI can be carried out in four steps: understanding the technologies, creating a portfolio of projects, launching pilot projects, and scaling up pilots to organization-wide applications
3. Integration of the AI application into the current business processes is a major challenge
4. Successful business strategies recognize that most cognitive tasks currently augment rather than replace human activities

# Recommended Reading

Davenport, T. H., and Ronanki, R. (2019). Artificial Intelligence for the Real World, Harvard Business Review, January – February, pp. 108 – 116.

<https://hbr.org/2018/01/artificial-intelligence-for-the-real-world>