Deloitte Insurance Week

Where Reinsurance Meets

The Actuarial Cyborg

07 May 2024

Introduction

Whole suit of topics about automation and industrialization. Today:

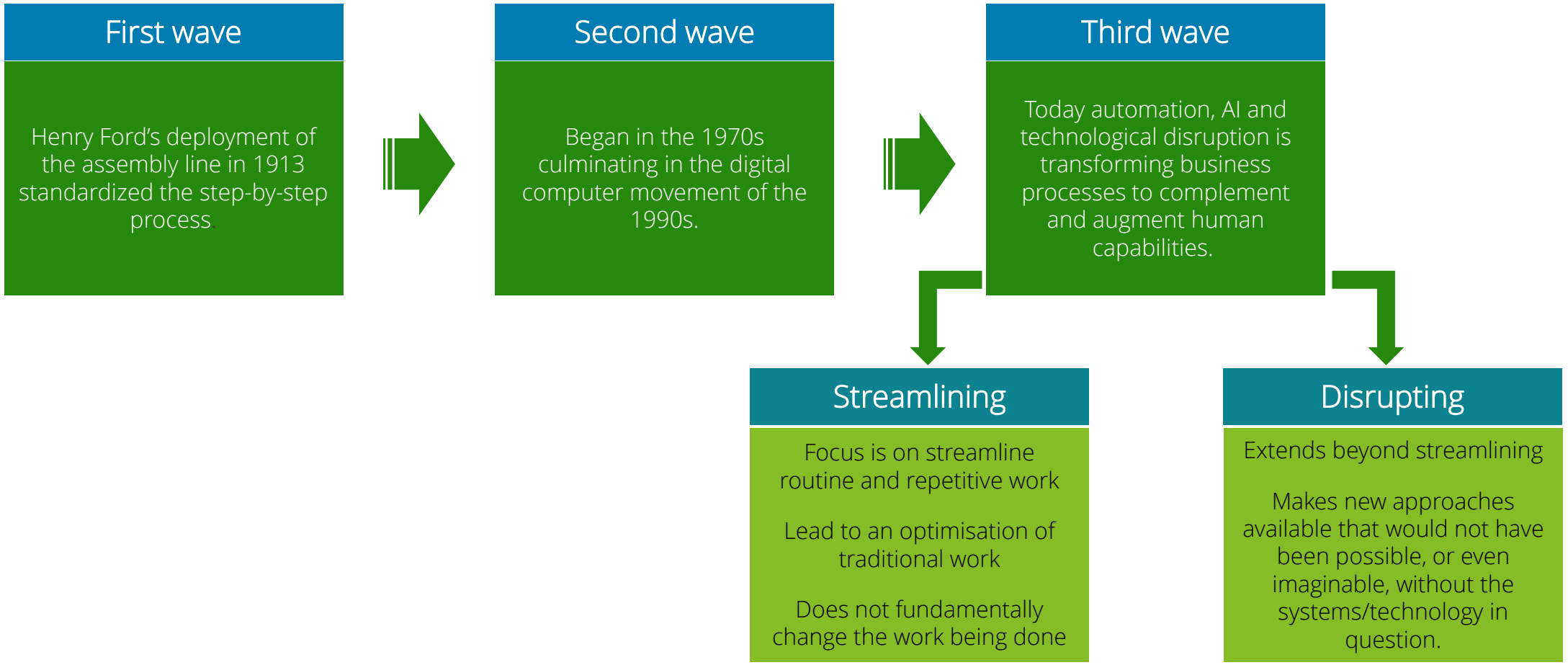
- How far can and should technology go in your business-critical models?
- What is the ideal cyborg; the optimal balance between person and machine?
- …and how do we get there?

Cyborg: A cyborg (/ˈsaɪbɔːrg/) is a portmanteau of cybernetic and organism

- a being with both organic and biomechatronic body parts
- an organism that has enhanced abilities due to the integration of some artificial component or technology

Cyborg'ing

Automation and Industrialisation …



The exam questions

Automation is the buzzword, and everyone is doing it. We need to automate our processes.

We have a broken process, and we'll fix it by automating it.

We need fewer resource; technology can take over the process.

Automation isn't linear. "More" automation isn't "better" automation.

So, …, how do we think about this?

The cyborg patterns: a spectrum

An example of some ways cyborgs can be arranged

Name	Description	Orchestrate	Run	Select	Judge	Review	Report
Luddite							
Calculator							
Gatherer							
Collaborator							
Augmenter							
Generator							
Trigger							
Autonomous							

H = Human
M = Machine

The cyborg patterns: a spectrum

An example of some ways cyborgs can be arranged

Calculator

A process designed, built, and parameterised by a human. The process is executed by a machine.

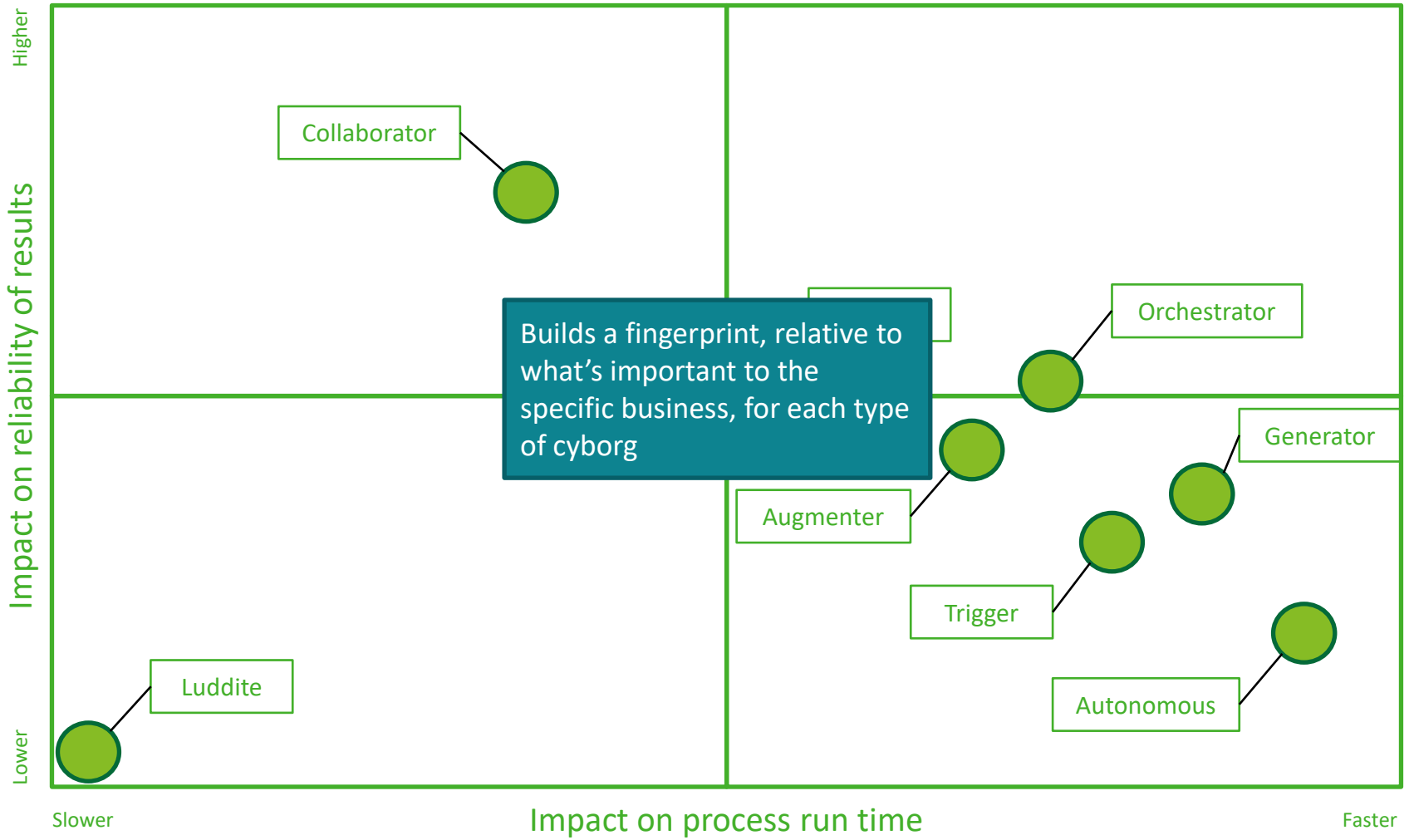
- Pros: High degree of control over the calculation, highly transparent, fast, …
- Cons: Needs significant human interaction, lower error tolerance, …
- Examples: linear excel spreadsheet with specified inputs and outputs, a reserving methodology coded in R, …

Trigger

A calculation with the structure built by human but self parameterized and executed by machine

- Pros: Significantly hands free, can adapt over time, potential to be more appropriate, …
- Cons: Low transparency, cultural change, …
- Examples: Neural net structure, random forests, …

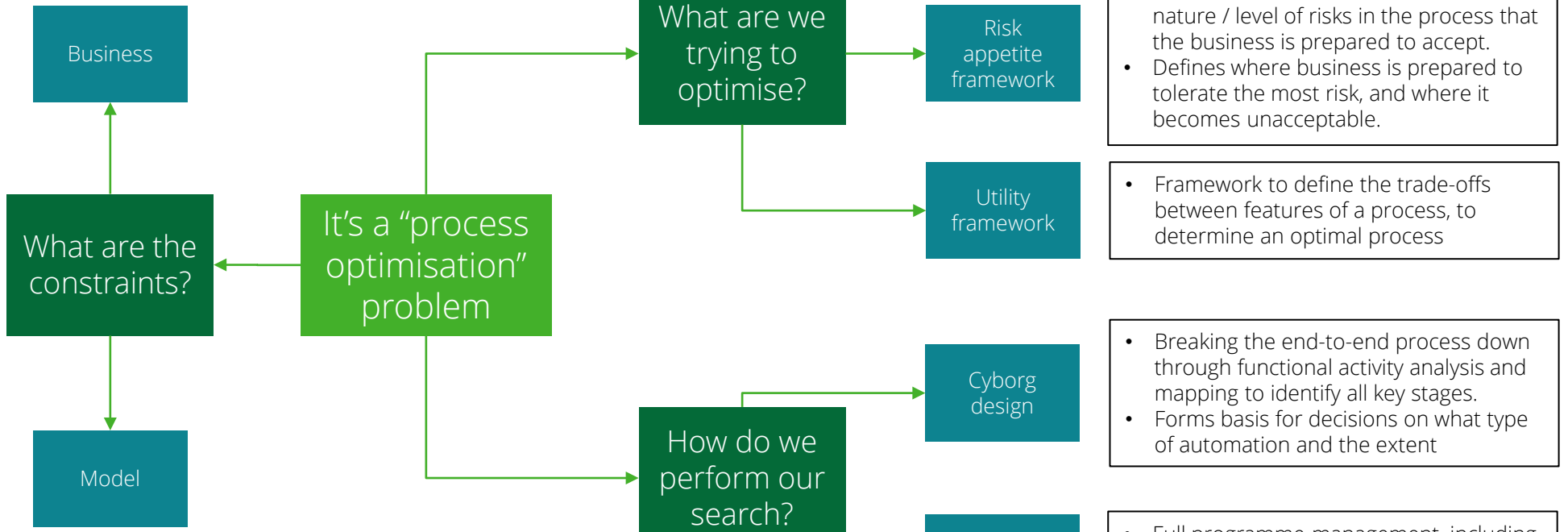
Characteristics of process cyborgs



Decision Dimensions

- Process run time
- Risk in results
- Transparency
- Cognitive overhead
- Technology required
- Internal skills needed
- Reputation
- …

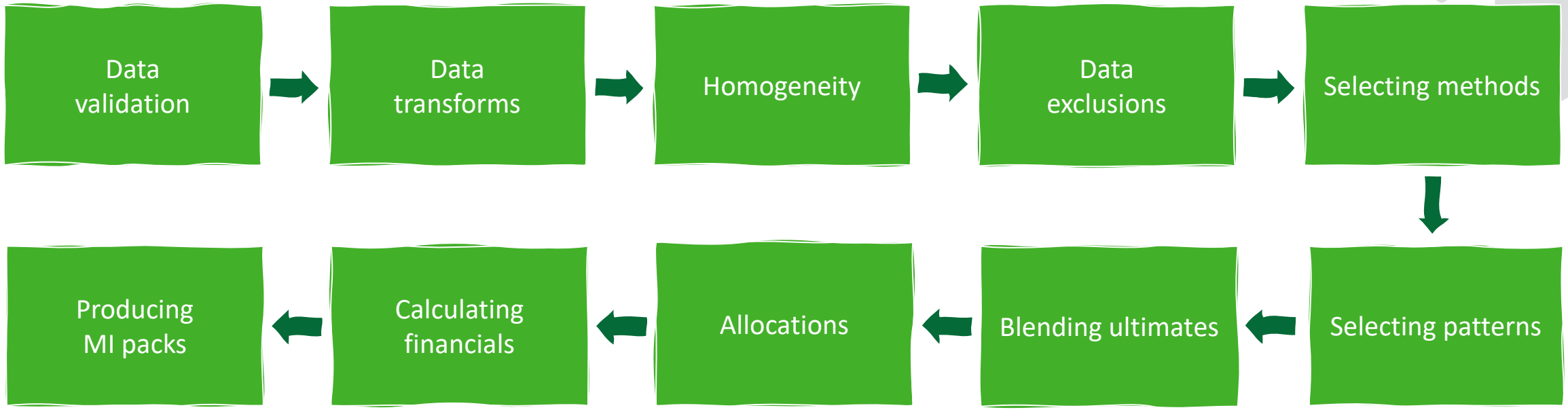
Arranging our “cyborg” estate



A simplistic example: A reserving process

dynamo

Process



Cyborgs

Calculator | **Gatherer** | **Collaborator** | **Generator** | **Trigger** | **…**

A simplistic example: A reserving process

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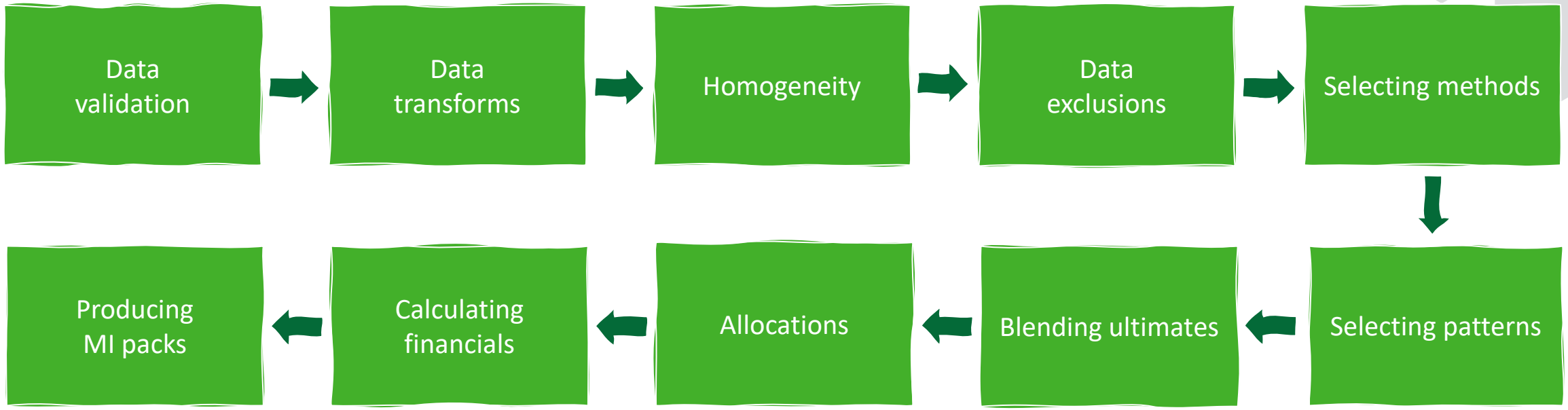
Process



Cyborgs

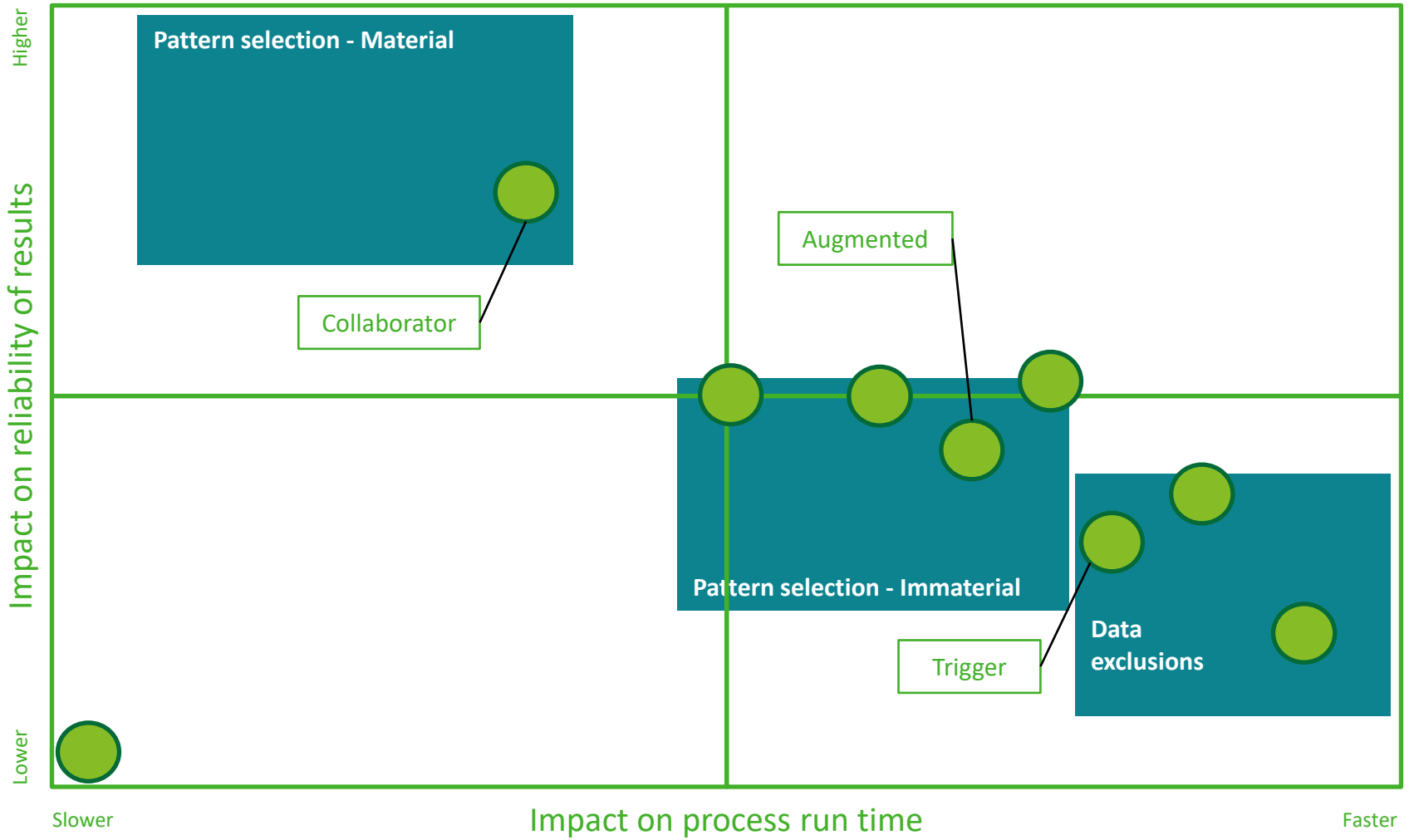
Calculator | **Gatherer** | **Collaborator** | **Generator** | **Trigger** | **…**

A simplistic example: A reserving process

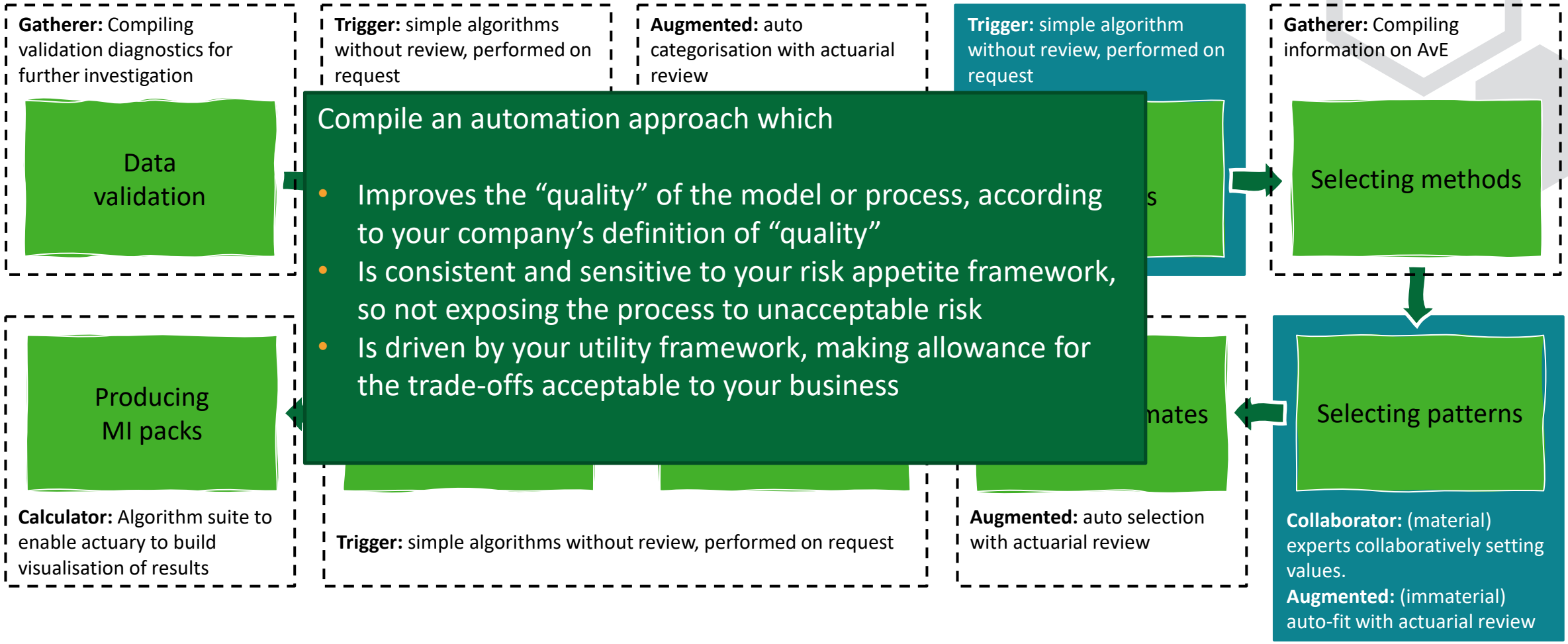
Key points from analysis

	Materiality	Risk appetite	Utility	Automation?
Data exclusion				
Selecting patterns				

Characteristics of process cyborgs



A simplistic example: A reserving process



Compile an automation approach which

- Improves the "quality" of the model or process, according to your company's definition of "quality"
- Is consistent and sensitive to your risk appetite framework, so not exposing the process to unacceptable risk
- Is driven by your utility framework, making allowance for the trade-offs acceptable to your business

Humans' responsibilities

Key take-aways

1. Automation isn't linear. There are many ways that human and machine can be combined for better outcomes, each with their own pros and cons. These range from the simple to the modern / complex.

2. There is a lot of groundwork that needs to take place before successfully automating an end-to-end process, such as specifying the process in detail, and preparing the organization for the cultural change.

3. The different patterns of cyborgs should be combined to help your process achieve its strategic aims, which could include shorter run times, fewer resources, more transparency, greater precision.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Questions?