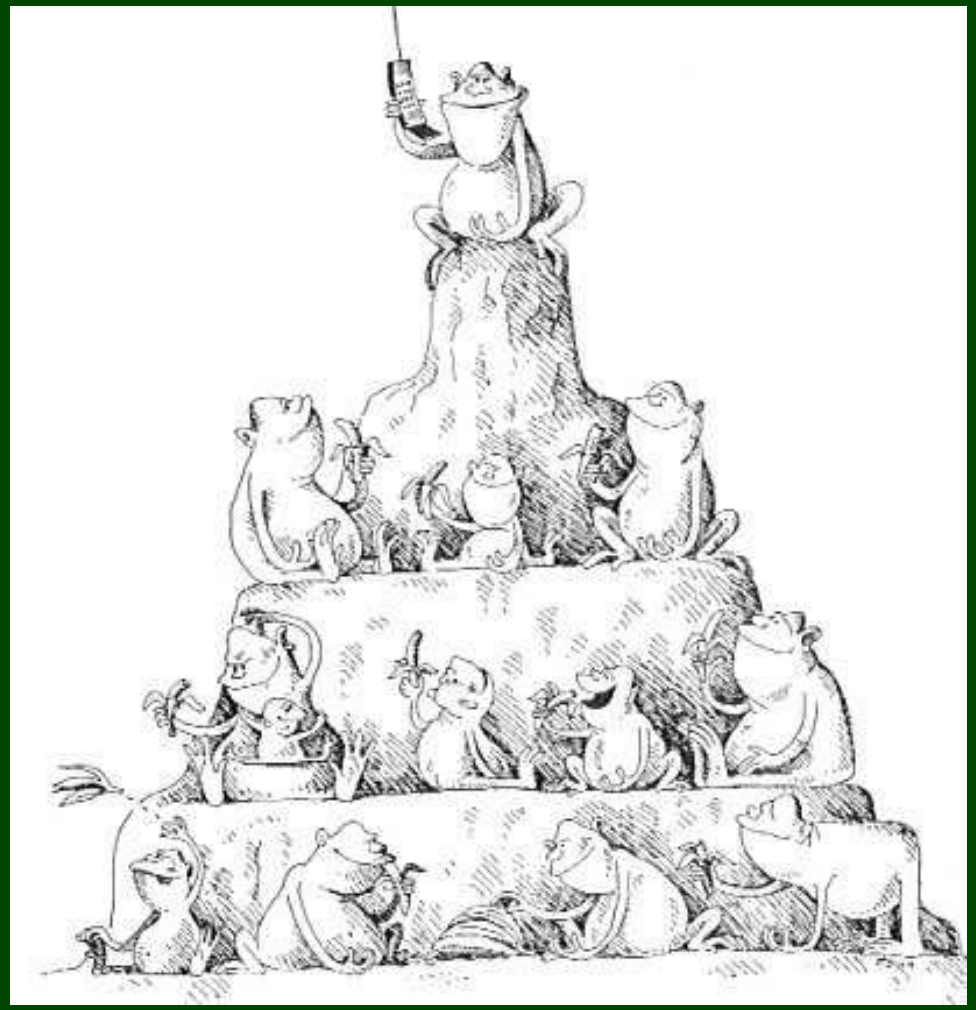
MANAGEMENT OF TECHNOLOGY



INNOVATIVE ORGANIZATIONS

INNOVATIVE ORGANIZATIONS

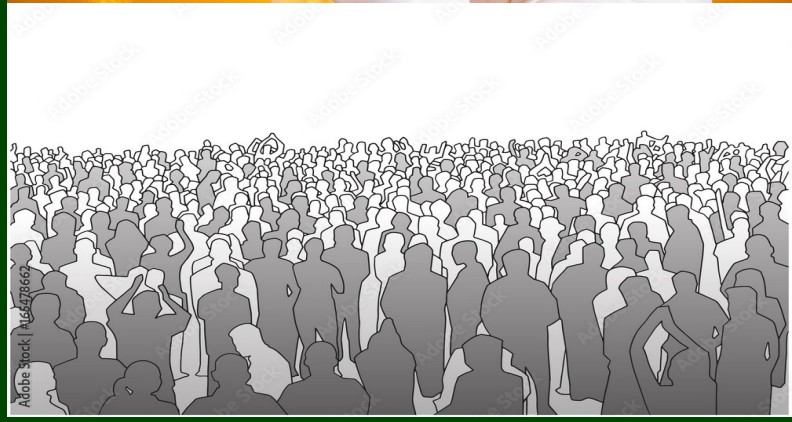
COLLECTIVE GENIUS

Hill et al., 2014

INNOVATIVE ORGANIZATIONS

COLLECTIVE GENIUS

- diverse people, wide-ranging ideas, debates



Hill et al., 2014

INNOVATIVE ORGANIZATIONS

COLLECTIVE GENIUS

- diverse people, wide-ranging ideas, debates
- trial and error, learning

Hill et al., 2014

INNOVATIVE ORGANIZATIONS

COLLECTIVE GENIUS

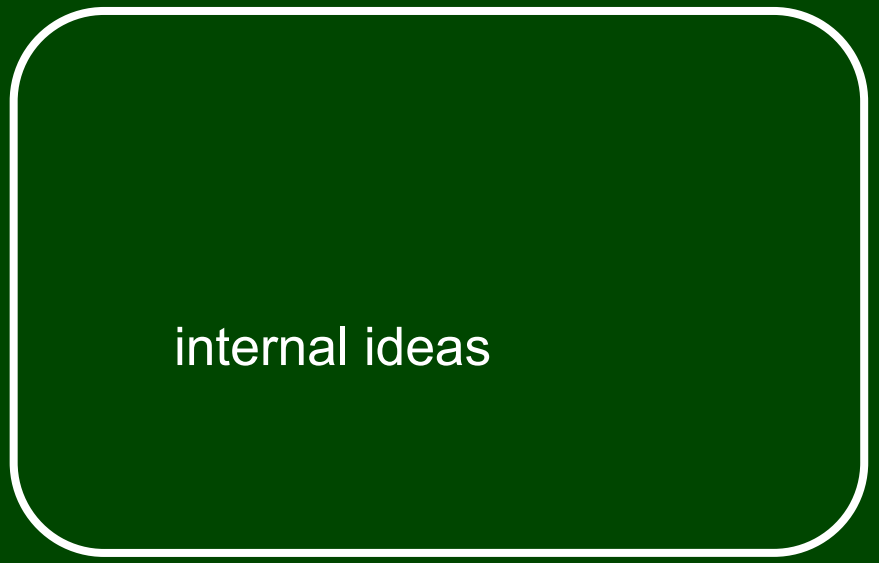
- diverse people, wide-ranging ideas, debates
- trial and error, learning
- ”either-or” → ”both-and” thinking

Hill et al., 2014

OPEN INNOVATION

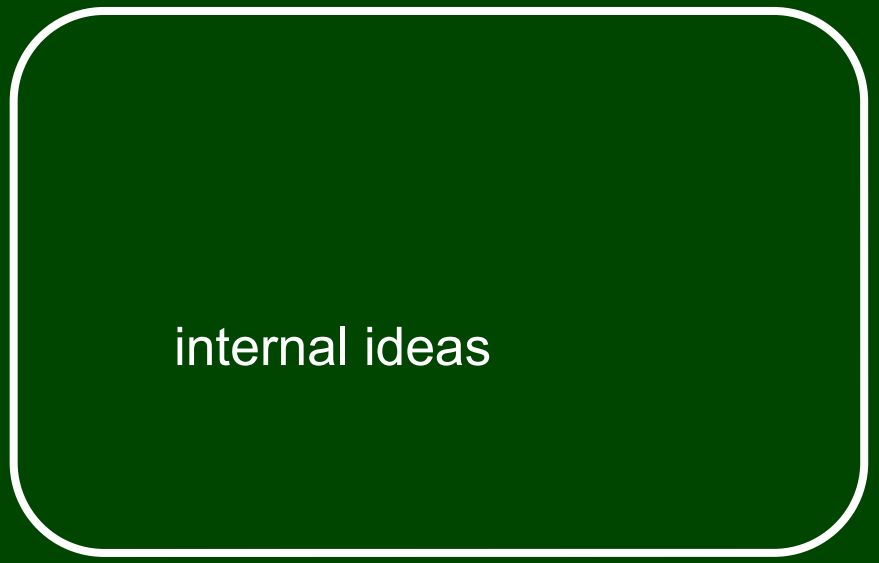
Chesbrough, 2003

OPEN INNOVATION



Chesbrough, 2003

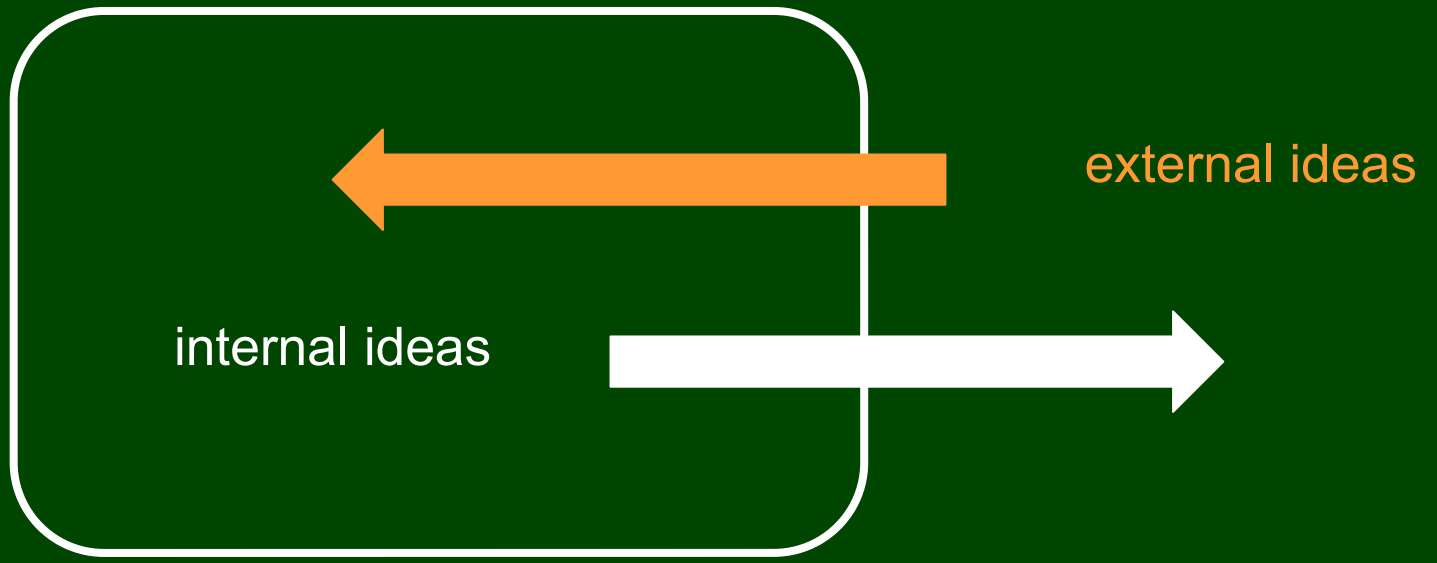
OPEN INNOVATION



external ideas

Chesbrough, 2003

OPEN INNOVATION

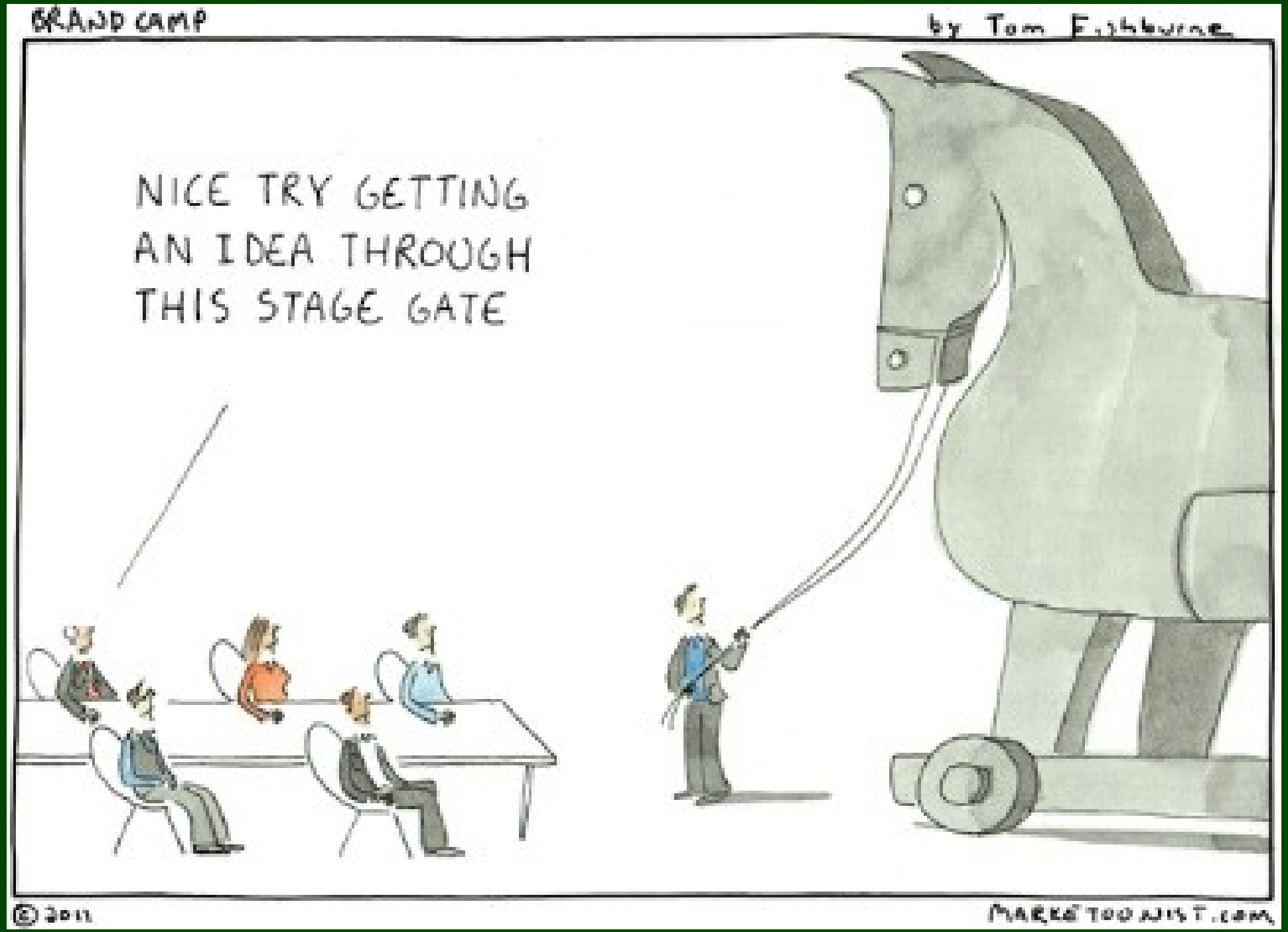


Chesbrough, 2003

STEPS OF PRODUCT DEVELOPEMENT

STEPS OF PRODUCT DEVELOPEMENT

STAGE	AIM	OBJECT	PLACE
(Pre-)Study	principle of operation, the essence of the product	model	laboratory
Prototype	the design of the product, laboratory-level manufacturing technology	product	laboratory
Pilot lot	factory-level manufacturing technology	product	factory


BRAND CAMP
by Tom Fishburne
NICE TRY GETTING AN IDEA THROUGH THIS STAGE GATE
© 2011
MARKETOONIST.COM

STAGE GATE SELECTION CRITERIA

(Aristodemou, Tietze, Shaw, 2020)

STAGE GATE SELECTION CRITERIA

CRITERIA	DEFINITION	SHARE (%)
market	probability of commercial success	23,3
technology	probability of technical success	14,9
profit	profitability of reward	12,8
leverage	probability of competitive advantage	11,7
strategy and business	probability of achieving long term goals	11,0
project management	probability of implementation success	7,6
resourcing	probability of capability	5,5
legal / regulatory	probability of legislative requirements	2,7
other	other	10,3

(Aristodemou, Tietze, Shaw, 2020)

PRODUCT DEVELOPMENT STAGES

Compared to the (pre-)studies

STAGES	REJECTION RATES (%)
(pre-)study	91
prototype	4
pilot lot	2
market launch	0,6 (failure)

PRODUCT DEVELOPMENT STAGES

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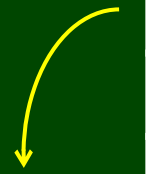

3%

2.4%

SUCCESS

PRODUCT DEVELOPMENT STAGES

Compared to the (pre-)studies

STAGES	REJECTION RATES (%)
(pre-)study	91
prototype	4
pilot lot	2
market launch	0,6 (failure)

3%

2.4%

SUCCESS

33

42

PRODUCT DEVELOPMENT STAGES

Compared to the row product ideas

STAGES	REJECTION RATES (%)
row product idea	90
product concept	5,8
(pre-)study	3,8
prototype	0,17
pilot lot	0,08
market launch	0,03 (failure)

PRODUCT DEVELOPMENT STAGES

Compared to the row product ideas

STAGES	REJECTION RATES (%)
row product idea	90
product concept	5,8
(pre-)study	3,8
prototype	0,17
pilot lot	0,08
market launch	0,03 (failure)

4.2%

1.26‰

1‰

SUCCESS

PRODUCT DEVELOPMENT STAGES

Compared to the row product ideas

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row product idea	90
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market launch	0,03 (failure)

4.2%

1.26‰

1‰

24

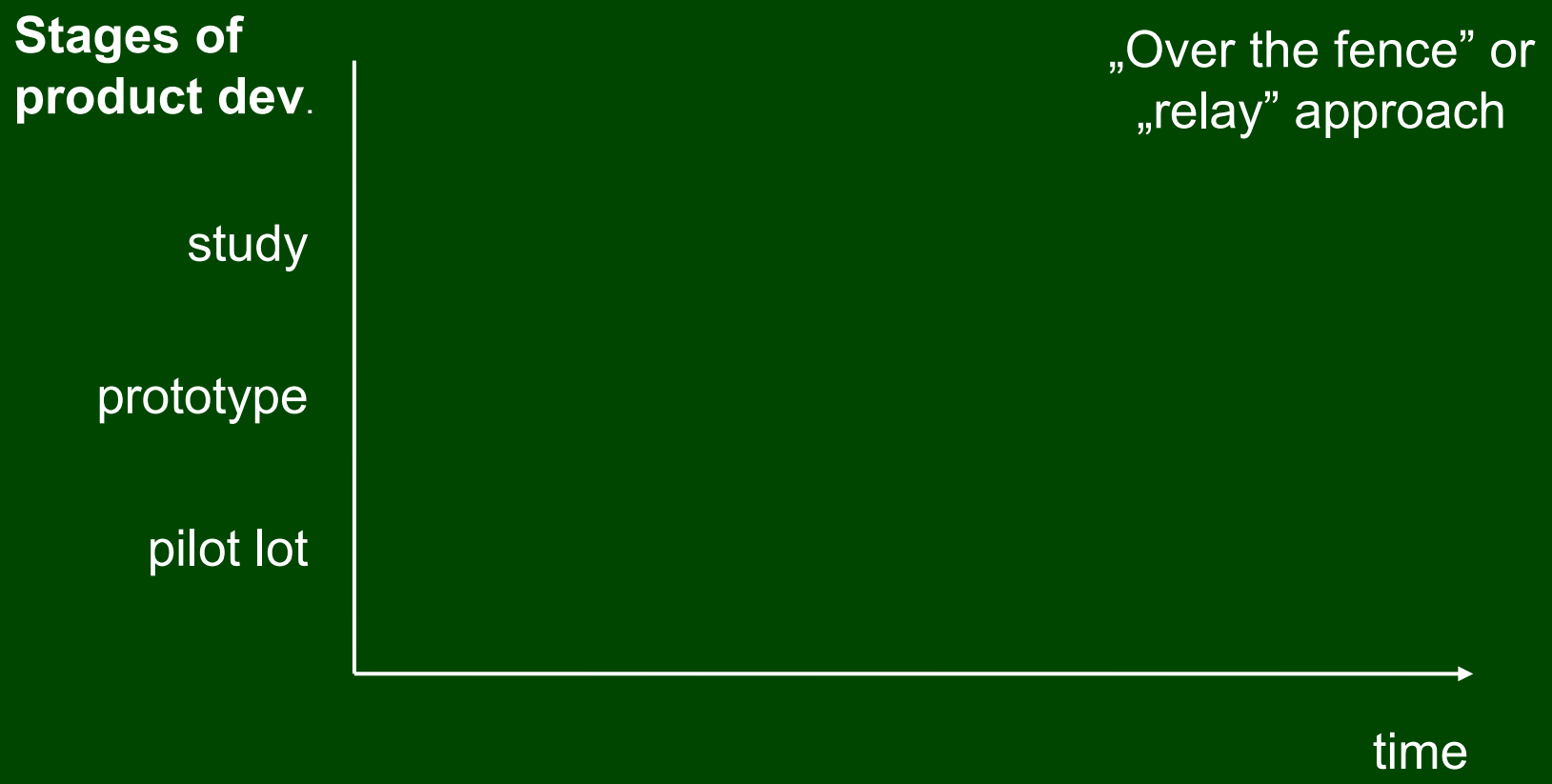
800

1000

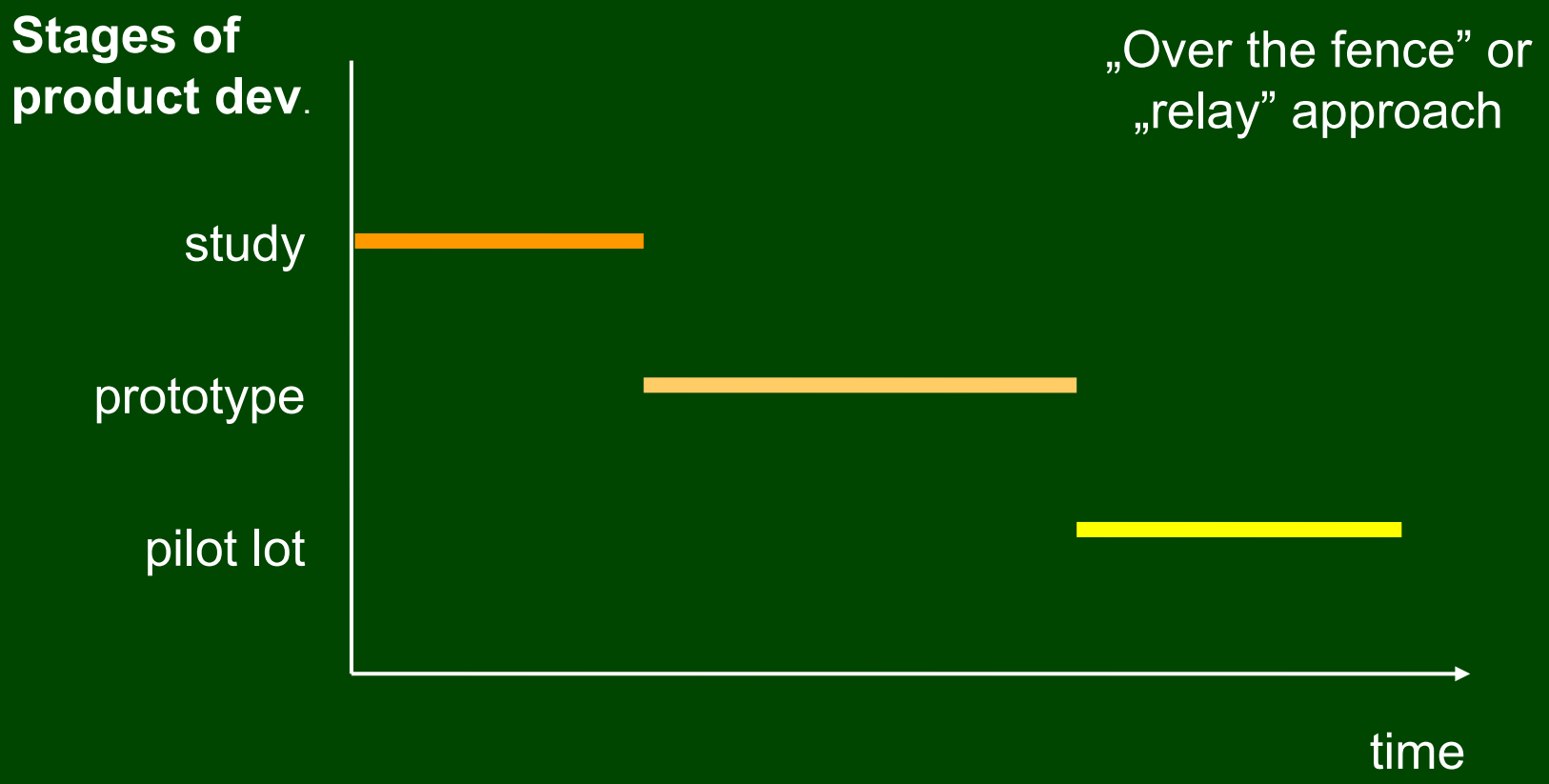
SUCCESS


STAGE GATE
REVIEW
TOM
FISH
BURNE
© marketoonist.com

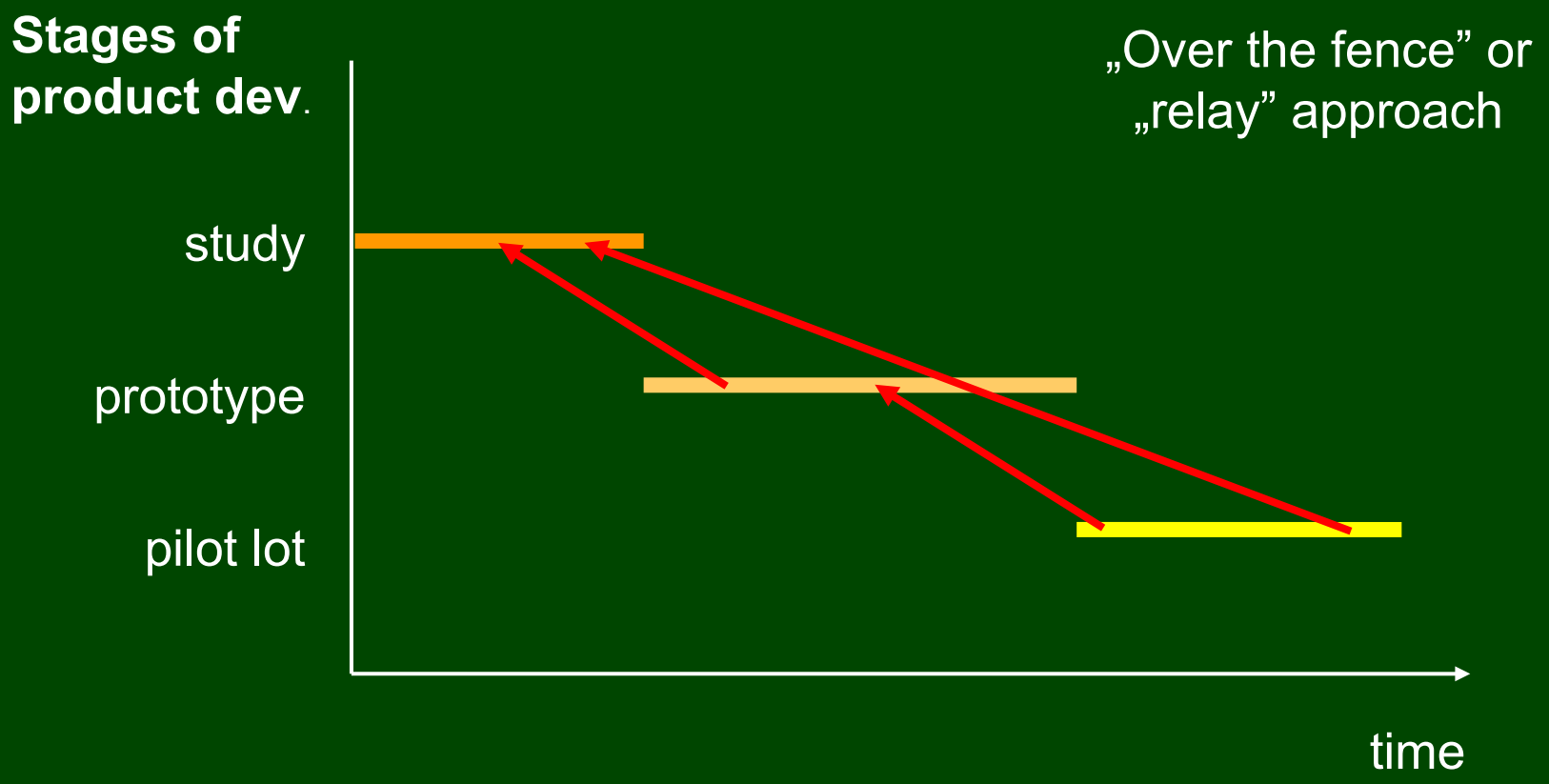
TRADITIONAL PRODUCT DEVELOPEMENT



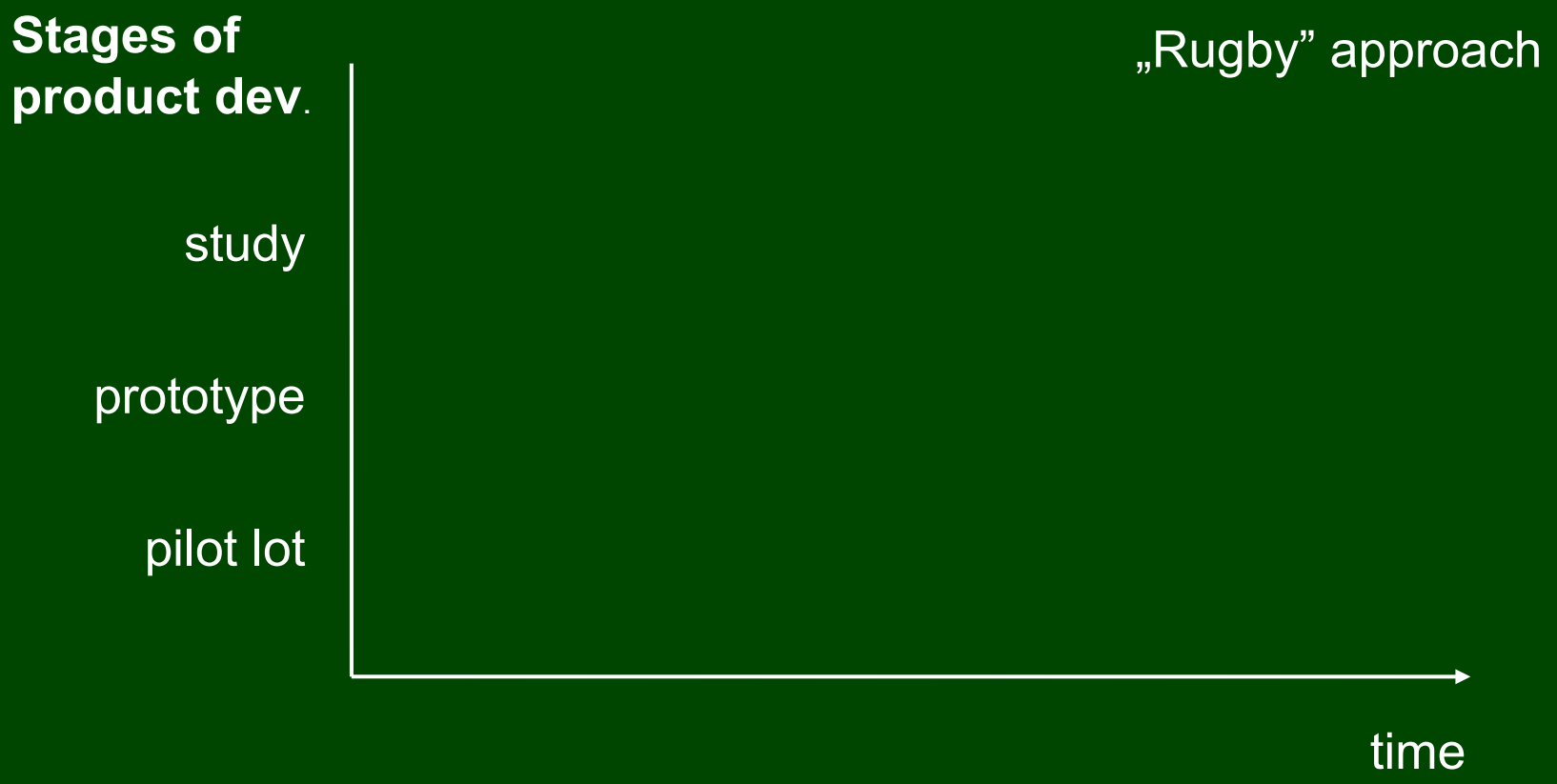
TRADITIONAL PRODUCT DEVELOPEMENT



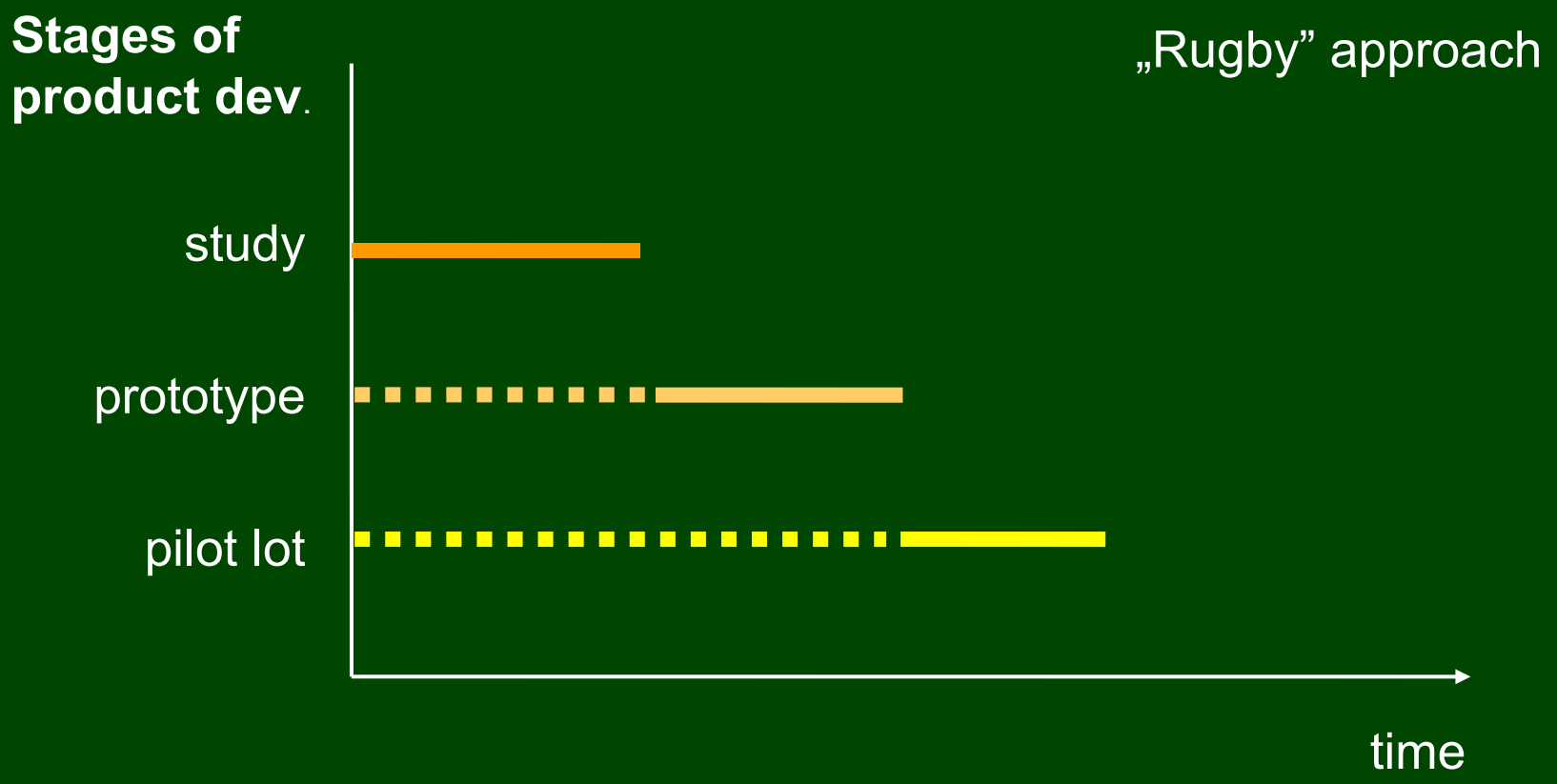
TRADITIONAL PRODUCT DEVELOPEMENT



SIMULTANEOUS OR CONCURRENT ENGINEERING



SIMULTANEOUS OR CONCURRENT ENGINEERING



SIMULTANEOUS OR CONCURRENT ENGINEERING

SIMULTANEOUS OR CONCURRENT ENGINEERING

2 DIFFERENCES BETWEEN RELAY AND RUGBY

SIMULTANEOUS OR CONCURRENT ENGINEERING

2 DIFFERENCES BETWEEN RELAY AND RUGBY

SOME OF THE SAME ACTIVITIES ARE DONE EARLIER

SIMULTANEOUS OR CONCURRENT ENGINEERING

2 DIFFERENCES BETWEEN RELAY AND RUGBY

SOME OF THE SAME ACTIVITIES ARE DONE EARLIER

- those that are independent of the results of the previous stages,
- and that are cheap (80% / 20% Pareto-rule)

NEW ACTIVITES

SIMULTANEOUS OR CONCURRENT ENGINEERING

2 DIFFERENCES BETWEEN RELAY AND RUGBY

SOME OF THE SAME ACTIVITIES ARE DONE EARLIER

- those that are independent of the results of the previous stages,
- and that are cheap (80% / 20% Pareto-rule)

NEW ACTIVITES

continuous collaboration between the experts of the different aspects, from start to finish

AGILE DEVELOPMENT

AGILE DEVELOPMENT

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ITERATIVE APPROACH

AGILE DEVELOPMENT

ITERATIVE APPROACH

- rapid, iterative loops

AGILE DEVELOPMENT

ITERATIVE APPROACH

- rapid, iterative loops
- inexpensive models and prototypes

AGILE DEVELOPMENT

TEAMS

AGILE DEVELOPMENT

TEAMS

- nimble, experimenting

AGILE DEVELOPMENT

TEAMS

- nimble, experimenting
- multidisciplinary, with external experts

AGILE DEVELOPMENT

TEAMS

- nimble, experimenting
- multidisciplinary, with external experts
- part-time or limited-time members, small constant core

AGILE DEVELOPMENT

GOVERNANCE

AGILE DEVELOPMENT

GOVERNANCE

- coach, go / no go decision maker

AGILE DEVELOPMENT

GOVERNANCE

- coach, go / no go decision maker
- mitigating ”organizational antibodies”

AGILE DEVELOPMENT

GOVERNANCE

- coach, go / no go decision maker
- mitigating ”organizational antibodies”
- culture of experimentation and learning

AGILE DEVELOPMENT

GOVERNANCE

- coach, go / no go decision maker
- mitigating ”organizational antibodies”
- culture of experimentation and learning
- sense of urgency and agility

AGILE DEVELOPMENT

PROCESS

AGILE DEVELOPMENT

PROCESS

- integrating agile into a single innovation process
- adding a partly parallel agile path

AGILE DEVELOPMENT

PROCESS

- ~~integrating agile into a single innovation process~~
- adding a partly parallel agile path ✓

AGILE DEVELOPEMENT

AGILE ORGANIZATIONS

(McKinsey)

AGILE DEVELOPEMENT

AGILE ORGANIZATIONS

”... network of teams within a people-centered culture that operates in rapid learning and fast decision cycles which are enabled by technology ...”

(McKinsey)

AGILE DEVELOPEMENT

AGILE ORGANIZATIONS

”... network of teams within a people-centered culture that operates in rapid learning and fast decision cycles which are enabled by technology ...”

”... quickly and efficiently reconfigure strategy, structure, processes, people, and technology toward value-creating and value-protecting opportunities ...”

(McKinsey)

How the customer explained it

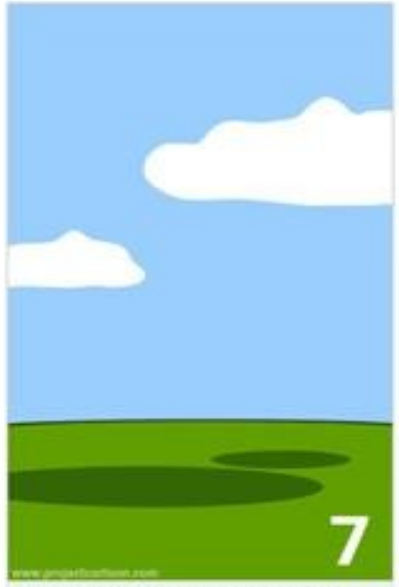
How the project leader understood it

How the analyst designed it

How the programmer wrote it

What the beta testers received

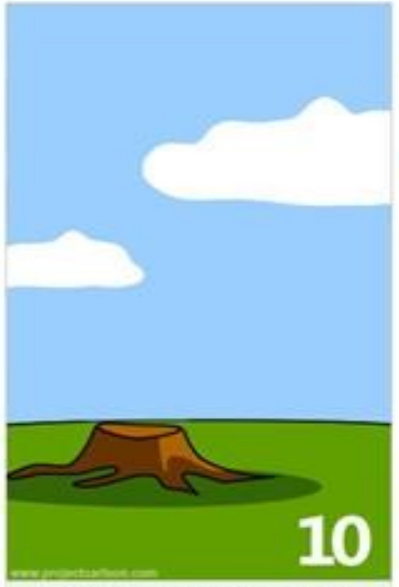
How the business consultant described it



How the project was documented

What operations installed

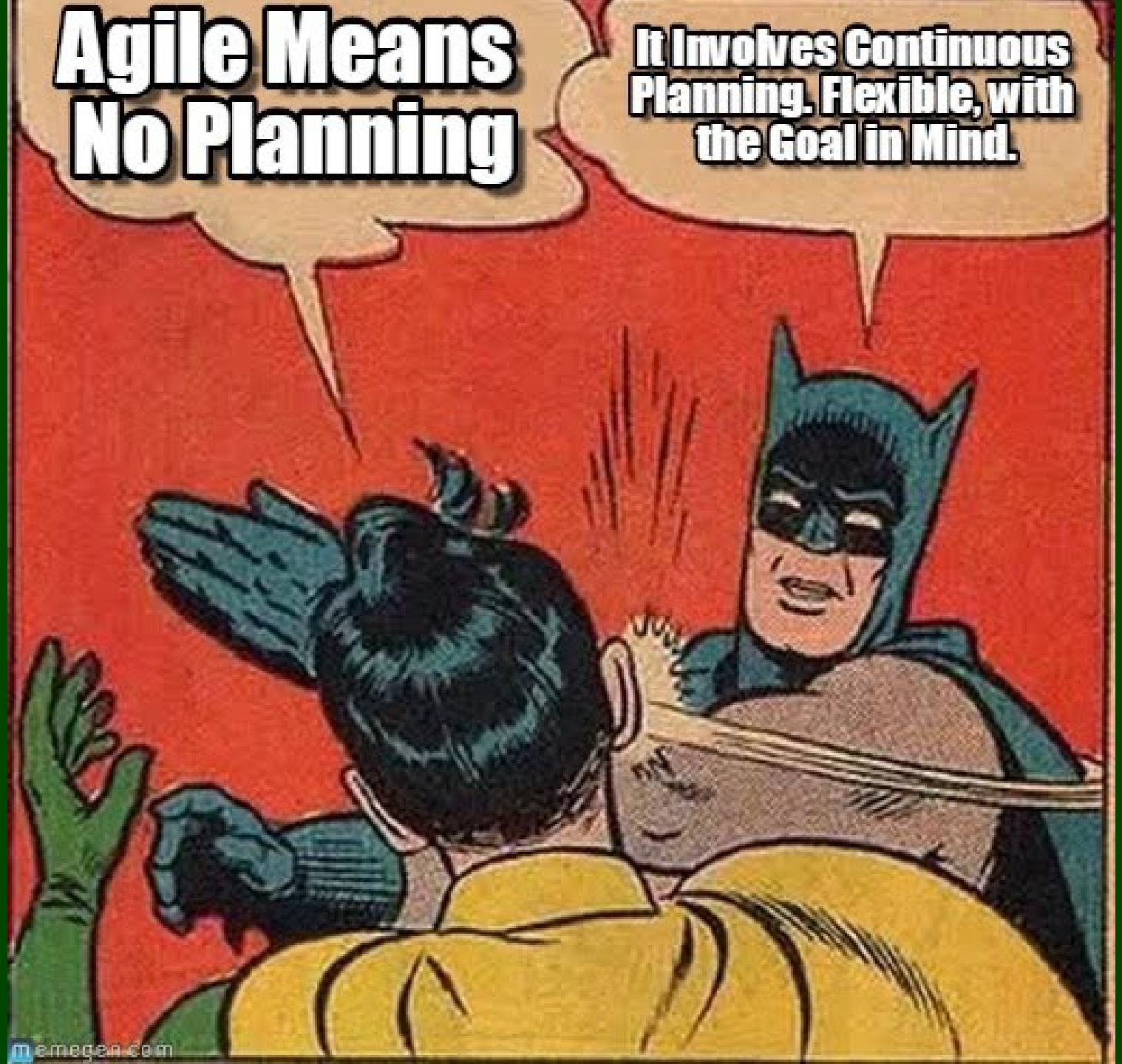
How the customer was billed

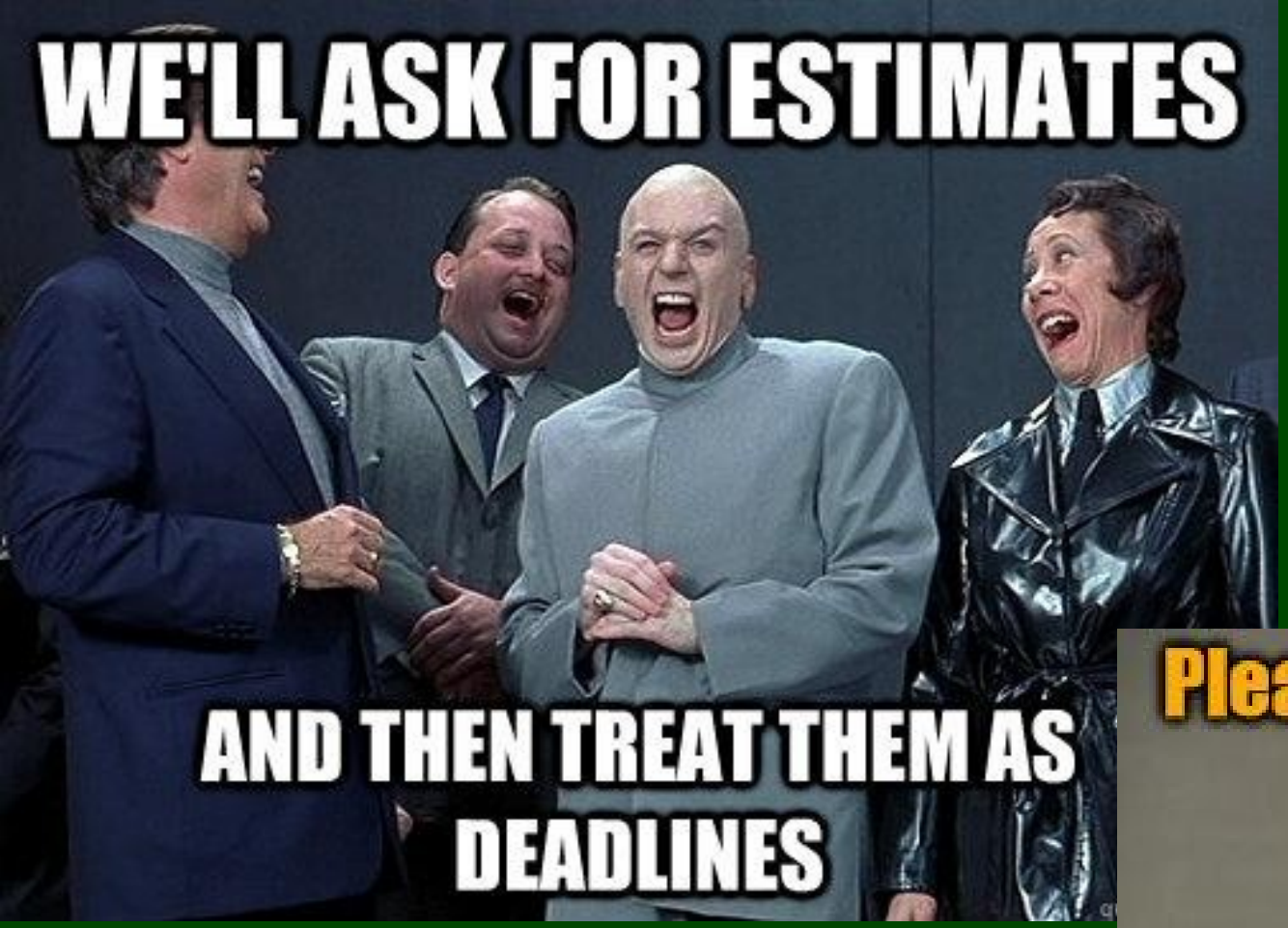


How it was supported

What marketing advertised

What the customer really needed


Agile Means No Planning
It Involves Continuous Planning. Flexible, with the Goal in Mind.
memegen.com


WE'LL ASK FOR ESTIMATES
AND THEN TREAT THEM AS DEADLINES


Please Tell us about your experience with project management
So project management... ya know, I like, manage the projects..
imgflip.com

AGILE DEVELOPMENT

STAGE/PHASE-GATE

AGILE DEVELOPMENT

STAGE/PHASE-GATE

- built for incremental innovation
- minimizes risk and time-to-market
- clear understanding of requirements

AGILE

AGILE DEVELOPMENT

STAGE/PHASE-GATE

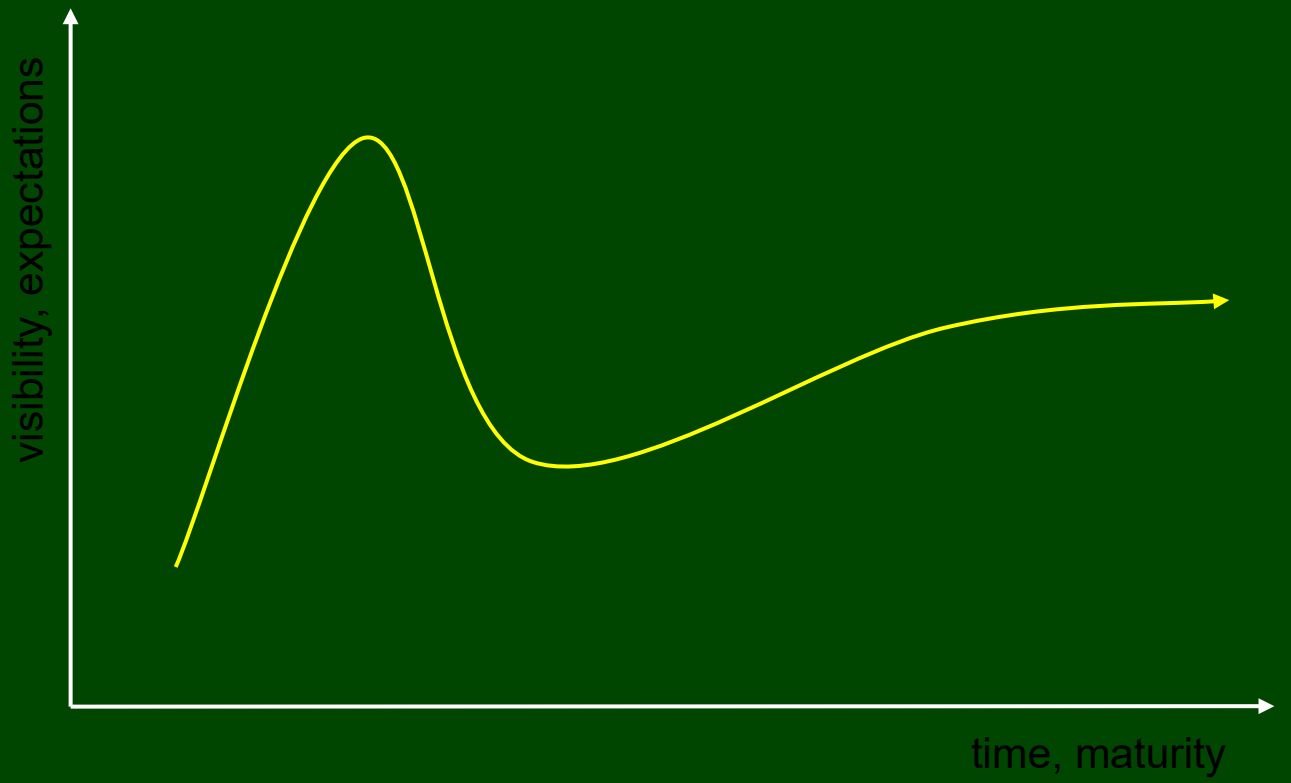
- built for incremental innovation
- minimizes risk and time-to-market
- clear understanding of requirements

AGILE

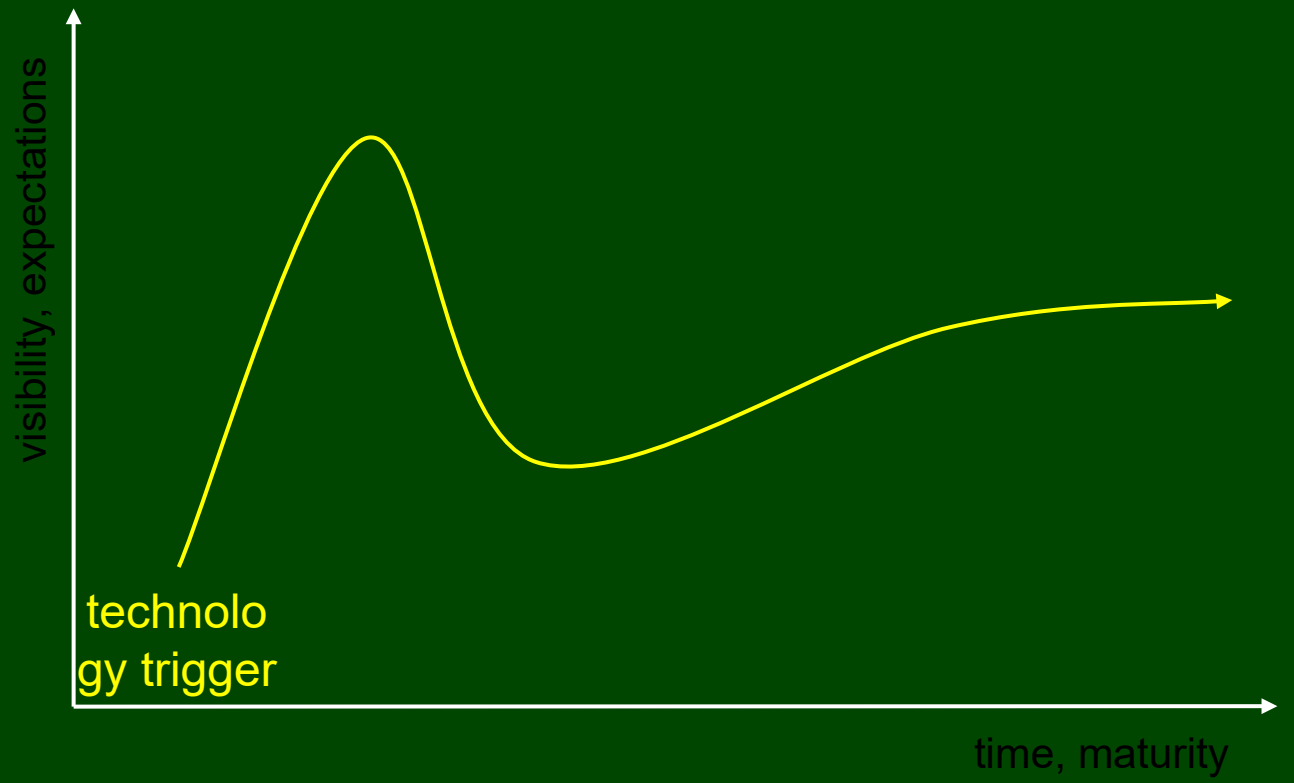
- built for breakthrough innovation
- creates new sources of value
- more unknown than known at beginning

GARTNER HYPE CYCLE

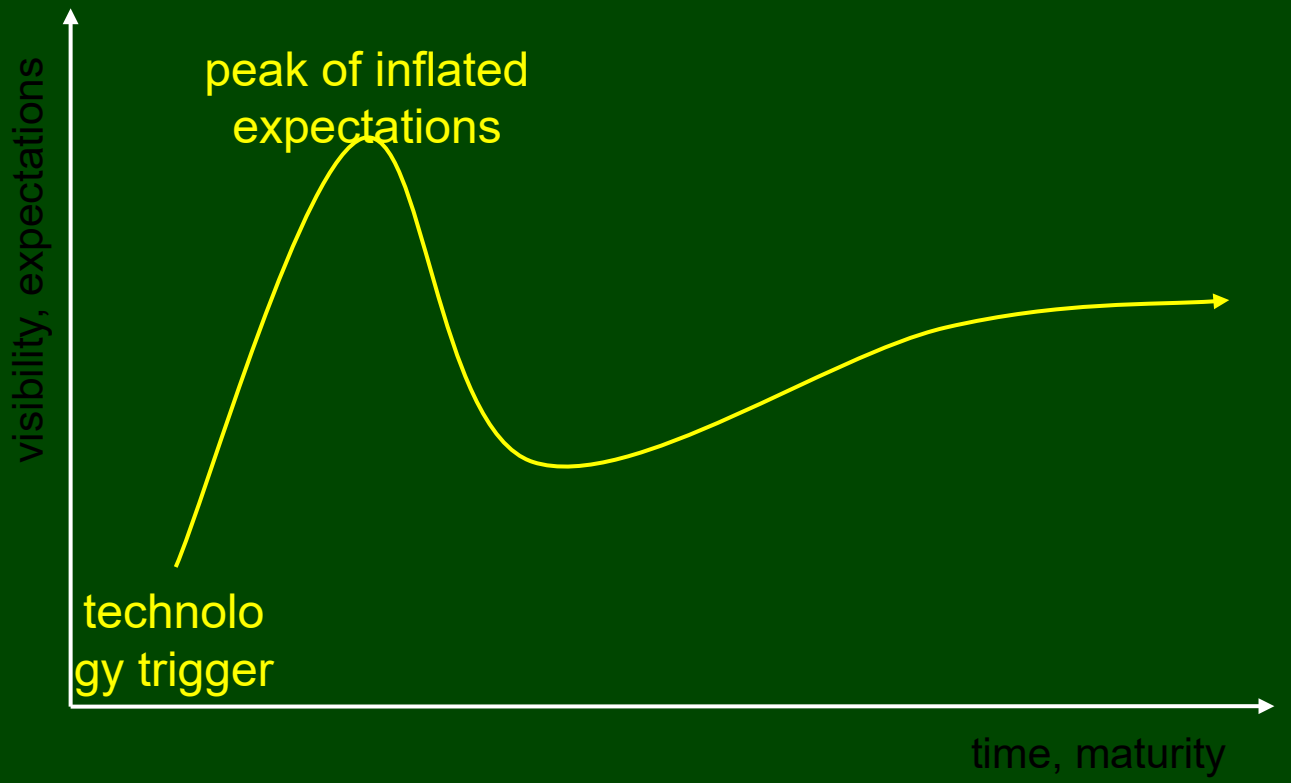
GARTNER HYPE CYCLE



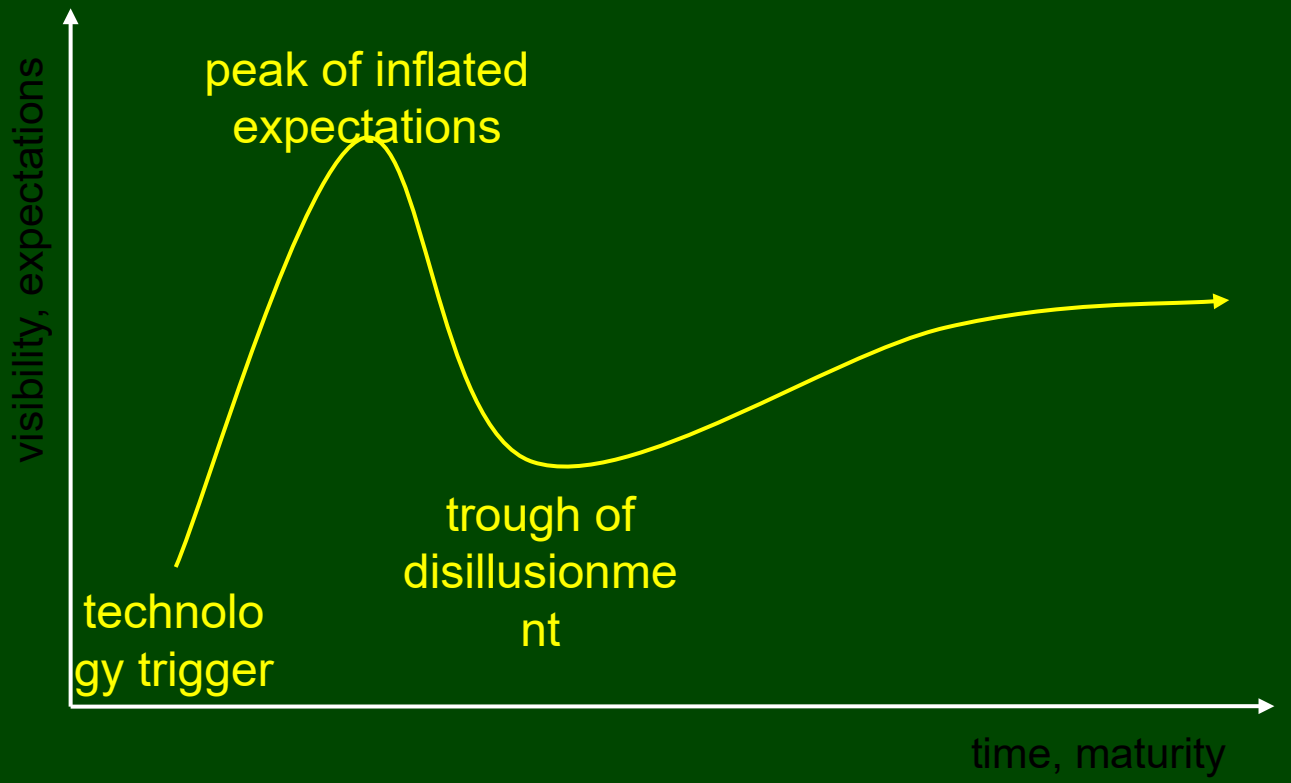
GARTNER HYPE CYCLE



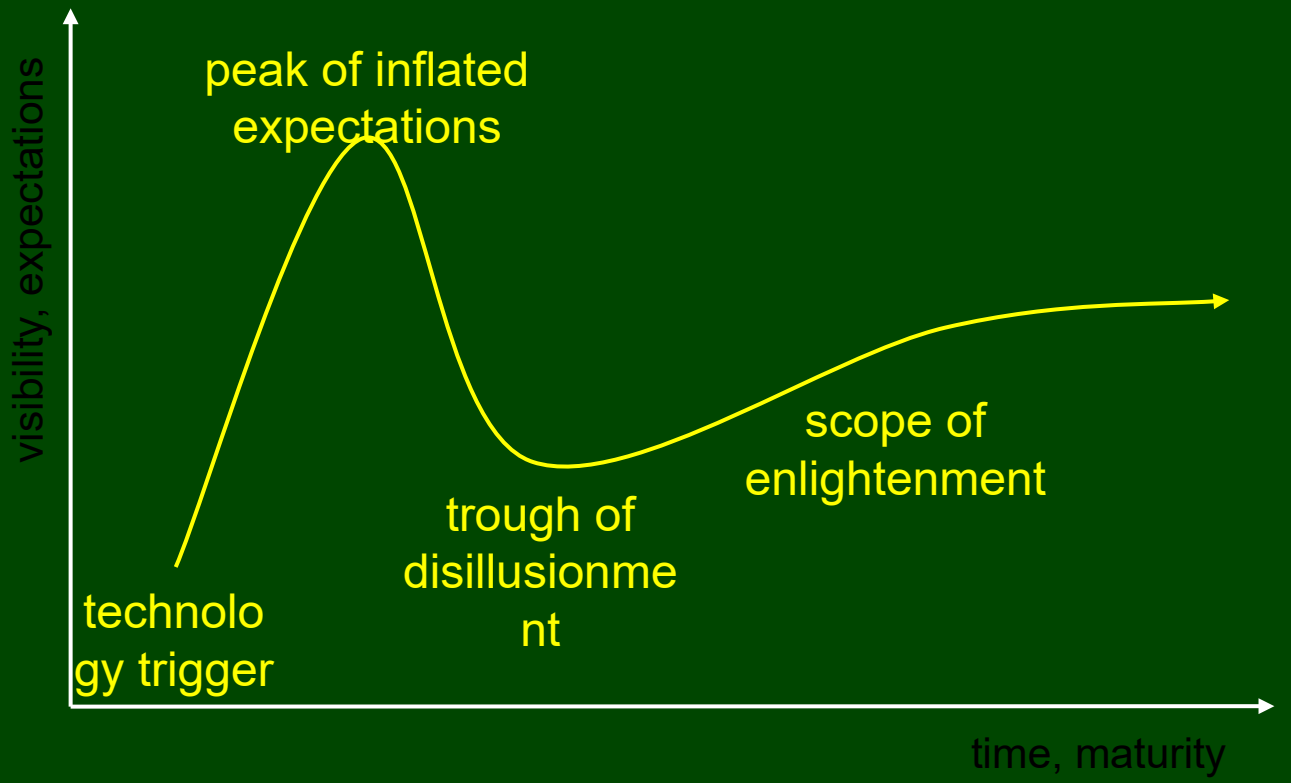
GARTNER HYPE CYCLE



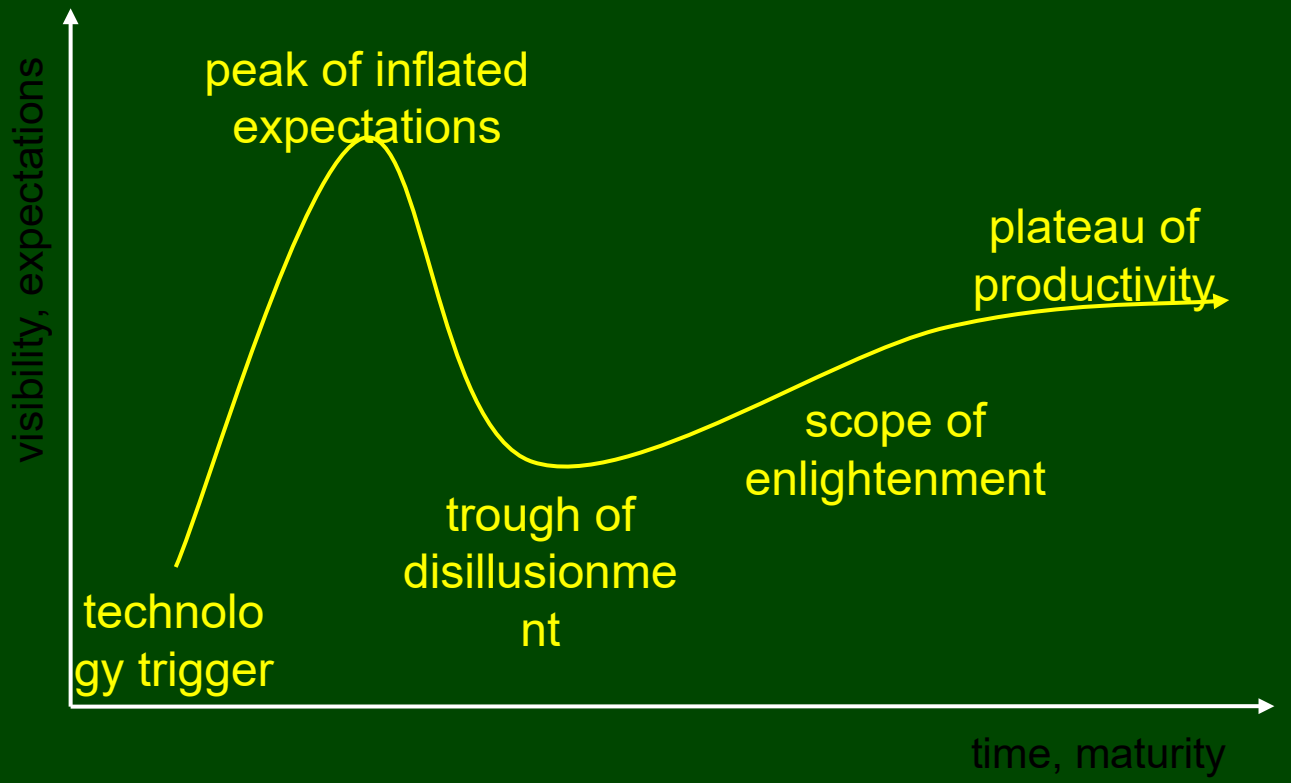
GARTNER HYPE CYCLE



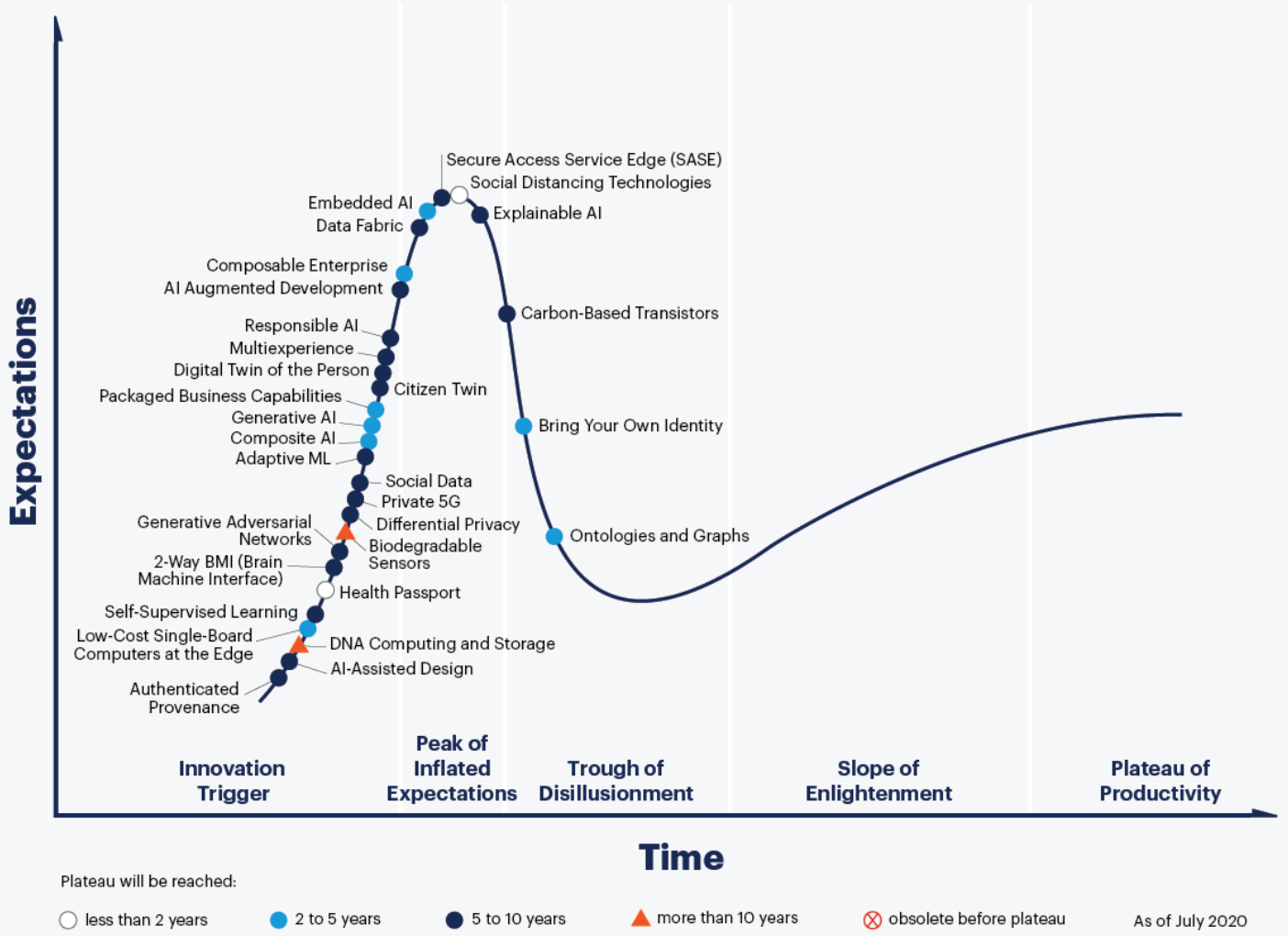
GARTNER HYPE CYCLE



GARTNER HYPE CYCLE



Hype Cycle for Emerging Technologies, 2020

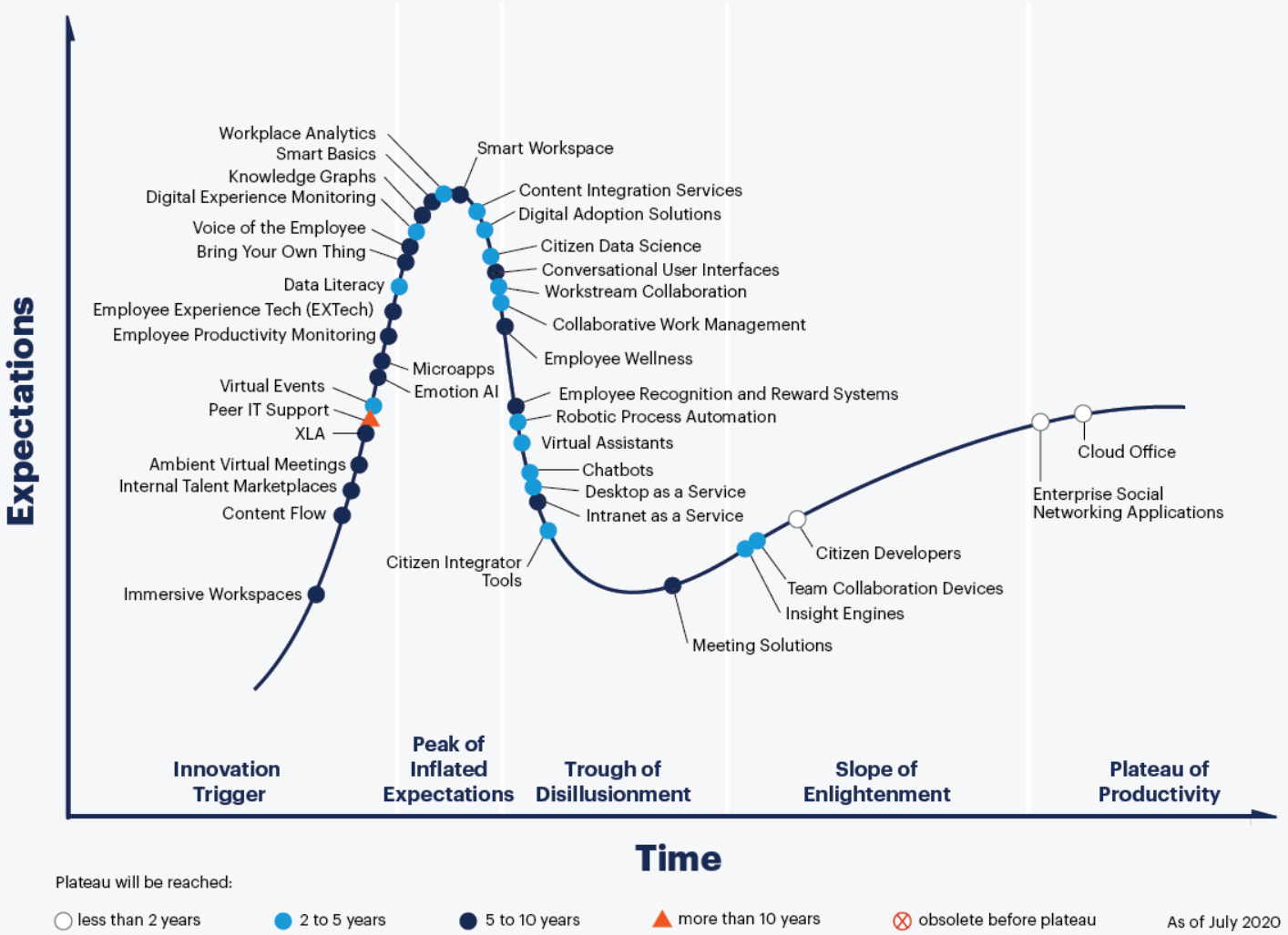


gartner.com/SmarterWithGartner

Source: Gartner

Gartner

Hype Cycle for the Digital Workplace, 2020



Plateau will be reached:

○ less than 2 years ● 2 to 5 years ● 5 to 10 years ▲ more than 10 years ⊗ obsolete before plateau

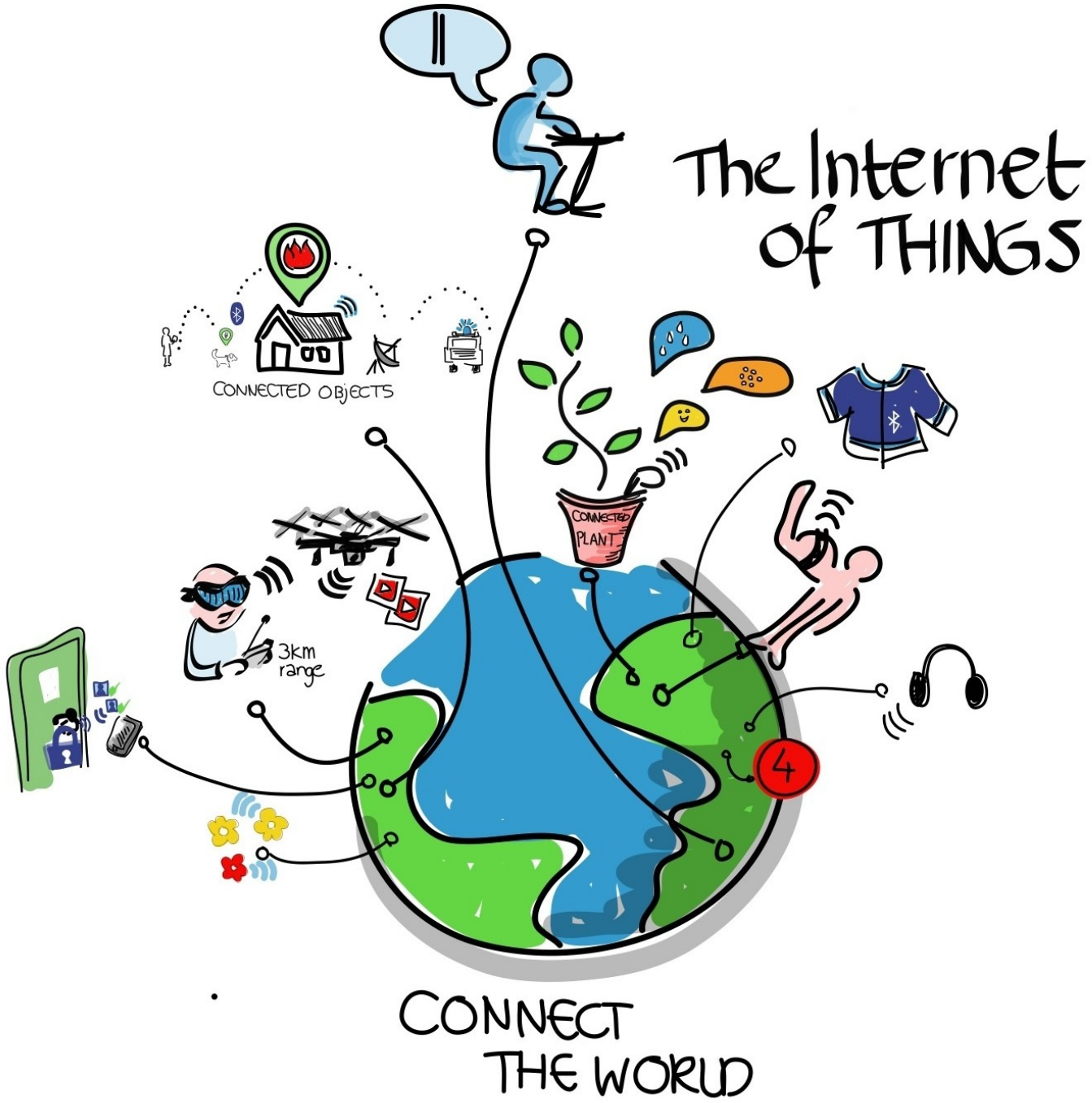
As of July 2020

gartner.com/SmarterWithGartner

Source: Gartner

Gartner


cloud
share
search
BIG
DATA
Info
Fast
Analysis
Security
MANAGEMENT
30% Photo
online
Storage


The Internet of THINGS
CONNECTED OBJECTS
CONNECTED PLANT
3km range
4
CONNECT THE WORLD

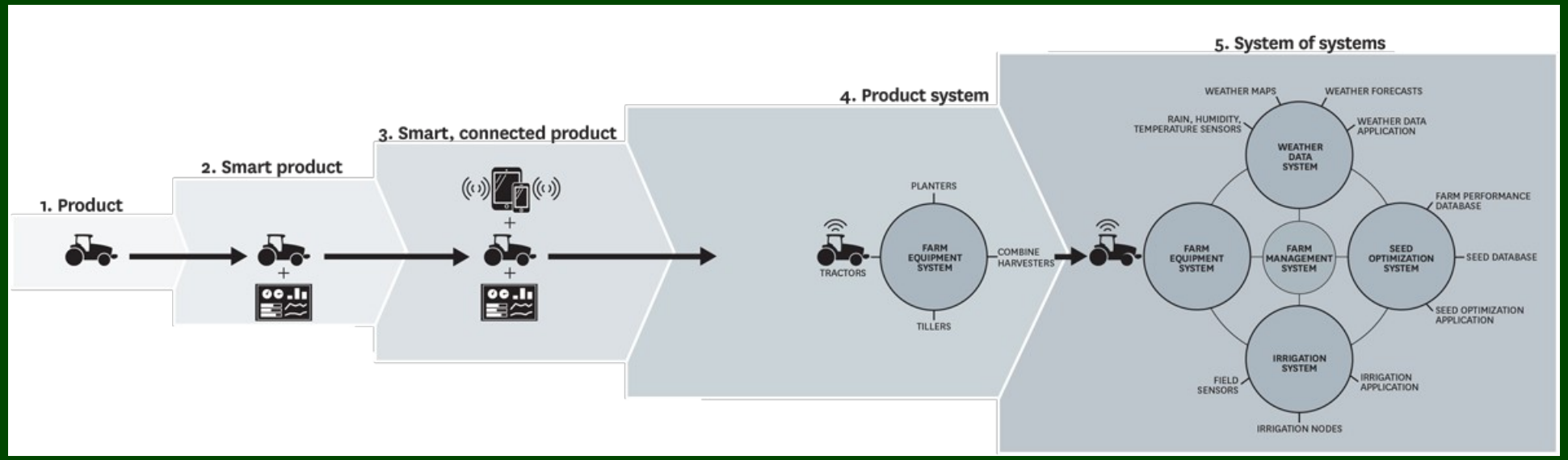
THE INTERNET OF THINGS

THE INTERNET OF THINGS

INDUSTRY BOUNDARIES

THE INTERNET OF THINGS

INDUSTRY BOUNDARIES



THE INTERNET OF THINGS

THE INTERNET OF THINGS

INDUSTRY BOUNDARIES

- product

THE INTERNET OF THINGS

THE INTERNET OF THINGS

INDUSTRY BOUNDARIES

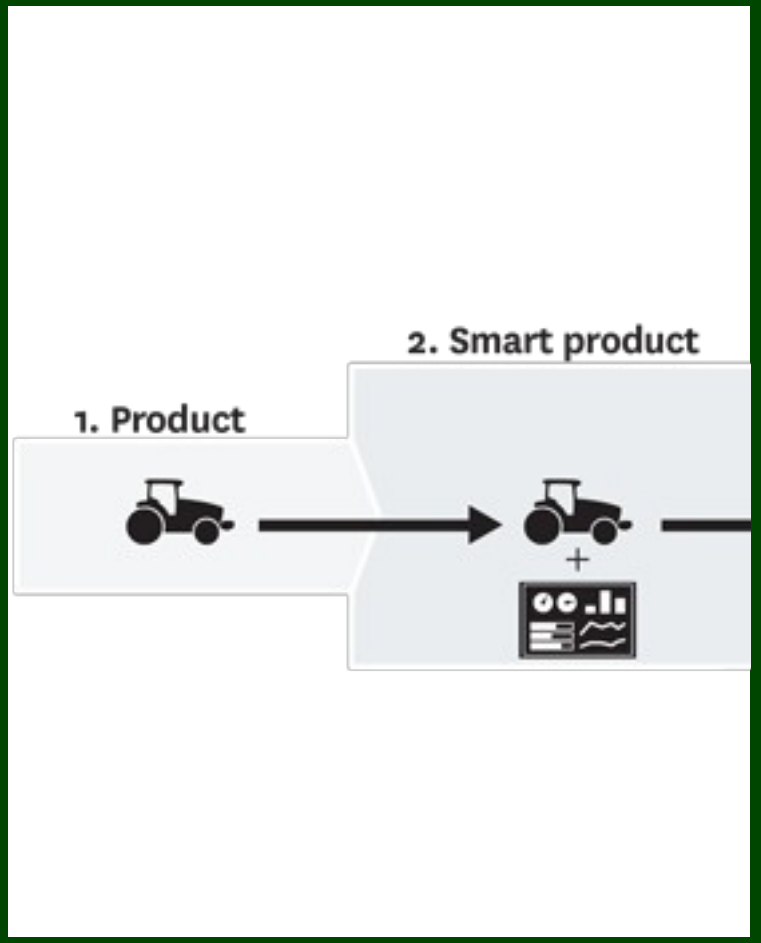
- product

THE INTERNET OF THINGS

INDUSTRY BOUNDARIES

- product
- smart product

THE INTERNET OF THINGS



THE INTERNET OF THINGS

INDUSTRY BOUNDARIES

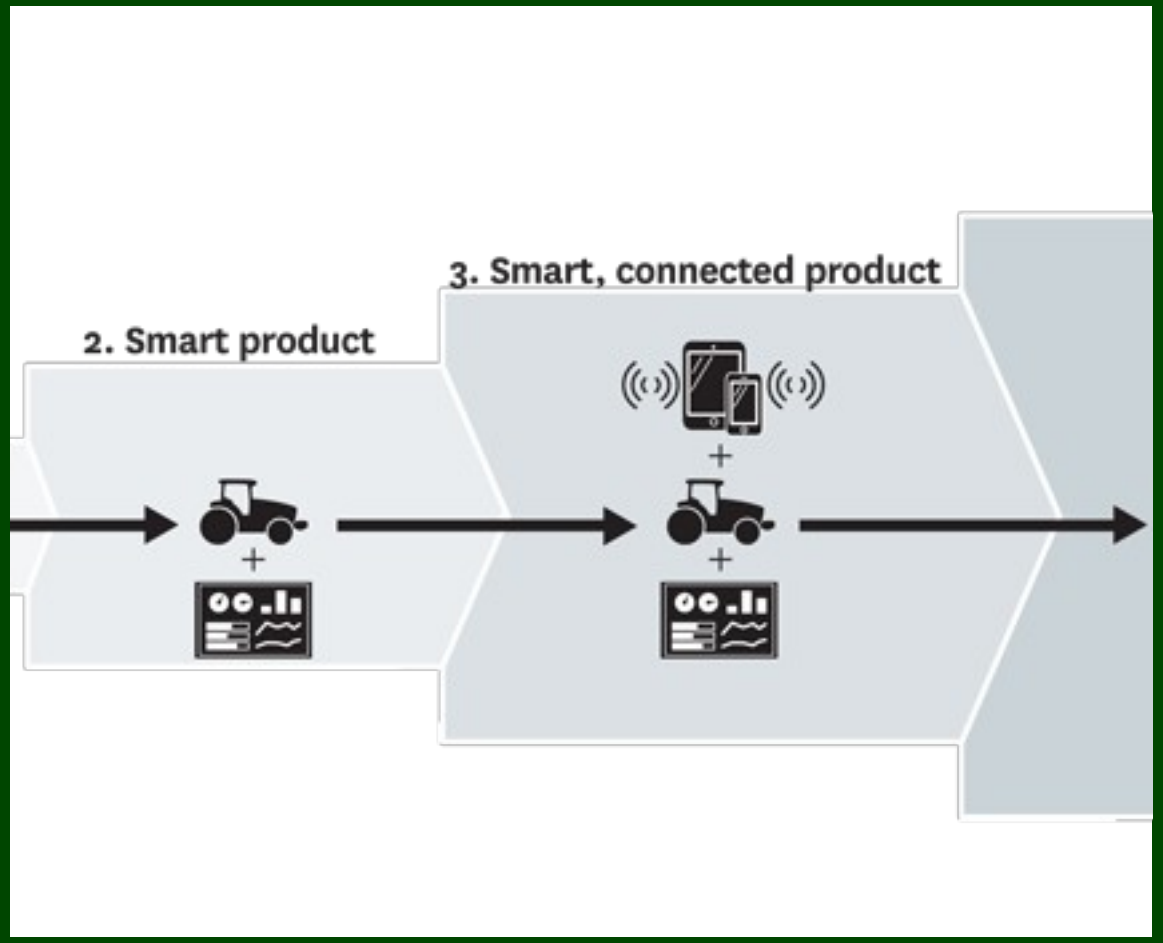
- product
- smart product

THE INTERNET OF THINGS

INDUSTRY BOUNDARIES

- product
- smart product
- smart, connected product

THE INTERNET OF THINGS



THE INTERNET OF THINGS

THE INTERNET OF THINGS

CAPABILITIES OF SMART, CONNECTED PRODUCTS

THE INTERNET OF THINGS

CAPABILITIES OF SMART, CONNECTED PRODUCTS

- monitor

THE INTERNET OF THINGS

CAPABILITIES OF SMART, CONNECTED PRODUCTS

- monitor
- control

THE INTERNET OF THINGS

CAPABILITIES OF SMART, CONNECTED PRODUCTS

- monitor
- control
- optimization

THE INTERNET OF THINGS

CAPABILITIES OF SMART, CONNECTED PRODUCTS

- monitor
- control
- optimization
- autonomy

THE INTERNET OF THINGS

INDUSTRY BOUNDARIES

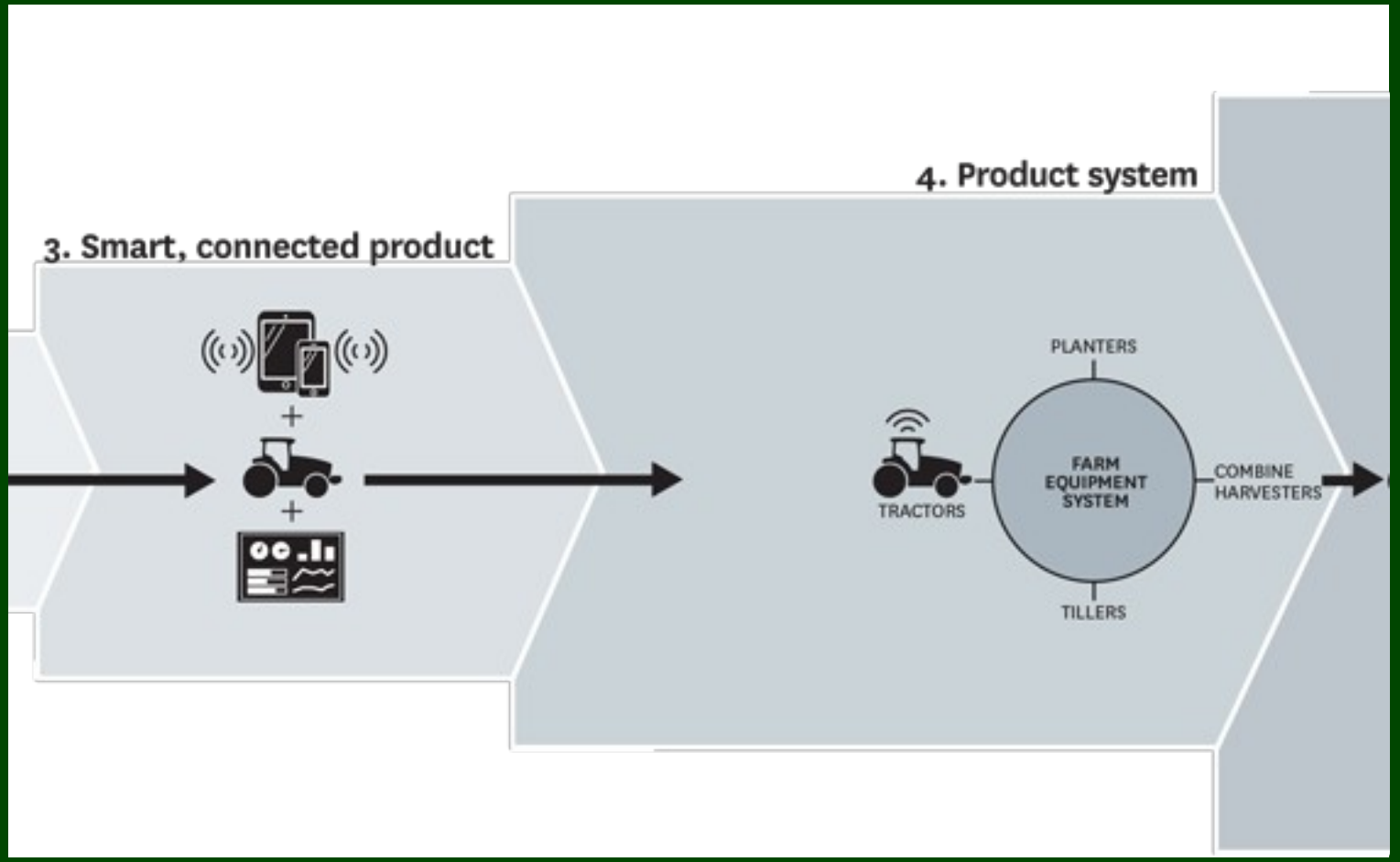
- product
- smart product
- smart, connected product

THE INTERNET OF THINGS

INDUSTRY BOUNDARIES

- product
- smart product
- smart, connected product
- product system

THE INTERNET OF THINGS



THE INTERNET OF THINGS

INDUSTRY BOUNDARIES

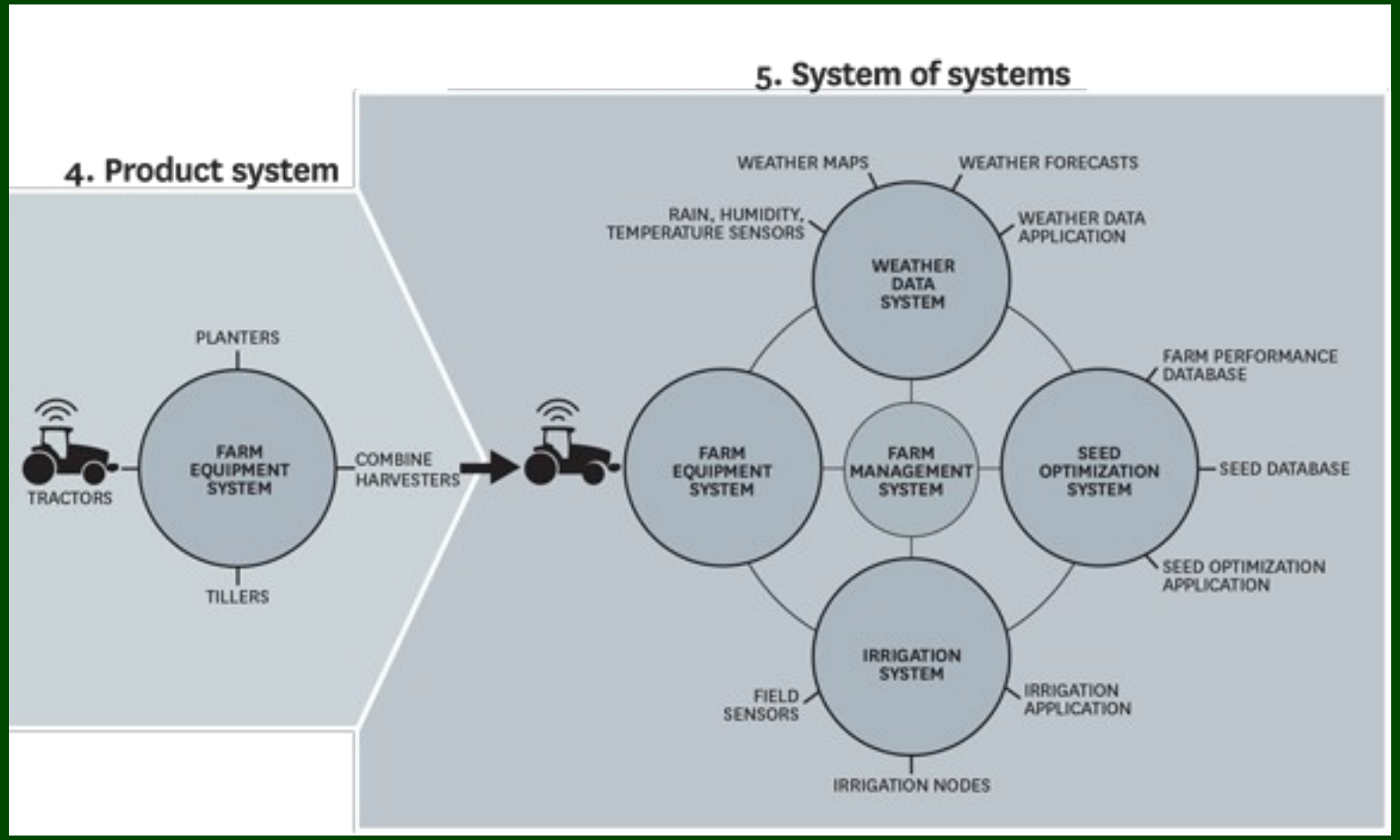
- product
- smart product
- smart, connected product
- product system

THE INTERNET OF THINGS

INDUSTRY BOUNDARIES

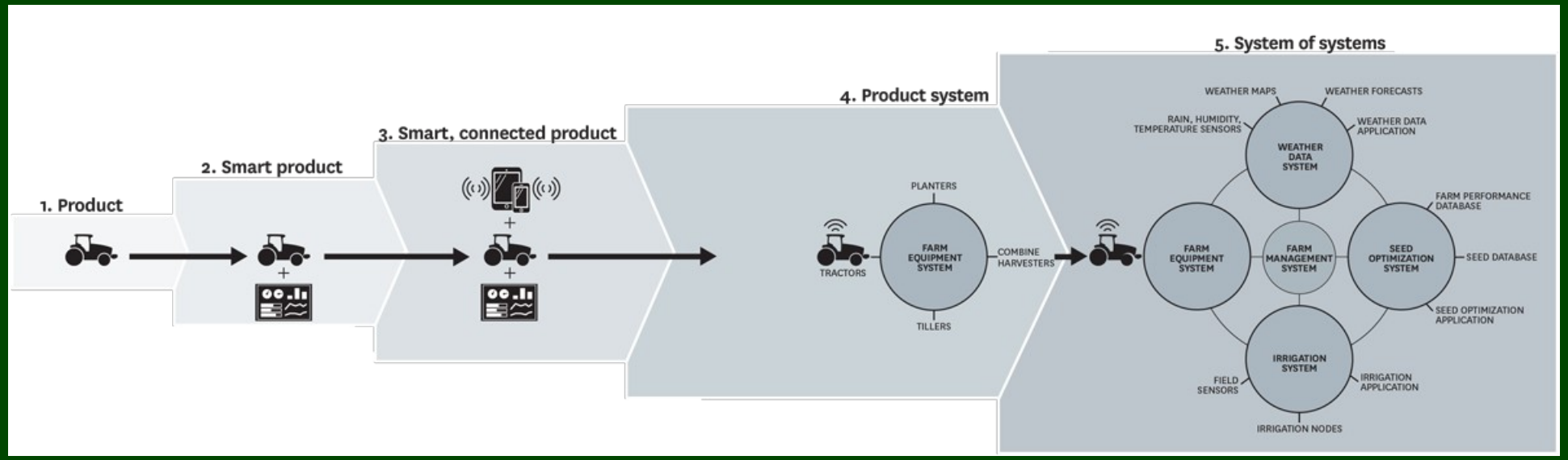
- product
- smart product
- smart, connected product
- product system
- system of systems

THE INTERNET OF THINGS



THE INTERNET OF THINGS

INDUSTRY BOUNDARIES



ARTIFICIAL INTELLIGENCE

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AI is the ability of a machine to perform cognitive functions we associate with human minds.

ARTIFICIAL INTELLIGENCE

AI is the ability of a machine to perform cognitive functions we associate with human minds.

E.g.: perceive, conclude, learn, interact, solve problems, be creative.

ARTIFICIAL INTELLIGENCE

AI is formed by a new generation of machines capable of

ARTIFICIAL INTELLIGENCE

AI is formed by a new generation of machines capable of

(a) interacting with the environment, gathering information from outside (including from natural language) or from other computer systems;

ARTIFICIAL INTELLIGENCE

AI is formed by a new generation of machines capable of

(a) interacting with the environment, gathering information from outside (including from natural language) or from other computer systems;

(b) interpreting this information, recognizing patterns, inducing rules, or predicting events;

ARTIFICIAL INTELLIGENCE

AI is formed by a new generation of machines capable of

(a) interacting with the environment, gathering information from outside (including from natural language) or from other computer systems;

(b) interpreting this information, recognizing patterns, inducing rules, or predicting events;

(c) generating results, answering questions; or giving instructions to other systems; and

ARTIFICIAL INTELLIGENCE

AI is formed by a new generation of machines capable of

(a) interacting with the environment, gathering information from outside (including from natural language) or from other computer systems;

(b) interpreting this information, recognizing patterns, inducing rules, or predicting events;

(c) generating results, answering questions; or giving instructions to other systems; and

(d) evaluating the results of their actions and improving their decision systems to achieve specific objectives.

ARTIFICIAL INTELLIGENCE

THE BASIS OF AI

ARTIFICIAL INTELLIGENCE

THE BASIS OF AI

- Algorithmic advancements
- Exploison of data
- Exponential increases in computing power and storage

ARTIFICIAL INTELLIGENCE

3 TYPES OF AI ANALYSIS

ARTIFICIAL INTELLIGENCE

3 TYPES OF AI ANALYSIS

- DESCRIPTIVE: what happened?
- PREDICTIVE: what is expected to happen?
- PRESCRIPTIVE: what should we do to achieve goals?

ARTIFICIAL INTELLIGENCE

3 TYPES OF AI ANALYSIS

- DESCRIPTIVE: what happened?

MACHINE LEARNING

- PREDICTIVE: what is expected to happen?
- PRESCRIPTIVE: what should we do to achieve goals?

ARTIFICIAL INTELLIGENCE

3 TYPES OF SUPPORTING BUSINESS NEEDS WITH AI:

ARTIFICIAL INTELLIGENCE

3 TYPES OF SUPPORTING BUSINESS NEEDS WITH AI:

- process automation

ARTIFICIAL INTELLIGENCE

3 TYPES OF SUPPORTING BUSINESS NEEDS WITH AI:

- process automation
- cognitive insight

ARTIFICIAL INTELLIGENCE

3 TYPES OF SUPPORTING BUSINESS NEEDS WITH AI:

- process automation
- cognitive insight
- cognitive engagement

ARTIFICIAL INTELLIGENCE

3 TYPES OF SUPPORTING BUSINESS NEEDS WITH AI:

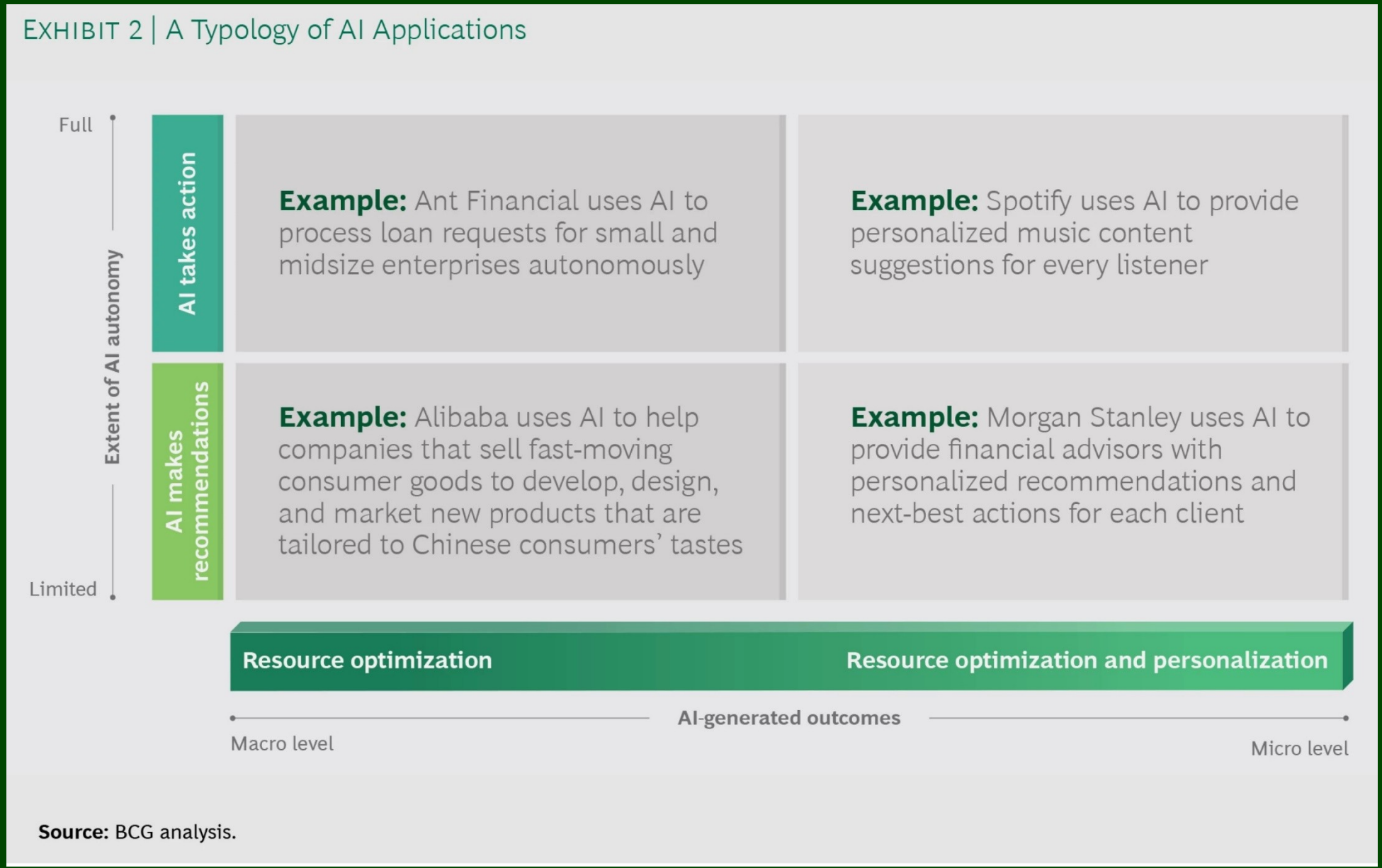
- process automation ← **MOST COMMON**
- cognitive insight
- cognitive engagement

ARTIFICIAL INTELLIGENCE

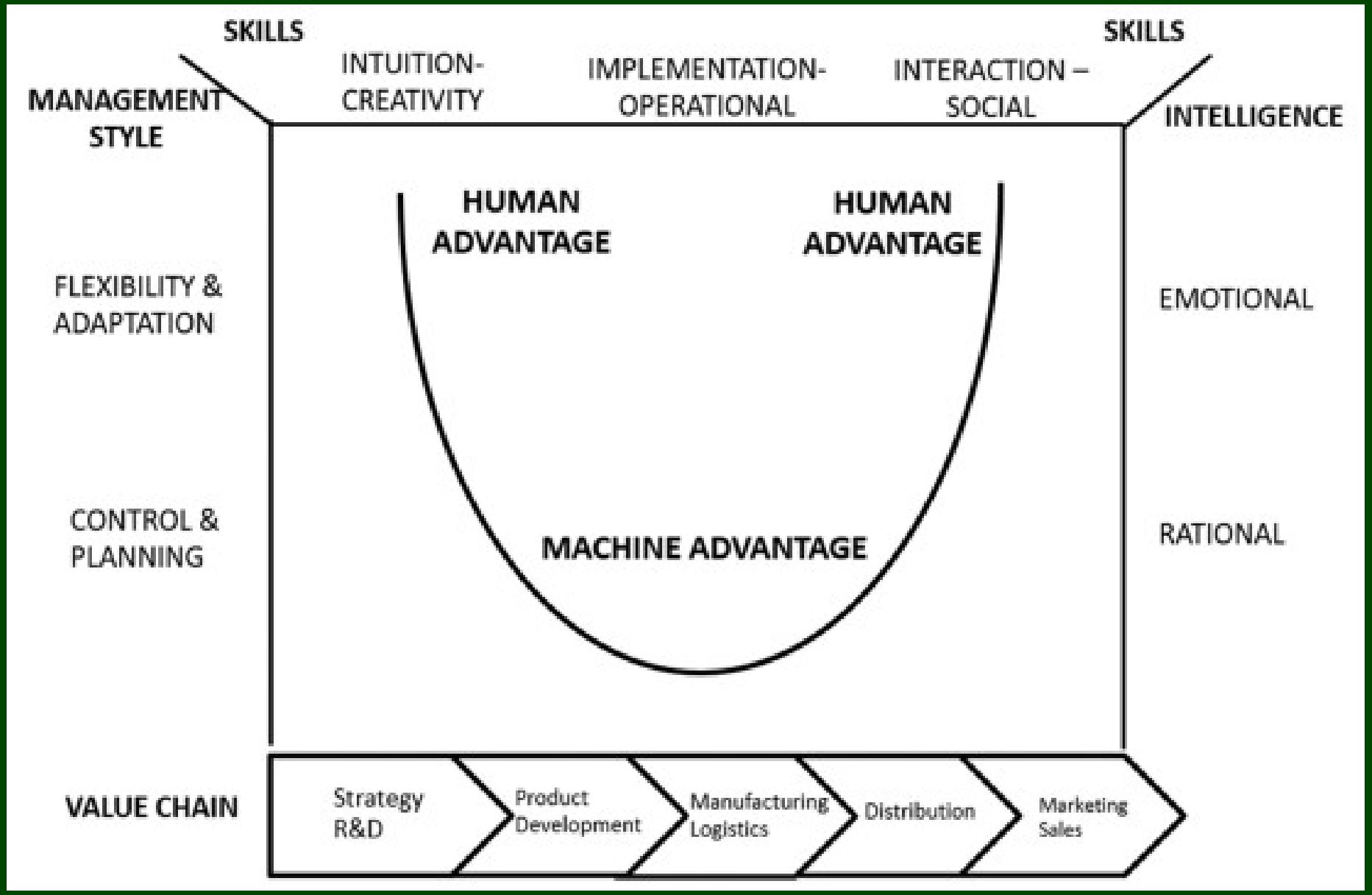
3 TYPES OF SUPPORTING BUSINESS NEEDS WITH AI:

- process automation ← MOST COMMON
- cognitive insight
- cognitive engagement ← LEAST COMMON

ARTIFICIAL INTELLIGENCE



ARTIFICIAL INTELLIGENCE



ARTIFICIAL INTELLIGENCE

RISKS OF MACHINE LEARNING

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- unobserved partiality

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- unobserved partiality
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ARTIFICIAL INTELLIGENCE

RISKS OF MACHINE LEARNING

- unobserved partiality
- logical rules − statistics
- not easy to correct if it makes a mistake

In the distant past, I worked as a software developer for IBM. There was typically a six-month delay between the time I completed an update to the system and the date it was made available to users because a quality assurance (QA) group needed time to run extensive tests. That kind of due diligence is increasingly a thing of the past. […] Newer applications are much more complicated. The transition happened incrementally but rapidly enough that QA did not keep pace. Furthermore, because of fierce competition, there is enormous pressure to rush to market, which can make QA seem like a nuisance.

Madnick, S. (2020): Blockchain isn't as unbreakable as you think
MIT Sloan Management Review, 61 (2) 66-70