the Data Science playbook

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GR5069: Applied Data Science
for Social Scientists

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a quick **reminder**…

no open laptops

no cellphones

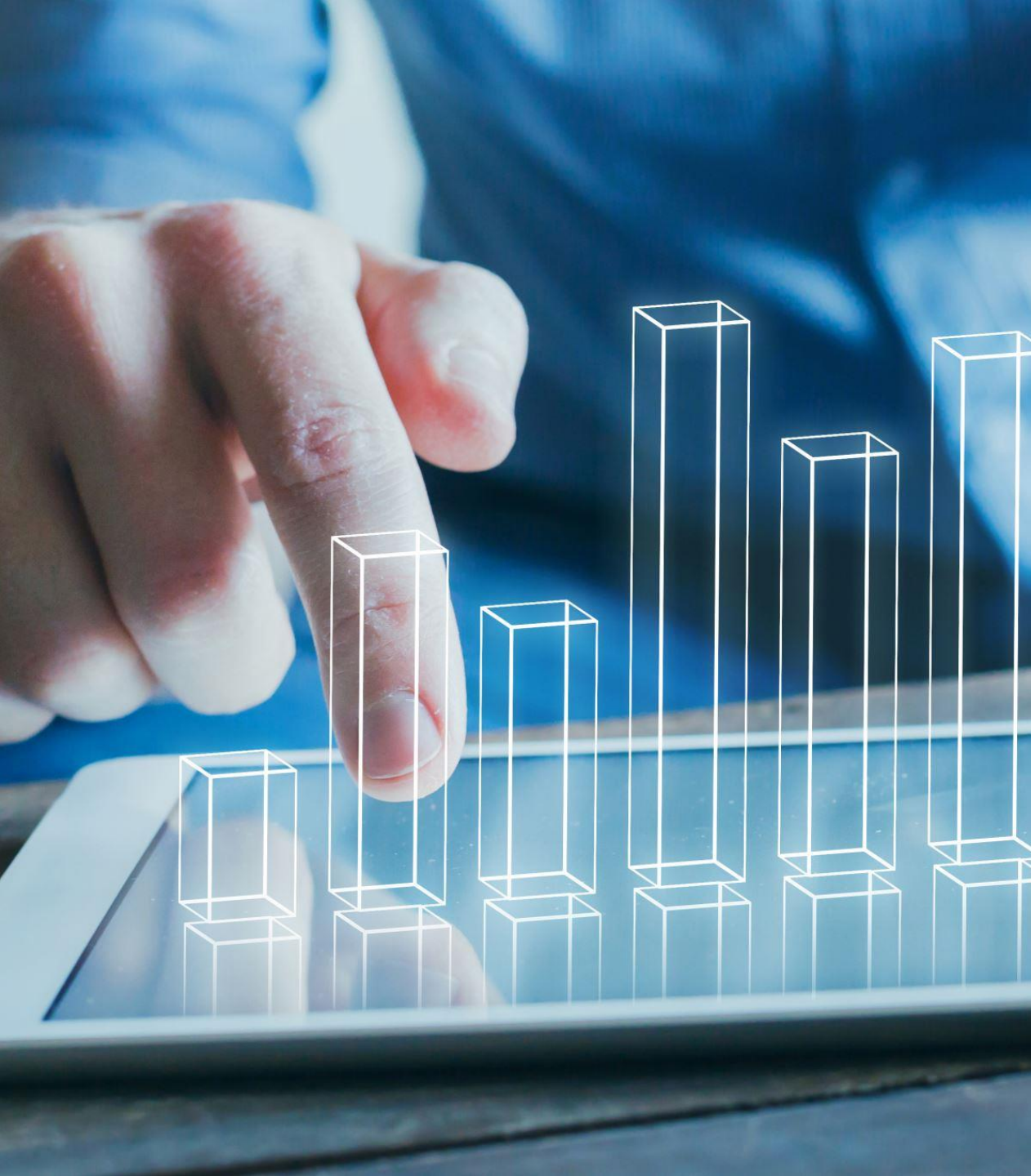
what does a **Data Scientist** do?

Instagram **vs** **reality**


Two myths
about
Data Science

myth #1:

Data Science
is about
machine learning
and / or **AI**



in practice:

Data Science is about building **Data Products** that solve a **business need or problem**

"[A] **data product** [...] facilitates an end goal through the use of data".

- DJ Patil, *Data Jujitsu* (2016)

data products are a special kind of **digital solution**

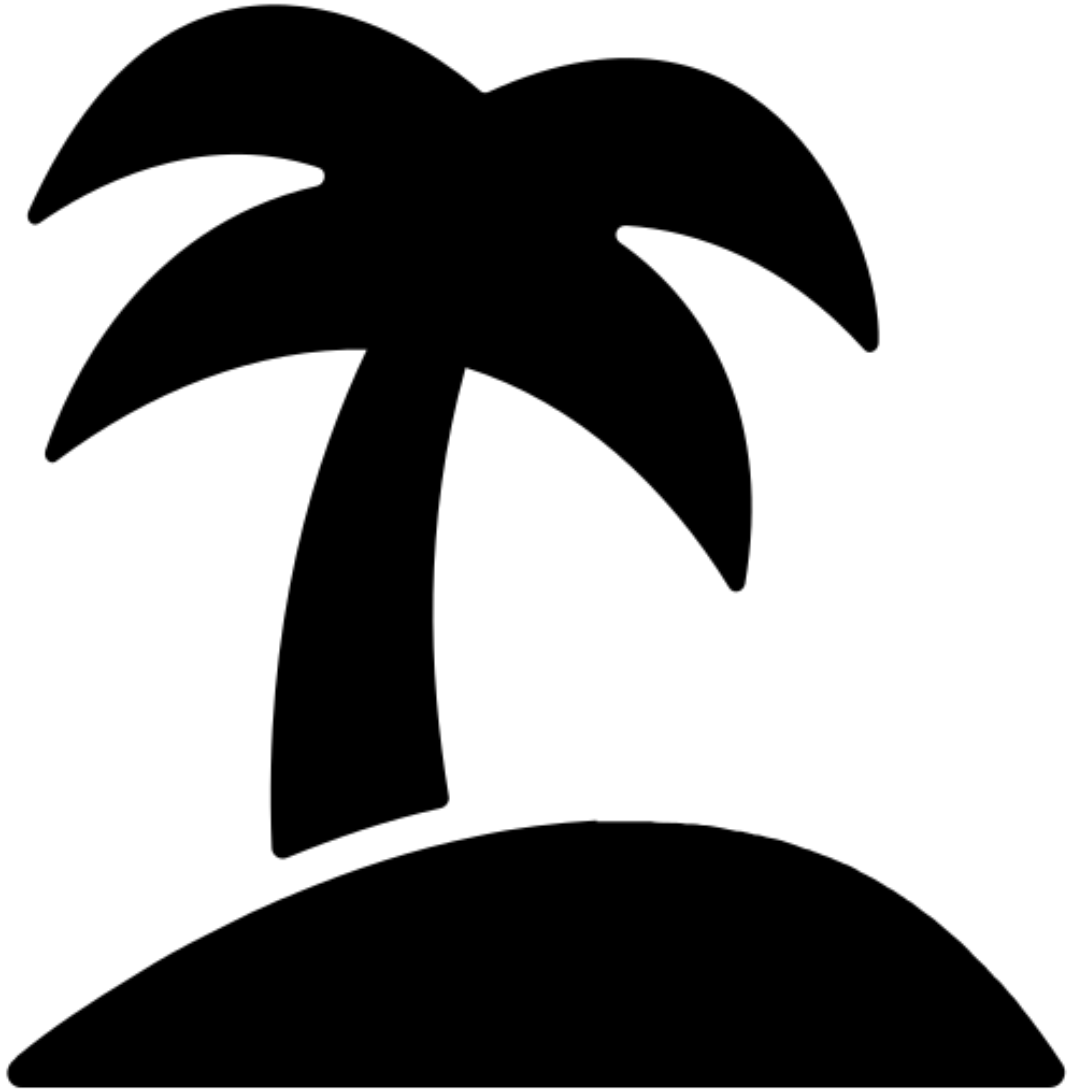
software products

data products

other digital solutions

myth #2:

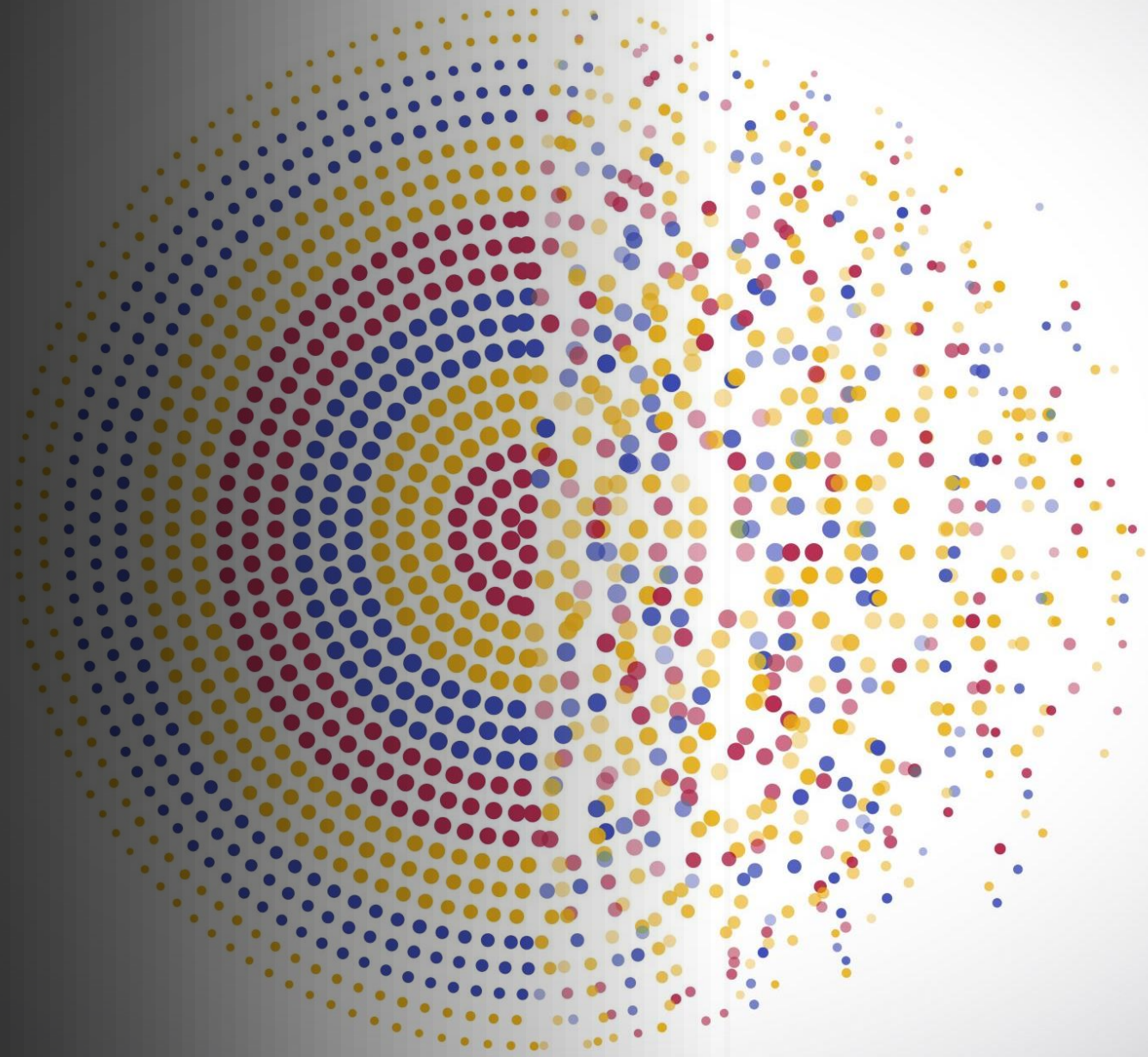
Data Scientists
work **alone**



in practice:

no Data Scientist
is an island

Data Science in practice




DATA
SCIENCE
SHOP
OFFICIAL
TRAILER

think of **Data Science as a play** on Broadway!

there is a **cast**…

Zazu

confidant

Scar

antagonist

Simba

protagonist

Rafiki

tertiary character

the cast performs on a **scenery…**

lights

costumes

sound

structures

the **plot** is built from a sequence of **scenes**…

ACT 1

scene 1:
“Circle of Life”

scene 2
“Life’s not fair”

[…]

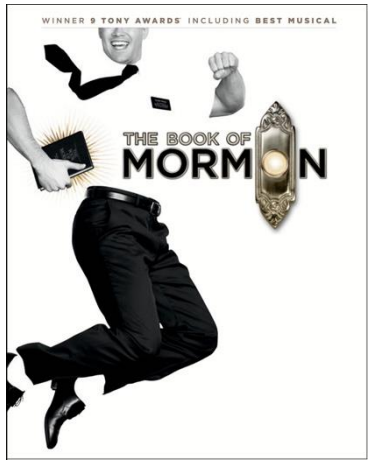
ACT 2

scene 14
“Hakuna Matata”

[…]

scene 27
“Pride Rock”

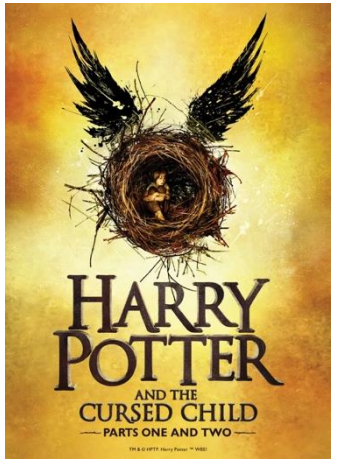
the play could be of any **genre…**



comedy

WEST SIDE STORY

tragedy

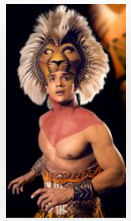


drama

in a nutshell…

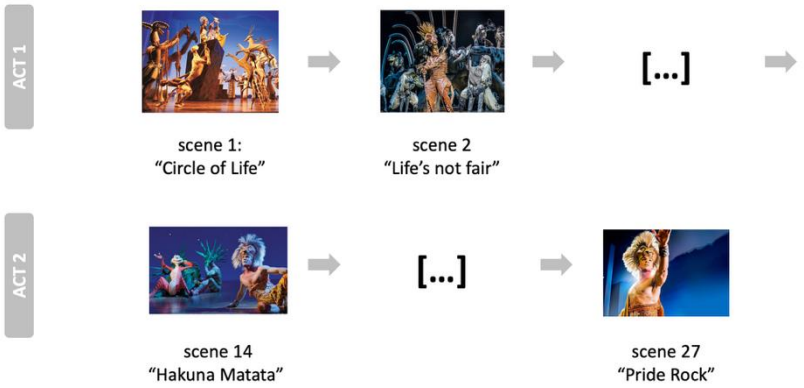
who



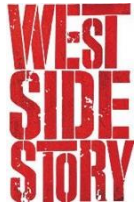


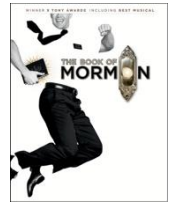

where

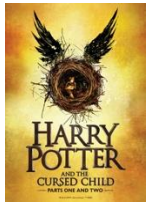
how

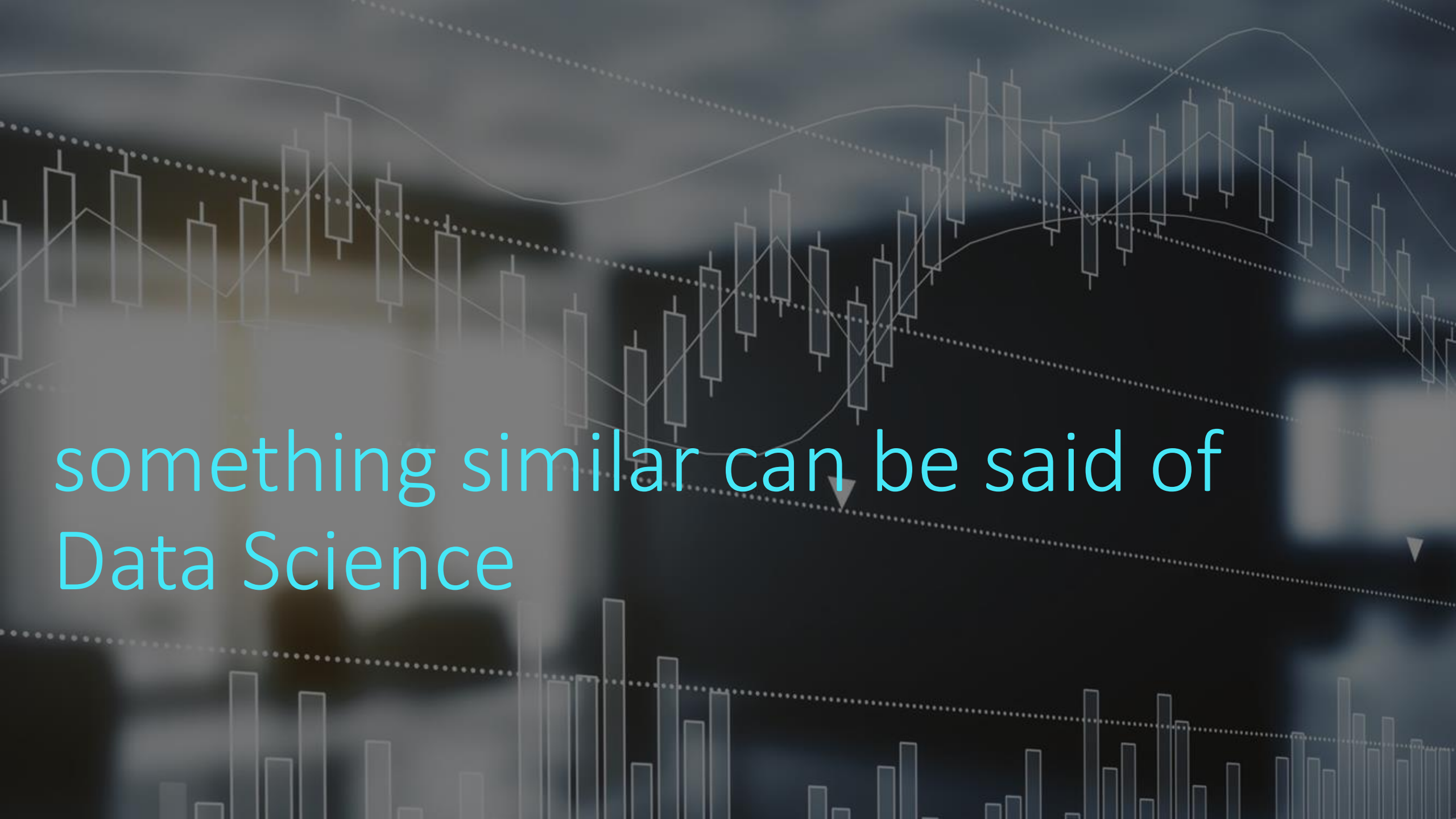


what








something similar can be said of
Data Science

>>>> re.sub(*pattern, repl*)

```
pattern = [
        ‘CAST’,
        ‘SCENERY’,
        ‘PLOT’,
        ‘GENRES’
]
```

```
repl = [
        ‘DATA SCIENCE SHOP CREW’,
        ‘TECHNOLOGY ENVIRONMENTS’,
        ‘DATA PRODUCT CYCLE’,
        ‘DATA PRODUCTS’
]
```

who crews the **Data Science Shop**?

data scientist

- define **correct questions**
- prototype **ETL**
- **model** data (apply **algorithms**)
- **build** prototype solutions
- **translate** solution outputs

data analyst

- **query** data(bases)
- **summarize** and **visualize** data
- identify **trends**
- **interpret** findings
- **communicate** with business

data engineer

- develop and maintain **data architecture**
  - data ingestion
  - data storage
  - data security
  - data transformation
- build **data pipelines**
- productionize **ETL**
- build **data quality processes**
- **orchestrate** processes
- build **working environments**

ML engineer

- **productionize** algorithms
- **scale** prototyped solutions
- **optimize** computational performance
- create **endpoints** for outputs
- **orchestrate** processes
- build **working environments**

project manager

- develop **timelines**
- task **planning**
- resource **allocation**
- **risk** monitoring

where does the **Data Science Shop** operate?

where

what

who

data architecture

data lakes

data warehouses

data pipelines

data engineer

computing architecture

computing engine

ML engineer

data scientist

solutions architecture

apps

dashboards

custom-built tools

data engineer

ML engineer

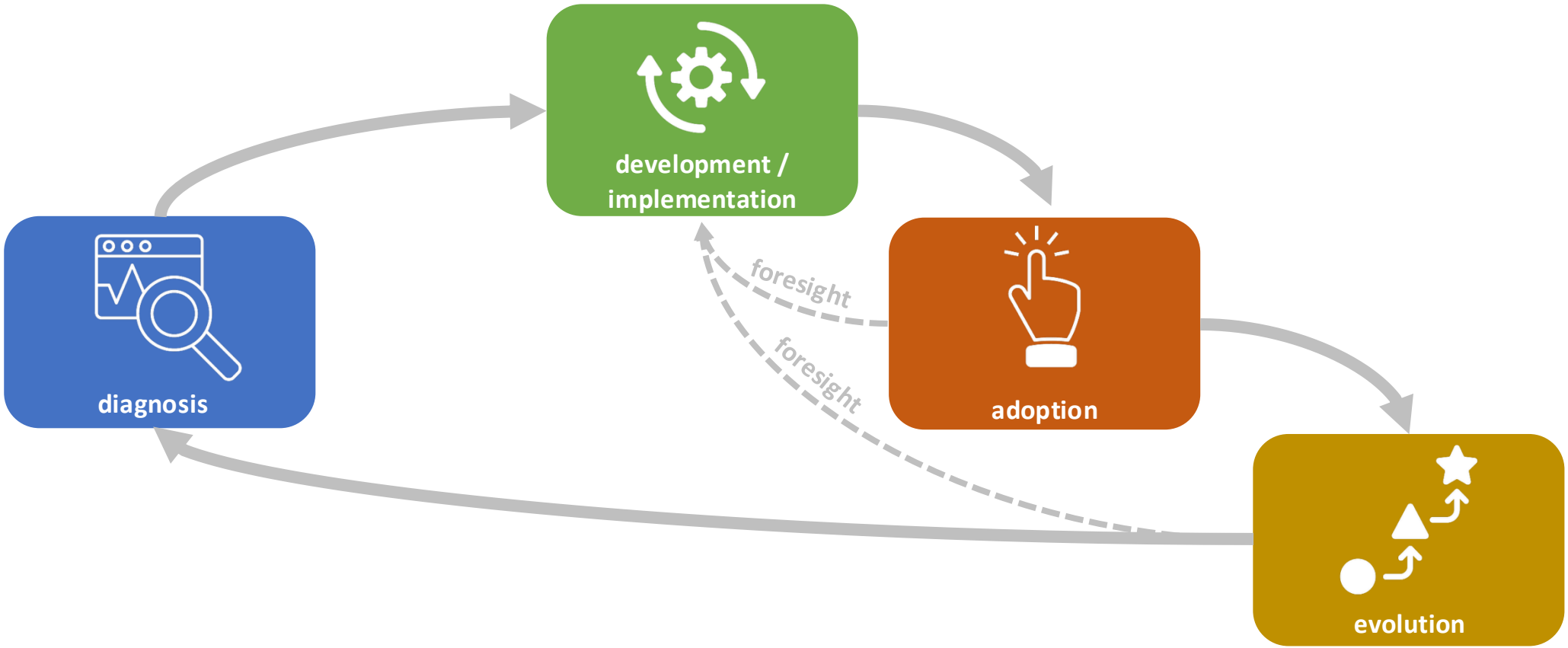
how is a **Data Product** built?

1. define the **problem** with crisp clarity
2. identify **data** available to tackle problem
3. **evaluate** whether data is appropriate to solve the problem
4. design a **solution**
5. select appropriate **tools** and **techniques**
6. decide how the solution will be **served**
7. **build** solution
8. identify **obstacles** to adoption
9. craft **strategy** to overcome obstacles
10. **uncover** unattended business needs
11. incorporate **new features** in roadmap

diagnosis | **development / implementation** | **adoption** | **evolution**

the **Data Product** cycle

how is a **Data Product** built?

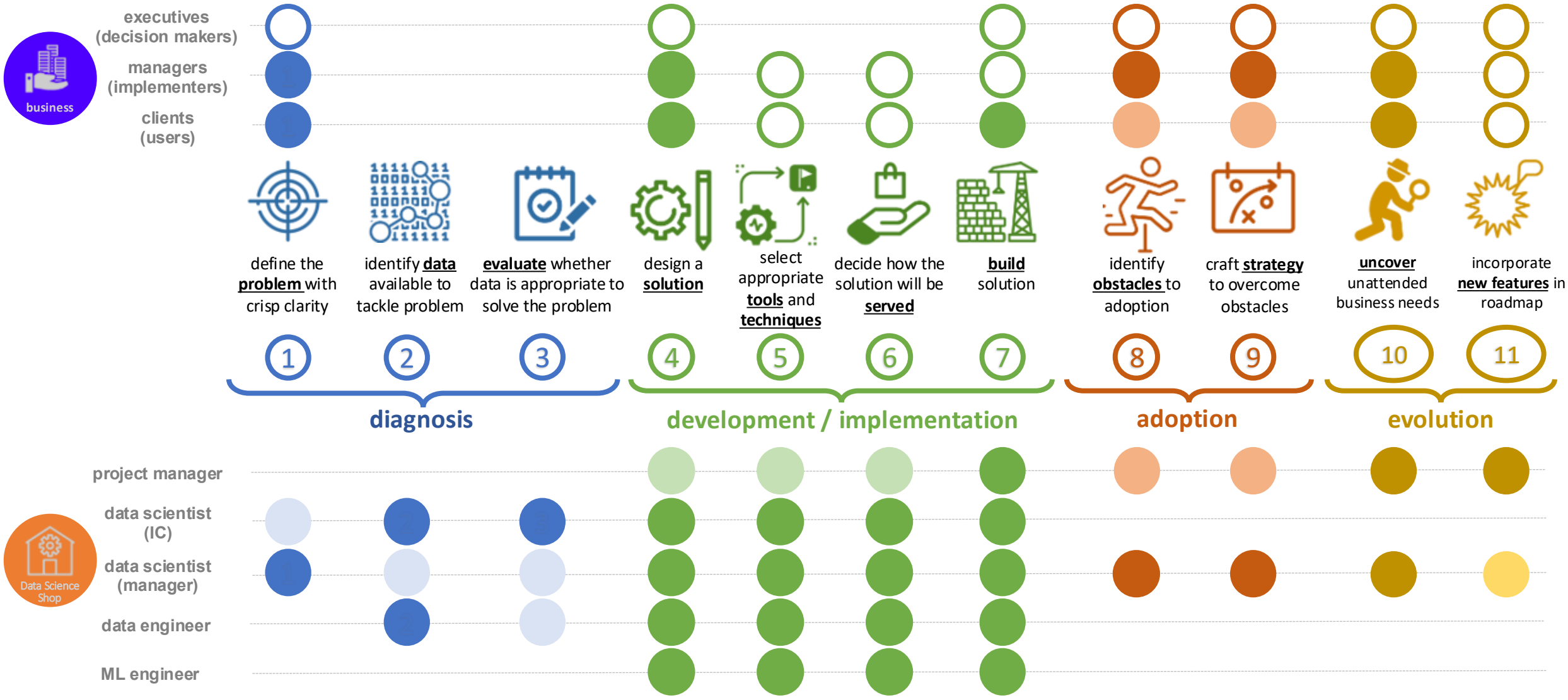


the **Data Product** cycle

what **Data Products** can the **Shop** build?

	dashboards	answers	deployments	custom-built tools
what	frontends for automated data summarization and visualization	science-backed answers to business questions (explanations, scenarios, projections, causes)	stand-alone algorithmic outputs that integrate to business processes	end-to-end proprietary applications developed to fulfill a business objective
who	 data engineer, data analyst	 data engineer, data scientist	 data engineer, ML engineer, data scientist	 data engineer, ML engineer, data scientist, data analyst, project manager
where	data architecture solutions architecture	data architecture	data architecture computing architecture	data architecture computing architecture solutions architecture

how does the **Data Science Shop** operate?



the **problem** defines the **type of shop**

problem: a statement without (an appropriate) solution

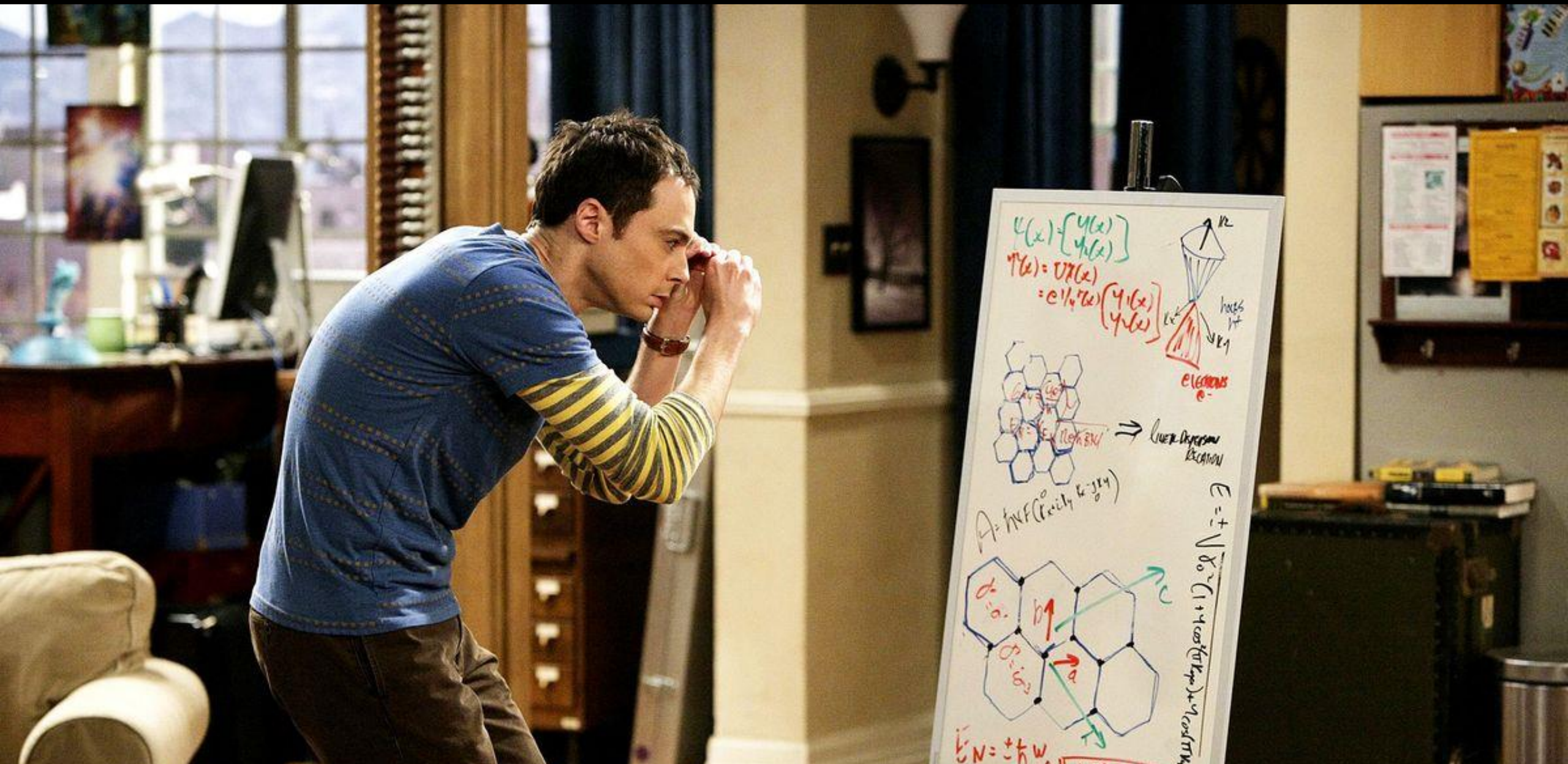
solution: a Data Product that (effectively) mitigates a problem

datascienceshop.com

datascienceshop.substack.com

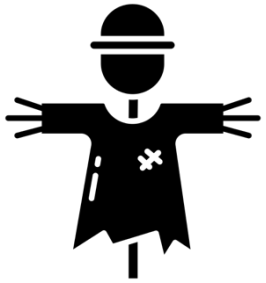
scan me!

well, there's a little more to it than that….



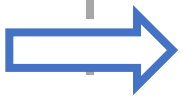

1

how does the **Data Science Shop** do it?



start small
(MVP)

fail fast



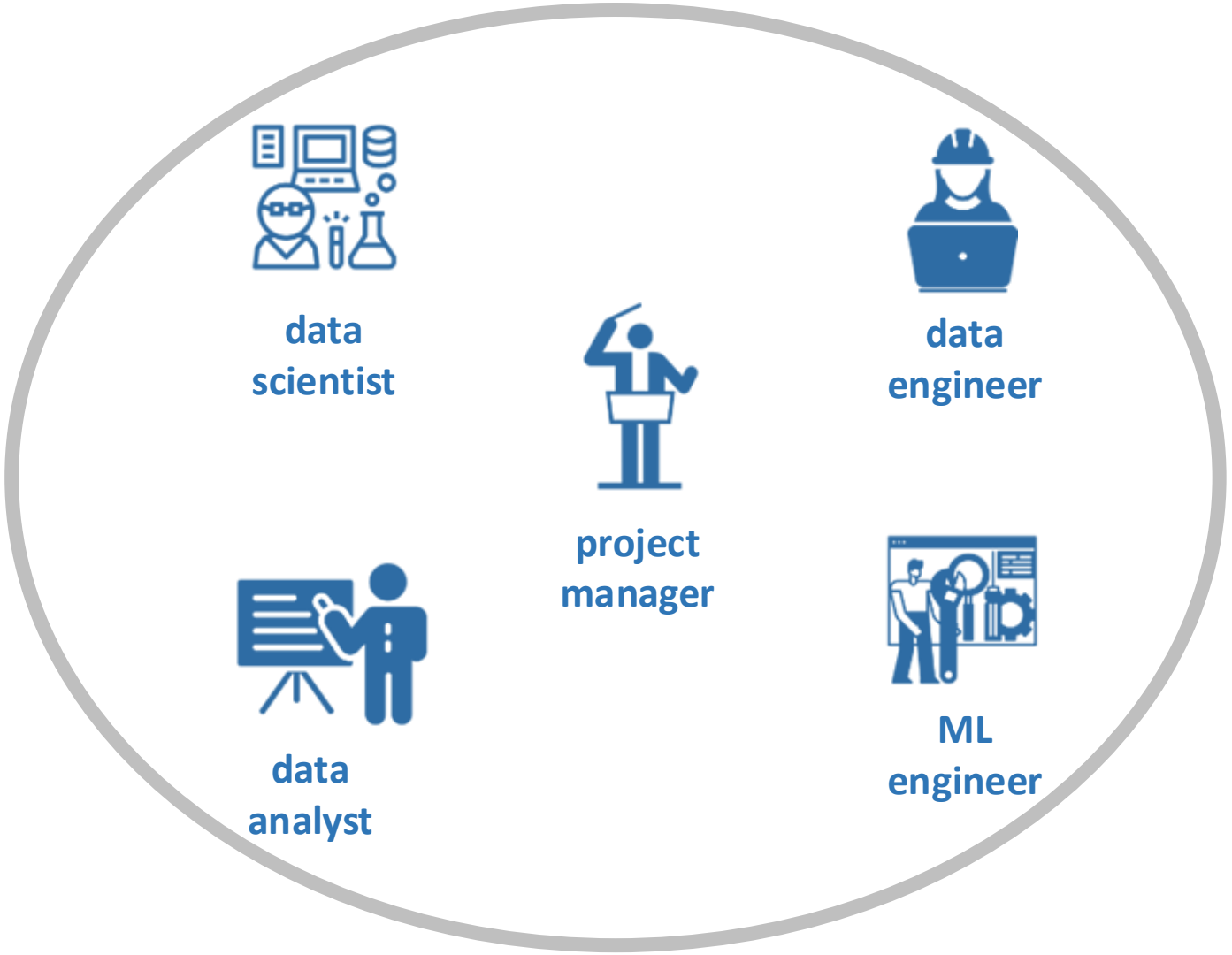
scale up

iterate

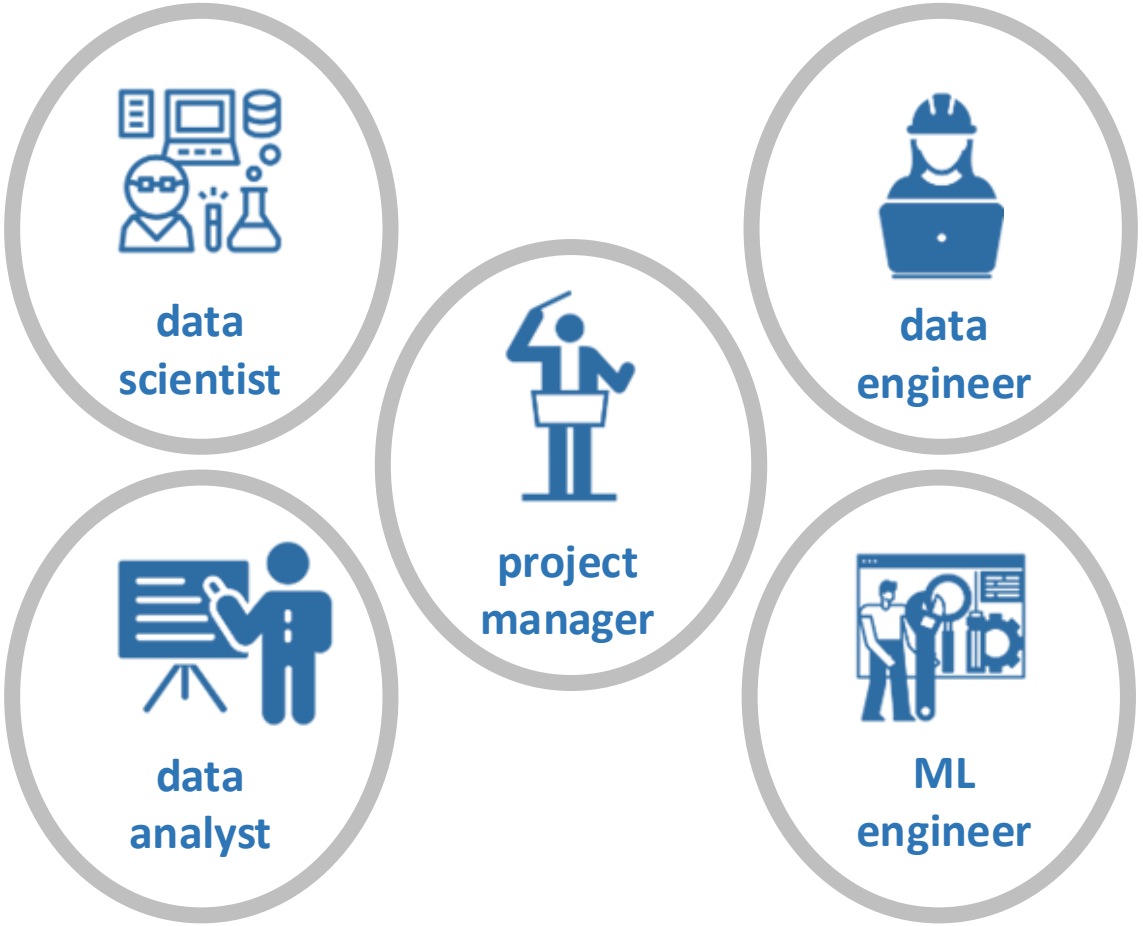

2

circa 2010: the **unicorn** approach

⇔



today: specialization & collaboration!



the **Data Science shop** crew in detail

data scientist

tasks

- Define **correct questions**
- Prototype **ETL**
- **Model data** (apply algorithms)
- **Build** prototype solutions
- **Translate** solution outputs

outputs

- **prototyped solutions**
- **science-backed solutions**

skills

- critical thinking (about data)
- statistics
- data visualization
- hacking
- algorithms
- explanation / prediction
- communication
- translation

data analyst

tasks

- **Query** data(bases)
- **Summarize** and **visualize** data
- Identify **trends**
- **Interpret** findings
- **Communicate** with business

outputs

- **insights**

skills

- dense business knowledge
- data querying
- data visualization
- communication

data engineer

tasks

- Develop and maintain **data architecture**
  - data ingestion
  - data storage
  - data security
  - data transformation
- Build **data pipelines**
- Productionize **ETL** (prototypes)
- Build **data quality processes**
- Orchestrate **processes**
- Build **working environments**

outputs

- **data architectures**
- **quality-checked data pipelines**

skills

- advanced programming skills
- advanced software engineering
- cloud computing
- database design
- data architecture design
- distributed systems
- communication

ML engineer

tasks

- **Productionize** algorithms
- **Scale** prototyped solutions
- **Optimize** computational performance
- Create **endpoints** for outputs
- **Orchestrate** processes
- Build **working environments**

outputs

- **computation-optimized solutions**
- **production-ready solutions**

skills

- advanced programming skills
- advanced software engineering
- advanced cloud computing
- advanced optimization math
- algorithms (intermediate)
- distributed systems
- communication

project manager

tasks

- Develop **timelines**
- Task **planning**
- Resource **allocation**
- **Risk** monitoring

outputs

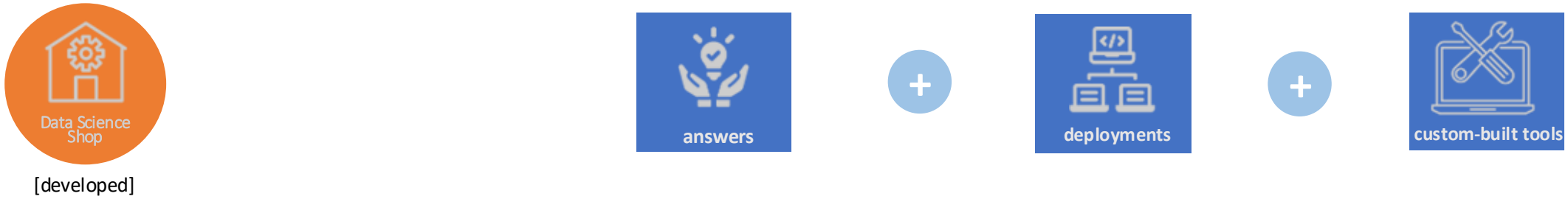
- **roadmaps**
- **execution**

skills

- leadership
- negotiation
- team building
- planning
- basic technical acumen
- communication
- translation


3

the **Data Science Shop**: *mutatis mutandis*



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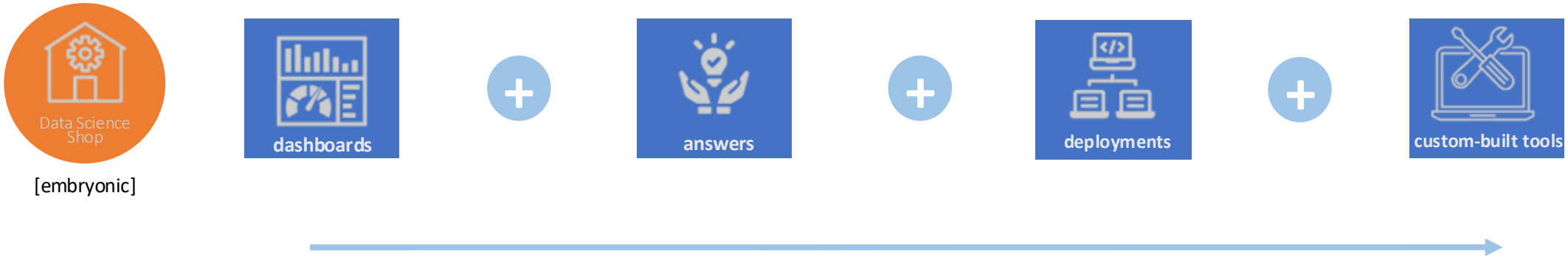

[embryonic]

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