



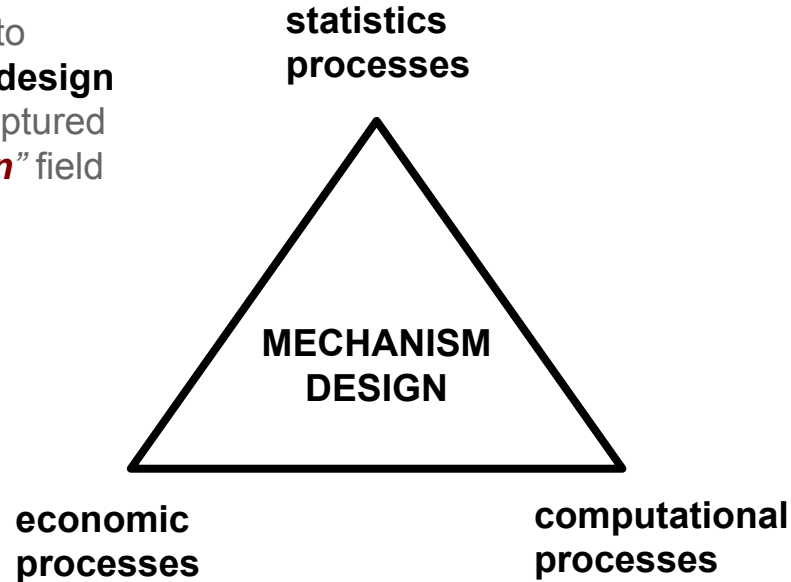
The technical side of commons intelligence?

15 June 2026, de Nieuwe Meent, Amsterdam

Giovanni Sileno, g.sileno@uva.nl

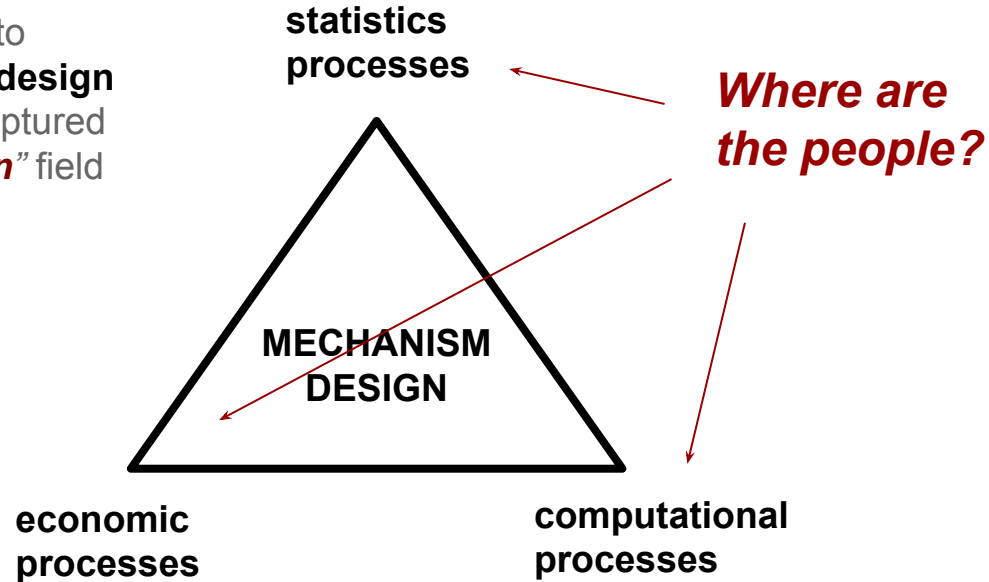
Socially Intelligent Artificial Systems (SIAS),
Informatics Institute, University of Amsterdam

The prototypical approach to **socio-technical systems design in computer science** is captured by the “***mechanism design***” field



cf. the foundational disciplines of **mechanism design**
after Jordan, <https://www.youtube.com/watch?v=sRL6KXVPzn8>

The prototypical approach to **socio-technical systems design** in computer science is captured by the “***mechanism design***” field



cf. the foundational disciplines of **mechanism design**
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**statistics
processes**

**MECHANISM
DESIGN**

**evaluative
processes**

**economic
processes**

**computational
processes**

*including normative directives,
conditional preferences,
value-based reasoning, emotions...*

**statistics
processes**

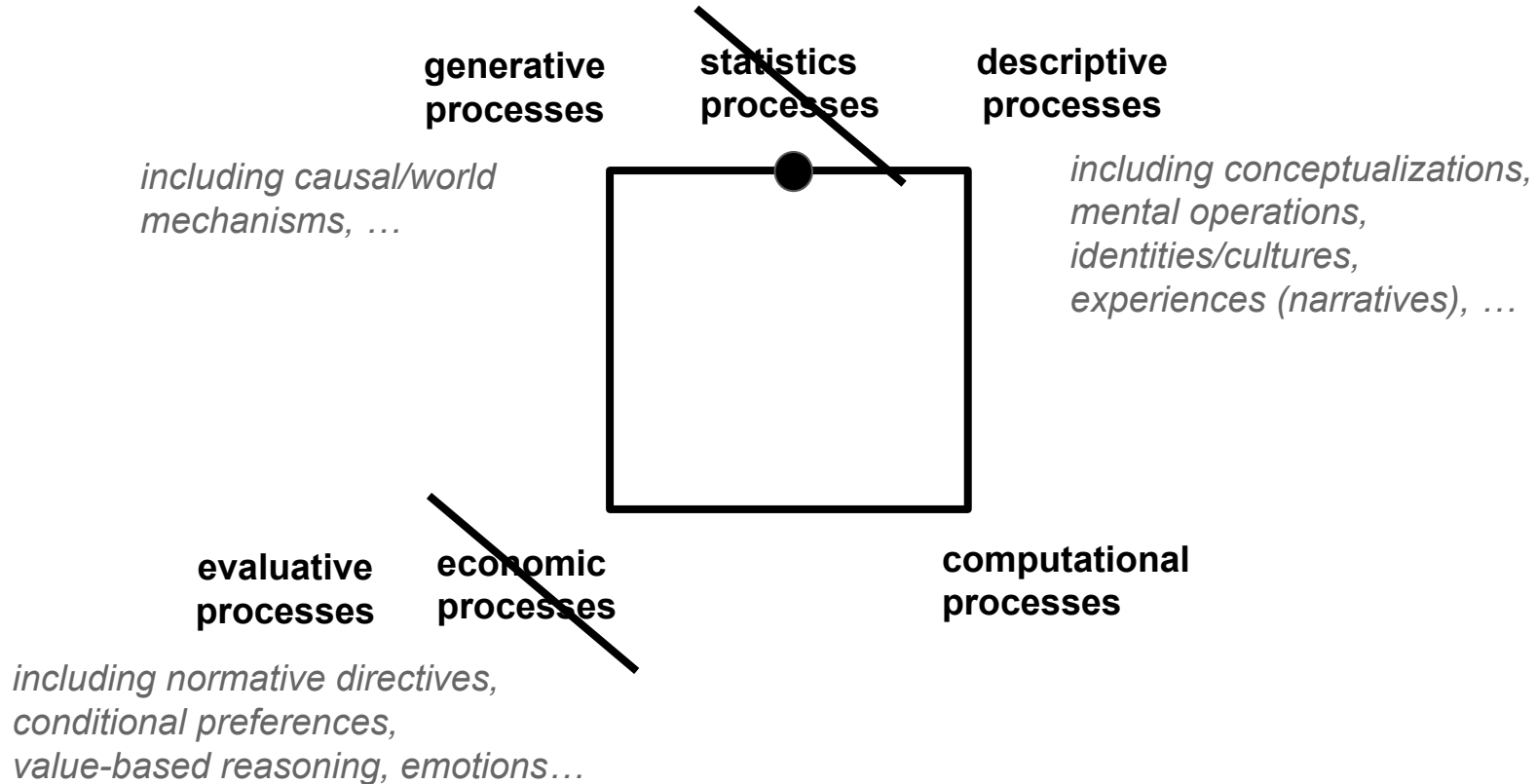
**MECHANISM
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**generative
processes**

*including causal/world
mechanisms, ...*

**descriptive
processes**

*including conceptualizations,
mental operations,
identities/cultures,
experiences (narratives), ...*

**SOCIAL-AWARE
DESIGN**

**evaluative
processes**

*including normative directives,
conditional preferences,
value-based reasoning, emotions...*

**computational
processes**

***making space for
“human” dimensions!***

**generative
processes**

*including causal/world
mechanisms, ...*

**descriptive
processes**

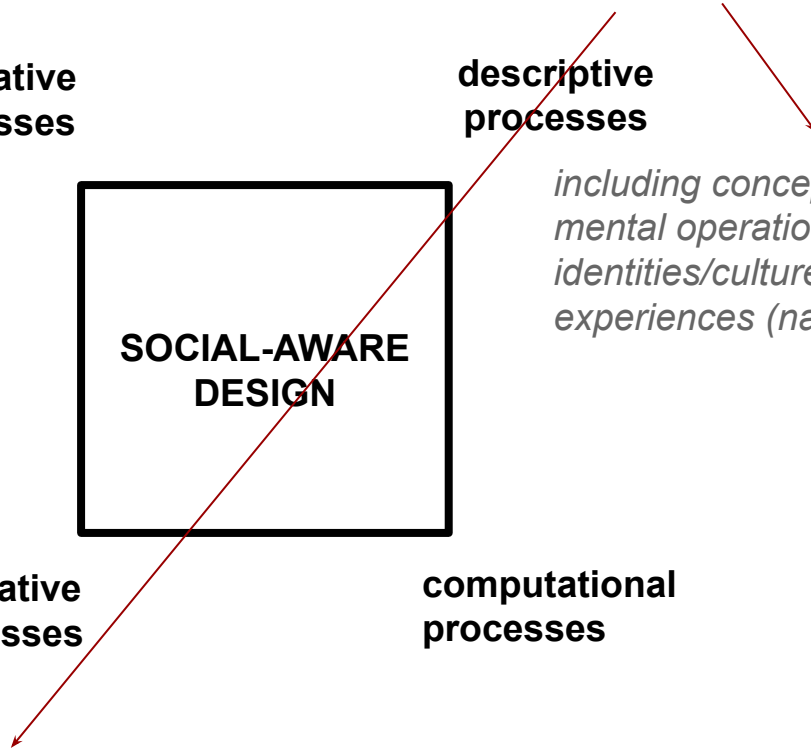
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**SOCIAL-AWARE
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overarching question

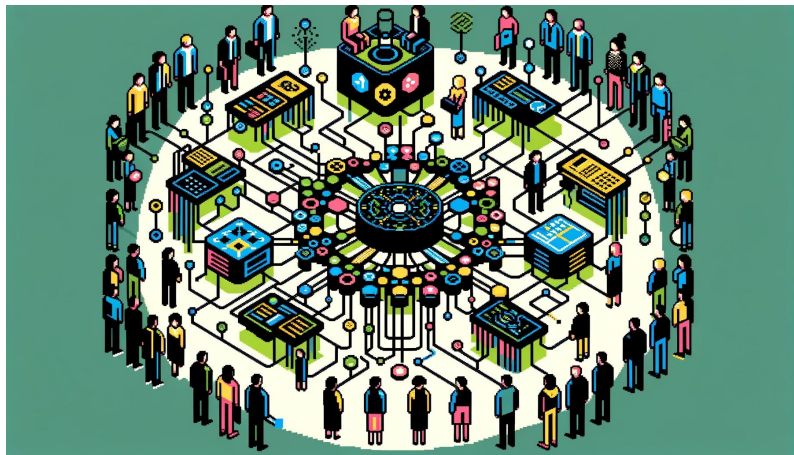


- Instead of relying on infrastructures ruled by single actors, I am engaging with challenges concerning:
 - how to design and deploy *computational infrastructures*
 - in which **users may decide** and **enact their own policies**



overarching motivation

- By enabling a pluralism of interactional mechanisms via “private” regulations, we make explicit the continuity holding between computational distributed systems and social systems.



This is relevant to ***responsible computing*** initiatives, concerning eg. responsible/participatory AI or the responsible Internet.

Cybernetics

or control and communication in the animal and the machine



Cybernetics

or control and communication in the animal and the machine

Ecological/plural cybernetics

or empowerment and communication in socio-technical assemblages



Cybernetics

or control and communication in the animal and the machine

decentralized

Ecological/plural cybernetics

or empowerment and communication in socio-technical assemblages

situated

from:

Cybernetics

or control and communication in the animal and the machine

to:

decentralized

governance

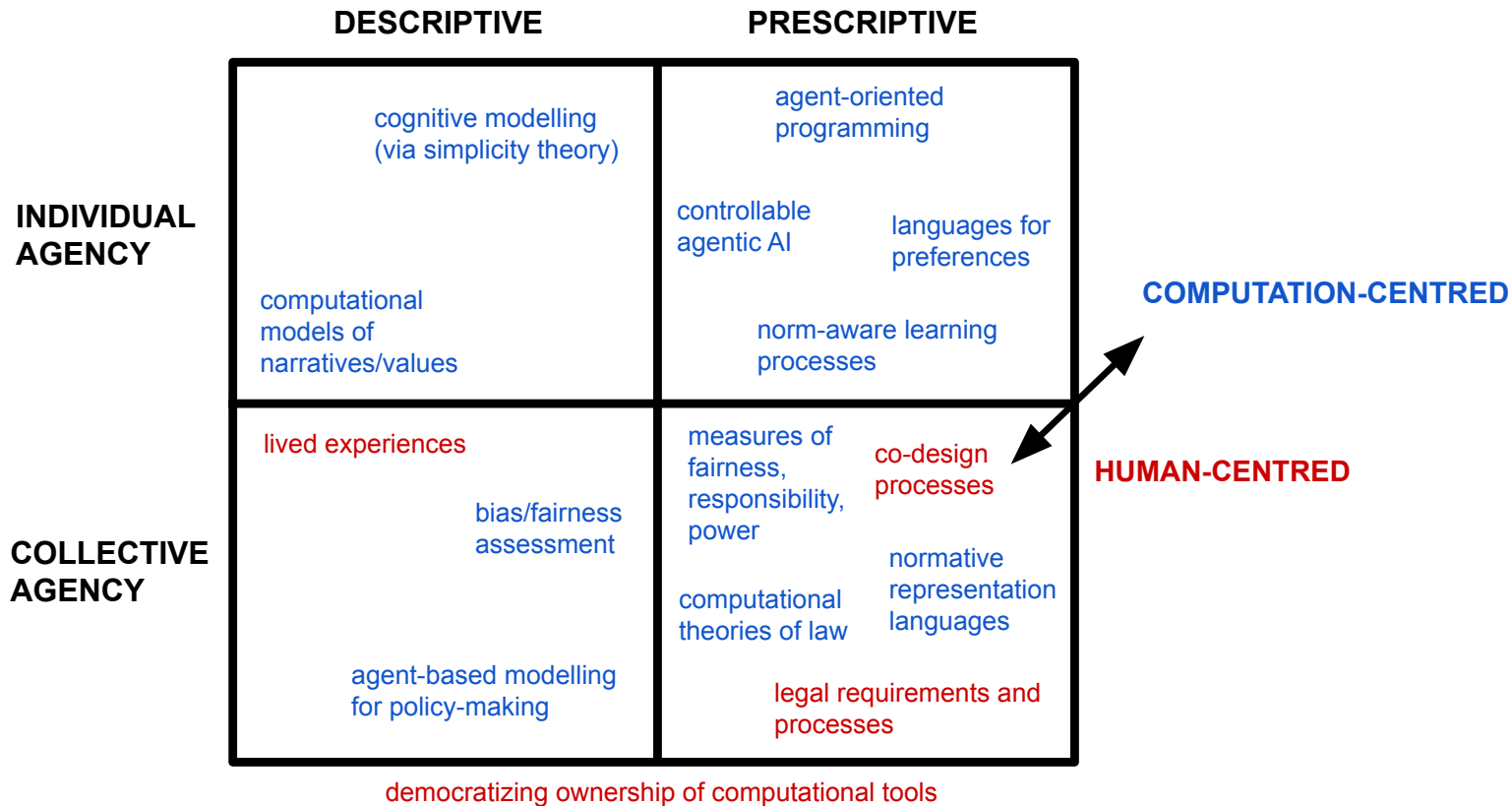
Ecological/plural cybernetics

or empowerment and communication in socio-technical assemblages

situated

cognition

My research tracks



what do we mean
by “bringing AI closer”?



what do we mean
by “bringing AI closer”?

AI as a tool



what do we mean by “bringing AI closer”?

AI as a tool



ACCESSIBLE

EASY TO USE

ONE'S OWN

UNDERSTANDABLE

VISIBLE

COMMON

USEFUL

BENEFICIAL

NOT HARMFUL



what do we mean
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AI as a tool



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control dimensions

observational dimensions



distributive dimensions

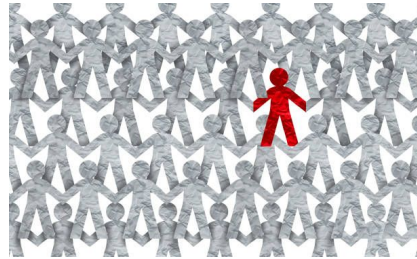
the hidden front of technological innovation



digital divide



linguistic divide

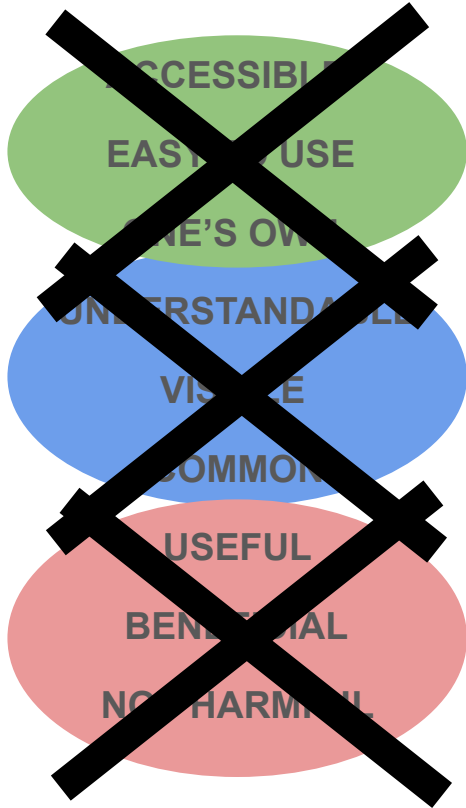


representation imbalance



socio-economic divide

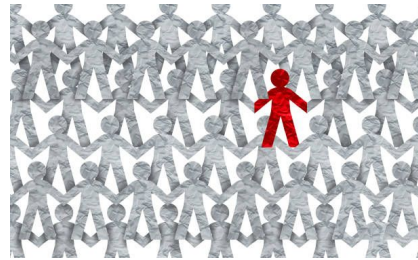
the hidden front of technological innovation



digital divide



linguistic divide



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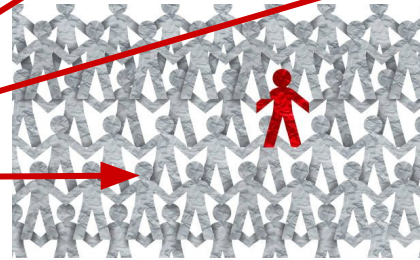
...starting tackling the hidden front of technological innovation



digital divide



linguistic divide



representation imbalance



socio-economic divide

we need to be mindful of these issues
when we design and roll out
innovative solutions

10 common-sense meanings of ownership



based on *Technical mean(ing)s of ownership*, a talk I have given at Virtual Ownership workshop, Maison de Science Humaines, Luxembourg, 2025. I'm working on a paper!



10 common-sense meanings of ownership

- ownership as (physical) possession, occupancy
- ownership as control
- ownership as (possibility of) use
- ownership as authorship
- ownership as authority
- ownership as (claim to a) rent
- ownership as understanding
- ownership as familiarity
- ownership as trust
- ownership as responsibility



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Generally, ownership concern something deemed of *value*.

Simplified view on computing

- All in computing is matter of three types of resources:
 - **Data**

Simplified view on computing

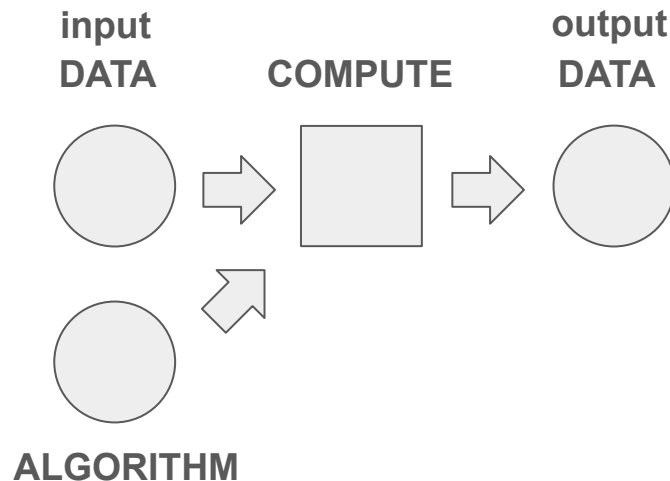
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 - **Algorithm or Code**
(programs, ML models, ML methods, ...)

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(devices providing computing power)

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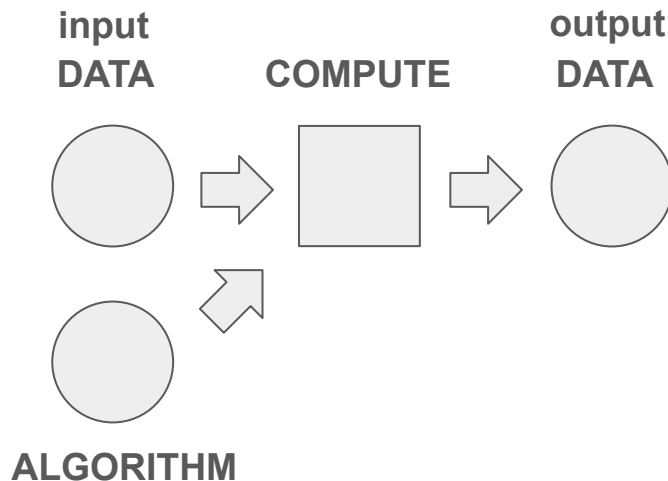


Simplified view on computing

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```
def add(x, y):  
    return x + y
```

```
a = 3; b = 4  
output = add(a, b)
```

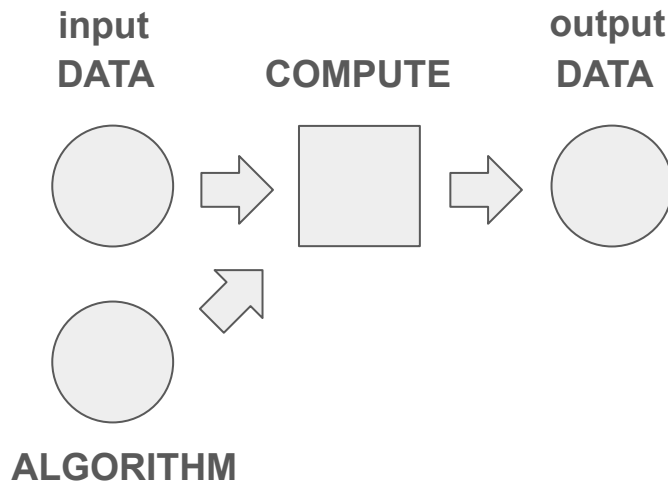


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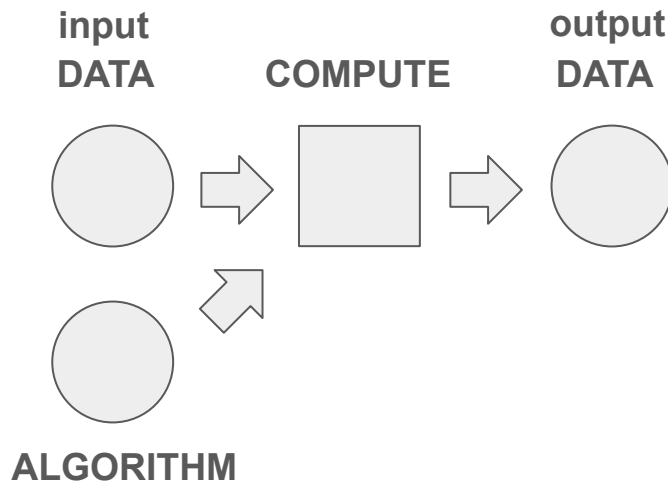
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```
def add(x, y):  
    return x + y
```

```
def apply(f, x, y):  
    return f(x, y)
```

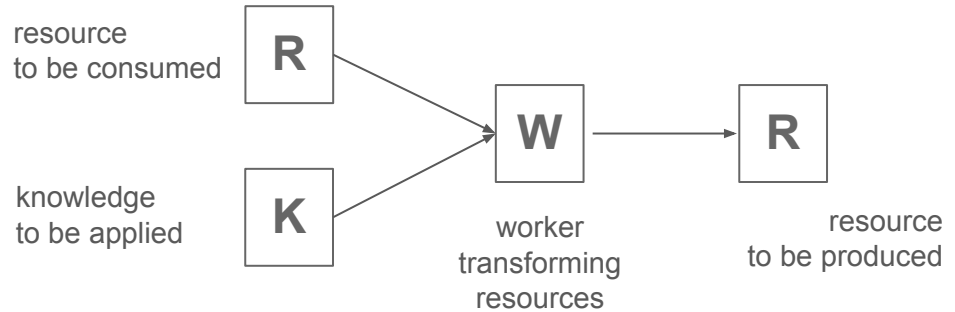
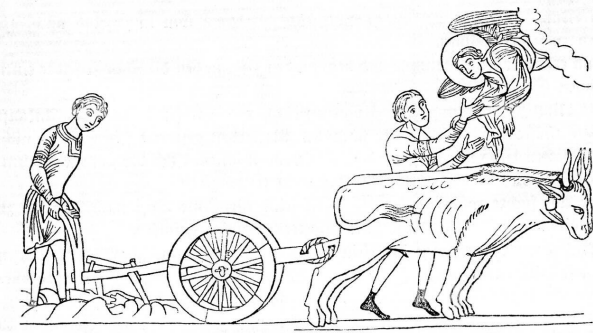
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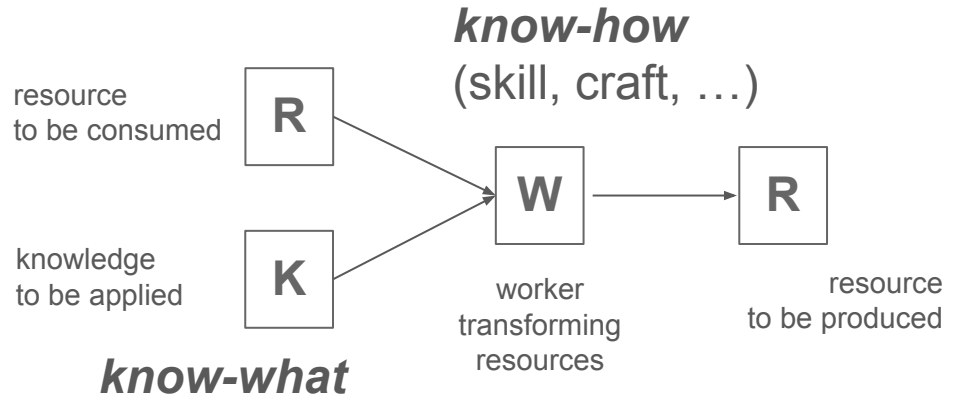
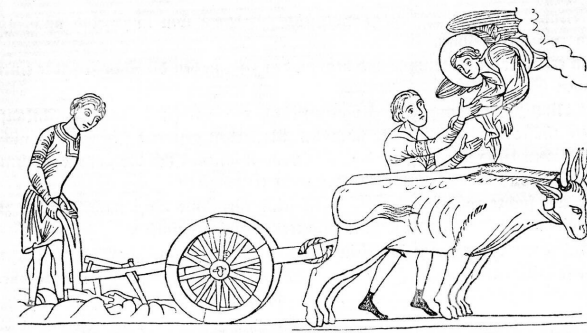
Simplistic view on production (1)

- Functional role decomposition
 - **Resource holder**
 - **Knowledge holder**
 - **Worker**



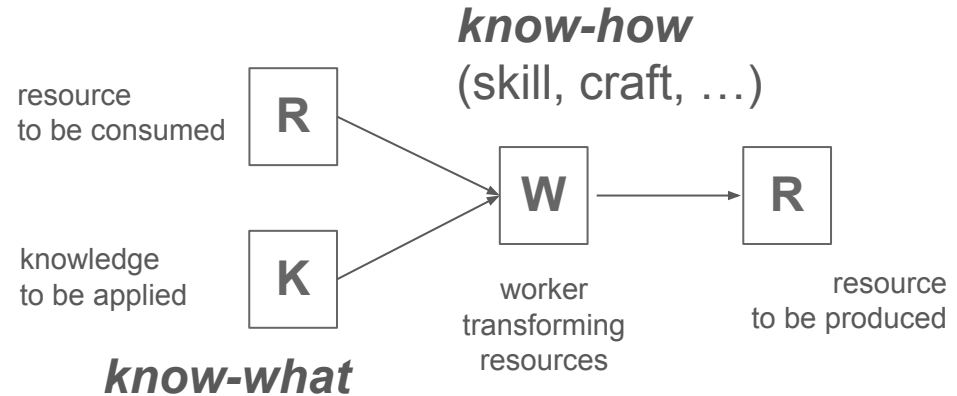
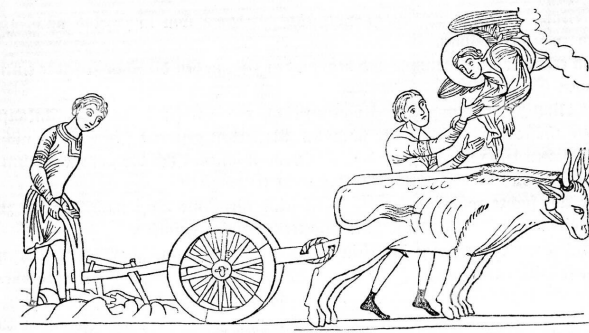
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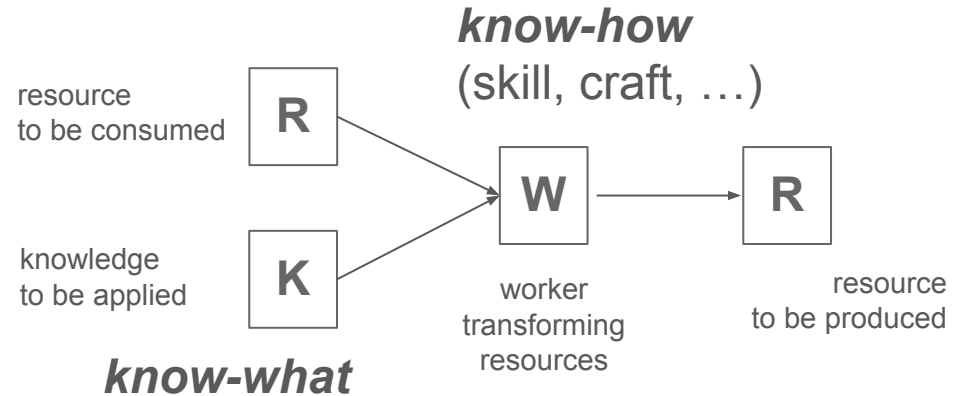
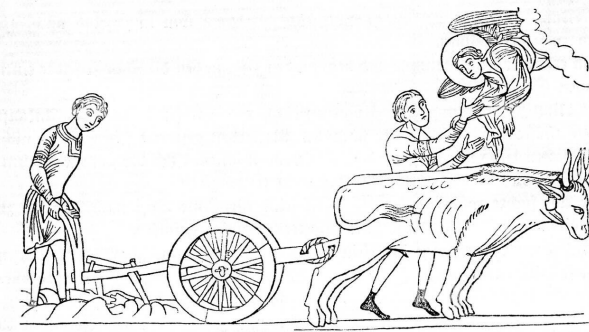
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NOTE: knowledge is a specific type of resource!

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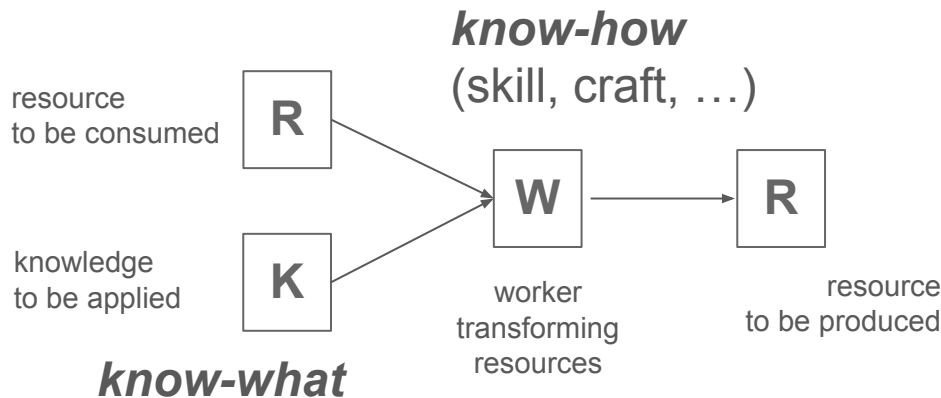
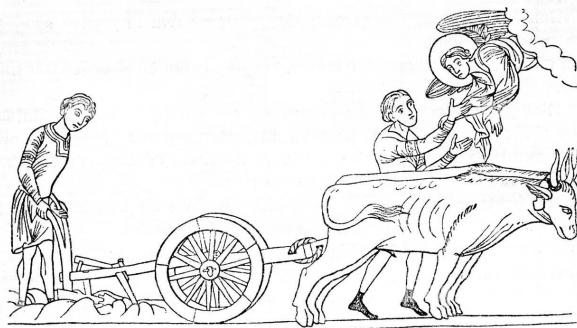


NOTE: knowledge is a specific type of resource! (and workers too, but at process level)

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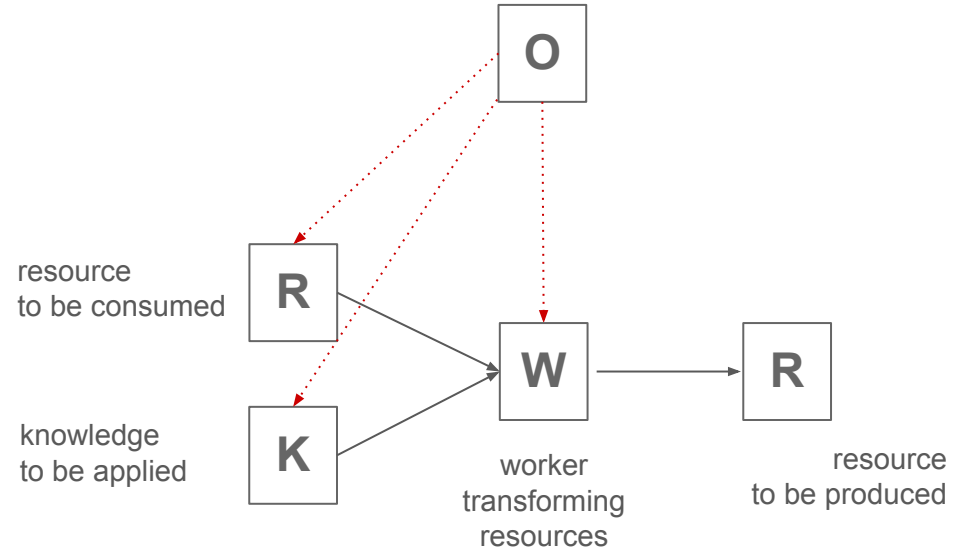
[the core problem with GenAI is that it captures part of the know-how and make it a cloneable resource]



NOTE: knowledge is a specific type of resource! (and workers too, but at process level)

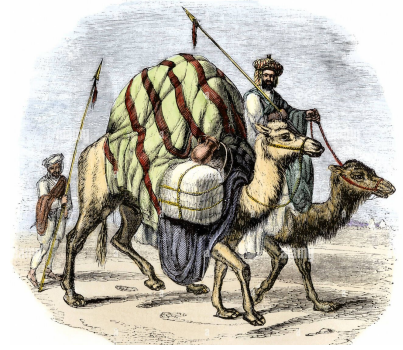
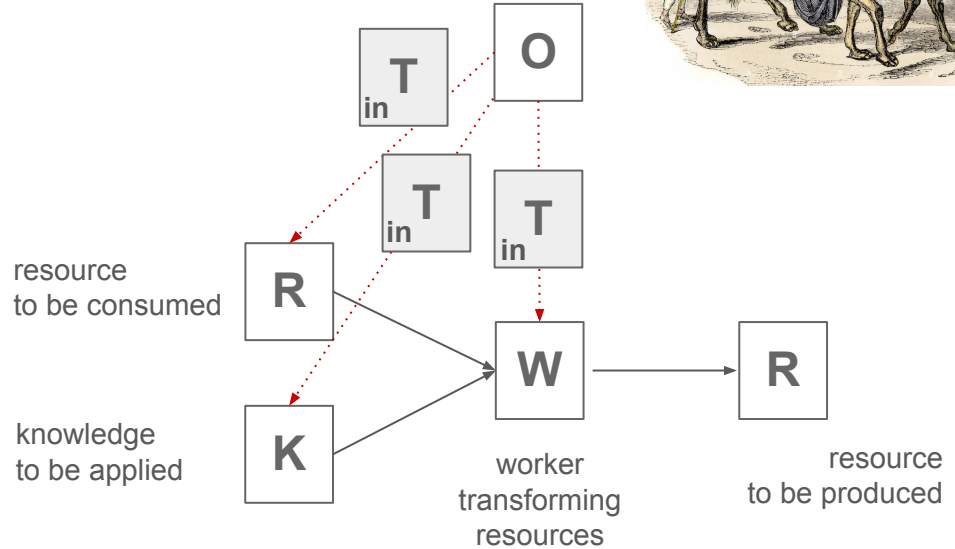
Simplistic view on production (2)

- Functional role decomposition
 - Resource holder
 - Knowledge holder
 - Worker
 - **Orchestrator**



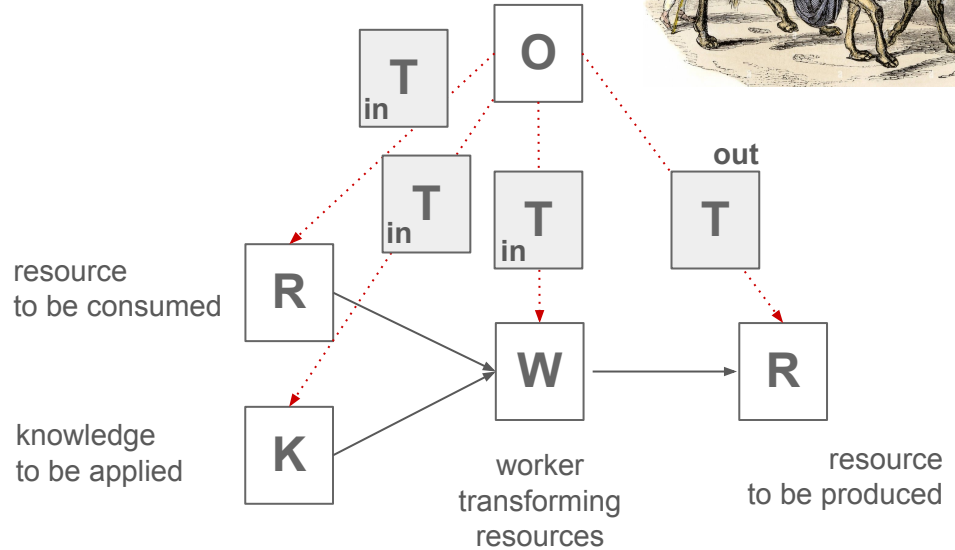
Simplistic view on production (3)

- Functional role decomposition
 - Resource holder
 - Knowledge holder
 - Worker
 - Orchestrator
 - **Trader**



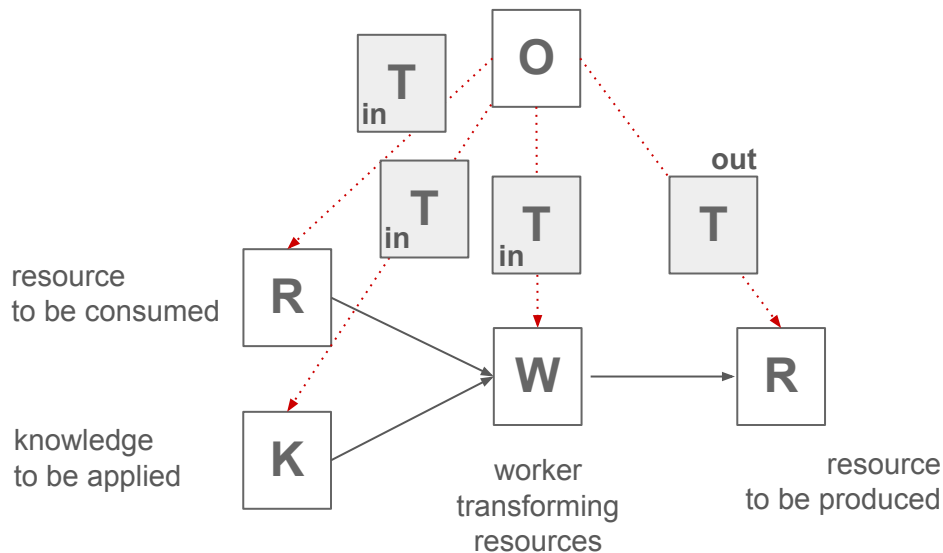
Simplistic view on production (3)

- Functional role decomposition
 - Resource holder
 - Knowledge holder
 - Worker
 - Orchestrator
 - **Trader**



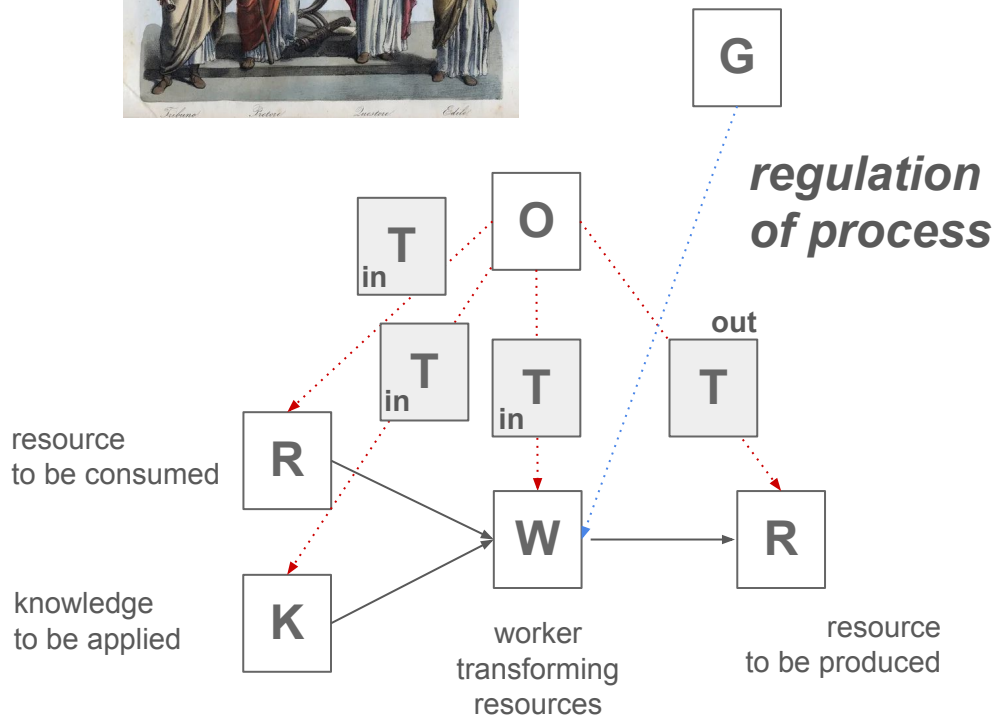
Simplistic view on production (4)

- Functional role decomposition
 - Resource holder
 - Knowledge holder
 - Worker
 - Orchestrator
 - Trader
 - **Governor**



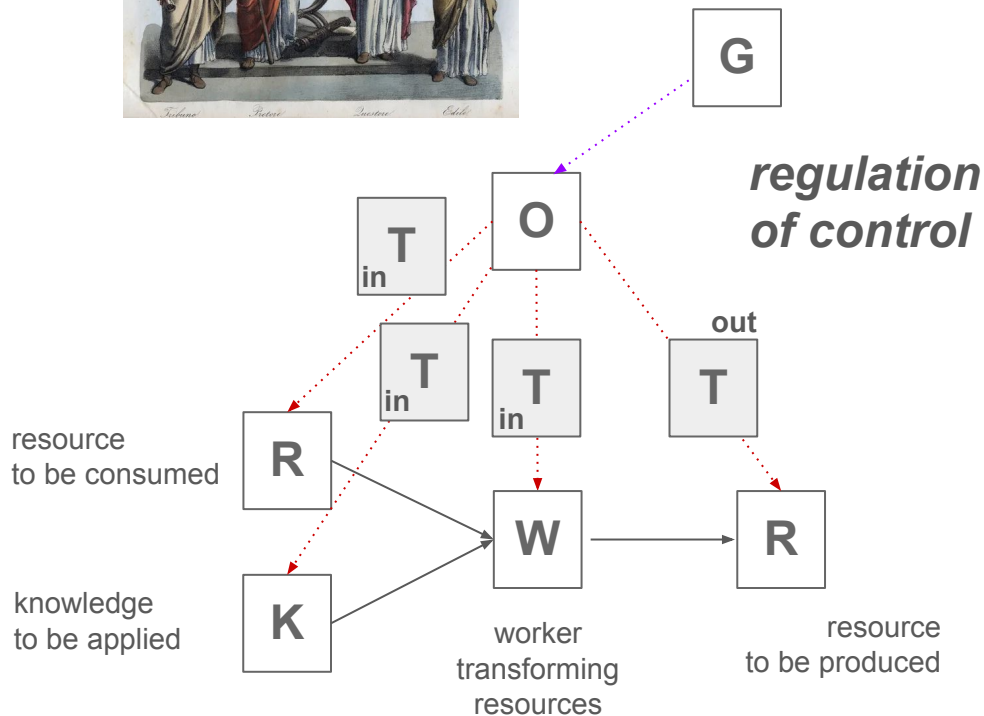
Simplistic view on production (4)

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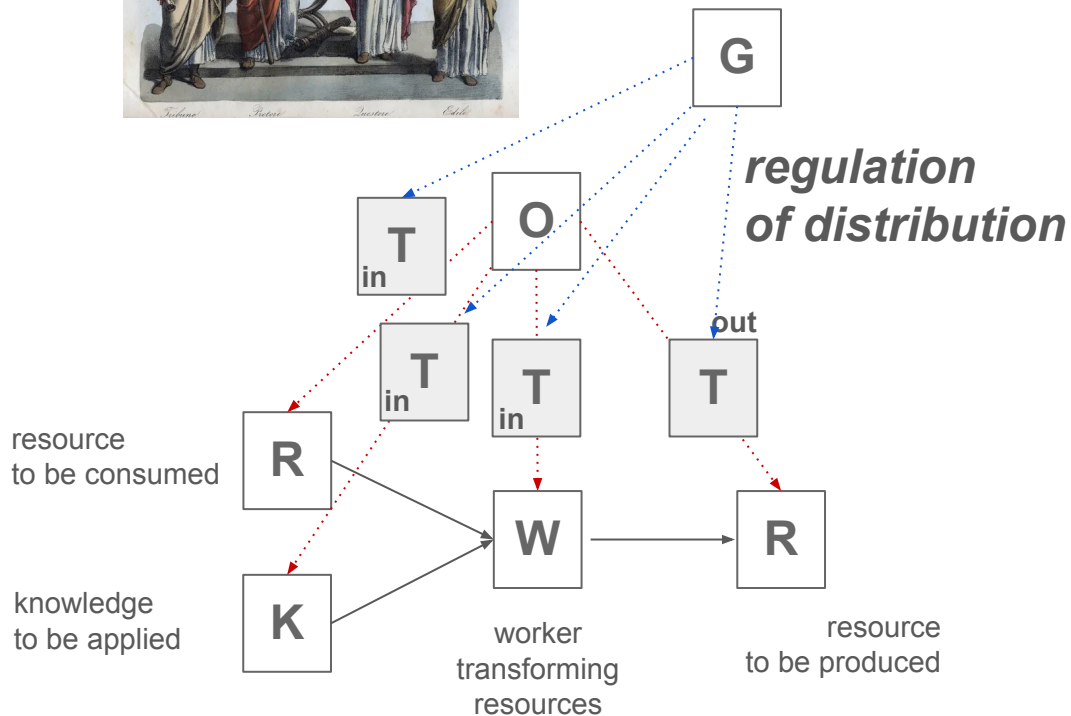
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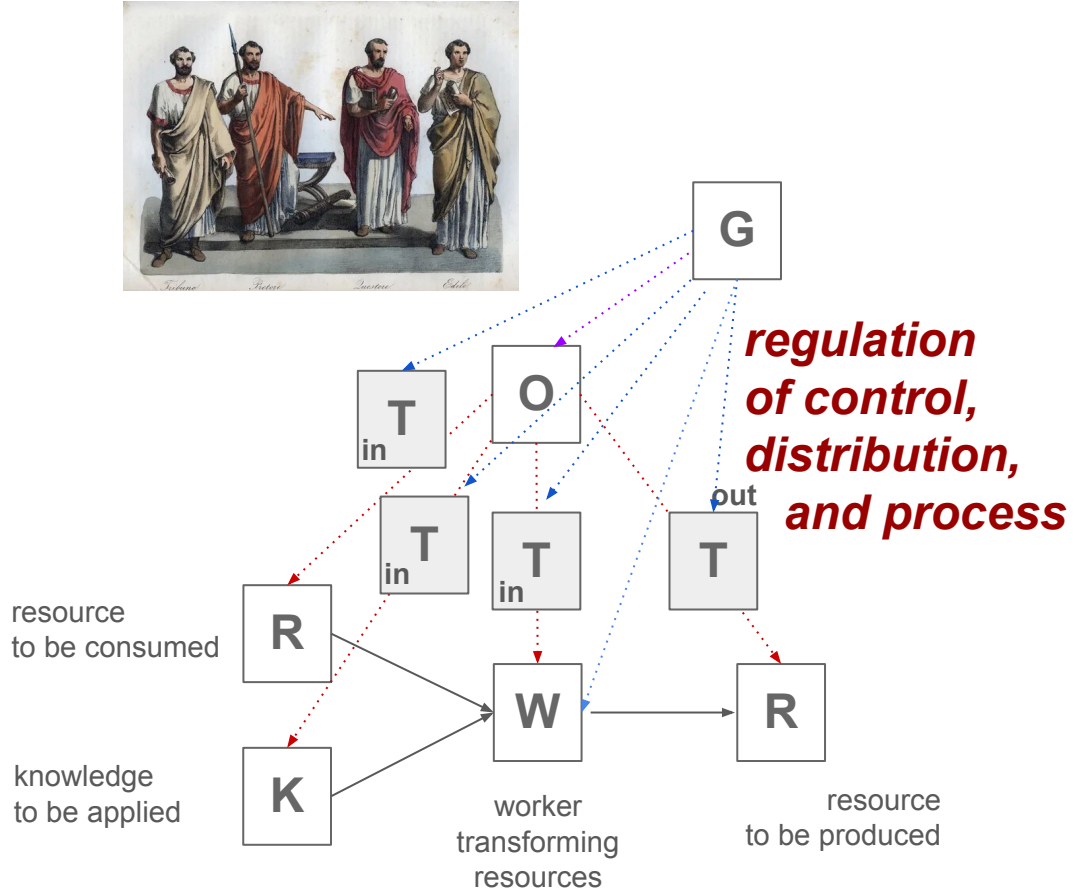
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 - Worker
 - Orchestrator
 - Trader
 - **Governor**

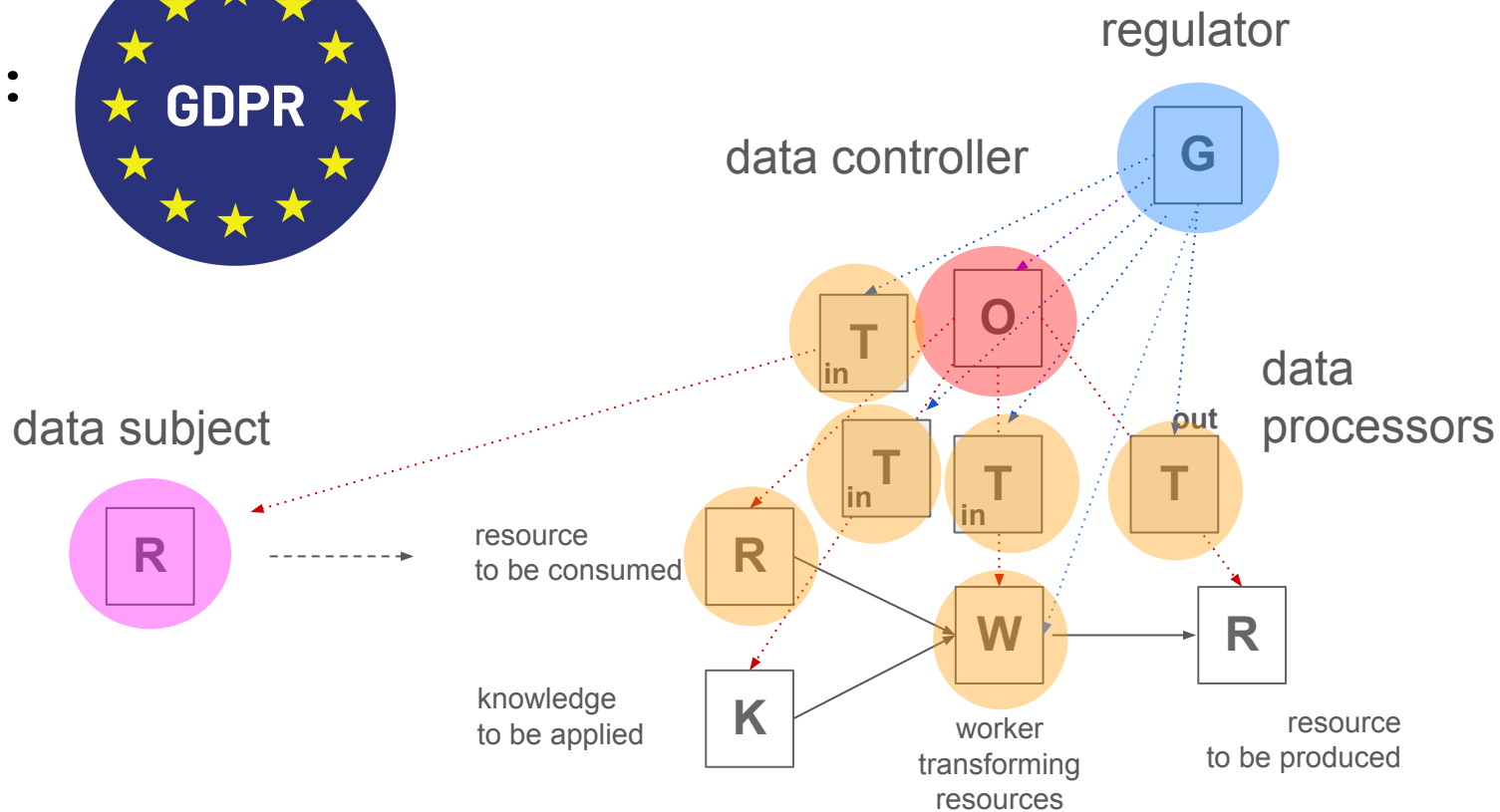


Simplistic view on production (4)

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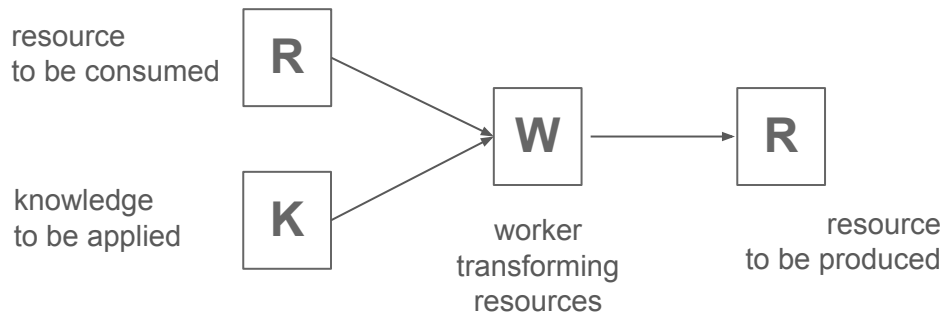
Example:



Ownership as possession, occupancy

As resource-holder,

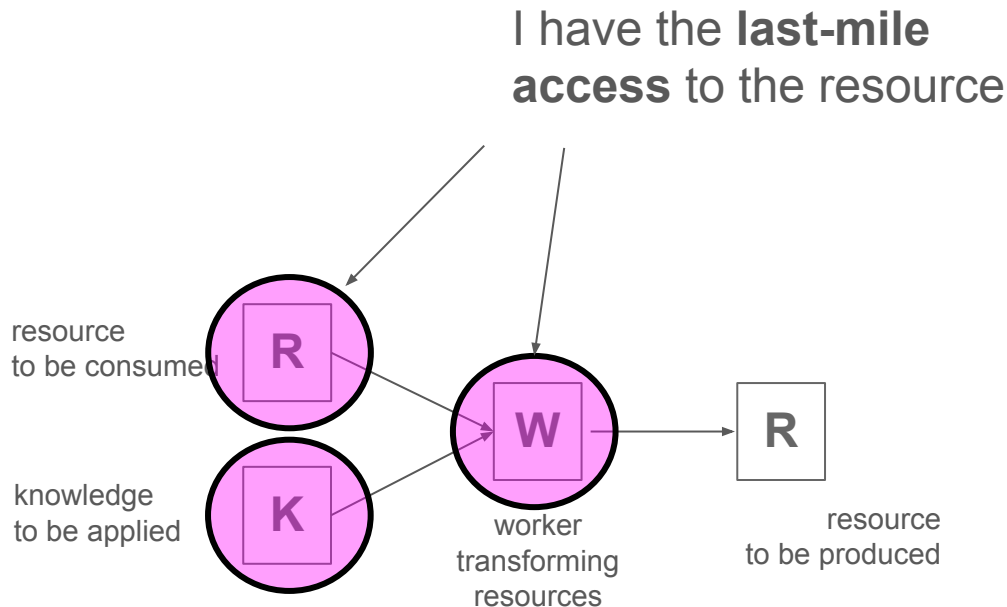
- I have (possibly exclusive) access to the resource
- Generally I may be in the conditions to destroy it or shut it down



Ownership as possession, occupancy

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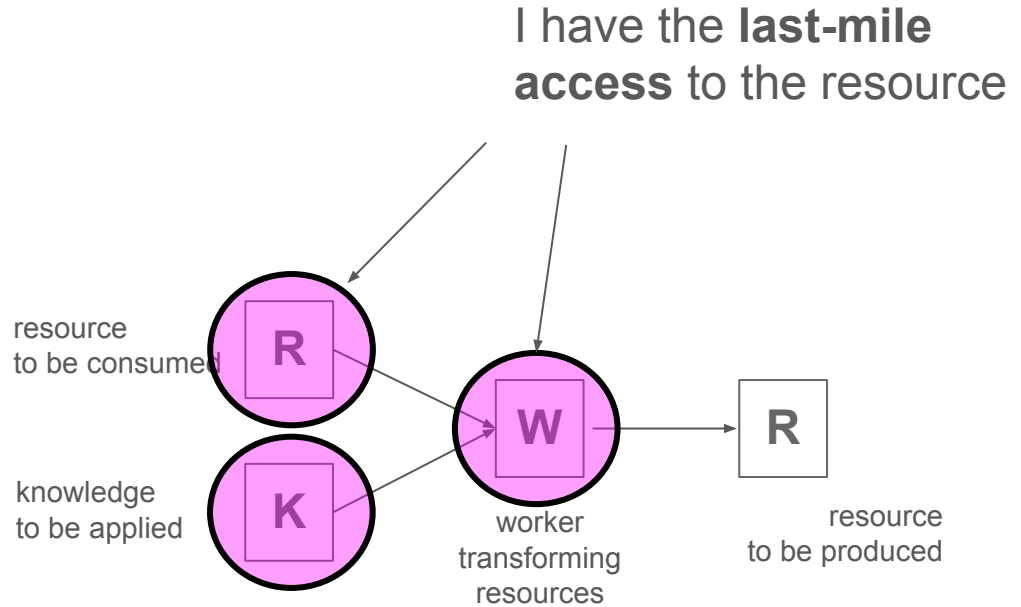
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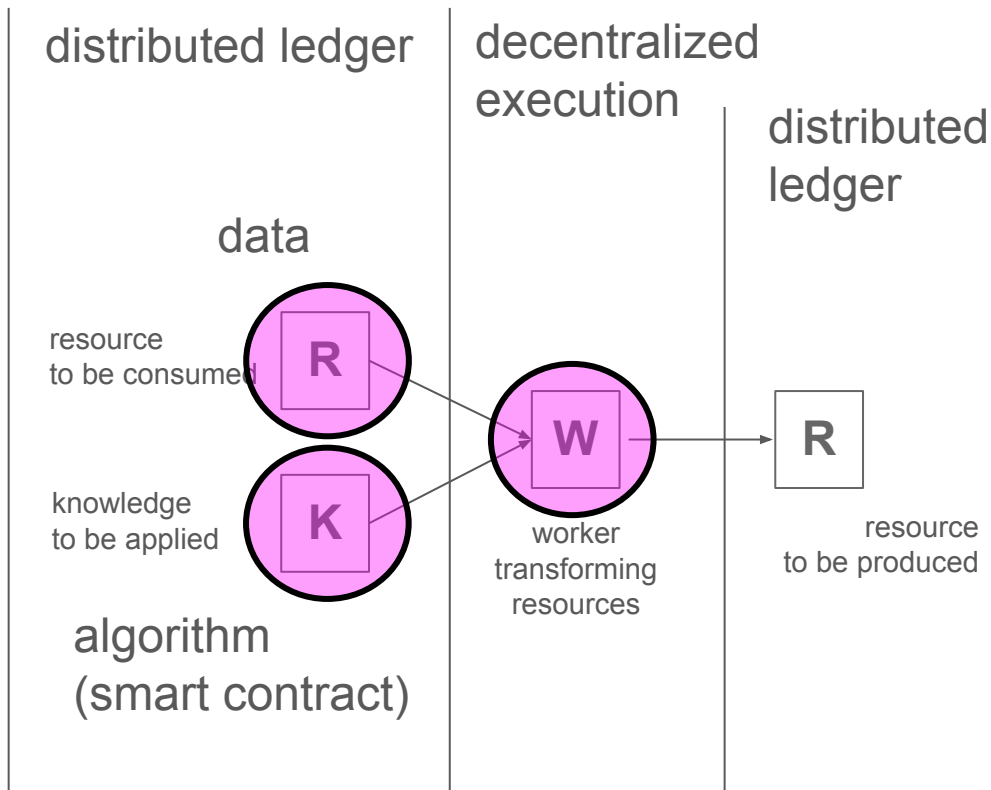
in slavery institutions,
slaves possessed their bodies without owning them



Ownership as possession, occupancy

in blockchain-like terms

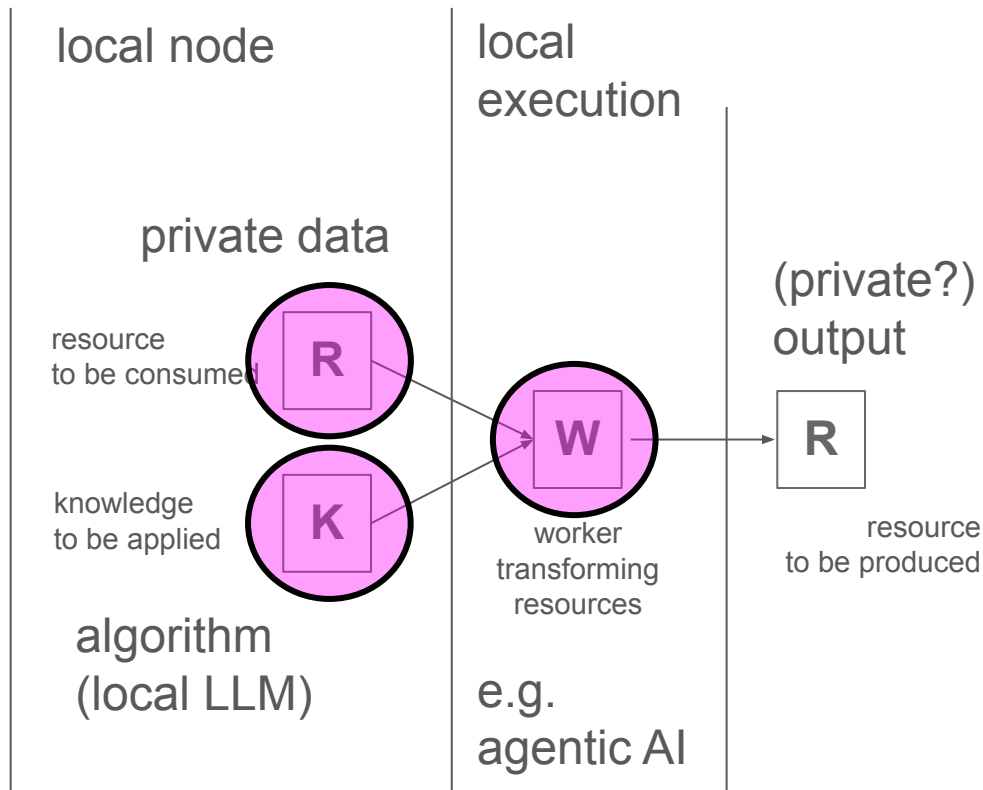
***holding a working node
of a distributed ledger***



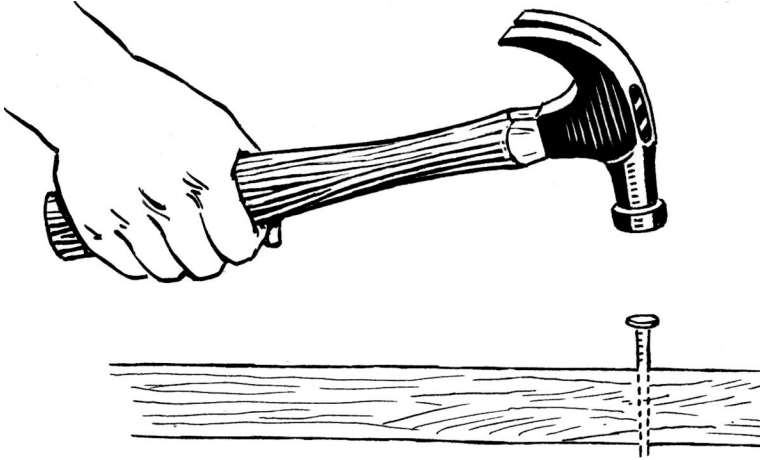
Ownership as possession, occupancy

in Agentic-AI terms

***holding a local LLM
and running agentic
AI on top of it***



Ownership as possibility of use



I am **ABLE**
to perform
a certain operation

resource
to be consumed

R

knowledge
to be applied

K

worker
transforming
resources

W

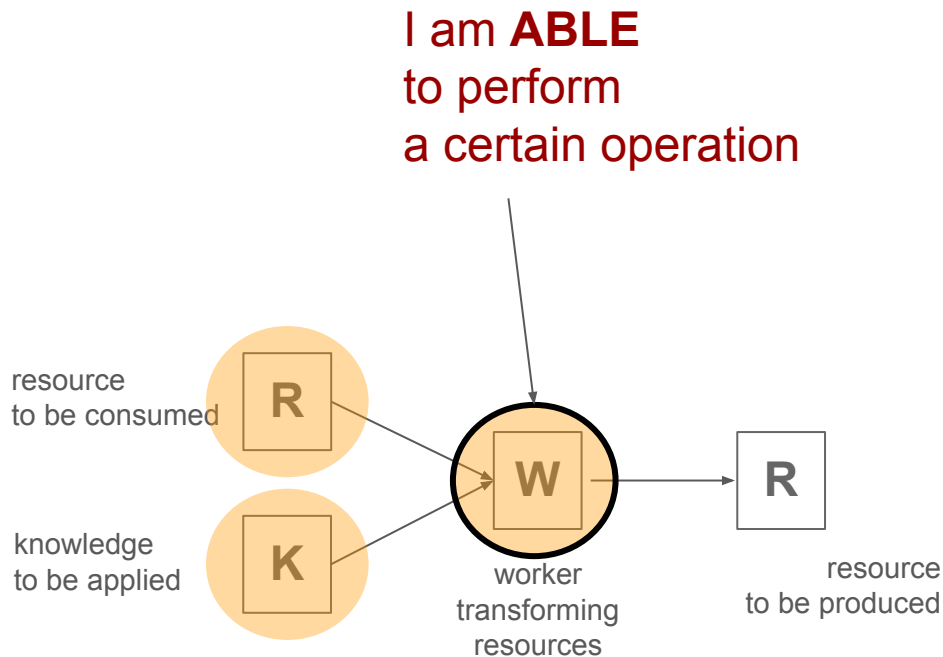
R

resource
to be produced

Ownership as possibility of use

As user,

- I have access to some console or other interfaces enabling me **to specify instructions**
- Through these instructions, I can command the machine **to perform operations**



The ground(ed) level

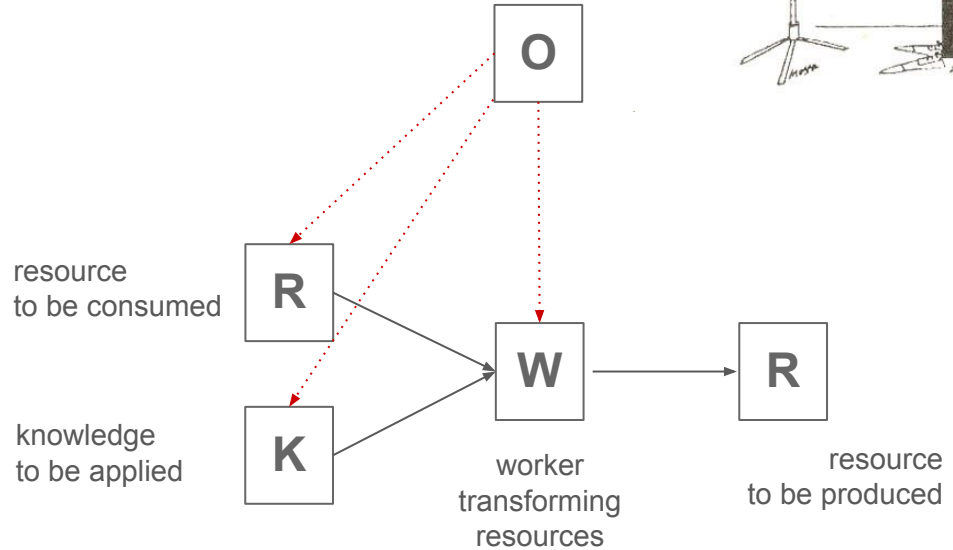
actors – operations

matter of powers and abilities

Ownership as control

As controller/orchestrator

- I can **direct** resources and processes to achieve a certain (desired/needed?) outcome
- I can also **put constraints** on processes and access to resources, determining how things can be done

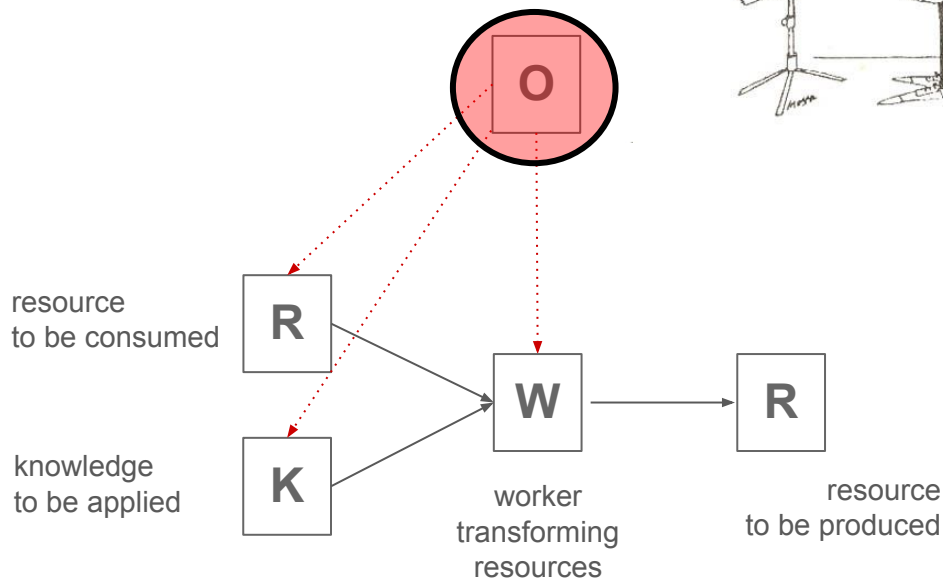


Ownership as control

As controller/orchestrator

- I can **direct** resources and processes to achieve a certain (desired/needed?) outcome
- I can also **put constraints** on processes and access to resources, determining how things can be done

I am **ENABLED**
to define **what to** achieve
and **how to** achieve it.

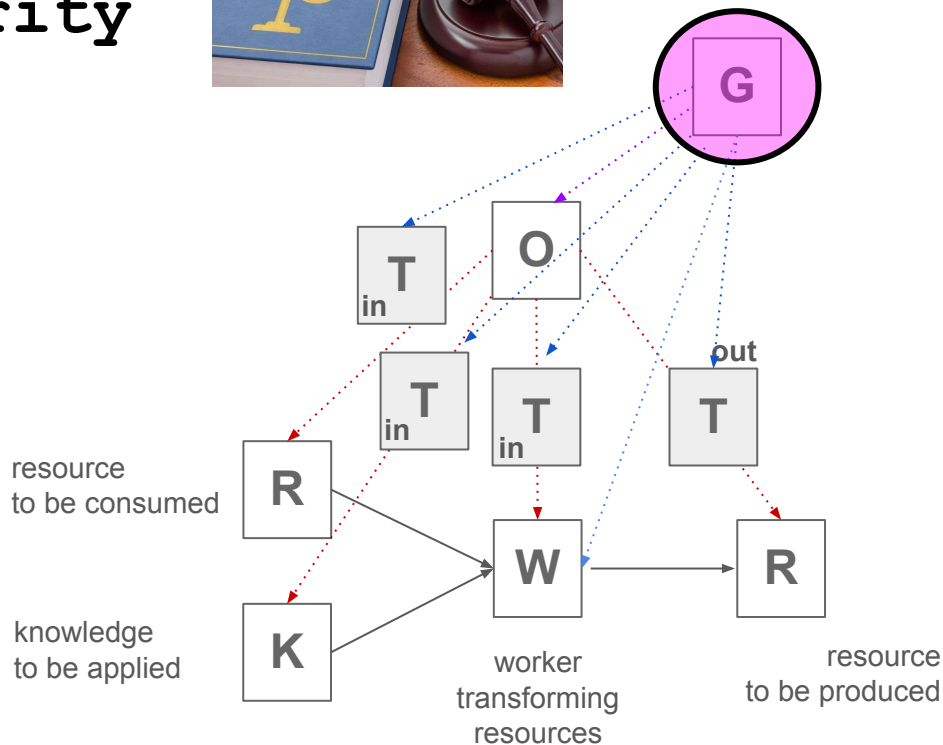


Ownership as authority



As regulator/authority

- I can put constraints on processes and access to resources ***circumscribing*** what/how things can be done by **guiding** controllers (orchestrator) and processors (worker, traders, resource-holders)

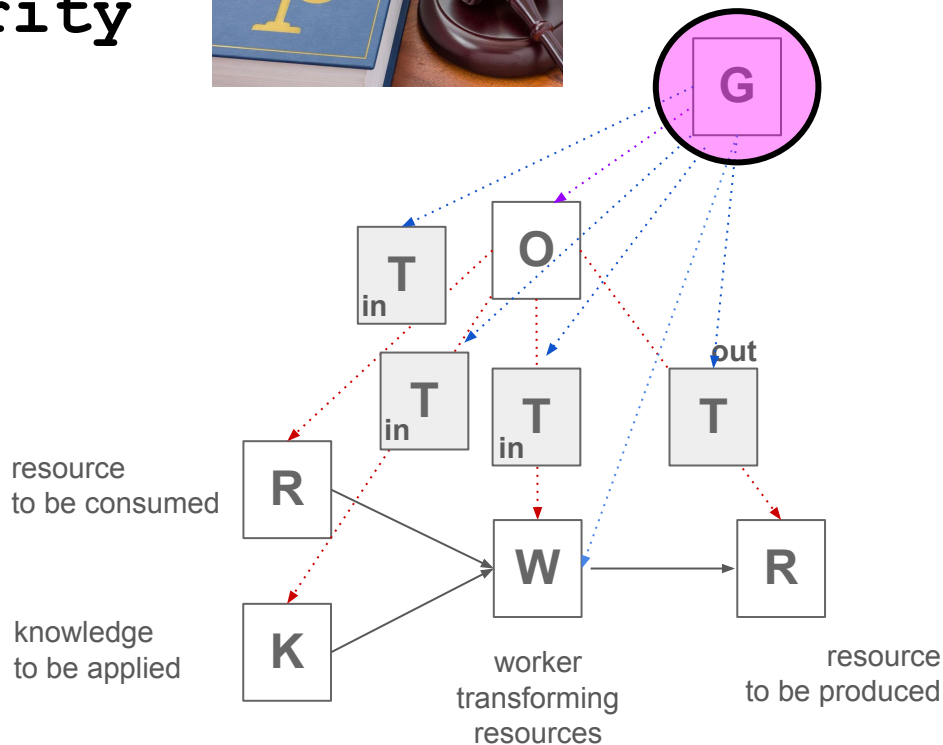


Ownership as authority



As regulator/authority

- I can put constraints on processes and access to resources ***circumscribing*** what/how things can be done by **guiding** controllers (orchestrator) and processors (worker, traders, resource-holders)



(guidance as second-order control, typically using enforcement mechanisms)

The coordination level

agents – horizon of expectations

matter of duties/claims/liberties

actors – operations

matter of powers and abilities

The coordination level

agents – horizon of expectations

actors – operations

matter of duties/claims/liberties

institutional arrangements

matter of powers and abilities

The coordination level

agents – horizon of expectations

actors – operations

social practices

matter of duties/claims/liberties

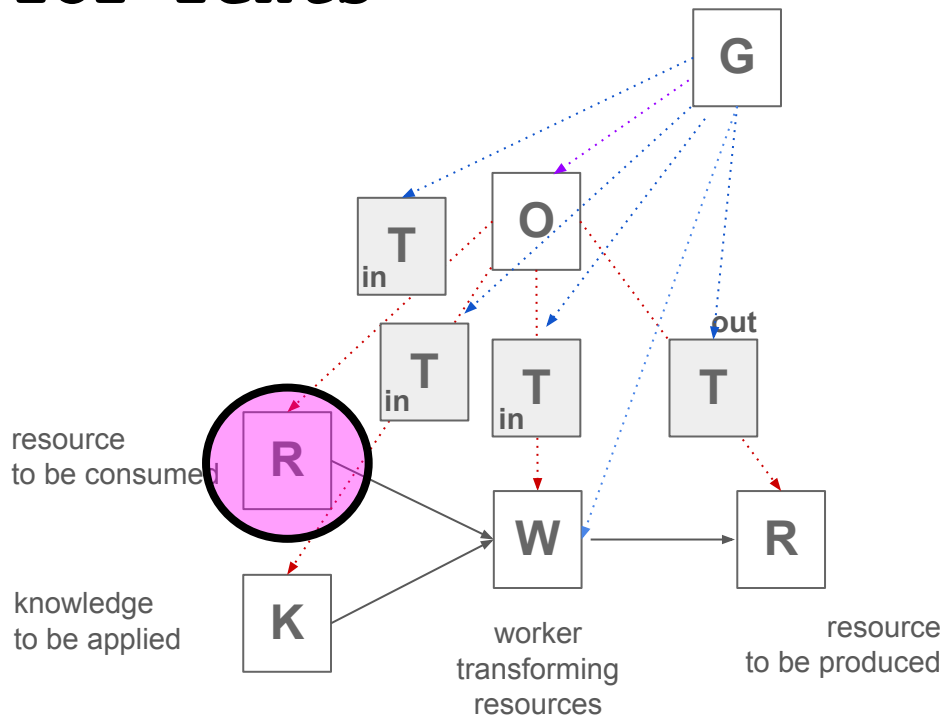
institutional arrangements

matter of powers and abilities

Ownership as claim for rents

As “resource-lord”

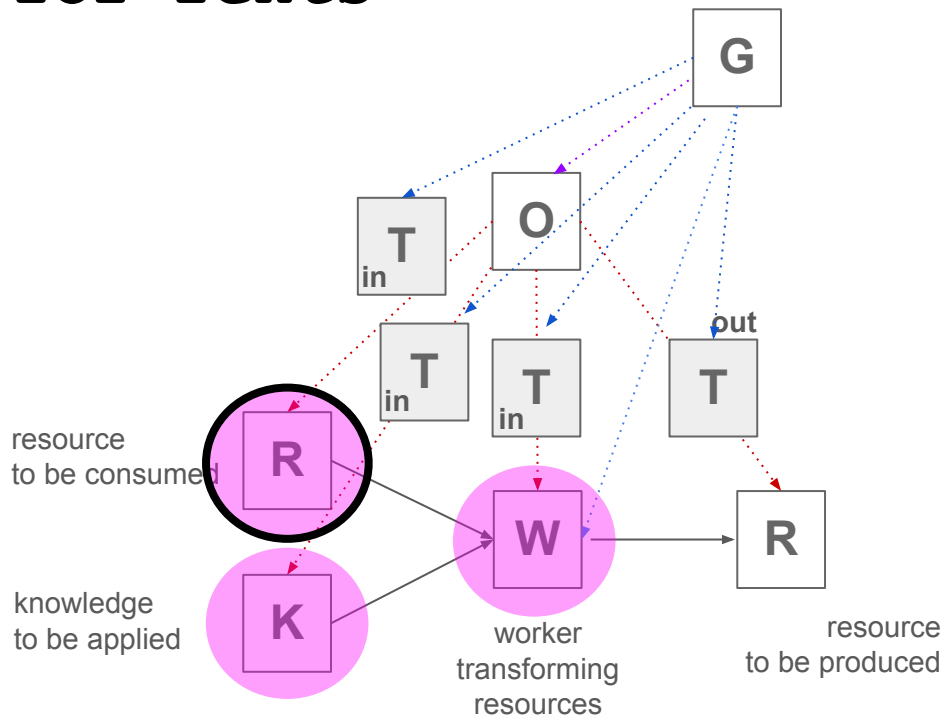
- I can claim compensation for use of an owned resource, and/or for benefits (possibly) resulting from use



Ownership as claim for rents

As “resource-lord”

- I can claim compensation for use of an owned resource, and/or for benefits (possibly) resulting from use



The impact level

beneficiaries – legitimate interests

matter of values

agents – horizon of expectations

matter of duties/claims/liberties

actors – operations

matter of powers and abilities

The impact level

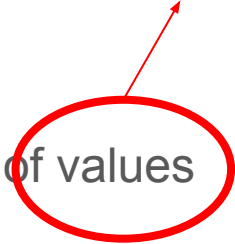
beneficiaries – legitimate interests

agents – horizon of expectations

actors – operations

but where values comes from?

matter of values



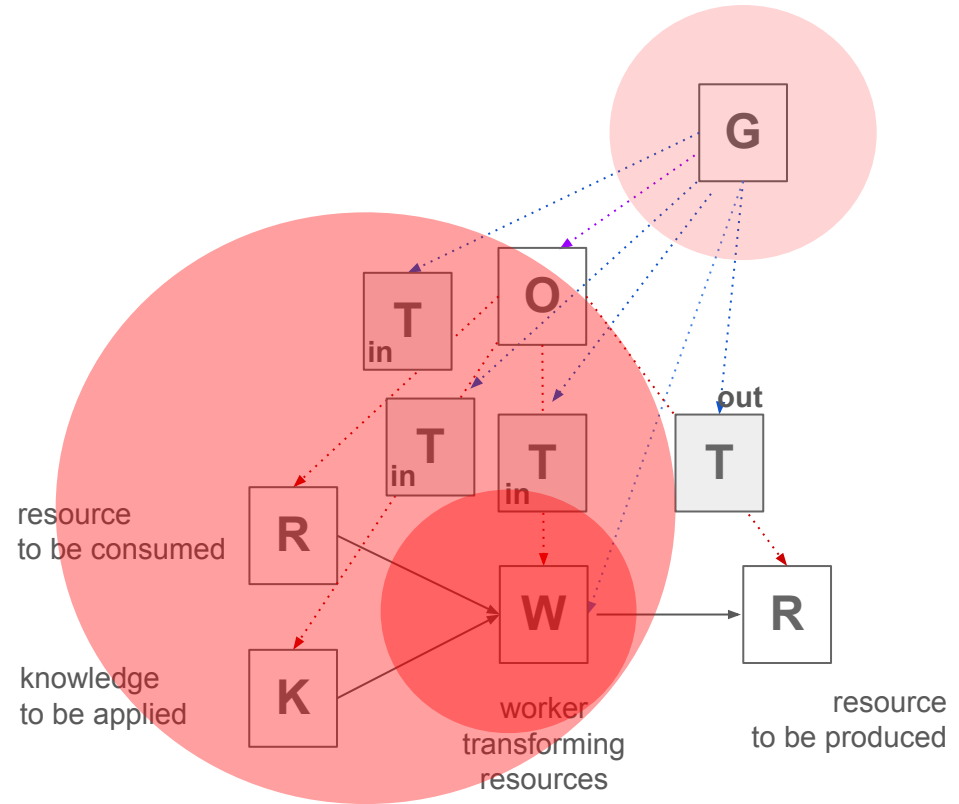
matter of duties/claims/liberties

matter of powers and abilities

Theories of Value?

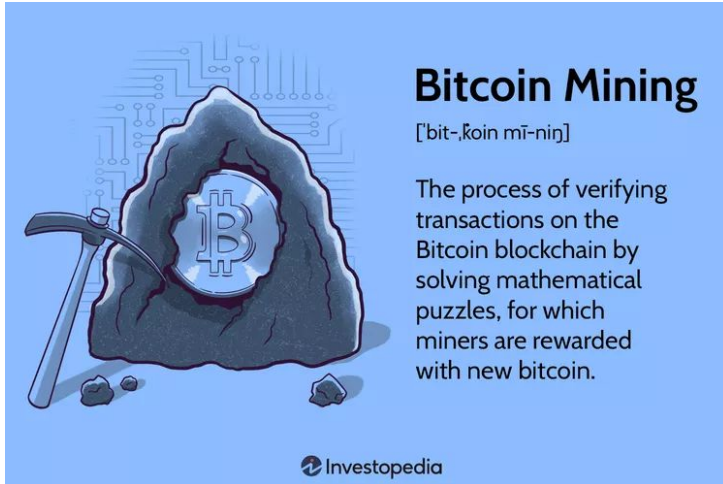


how much its production/maintenance costs

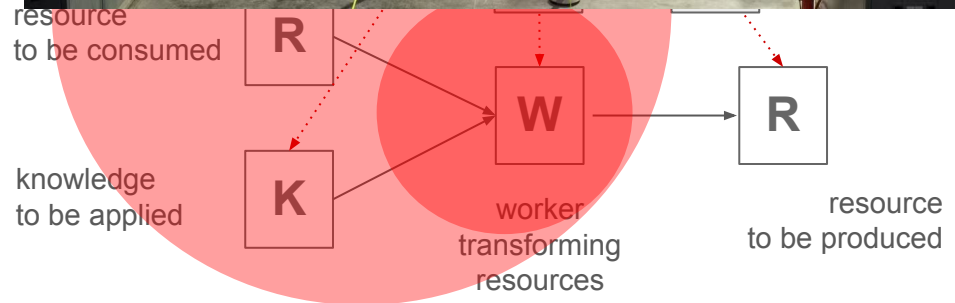
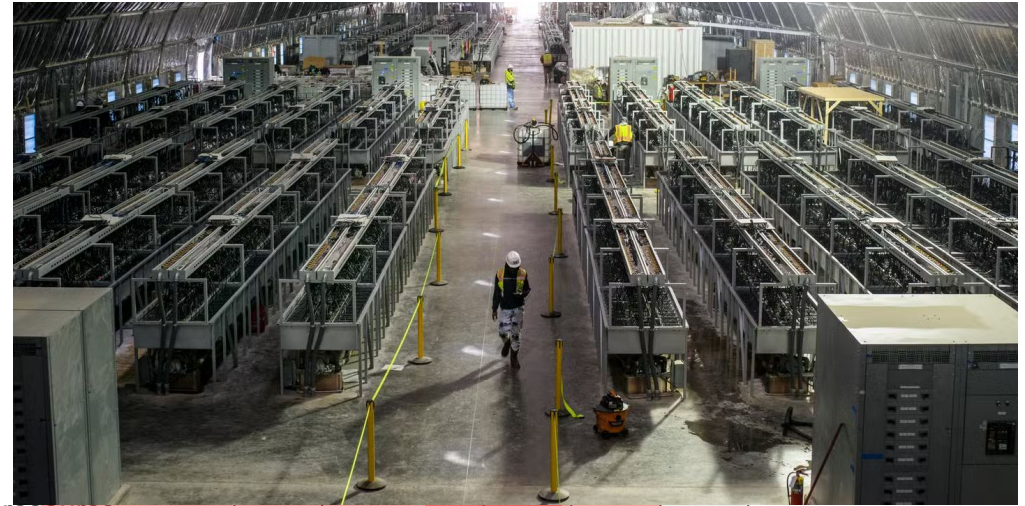


In Texas, the largest bitcoin factory in the US (2022)
consumes the equivalent of half a nuclear reactor

Theories of Value?



how much its production/maintenance costs
cf. cryptocurrencies

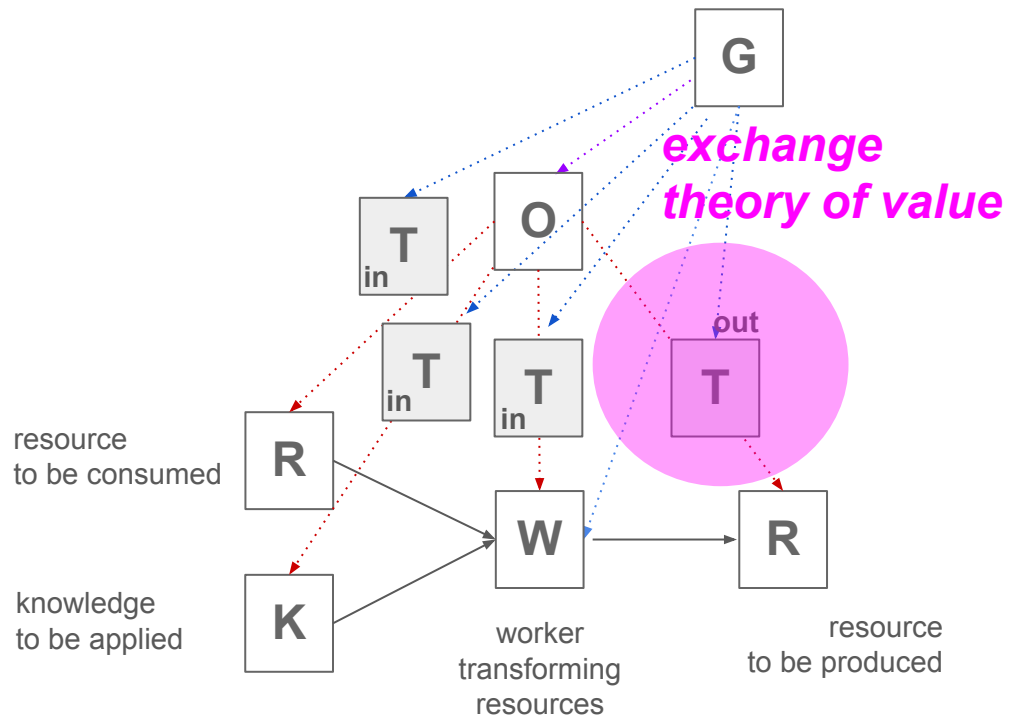


***labour
theory of value***

Theories of Value?

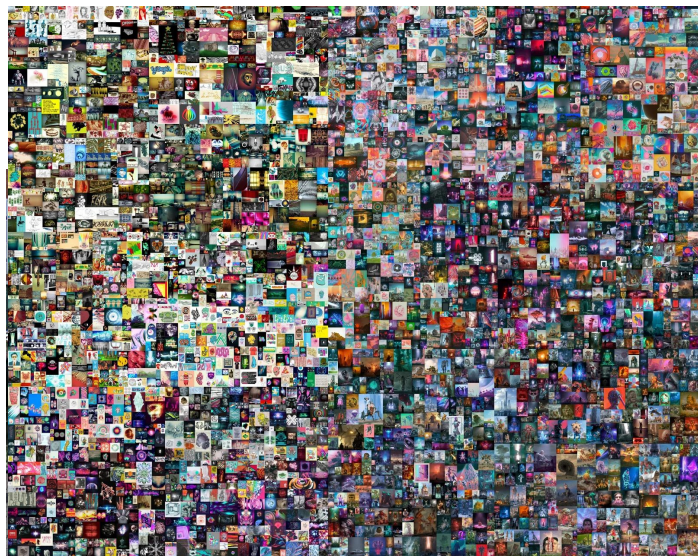


how much others pay for it

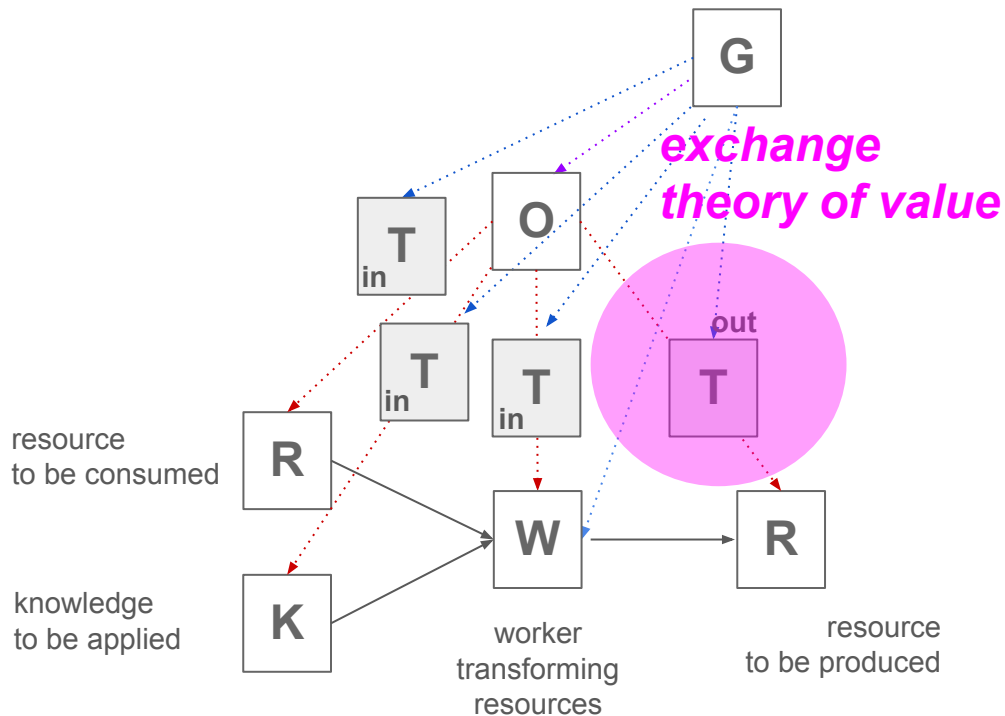


Theories of Value?

Beeple's Everydays: 5000 Firstdays. Sold for \$69M at Christie's



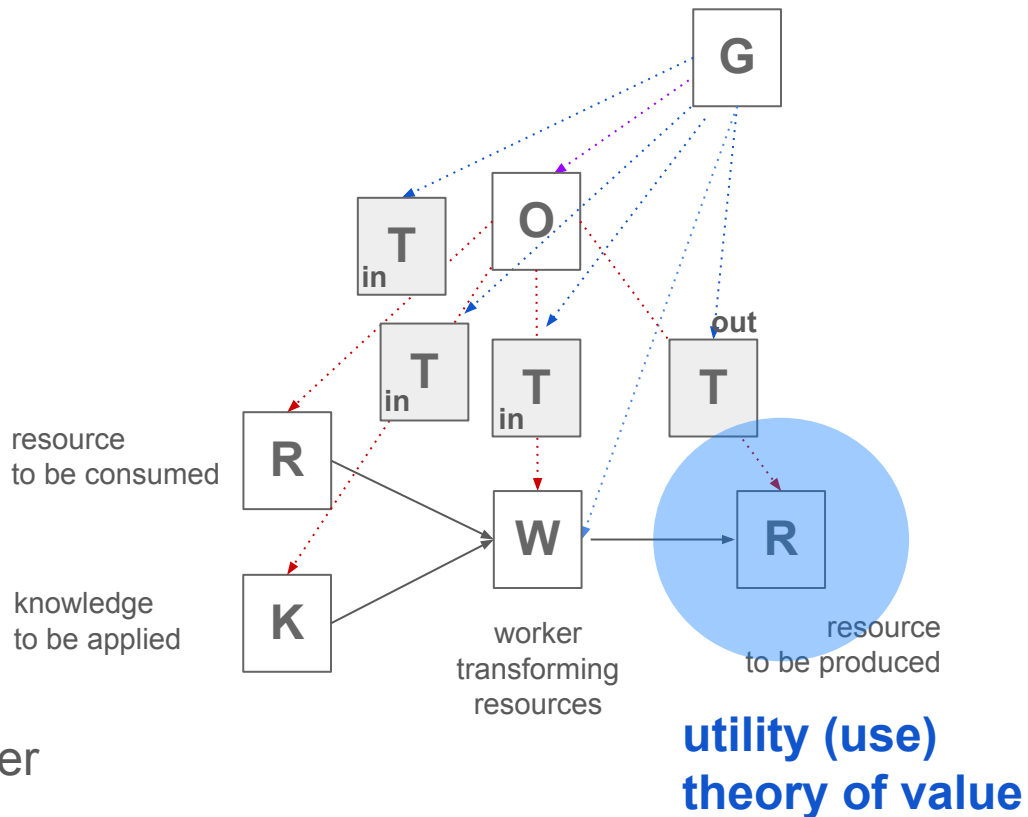
how much others pay for it
cf. **NFT (non-fungible tokens)**



Theories of Value?



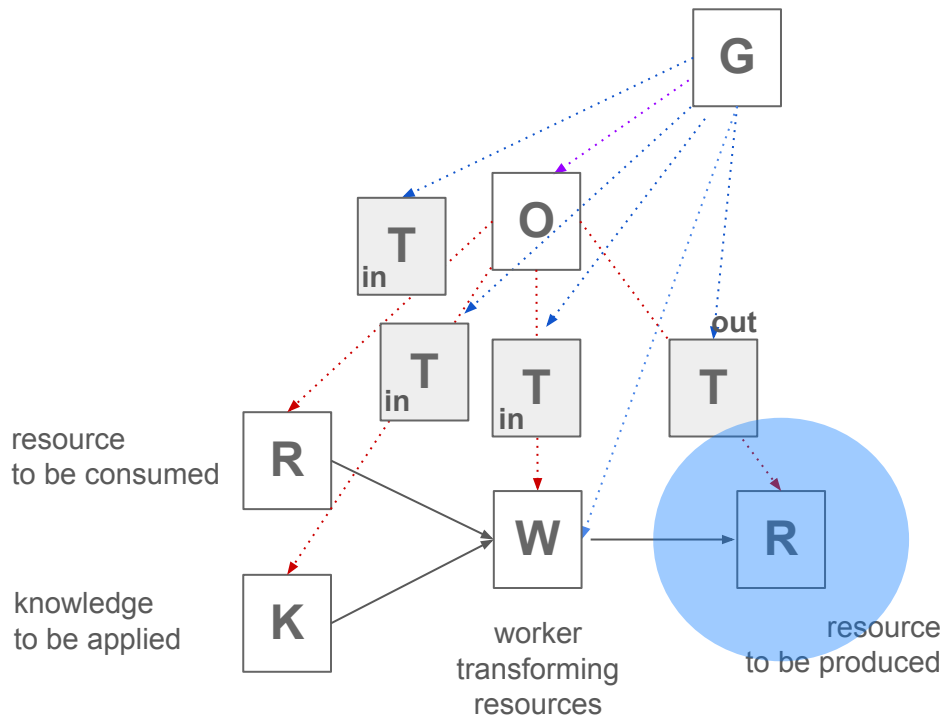
how much benefit it brings to the user



Theories of Value?



how much benefit it brings to the user
cf. **smart contracts? distributed ledger?**



utility (use)
theory of value

Theories of Value?



how much benefit it brings to the user
cf. **smart contracts? distributed ledger?**

*We cannot have an idea of the
utility of a certain tool if not by
**grounding our observations on
users' practical context!***

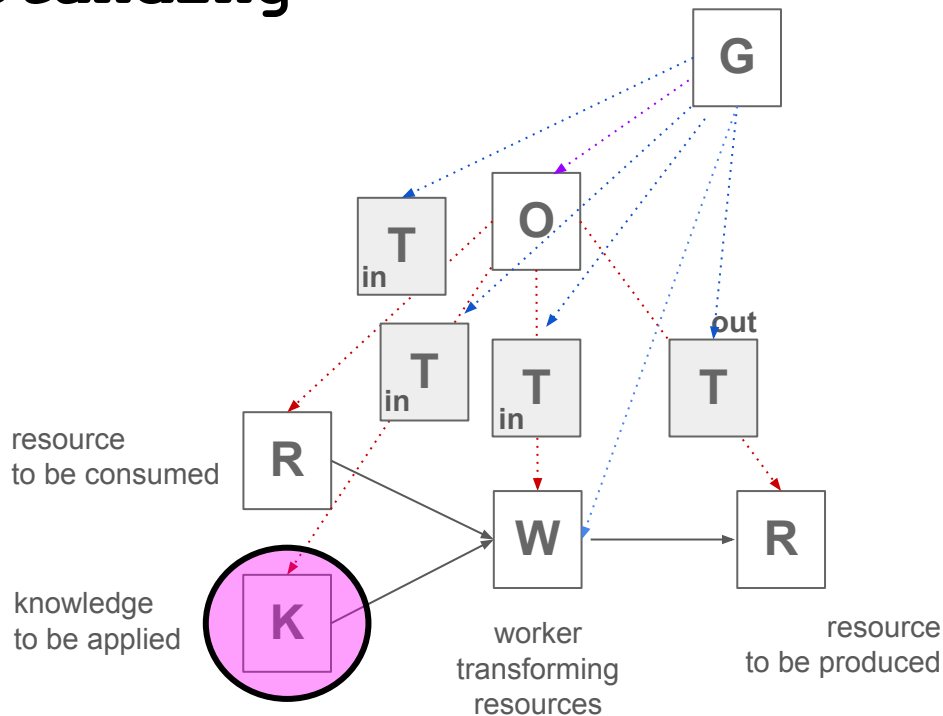


utility (use)
theory of value

Ownership as understanding

As interpreter

- I can (partially) understand the process of production...

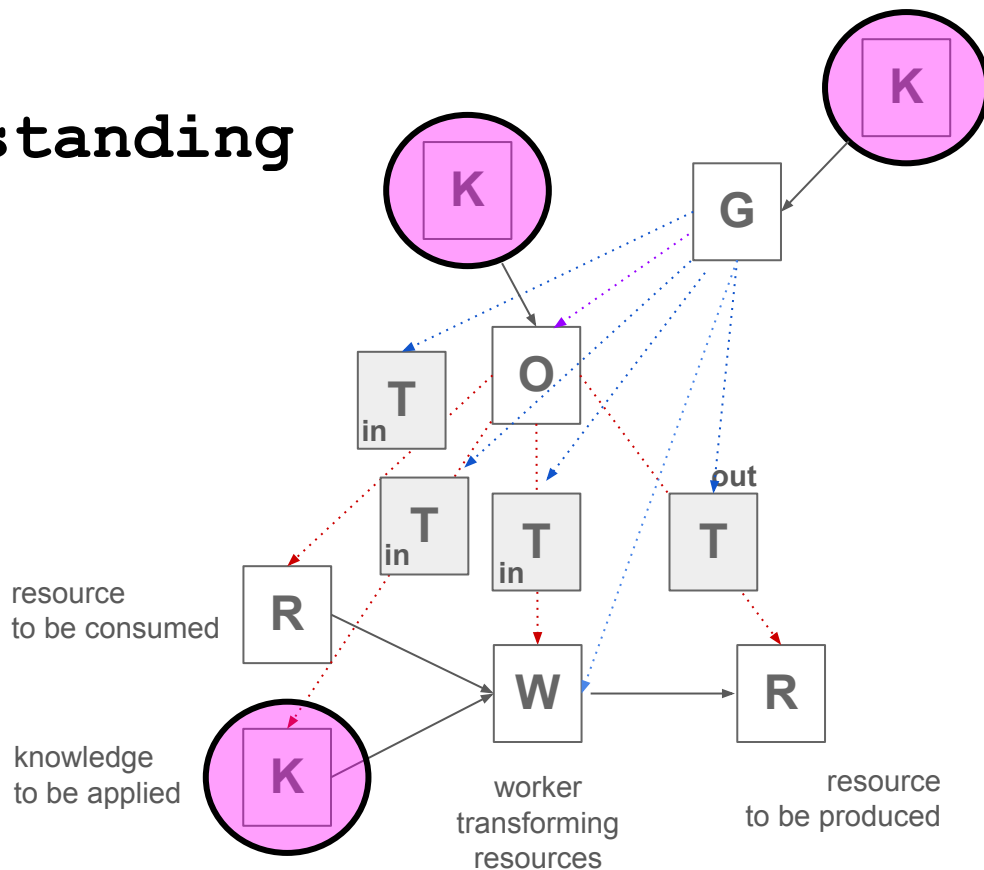


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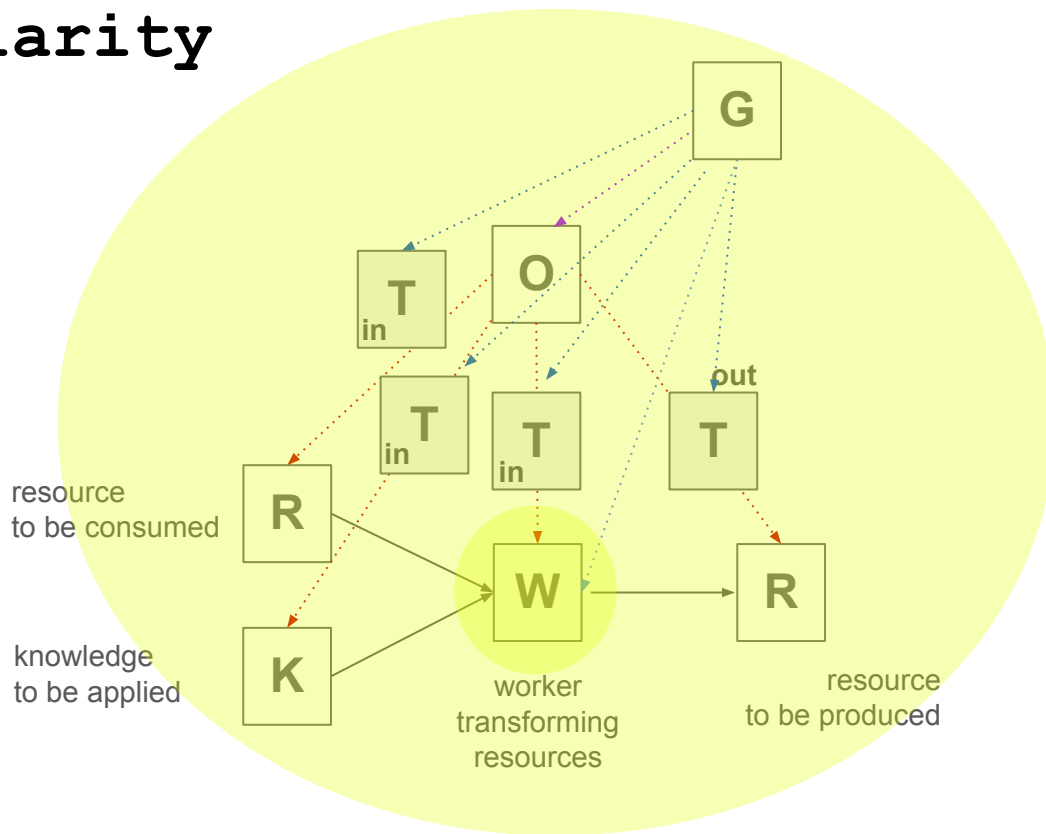
at the various levels...



Ownership as familiarity

As observer

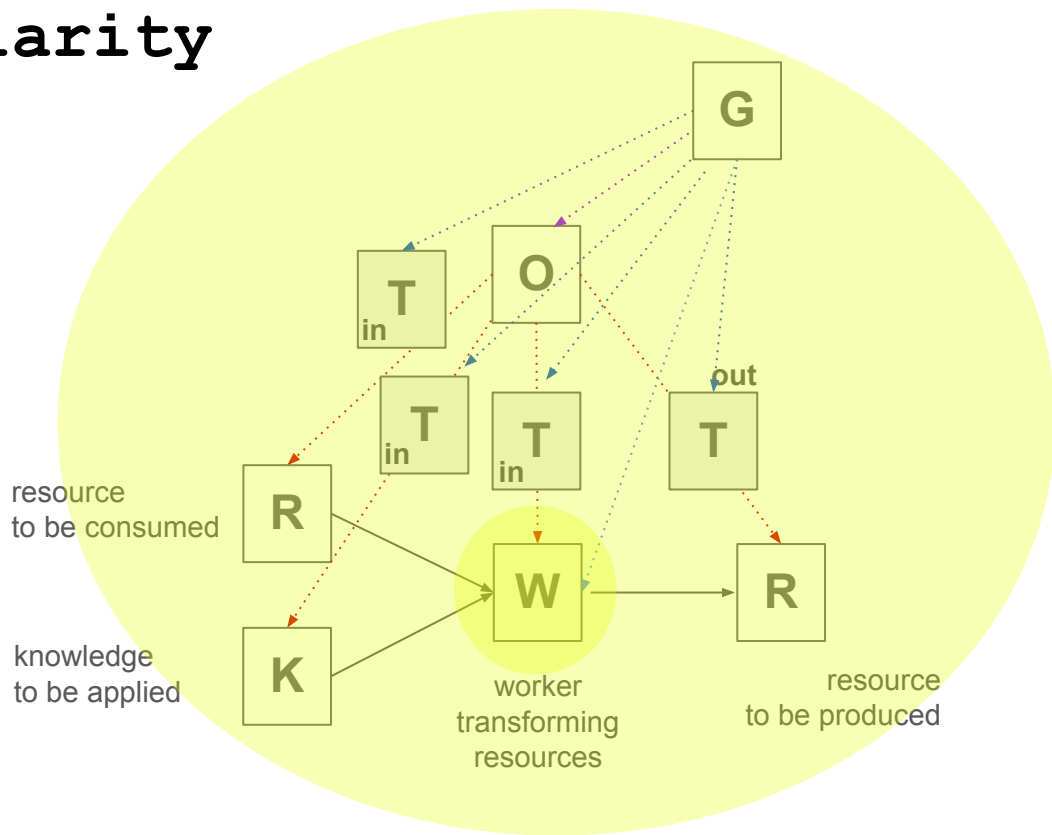
- I internalize common patterns in the process of production
- I can then discriminate uncommon/abnormal patterns



Ownership as familiarity

As observer

- I internalize common patterns in the process of production
- I can then discriminate uncommon/abnormal patterns

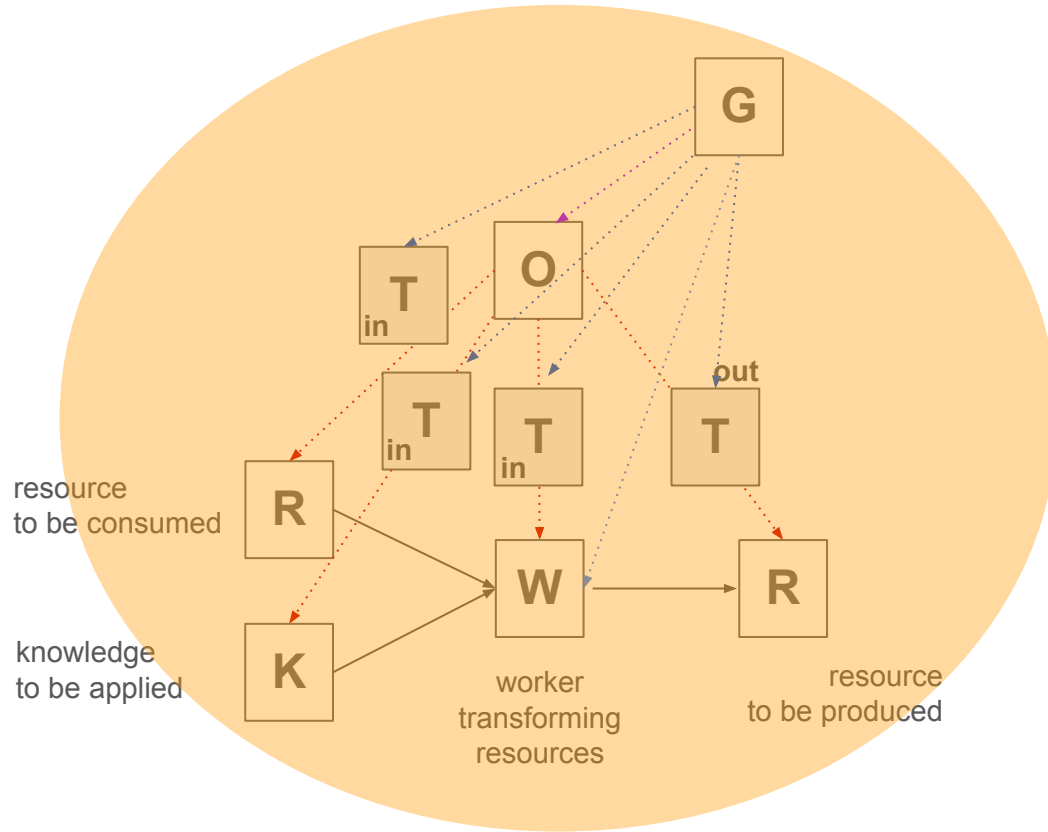


requires technological accessibility, and societal uptake

Ownership as trust

As trustor

- I trust a process of production if I expect that it will behave “properly”...

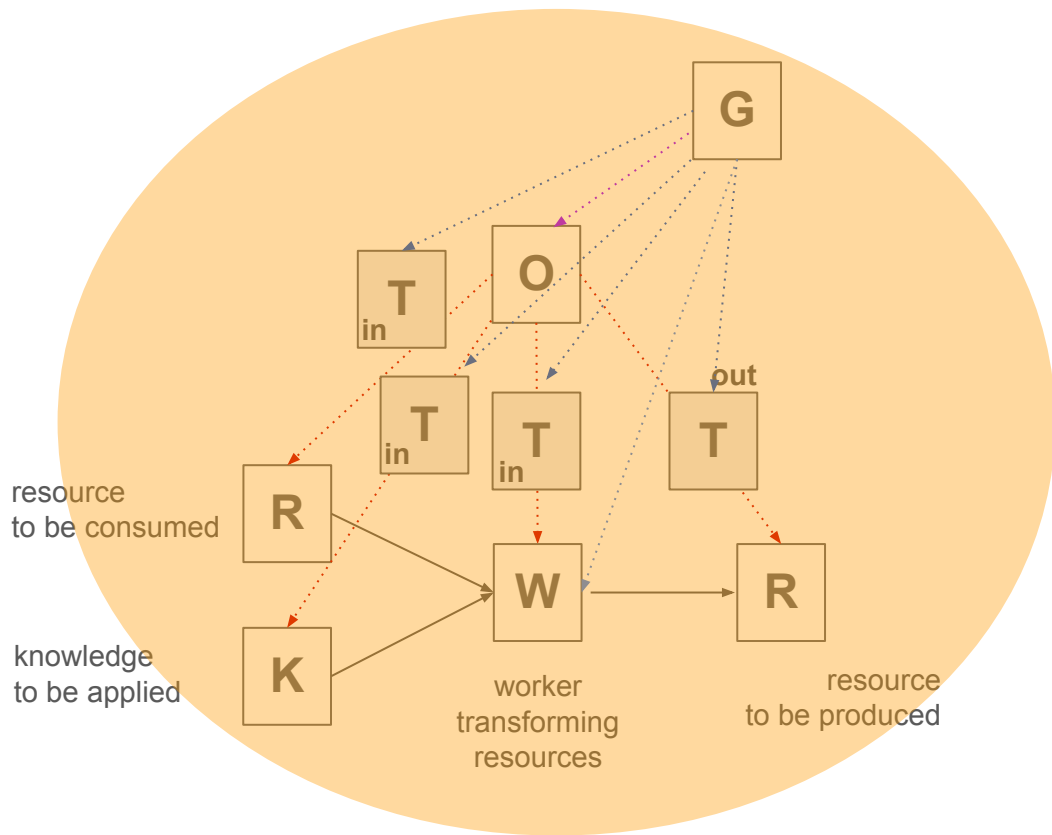


Ownership as trust

As trustor

- I trust a process of production if I expect that it will behave “properly”...

particularly when I need it most!



Trustworthy vs secure (trust-less?)

- Trust is about behaving properly...

I trust someone if I expect that they will behave properly

Trustworthy vs secure (trust-less?)

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when I need them most

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- Secure is something that cannot be attacked
(e.g., tampered with..)

Trustworthy vs secure (trust-less?)

- Trust is about behaving properly...

*when I need them most
I trust someone if I expect that they will behave properly*

**(unconquerable,
cf Nafplio, GR)**

- Secure is something that cannot be attacked
(e.g., tampered with..)



Trustworthy vs secure (trust-less?)

- Trust is about behaving properly...

*when I need them most
I trust someone if I expect that they will behave properly*

- Secure is something that cannot be attacked
(e.g., tampered with..)



***but such a strong asset
can go against us –
cf Valkenburg (NL)***



William of
Orange



Ownership as responsibility

- responsibility as having effects in the world
 - causal responsibility



Ownership as responsibility

- responsibility as having effects in the world
 - causal responsibility
- responsibility as who is the principal
 - regulator responsibility
 - designer responsibility
 - user & “citizen” responsibility



(Provocative) conclusions (1)

- The fundamental (non-financial) **value of a tool** eventually depends on its **material utility** within existing/emerging social practices. All other means are either speculations or distorted side-effects.



(Provocative) conclusions (1)

- The fundamental (non-financial) **value of a tool** eventually depends on its **material utility** within existing/emerging social practices. All other means are either speculations or distorted side-effects.
 - The value for people of any technological intervention will depend on the social practices that it will promote (and the ones that it will demote) to the people.



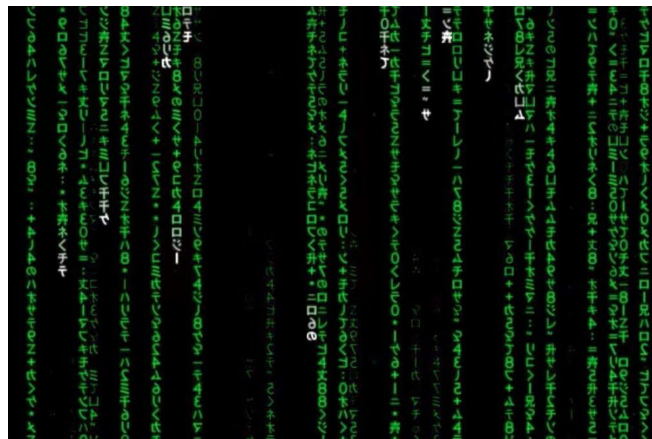
(Provocative) conclusions (2)

- Contemporary technologies (**AI, smart-contracts**) provide **very little understanding and accountability** (only text/action level, no horizon of expectations, no directly accessible higher-level governance mechanisms)



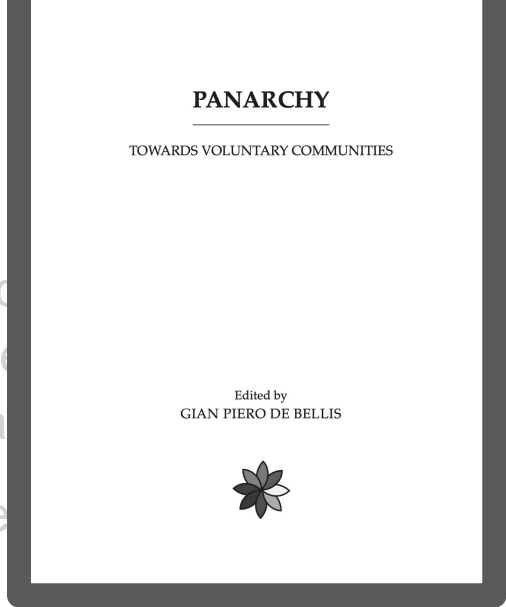
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(Provocative) conclusions (2)

- Contemporary technologies (**AI, smart-contracts**) provide **understanding and accountability** (only text/action level expectations, no directly accessible higher-level governance).
- **Strategic safety requires some hole in security.** Better failures than striving for global impossibility of failure.
- Truly decentralized governance requires to revisit decentralization as localization of autonomous operational and governance mechanisms. Is there a role for communities? **Does *panarchy* offer a better metaphor for the type of infrastructure we should work towards?**





The technical side of commons intelligence?

15 June 2026, de Nieuwe Meent, Amsterdam

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