



Appraisal Institute®

Professionals Providing Real Estate Solutions®

Impact and Opportunity of Technology-Based Valuation

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IVSC-WAVO Global Valuation Conference
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What Direction Will the Profession Follow?



Presentation Highlights

- Technology and valuation
- Digitization
- Data science in the real estate industry
- Defining elements of our current era
- A look ahead

Technology and Valuation

A Few Observations from “Shift Happens 2018”

- Internet devices in 2008 = 1,000,000,000
- Internet devices today = 30,000,000,000
- Data doubles every 2 years
- Half-life of engineering information = 4 years
- Education is obsolete the graduation day
- Machine learning: algorithms that learn from patterns in data
- Computers detect diseases more accurately than doctors

A Few Observations from “Shift Happens 2018”



- Agrarian economy
- Industrial economy
- Knowledge economy
- Creative economy

What is Left?

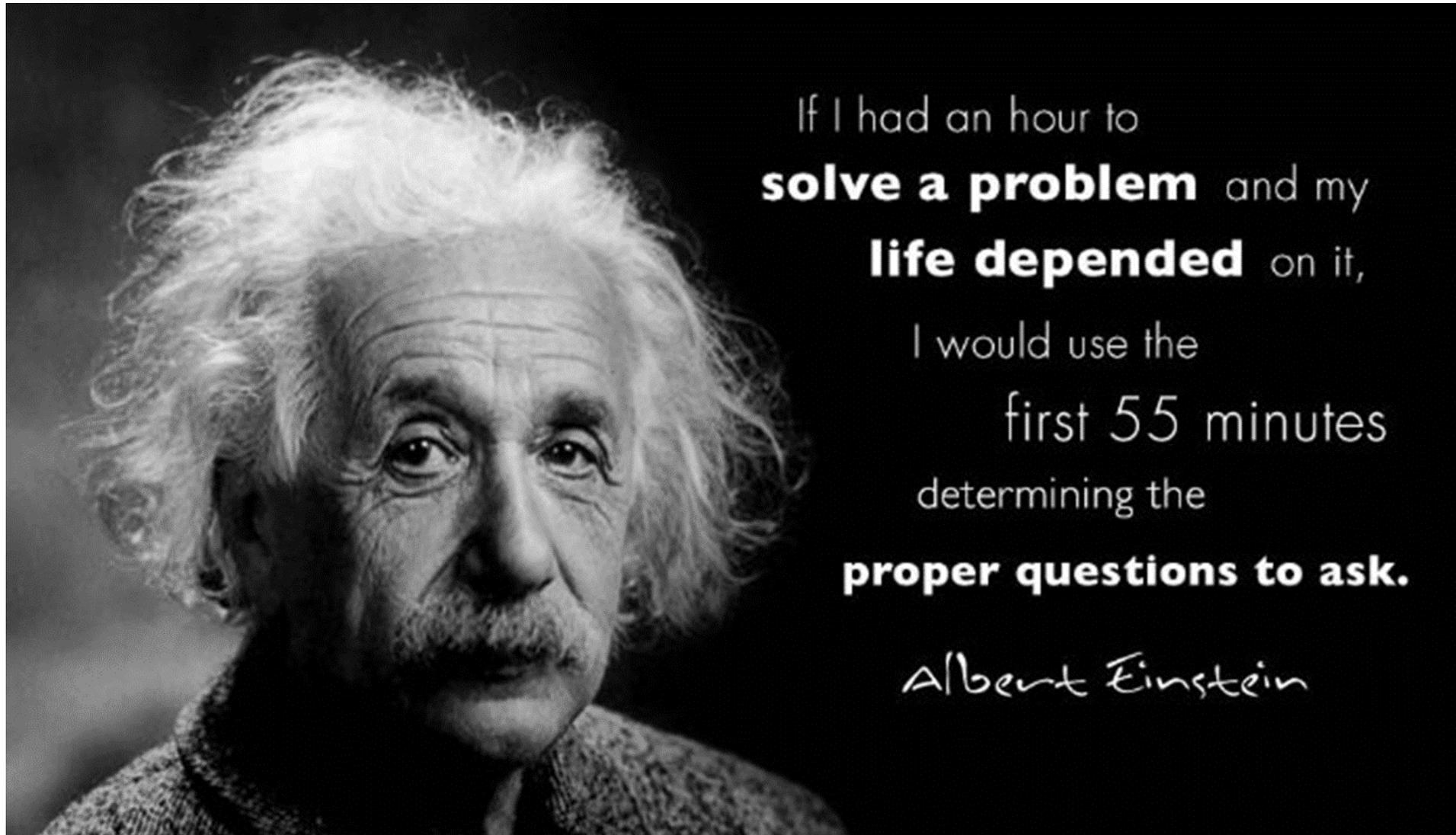
Over the next decade or so, technology will be able to:

- write reports or contracts
- analyze leases
- undertake valuations
- even trade assets

Evidence to the Contrary

- “So when you talk about it being disrupted, it is not in the sense of there being huge job losses. If you look at Airbnb, there is no evidence of thousands of job losses in the hotel sector. So in real estate, you are just talking about tools that allow people to make decisions more quickly and with more data.” -Dimitrios Pilitsis

Asking the Right Questions



Sorry, ~~home~~ appraisers, bots are coming for your jobs

Federal regulators are looking to change appraisal rules to allow for more automated appraisals

November 29, 2018 03:00PM



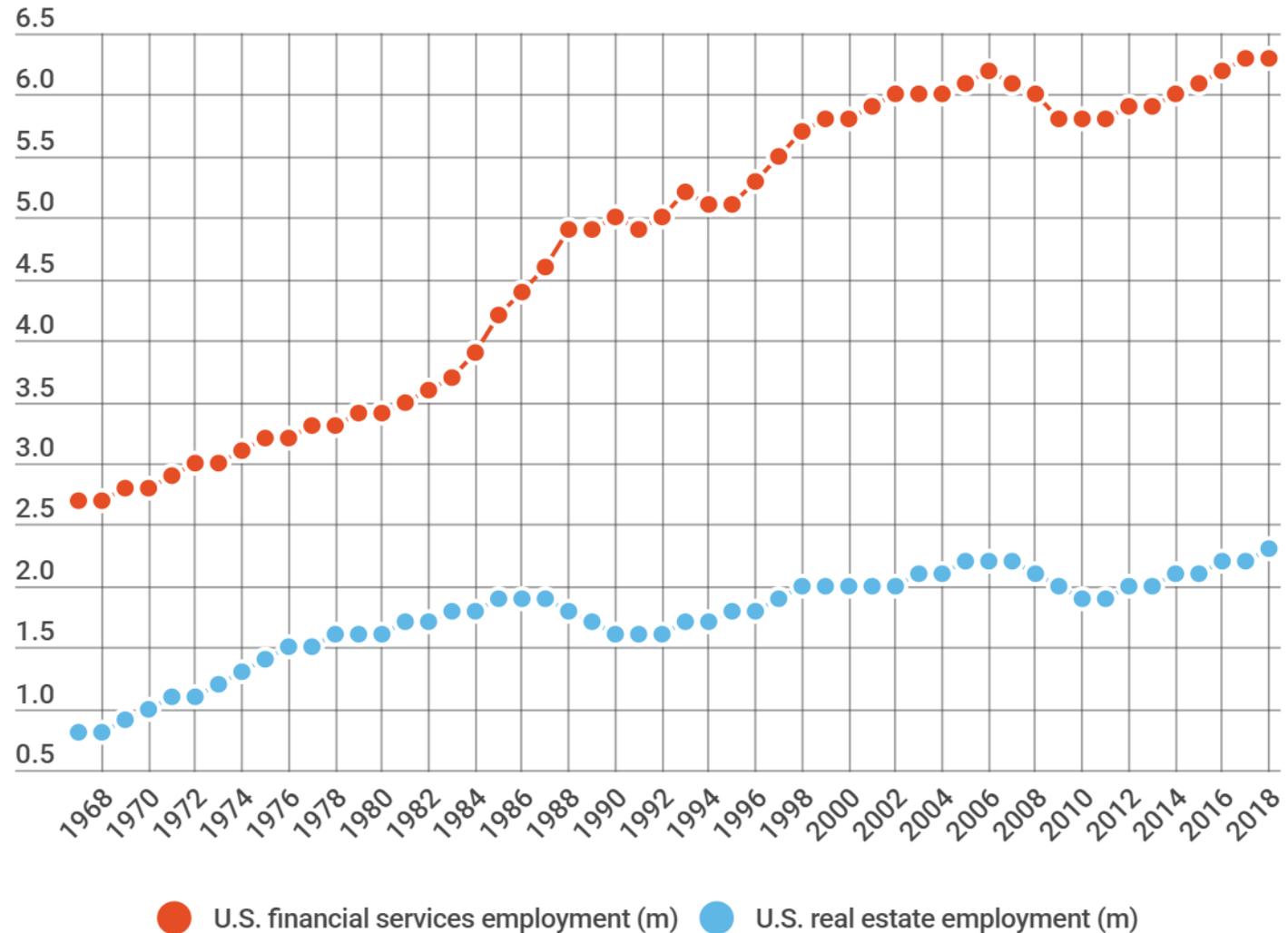
Is the Apocalypse Coming?



Lesson in History?

- Junior analysts spent weeks running numbers
- Huge rolls of paper and slide rules
- Computers do same thing quicker

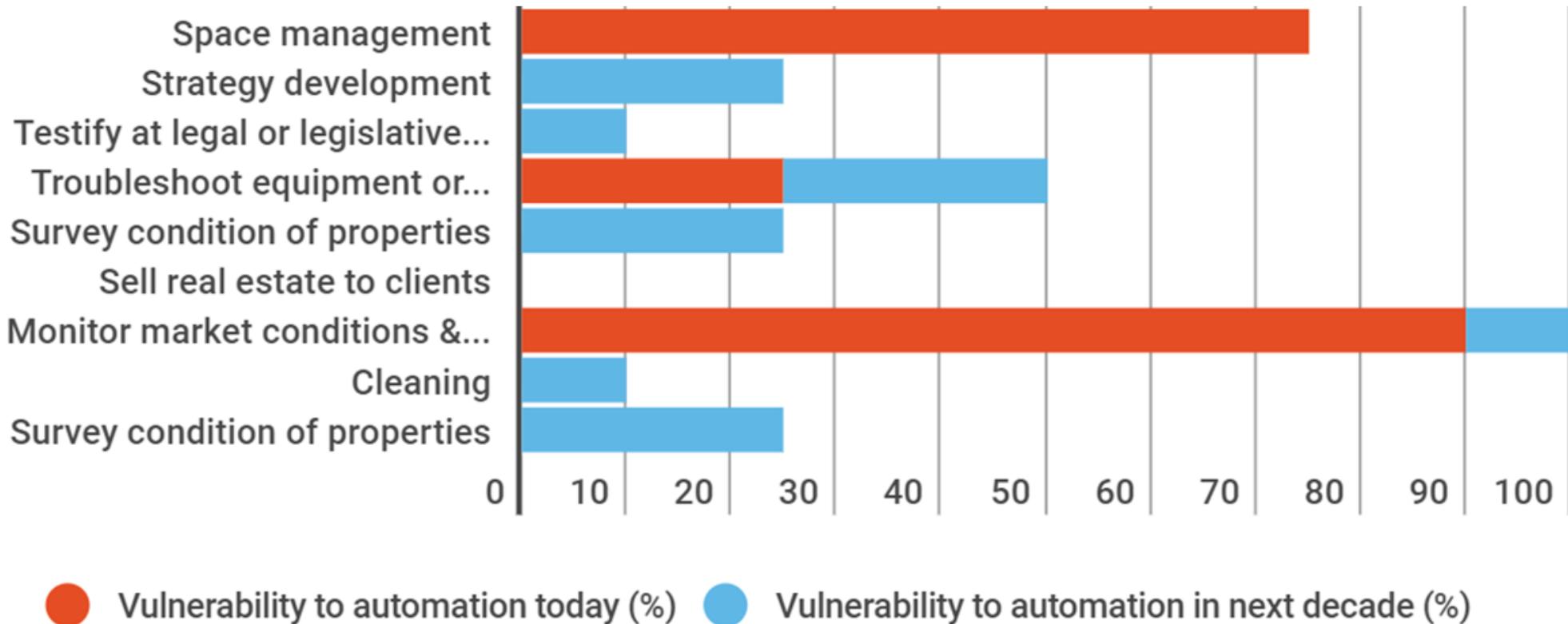
What Actually Happened?



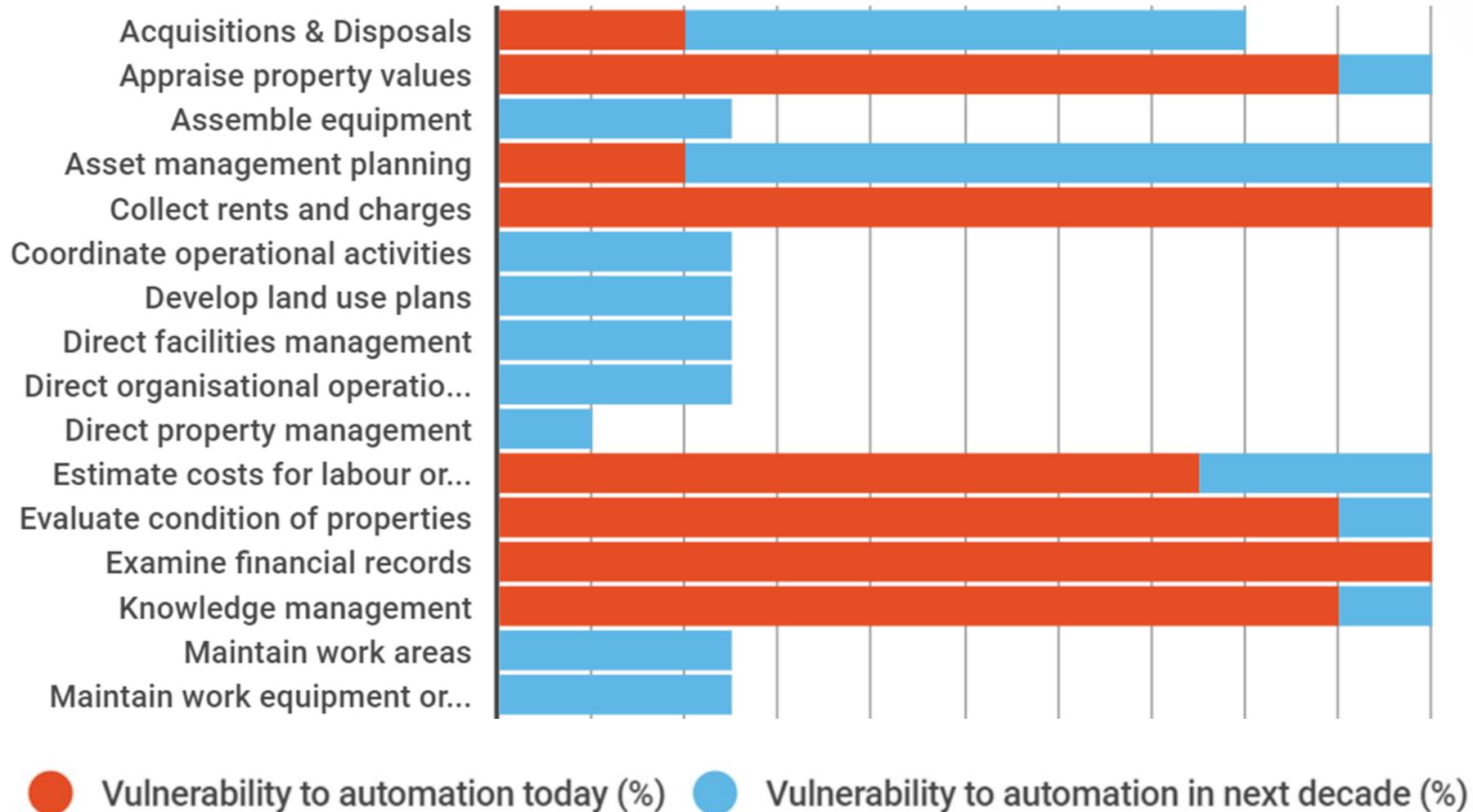
The Devil is in the Data



Susceptibility to Automation



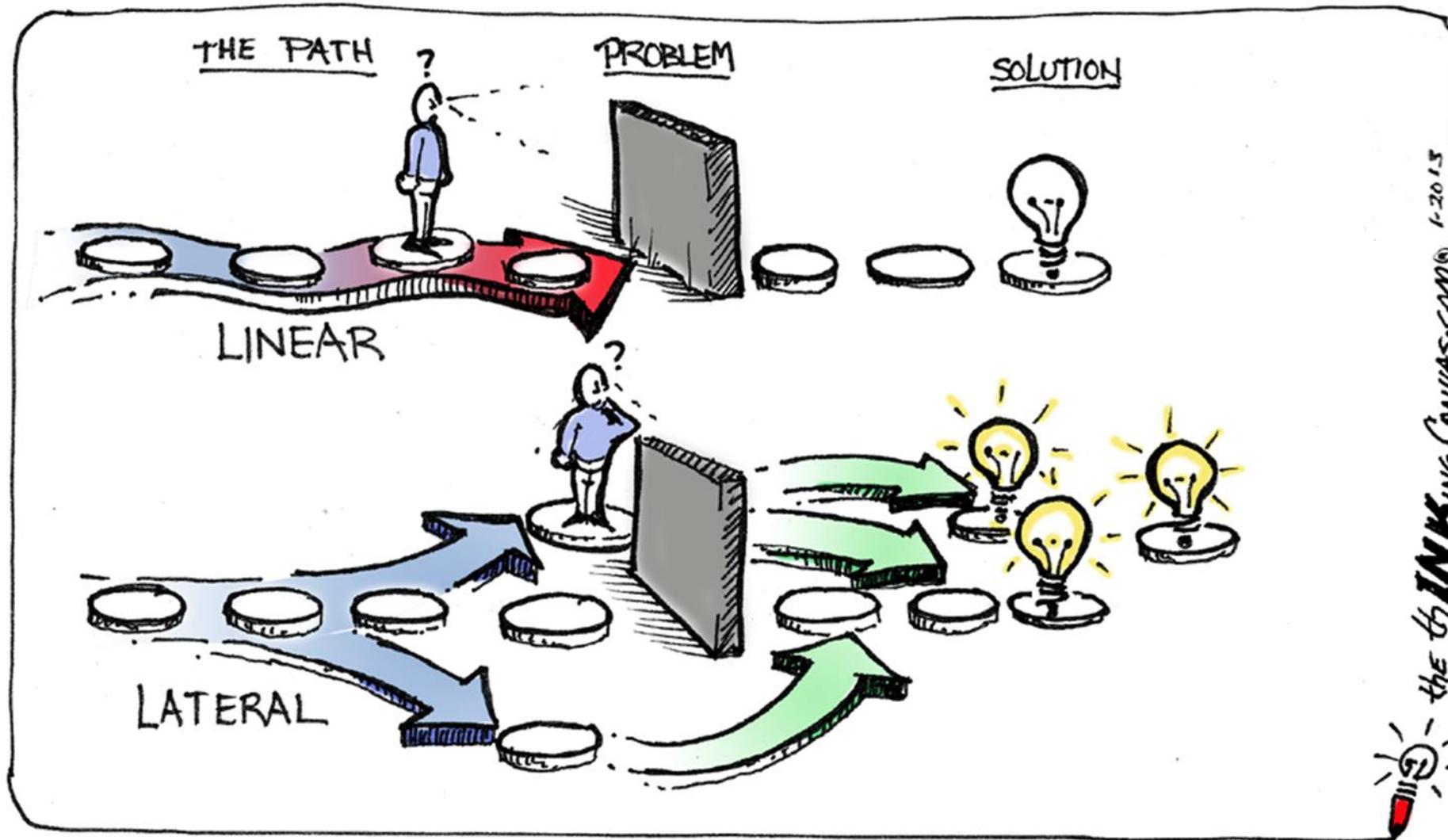
Susceptibility to Automation



Getting it Right Pays Big



Here's the Catch



Digitization

What is Digitization?

- Preparation of information for processing or storage
- Advantages of data in digital form:
 - Electronic data processing systems
 - Automatic reproduction of data
 - Long-term archiving

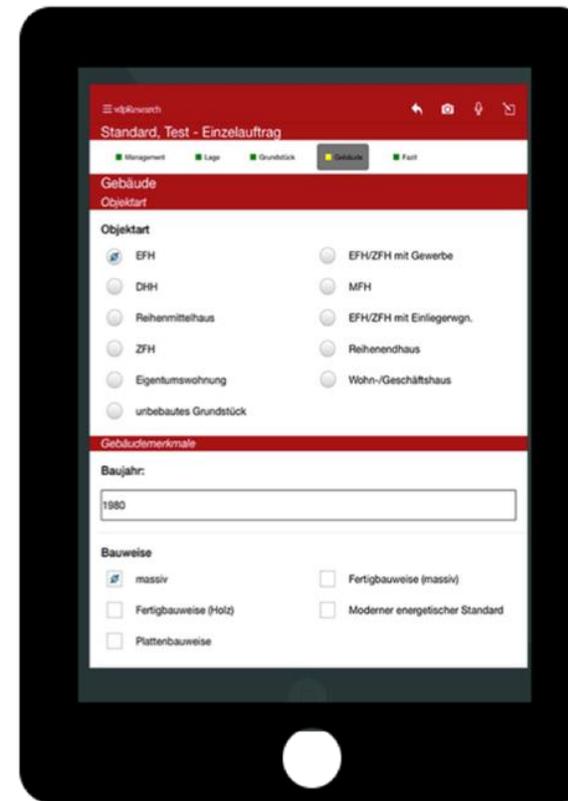
Digitization in Property Valuation

Valuation tools in 1930



Diagram 36—The Real Estate Appraiser's Kit.

Valuation tools in 2018



Source: McMichael (1931), McMichael's Appraisal Manual, p. 290

Digitization and Geoinformation Systems

1 The accelerating pace of change ...



2 ... and exponential growth in computing power ...

Computer technology, shown here climbing dramatically by powers of 10, is now progressing more each hour than it did in its entire first 90 years

3 ... will lead to the Singularity

COMPUTER RANKINGS

By calculations per second per \$1,000



Analytical engine
Never fully built, Charles Babbage's invention was designed to solve computational and logical problems



Colossus
The electronic computer, with 1,500 vacuum tubes, helped the British crack German codes during WW II



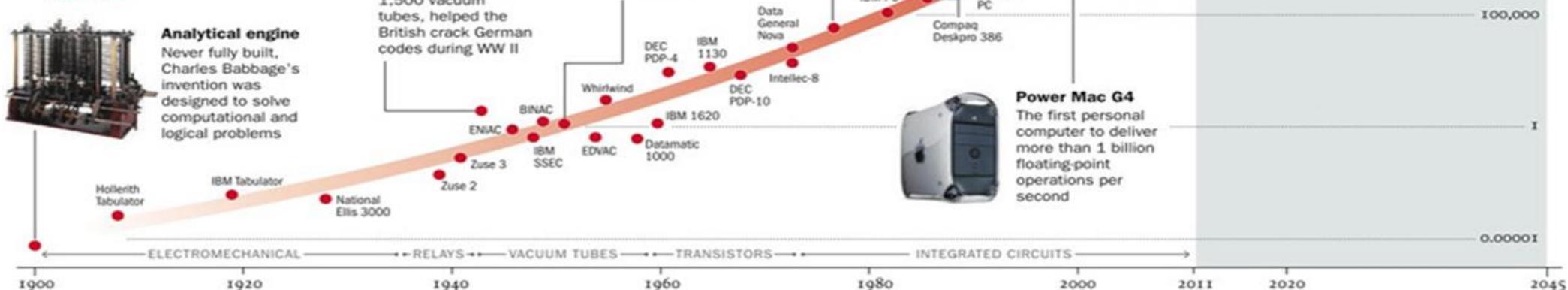
UNIVAC I
The first commercially marketed computer, used to tabulate the U.S. Census, occupied 943 cu. ft.



Apple II
At a price of \$1,298, the compact machine was one of the first massively popular personal computers

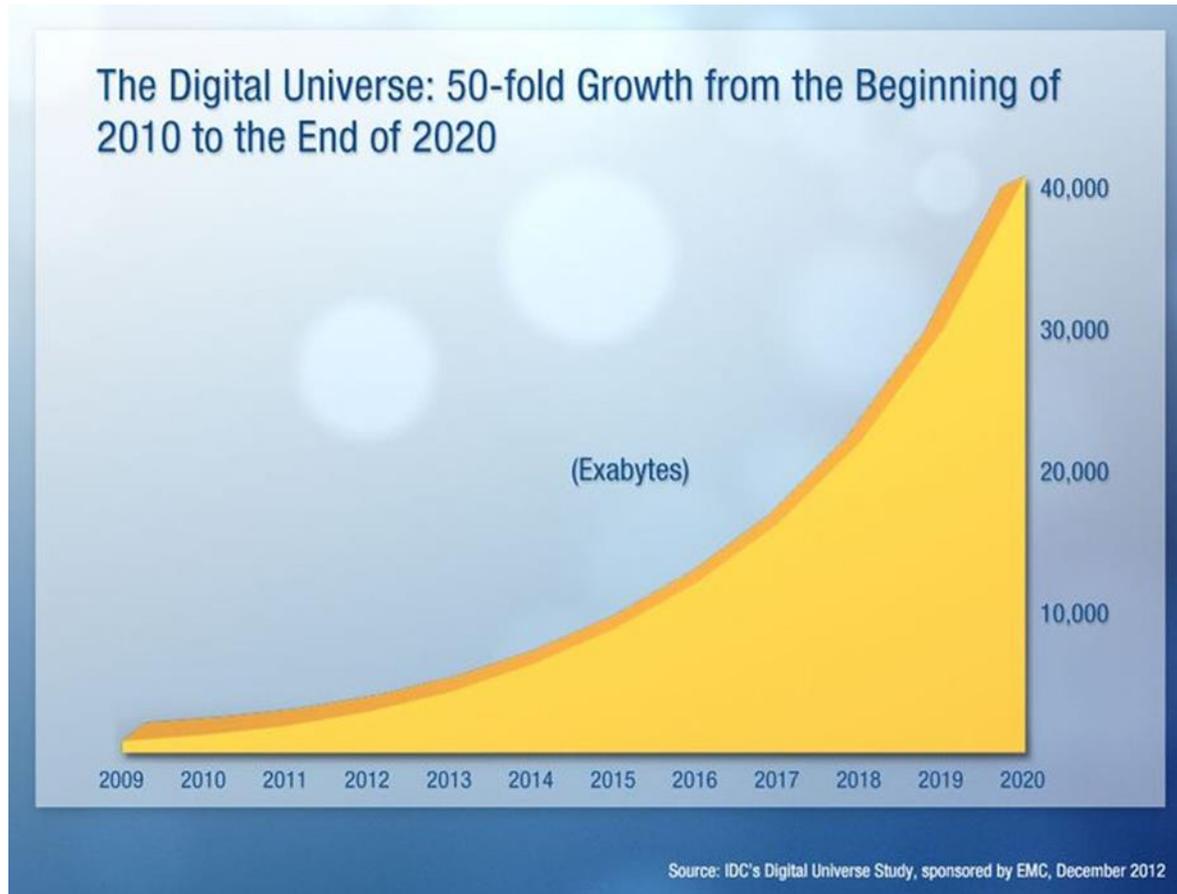


Power Mac G4
The first personal computer to deliver more than 1 billion floating-point operations per second



Source: Time Magazine, <http://content.time.com/time/interactive/0,31813,2048601,00.html>, retrieved 19.02.2018

Digitization and Geoinformation Systems



Source: IDC, Digital Universe Study, retrieved 19.2.2018

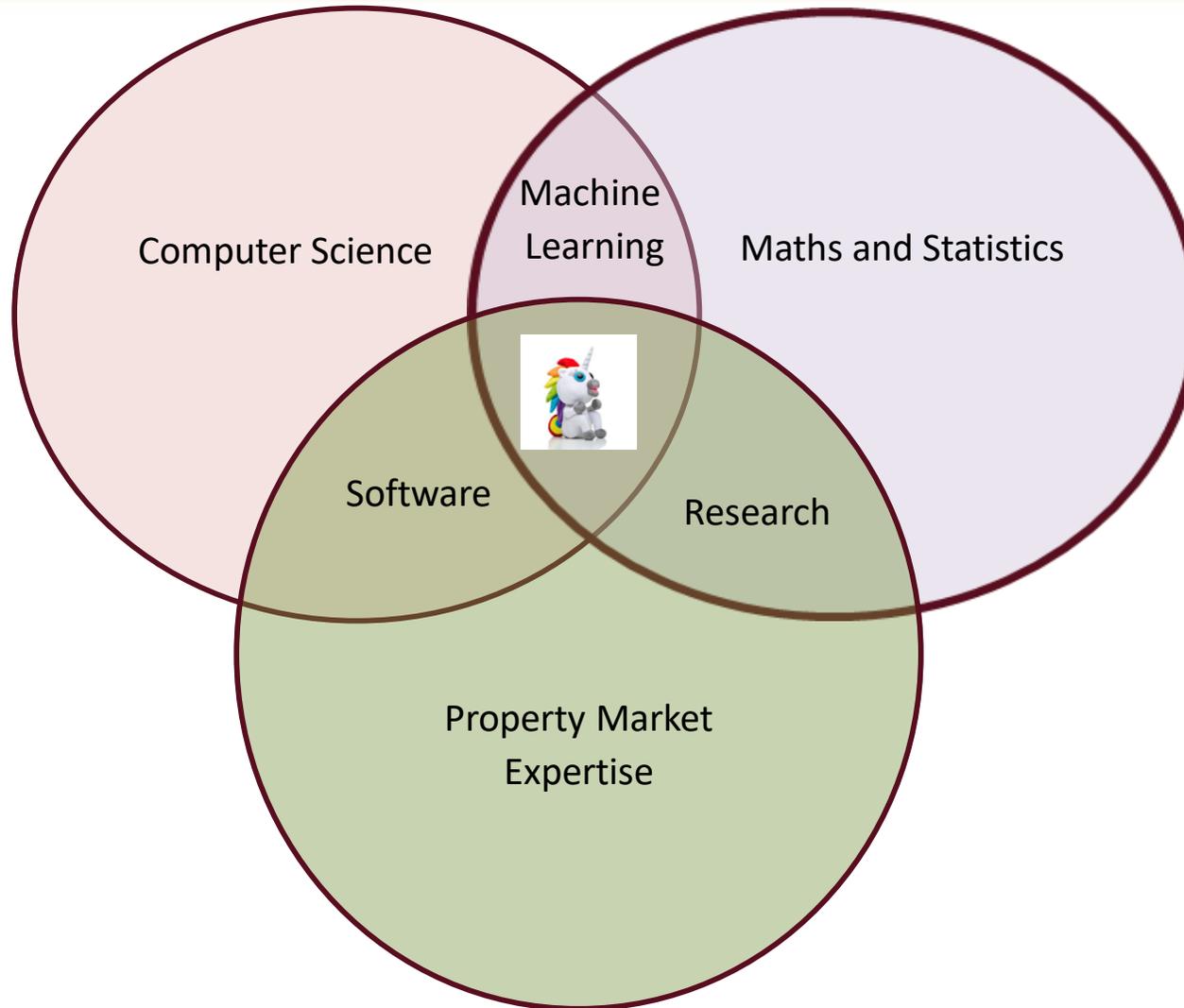


- As at 2015: a total of about 15 exabytes stored

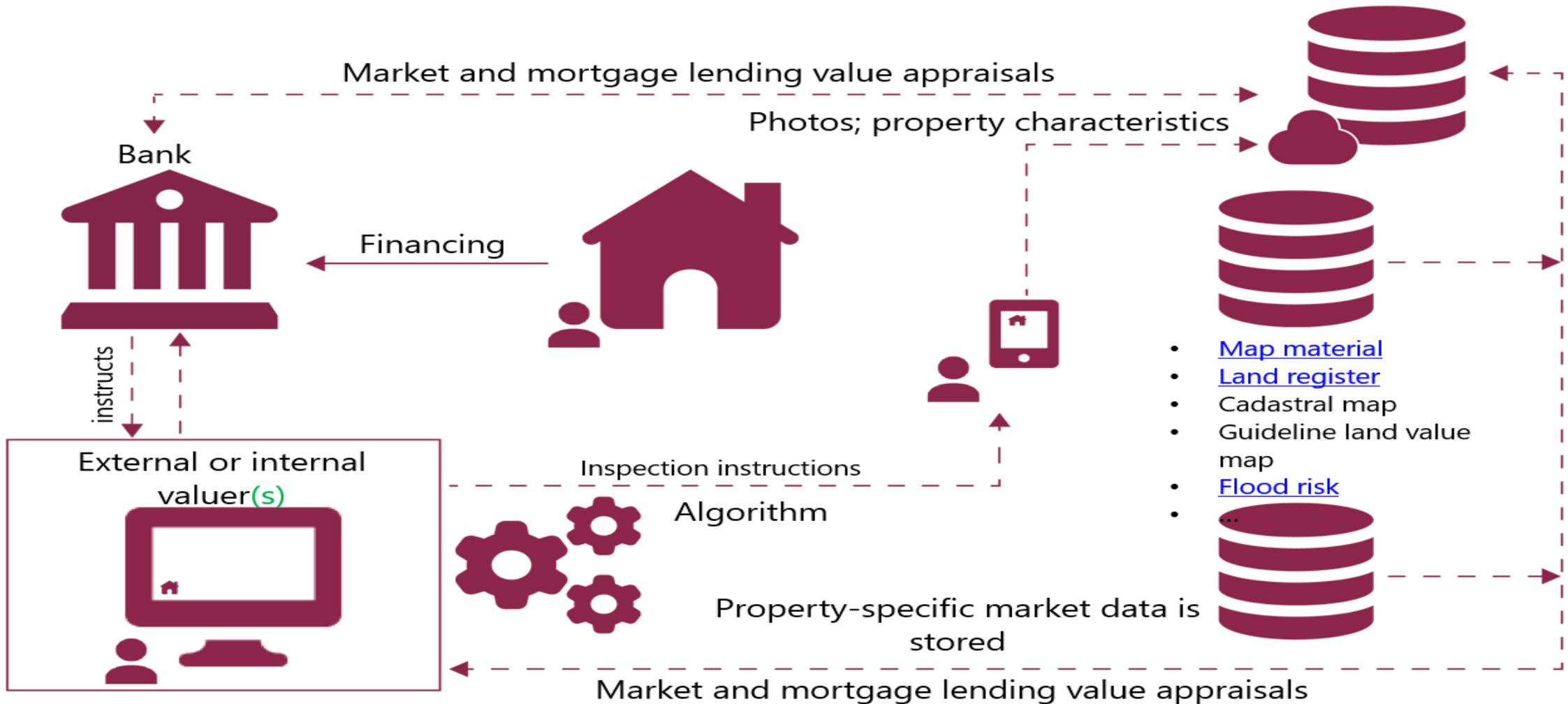
Source: <https://what-if.xkcd.com/63/>

Data Science in the Real Estate Industry

Data Science in the Real Estate Industry



What Data is Available in Digital Form?



Standard Valuation – Income Approach

- Assessment of location
- Guideline land value
- Construction costs operating costs
- Rents / prices
- Remaining useful life / total useful life
- Property yields / capitalization rates
- DRC factors
- Regional factors
- Future price trends

Defining Elements of Our Current Era

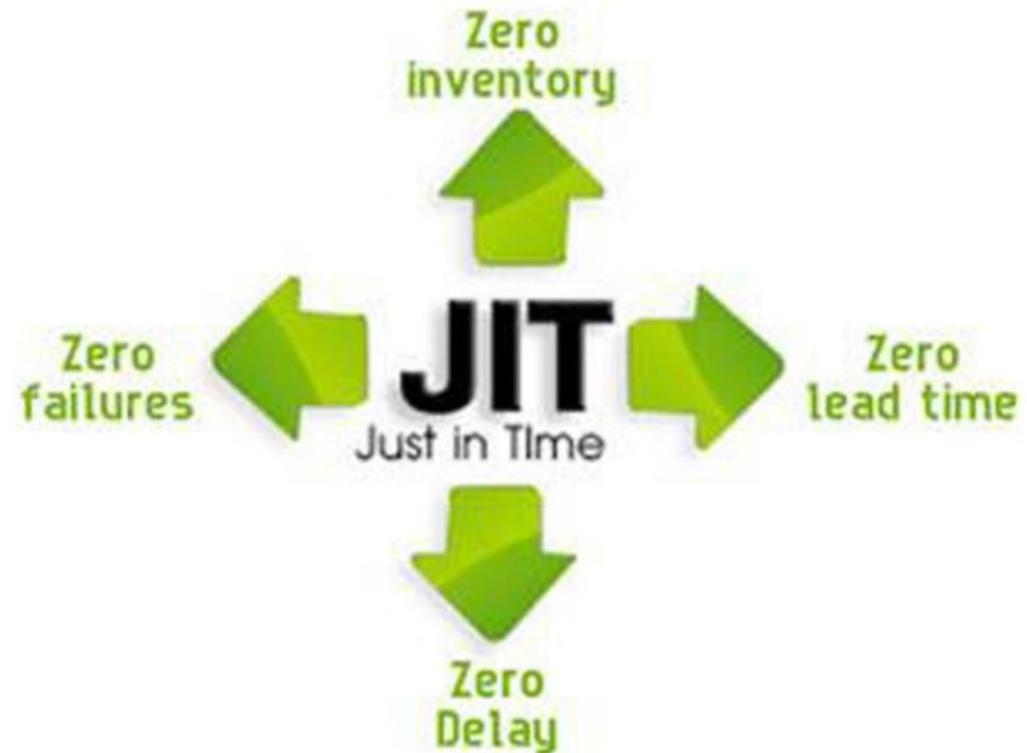
Importance of Efficiency

- Efficiency at all cost



Importance of Efficiency

- Efficiency at all cost
- Just in time



Importance of Efficiency

- Efficiency at all cost
- Just in time
- Internet of things



A Look Ahead

The Future is Data-Stream Technology

Forms are nearly obsolete.

The new process:

- The analyst takes data, shapes and analyzes it into useful information, then forwards the modified data stream to the *user* dashboard.

Each participant works with a different dashboard:

- The asset analyst's interface dashboard
- The user (collateral/investor) dashboard
- Regulator and portfolio manager dashboards

A Look Ahead

- History of Appraisal Thinking

Data *rummage* era (1930's – 1980's)

Availability

- *Comps* = whatever can be found

Market *analysis* era (1980's - paper data sources)

Convenience

- *Comps* = similar sales = describes the market

Data *discarding* era (1990's - electronic sources)

Avoidance

- *Comps* = delete the least similar sales

Data *optimization* era – our now paradigm

Optimizing

- *Market segment* = analytical data set

Use *all* the competitive sales

The world has changed . . .

. . . we have not

“You can’t get objective output...

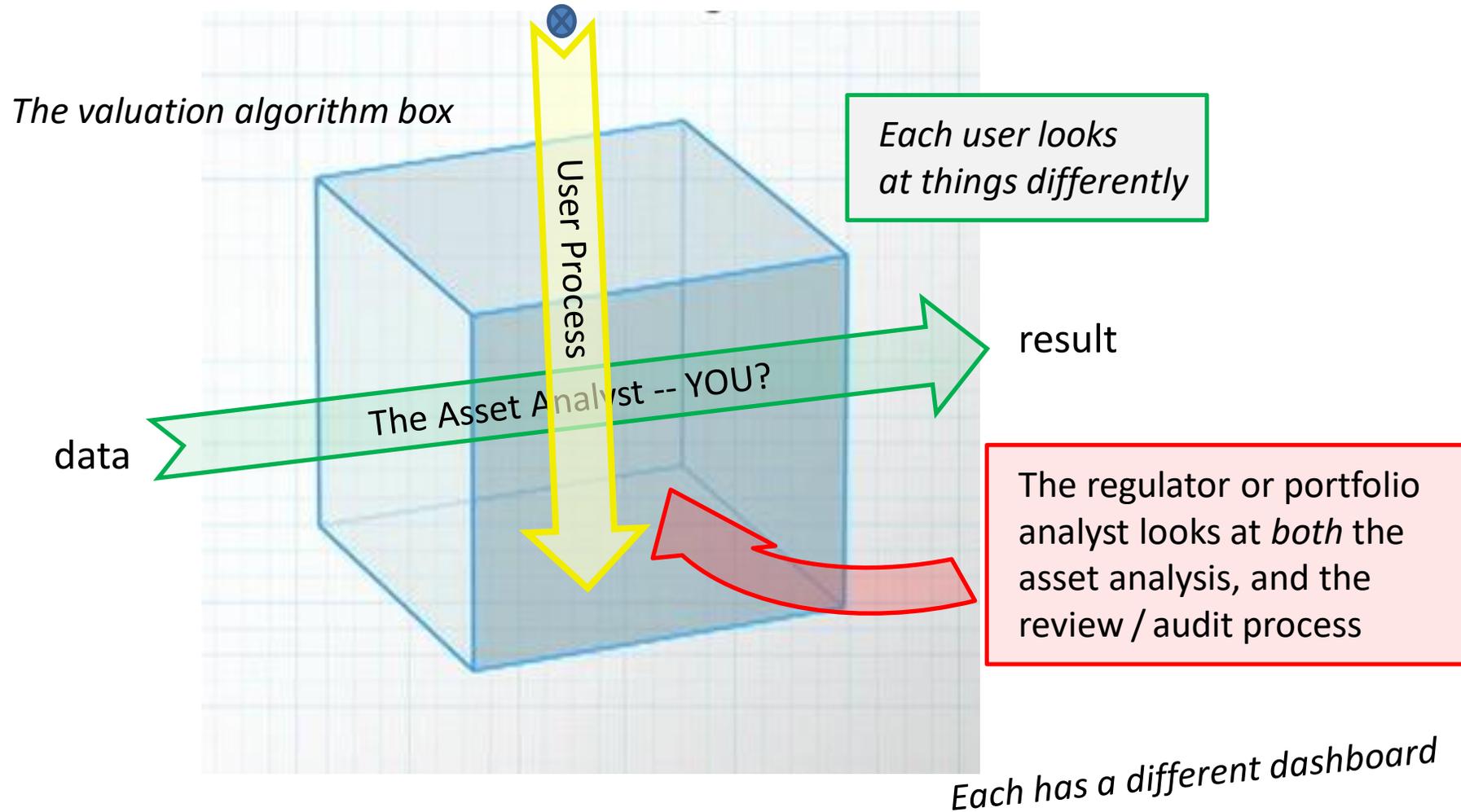
... from subjective input”

“Trust me ...”

George Dell Axiom #1—the impossibility theorem

A Look Ahead

Analyst -> Client -> Regulator or Portfolio manager



A Look Ahead



As a “Springboard” for the Future of Valuation,
Technology and Data will bring the “Art” back into the valuation
professional’s focus.

A Look Ahead





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