



Fitting Square Pegs Into Square Holes: Data Analytics Trends in Reserves Evaluation

SPEE Latin America, May 2023

PEGS, HOLES, MISMATCHES and MATCHES



OUTLINE

- Some frameworks for how to think about this stuff
- How have Data Analytics and Reserves/Evaluation interacted historically?
- The market today – Software Survey results and current trends
- What's exciting going forward? What are the barriers?

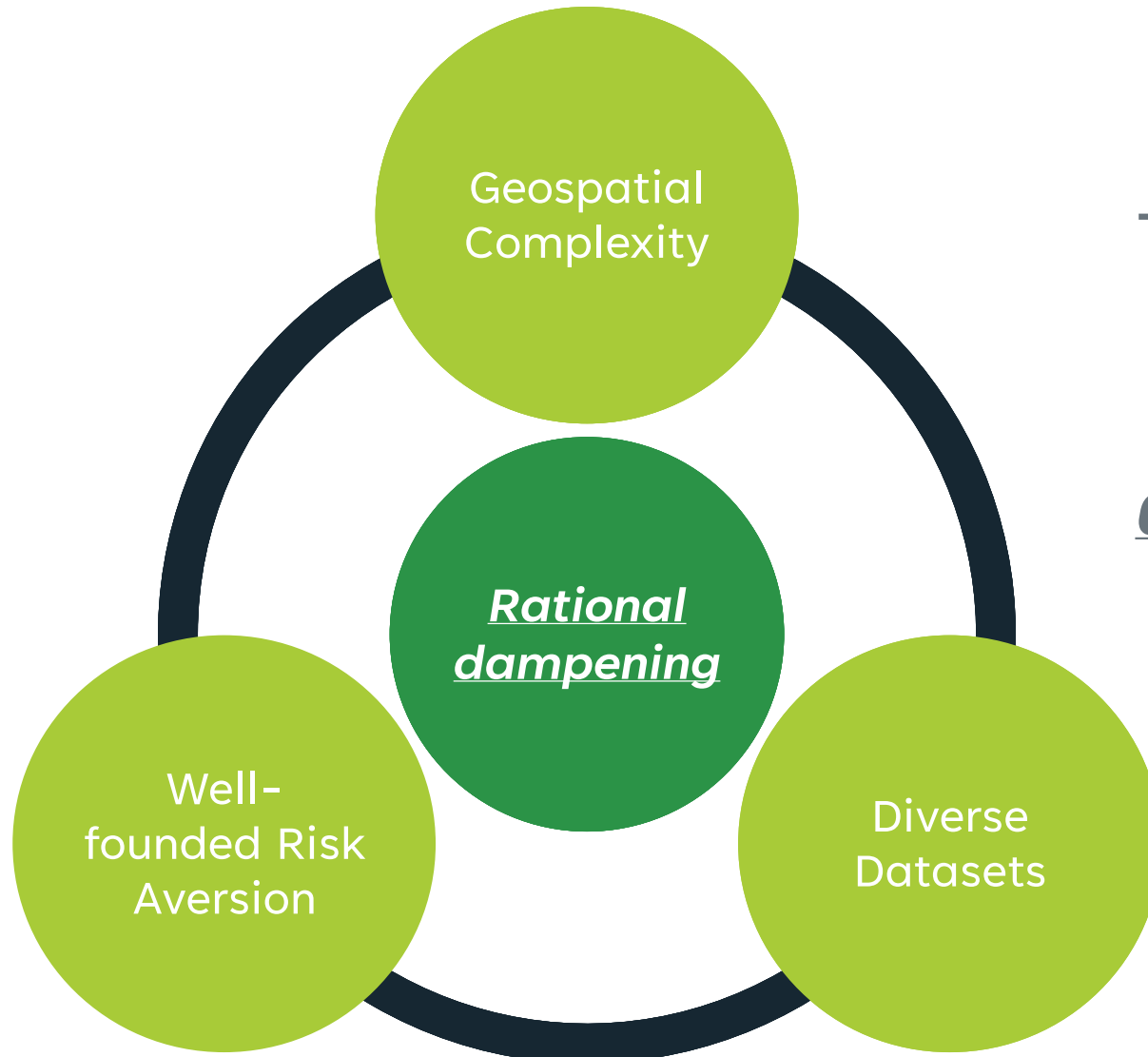
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Frameworks

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O&G DATA IS **DIFFERENT**

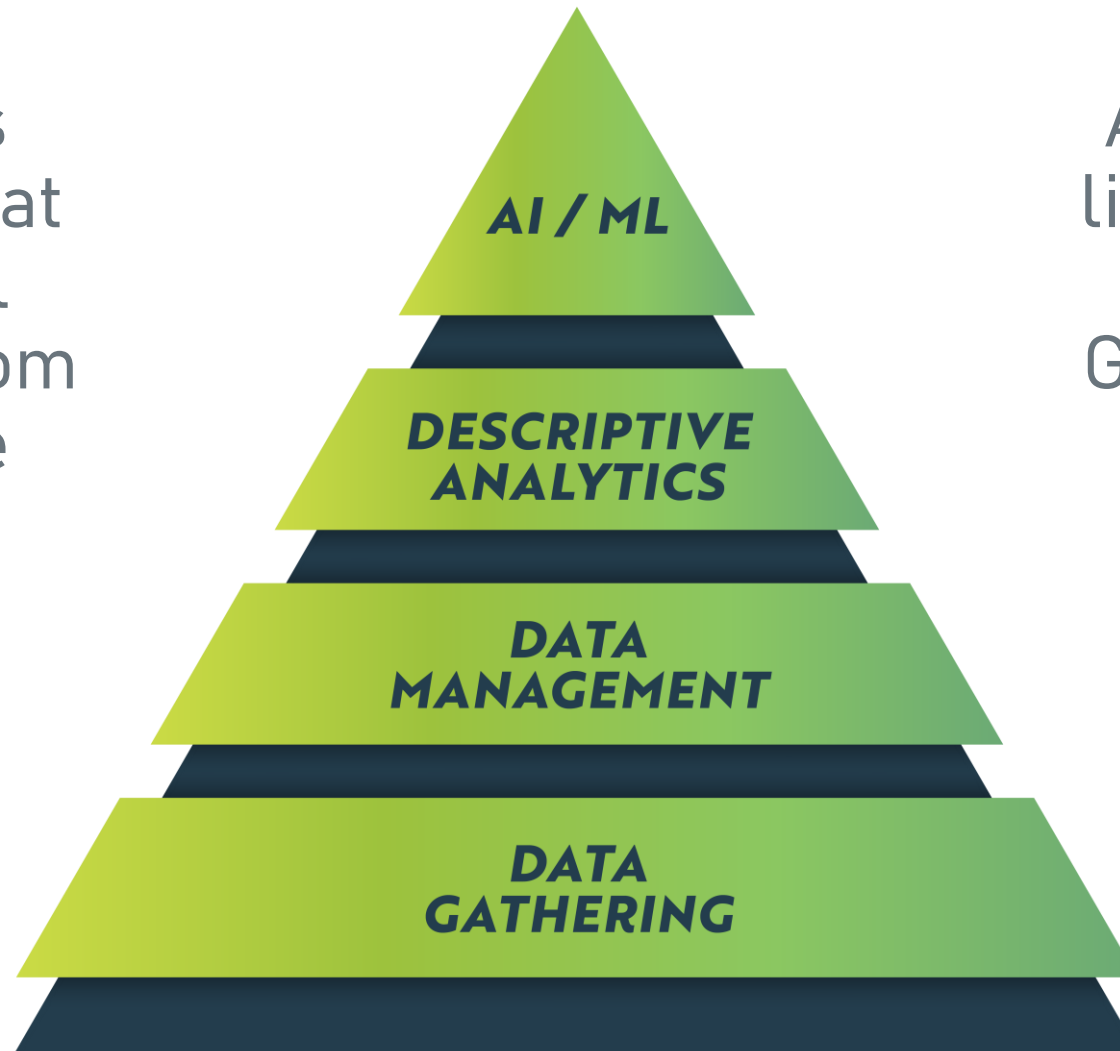


There are some *good reasons* E&P digital transformation has been slow, and they both *dampen* and *differentiate* how O&G can and will change



THE DATA PYRAMID

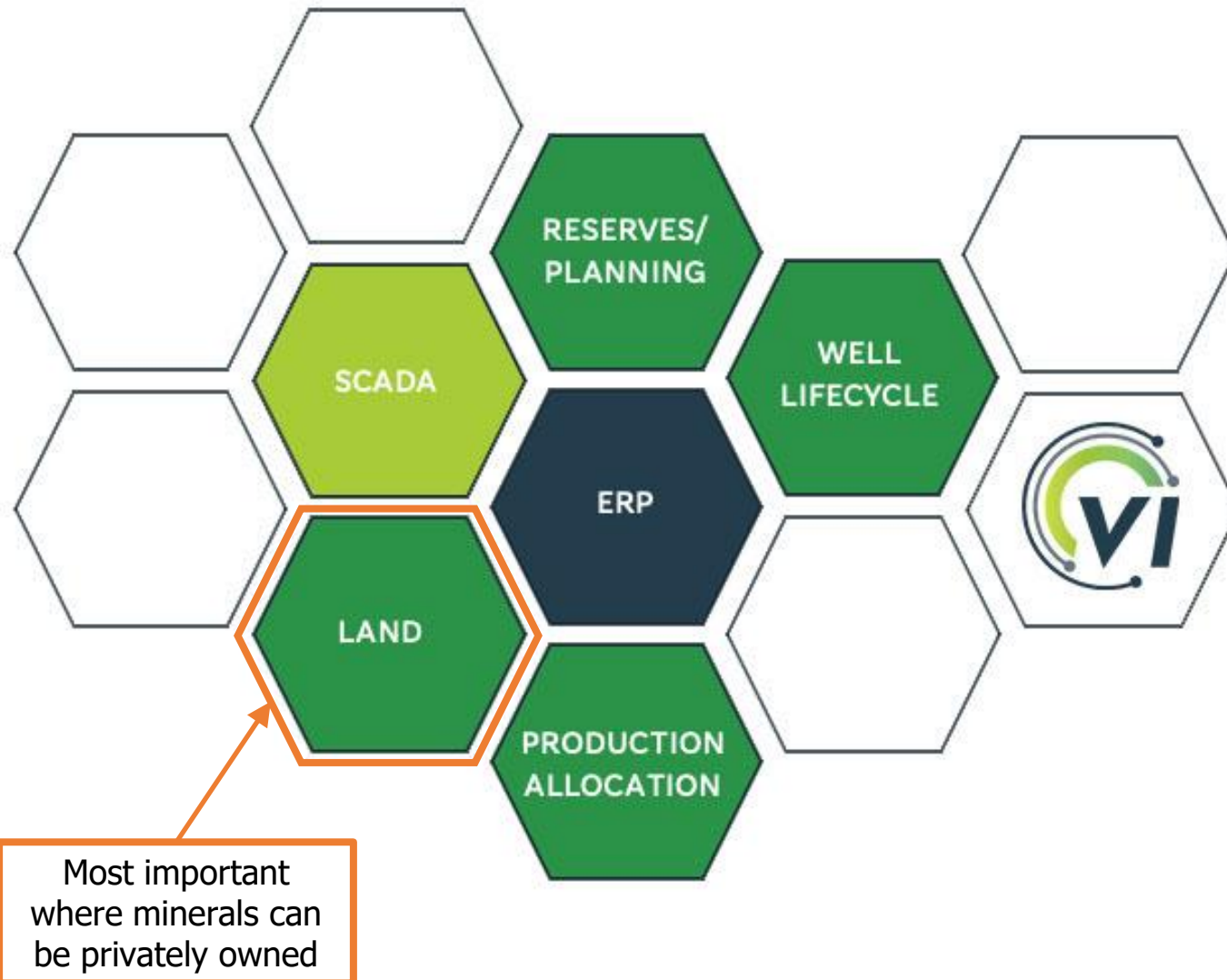
Effort required is arguably smallest at the top – the real work is at the bottom and in the middle



AI and ML are just like other advanced analytical tools – Garbage In leads to Garbage Out



THE BIG SIX



- 1) Highly integrated with the rest of the Big 6
- 2) Central to the basic functions of an E&P
- 3) Expensive to Rip & Replace



*Those who don't learn the
past.....*



WHAT'S OLD IS NEW AGAIN...

- Better valuation and reserves work through data is **NOT** new

Reservoir Characterization

- Subscriptions datasets for production, logs, etc.
- Neural nets for petrophysics

Reserves Evaluation

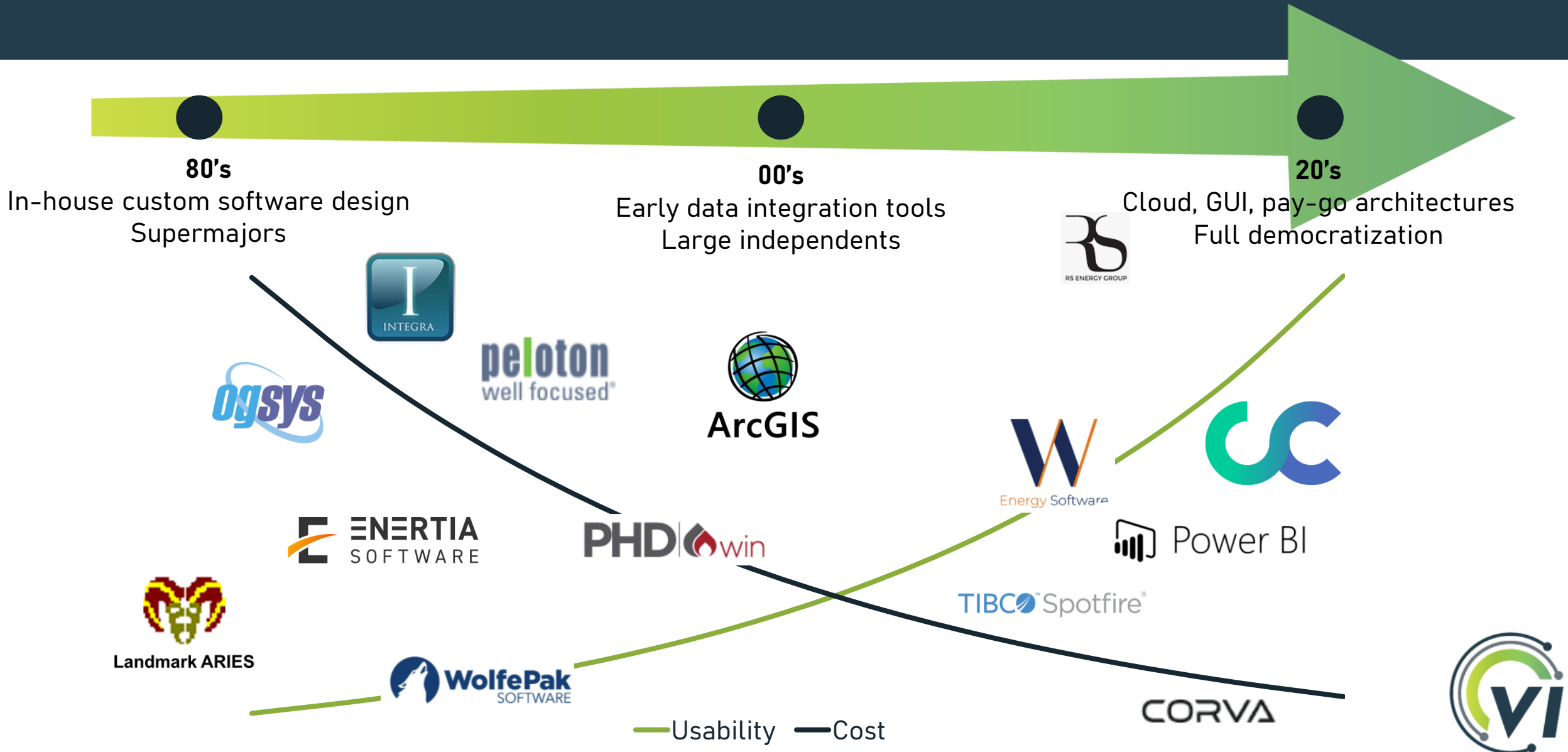
- Computer software for DCA, economics, etc.
- Reserves management systems for EIA, SMOG, etc.

Asset Valuation

- Surveys and databases, e.g. SPEE Parameter Survey
- Black-Scholes option pricing



THE SOFTWARE PROLIFERATION LANDSCAPE



[illegible]

E&P Software Survey Results

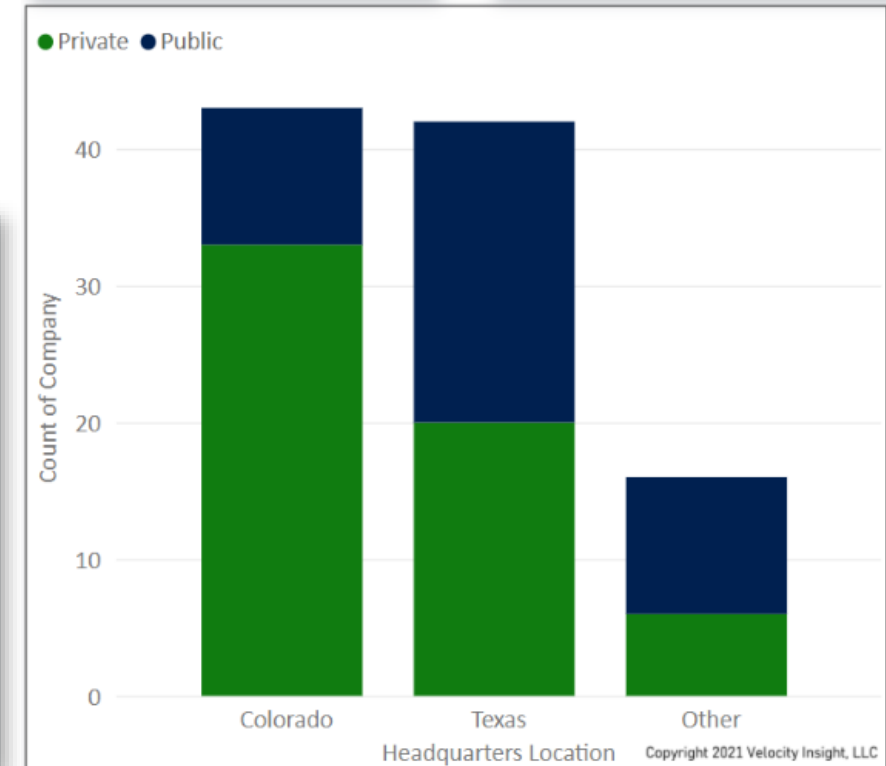
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SOFTWARE SURVEY – SUMMARY

- Three big themes:
 - *Compartmentalization – by region, size, business model, etc.*
 - *The Long Tail – hundreds of low-utilization tools on the market*
 - *Widespread Dissatisfaction – “I hate it, but we use _____”*
- Barriers to modernization:
 - High cost of ripping and replacing
 - “We’re just about to sell/buy/merge/go bankrupt”
 - Risk aversion
 - Lack of better options

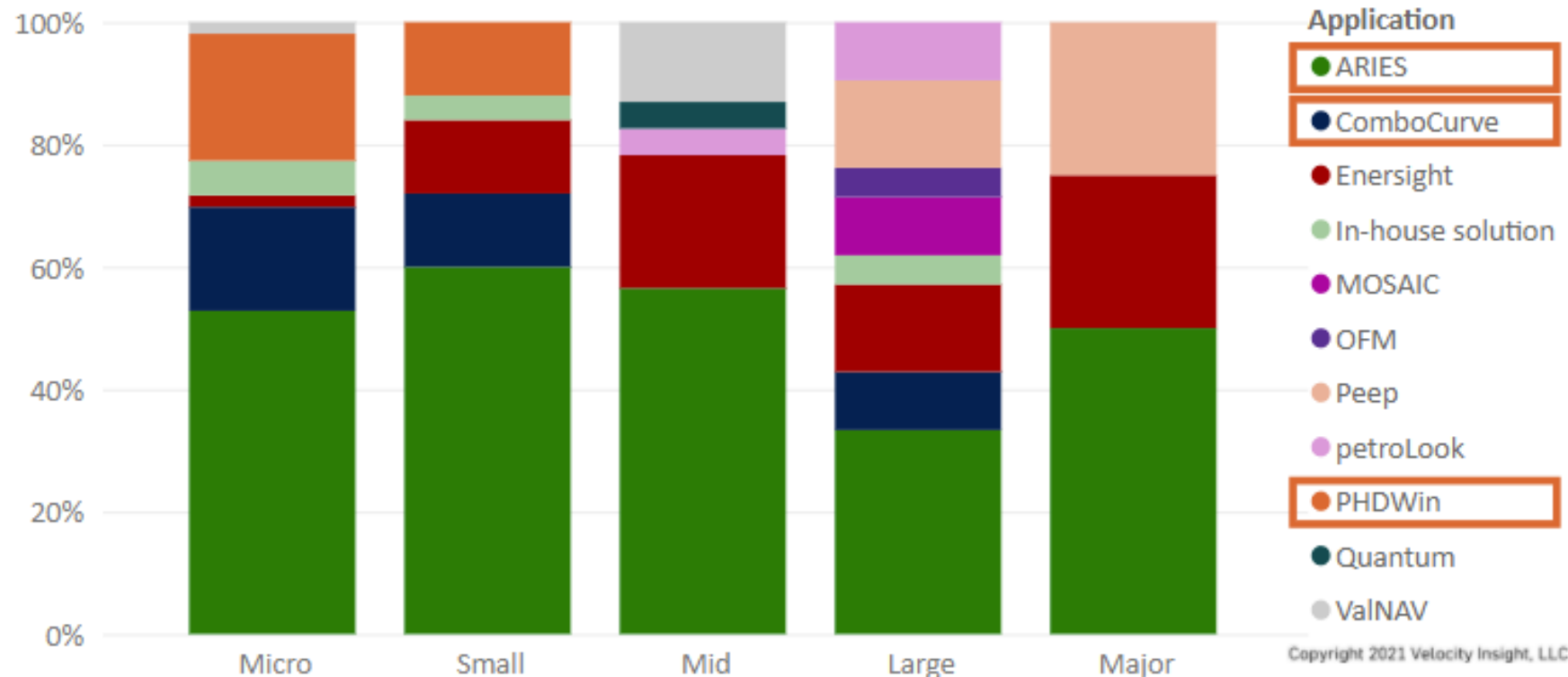


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- The left pie chart illustrates the ownership split between 'Nonop/minerals' (11%) and 'Operator' (90%). The right pie chart shows the split between 'Public' (42%) and 'Private' (59%).



RESERVES/PLANNING

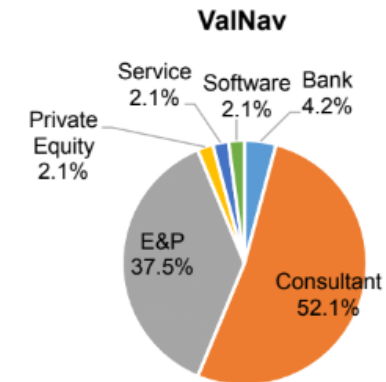
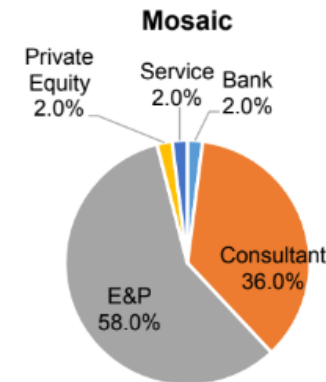
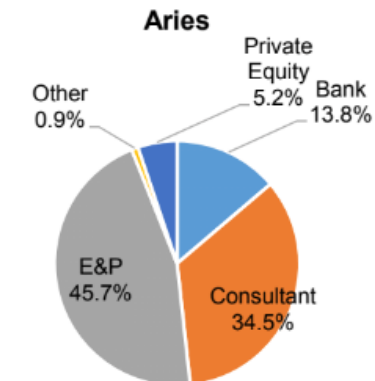
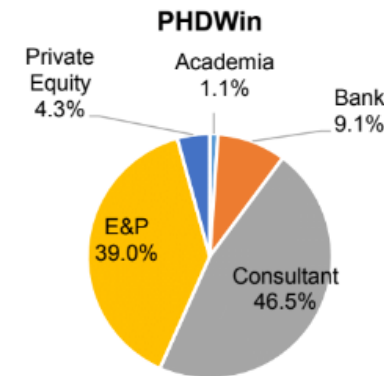
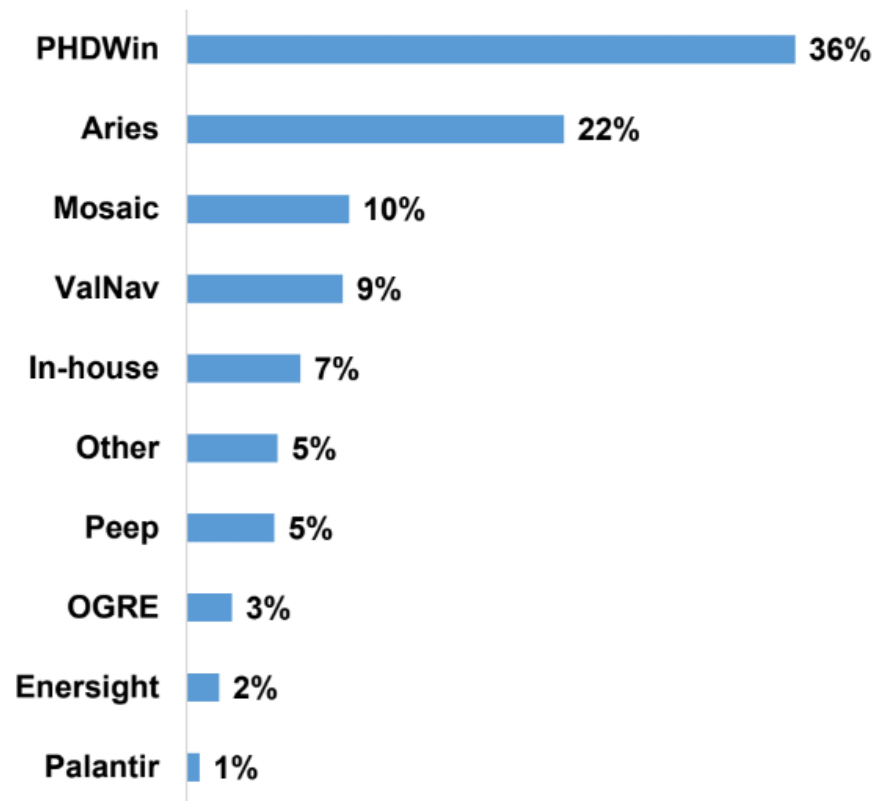
- ARIES dominates, but struggles to handle full workload
- Lots of companies using multiple tools to accommodate limitations – Enersight, ComboCurve, etc.



Application	Implementations
ARIES	65
ComboCurve	14
PHDWin	14
Enersight	13
In-house solution	5
Peep	4
ValNAV	4
petroLook	3
MOSAIC	2
OFM	1
Quantum	1
Total	126

2018 SPEE SYMPOSIUM SURVEY

Which economic/reserves management software do you regularly use?



SOFTWARE A&D and MAJOR UPDATES

Big changes in who owns which piece of software

- **MOSAIC** goes from Entero → Quorum → Omnira
- **ValNav** goes from Energy Navigator → Aucerna → Quorum
- **Energisight** goes from Energisight → Aucerna → Quorum
- **petroLook** goes from Aclaro → Aucerna → Quorum
- **Peep** goes from Schlumberger → Quorum
- **ComboCurve** raises >\$50mm via Series A and Series B

Legacy tools also going through big changes

- PHDWin 3.0 on SQL
- ARIES v6 goes 64 bit with daily calcs
- What's the future for ValNav/Energisight/petroLook/Peep/PlanningSpace at Quorum?



TIME FOR A QUIZ!

What is the Total Addressable Market for E&P Reserves/Planning software in Latin America?

- A { <\$10mm/yr
- B { \$10-25mm/yr
- C { \$25-100mm/yr
- D { >\$100mm/yr



..are doomed to repeat it.



VALUE PROPOSITIONS

Cheaper

- Focus on the bottom of the Data Pyramid
- Automate data processing

Faster

- Better data access to accounting data like LOE, differentials, and CAPEX
- Automated DCA

Better

- Reduce bias
- Improve run QC to minimize errors
- Discover unexpected factors for type curve binning/scaling



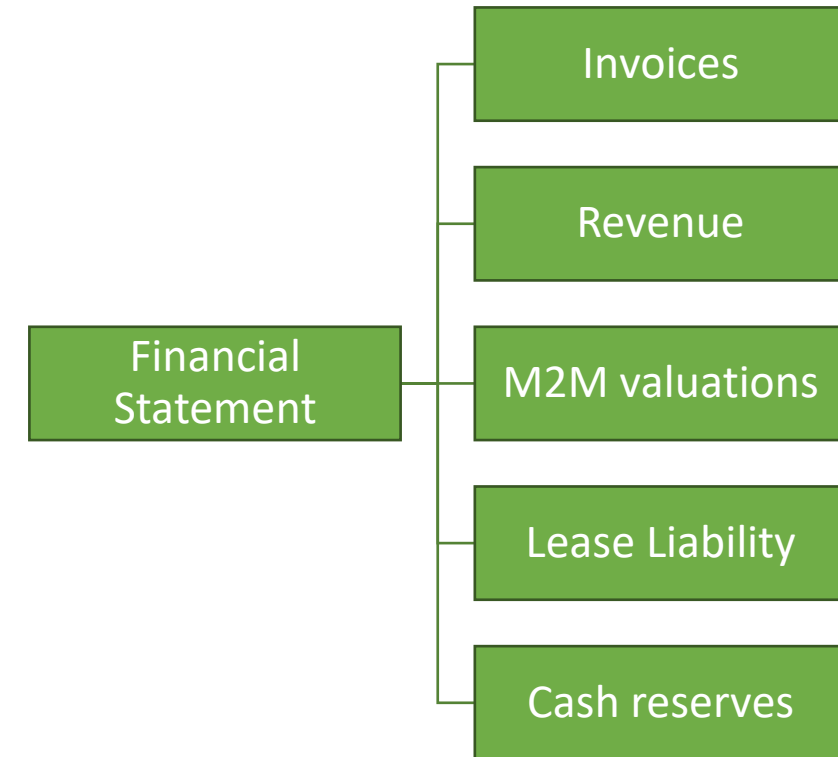
AI AND ML – WHAT SHOULD WE FOCUS ON?

- Automated DCA starting to mature, but will a human always be in the loop?
- Type well profile creation making progress, especially clustering and R^2 loss techniques for multivariate regression
- Data quality, data quality, data quality – it's all Garbage In, Garbage Out



AI AND ML – QUESTIONS FOR ADOPTION

- Are they “reliable technologies” in the eyes of the SEC or other regulator?
- Are they transparent and explainable enough for all stakeholders (auditors, executives, bankers, etc.)?
- How does the signing of a reserves report compare (or not) to the signing of a financial statement?



SUMMARY

- This isn't new, it's a continuation of 40+ years of evolution
- Focus on the bottom of the Data Pyramid first
- Think about the roles of all stakeholders in the use of AI and ML



WHO WE ARE

Full-stack, full-function data management and analytics consulting firm helping with both *advisory* and *implementation* projects



Deep O&G Experience

State-of-the-Art Tools

Real-World Digitalization Experience



TO HEAR MORE....

VI News of the Month

LinkedIn

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Submit info for our 2023
Software Survey!

