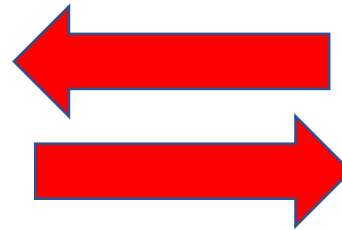


THE FUTURE FINANCING OF MINERAL EXPLORATION



Prospects



Money

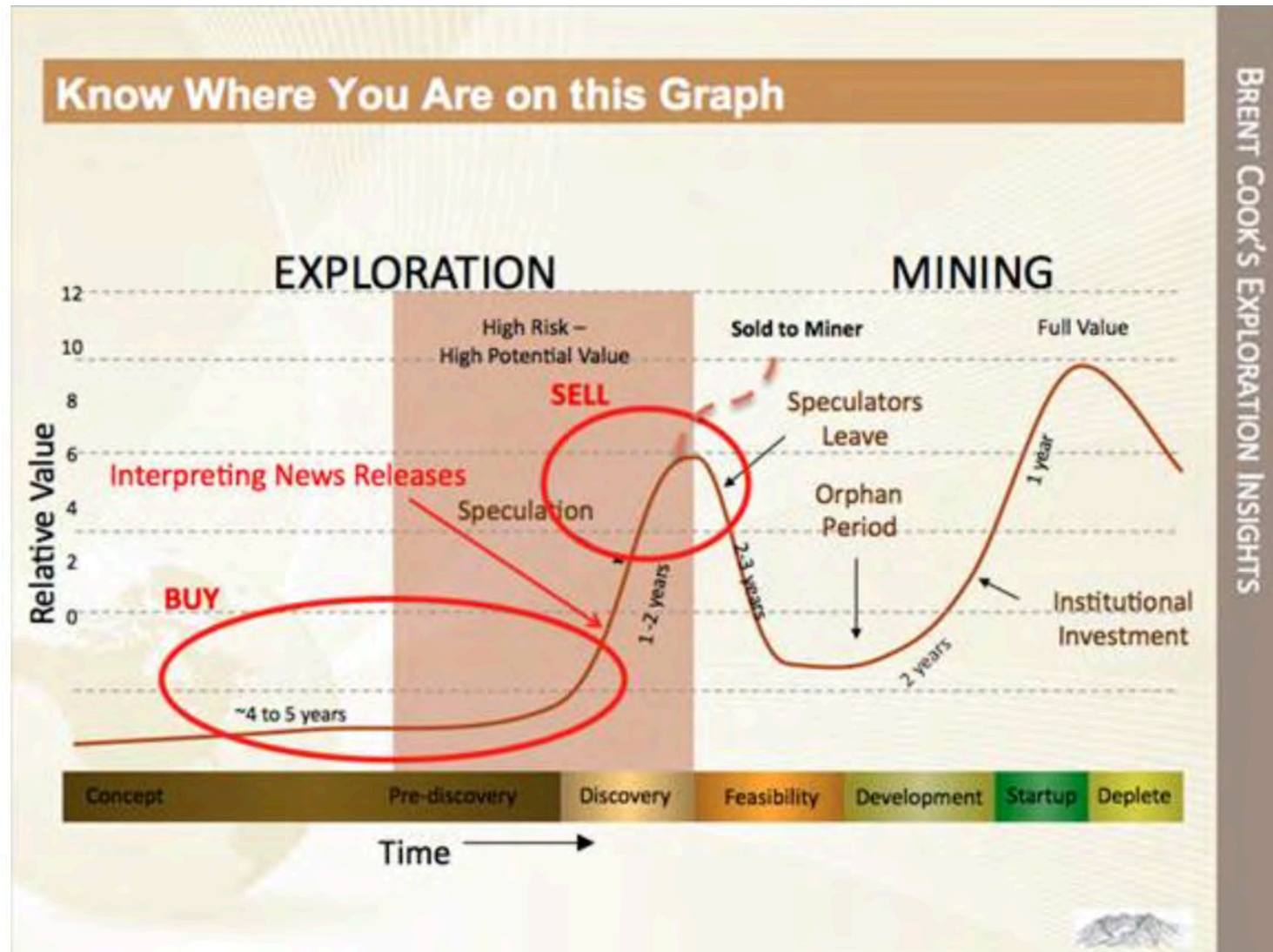
IS THE MODEL BROKEN?

Successful mineral exploration leads to discovery and it is the initial step in wealth-creating part of the mining value chain (Porter, 1985)



***The way we as an industry finance early-stage exploration in the Global Junior Sector is inefficient, wastes capital and is no longer working.
(Western Mining Services,)***

Let's be realistic about what time it takes to make a discovery



What does it take?



10 years?



≤10% of insitu value for all related exploration

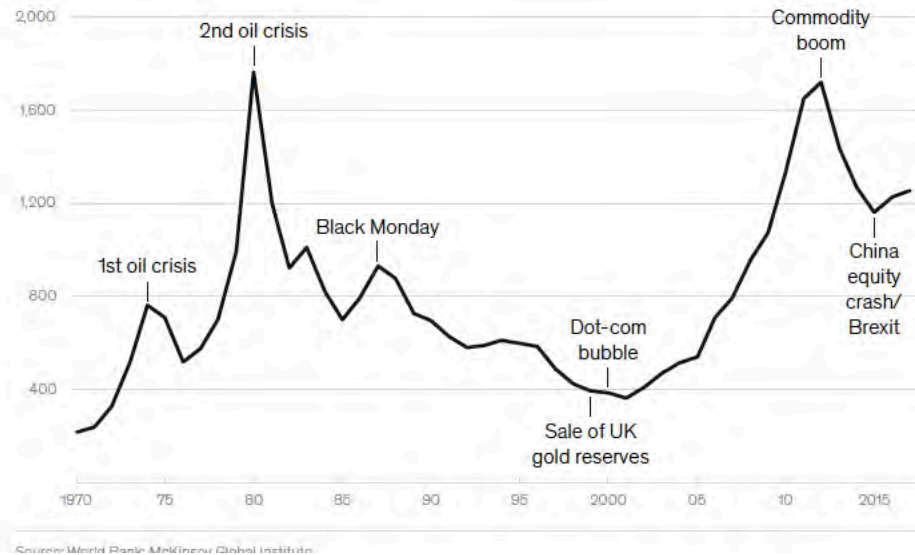
Mineral Exploration:
Discovering and Defining Ore Deposits
Wood, D. et al, Jan 2019 SEG Newsletter

**E.g. Lisheen 20 million tonnes @ 12% Zn and 2% Pb = \$6 billion in-situ value
Should be < \$600 million over 10 years on all related exploration to discover and define
resource and bring to DFS.**

Investment in Juniors based on sentiment or strategy?

Project time span out out of phase with the price cycle

Gold prices peaked above USD 1,700/oz during the 1980s energy crisis and 2003-11 commodity boom, only to sharply decline thereafter
Gold price, 1970-2017, USD/oz, 2015 real



Gold price over 45 years

Zinc Price
1.35 USD/lb
5 Apr '19

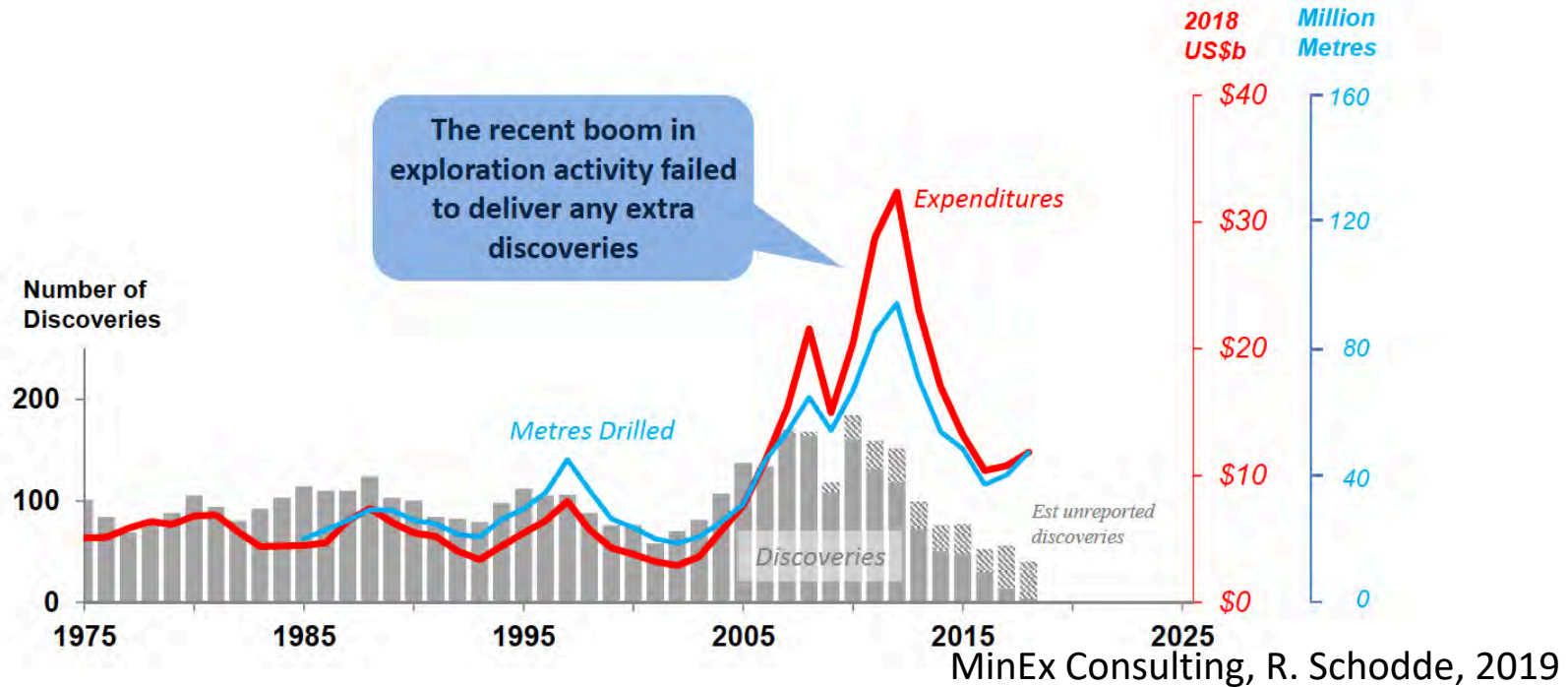


Zinc price over 15 years

Don't worry about the current metal price. It will take 15 years before production of metal. Investment in early-stage exploration should be counter-cyclical to metal price but do pigs fly?

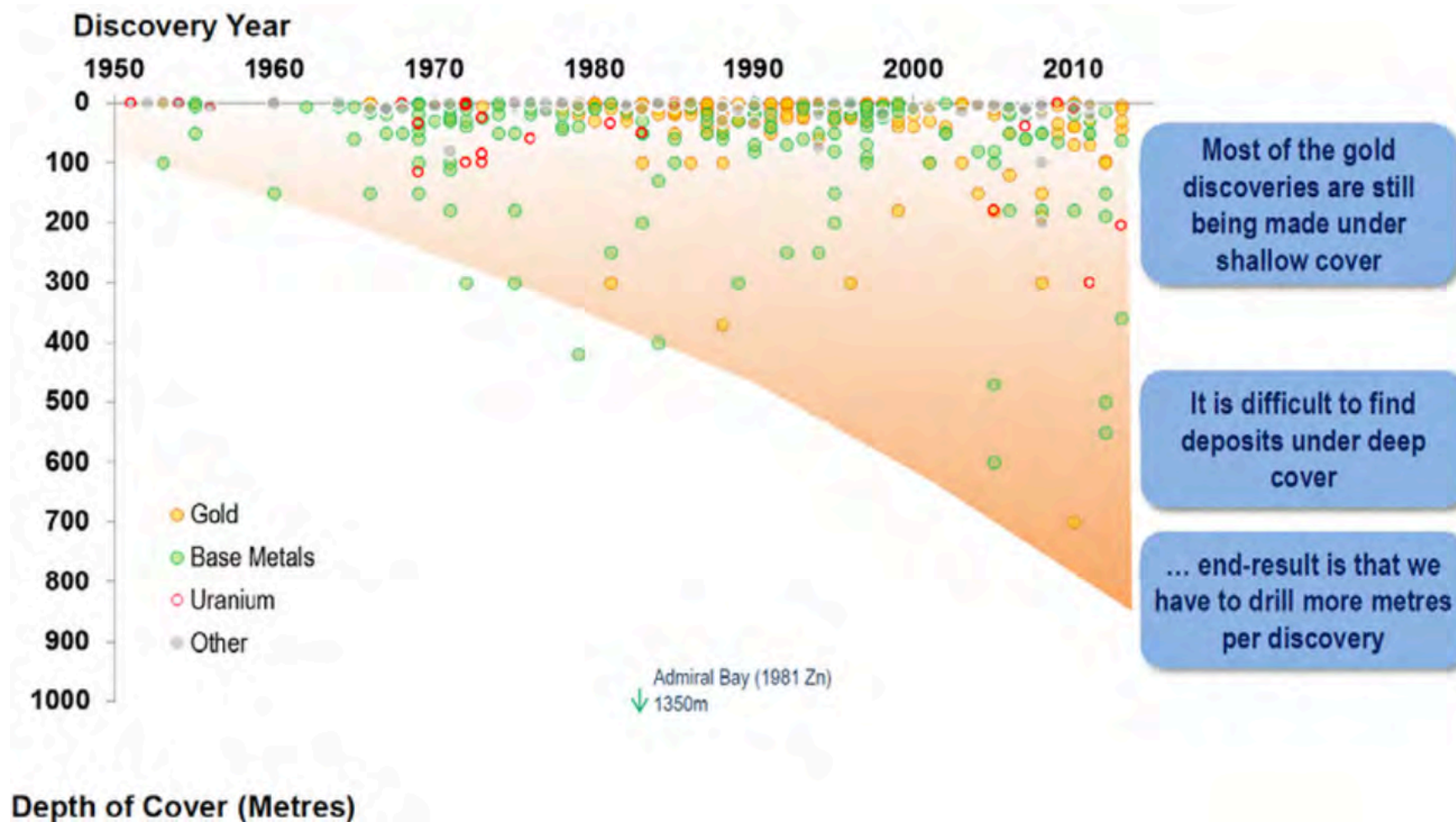
This is serious.....

Discovery Rate versus Exploration Drilling & Expenditures
 All Commodities World: 1975-2018



Why?

We are forced to go deeper



Major challenge - Exploration is failing and unsustainable – Schodde estimates that US\$65 billion was expended to unlock US\$30 billion worth of gold between 2007 and 2016.

A growing focus on brownfield

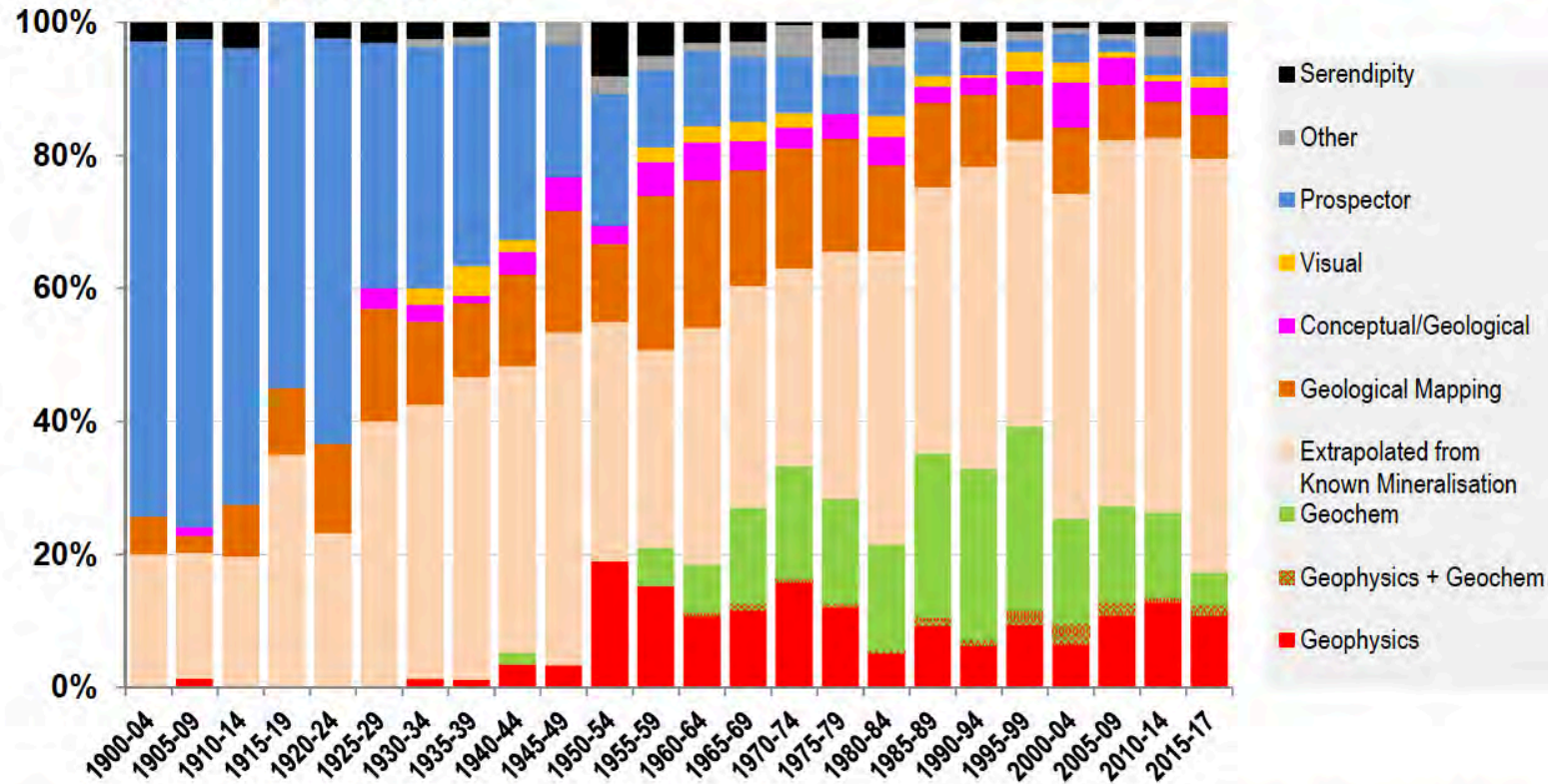
Primary search method used at the **project-scale**

ALL discoveries in the World: 1900-2017

The most popular area selection method is to work in areas of known mineralisation

ie What method was used to decide where to **peg the leases**

Percentage of total discoveries



Note: Analysis based on detailed analysis of 3799 projects (out of 7108 known discoveries)

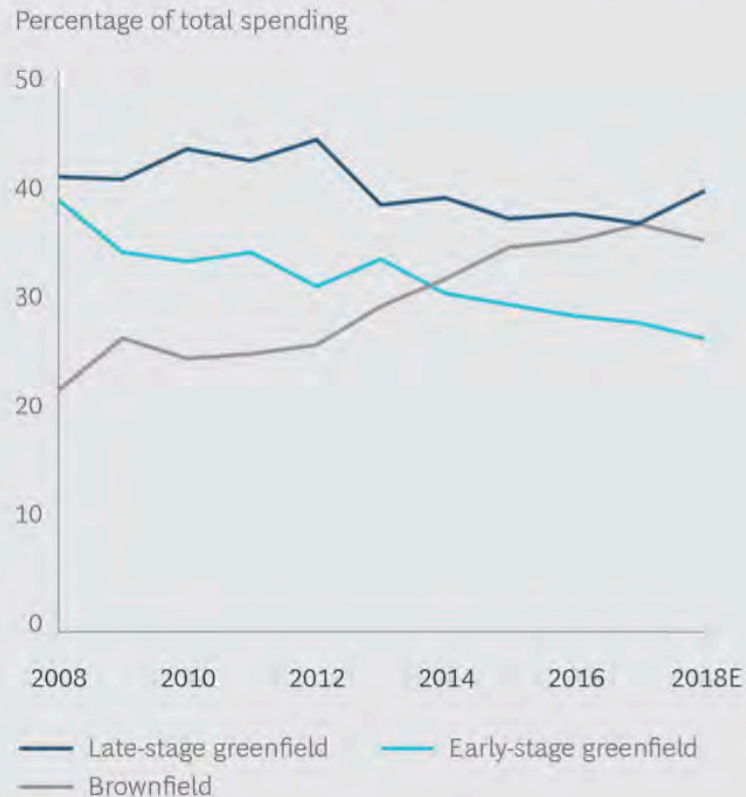
Source: MinEx Consulting © October 2018

Rising brownfield and re emergence of Juniors

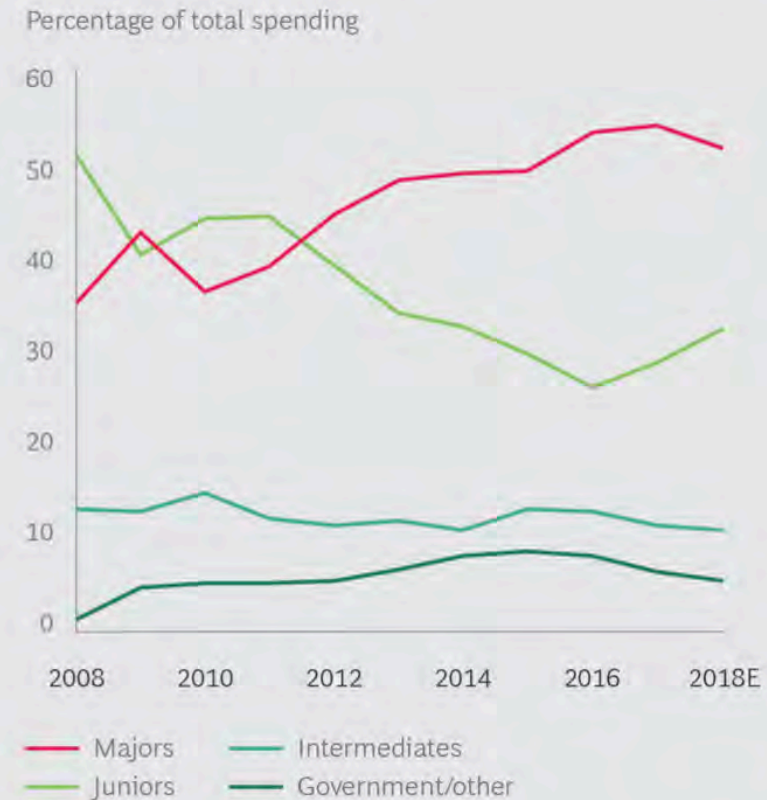
EXHIBIT 4 | Exploration Spending Is on the Rise



Brownfield accounts for an increasing share

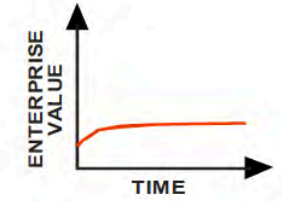
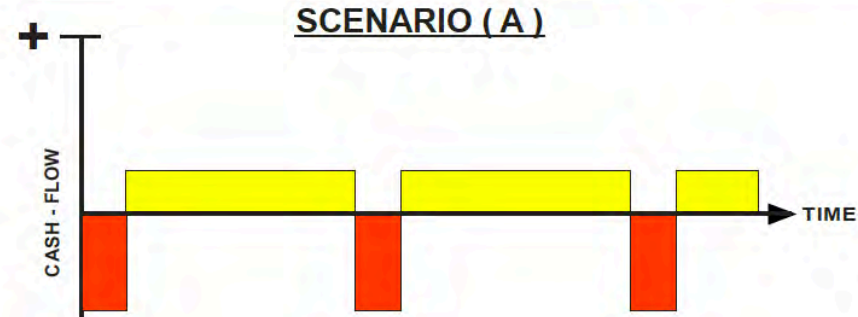


Majors rule, but juniors' share has rebounded

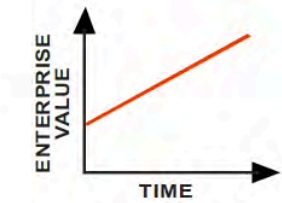
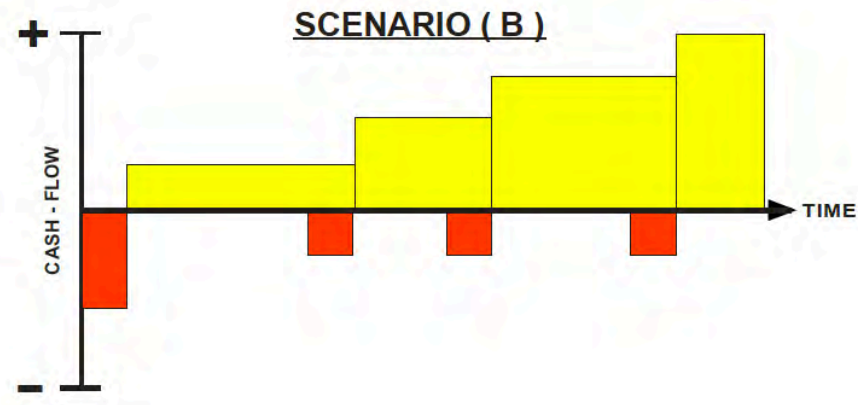


Source: S&P Global Market Intelligence.

Tier One Deposits are rare beasts



Lisheen



Navan

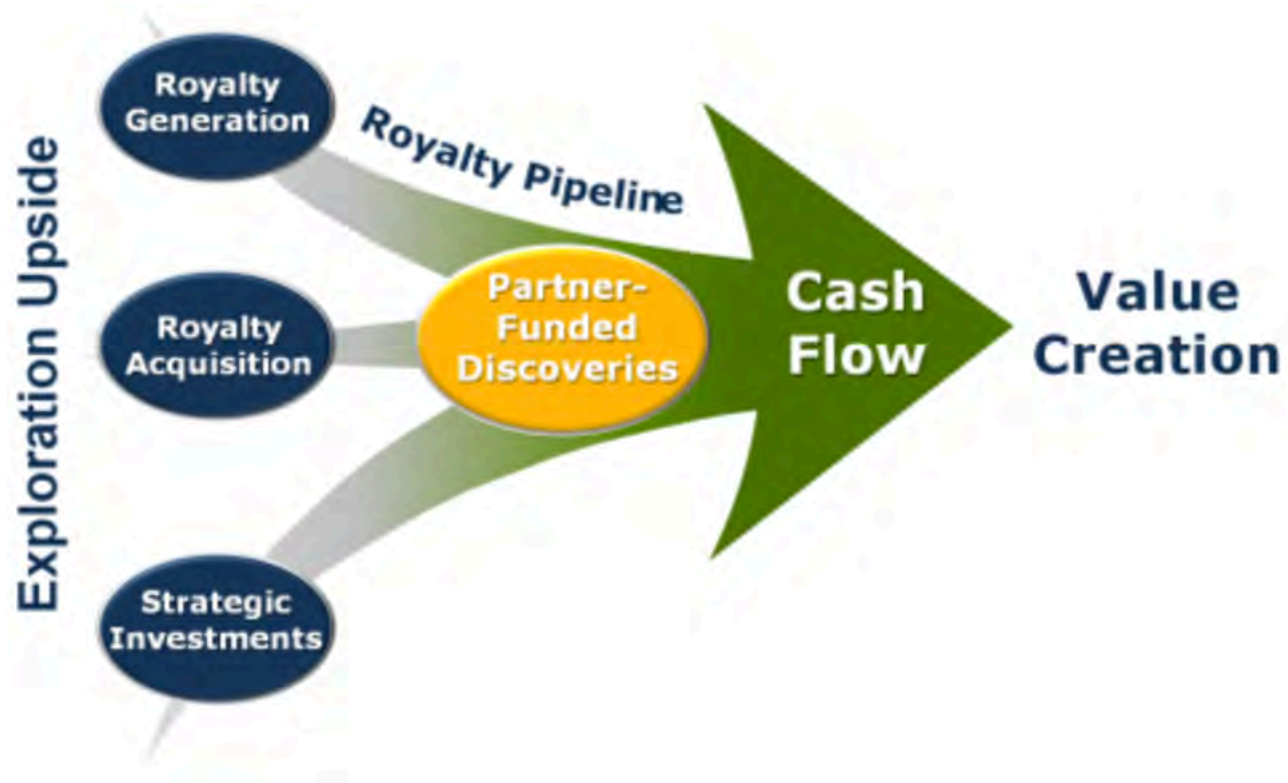
Sources of Financing for Juniors



Sources of Exploration Funding



Project Generator Model - EMX Royalty



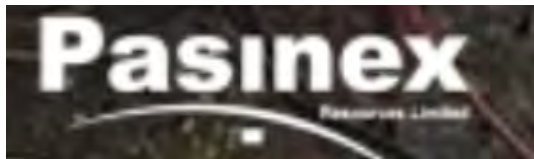
Project Generator Model/ Elephant-Hunter

Exploration strategy – discover deposits it can sell to fund future exploration.

Junior Growth Model – Cash Flow from ops



Now a mid-tier gold miner in Ghana




Boutique high-grade zinc DSO mining in southern Turkey



..... Is there a role for Government to fund discovery-drilling as exploration gets deeper and more conceptual and beyond the financial capability of Juniors?

South Australia Case Study I

Value proposition for Governments' supporting exploration CASE STUDY 1: 2014 Review of South Australia's PACE Programs



The Review assessed the benefits of the PACE Program which was introduced in 2004. Total spend (to June 2014) was A\$56m.

PACE is focused on getting the right mix of prospectivity, programs, promotion and people.

Key themes are:

- 1) Balancing resource development with conservation
- 2) Drilling partnerships
- 3) R&D on exploring under cover
- 4) 3D geological models
- 5) Working relations with Indigenous Communities
- 6) Baseline geochem survey
- 7) Better data delivery
- 8) Stronger promotion through having expert resource ambassadors

Economic Benefits of the A\$56m spent on PACE between 2004-2013

- Extra A\$700m invested in private mineral exploration (20:1 leverage)
- Extra A\$2400m in State Mining Revenues (a factor of 44x)
- The collaborative drilling program led to 2 major copper discoveries and 14 other significant deposits
- Establishment of 2 leading research centres in SA ... Deep Exploration Technologies CRC and SA Centre of Geothermal Energy Research

Other benefits to South Australia

- Internationally recognised as having “best practice” policies & regs ... such as “One stop shop” and improved land access decision making
- SA now recognised as a leader in developing exploration technologies
- Higher PPI & MPI ratings in the Fraser Institute surveys

West Australian Case Study II

Value proposition for Governments' supporting exploration CASE STUDY 2: 2015 Review of West Australia's Exploration Incentive Scheme

Every **\$1m** spent on the EIS for greenfield exploration will (in the long run) generate **\$23.7m** in benefit to the State

EIS \$1M

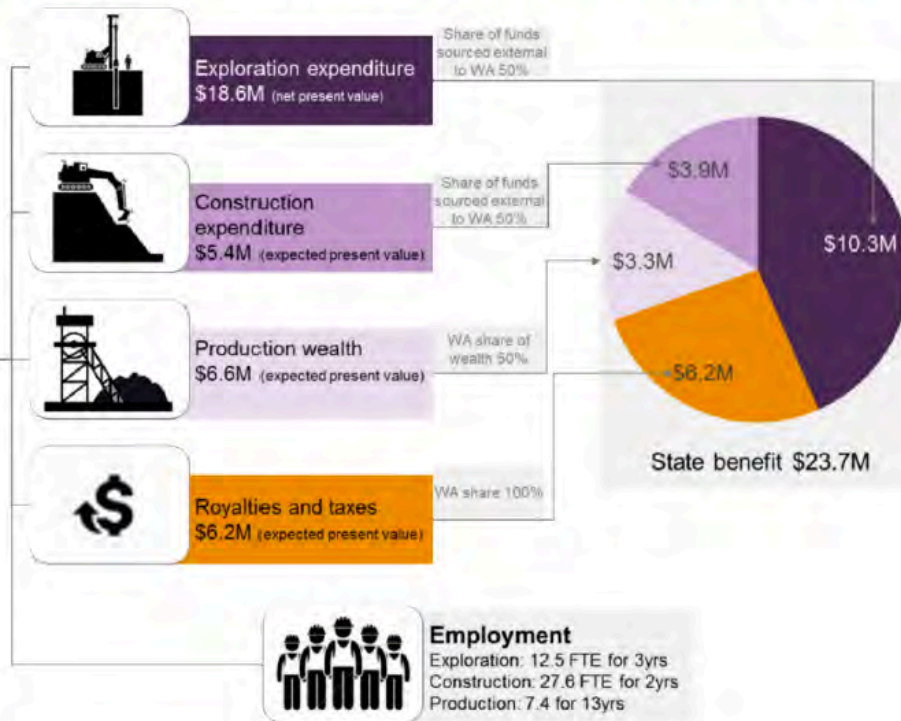
Study was based on empirical modelling of the WA's EIS scheme, which was introduced in 2009. Total spend (to June 2017) is A\$130m.

EIS funding is focused on providing new pre-competitive geoscience data.

- 1) Geophysics & geochem surveys
- 2) Innovative drilling
- 3) 3D-geological mapping
- 4) Strategic R&D with Industry
- 5) Working relations with Indigenous Communities

Assumes "normal" commodity prices. A low / high price scenario generates \$0m / \$38.3m benefit

Present Value calculated using a 12% discount rate.



Source: Report on the Exploration Incentive Scheme for the WA Dept of Mines and Petroleum by ACIL Allen Consulting Jan 2015

Source: <https://www.minexconsulting.com/>

For risk-takers it can be like a cow looking into an engine

**Technically
complex**



Trust

Multiple interwoven strands

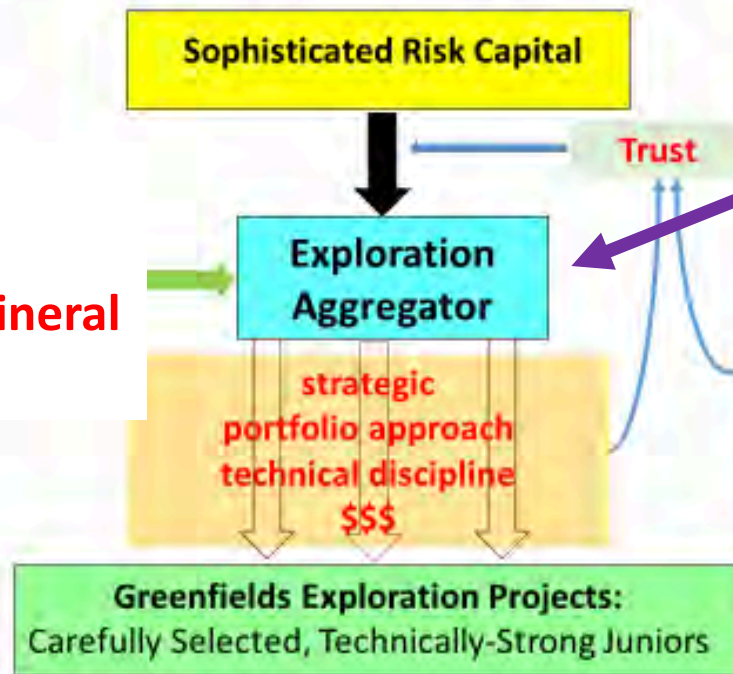
More an art than a process

All about the people and leadership

How it Might work for Ireland and its world-class Zn-Pb ore-field



The Exploration Aggregator Model



NTMA
- ISIF Co-Invest?
Venture Capital Fund?

Financial literacy
World-class technical skills
Strong strategic understanding of mineral exploration

Juniors using "Big Think" and opening up the search space

State-sponsored research is great but only drilling finds orebodies

*You can only guarantee failure.
You only need to be right that one time,
usually for the wrong reasons – Dan Wood*

