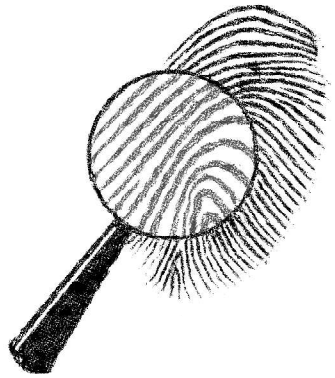
The fingerprint of a successful discovery



Richard Schodde
Managing Director, MinEx Consulting
Adjunct Professor, Centre for Exploration Targeting , UWA

amira Global Exploration Managers Conference
24th September 2025, Sanctuary Cove, Queensland

While it is the ambition of every geologist to find a giant deposit, what's really important (to business and society) is that the discovery needs to be of value … which is only realised if it can quickly and smoothly go into production

All too often discoveries get stalled, and never get developed.

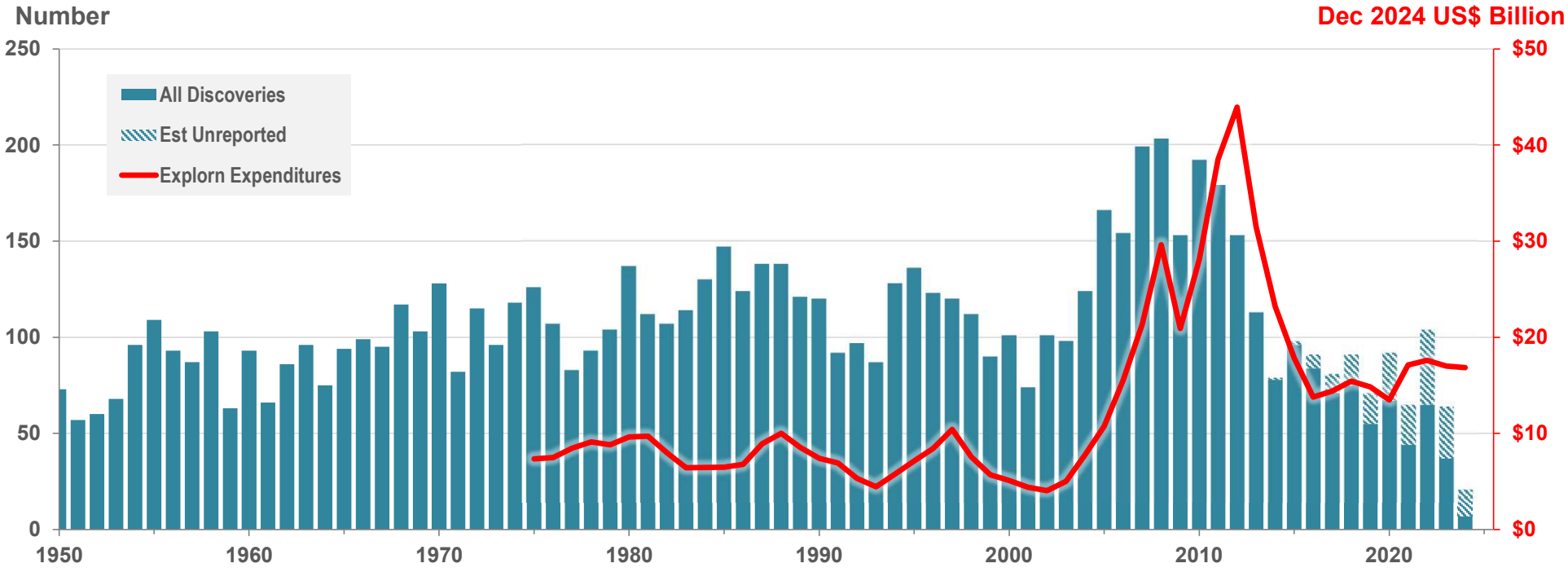
The purpose of this presentation is to identify the characteristics of those discoveries that do quickly go into production

On average less than half of all discoveries turn into mines. And of those that deposits that do get mined, there is a 15 year delay between discovery and development

HIGH-LEVEL OVERVIEW OF DISCOVERY AND DEVELOPMENT

Significant Discoveries : 1950-2024

World : All Commodities



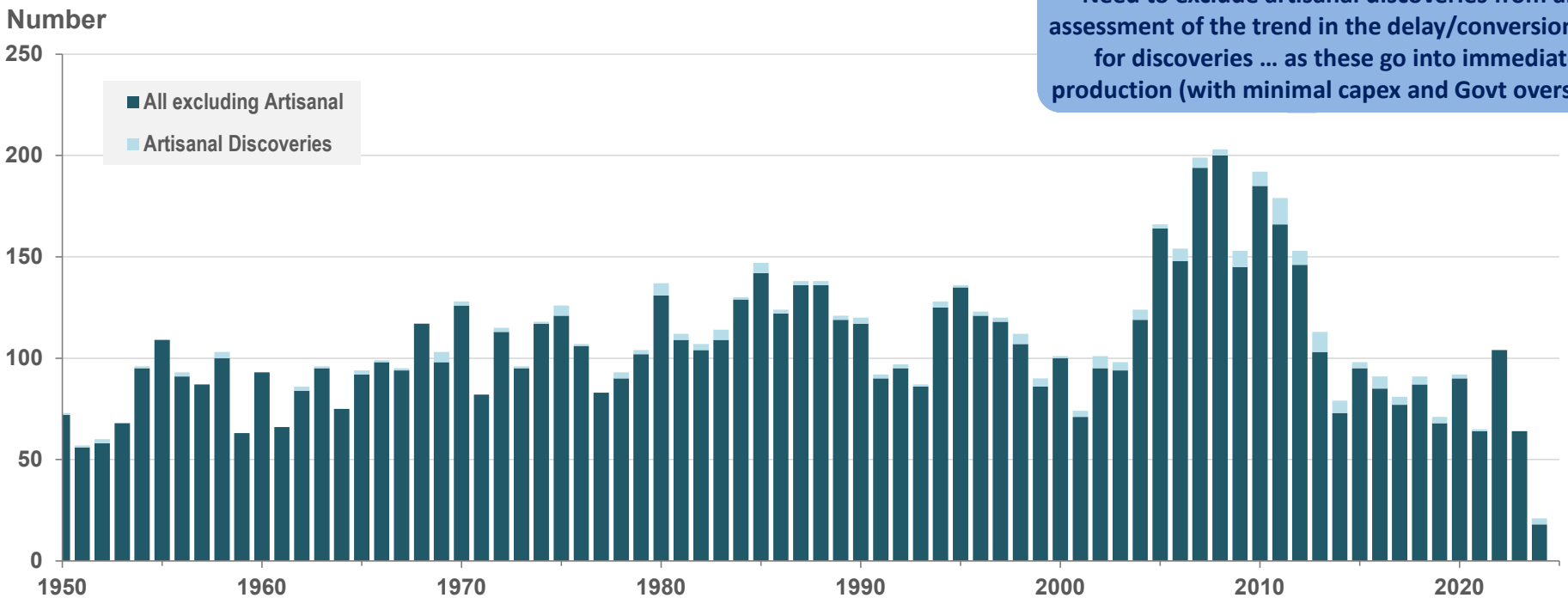
Note: Based on deposits >="Moderate" in-size. i.e. >100koz Au, >10kt Ni, >100kt Cu, 300kt Zn+Pb, >5kt U_3O_8 >5 Mt Heavy Minerals, >20 Mt Fe, >20 Mt Thermal Coal >10 Mt Met Coal, >3 Mt P_2O_5 and >3 Mt K_2O

Source: MinEx Consulting © September 2025

Significant Discoveries (Adjusted): 1950-2024

World : All Commodities

Need to exclude artisanal discoveries from any assessment of the trend in the delay/conversion rate for discoveries … as these go into immediate production (with minimal capex and Govt oversight)

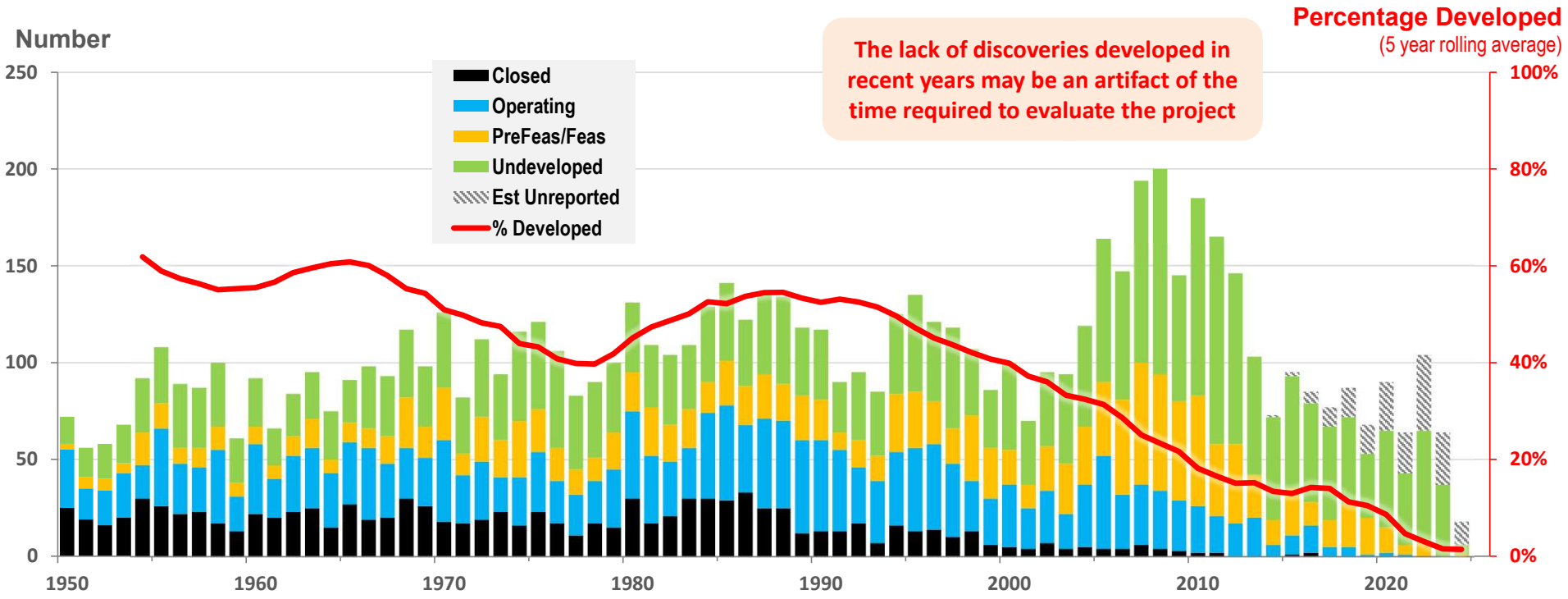


Note: Numbers include estimates of unreported discoveries in recent years
Artisanal discoveries are mainly associated with gold and precious gem deposits
Significant discoveries are based on deposits >="Moderate" in-size. i.e. >100koz Au, >10kt Ni, >100kt Cu, 300kt Zn+Pb, >5kt U_3O_8 >5 Mt Heavy Minerals, >20 Mt Fe, >20 Mt Thermal Coal >10 Mt Met Coal, >3 Mt P_2O_5 and >3 Mt K_2O

Source: MinEx Consulting © September 2025

Current Status of Significant Discoveries : 1950-2024

World : All Commodities



Note: Developed = Operating Mines + Closed Mines
Have assumed that the Unreported discoveries in recent years are "Undeveloped"
Have excluded deposits found by artisanal workers

Source: MinEx Consulting © September 2025

Only 41% of all discoveries in the World since 1950 have been developed. The average delay is 15 years

	Number of Deposits			Contained Metal (Pre-Mined Resource basis)				Average Delay (Years)
	Discovered	Developed	Conversion Rate	Discovered	Developed		Conversion Rate	
Gold	2629	1222	46%	7228	4669	Moz Au	65%	11.8
Copper	1173	424	36%	3223	1763	Mt Cu	55%	18.0
Zinc+Lead	436	218	50%	1103	610	Mt Zn+Pb	55%	14.1
Nickel	477	160	34%	375	194	Mt Ni	52%	18.4
Uranium	375	160	43%	11020	6170	kt U3O8	56%	14.1
Bulk	1227	426	35%	na	na			18.7
Precious	387	204	53%	na	na			13.6
Other	941	284	30%	na	na			16.2
	-----	-----	-----				-----	-----
Total/Average	7645	3098	41%	na	na		~55%	14.7

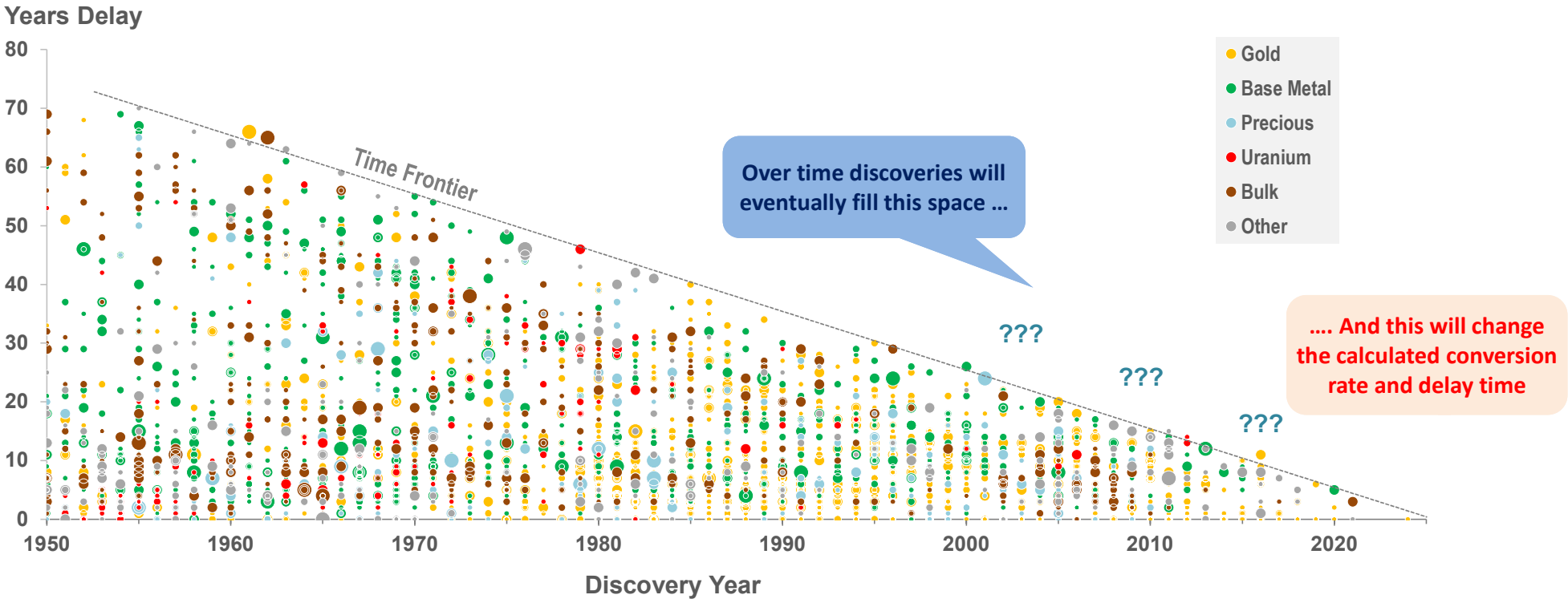
In terms of the amount of metal found, the conversion rates were higher … i.e. bigger deposits are more likely to be developed

Note: Analysis based on "Significant" sized deposits
Excludes deposits found by artisanal workers
"Precious" includes Diamonds and Other Gemstones, Silver and PGE

Source: MinEx Consulting © September 2025

Delay between Discovery and Development

All Commodities : World : 1950-2024



Note: Excludes artisanal discoveries
Bubble-size refers to Moderate, Major, Giant and SuperGiant discoveries

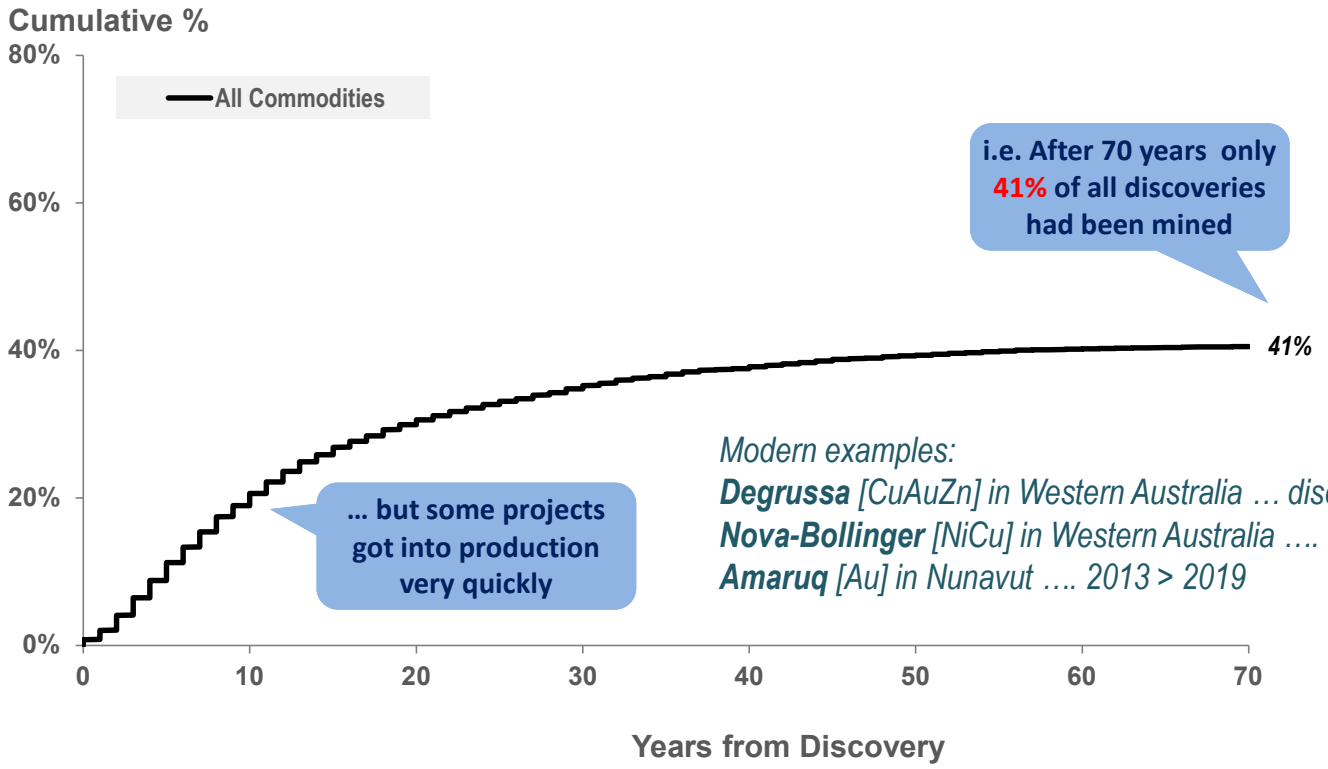
Source: MinEx Consulting © September 2025

Rather than looking at simple averages, a better way of assessing the time-delay is to look at how the percentage of projects developed increases over time … and what the shape of the "trajectory" is

This give you a better "feel" for recent trends in performance.
It also make you focus on identifying how to be "better than average"

Cumulative Number of Discoveries that become mines

All Significant Discoveries in the World : 1950-2024



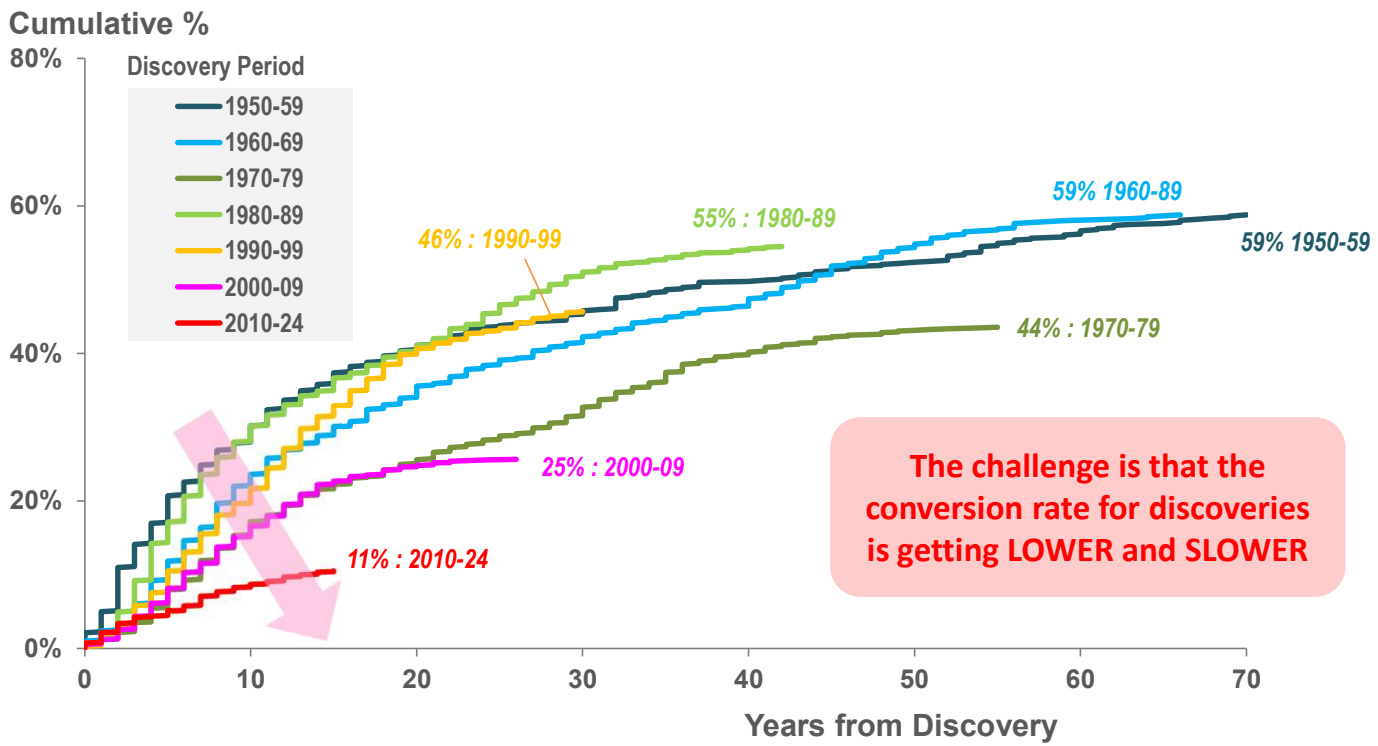
Modern examples:
Degrussa *[CuAuZn] in Western Australia … discovered in 2009 in production by 2012*
Nova-Bollinger *[NiCu] in Western Australia …. 2012 > 2017*
Amaruq *[Au] in Nunavut …. 2013 > 2019*

Note: Excludes artisanal discoveries

Source: MinEx Consulting © September 2025

Cumulative Number of Discoveries that become mines

All Significant Discoveries in the World : 1950-2024 : By Decade

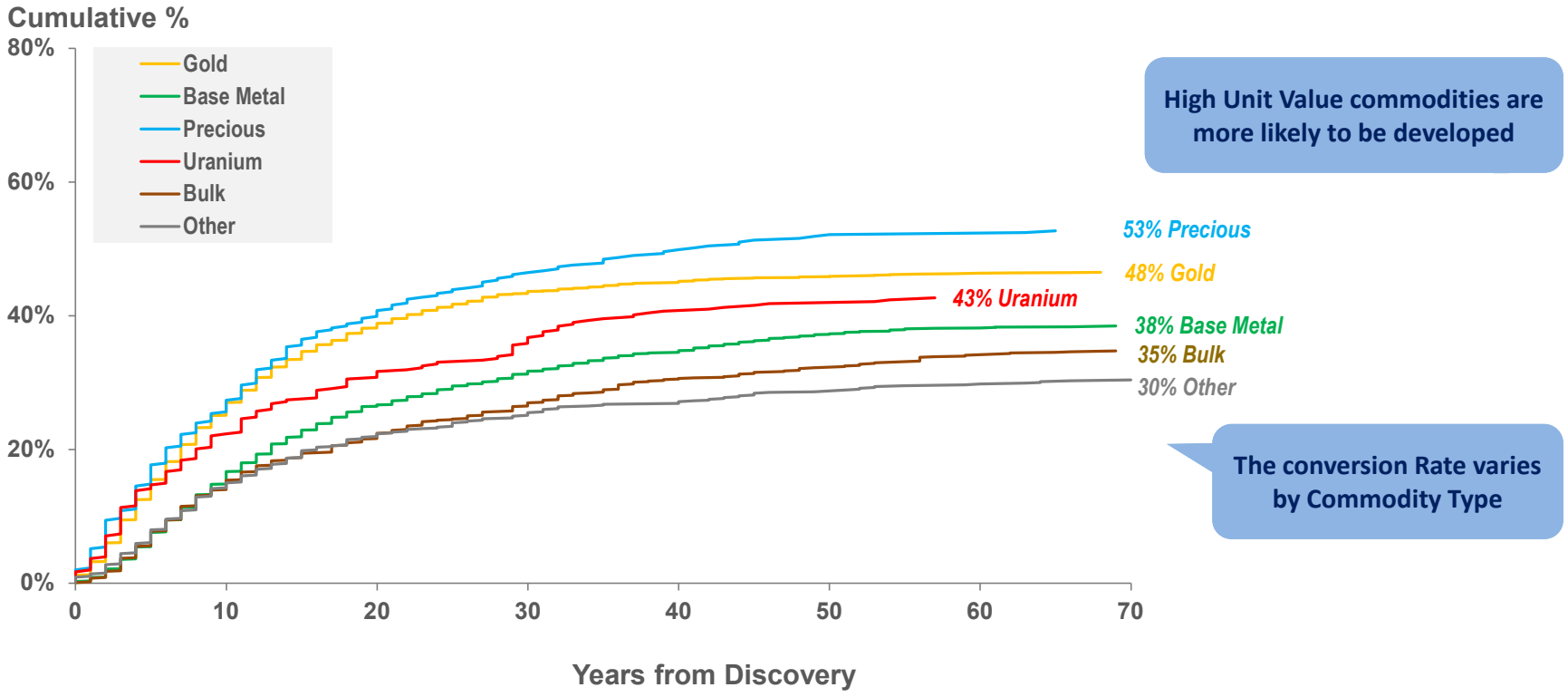


Note: Excludes artisanal discoveries

Source: MinEx Consulting © September 2025

Cumulative Number of Discoveries that become mines

All Significant Discoveries in the World : 1950-2024 : By Commodity

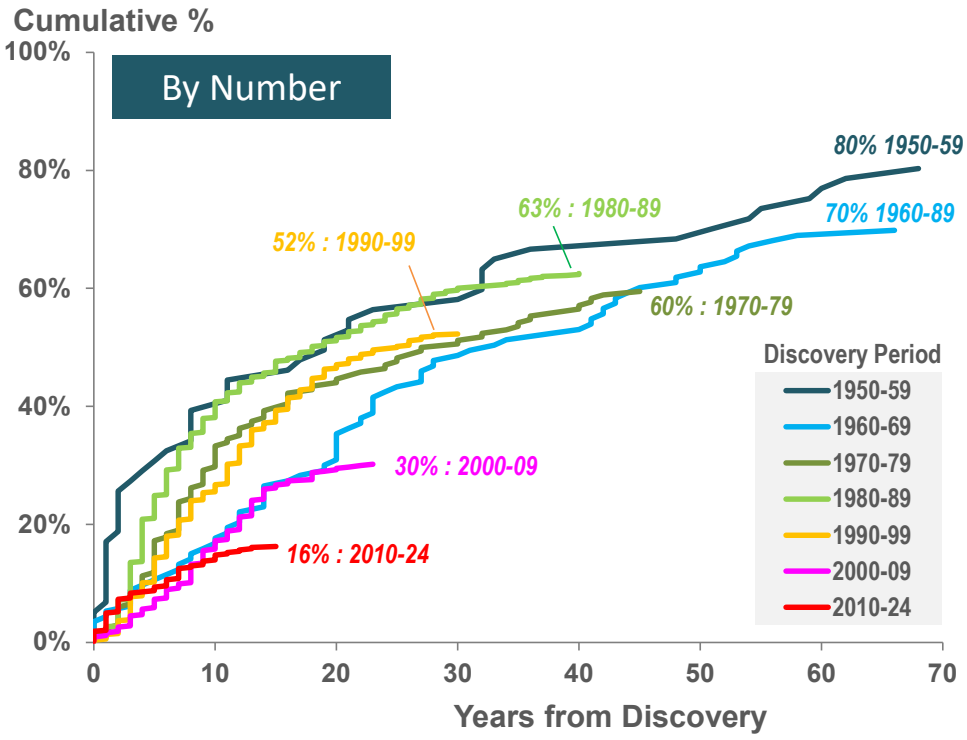


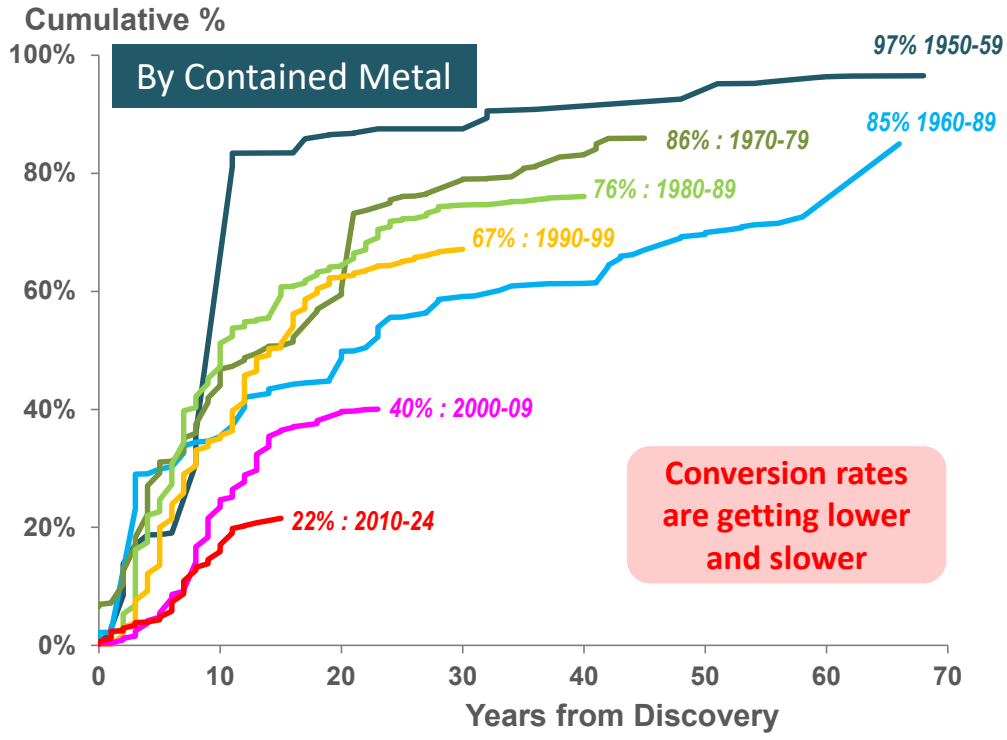
Note: Excludes artisanal discoveries

Source: MinEx Consulting © September 2025

Cumulative Number & Metal in Discoveries that become mines

All Significant GOLD Discoveries in the World : 1950-2024 : By Decade



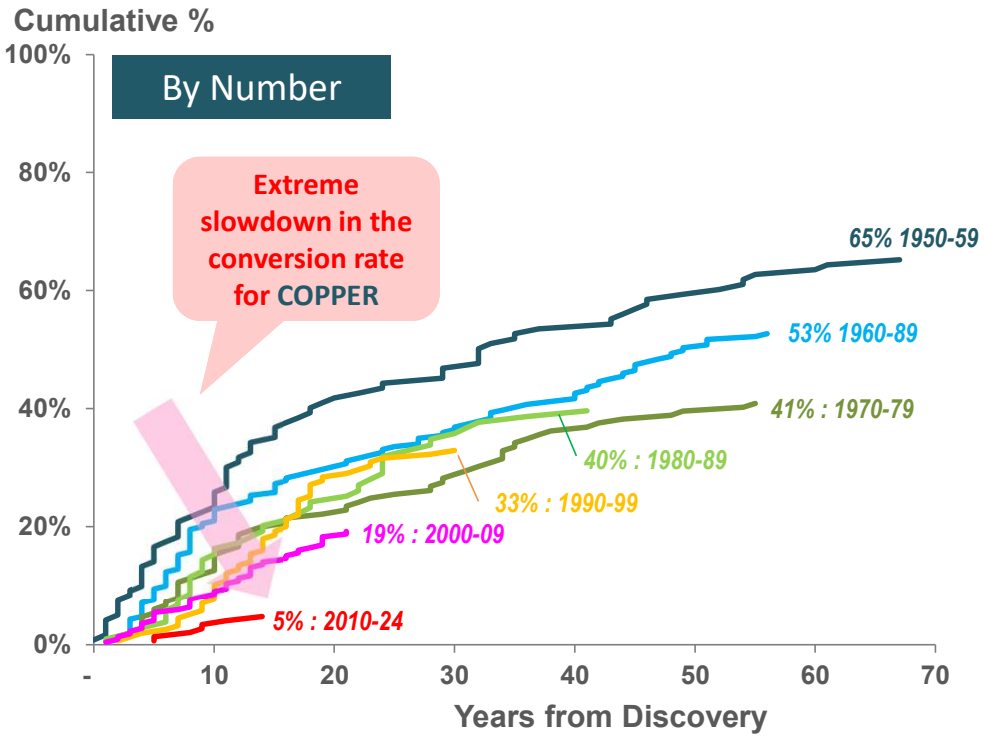


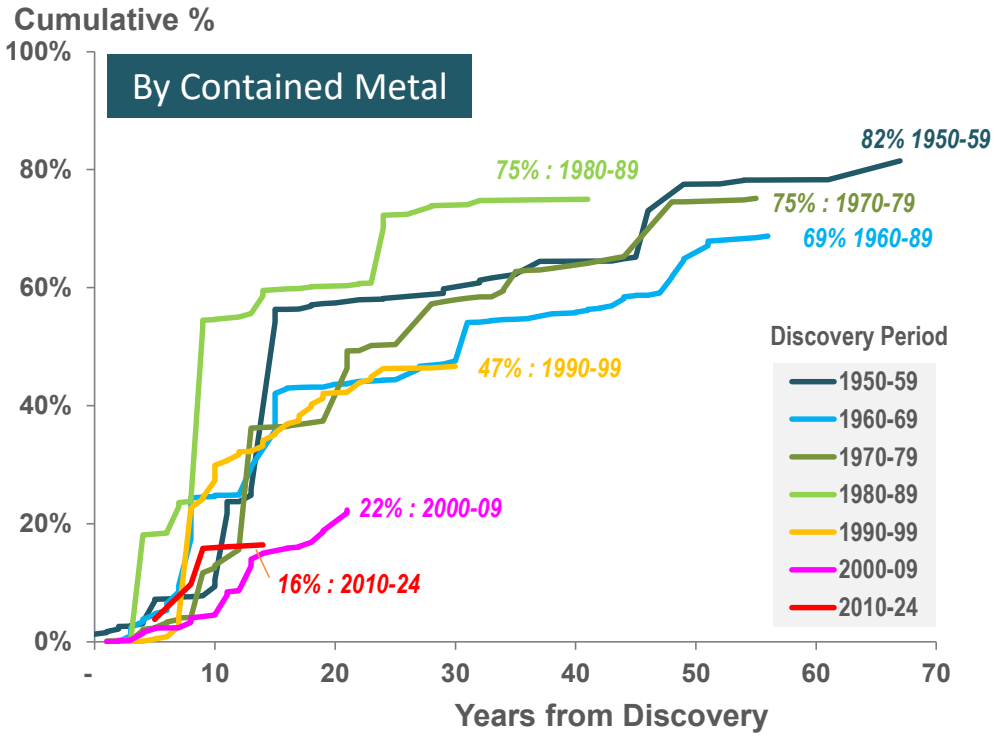
Note: Excludes artisanal discoveries

Source: MinEx Consulting © September 2025

Cumulative Number & Metal in Discoveries that become mines

All Significant COPPER Discoveries in the World : 1950-2024 : By Decade



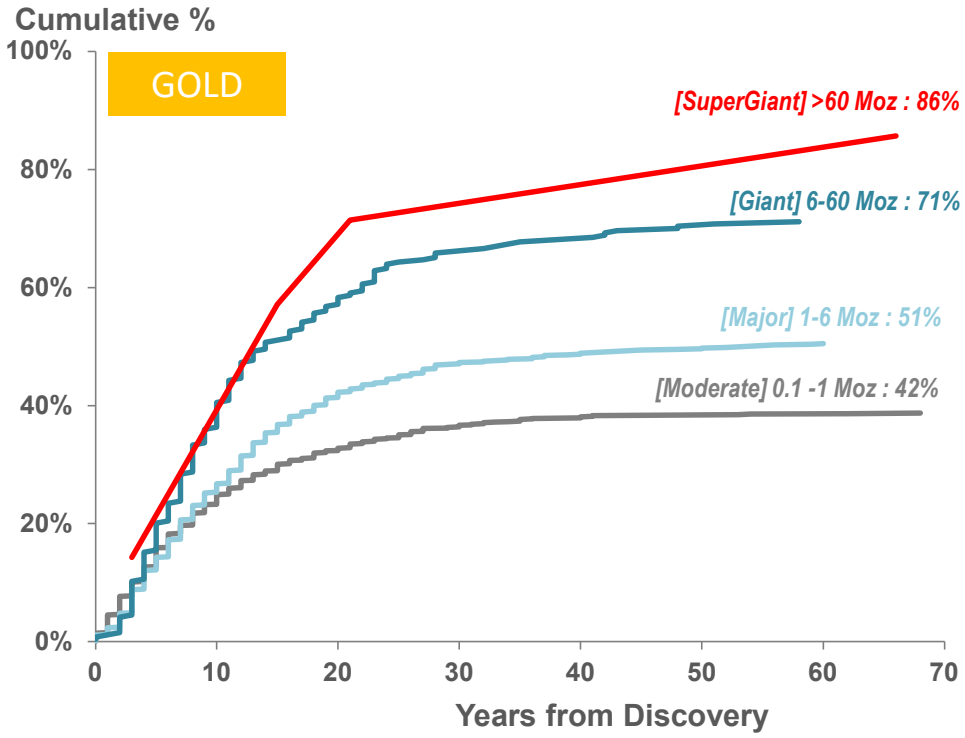


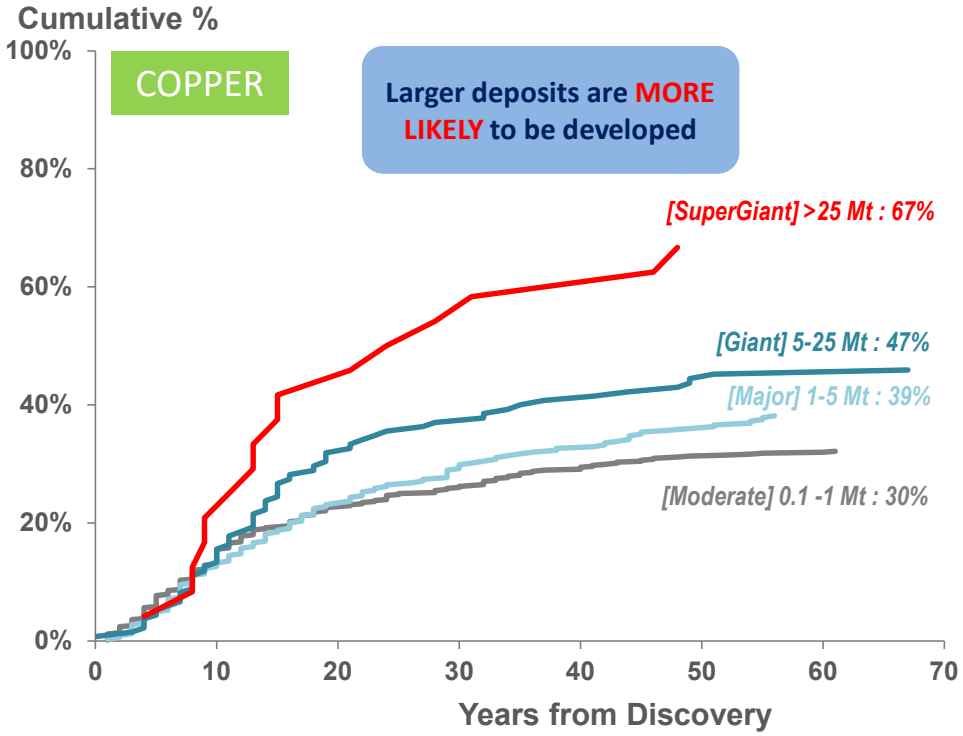
Note: Excludes artisanal discoveries

Source: MinEx Consulting © September 2025

Cumulative Number of Discoveries that become mines

All Significant Gold and Copper Discoveries in the World : 1950-2024 : By Size



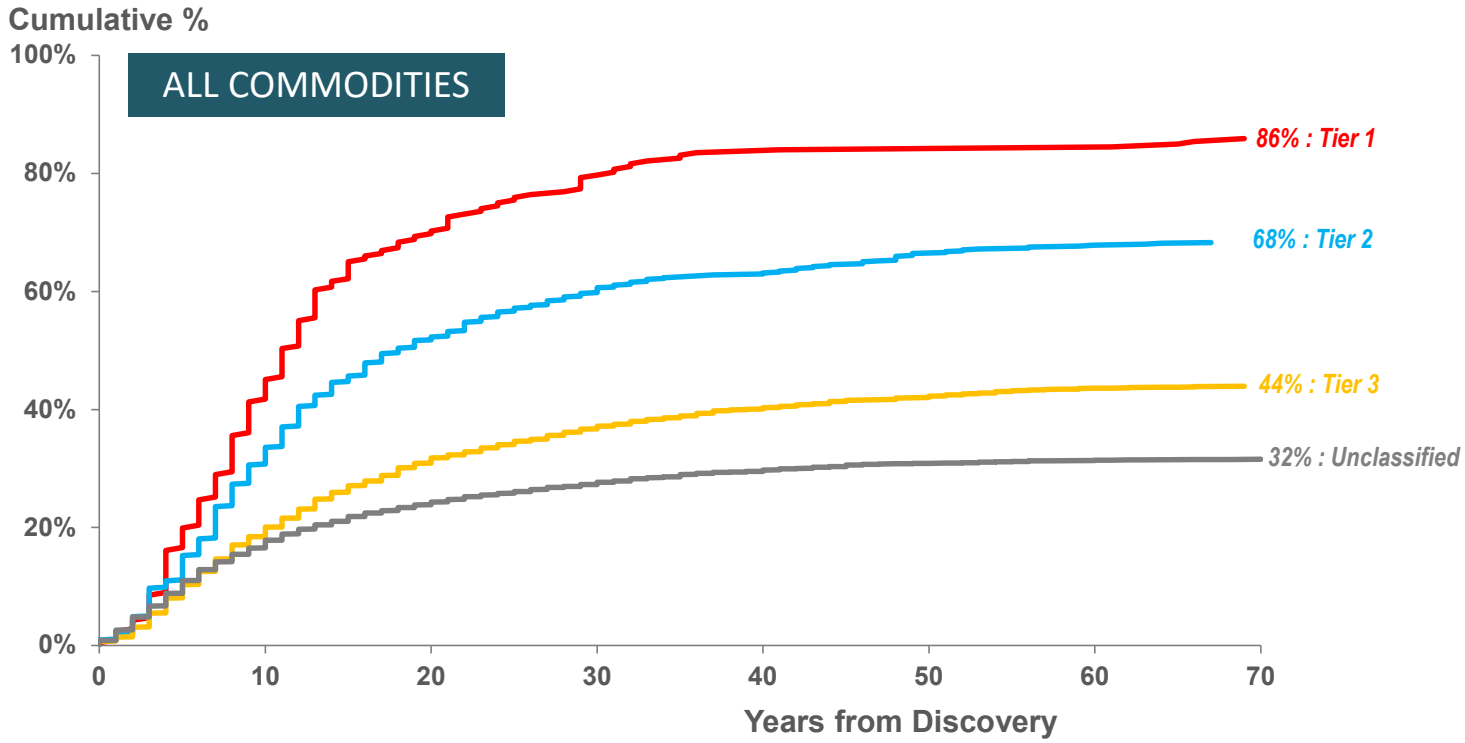


Note: Excludes artisanal discoveries

Source: MinEx Consulting © September 2025

Cumulative Number of Discoveries that become mines

All Significant Discoveries in the World : 1950-2024 : By Tier



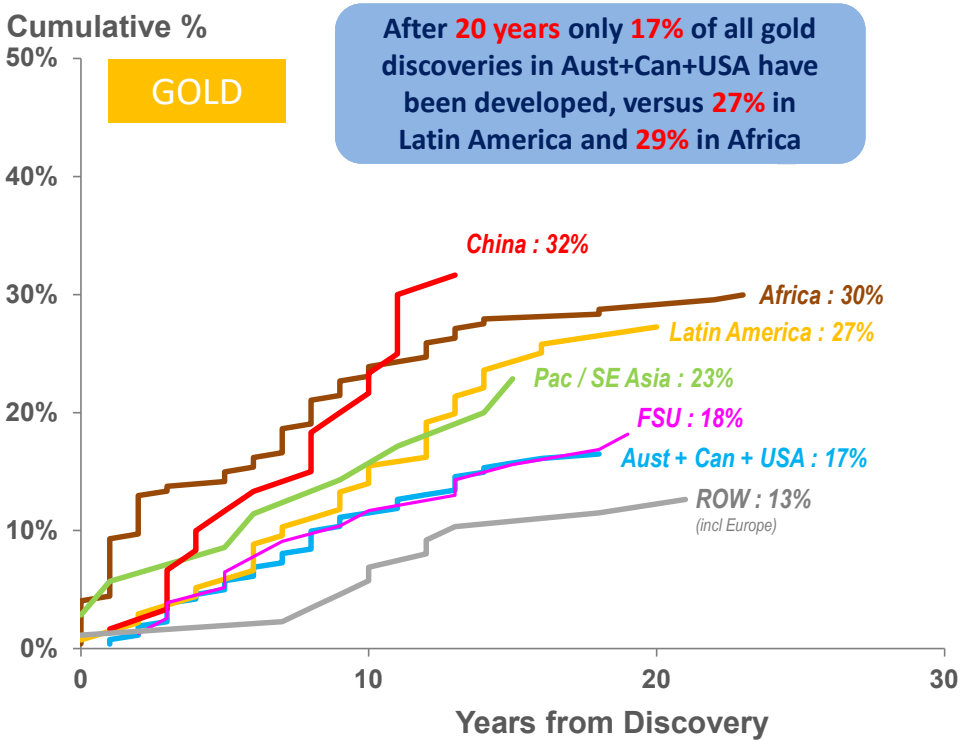
Tier 1 & 2 discoveries are **TWICE AS LIKELY** to go into production than Tier 3 or Unclassified deposits

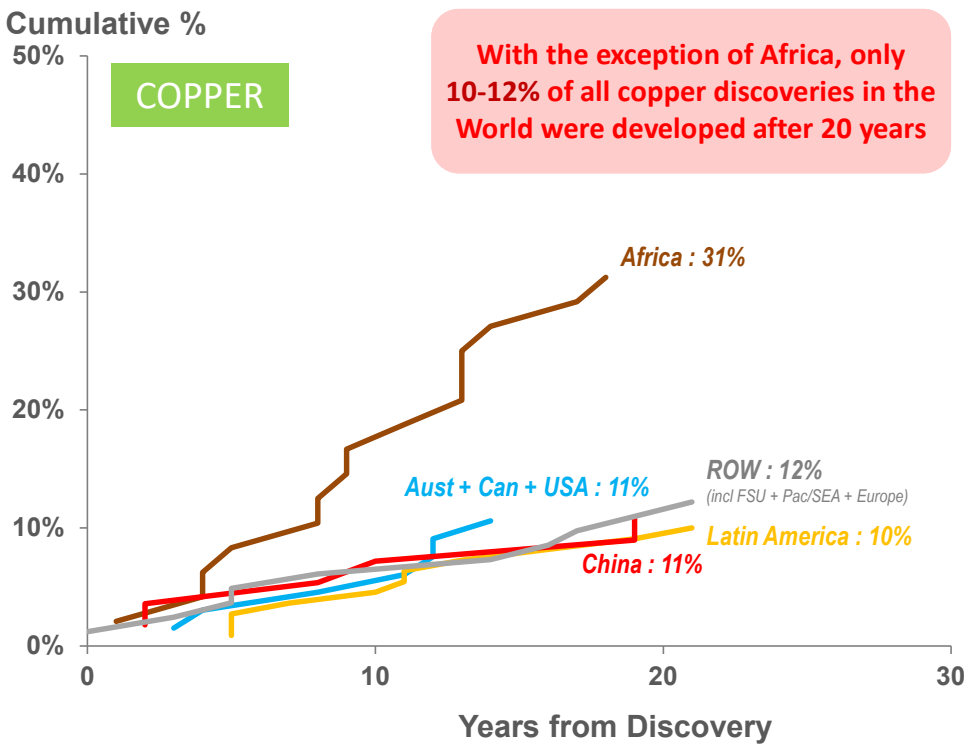
Note: Excludes artisanal discoveries

Source: MinEx Consulting © September 2025

Cumulative Number of Discoveries that become mines

All Significant GOLD & COPPER Discoveries in the World : 2000-2024 : By Region





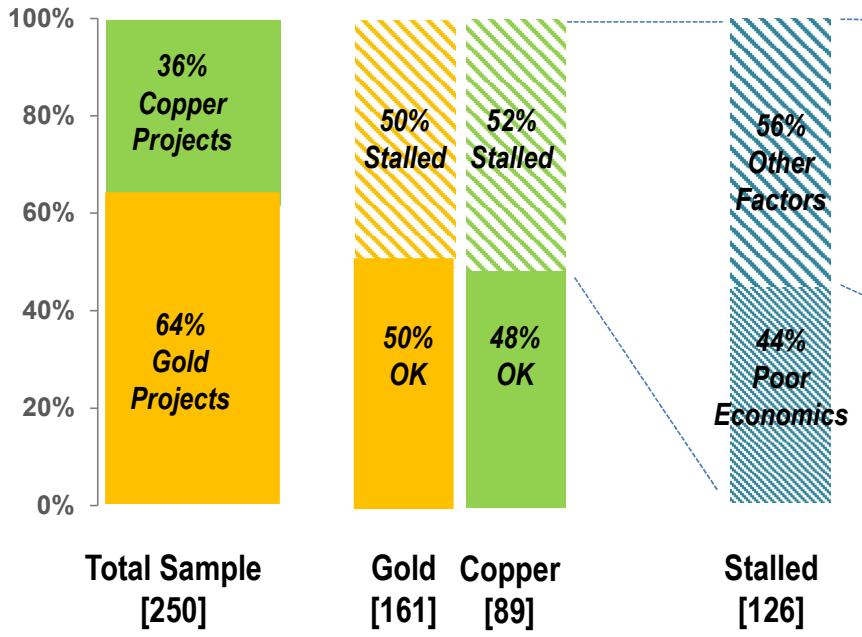
Note: Excludes artisanal discoveries

Source: MinEx Consulting © September 2025

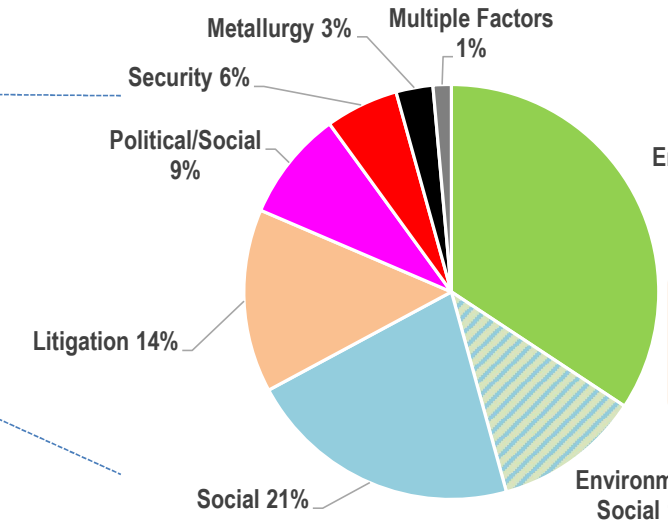
Half of all Projects at PreFeas/Feas are currently stalled

Current status of Copper and Gold Projects at PreFeas/Feasibility Study Stage: World

Assessed the current status of 250 Au & Cu projects (out of a total pool of 665 projects)



FACTORS STALLING THE PROJECT



Two-thirds of the other factors are associated with Social and Environmental issues

At the start of exploration you need to actively assess and manage these risks

Based on Gold and Copper Projects >100 koz Au and > 100 kt Cu

Source: MinEx Consulting © September 2025

Stalled Projects by Region

Current status of Copper and Gold Projects at PreFeas/Feasibility Study Stage: World

Region	No of Projects at Feas/PreFeas	No of Projects Assessed		Stalled Projects				
		All	OK	Poor Economics	Social & Environmental	Other Factors	Total	% Stalled
Australia	93	42	31	5	2	4	11	*26%*
Canada	107	51	37	6	6	2	14	*27%*
USA	65	22	8	4	9	1	14	*64%*
Latin America	144	54	17	15	13	9	37	*69%*
Africa	85	21	11	4	0	6	10	*48%*
Pacific / SE Asia	43	19	11	4	3	1	8	*42%*
FSU	59	19	4	11	2	2	15	*79%*
Rest of World	69	22	5	7	6	4	17	*77%*
	----	----	----	----	----	----	----	----
World	665	250	124	56	41	70	126	*50%*

Note: Being *"Currently Stalled"* isn't a death-sentence … with persistence and innovation (and better prices !) projects can progress

Caution: Indicative numbers only - as the analysis is based on a limited sample of assessed projects

Source: MinEx Consulting © September 2025

Half-seriously …

Making the discovery is the "easy" part. Unlocking its value by quickly turning it into a mine is becoming a real challenge

SUMMARY

Fingerprints of a Successful Discovery

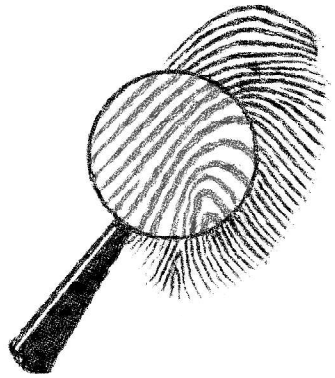
On average less than half of all discoveries get developed. Even worse, it's getting lower and slower.

- Currently less than 17% of discoveries in Australia + Canada + USA are developed after 20 years
- Half of all (Au and Cu) projects at the PreFeas/Feas Study-stage are currently stalled

Successful projects are:

None of this is "Rocket Science" … just common sense !

- Free of ESG issues that could stall/kill the project
- Has a high-unit value (per tonne of ore) – better potential with gold than base metals or bulks
- Giant-sized
- Potentially Tier 1 or 2 … these are TWICE AS LIKELY to go into production than Tier 3 or Unclassified
- Located in Africa ! Copper and Gold projects in Africa are 2x-3x more likely to be developed



Contact details

Richard Schodde
Managing Director
MinEx Consulting
Melbourne, Australia

Email: Richard@MinExConsulting.com
Website: MinExConsulting.com

Copies of this and other similar presentations can be downloaded from my website