

MBE & QIF Summit 2026:

The Political Problem with MBD

Linear Models

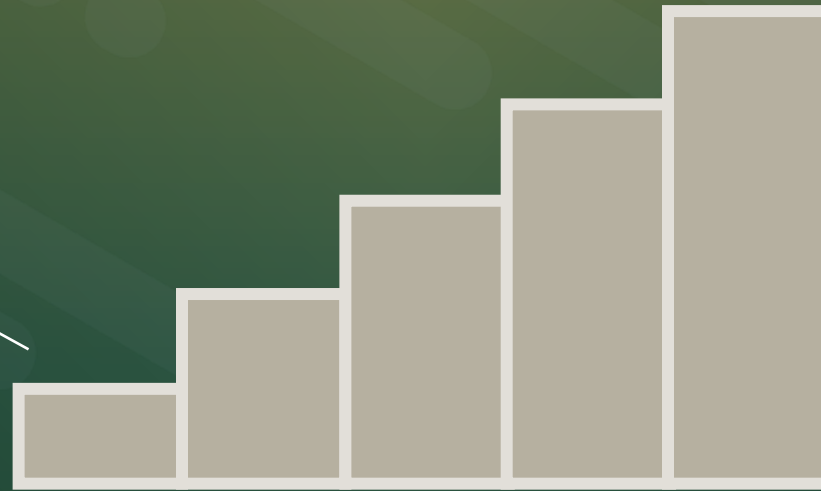
Phase 1 — Drawing-Centric / Baseline
3D models exist but are created to support 2D drawings. The drawing remains the legal/contractual deliverable. PMI is absent or minimal. Downstream consumers work from paper/PDF.

Phase 2 — Model-Assisted 3D geometry is used for visualization and some downstream workflows (CNC, CMM), but annotation is still on the drawing. The model is a convenience artifact, not authoritative.

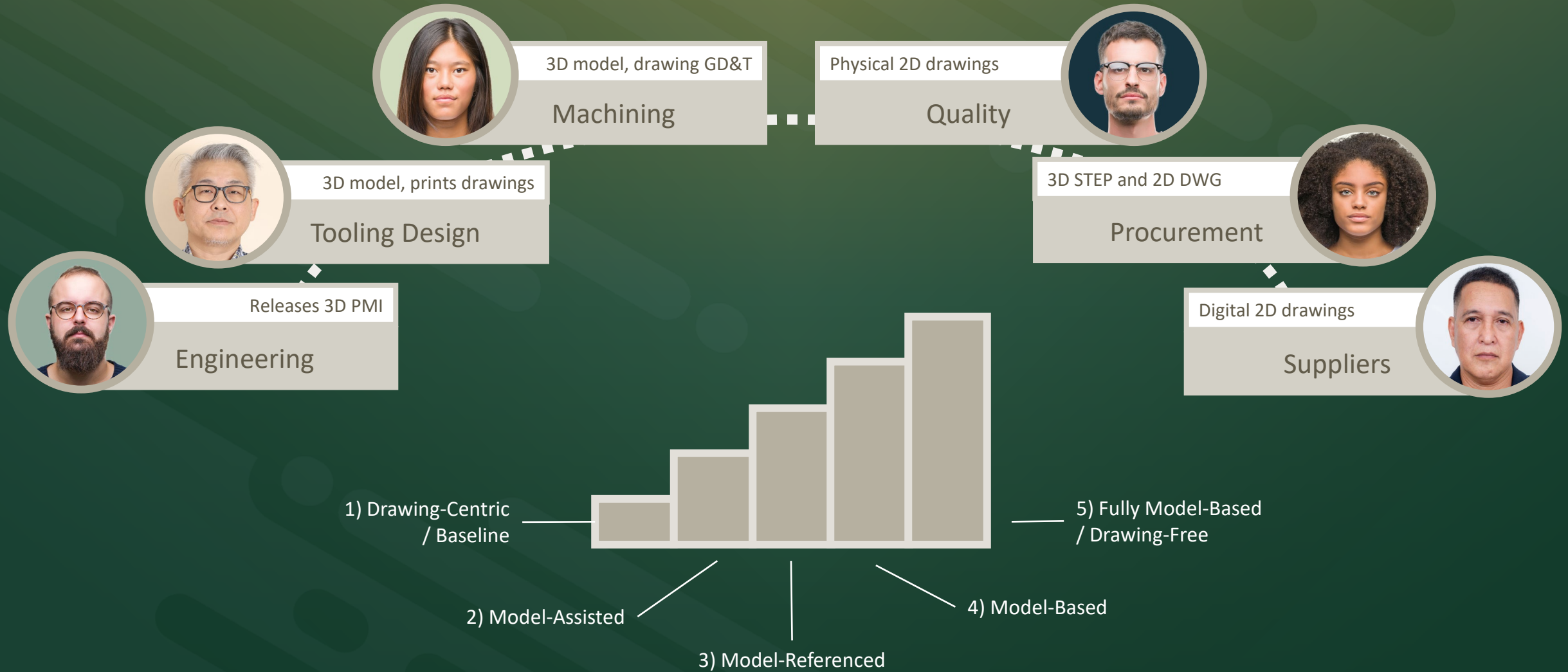
Phase 3 — Model-Referenced The 3D model is explicitly referenced in documentation as the primary source, but the drawing still exists as a companion document. PMI begins appearing on the model. Dual-source ambiguity is a persistent problem at this phase.

Phase 4 — Model-Based (Drawing-Reduced) PMI is authored on the model per standards (ASME Y14.41, ISO 16792). Drawings are generated from model annotations rather than authored independently. The model is contractually authoritative for most use cases.

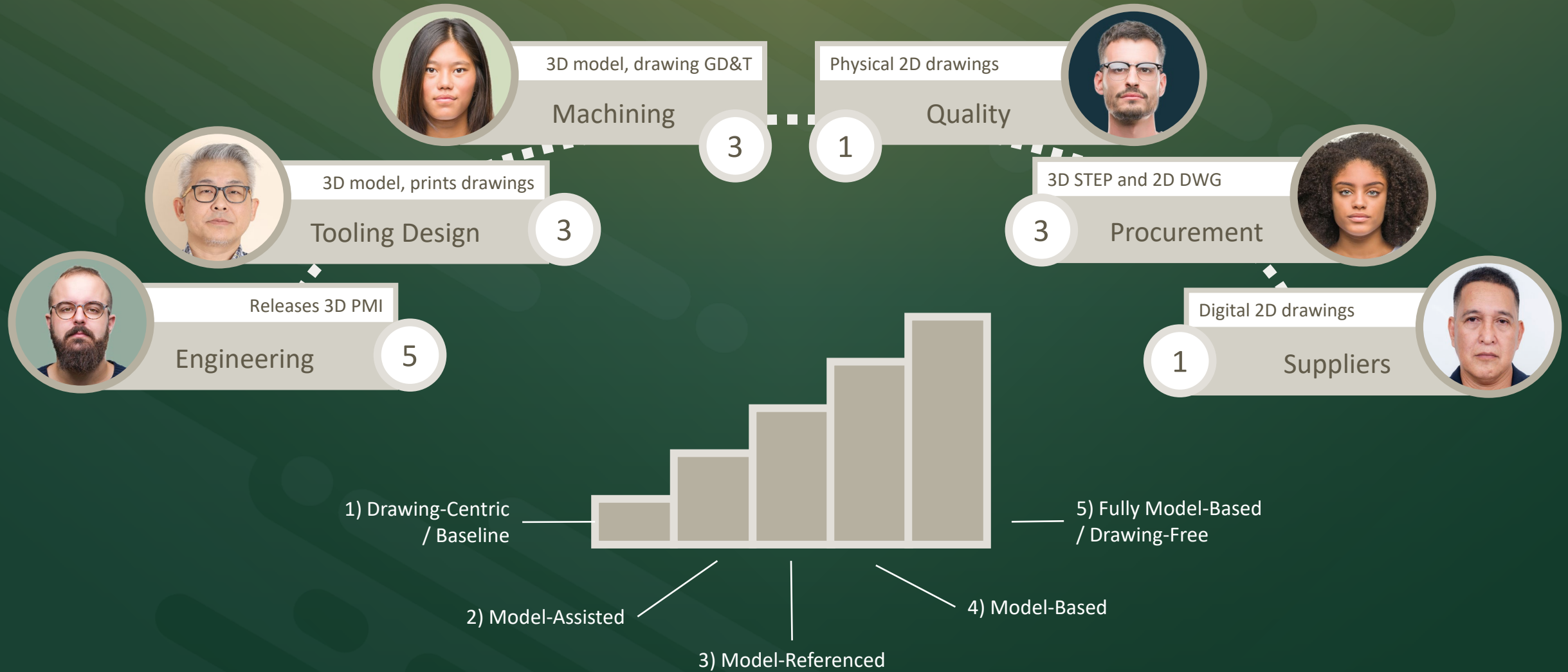
Phase 5 — Fully Model-Based / Drawing-Free No 2D drawings are produced or required. Downstream consumers (manufacturing, quality, suppliers, procurement) all consume the annotated model directly. Full upstream-to-downstream digital thread continuity.



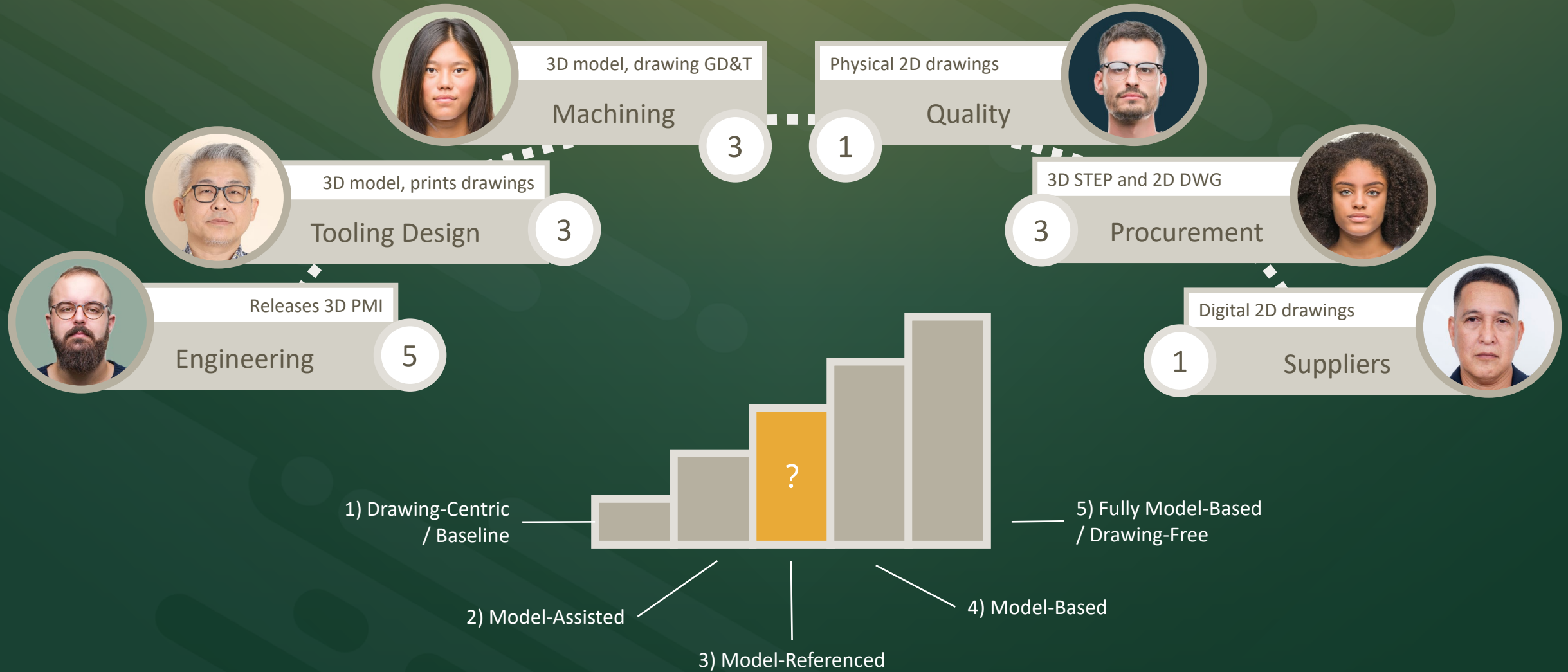
Linear Models



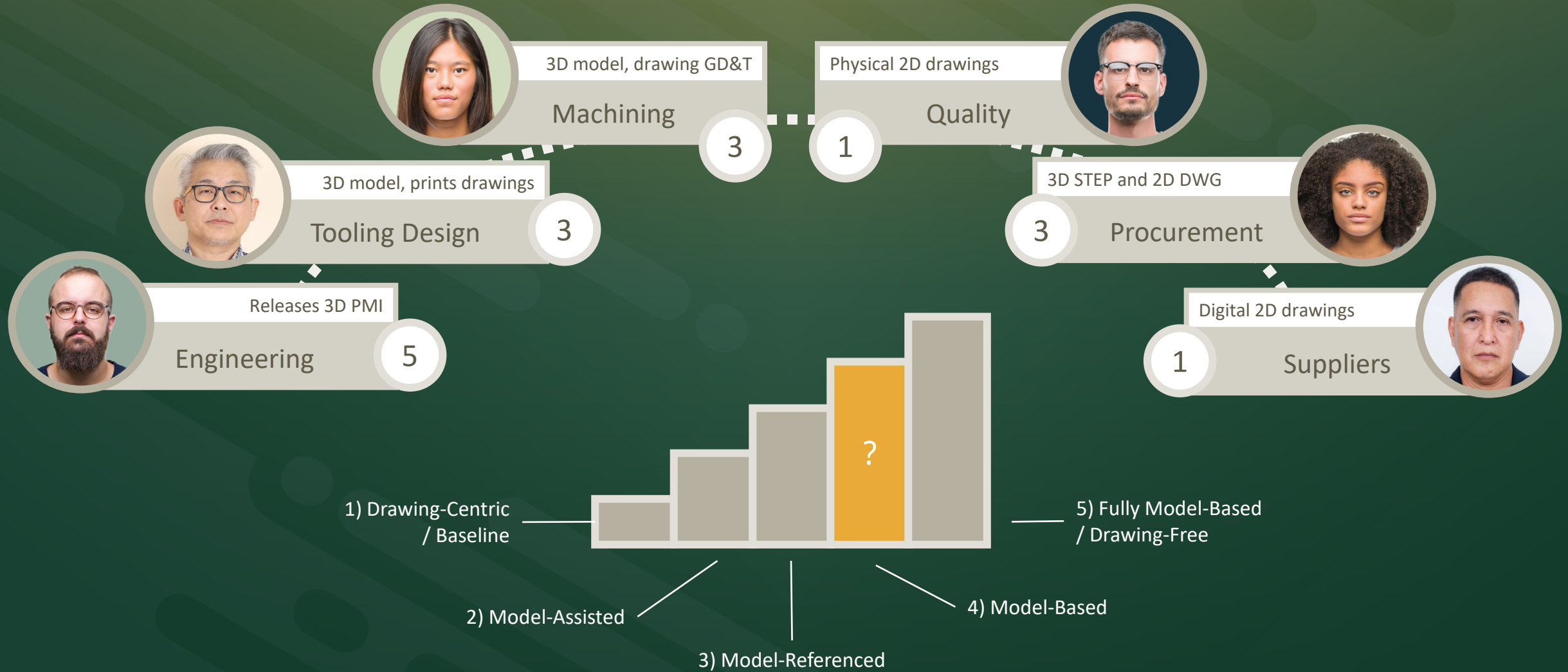
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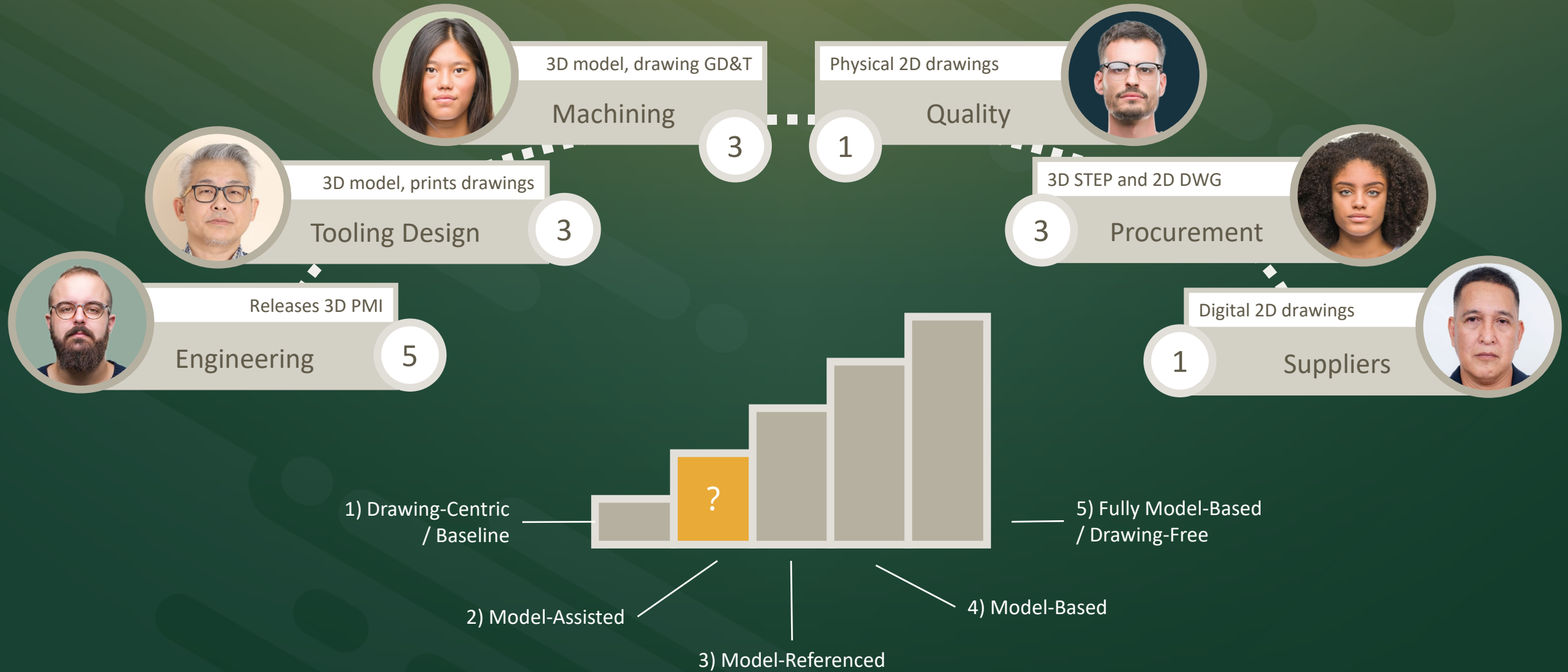
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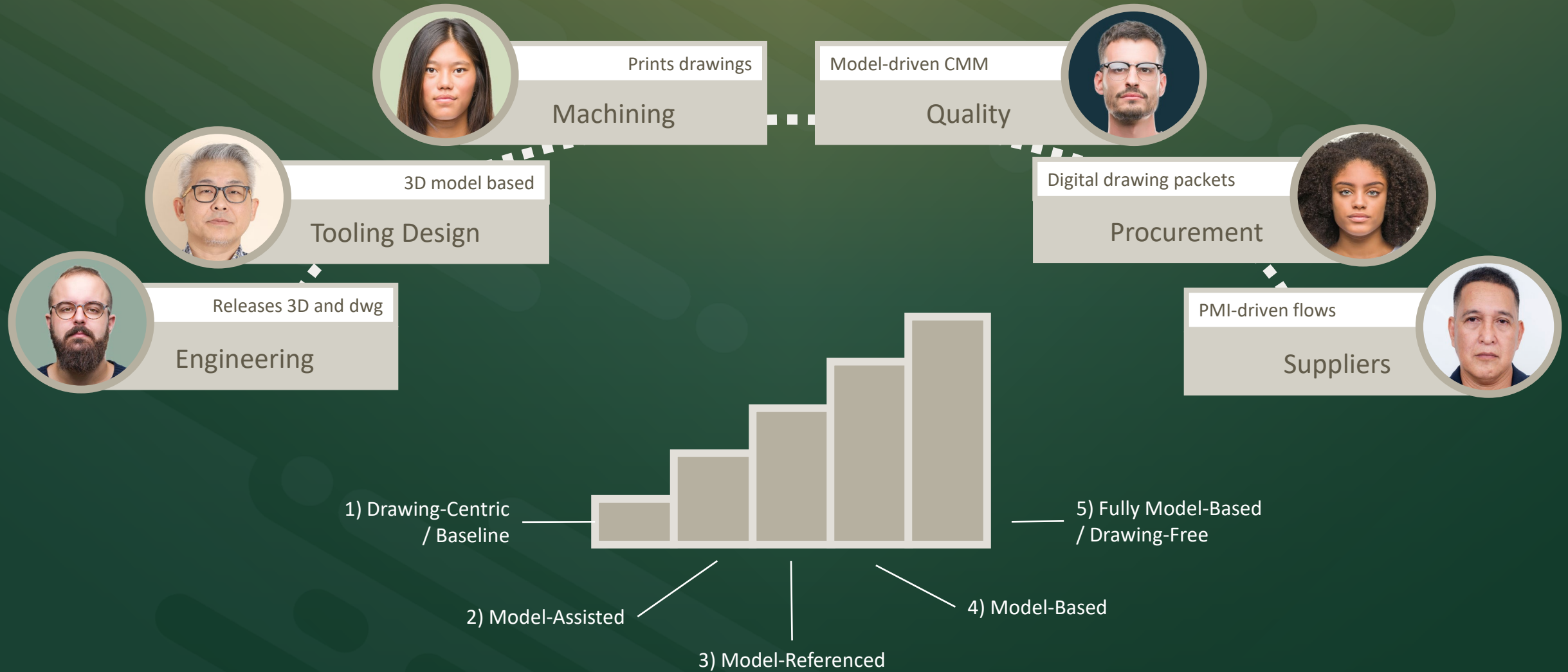
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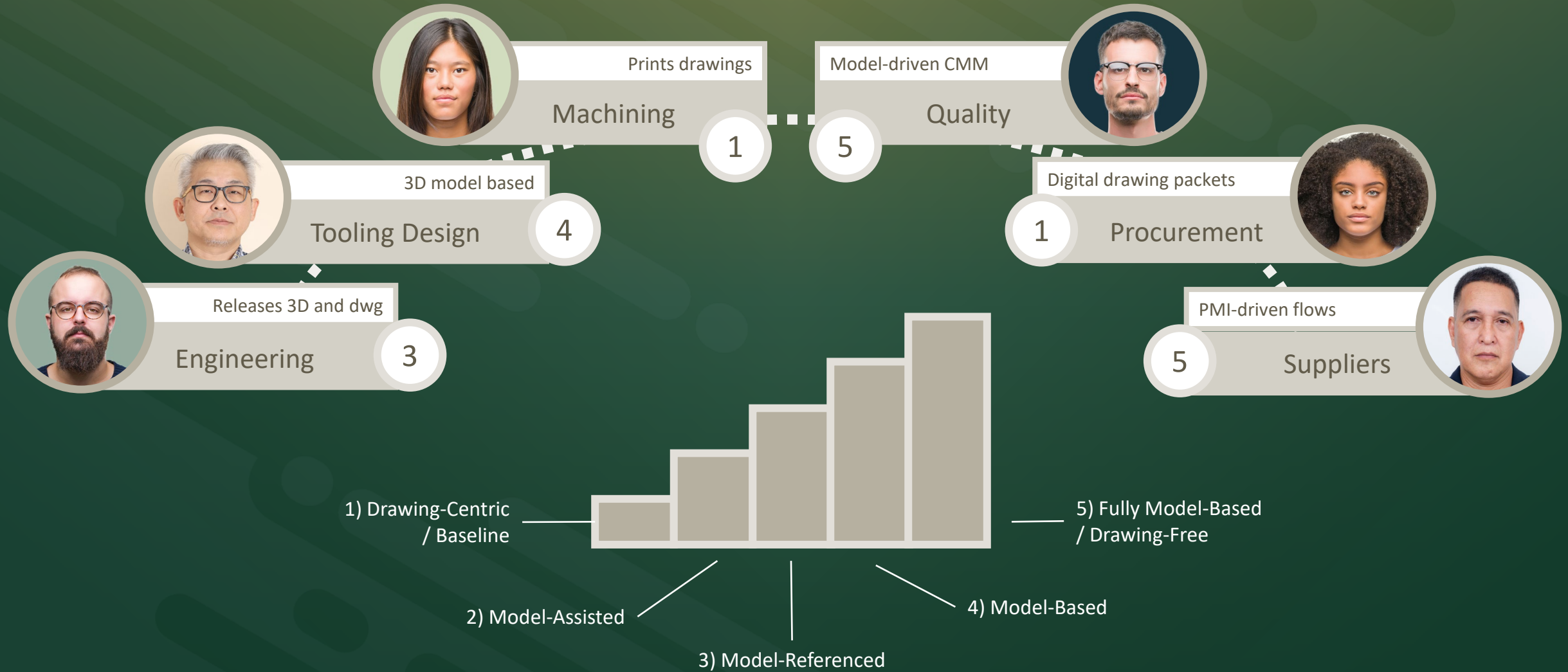
Linear Models



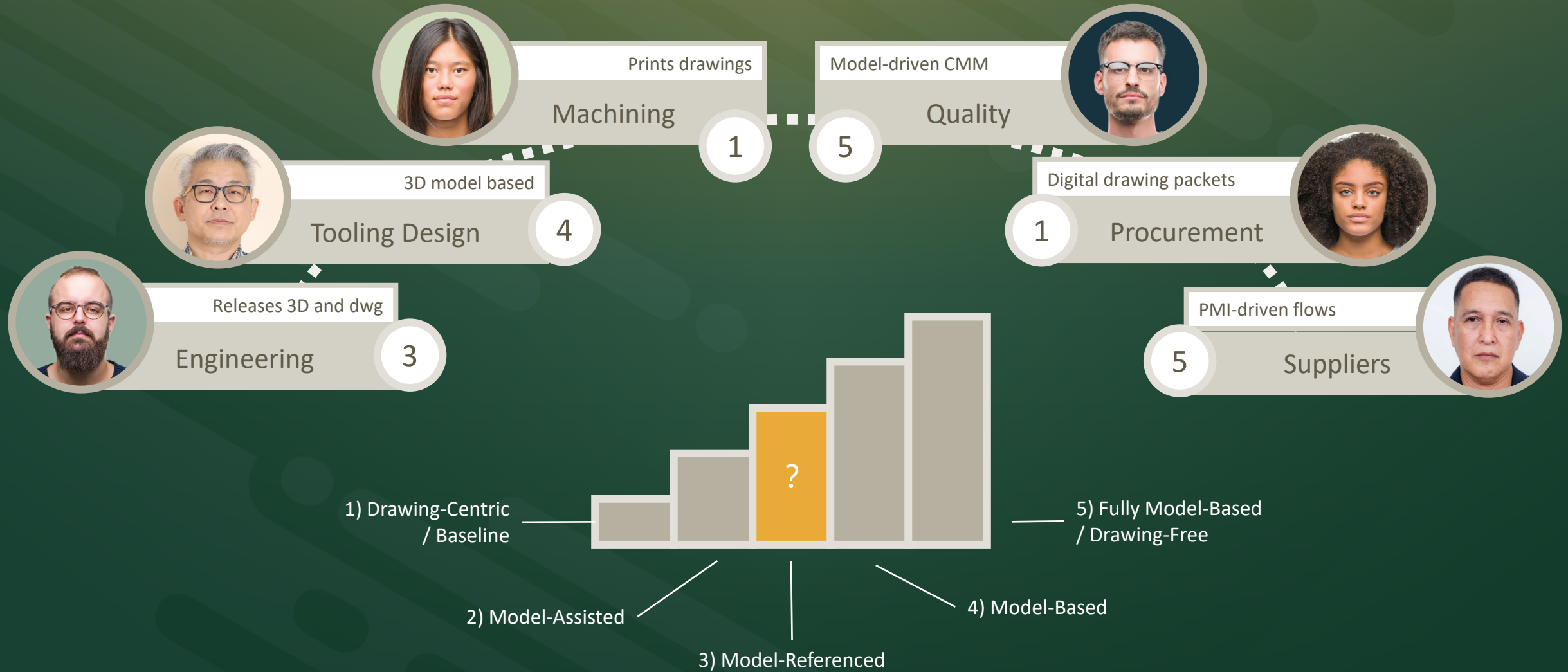
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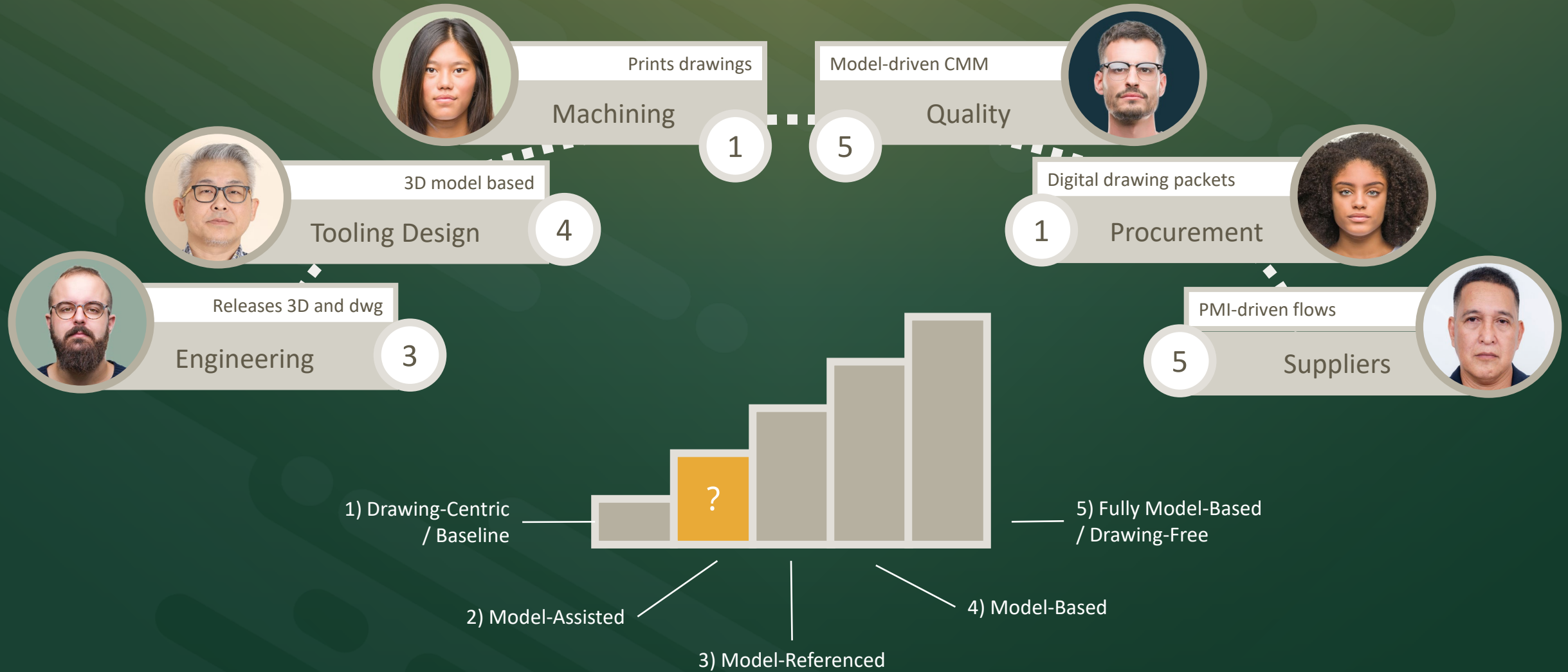
Linear Models



Linear Models



Linear Models



It Starts on Day One

“Misalignment between engineering and manufacturing created friction right away.”

This isn't a late-stage failure. It starts on day one.



Structural, Not Accidental

“Procurement and suppliers struggled because they were not accustomed to receiving digital models instead of drawing.”

“Quality teams often operate in silos making integration difficult.”

Two different functions. Same pattern.
Structural, not accidental.



Research Findings

Winter 2026, n=132

Engineering Deliverable Reality

- ~75% release 3D with PMI — on paper, strong adoption
- 57.6% also release 3D without PMI — often the same organization, different deliverables to different functions
- 61% running mixed formats with no clear path to standardization

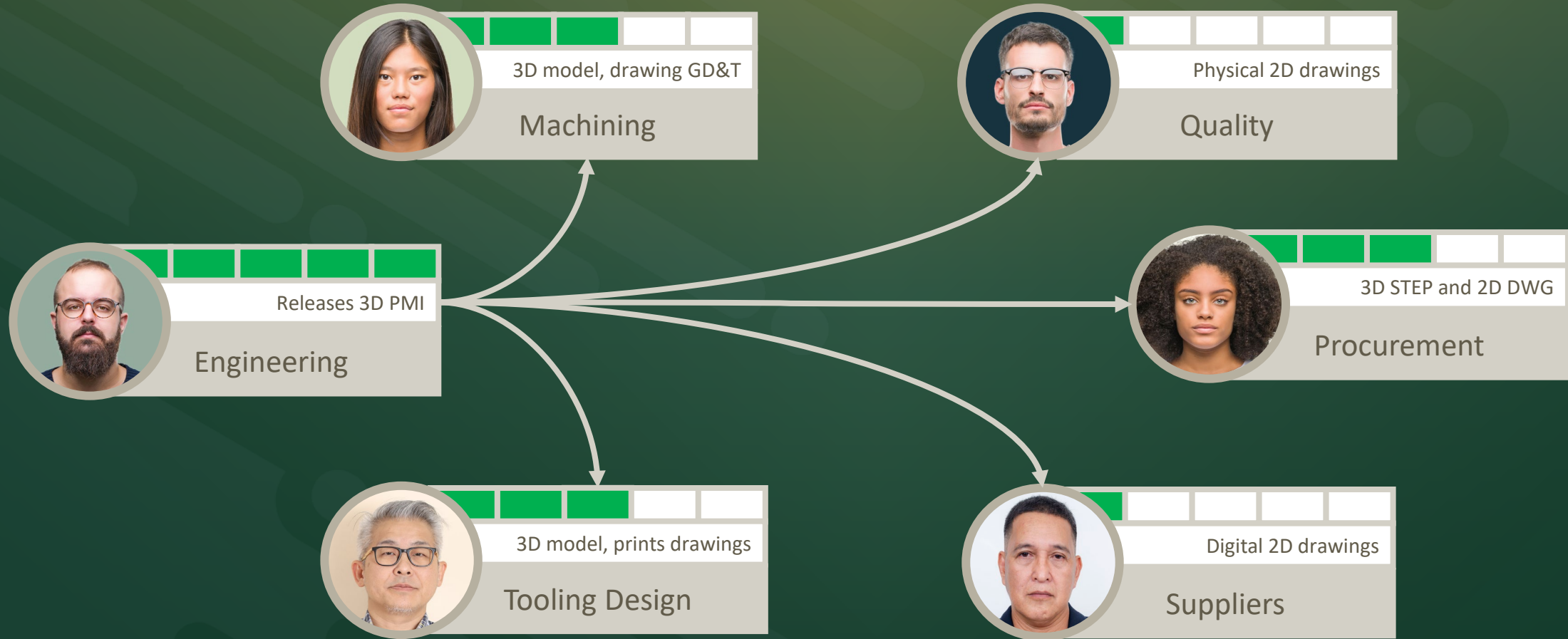
Physical Printing Rate by Function (n=132)

- Tooling Design 57.7% | Technical Documentation 44.8% | Procurement 42.5%
- Suppliers 39.3% | Quality 36.2% | Machining/NC 35.1%

81% of initiative leaders self-report strong success — yet downstream printing rates reveal a systematic gap between perceived progress and actual adoption.



The Multi-Track Maturity Model



MBD Crosses the Org Chart, and Trust Matters



「The Sound of Resistance

“Unclear ROI or benefits.
Collaboration between
engineering, manufacturing, and
supply chain.”

Not obstruction — genuine confusion
about what success looks like and who
owns it.



Managing Expectations

The Governance Problem

- Execs were sold a linear story and expect a progress bar
- No single engineering leader controls the outcomes that determine MBD success
- MBD success requires CEO or COO ownership with authority to make binding decisions across all department heads simultaneously

Use the Functional Model Proactively — Before the Exec Asks

- Contrast 81% self-reported success vs. 27–57.7% downstream printing rates
- Frame it as a measurement problem, not bad news
- This is a governance request with a quantified business case — not a technology request



Frame the Upside

“Reduce engineering cycle time by 25% by adopting a single source of truth for models and data.”

“MBE helped us eliminate redundant documentation, automate key processes, enhance cross-department visibility, and achieve more predictable manufacturing outcomes company-wide.”

Product development cycles shortened 20–50%.
Engineering cycle time reduced 25%+.



Obstruction to Ownership

The Resistance Data

- 77% experience moderate to extreme resistance (n=132)
- 34.1% face high resistance across multiple groups simultaneously
- Only 7.6% report no noticeable resistance at all

Resistance by Function

- Manufacturing/Tooling Design: Throughput accountability; transition temporarily threatens it
- Quality: Compliance and audit requirements may genuinely mandate paper — not pretext
- Suppliers/Procurement: No commercial incentive to invest while 2D remains available



Two Functions, Two Motivations

“Engineers clung to 2D drawings, suppliers demanded PDF printouts immediately.”

That’s the reality change agents are navigating.



External Problem, Internal Cost

“Some suppliers and subcontractors haven’t fully embraced MBD standards yet. Some external parties still want 2D drawings, which means we have to redo stuff and backtrack, adding to the engineering team’s workload.”

“We faced resistance from suppliers who had not yet adopted compatible digital tools and from teams hesitant to use workflows embedded with PMI.”

Supplier resistance creates internal rework. The external problem lands back on the engineering team that started the initiative.



The Personal Bit

“Some senior employees felt that MBD’s 3D model annotation was too cumbersome and refused to learn the new modeling tools.”

The most vocally resistant person is often the one who cares most about how their function operates. That makes them the right **co-author**, not the right opponent.



Resistance to Participation

“After using MBD, suppliers can machine and inspect parts directly from 3D models, greatly improving first-article qualification rates and cutting communication costs.”

“We reduced the time spent creating technical files by automating the traceability of requirements, models, tests, and risk documentation.”

“MBE improved traceability, making compliance and documentation far more efficient.”

Suppliers. Technical Documentation. Quality. Once they owned the outcome.



Three Monday Moves

- Map your org chart, not your maturity model. Identify which executive owns each downstream function.
- Reframe governance before the exec asks. Use the research data to anchor the conversation: measurement problem, not failure.
- Convert one resister this quarter. Find the most vocal critic in a downstream function and make them a co-author of the standard for their function.



MBE Initiatives Deliver Value

“Communication between engineering and manufacturing has become much smoother.”

“MBD/MBE initiatives improved product development speed, reduced errors, enhanced collaboration, and shortened time-to-market while lowering production costs.”

“This allowed us to anticipate manufacturing problems, which significantly reduced costs.”

