

Adoption Challenges in Artificial Intelligence and Machine Learning: Why Technology Acceptance is Hard (and What We Can Do about That)

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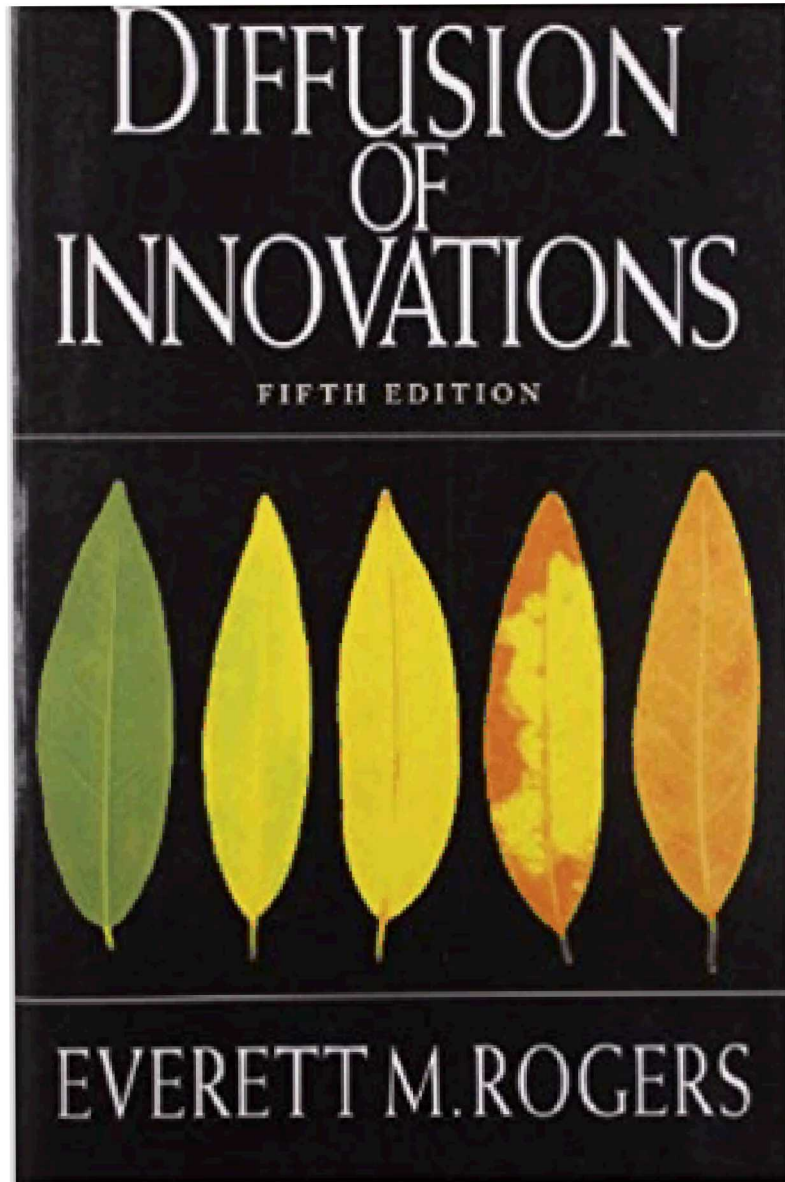
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- The literature on *innovation diffusion* is worth reading.
- Algorithmic technologies have very specific adoption challenges.
- Multidisciplinary engineering environments can make innovation adoption challenging, too.
- AI/ML innovations need thoughtful, deliberate strategies to deal with these challenges.

Innovation Diffusion



- Categories and Characteristics of Adopters
- Characteristics of Technologies
- The Decision Process
- The S-Curve of Diffusion

EVERETT ROGERS' ADOPTER CATEGORIES



Source: Everett Rogers, *Diffusion of Innovations* model

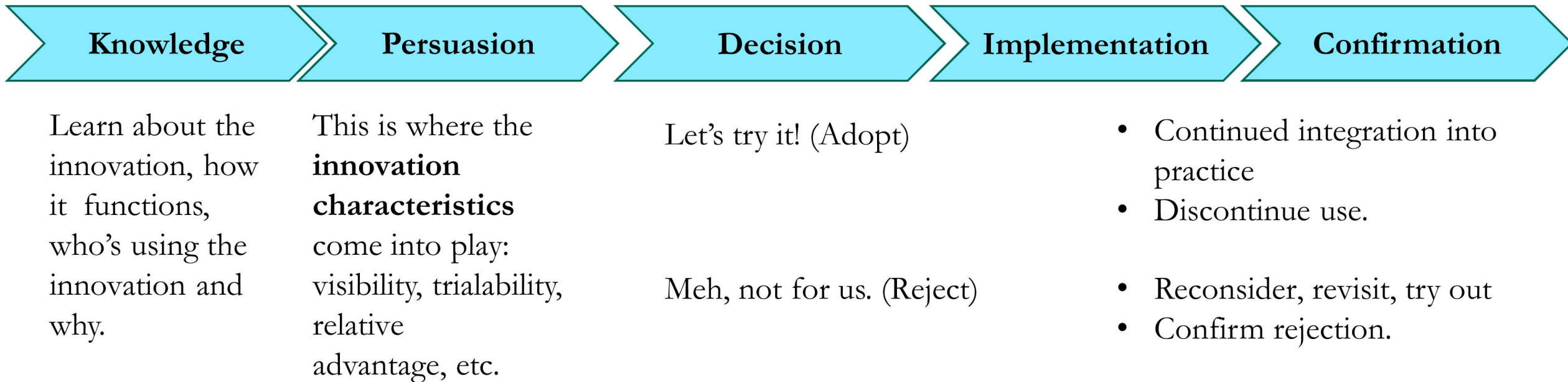
CHARACTERISTICS OF INNOVATIONS

1. **VISIBILITY.** How visible is this technology? How impactful is it? To what extent are its benefits describable to others?
2. **COMPATIBILITY.** How well does the technology fit into existing ways of doing work? Does the technology support the tasks and outcomes that people are responsible for achieving?
3. **TESTABILITY.** Can people experiment with, try out, get to know the technology, without making a wholesale commitment?
4. **COMPLEXITY.** How difficult is it for the target user group to develop an accurate working mental model of the technology, so they can apply it effectively in their work?
5. **RELATIVE ADVANTAGE.** Compared to existing ways of doing work, what benefits does this bring? How much work is required for the technology to be useful?

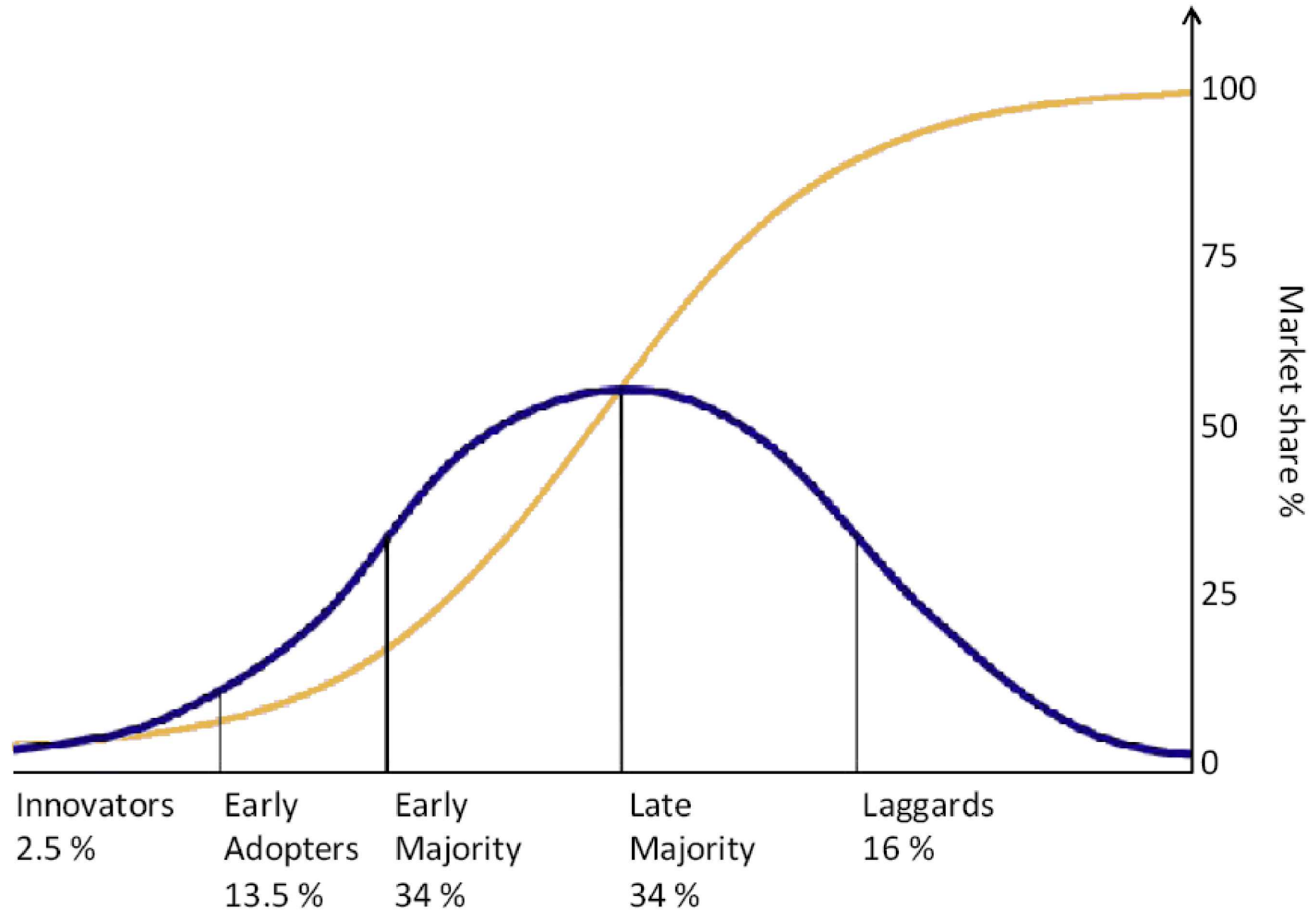
DIFFUSION IS EXPLORATORY DECISION-MAKING

Existing Context:

- Decision-making framework: Optional/individual, collective, or top-down (authoritarian)
- Social network and communication patterns
- Perceived/recognized need
- Individual differences



THE DIFFUSION S-CURVE

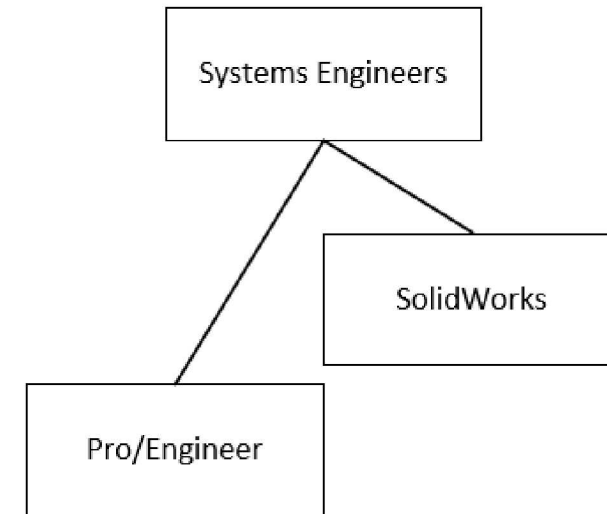
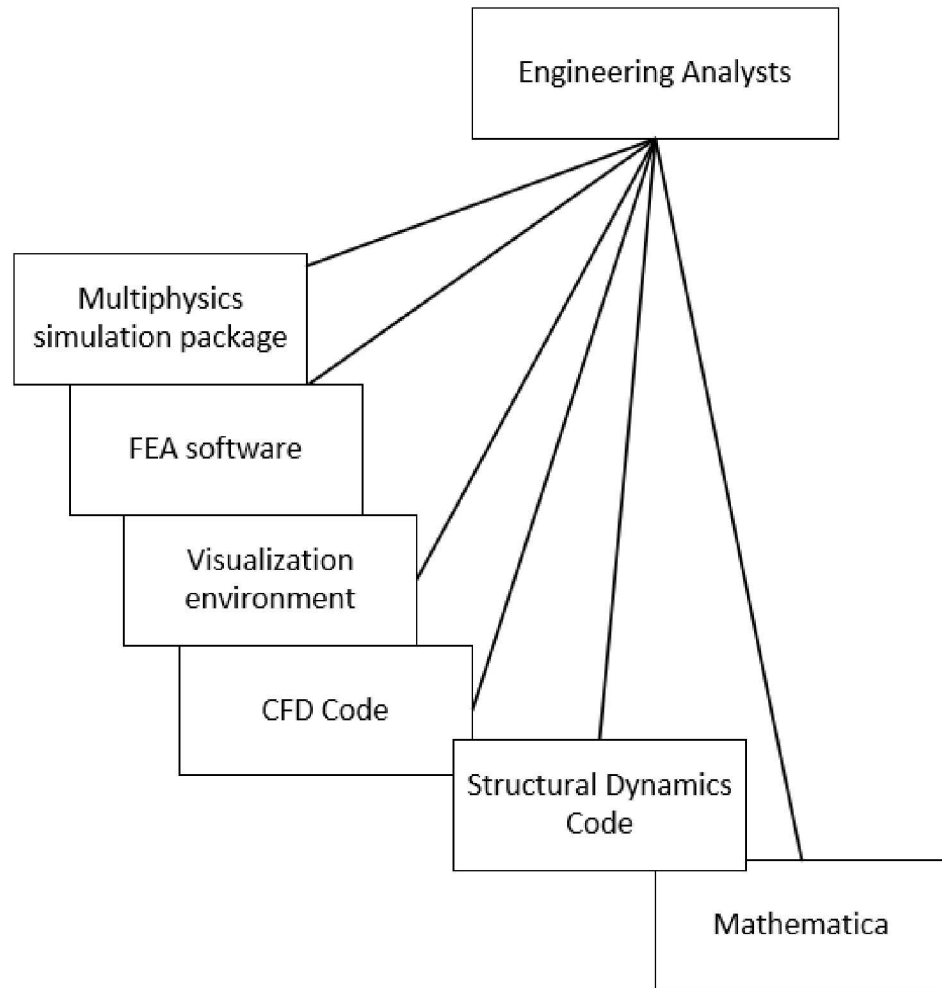


Algorithmic technologies have specific innovation challenges.

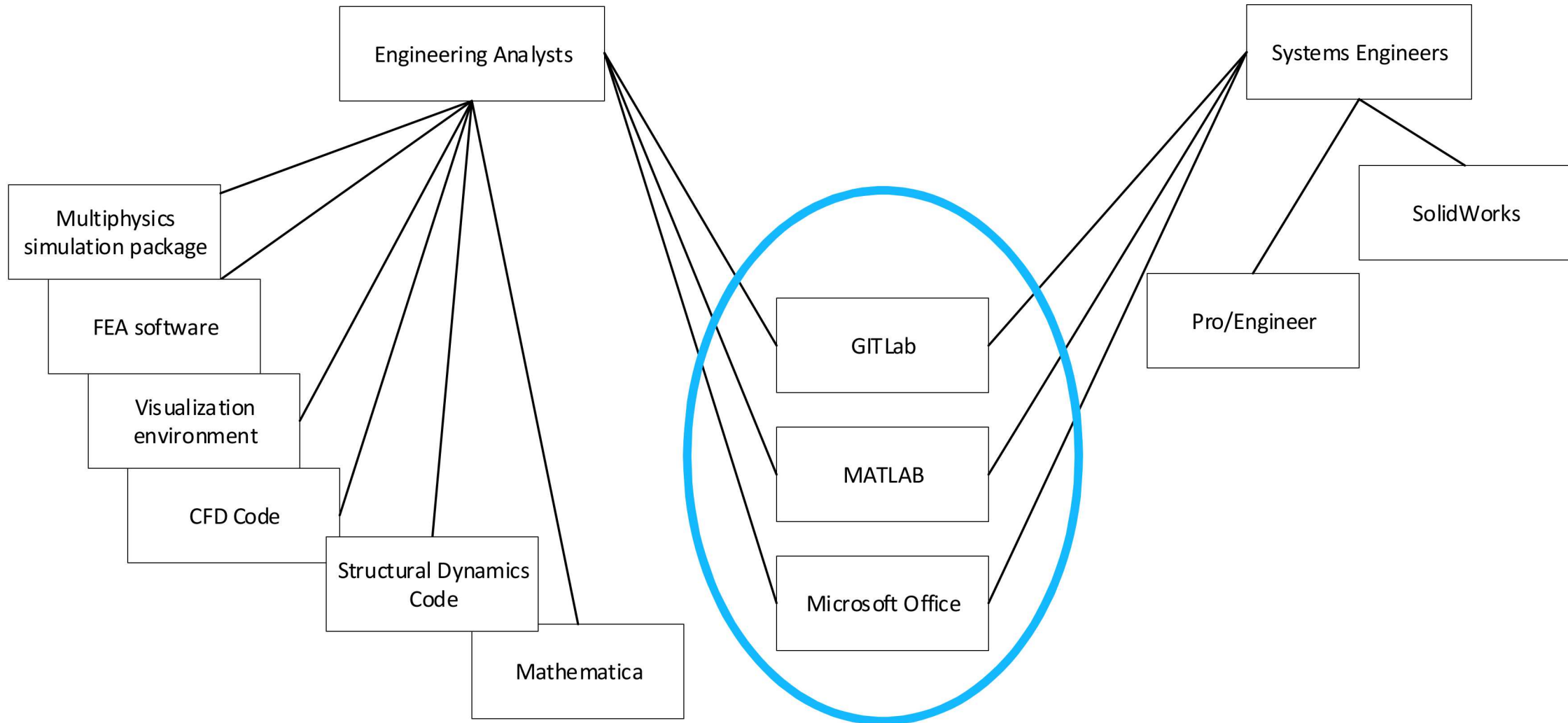
CHARACTERISTICS OF ALGORITHMS AS INNOVATIONS

1. **RELATIVE ADVANTAGE.** The MATLAB problem. Why should I use your techniques when I've got MATLAB?
2. **COMPATIBILITY.** My customers expect me to deliver an analysis or a design within (x) days, within (y) budget. How much extra work/investment is required for me to incorporate your technology?
3. **COMPLEXITY.** The workings of artificial intelligence, machine learning, and other algorithmic technologies can be difficult to understand, even for highly educated target user groups.
4. **VISIBILITY.** To what extent are peers, colleagues, leaders, other groups integrating this technology into their engineering workflows? What's the impact?
5. **TESTABILITY.** How do I get the trial version? Does trying this out introduce risk? Can I revert to MATLAB if this isn't useful?

Multidisciplinary engineering environments
can be challenging, too.



THE MATERIAL CULTURE OF WORK



Algorithmic technologies need thoughtful,
deliberate diffusion strategies.

FACILITATING DIFFUSION

1. **DON'T BLAME THE LUDDITES.** It's called correspondence bias, we all do it, and it's a dangerous trap.
2. **EXAMINE THE ENVIRONMENT.** Structural factors, such as funding sources and delivery schedules, can impede diffusion – or facilitate it.
3. **WHAT IS THE TARGET DOMAIN GENERATING?** If you can support people in developing their deliverables, you build trust and promote their success.
4. **INTERDISCIPLINARY TEAMS.** An AI/ML team that's focused on facilitating quality engineering outcomes can be a great way to facilitate the diffusion factors we discussed earlier.

Thank you.