

Building Your Industrial Knowledge Graph: Comparing AI Driven Discovery, Vendor Models, and Self-Service Platforms

Introduction — Why the How of Graph Construction Dictates Business Value

"Knowledge graphs can help manufacturers monitor various interconnected facets of their business. This visibility makes a complex web of systems more accessible and allows manufacturers to identify and solve for issues that may arise proactively in order to avoid downtime and keep production lines up and running."

Digital leaders now treat knowledge graphs as the connective tissue binding time-series data, engineering diagrams, maintenance work orders, and unstructured documents into a single context fabric. But the way you build your graph—whether through AI-driven discovery, vendor-supplied models, or self-service platforms—directly impacts:

- **Time-to-insight:** How quickly engineers can answer new questions.
- **Governance & trust:** The audit trail needed for safety, ESG, and financial reporting.
- **Strategic flexibility:** How easily the model adapts as plants, partners, and regulations change.

This post dissects three dominant construction paradigms—AI-driven dynamic discovery, pre-built vendor models, and self-service auto-discovered graphs—and offers a decision framework for choosing (or blending) them.

1 | The Spectrum of Construction Approaches

Approach	How the Graph Is Built	Typical Query Experience	Governance & Control	Illustrative Vendor
AI Driven Dynamic Discovery	LLMs or AI services infer relationships at query time; no persistent schema	Natural-language search that "discovers" context as you ask	Minimal upfront modeling; relationships are transient and opaque	AVEVA Connect
Pre-Built, Vendor-Controlled Models	Vendor platform includes a reference data model; customers map their data into it	Well-defined APIs Optionally, GraphQL/REST or Cypher queries	High consistency, limited extensibility and data coverage; roadmap steered by vendor	Cognite Data Fusion
Self-Service, Auto-Discovered Graphs	Platform auto-detects entities & edges during ingestion and supports AI-linkage of disparate systems users extend via low-code tools	SPARQL/Cypher plus NL copilots grounded in the live graph	Full ownership of schema versioning and lifecycle Easy extensibility of both the data model and included data sources	DeepIQ

2 | Deep Dive into Each Paradigm

2.1 AI Driven Dynamic Discovery (AVEVA Connect)

AVEVA's Knowledge Linking uses LLM reasoning to stitch together assets, tags, and documents at query time—eliminating the need for an upfront ontology. The result: near-instant onboarding for exploratory analytics and digital assistants.

Watch-outs:

- Edges are created on demand, making reproducibility for audits challenging.
- Limited ability to enrich or harden the model over time.
- Issues related to Hallucination can limit accuracy of responses

2.2 Pre-Built, Vendor-Controlled Models (Cognite Data Fusion)

Cognite delivers a Core Data Model plus vertical extensions for industries like oil & gas and manufacturing. Customers load data through extractors that automatically populate the graph in line with those schemas.

Watch-outs:

- Extending the ontology beyond supported patterns often requires vendor services.
- Risk of vendor lock-in if your operations diverge from the reference design.

2.3 Self-Service, Auto-Discovered Graphs (DeepIQ)

DeepIQ enables the rapid construction of a unified knowledge graph by either allowing users to define a schema or automatically inferring one from existing hierarchies and data structures. Its AI-driven, no-code transformation engine analyzes information across multiple systems—such as tag registries, work orders, engineering documents, and asset databases—to automatically identify entities and relationships. This cross-system pattern recognition populates the knowledge graph with high fidelity and domain relevance. Users can then visually validate, refine, and curate the graph. All changes are version-controlled, enabling continuous improvement without sacrificing auditability.

Watch-outs:

- Basic data stewardship (e.g., naming conventions, resolving duplicates) remains important.
- Workflow logic to detect entities and relationships are specific to the sources involved and might require initial set up time.

3 | Choosing the Right Path

If your priority is...	Gravitate toward...	Rationale
Instant insight for exploratory questions	AI Driven Dynamic Discovery	No modeling marathon; useful for PoCs and brown-field estates.
Out-of-the-box KPIs for a targeted use-case	Pre-Built Vendor Model	Starter kit encodes industry best practices and accelerators.
Enterprise-wide context & long-term ownership	Self-Service Auto-Discovered Graph	Balances speed with full control and extensibility.

4 | Hybrid Strategies Are Emerging

Many organizations pilot with a vendor model to deliver a lighthouse win, add dynamic discovery for ad-hoc Q&A, and ultimately migrate core systems to a governed self-service graph as data maturity grows.

Treat construction style as an architectural decision, not a tooling footnote: it determines how you will answer tomorrow's as-yet-unimagined questions.

5 | Executive Takeaways

- **Start with the business question.** If you only need rapid, exploratory answers, dynamic discovery may suffice—just beware of reproducibility gaps and issues with hallucinatiopn
- **Beware invisible handcuffs.** Pre-built schemas speed time-to-value but can impede innovation if your processes diverge from the template.
- **Own your context.** For multi-site operations, M&A activity, or safety-critical analytics, a self-service, auto-discovered graph offers the best balance of agility and governance.

- **Plan for evolution.** Even if you begin with a vendor model, design an exit ramp that allows incremental extension or refactoring.
- **Invest in stewardship.** No matter the approach, assign data owners—they're cheaper than downtime caused by a misunderstood dependency.

References

- [Cognite Data Fusion Documentation](#)
- [AVEVA Deep Dive: Knowledge Linking Presentation](#)
- [DeepIQ Explore Platform](#)

Selecting the right construction paradigm today prevents costly re-platforming tomorrow—and turns your knowledge graph into a living, strategic asset rather than a brittle technical artifact.

To learn more about DeepIQ, explore [our Customer success stories](#) or engage with us through a focused pilot to experience the platform's capabilities firsthand. Contact us at info@deepiq.com to begin your transformation journey.