

Innovation Insight for AI-Enabled Skills Management

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AI-enabled skills management is foundational to a dynamic skills approach in supporting talent and work processes. This research helps HR technology leaders navigate the complex and emerging landscape of AI-enabled solutions, each with its own proprietary skills models and matching algorithms.

Overview

Key Findings

- Skills change quickly, as does the data describing them. A dynamic approach is required to capture emerging skills and knowledge domains and how they relate to more established domains.
- Traditional skills management solutions require organizations to have a structured list of skills, categorized and mapped in a stable framework. In contrast, AI-enabled skills management solutions require the organization to provide feedback and interact with an ever-evolving skills graph.
- Traditional approaches to skills management required organization to build a standard taxonomy that would apply to all processes and systems. But when each system has its own proprietary model, a standard taxonomy is no longer possible.
- AI-enabled skills management systems don't only provide updated and searchable skills data. They are also a foundational element for matching algorithms, which match talent to work, learning and job opportunities.

Recommendations

HR technology leaders investing in AI-enabled skills management must:

- Take a dynamic approach to skills by building a self-perpetuating system in which work and learning experiences automatically generate skills data. This system can then match talent to further work and learning experiences.
- Adapt to complexity by embracing the chaos in AI-enabled skills management systems, which are able to manage and reflect complex systems of related concepts in a multidimensional and abstract space. Minimize the number of highly structured and strictly managed and assessed skills.
- Govern skills data by creating a team that can use metadata and other indicators to monitor how data, skills tags and other inferences work across systems. Follow the data instead of trying to control it.
- Improve automated matching capability across the HR technology landscape by feeding more varied data into algorithms and matching engines, thereby enhancing skills and knowledge data.

Introduction

Despite variability in quality across vendor solutions, the value of nascent AI-enabled skills management solutions already makes them preferable to the manual effort of a traditional skills management approach. HR needs to adopt a new way of thinking about skills data to take advantage of the transformation that applied AI techniques bring to this domain.

Because these capabilities are just emerging, differences between providers are substantial. These differences are based on:

- What data providers use
- What standards or stable taxonomies provide structure in their models
- How frequently they update their models
- How adaptable they make their models to a given context
- How they address bias and ethical AI

HR leaders will benefit from investing in this technology at an early stage. Trying to set up a stable structure first is wasted effort; AI-enabled skills management will quickly become a foundational capability for any organization.

Description

Definition

AI-enabled skills management is a foundational capability within talent and day-to-day work contexts that applies natural-language processing, knowledge graphs and other AI techniques to build a dynamic representation of skills data. It is used to automate skills inference for people, content, work tasks, career paths and jobs.

AI-enabled skills management is emerging in HCM suites, talent acquisition solutions, internal talent marketplaces, labor market insight platforms, learning experience platforms and stand-alone skills management solutions. Other solutions, such as packaged talent analytics, workforce optimization, workforce management and workforce planning tools, aim to consume, process and display complex skills data and insights as a value-add to their existing functionality.

Factors that differentiate vendors' solutions include:

- **Data sources for building the skills graph** — Many solutions rely solely on skills data from job descriptions and résumé data. Others will tap into data sources as far ranging as Wikipedia, patents, university course curricula, census data and domain-specific collaboration spaces (such as GitHub).
- **Data sources for automating skills inference** — Many solutions rely solely on data within their own systems to automate skills inference for talent profiles or job, work or learning opportunity descriptions. Few will ingest and process data from other talent systems or other systems where work and team collaboration happen.
- **Skills standards for structuring the model** — The most basic solutions on the market only reference the skills standards used for labor statistics, such as O*NET in the U.S. or ESCO in Europe. Other basic solutions reference skills standards from infrequently updated competency models and frameworks sold by consulting firms. The most powerful models can manage and translate many skills standards.
- **Inference of skills levels** — Technology providers vary widely in the way they tune their models to infer skills level based on types of experience, relevance, recency, frequency or other factors.

- **Adaptability to context** — Language coverage varies. Some solutions only work in English. Solutions also vary in their ability to infer skills based on organization-specific skills names, domain knowledge, expertise or experience descriptors filled with organizational jargon. Adaptability also includes the ability to process those skills where safety, security or regulatory guidelines still require formal assessment.

Benefits and Uses

A vast number of organizations never implemented traditional skills management practices. It was too overwhelming a process to establish a taxonomy — a hierarchical structure of skills names grouped into categories. It was even more onerous to track and evaluate skills across employee populations. Therefore, most organizations have relied solely on establishing a job structure, including job categories, families, descriptions, levels, and in some cases, a competency framework.

However, some organizations did implement traditional skills management tools. These tools allowed them to establish a structured pick-list of skills, organized by category and in a set taxonomy. Employees could self-assess their skills, and a workflow would allow managers to validate those skills.

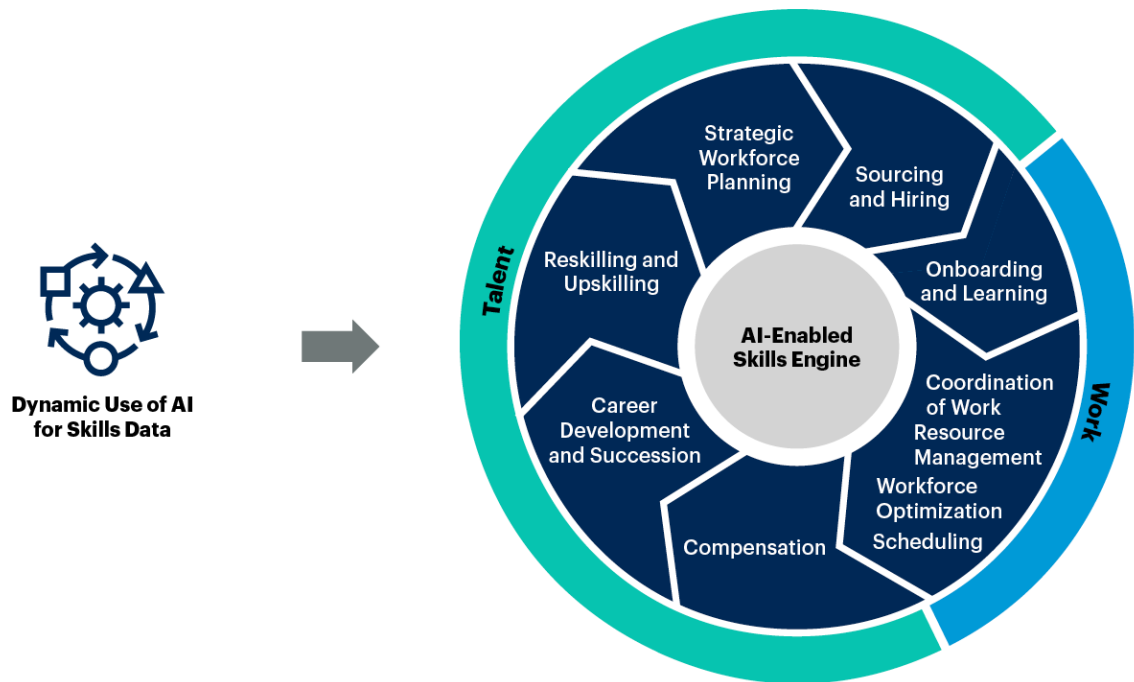
AI-enabled skills management, on the other hand, is a foundational element for enabling dynamic skills sensing. It is an always-on approach to detecting which skills are in use, emerging or declining — continuous rather than episodic. However, its dynamism doesn't mean a lack of stability. Skills are detected and inferred more systematically. Ontologies are updated based on emerging and validated patterns detected in the data. This creates greater stability and increases the reliability of skills data. In more traditional skills approaches, data may be incomplete. For example, employees can't indicate they have a skill if it hasn't already been implemented in a pick-list. Or, employees and managers may not adhere to data collection processes and workflows.

A dynamic use of AI-enabled skills management delivers the following:

- **Reach** — A dynamic use of AI-enabled skills management has a broad reach. It doesn't only address talent processes; it is also instrumental in operational processes related to the allocation and coordination of work, resource management, workforce optimization and scheduling. It can be a key enabler for intrashift work scheduling on teams of shift-based workers (see Figure 1).

Figure 1: Reach of AI-Enabled Skills Management

Reach of AI-Enabled Skills Management



Source: Gartner
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- **Alignment** — The work employees are currently doing is the richest source of current skills data. This data, in turn, helps the organization automate work coordination and task assignment. For example, it helps resource managers assign roles in projects. In domains where work is more routine, it can help optimize scheduling and work coordination across teams and shifts to reach better business outcomes. This alignment provides better and more specific data and increases the value of the following talent processes:
 - Onboarding journeys and learning recommendations become easier to adapt to different work contexts. This, in turn, can decrease time to productivity and ensure learning outcomes are tightly tied to improving performance and productivity for the work that needs to be done.
 - Sourcing and hiring achieves improved automated matching, which can decrease time to hire, increase the quality of hires and increase the diversity of the talent pool.
 - Strategic workforce planning processes can more reliably track and plan for emerging skills, and compare internal talent with external labor market trends.
 - Reskilling and upskilling initiatives are better prioritized and can lead to increased ROI. Improved focus ensures the new skills being acquired can be directly applied within existing roles and better retained.
 - Career development and succession improve by automating the ability to see potential career paths and related development opportunities (including learning opportunities, work opportunities without changing jobs and new position opportunities through internal mobility.) It also increases the visibility of talent in successor pools.
 - Compensation practices are more finely tuned and validated by comparing AI-enabled skills models to existing and more formal job-level structures. More formal structures remain a necessary part of compensation planning. While not widely applied yet, AI-enabled skills management can enable better benchmarking and transparency and provide greater insights on fairness and pay equity.

- **Increased data usage, not storage** — AI-enabled skills management shifts the focus from data collection and storage to data usage. When HR, employees and managers regularly and consistently interact with the data, skills data inferences improve and dynamic skills graphs adapt to an ever-changing lexicon within the work context. To align skills data across systems and talent domains, AI-enabled skills management systems should “speak to” HR systems and the systems where work happens. Automation decreases the effort of building and maintaining skills data, significantly reducing the need for people to define and impose tight and restricted taxonomies and standards.
- **Better quality of matching algorithms** — AI-enabled skills management is also a foundational element for better matching algorithms. Matching algorithms predict, score and rank the best content, work or learning opportunity, or job for a given outcome — hopefully the outcomes an individual or team wants to achieve. While skills data should never be the only data used to predict fit, it is one of the more valuable data points to include. Each system applies its own logic and algorithm to determine what a match is. Therefore, the development of proprietary skills ontologies that are applied to all clients is an essential building block for the matching functionality offered by vendors. Match quality has a greater impact on user experience than many think, delivering significant value when paired with an easy-to-use user interface.

Risks

AI-enabled skills management is still in its infancy. There will be a learning curve, both for the AI technology and for the people and organizations using it. Risks include:

- **Underestimated effort** — Just because AI is doing some of the heavy lifting in processing data and inferring skills, that doesn’t mean people using the systems don’t need to validate, tune and provide feedback.
- **Overinflated or unclear expectations** — The benefit of these systems makes them preferable to the effort of building something equivalent manually. However, it is still difficult to infer skills based on highly unstructured content, such as learning content.

- **Difficulty in summarizing skills data** — Skills data was historically pared down to simple items in structured tables or hierarchies partly because it is easier to understand and process that way. For example, a bar chart can be applied to such skills data. Complex graph structures, on the other hand, are harder to summarize and present in an easy-to-understand way. Organizations must make the effort to embrace the complexity of the data while being able to summarize it more simply.
- **Missed user experience expectations** — It is debatable whether many employees care if a given skill is described using one term or another, similar term. However, some will care, and HR will need to be ready to explain why the same skill may be described with different terms in different systems.
- **Difficulty in evaluating where inferred skills are sufficient, and where skills validation is needed** — Some skills must be validated. Safety, security or other regulations may require this to be done. This validation process requires formal assessments and workflows. AI-enabled skills management, however, automates inferred skills and would not be a trusted source without further manual validation for these contexts.
- **Difficulty in articulating the continued necessity of competency models** — Competency models remain necessary, especially for ensuring job and compensation-level structures. They also are useful for communicating and structuring discussions about desired behaviors that will contribute to the desired leadership qualities and organizational culture.
- **Too many closed systems** — Technology providers understandably want to get value from the investments and intellectual property they poured into AI-enabled skills management functionality. Building the technology or capability remains a costly undertaking, and not all providers will be able to afford to build their own. They are likely to put in place protective measures by which data and models cannot be shared with downstream systems. They may be open to receiving data to increase the value of their systems, but they are likely to make it difficult to use the data created and stored in their systems in the other systems an organization may be using. Organizations may, therefore, need a third-party tool to be able to track and understand skills data variations. Based on this understanding, additional investments would be needed to align data within and across different systems. Vendor management can become quite complex as more systems are put in place. Therefore, openness to sharing data and enabling cross-customer and cross-solution views will be critical.

Recommendations

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Representative Providers

- **HCM Suite Providers:** ADP, Cornerstone, Oracle, Workday
- **Talent Acquisition Providers:** Beamery, Eightfold AI, Phenom, SeekOut
- **Learning Experience Platforms:** Degreed
- **Internal Talent Marketplace Providers:** See Market Guide for (Internal) Talent Marketplaces
- **Labor Market Insight Providers:** Lightcast, SkyHive, TalentNeuron
- **Stand-Alone AI-Enabled Skills Management Providers:** JANZZ.technology, SkyHive, TechWolf
- **Talent Analytics and Workforce Planning Providers:** Visier

Evidence

This research is based on over 150 Gartner client interactions and briefings from relevant vendors.

Recommended by the Authors

Some documents may not be available as part of your current Gartner subscription.

[How to Build Knowledge Graphs That Enable AI-Driven Enterprise Applications](#)

[Future of Work Reinvented: Shifting Talent and Skills](#)

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