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The Engineer's Flow State

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Manufacturers can boost engineering productivity and close the loop of their digital thread with **AI-powered search**

Manufacturing leaders are constantly working to increase employee productivity, reduce costs, and deliver innovative products and solutions. You are reaching for a vision where your company's reputation for high-quality products keeps it fiercely competitive for years to come.

The key to achieving this goal is through a talented and well-equipped workforce. The best minds using the best tools will minimize errors, optimize costs, and make better decisions for customers and the company. It's not fast or easy, but tech-empowered talent has proven time and again to be an unbeatable long-term strategy.

As such, it's the organization's responsibility to create the conditions necessary for engineering teams to perform at their best: efficiently, collaboratively, and enthusiastically. Ideally, you can set up your product designers and engineers to achieve a flow state.

Flow state – n.

In psychology, 'flow state' describes a feeling where, under the right conditions, you become fully immersed in whatever you are doing.[1]

[1] What is a Flow State and What Are Its Benefits?", Headspace, www.headspace.com/articles/flow-state

" ***[When a person is in flow]*** there's this focus that, once it becomes intense, leads to a sense of ecstasy, a sense of clarity: you know exactly what you want to do from one moment to the other; you get immediate feedback. You know that what you need to do is possible to do, even though difficult, and sense of time disappears, you forget yourself, you feel part of something larger. And once the conditions are present, what you are doing becomes worth doing for its own sake." [2]

When engineers get into a zone, their work is prolific and innovative.

They consistently produce never-before-seen solutions and high-quality products and parts.

Many digital transformation efforts in the manufacturing world have sought to improve an engineer's job in such a way as to connect the person more closely to the work product.

Such implementations have minimized physical and temporal gaps to help engineers do more via automation, virtual simulation, rapid iterations, and constant feedback.

[2] Mihaly Csikszentmihalyi, "Flow, the secret to happiness," TED Talks, February, 2004, video, 18:42, https://www.ted.com/talks/mihaly_csikszentmihalyi_flow_the_secret_to_happiness

The Engineer's Perspective on Digital Transformation

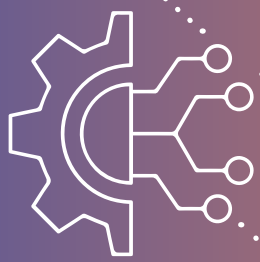
Not all digital transformation initiatives result in a user experience that enables flow. Cumbersome legacy systems hinder real-time decisionmaking, especially when it comes to completing complex engineering projects.

IT systems need to connect the dots across the product lifecycle by making relevant information discoverable by employees working in engineering & design roles. This seamless accessibility to insights can often be an afterthought. Or the true findability of information is overpromised, and falls short in practice.

Persistent information silos result in redundant work, expensive errors, and delays. Valuable knowledge can remain trapped in the minds of key employees, who take it with them when they leave the company.

Productivity plateaus below where it could be. Costs are always on the rise. The perception is that engineering teams are wasting time and projects are taking too long to complete. Engineers are often under pressure to work faster, but can't break through the silos on their own.
The tension builds.

Is your workforce forever stuck with suboptimal ways of finding information? Can't they design their way out of this mess?



Constraints: the Good, the Bad, and the Ugly

Creativity thrives on—demands—constraints. But while this may be true for some types of limitations, there's a difference between the necessary constraints in your team's product specifications and the system-imposed constraints often found in manufacturing organizations.

Any constraint on a team's **ability to access relevant information** restricts the design process.

"When creativity is killed, an organization loses a potent competitive weapon: new ideas. It can also lose the energy and commitment of its people. Indeed, in all my years of research into creativity, perhaps the most difficult part has been hearing people complain that they feel stifled, frustrated, and shut down by their organizations." [3]

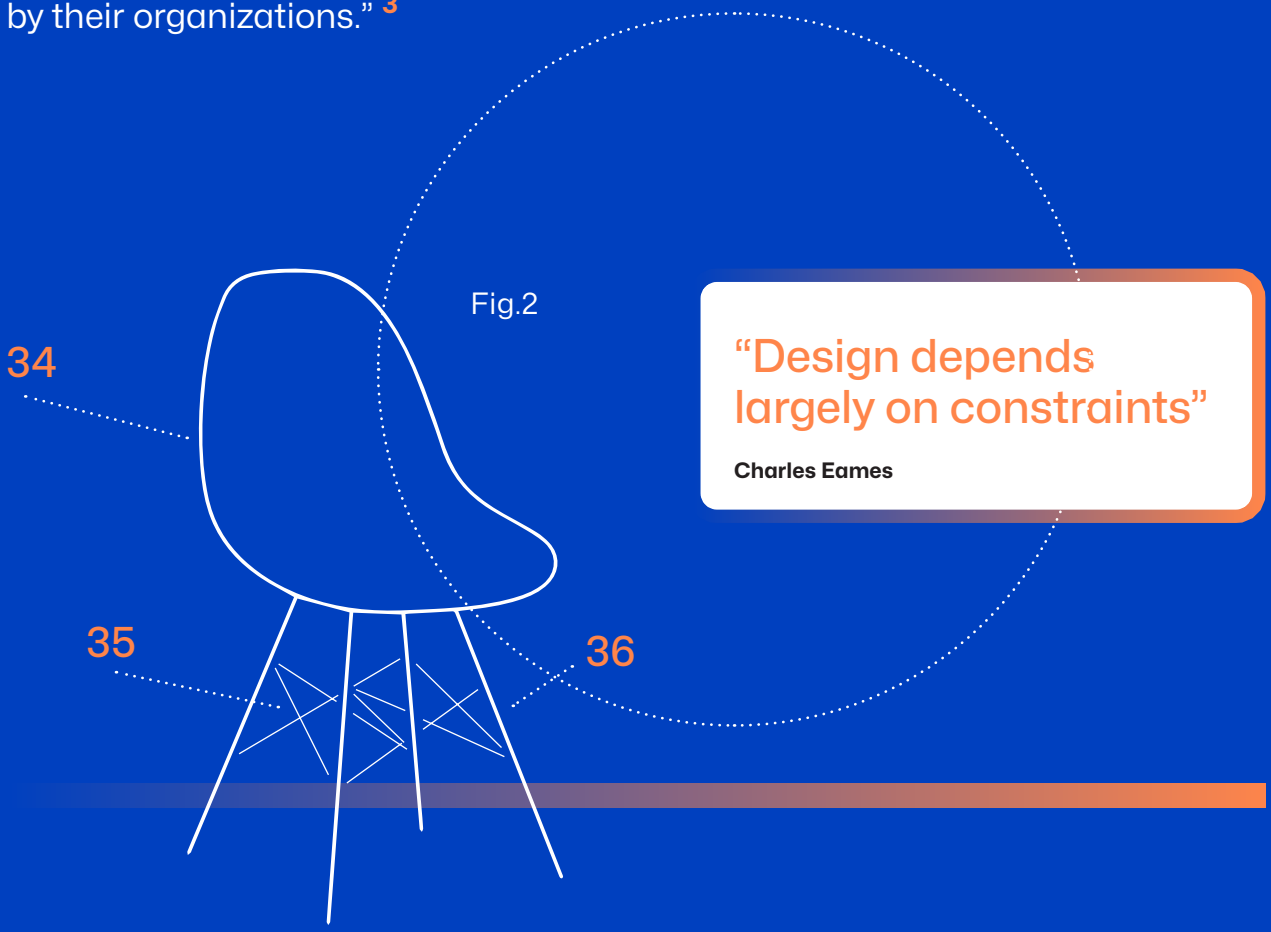


Fig.2

"Design depends largely on constraints"

Charles Eames

[3] Teresa M. Amabile, "How to Kill Creativity," Harvard Business Review, September-October 1998, https://hbr.org/1998/09/how-to-kill-creativity

Downstream effects

Too often, organizations inadvertently restrict their engineer's ability to achieve a flow state because they don't prioritize breaking downinformation silos.

Disjointed product lifecycle information and cumbersome processes prevent a perfect flow of information, or the ever-elusive "digital thread". Yes, engineers are wasting time and resources. They should be building and fixing, but instead they spend too much time searching. D esign engineers are estimated to spend 80% of their time duplicating part designs when working with incohesive digital threads.[4]

It's not their fault.

PLM systems are good for structured workflows and data integration, but much of the information that engineers need lives in other siloed systems. And the volume of information being created is growing exponentially. The bigger and more established an organization is, the larger its repository of data grows. The data and IP within that repository are trapped within legacy systems and various file formats, making them difficult or even impossible for employees to navigate. This negatively affects the quality of everyday work and the ability to innovate.

Even if a user could see all the data, it is unlikely they would be able to parse it into usable knowledge and insights. But this does not make the information any less important to the optimal function of the organization. [5]

As a result, engineering teams are limited, stifled, and discouraged, plagued with the feeling that they could have used more organizational knowledge, worked more efficiently, and conserved energy for what they do best: design solutions based on reliable information.

[4-5] Is Your Digital Thread Cut Short? Mend It With Intelligent Search," Engineering.com, www.engineering.com/story/is-your-digital-thread-cut-shortmend-it-with-intelligent-search

Remove the Friction

The flow of information is critical for engineering success.

We've established that a mental ***flow state***, occurring in the minds of the engineers, is ideal for design and innovation.
To remove blockers from the design process, and facilitate a flow state, the ***flow of information*** must happen between and across three types of sources.

People

Data is exchanged between customer-facing teams, customers, and engineers during early design phases. Mergers and acquisitions, joint ventures, partnerships, and organic growth mean knowledge builds rapidly. People hold mental models of the business, strategies, customers, ecosystems, social priorities, experiences, and more. All this information needs to be findable.

Tools

Data is used and generated by tools for CAD, modeling, FEA, prototyping, simulation and testing, 3D printing, generative design, and the list goes on. New tools are emerging all the time and fighting against this wave is futile. Using better, more advanced engineering and design tools is half the reason engineers love their job. It's a dynamic time for engineers with new tech always in the works, creating new troves of data. As a result, the ecosystem of tools will only continue to grow in complexity, making it increasingly difficult for engineers to find what they need.

Systems

Digital twins (virtual representations of physical products or processes) send information to a display on the manufacturing floor. Many systems claim to have the potential to become a single source of truth. But in reality, there will always be more than one system at play in an organization. Consider the number of systems an engineering team must interact with to get all the information they need to develop solutions: dozens of corporate systems (PDM, PLM, ALM, ERP, MES, MRO, SDM, IoT, supplier catalogs, test results, operational data, intra- and inter-company collaboration) and hundreds of "personal" systems (meeting notes, spreadsheets, presentations, reports).

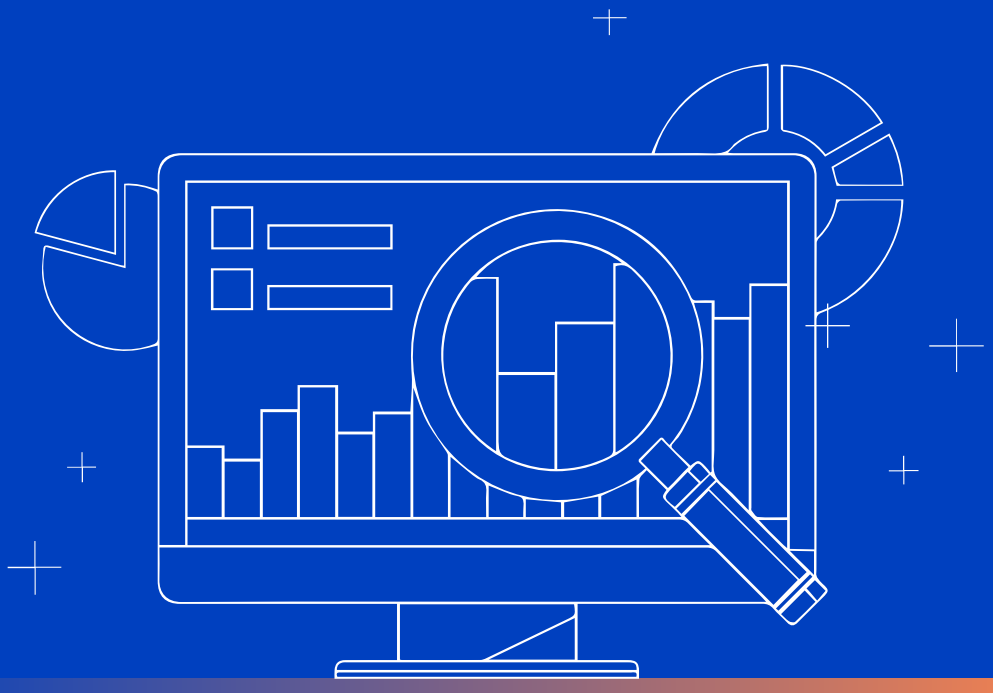
Any friction between people, tools, or systems stands in the way of manufacturing agility and success.

Availability is not the same as ***findability***

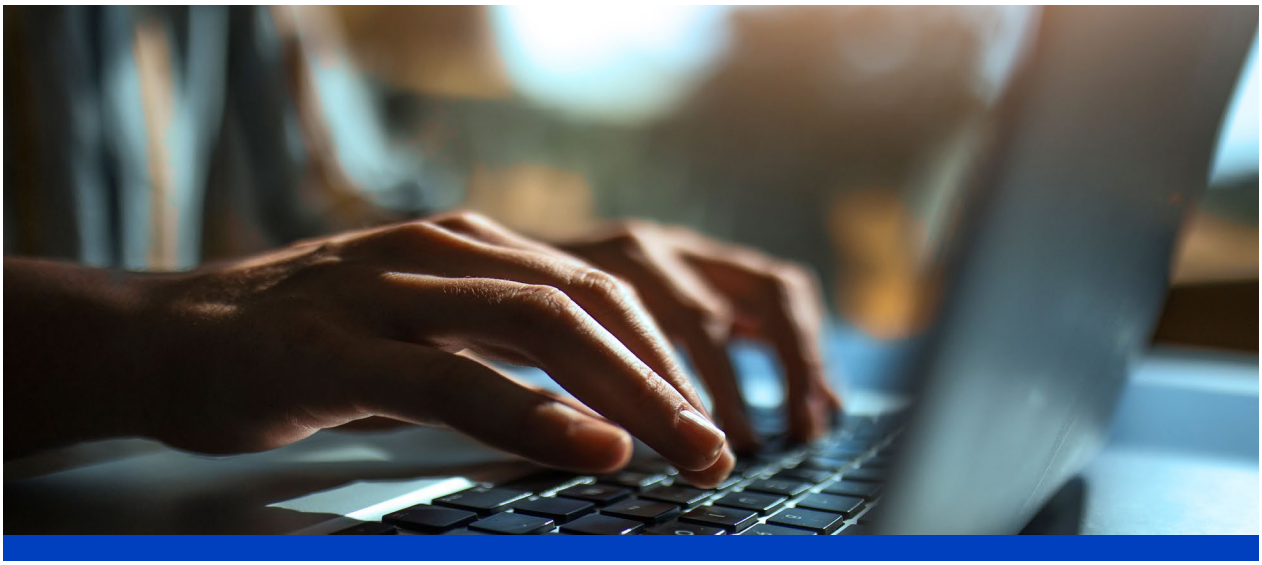
Information availability or accessibility usually isn't problematic for manufacturing organizations. But a universal challenge for employees today is searching for something and **finding it quickly.**

For product engineers and project managers, the challenge is being unable to put their finger on relevant information from a person, tool, or system they already have access to.

They need a singular, intuitive interface that can evaluate, contextualize, and serve up the right insights from any system, thereby tapping into a virtual single source of information and leveraging a digital thread of connected assets.



Let Engineers Engineer



It's time to build a path for engineers to achieve their own flow state.

The single most important thing a manufacturing organization can do is to **remove the friction caused by searching** (and not finding) the information engineers need. End their eternal hunt for insights across multiple systems, stored in unstructured data formats.

HERE'S HOW TO GET OUT OF THEIR WAY

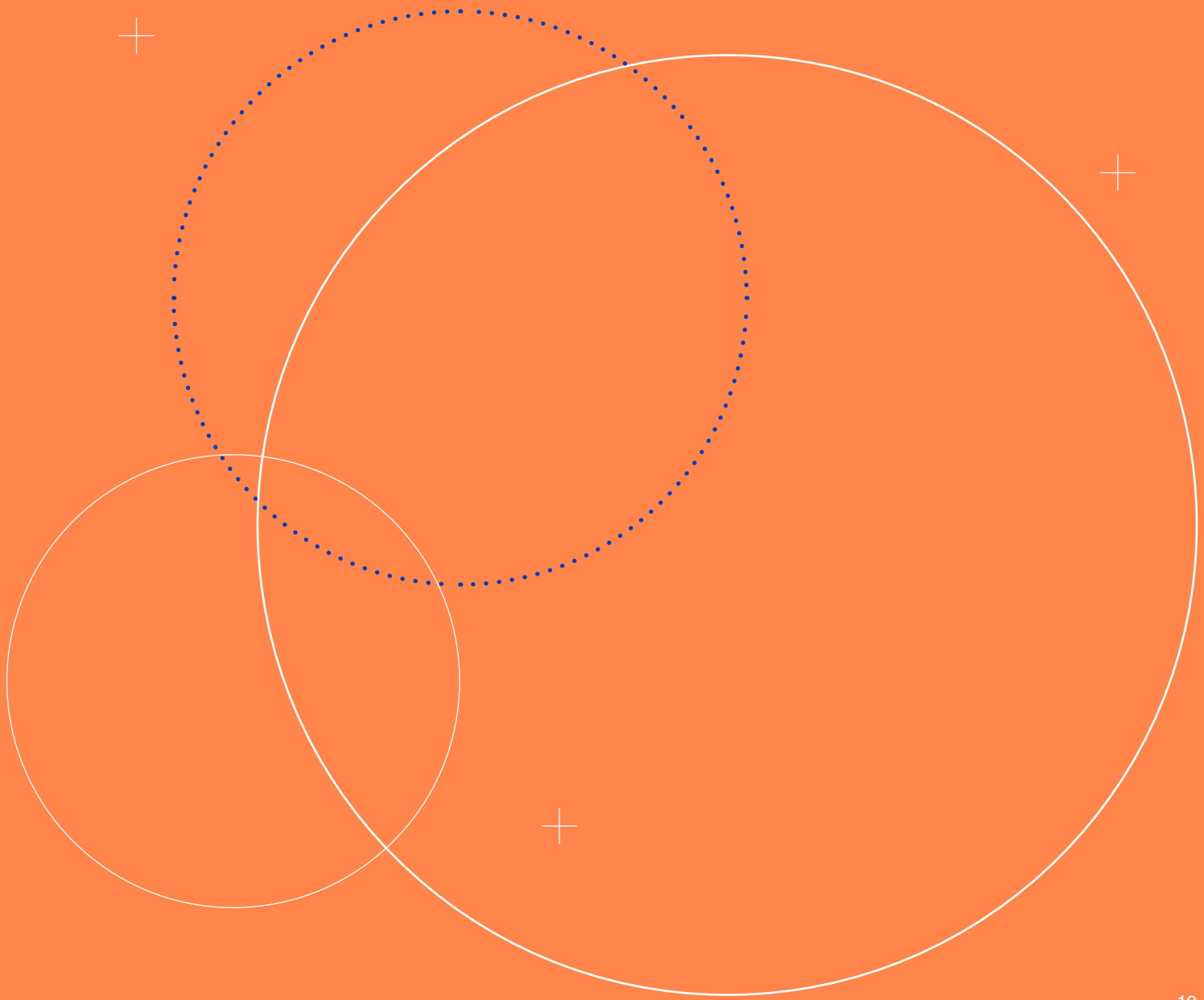
Process 01

Weave a digital thread

By connecting, searching, indexing, and retrieving information from multiple sources, you weave a digital thread of connected information assets.

A digital thread is the (neural) pathway that allows your engineers to stay in the zone. It's a continuous, closed-loop system that not only serves to create knowledge and data, but also reuse it to drive innovation.

We know from experience with real-world implementations that a digital thread is only possible through intelligent, AI-based enterprise search.



Process 02

How it works

If you already have **Sinequa's AI-powered search** solution deployed for knowledge workers or maintenance and support, extending the system for use by engineers is a no-brainer.

If you don't use Sinequa elsewhere in your organization yet, engineering is a great place to start.

Sinequa helps create a 360-degree view of all relevant insights, drawing connections between parts and product data, customers, current and past issues, and processes stored in disparate systems.

The system allows users to easily search through any system or app: PLMs, collaboration apps, ERPs—anything.

With **AI-powered search**, manufacturers reap the benefits of:

Universal Connectivity

With a robust set of pre-built connectors and support for 350+ content formats, organizations can unify their data and content **no matter the source,** format, or language—even unstructured data living in legacy systems.

Automated Curation at Scale

Thanks to the most advanced NLP technology and deep machine learning available on the market, all data and content are enriched and interconnected, transforming them into **information that is findable.**

Contextualized Insights for Every Employee

A completely personalized, contextualized search experience allows users to quickly and efficiently connect every employee to **actionable insights** and the organization's collective knowledge.

Modern Architecture

Enterprise-grade **security that scales** can handle even the most complex security requirements, ensuring maximum flexibility and longevity.

A Better, Faster, Stronger Manufacturing Organization

The digital thread for manufacturing organizations is an easy and costeffective way to modernize design and engineering processes without having to completely uproot and organize all your systems.
The result? Improved employee engagement and retention, sound decision making, and cutting-edge innovation.

With Sinequa, engineering teams can quickly find relevant insights and make well-informed design decisions. Minimizing their search time maximizes their working time and enables a flow state, so that humans can do what humans do best.

SOME OF THE MANY BENEFITS

Benefit 01

Improve engineering productivity and satisfaction

Out-of-the-box, engineers enjoy a familiar and intuitive search experience. They can find the answers they need quickly, plus find expertise from across the organization, boosting productivity and minimizing duplicate work. Save engineers' time searching across multiple repositories, providing one central place to uncover insights, even within unstructured data sources.

Benefit 02

Speed time to value with a fast, scalable platform

Deploy rich search-based applications with ease, utilizing pre-built functionalities that are highly customizable based on the needs of the business and the workforce. When engineers can easily navigate and locate relevant information, business value is delivered quickly.

Benefit 03

Limit project costs by minimizing mistakes and delays

Unify digital repositories (ECM, SharePoint, databases), business applications (PLM, ERP/MRP, CRM), and communication platforms (Teams, Outlook, Slack) to give engineers a comprehensive overview of information so they can make the best decisions possible. Reduce costly production errors and delays by connecting all relevant information sources, and surfacing critical documentation, past issues, and available expertise. Provide secure access to enterprise data and content in order to avoid compliance risk and regulatory fines.

Creativity, speed, and an engaged workforce are invaluable to manufacturing organizations. An elegant solution like AI-powered search connects all the information necessary to close the loop of their digital thread and solve multiple business challenges at once.

About Sinequa

Sinequa enables manufacturers of all sizes to put their content to work through the Sinequa Search Cloud. Customers trust the Search Cloud to connect, organize, and enrich all their content, learn from employee interactions, and present contextually relevant information with every search. Employees are empowered with the knowledge, expertise, and insights needed to make fast, informed decisions. Sinequa helps customers accelerate innovation, reduce duplicate work, foster real-time collaboration, and increase productivity.

Find out what enterprise search can do for you at:

www.sinequa.com

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