

# How Manufacturers Can Cut Waste and Improve Value in Product Development Processes



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## Idea In Brief

Valuable part designs, process notes, test results and other intellectual property (IP) associated with product development are embedded in the enterprise systems of every manufacturer. Standard search tools lack the robust features needed to quickly and efficiently tap into these files, so they often go unused. The outcome results in higher development costs, lower quality, inefficiency, duplication and missed opportunities. By replacing standard search with a purpose-built search solution, manufacturers can add easy-to-use and efficient search capability to their product development toolbox, an investment that maximizes the value of IP and improves top- and bottom-line performance.

**N**orth American manufacturers have long been global leaders in product innovation<sup>1</sup> thanks to a history of R&D investment and widespread adoption of technologies that have hastened commercialization of new ideas. Companies with highly skilled research, design and quality teams have benefited even more by building unique intellectual property (IP) stores that hold potential for long-term advantage.

Unfortunately for most manufacturers, IP pertinent to current product lifecycle work — from concept to testing to upgrades — is stored in disparate systems and files across the enterprise and is not easily searchable. This condition results in sub-optimization of top- and bottom-line performance due to:

- **Lowered Productivity:** A rise in non-value-added per-unit costs due to productivity-draining inefficient manual searches and design rework;
- **Redundancies:** A stealth cash drain caused by duplicated work and parts proliferation;
- **Subpar Quality:** Increased risk for quality problems and out-of-compliance complications; and,
- **Longer Work Cycles:** This can cause manufacturers to miss both first-to-market opportunities and customer requirements because information can't be found quickly and efficiently.

A powerful cross-platform search tool that could tap all relevant file types, platforms and programs quickly would be the ideal solution. However, awareness and adoption of such a tool has not been a priority for manufacturers.

Accenture's Kevin Prendeville, a Managing Director in the consultancy's Product Lifecycle Services business, recently wrote about this phenomenon:

"Too many companies still use a linear, sequential product development process spanning numerous silos of systems, departments and data. This process

<sup>1</sup> "Top Ten Countries Registering The Most Patents," Compare Infobase Limited, [www.mapsofworld.com](http://www.mapsofworld.com)

“Engineers often become disconnected from the new product introduction process. Product launch teams don’t hear about critical, last-minute design changes as often nor as soon as they should.”

inhibits internal and external information flow needed to optimize product development. Engineers often become disconnected from the new product introduction process.

Product launch teams don’t hear about critical, last-minute design changes as often nor as soon as they should. Customer insights may be out of sync with functional and technical product requirements as well as test results. Products emerging from this fragmented system are unlikely to deliver on customer expectations.”<sup>2</sup>

This reality undercuts the payoffs manufacturers should be receiving from technology and IP investments they’ve made over the years; specifically, product development performance is falling short in time-to-market, quality and cost control.

### The Cost of Inaccessible Information

Manufacturers are sitting on massive stores of product development data thanks to the digitization of workflows over the past 20 years. These workflows span many separate business platforms such as ERP, MES, PLM and databases that are personal, departmental or part of internal portals, document management systems and file-share tools. All this information is also contained in different file formats.

This means engineers are wasting time looking in multiple places for data to support design, manufacturing or research objectives. Often, they can’t find what they need and, therefore, use workarounds. The resulting problems directly influence profits

and revenue. Let’s take a deeper look at what drives each of the problems listed earlier — and how an ideal search solution would change outcomes from negative to positive.

### 1. Lowered Productivity

The most obvious examples are time and productivity hits which push up costs and cut into profits. According to IDC<sup>3</sup>, employees in general waste exorbitant amounts of time searching for and recreating existing information.



25% of an employee’s time is spent finding and analyzing information



61% of knowledge workers access 4 or more systems on a regular basis



13% need to access 11 or more systems to get the information they need to do their jobs



44% of time engineers can’t find what they are looking for.

Costly inefficiency can arise not only at the individual level, but also at the process level. It’s common for companies to have built-in additional resources and steps to help engineers manually locate the information they need.

Additionally, inefficiency swells with each new hire. Onboarding is delayed due to limited access to IP, so time-to-value for the resource investment suffers; and, once the new hire is fully onboarded, he or she is working as inefficiently as his or her peers.

<sup>2</sup> “Should a CIO Invest In Product Development?” Kevin Prendeville, Accenture

<sup>3</sup> “The Knowledge Quotient: Unlocking the Hidden Value of Information Using Search and Content Analytics” IDC

### Solution and Positive Outcomes

A search solution that simplifies analysis during the product development process and improves discovery and sharing of IP knowledge creates a more fertile workplace culture that's open to continuous improvement and is more aligned to strategic goals. With universal capabilities that can search across any and all places where data is stored, product design team members make more value-added contributions to the business.

Positive outcomes include:

- Less per-unit cost due to higher productivity, and less non-value-added activity at the individual and process level;
- More streamlined and comprehensive IP searching that uses fewer resources; and,
- Faster onboarding, better training and shorter time-to-value for new hires.

## 2. Redundancies

Not so obvious within the product development function are the hidden threats of duplicative efforts and parts proliferation, an insidious threat that is most prevalent in large, geographically dispersed manufacturing companies with multiple product families and product teams.

When product development and quality professionals can't find key information, they recreate or reinvent designs. The outcome is duplicate data and work and proliferation of projects and parts. Part proliferation can be the single most expensive source of inefficiency within an organization. Not only do new parts need to be designed, but they also need to be sourced, inventoried, tracked and serviced over their lifetimes.

Additionally, valuable enterprise knowledge about previous designs, tests, approvals, production, sourcing, inventory, distribution, warranties and service efforts is wasted.

### Reduce Parts Proliferation to Lower Overhead

30% to 40% of a manufacturer's parts are duplicates or have acceptable substitutes. With the annual carrying cost of between \$4,500 and \$23,000 per item for the introduction of a new part number, duplicate part proliferation is an area of known cost exposure.<sup>4</sup>

### Solution and Positive Outcomes

An intelligent solution that can search all past and present relevant files, programs and platforms quickly and efficiently encourages product development engineers to identify existing designs and test results before they repeat work that's already been done. Capabilities such as dynamic navigation that enable users to filter search results are key. This maximizes investments in technology and IP resources.

Positive outcomes include:

- Reduced input cost through use of preferred parts;
- Reduced rework, duplication and parts proliferation; and,
- Reduced inventory carrying costs thanks to fewer parts.

<sup>4</sup> "Component & Supplier Management: Saving Time and Money Part by Part" Aberdeen Group

### 3. Subpar Quality

Design quality suffers when assumptions are made because of missing quality and testing data during the product improvement cycle. If problems are caught before the product goes to market, some costs are avoided, but companies still must pay for redesign and the cost of the lost opportunity.

When quality issues arise after the product goes to market, costs rise. Each time customers report a defect, engineers need to locate and review inspection reports, quality studies, simulation results, FMEA reports and/or related problem or incident reports from the field. If they can't do this in an efficient and timely manner, the company could end up paying out-of-compliance penalty fees.

#### Solution and Positive Outcomes

A search solution that is user-friendly and can be used across the enterprise improves communication among team members who influence product development.

New notes made in files and other updates are less likely to be missed when the search tool can always find them; and users can more efficiently analyze records and complete reports when quality or compliance traits need to be reviewed.

Positive outcomes include:

- Quality-from-the-start, which reduces warranty, scrap and rework costs;
- Lower non-compliance risk and associated costs;
- More efficient analysis and reporting when needed; and,
- Improved customer satisfaction.

### 4. Longer Work Cycles

When engineers cannot find information such as reports, procedures, past product initiatives, research, quality and testing data, time-to-market and other time-based metrics suffer because it takes longer to complete the project. Missing customer deadlines obviously hits revenue in the form of givebacks or lost opportunity.

#### Solution and Positive Outcomes

By providing research, design and quality employees with the ability to easily find the information they need, manufacturers can speed up the product development process and gain competitive advantage. Standard enterprise search solutions aren't powerful enough, however.

A purpose-built solution can deliver more precise information faster — up to five times faster:

Positive outcomes include:

- More first-to-market opportunities;
- Shorter customer response time than competitors; and,
- Increased capacity for more projects using the same resources.

“A search solution that is user-friendly and can be used across the enterprise improves communication among team members who influence product development.”



# The Business Value of Enterprise Search

**W**hat business leaders might not know is that universal search functionality can be applied to business needs such as product and quality engineering through an enterprise search solution, which integrates with multiple content sources, including ERP, MES, PLM and other document repositories.

With the power of an enterprise search solution, manufacturers can strengthen their ability to access and disseminate organizational knowledge and solve problems associated with siloed content, multiple file shares and disparate document management systems.

Employees can reduce inefficiencies and find the information they need to be more effective. Such benefits position manufacturers competitively because their products go to market faster, are of the highest quality, and are manufactured in the most cost-effective way. *Three components comprise this formula for success: cost avoidance, discovery of existing solutions and access to internal expertise.*

**Cost Avoidance:** As previously detailed, an inability to find existing data drives up cost in many ways. For example, engineer's inability to find complete test results of a diesel locomotive engine could require the re-running of tests (especially emissions tests to satisfy regulatory requirements), which can range in the hundreds of thousands of dollars to reproduce. Universal search would make these results easier to find, and thus the manufacturer avoids the cost of additional testing.

**Discovery:** At a multi-site manufacturer, engineers may not be familiar with each other and may not have access to the repositories of information in their respective regions; so they have little to no ability to “discover” that peers are working on the same problem or may have already identified a solution. The result is wasted engineering effort, wasted design/development/test effort, and, quite likely, duplicated and redundant parts.

A large aerospace manufacturer is addressing this problem with an enterprise search solution, which enables engineers working in different regions, divisions and programs to “discover” parts and products they can reuse in other applications. For example, engineers could discover avionics components from an existing aircraft program that they could use in new programs. This reduces product development lead times, costs, and development effort — all of which make the company more innovative and competitive.

**Expertise:** When an engineer is faced with a problem, the ability to find experts or people with related expertise can significantly accelerate problem solving; enhance innovation; and reduce design time, test time and lead time. The idea is to capitalize on the IP in which the organization has invested. Here's how this works: The company provides a portal with “people” information which includes skills and expertise. As users search with keywords, the enterprise search solution looks for people with skills that match. Those people become the “experts” returned in the search results.

# Use Case Allegory: What's Possible at Altostrat Industrial

**Problem:** The research, design and quality engineers at Altostrat, a large industrial manufacturer, are struggling to manage R&D documentation and locate existing information they need for projects. The high number of disparate technology systems and solutions Altostrat uses makes locating the right information a complex and cumbersome process, so the engineers often make assumptions or duplicate efforts in their work. Quality and efficiency suffer as a result.

## Solution:

An enterprise search solution would provide a fast, streamlined and comprehensive information-search capability which would positively affect Altostrat's bottom line. Costly inefficiencies such as duplicate parts and test re-runs could be eliminated or reduced, and overall engineer productivity would improve because they would spend less time looking for information.

**“Altostrat could save \$858,960 dollars in year three, and \$1,853,400 in year five after implementing an enterprise search solution.”**

## Potential Results:

- **Duplicate parts:** Assuming 10 new duplicates are created each year, Altostrat could save \$858,960 dollars in year three and \$1,853,400 in year five after implementing an enterprise search solution. (See Figure 1.)

Additionally, assuming 3% of the duplicate components at \$2,500 would have to be maintained in the company's systems (total cost of ownership), enterprise search could save the manufacturer \$27,307,500 in year three and \$50,367,075 in year five. (See Figure 2.)

**Total Cost of Ownership of Components**

		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Duplicate parts, (p)	10	0	10	20	30	40	50
duplicate parts, cost							
Engineering & Design*	\$9,300.00	\$0.00	\$93,000.00	\$93,000.00	\$93,000.00	\$93,000.00	\$93,000.00
Testing*	\$700.00	\$0.00	\$7,000.00	\$7,000.00	\$7,000.00	\$7,000.00	\$7,000.00
Manufacturing*	\$1,760.00	\$0.00	\$17,600.00	\$17,600.00	\$17,600.00	\$17,600.00	\$17,600.00
Purchasing	\$3,800.00	\$0.00	\$38,000.00	\$76,000.00	\$114,000.00	\$152,000.00	\$190,000.00
Inventory	\$876.00	\$0.00	\$8,760.00	\$17,520.00	\$26,280.00	\$35,040.00	\$43,800.00
Logistics Support	\$3,760.00	\$0.00	\$37,600.00	\$75,200.00	\$112,800.00	\$150,400.00	\$188,000.00
Total Cost of Ownership of Components		\$0.00	\$201,960.00	\$286,320.00	\$370,680.00	\$455,040.00	\$539,400.00
Total Cost of Ownership of Components				\$858,960.00		\$1,853,400.00	
				In year 3		In year 5	

\* Assuming one-time cost

Figure 1.

**Total Cost of Ownership of Components**

		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Number of components	100,000.00	100,000.00	110,000.00	121,000.00	133,100.00	146,410.00	161,051.00
growth rate, (g)	10.00%	100,000.00	110,000.00	121,000.00	133,100.00	146,410.00	161,051.00
duplicate parts, (p)	3.00%	0.00	3,300.00	3,630.00	3,993.00	4,392.30	4,831.53
duplicate parts, cost							
Cost of maintaining part in systems & inventory	\$2,500.00	\$0.00	\$8,250.00.00	\$9,075,000.00	\$9,982,500.00	\$10,980,750.00	\$12,078,825.00
Total Cost of Ownership of Components		\$0.00	\$8,250.00.00	\$9,075,000.00	\$9,982,500.00	\$10,980,750.00	\$12,078,825.00
Total Cost of Ownership of Components				\$27,307,500		\$50,367,075	
				In year 3		In year 5	

Figure 2.

# Real-Life Use Case: Stryker Instruments Saves Time, Aims Other Improvements

**Problem:** Stryker Instruments is a growing medical device company that has long life cycles on some of its surgical and instruments products. For these instruments and others, R&D engineers at the company were having a hard time finding complete product development information which sometimes was compiled by an employee who had since moved on. On average they spent more than four hours a week per person looking for data. Typically the data included test results, and if they couldn't find the data, they had to reproduce the results, adding significant cost.

**Solution:** The R&D department began using an enterprise search solution, which is enabling streamlined search within file-shares, Microsoft SharePoint and PTC Windchill.

**Results:** After one month of a partial implementa-

tion, R&D engineers reported a savings of 1.4 hours per week through more efficient search (compared to a savings of 1.0 hours per engineer per week in the business case). Feedback also includes endorsement of enterprise search as a high-quality and effective tool.

“Enterprise search is going to be way more valuable than just the time savings reported in our survey of engineers.”

Hannes Rau, Manager New Product Development Systems, also said although he doesn't have metrics, he expects the enterprise search solution to prevent “reinvention of the wheel,” at multiple levels and to provide an overall boost to productivity.

“Enterprise search is going to be way more valuable than just the time savings reported in our survey of engineers,” Hannes said. “I've experienced it myself. A colleague was searching for hours for a report needed for an audit. He called me, and I was able to use our enterprise search solution to find it in minutes.”

## Expert Consulting, Integration and Service of Enterprise Search Solutions

Onix has been providing enterprise search consulting to corporate, federal, state and local government organizations since 2001. During that time, the company has seen manufacturers accelerate speed to market, increase productivity and boost innovation through enterprise search solutions.

“Onix is a technology and product development company, delivering solutions to address important business challenges,” explains Tim Needles, Onix CEO and President. “We deliver a full range of services including consulting, deployment planning,

implementation and support to ensure knowledge discovery solutions are driving maximum value to organizations.”

Onix knows search and can help your organization access and disseminate organizational knowledge like never before. When employees find data, manufacturers improve operating efficiency. In fact, companies can save tens of thousands of hours and millions of dollars per year. To find out how much you can save, use [Onix's Enterprise Search Calculator](#).



“Onix is a technology and product development company delivering solutions to address important business challenges.”

## Conclusion: Enterprise Search Unleashes Hidden Potential to Boost Advantage

**M**anufacturers have relied on innovative technology to stay competitive through product innovation and cost control. Ironically, the proliferation of separate platforms, programs and file formats has made it difficult to easily find and apply the valuable knowledge that exists in those systems. Especially in the R&D, design and quality functions, barriers to enterprise IP cause problems that are compounded downstream as time-to-market and product quality suffer.

Other problems such as product proliferation and rework are less obvious, but still weigh heavily on profits.

Manufacturers can solve this dilemma by using an enterprise search solution, which integrates with multiple systems and streamlines the search for information on current and past projects. Enterprise search solutions have the power to eliminate or reduce costly inefficiencies such as duplicate parts and test re-runs, as well as freeing up engineering resources for more strategic work rather than looking for information.

Users can realize metrics improvement in multiple areas, but especially in time-to-market, quality and resource onboarding, as well as the potential for cost control and higher ROIs from existing technology and IP.

If knowledge is power, then enterprise knowledge is only as powerful as it is accessible. An enterprise search solution offers manufacturers a valuable tool for maximizing the competitive power of internal knowledge.

To increase operational efficiencies, enhance knowledge sharing, ensure compliance and, ultimately, sharpen your competitive edge, bring the best of enterprise search to your organization. Find out how by scheduling a free consultation with Onix at [EngageOnix.com/SearchConsultation](https://EngageOnix.com/SearchConsultation).