Connected
Data

TeamD3

A Massive Amount of Data

Companies produce more data than ever before. This data provides valuable insights into operations and product performance. Unfortunately, however, product data is underutilized in many manufacturing organizations. The COVID-19 pandemic has made that clearer than ever.

The traditional product design process cannot keep up with the demands of the modern market. Companies are now under pressure to develop increasingly complex, innovative products than in previous decades and generations. Utilizing product data fosters a more innovative environment than the traditional processes of the past—but there are a number of obstacles that manufacturing companies face to achieve this goal.

Outdated Systems are Not Designed for Data

Product data is located in separate silos throughout an organization—and could even be located at entirely different organizations. These separate departments and systems were built before our current level of data integration and management was even possible. Companies only had to collaborate with a few departments and outside collaborators back then.

This led manufacturers to develop outdated software, processes, and systems that contained unconnected data. This lack of flexibility is not suitable for modern manufacturing environments. Manufacturers need to facilitate collaboration and data visibility throughout their organization.

This is easier said than done. The complexity of managing, integrating, and optimizing product data can overwhelm even the mostforward-thinking organizations.

However, companies who do not embrace the future of connected data will be left behind.

# Business Impacts of Disconnected Data

Poor data management practices have negative business outcomes. Manufacturers cannot meet the needs of their customers by utilizing unconnected data processes and systems. These outdated systems have real business implications for manufacturers.

Process and Collaboration Costs

Unconnected data leads to inefficient processes throughout product development and production processes.
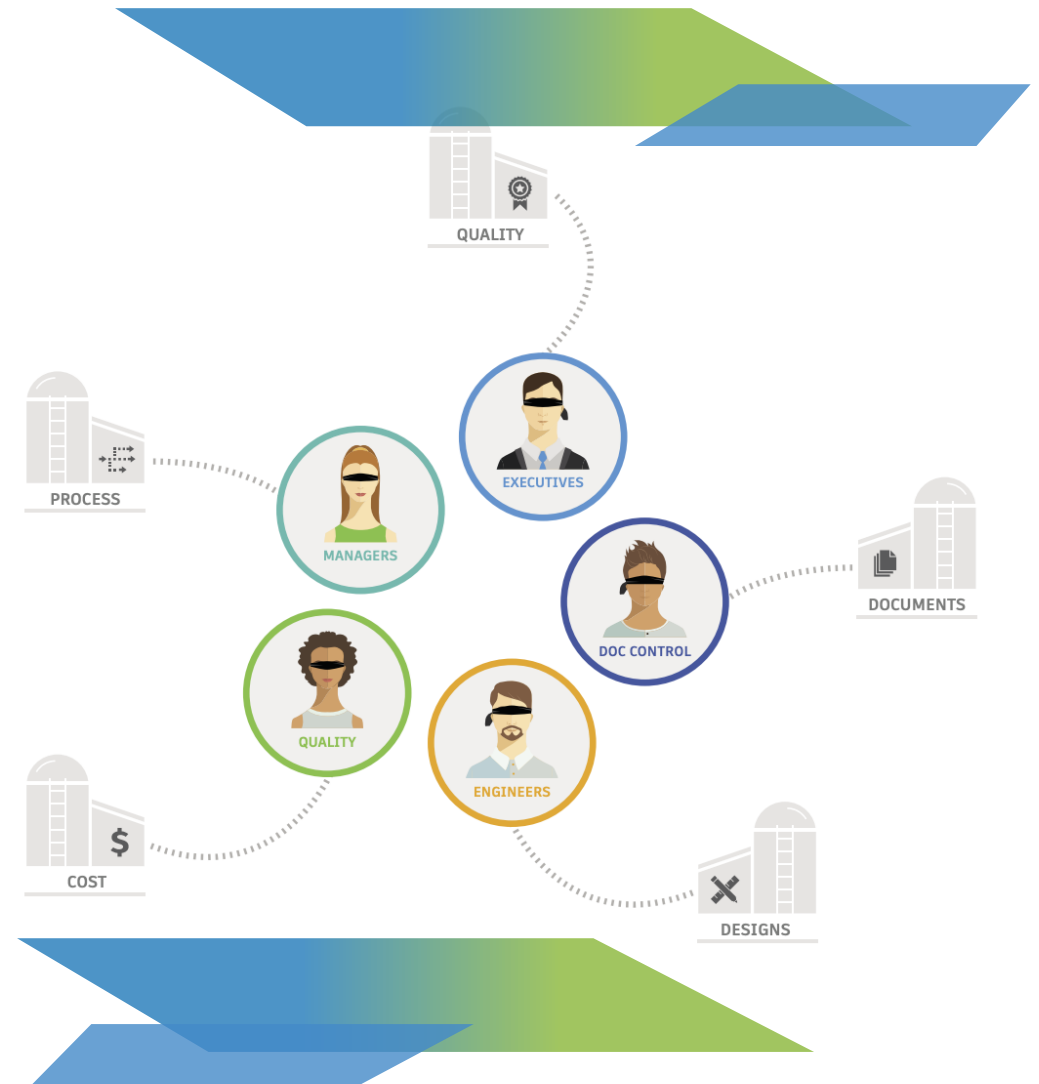
Lack of Innovation

Manufacturers need to be innovative to best meet the needs of customers, and limited data visibility leads to less innovation. It's detrimental when product development teams don't have the full picture while developing the next generation of products. Missing product data leads manufacturers to create products that do not fit target market needs.

Additionally, unconnected data makes it more difficult to collaborate with internal and external stakeholders. Engineers complain that their systems are not capable of facilitating collaborative environments, for example. Not to mention, manufacturers are not able to develop innovative products as quickly when they're using outdated solutions.

Wasted Time

Unconnected data leads to lost time. Engineers waste a significant amount of time looking for the right information and data across various systems. Some research estimates that engineers waste up to two months a year searching for the data they need. This time could be better spent on value-added tasks.

Keeping track of design changes in separate engineering assets is time-consuming. Engineers have to manually update designs and drawings for each individual product. Product development teams may even need to interact with upwards of ten systems each day. This manual approach takes precious time away from designers and engineers.

Poor Product Development Processes

Engineering workflows and processes around new product development are a major pain point for companies with unconnected data. These processes slow down new product development and production optimization.

Engineers often have difficulty reusing engineering assets and understanding why certain design changes were made to products. Issuing and managing change order releases, design reviews, project management, and bills of materials are all processes that are inefficient with unconnected data processes.
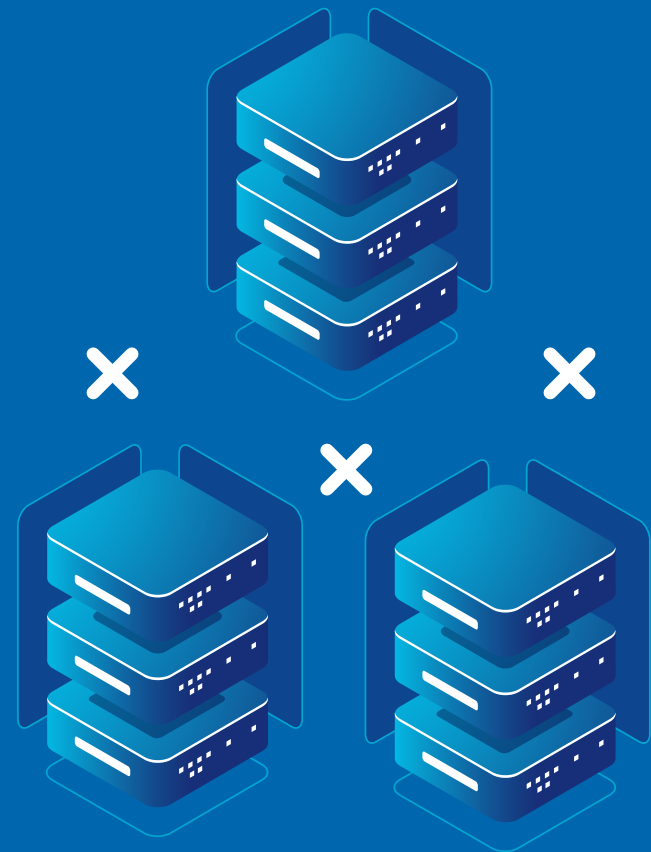
Unconnected Data Problems

Manufacturers face a number of issues around their unconnected data. These issues prevent manufacturers from fully understanding their processes and areas of improvement.

Working on the Wrong Dataset

Garbage in. Garbage out. Data processes, insight, and analytics are only as good as the data being used. Manufacturers with unconnected data are at risk of using wrong or outdated data. If a manufacturer utilizes incorrect data, they will likely come to the wrong conclusion. Inconsistent data formats make it difficult to work with data. Additionally, engineers waste time cleaning and verifying data.

Cybersecurity Risks

Hackers have found a new target in the manufacturing industry. Manufacturers often use outdated cybersecurity practices, which do not properly secure sensitive data. This leaves manufacturers vulnerable to hacking incidents. Unconnected data in unsecure systems are easy targets for hackers. This is a huge risk to take. Manufacturers lose trust with customers, partners, and vendors when sensitive data is stolen. This also typically results in government fines.

Quality Data

The traditional product design process is slow to react to quality issues. As a result, manufacturers and companies often fail to predict and prevent quality problems. There are various blind spots throughout any design process that allow errors to slip through. This is especially common without connected quality data. And, in the event there are any product quality issues found, a product's release could be delayed by weeks if not months, end users could be hurt, and a brand's reputation could be irreversibly damaged.

Test Data

Engineering validation tests, design validation tests, and production validation tests are vital to the success of any new product. Managing the data involved in this process is difficult, however. Two or three factories are often involved in the engineering validation, design validation, and production validation phases of the product development cycle. Coordinating all the involved parties is a cumbersome task. The lack of collaboration in these tests often stagnates the product development process.

Missed New Product Introduction

Bringing a new product to market is a necessary but difficult endeavor every manufacturer works toward on an almost daily basis. Meanwhile, manufacturers are losing time and money due to poor data management and product development teams routinely miss new product introduction targets. About 83% of new products are over budget and 79% are late tomarket.

Manufacturers who properly utilize data are able to better meet their new product introduction goals. Top-performing manufacturers are about twice as likely to beat targets for quality, budgets, and design due dates. Therefore, manufacturers who want to stay ahead of the competition need to give their team the data management processes and tools needed to develop the next generation of products. Connected data enables manufacturers to properly address their data management problems.

What is Connected Data?

Modern technologies enable data to be a real-time, on-demand asset for manufacturers. Poor processes and procedures are reinvented with data insights. Connected data brings all information about a product and process together in one place. This allows users both inside and outside an organization to utilize these resources.

Connected data drastically improves product lifecycle management. Most notably, manufacturers are able to gain insights that would otherwise be unknown. Connected data allows companies to improve product development while spending less time managing data. Manufacturers can utilize connected data in a number of ways throughout their organization.

How to Use Connected Data

Understanding how to utilize data in an effective way is a tricky task—especially in industries where data has been underutilized. Connected data has a number of uses throughout any manufacturing organization. These methods showcase the value of connected data.

› Product Data Management

Managing data in any organization is a difficult task. Manufacturers are in the business of developing and producing products—not data management. A connected data solution helps manufacturers easily manage and utilize all of their data.

› Centralize Data

Unconnected data prevents optimization in various manufacturing processes, as engineers waste precious time looking for and managing data. That time is better spent developing new products and improving existing production processes.

Centralizing data is an effective way to reduce time spent on tasks that don't add value. A singular platform that connects all of an organization's data gives engineers a specific place to find and manage all information related to a product. Users can easily find any relevant data on products, such as bill of materials, testing data, and spreadsheets. Engineers no longer need to search high and low for the data they need when they need it.

❯ Revision Control

Keeping track of revisions is a tedious task. Engineering managers often send unnecessary emails to attempt to follow the trail of bread-crumbs around who made what changes to a certain design. Automating revision control reduces the need for managing revision data. Connected data solutions ensure that all data around revisions is easily and properly docu-mented.

Users are able to quickly find and reuse designs. With connected data, engineers no longer need to document their revisions; they simply make the necessary changes. Connect-ed data eliminates confusion around revision changes and management has the ability to quickly review a complete history of changes.

❯ Standards and Regulations

Adhering to organization-wide and industry-wide standards and regulations is a difficult task. After all, one rogue team member could compromise an entire batch of product by skirting around industry standards. Organizations risk developing products that do not meet customer requirements and lose accreditations. Additionally, government agencies can fine manufacturers who do not comply with regulations.

Connected data solutions provide customizable tools to help enforce these standards and administrators are able to ensure that all users are compliant. Audit and quality assurance teams rest easy knowing that engineering and manufacturing teams are adhering to the right standards and regulations.

Process Management

Manufacturers waste precious time and resources on inefficient processes. Developing the right processes and workflows is a fool's errand—unless you have access to the right tools and data. Connected data solutions help product development stay on schedule while reducing inefficiencies.

> New Product Development

Keeping track of product data, tasks, and deadlines associated with new product development slows down the process. To make matters worse, product development teams can quickly lose track of the data needed to move a project forward. Engineers and managers waste time tracking down data and test results, as well as making sure all team members are on the same page. Their time is better spent elsewhere.

Connected data keeps product development projects moving forward. All team members will be working with the same set of data. Product development teams are able to ensure that everyone is on the same page. Teams can standardize milestones, deliverables, and tasks by any designation. Connected data ensures that all stakeholders have up-to-date information on the latest product developments.

> Product Portfolio Management

Customers demand variations of any given product, which further increases design complexity and management. Managing the data associated with these product variations is a potential pain point. In response, companies are implementing processes—such as product line engineering—to meet market demand.

Connected data enables manufacturers to more easily build and manage a competitive product portfolio. Integrated change management and new product development tracking processes are powerful tools for manufacturers. Product development teams are now able to access engineering assets to quickly develop variations of products within the same product line.

⊗ Bill of Materials

Product documentation like the bill of materials (BOM) is needed in any manufacturing operation. Engineers are fallible, however, and they can easily make a mistake when updating the bill of materials for product variations. Bill of materials inaccuracies cause product delays and supply chain disruptions.

Connected data enables manufacturers to centrally manage and share structured BOMs throughout any organization. Engineering teams sleep easy at night knowing that their products have the most up-to-date, accurate information for BOMs. Manufacturers reduce production delays and increase inventory accuracy with connected data.

⊗ Change Management

It's inevitable that product design will change at some point. Nevertheless, changing any part of a product is a headache for manufacturers. The change order process is filled with inefficiencies that slow down production development and production.

Connected data gives engineering teams a clear view of all the details needed in the change order process. Manufacturers thus spend less time slowly gathering data. Engineering teams can make change requests while visiting customer facilities before getting back to the office, thereby allowing the product team to begin working on the change order immediately.

Quality Management

Quality problems are more common with manufacturers who have unconnected data. This is because the lack of visibility into all processes makes it difficult to correlate product defects and issues with quality processes. Production teams may have difficulty tracking down the root cause of a product issue.

Connected data allows quality teams to get an overview of the entire product development and production process. Quality departments are able to automate quality workflows, track and record changes, and analyze quality metrics. Engineering teams can get ahead of quality issues and find the root cause of issues before they impact production or end users.

Supplier Collaboration

Increasing product complexity and variety has drastically increased the number of suppliers that manufacturers need. Keeping this data unconnected makes it difficult for supply chain teams to manage the supply chain. This leads to production delays. Manufacturers need to work with their suppliers earlier in the design process to create superior products.

Connected data solutions, on the other hand, keep manufacturers connected to their global supply chain 24/7. Team members can access all supply chain information for quoting, procurement, and supplier management. Manufacturers are able to reduce supply chain disruption and easily enable suppliers' input in product development.

Modular Capabilities without Module Costs

Manufacturers are embracing modular platforms to improve product development and product capabilities. This means product development teams are able to quickly create variations of products within the same product family. This process is generally expensive, however, so manufacturers are looking to minimize the costs associated with developing modular processes.

Connected data solutions give manufacturers modular capabilities without the associated module costs. Manufacturers are able to incorporate product lifecycle management applications and specialized processes to implement a modular platform. This enables product development teams to better meet customer needs.

Visual Configuration Editor

Every manufacturing operation is different and has unique needs. Unconnected data processes inhibit proper product lifecycle management, particularly because setting up modern workflows is difficult for manufacturers with little to no coding background.

Connected data solutions utilize no-code editors that allow manufacturers to develop customized, tailored workflows. Manufacturers can edit their workflows to meet their unique needs. This allows for the facilitation of better data collection and production processes.

Dashboards and KPIs

Wading through massive amounts of product and manufacturing data prevents manufacturers from getting the insights they need. Connected data solutions solve this issue through interactive dashboards. Dashboards and key performance indicators give manufacturers an idea of how production and product development is actually going.

⊙ Real-Time Status

Getting real-time updates during the product development process was impossible before connected data. Unconnected data only allowed manufacturers to analyze product and manufacturing data intermittently. Manufacturers were slow to react to potential issues that could make product development teams miss their original timelines.

Connected data solutions give manufacturers real-time insights on product development and production. Graphically-rich dashboards give stakeholders an overview of the bigger picture. Management is therefore able to take action before issues become delays.

⊙ Status Reports

Developing status reports for project updates was a time-consuming process for product development teams. Properly gathering the data needed and formatting it in a way that could be interpreted was a slow, arduous process. Additionally, engineers could struggle to find all of the data that was needed for the right status report.

Connected data solutions create ease when exporting status reports. Product development teams even have the ability to create reports with a single click. Managers are able to give status updates on projects and projects to key stakeholders, and engineers will not have to waste valuable time looking for the data needed for their status reports.

Flexible External Collaboration

Getting all of your suppliers involved early in your product development cycle results in superior projects. Outside engineers and consultants likely help your team design products, but collaborating with outside vendors is a difficult task. Keeping track of who made what changes, what the best design is, and other company processes takes a lot of effort—and previously was not worth the headache for most organizations.

Collaboration is facilitated by technology. Connected data enables your organization to bring together external participants associated with your project. A browser-based workspace allows everyone to share, view, comment, and markup designs while maintaining versioning and traceability.

Individual collaborators can set up their own dashboard. That dashboard shows specific tasks, goals, and activity streams. Your product development team will create superior products by bringing the best minds together.

Mobile Access

The future of work is remote. Product development teams are working from home, on the road, and in customer facilities. Designers and engineers need access to their designs anywhere in the world—at any time.

Connected data allows engineers to work with product data no matter where they are. Product development teams will be able to access every piece of information around any product right from a mobile device. Engineers have the ability to review designs, see bill of material items, change lifecycle states, and create and participate in change orders.

Software Integrations

PDM and PLM Integrations

Integrating connected software solutions with different systems is a potential pain point. But when done properly, connected data gives your manufacturing team more insight into all processes. System and application integration is easier said than done.

Connected data solutions typically integrate with existing systems to allow the bi-directional flow of data. This flow of data among all members involved in a project results in a superior approach to product design management. Engineers have the ability to make fully informed design decisions based on all relevant engineering and business data.

The Value of Connected Data

⊙ Innovative Products

The traditional product launch process cannot keep up with the demands of the modern market. Companies are under pressure to develop increasingly complex, innovative products. Connected data processes foster a more innovative environment than the traditional processes of the past.

Silos that prevent the development of new products are torn down when using these innovative processes. Team members and organizations are able to more easily collaborate and work effectively with companies to help them develop products that meet customer needs. Companies are therefore able to develop exceptional products in a shorter period of time.
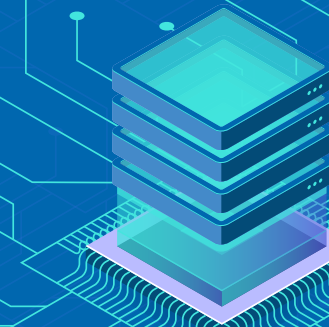
Parallel Development at Scale

The traditional production path and unconnected status quo prevents companies from continuous product development. Before connected data, companies often had to wait until the product was fully in production before product changes or new products could be developed. Connected data enables companies to design and create prototypes, all while scaling up production and without the limitations of the traditional production path.

Product development teams creating new products in parallel increases speed to market. Companies are able to utilize connected data to prototype, test, and iterate faster than ever before. They can immediately move to manufacturing high volumes when ready to scale up.

Supply Chain Resiliency

Manufacturers need supply chains that are built to be resilient. Connected data ensures that manufacturers build supply chain risks right into their processes. This is because suppliers and manufacturers are able to facilitate better collaboration and communication with connected data than they were able to in the past. Connected data helps organizations better handle supply chain disruptions.

Time Saved

Connected data solutions ensure that engineers can quickly find the product data they need. Product development teams as a result spend less time manually updating design and design documentation. Engineers instead use their time to develop more innovative products.

⊙ Reduced Costs

Data costs quickly add up when manufacturers are storing a massive amount of data.
On the bright side, cloud-based connected data solutions reduce costs for manufacturers. Organizations have the opportunity to spend their capital on other projects—instead of storing data. Manufacturers also minimize mistakes, rework, and scrap costs, all of which decrease product costs.

⊙ Data Consistency

Accurate, consistent data ensures that manufacturers efficiently optimize their products and processes. All product development and implementation data is housed in a single, easily traceable place. Teams across organizations then have access to the accurate, up-to-date information they need. Product development teams consequently spend less time cleaning up and organizing data, and more time developing new products.

⊙ Protecting Data

Manufacturers need to protect sensitive data. The right connected data solution reduces the risk of data loss, and centralized data helps cybersecurity teams protect data in a singular place. Manufacturers maintain their reputation and avoid government fines with the proper cybersecurity policies and processes created with connected data.

Autodesk Has an Entire Suite of Products to Connect Data

Autodesk has developed a comprehensive suite of products that manufacturers can utilize to propel connected data initiatives forward. Manufacturers are able to utilize these products for an all-in-one solution for product data and lifecycle management.

"With Autodesk we can now cover the CAD, product data management, and lifecycle management," said the co-founder of an electronics manufacturer. "We have a simple 'one stop solution.'"

Fusion 360 Manage with Upchain

Fusion 360 Manage with Upchain is a out-of-the-box cloud-based product data management and product lifecycle management solution with industry best practices built-in. This solution connects data, teams, and processes across your entire organization. Users can access the platform and associated data from any browser, making it easy for manufacturers to integrate this product into existing systems.

This product removes collaboration barriers and connects the entire product development process. Stakeholders and engineers across multiple organizations can access real-time data wherever they are located. Organizations can get up and running in just weeks to collaborate with users across the world and get full visibility into their processes.

"**We wanted a cloud-based solution to eliminate the on-premise hardware maintenance and reduce the costs and time associated with implementing system upgrades,**" explained a Quality Assurance Manager. "**This solution reduced our overall costs while being able to take advantage of the newest improvements (without the cost and time to implement them).**"

**AUTODESK
Fusion 360 Manage
with Upchain**

Vault

Vault is an on-premise product data management software that helps streamline workflows. All Vault users work with a central source of data. Manufacturers improve collaboration, easily find data in a centralized location, and see all revision history with Vault. Product development teams utilize product data in Vault to drive product innovation.

Vault PLM

Vault PLM is a combination of Vault and Fusion 360 Manage. This product facilitates collaboration and allows product development teams to innovate. Manufacturers are able to manage all parts of the product lifecycle, from updating product designs to tracking and approving change requests.

"Before using Vault ... we wasted 30% of our engineering time waiting for data files to open, save or close. Now we are able to open the data we need in seconds – the wait time is almost zero," said the Digital Design Manager at a piping systems manufacturing company.

AUTODESK Vault

AUTODESK Vault PLM