

Extending the value of product data and processes in the cloud

Jim Brown | President



Extending the value in the cloud

Top Performers leverage the cloud for product data and processes

Manufacturers continue to move more product data and product-related processes to the cloud. What's driving them? What value are they looking for, and what are they achieving? We surveyed 270 companies that design, engineer or manufacture products to find out.

The survey shows that companies are going beyond primary cloud benefits to improve system cost, deployment and operations. Although these benefits are valuable, manufacturers need more. They are looking for ways to change how they work. Over three quarters of respondents say that the cloud is important or critical to driving digital transformation. Top Performers – those that report better product design and development performance – are even more strategic about their cloud adoption. This eBook shares how top performers extend cloud use for product-related data and processes, and offers recommendations for manufacturers to get the most out of their cloud strategy.



Table of contents



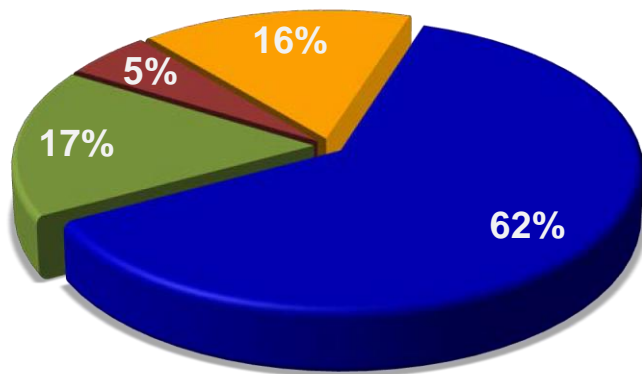
	PAGE
Multi-faceted cloud benefits	4
Achieving significant benefits	5
How does the cloud affect performance?	6
Digitalise data and processes	7
Expand cloud data and processes	8
Increase product data management maturity	9
Increase product- related process maturity	10
Integrate cloud data and processes on a platform	11
Taking the next steps	12
About the research	13
Acknowledgements	14

Multi-faceted cloud benefits

Transformational cloud value

The cloud offers a variety of value, ranging from purely tactical benefits to highly strategic advantages in how companies operate. This survey finds that manufacturers view the cloud as a way to enhance their business. Over three quarters of companies say that the cloud is critical or important to achieving their company's digital transformation goals.

IMPORTANCE OF CLOUD TO DIGITAL TRANSFORMATION



- Critical
- Important
- May contribute
- Not important

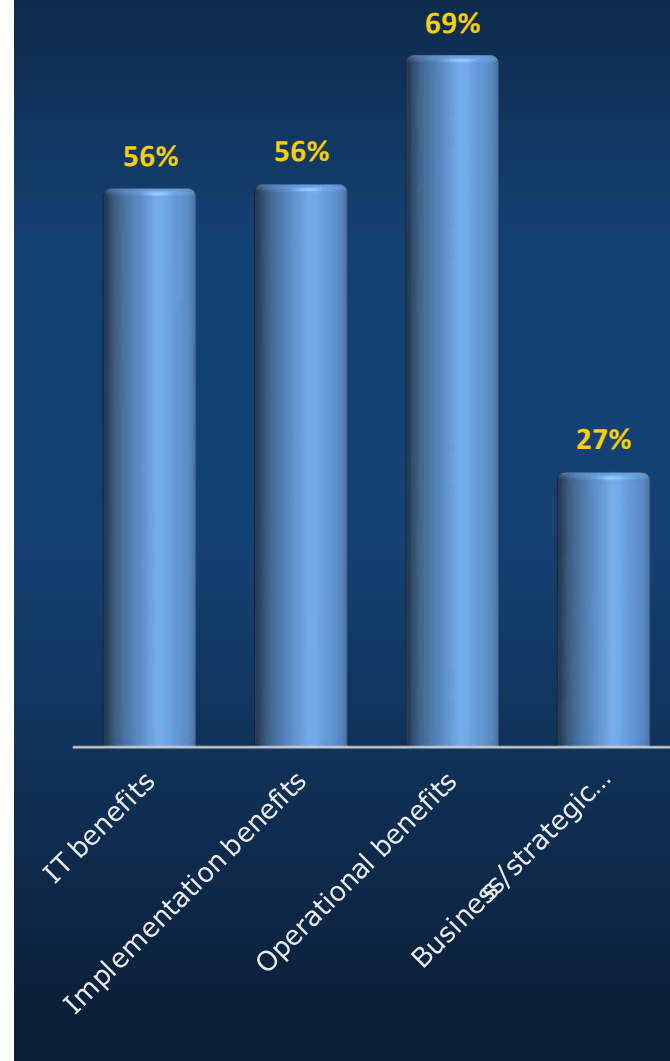
Complementary cloud benefits

Companies are moving to the cloud for benefits that range from implementation to operation and include strategic business benefits. These benefits include:

- IT benefits such as lower cost, scalability, security and performance
- Implementation benefits including faster adoption and lower IT resource needs
- Operational benefits such as data access, supporting flexible work styles, and supply chain collaboration
- Business/strategic benefits including agility, talent acquisition and data/knowledge retention

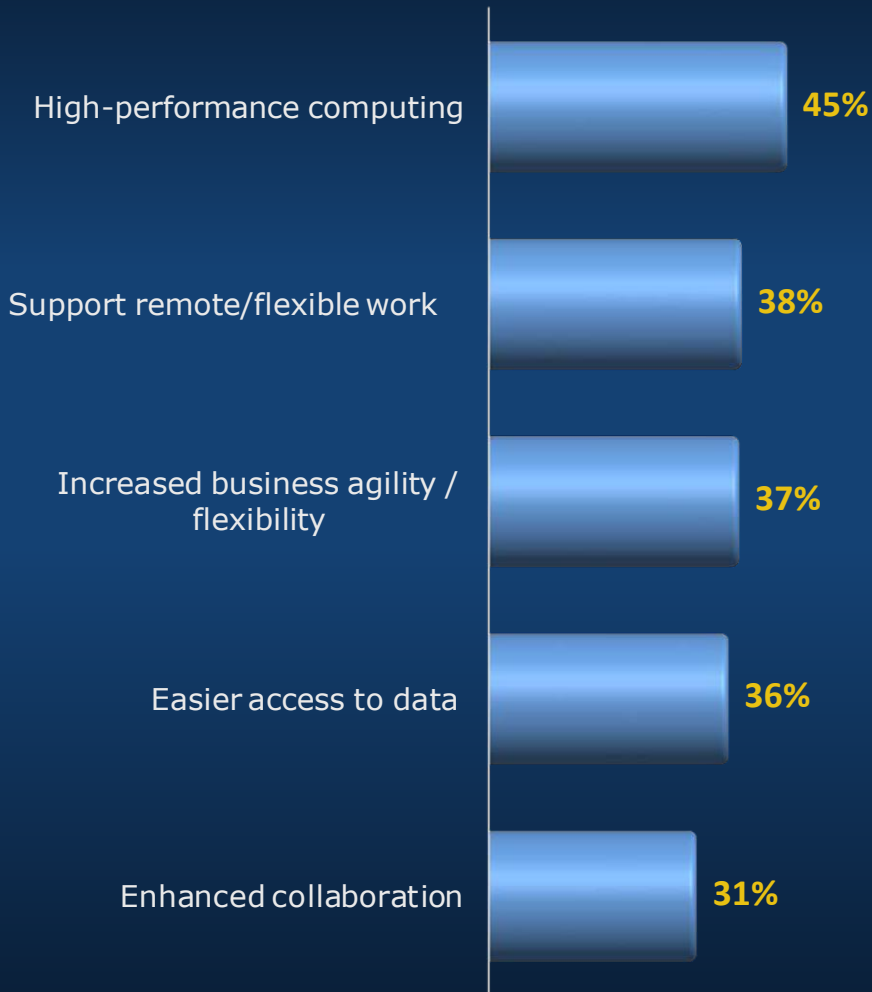
Survey responses show that these benefits are not mutually exclusive. More than half of the respondents reported multiple drivers as their "most important". Companies have a combination of objectives, the most common being operational benefits. These benefits help them improve how their designers and product developers access, work with and collaborate on product data. Of course, these benefits are complementary with others that help IT more directly and business values affecting corporate agility and the workforce.

MOST IMPORTANT DRIVERS FOR CLOUD PRODUCT DATA AND PROCESSES



Achieving significant benefits

BENEFITS ACHIEVED FROM CLOUD PRODUCT DATA AND PROCESSES



Companies are gaining value

Manufacturers are achieving multifaceted benefits. Respondents shared the operational and business benefits that their company receives from having product-related data and processes in the cloud. These are in addition to IT and general advantages of the cloud span solution categories and are relatively well known.

Moving product data and processes offers some unique benefits, as well. For example, high-performance computing (HPC) is the most common benefit. HPC can allow companies the flexibility to perform resource-intensive processes without investing in high-end workstations or enable engineers to work from home. In addition, flexible, scalable compute power makes high-value tools easily accessible to infrequent users or new teams without the need to add additional resources like RAM or GPUs.

The cloud makes work easier and more flexible

The next most common benefits are those that make work easier. Moving product-related data and processes to the cloud allows remote and flexible work, supports business agility, allows easier access to data and enhances collaboration. These are very valuable for today's distributed product design and development teams. They are also important as companies have adapted to changing markets and ways of working to cope with recent global disruptions like the pandemic. Additional benefits include enhanced talent acquisition and retention, greater supply chain connectivity, better data and knowledge retention, and continuous process improvement.

How does the cloud affect performance?



The **Top Performers** are the 20% of companies that are best able to design high-quality, innovative products quickly and efficiently.

Identifying the Top Performers

Making work easier and more flexible or gaining IT benefits sounds nice. But how does the cloud affect business performance? Our researchers used a benchmarking process that we call "Performance banding" to find out. First, we benchmarked metrics representing responding companies' ability to hit their product design and development targets compared to their competitors. The metrics include:

- Designing high-quality products
- Developing new products quickly
- Developing innovative products
- Developing products efficiently

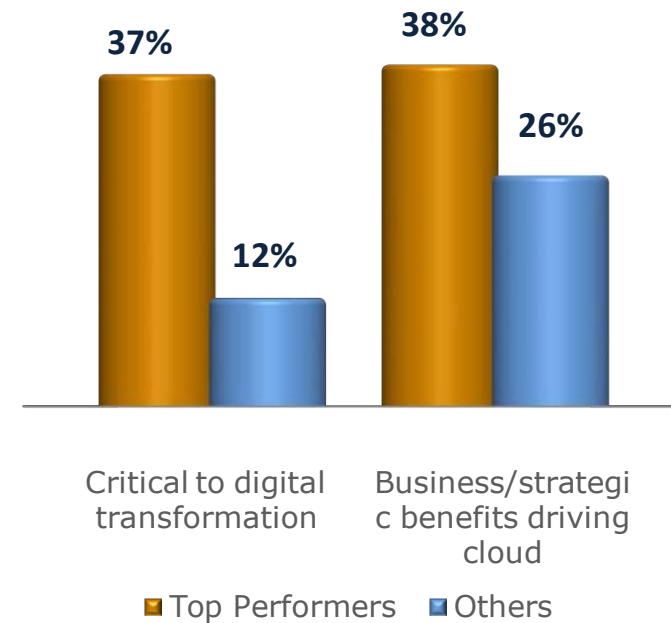
Then we created an aggregate metric across these measures and labelled the top 20% "Top Performers" to look at what these higher-performing companies do differently to the lower 80%, the "Others". Lastly, we investigated what these leaders do to identify best practices for cloud product-related data and processes.

Top Performers view the cloud more strategically

The first conclusion from the benchmarking process is that Top Performers look to the cloud for more

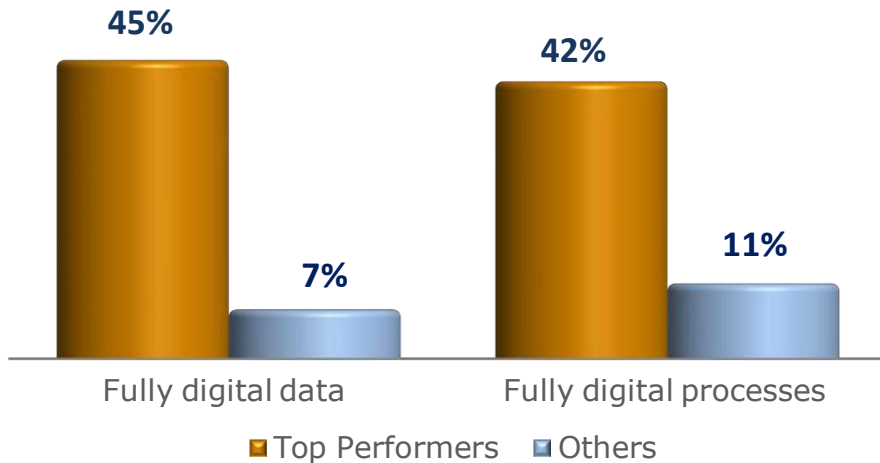
strategic value than the Others do. For example, the leading product development companies are three times as likely to view the cloud as critical to digital transformation goals. They are also about 50% more likely to report that achieving business/strategic benefits is one of their most important drivers for using the cloud for product data and processes. Not surprisingly, these leading companies also report gaining more of the benefits available from the cloud.

CLOUD DRIVERS BY PERFORMANCE BAND



Digitalise data and processes

PRODUCT DATA AND PROCESSES
BY PERFORMANCE BAND



Digital data

We define "digital" as data in a database that can be accessed by any application. Digital data does NOT include files that must be opened by a specific tool. It does NOT include data that is embedded in documents, forms, files, CAD models or scanned data.



Digital processes

We define "digital processes" as those that are executed based on computer-managed workflows and tasks. An example of this kind of process would be to manage engineering changes and approvals.

Digitalise data

The first recommendation from the benchmarking process is to digitalise both product data and processes. The survey results show that the Top Performers are more than six times as likely to have fully digital data as Others. It's important to define "digital data" to understand the significance and value of digitalisation (see graphic).

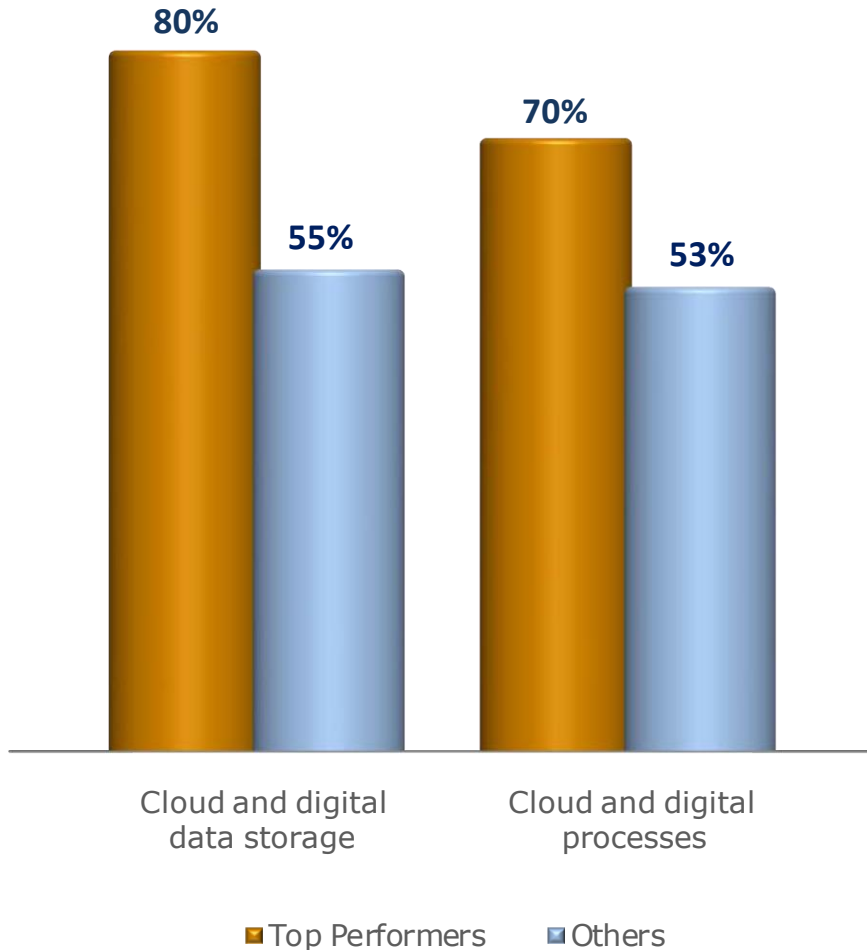
Digital data is more than data stored on a computer. Companies should keep data using an accessible, granular approach that makes it broadly available. This method contrasts with product data stored in proprietary file structures that people can only access with specialised authoring or viewing tools. In addition, digital data can be accessed and used programmatically to extend the information to others outside of Engineering for collaboration and reuse in downstream processes like manufacturing and service instructions.

Digitalise processes

The next recommendation is to digitalise product-related processes. Top Performers are almost four times as likely to have fully digital processes than Others. Digital data allows companies to use data in online, product-related processes like revision control or release to manufacturing. Digital processes are executed programmatically in workflows and tasks so they can be easily assigned and completed. In addition, they can reference the contextual product data so they are directly actionable. As a result, digital processes save time, increase efficiency, and help ensure that product developers and others follow standards and best practices.

Expand cloud data and processes

PRODUCT DATA AND PROCESS APPROACHES
BY PERFORMANCE BAND



Move product data to the cloud

The next recommendation is to move product data to the cloud in addition to digitalising it. Digitalising product data, even in a traditional systems architecture, provides benefits. Moving that data to the cloud significantly expands the value. Product data in the cloud is much easier to access for remote workers, supply chain partners and customers. Integrating with other cloud systems also makes it easier to extend the value to new people and processes. Top Performers are 45% more likely, on average, to have their product-related data stored digitally in the cloud.

Move product processes to the cloud

Similarly, moving product-related processes to the cloud increases their value. The data supports a recommendation to move product-related processes to the cloud. Executing processes in the cloud makes them more accessible to people outside the four walls of the business. Companies can easily share them with others via email or other methods so collaborators can act on them directly. Including contextual data in the process makes it easier for people to do their job because they have the relevant information at their fingertips and can act on it directly. Top Performers are 32% more likely, on average, to execute processes digitally and in the cloud.

Increase product data management maturity

Take more advanced approaches to product data in the cloud

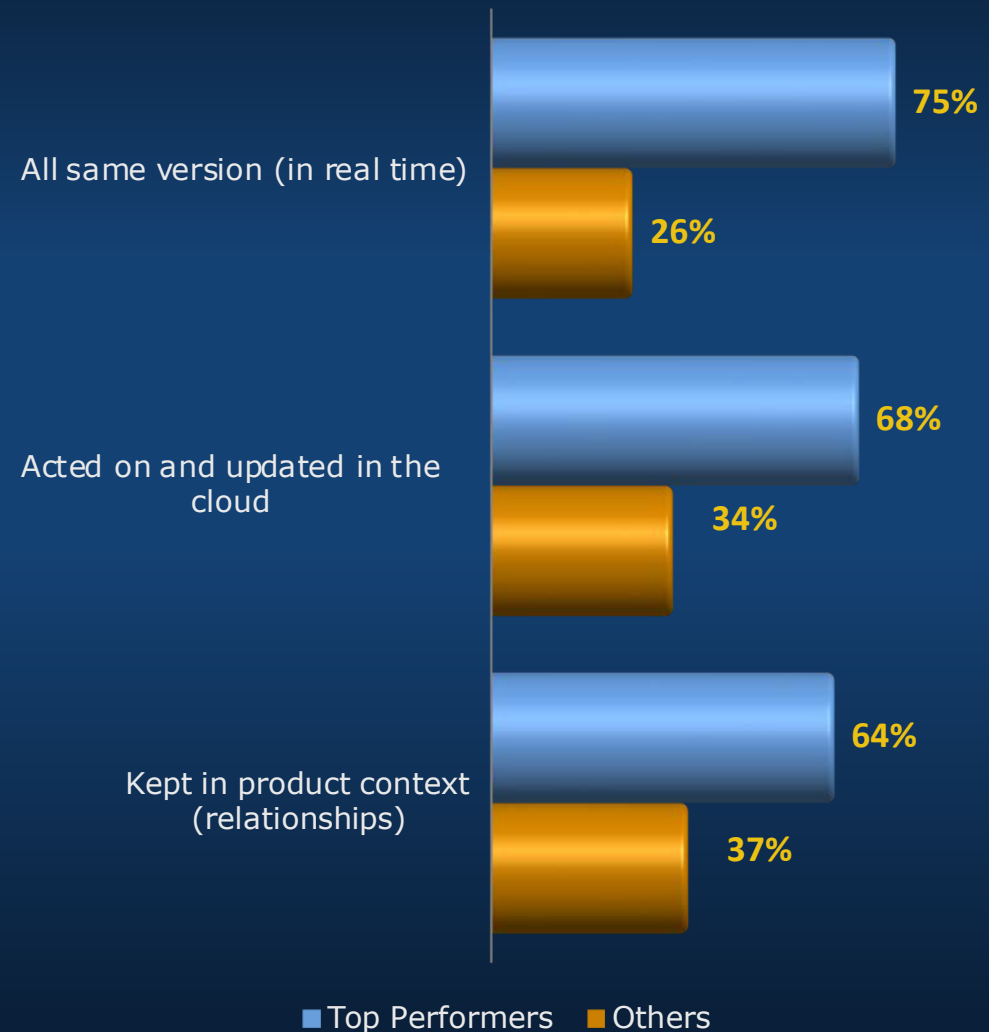
Our research and experience show that companies with greater product data management maturity get better product development results. This holds true in the cloud and shows that "the cloud" is not sufficient without data management best practices.

Top Performers are almost three times as likely to have all parties accessing and updating a common data set, in real time, in the cloud. This is sometimes known as having "one version of the truth" and is a fundamental building block for effective product lifecycle management. They are also about 75% more likely to manage product data in context, meaning they control the relationships between the various data elements that define a product. Maintaining an integrated view promotes a more cohesive design process across disciplines, enables richer collaboration, improves change impact analysis, and supports better decision-making.

Provide live, actionable data

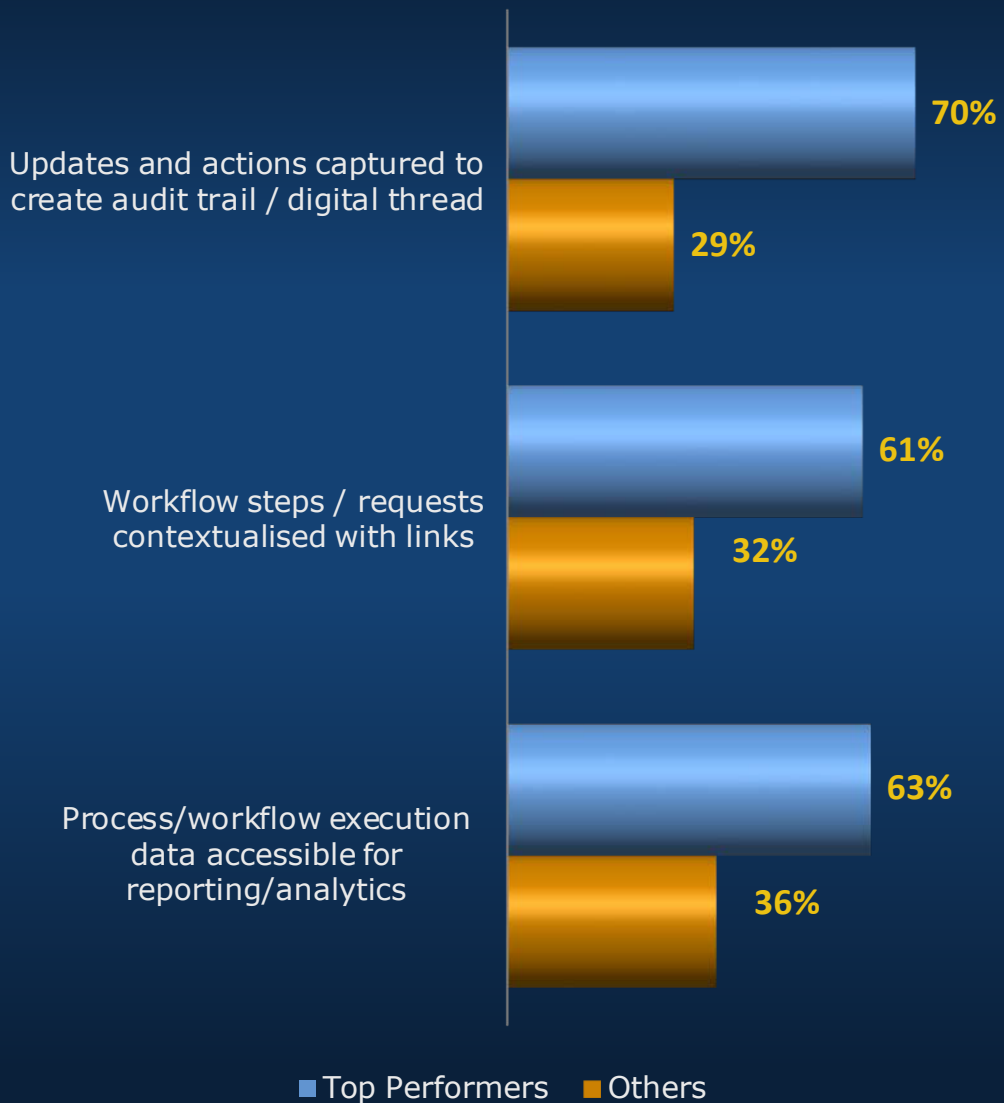
The final best practice related to data is ensuring that all parties accessing product data in the cloud are not just seeing the data in a web-enabled viewer. Instead, they should be able to act on and update the information in the cloud without having to download a data file, special application or plugin. Top Performers are about twice as likely to be able to act and update the data in the cloud, not just provide a copy for others to view. Together, these practices encourage more, and more effective, product development collaboration.

CLOUD DATA CAPABILITIES BY PERFORMANCE BAND



Increase product-related process maturity

CLOUD PROCESS CAPABILITIES BY PERFORMANCE BAND



Implement best practices for processes

Beyond improving data management maturity, companies benefit from leveraging best practices for product-related processes. Simply enabling poor processes in the cloud will not provide the intended benefits.

First, Top Performers contextualise processes with product data. They are about twice as likely to include links to appropriate product data in workflow steps to contextualise the information so they can easily act on it.

Next, these leading companies capture an audit trail to create a resulting digital thread of actions taken on their process steps. This information provides a rich history of decisions that companies can leverage for reuse, increasing product

development knowledge and continuous improvement. To leverage this, they also make this process information available for decision-making. Top Performers are about three quarters more likely to capture workflow information for reporting and analytics.

Digitally transform product processes

Together, these capabilities help make product design and development projects run more smoothly and reduce friction, helping speed up decision-making and time to market and allowing for better management oversight and continuous improvement through analytics. This, in turn, leads to better product development performance.

Integrate cloud data and processes on a platform

Integrate cloud data and processes

Beyond maturity, our research and experience show that centralised, contextualised product data helps improve product development performance. Integrated data extends the value of managing product data in context, identified early. This survey shows that a unified product data model in the cloud is even more valuable. Specifically, Top Performers are about six times as likely to have their data fully integrated or in a single data model in the cloud than Others.

Similarly, integrated processes help drive better performance. Top Performers are over four times as likely to integrate their product-related processes in the cloud.

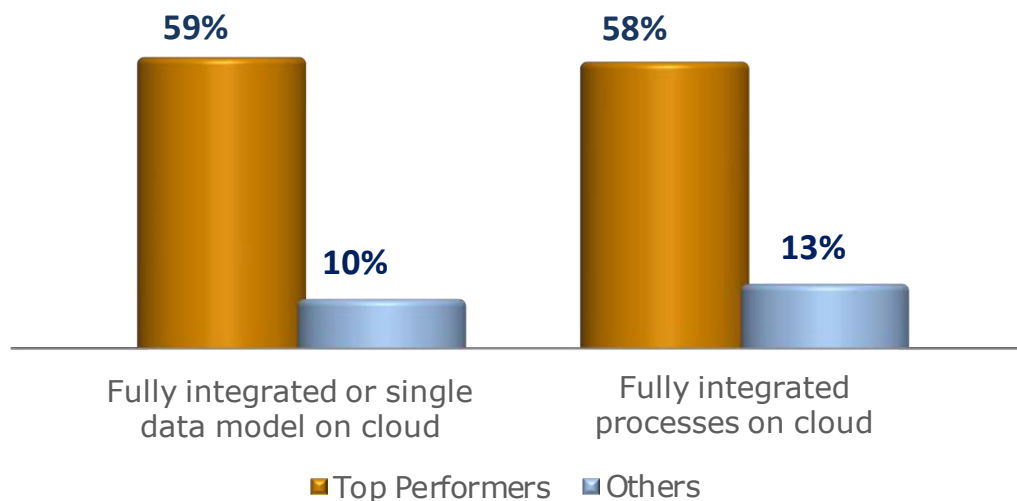
Take a platform approach

The top-performing product developers take a more integrated, holistic approach to product-related data and processes in the cloud. Companies can best support data and process cohesion by adopting platforms and solution suites versus disparate point solutions. Top Performers are over twice as likely to adopt an integrated solution platform and 76% more likely to leverage a suite of solutions to support their product data and processes to the cloud.



Top Performers are over **twice as likely** to adopt an integrated solution platform and 76% more likely to leverage a suite of solutions to support their transition of product data and processes to the cloud.

PRODUCT DATA AND PROCESSES INTEGRATION BY PERFORMANCE BAND



Taking the next steps

Take advantage of cloud benefits

Manufacturers target the cloud for digital transformation and achieve a broad array of benefits. The benefits of the cloud are proven and achievable. Take advantage of the cloud for product data and product-related processes to achieve measurable benefits in the following areas:

- Operational benefits
- IT/implementation benefits
- Business/strategic benefits

Follow the leaders

Moving product data and processes to the cloud is no longer on the cutting edge. Instead, it has become the new norm. Companies that aren't taking action, barring specific regulations or circumstances preventing them, are likely missing an opportunity and falling behind those that do. The companies that went first have paved the way for others and helped software vendors mature their offerings. Of these, those that are better hitting their product development targets are further along in their digital transformation. Based on the research and experience of the Top Performers, we recommend:

- Fully digitally transform product data and processes, making it easier to share, reuse and collaborate with others across the enterprise and the value chain
- Have more fully integrated data and processes in the cloud, providing a complete digital thread and a single version of the truth and coordinated actions to help accelerate product development, encourage reuse and drive higher quality
- Adopt more mature, best-practice approaches to product data and processes in the cloud, including
- Deploy more integrated cloud solutions or a platform to achieve greater product design and development performance



About the research

Data gathering

Tech-Clarity gathered and analysed over 270 responses to a web-based survey on the use of the cloud for product data and processes. Survey responses were gathered via direct email, social media, online postings and third-party data collection.

Industries

The respondents represent primarily process manufacturing industries. 18% were from Automotive/Transportation, 16% Architecture/Engineering/Construction, 14% Electronics/High Tech, 13% Energy/Utilities, 13% Industrial Equipment/Machinery, 11% Building Products and Fabrication, 9% Life Sciences / Medical Devices and others including Consumer Packaged Goods, Consumer Products and Aerospace/Defence.*

Company size

The respondents represent a mix of company sizes, including 19% with 1 to 500 employees, 21% with 501 to 1,000 employees, 22% with 1,001 to 5,000 employees, 20% with 5,001 to 10,000 employees, and 18% with over 10,000 employees.

Geographies

Responding companies report doing business in North America (40%), Western Europe (36%), Asia (36%), Eastern Europe (16%), Australia (10%), Middle East (7%), Latin America (6%) and others including Africa.*

Product role

89% of respondents design and/or manufacture products. The other 11% provide engineering or design services that help companies to design and/or manufacture products.

Role

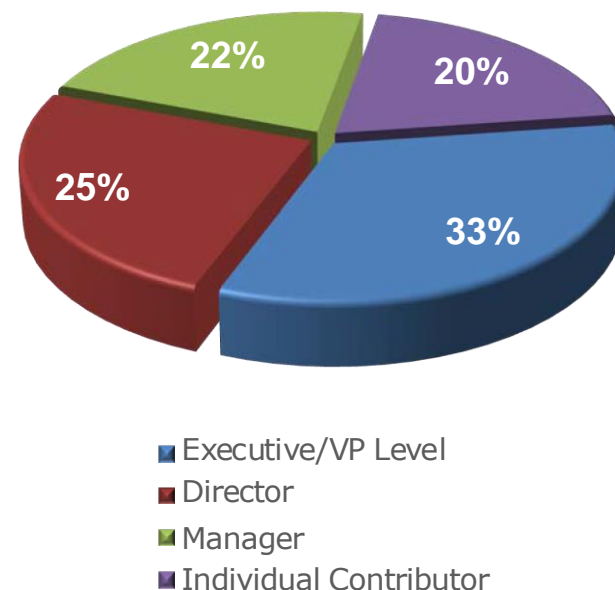
The respondents comprised 33% Executive/VP level, 25% Director, 22% Manager level and 20% individual contributors.

Organisational function

Of the respondents, 24% were in Product Design/Engineering, 16% in Industrial/Manufacturing Engineering, 12% in Information Technology (IT), 11% in Manufacturing, 9% in Product Management, 6% in Industrial Design, 4% in Supply Chain/Logistics, and the remainder were from a variety of organisations including Project/Programme Management, General Management, Plant/Facilities Engineering, Analyst/Simulation Expert and others.

* Note that the values may total greater than 100% because companies reported doing business in multiple industries and geographies.

The respondents represented a mix industries, company sizes and geographies.



Acknowledgements



Jim Brown
President
Tech-Clarity, Inc.

About the author

Jim Brown founded Tech-Clarity in 2002 and has over 30 years of experience in the manufacturing and software industries. Jim is an experienced researcher, author and speaker, and enjoys engaging with people with a passion to improve business performance through digital enterprise strategies and supporting software technology.

Jim is actively researching the impact of digital transformation and technology convergence in the manufacturing industries.

Tech-Clarity is an independent research firm dedicated to making the business value of technology clear. We analyse how companies improve innovation, product development, design, engineering, manufacturing and service performance through the use of digital transformation, best practices, software technology, industrial automation and IT services.

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