

FUTURE OF
Operations

IDC eBook

Using Data-Driven Operations to Overcome Digital Disruption

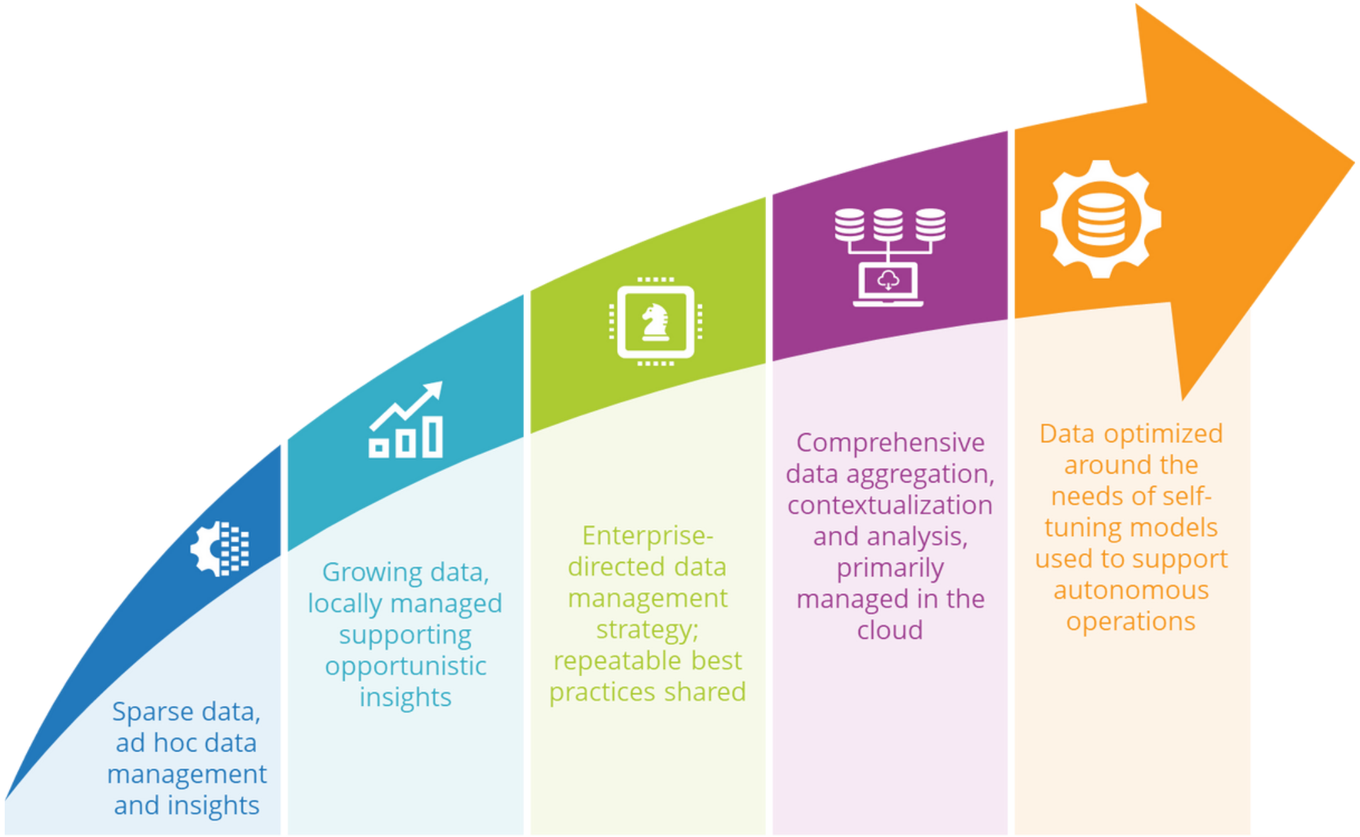
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Organizations that build their technology investment strategies around data-driven operations will thrive in the face of digital disruption. Those that fail to do so, or fall behind in their efforts, will be at risk of making themselves targets for acquisitions by private equity firms that will look to rebuild the organization around data-driven operations.

Since launching our Future of Operations practice in 2020, we have consulted with business leaders and conducted extensive research to provide informed guidance on investment and technology requirements to our clients.

Our global surveys, PlanScapes, MaturityScapes, and FutureScapes, along with timely research show that data, its effective management, and its central role in operational decision making is driving the transformation of operations.

The Data-Driven Operations Journey



Source: IDC

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The data-driven operations journey spans several stages. The destination – mostly aspirational today – is autonomous operations, but there are significant benefits along the way, in the form of better and more timely decisions that rely less on human judgment and more on insights derived from operational data.

This trend toward data-driven operations is reflected in our updated future of operations framework, which identifies the foundational elements, the enablers/technologies and the desired business outcomes.

IDC's Future of Operations Framework

Data-driven operations is built on three foundational elements: agility, resilience, and predictability. These are perennial, but elusive, goals for operations as discussed in the sections that follow.

Agility, the ability to respond effectively to new opportunities and new business imperatives, is a function of organizational structure and how decisions are made. The more hierarchical and rigid an organization is, and the more decision making is concentrated in the hands of a few, the less agile an organization will be.

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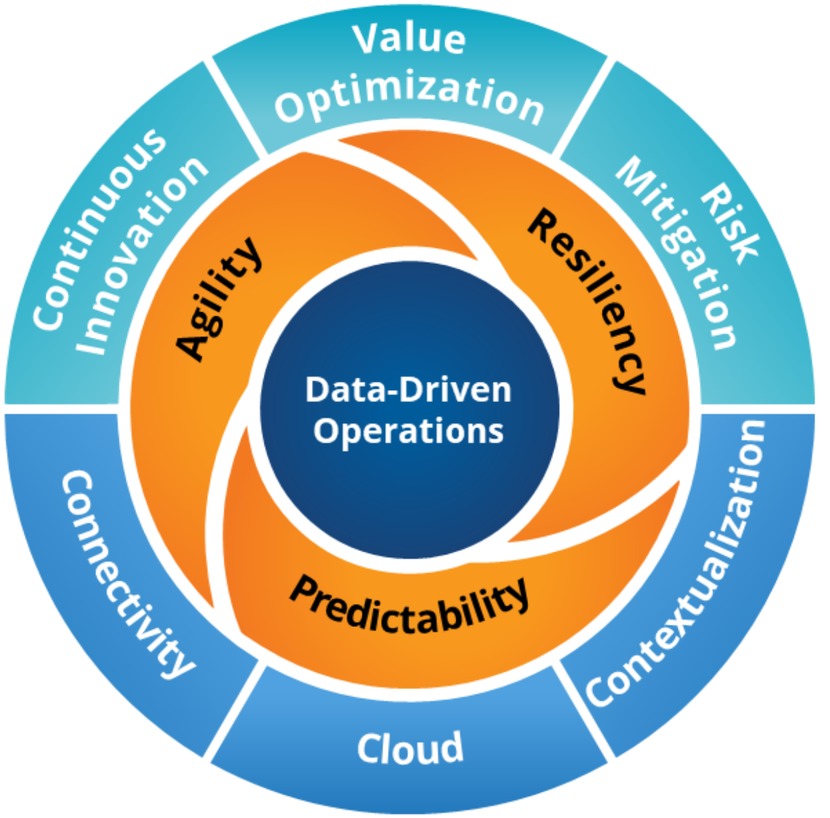
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Data-driven organizations are characterized by data sharing, collaboration, and distributed decision making. To be as agile as possible, organizations must have both the data necessary to do timely what-if analyses and the processes needed to support agile decision making. Without the necessary data, organizations will suffer from analysis-paralysis; without agile decision-making processes, organizations are prone to making poor, counterproductive decisions.

Resiliency is the ability to withstand the impact of unforeseen adverse events. In the past several years, a steady onslaught of these adverse events – unplanned equipment failures, supply chain disruptions, unexpected weather events, pandemics, and geopolitical disruption – have caught many organizations unprepared. Enabling decision making to happen in a timely fashion at the point of activity, is the key to resiliency. Equally important is access to the right information (contextualized data) at the right time for those empowered to make decisions.

Predictability in operations is the ability to predict how equipment and processes will behave for some period into the future.

IDC's Future of Operations Framework



Source: IDC's Future of Operations Framework, IDC, 2023

Although there are some examples of success – most notably more sophistication in predicting the potential failure of critical equipment and machines – predictability in operations has been constrained by lack of data and limited ability to effectively analyze that data. With the rapid pace of technological innovation, we are now on the cusp of breaking through these constraints and becoming truly data driven. But, it is not just a question of technology – organizational changes are also required.

IDC's Future of Operations Framework: Enablers/Technologies

The enablers/technologies underpinning data-driven operations fall into three broad buckets – connectivity, cloud, and contextualization. The rapid growth and maturation of these technologies make data-driven operations possible and open the door to autonomous operations.

The growing connectivity of things – most notably assets, equipment, and infrastructure – that make up operations is essential to collecting increasingly of operational data sets and getting them to where they can be aggregated, managed, and shared with the ultimate goal of making better decisions. This is often referred to as the Internet of Things (IoT) or, more specifically, the Industrial Internet of Things (IIoT). Advances in connectivity technologies are making it possible to measure parameters and collect data, which, until now, was not feasible.

Cloud is rapidly emerging as the logical place to aggregate, contextualize, and manage increasingly large volumes of operational data. Cloud offers a seamless and powerful platform for sharing data and insights both within the organization and across the extended value chain. There has been an explosion of cloud-based service offerings that deliver data management, analysis, and visualization capabilities in cost-effective and scalable ways to organizations of all sizes.



Context, in conjunction with connectivity and cloud, will provide the technology foundation for data-driven operations. Raw data points – sensor readings, observations, and parameters – have limited utility. Value is created when we aggregate, normalize, and analyze operational data to extract insights and create meaning from the data. It is for want of context that organizations continue to make significant investments in analytical tools and technologies, most prominently AI and machine learning. And, while the results from AI/ML projects have been mixed, the potential is significant.

IDC's Future of Operations Framework: Business Outcomes

Operations is about optimizing outputs while simultaneously minimizing risks. For much of the history of operations, these goals have involved significant trade-offs. Reliability could be improved, but often involved an increase in costs. Product quality could be improved, but might result in reduced production. Trade-offs were necessary because there was simply not enough information about the performance of equipment and processes and the risks associated with pushing the operating envelope. Data-driven operations opens the door to the possibility of optimizing operational performance while simultaneously supporting continuous innovation and mitigating risk.

IDC defines operations as:

The activities responsible for the safe, reliable, and efficient execution of a physical process central to an organization's business. These processes can include producing and/or moving goods or services and maintaining assets, infrastructure, or facilities.

Value optimization can be summarized as extracting the most economic value from a given set of inputs while managing operational risks. In some industries, particularly in capital-intensive ones that produce commodities, value optimization is simply a matter of maximizing output. In many other industries, it is about producing the highest quality product at the lowest cost. And for some, such as public utilities and infrastructure, it is simply about maintaining safe assets and infrastructure at the lowest possible cost. Data-driven organizations are better able to optimize the value of their operations because they are better able to see – and even predict – the implications of their decisions in real time.

Another business outcome, continuous innovation, is made possible by using data to identify innovation opportunities and better understand costs and benefits. However, it is not just the ability to support continuous innovation; organizations must also realign incentives to better support innovation and change, which takes many forms. It can be innovation in the production process, innovation in the final product, or even innovation in the business processes necessary to run operations.

One of the major benefits of data-driven operations is a significant reduction of operational risk, which is ever-present in environments where heavy equipment, hazardous environments, and people intersect. In some industries, risk also manifests itself in product safety and quality. Shipping poor quality products has implication for brand and future business. And shipping products that can cause customers to become injured or become sick can impact an organizations license to operate.

Finally, there is the risk of failing to meet societal obligations or adhere to regulations with respect to the environmental impact of operations, particularly in light of efforts to reduce CO2 emissions and other forms of greenhouse gases.



The more we know about the operation of equipment and processes – through the use of data –the more we can avoid unplanned incidents and undesirable outcomes. And, as we move closer to the goal of autonomous operations, we also reduce risk by taking more workers out of harm's way.

Next Steps for Tech Buyers

- Embrace data-driven operations and the technologies necessary to support it. Recognize the opportunities and challenges inherent in operational data collection, management, and contextualization.
- Ensure that your organization is prepared for the inevitable changes brought about by becoming more data driven. Look closely at how decisions are made and by whom. Failing to recognize the transformational nature of data-driven operations will lead to suboptimal results.
- Evaluate the implications of data-driven operations for your extended value chain and, more broadly, your industry. Becoming more data driven opens the door to new business models and new modes of intra- and inter-organization collaboration.



Data-driven operations opens the door to the possibility of optimizing operational performance while simultaneously supporting continuous innovation and mitigating risk.

With a data-driven approach, true optimization – the ability to push the operating envelope in any direction we choose and be confident in the outcome – is within reach. IDC's Future of Operations practice provides the expert guidance our tech supplier clients need to help their customers manage the transition to data-driven operations.

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Contact us to learn more about IDC's research, data, and custom solutions.



Learn more about the full IDC report: ***IDC's Future of Operations Framework***.

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