



Emerging Technology and Modern IT: The Key to Unlocking Your Data Capital

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INTRODUCTION

Our systems, networks, and entire environments today are rich with data, yet we are at the very beginning stages of gaining deeper insights from data and unlocking its real value.

IDC forecasts that the global data sphere will grow to 163ZB by 2025. Whether a company is adding sensors to systems and devices in factories, buildings, hospitals, or cities as part of Internet of Things (IoT) initiatives; seeking to improve public safety; or transforming the customer experience through the use of augmented reality/virtual reality (AR/VR) systems in combination with artificial intelligence (AI) and machine learning (ML), the most immediate consequence for IT teams is an explosion in data being generated that must be moved, stored, protected, and analyzed — and then leveraged and capitalized on.

The influx of data presents both a challenge and an opportunity for organizations. Some organizations will flourish and turn the influx of data into competitive differentiation. Others will be overwhelmed in a struggle to collect, cleanse, and protect data and will miss out on opportunities to innovate and improve. IDC studied the behaviors, strategies, and outcomes of organizations to understand factors that contribute to success. By and large, thriving organizations (“Thrivers”) have embraced automation and shifted to data-driven decisions - essentially harnessing data to streamline processes and drive innovation.

Key Highlights: Thrivers Versus Survivors

Greater investment in advanced infrastructure helps Thrivers overcome management complexities and shift to more autonomous operations.

- » Thrivers reduce operational costs by **2.7x more** than Survivors.
- » Thrivers achieve **39% higher overall IT staff productivity.**
- » Thrivers are able to deliver new IT services **64% faster** because automated and data-driven delivery of IT services underpins innovation.
- » Thrivers have a much higher rate of innovation when it comes to new products and features — being able to deliver **46% faster** on new products/services.
- » Thrivers improve their customer service levels, resulting in higher customer satisfaction (**up to 75%**) and reduced churn rates.

Data generation, delivery, concentration, and exploration are transforming how organizations connect with customers, develop new revenue sources, and improve operational efficiencies.

The process of turning data into actionable insights is complex. IDC believes that organizations that are thriving amid this challenge have a unique approach. Leading organizations across all industries are fundamentally reassessing their investment priorities and redefining their datacenters' role in enabling the business capabilities fueled by information. Emerging data-centric technologies such as big data and analytics (BDA), AI/ML, IoT and other fast-evolving technologies such as augmented reality, virtual reality, and blockchain are reshaping how organizations create value, fuel growth, and realize competitive advantage through the adoption of innovative business models, the introduction of new product/service offerings, and the establishment of deeper business relationships.

Data generation, delivery, concentration, and exploration are transforming how organizations connect with customers, develop new revenue sources, and improve operational efficiencies. The ability to operationalize data, accelerate innovation, and focus on customer engagement and experience is the foundation for capitalizing on this explosion of data. These three strategic priorities are taking precedence in driving the use of emerging technology and the subsequent value organizations reap from their data. Capitalizing on these insights requires a new vision and strategy for datacenter resources that includes the following critical capabilities:

- » **Volume of data.** Datacenters need to collect, cleanse, manage, leverage, and protect the massive data volumes that AI, ML, and deep learning (DL) technologies require. Accomplishing this requires a coordinated data control vision and strategy that enables leveraging very large volumes of data coming from highly diverse and distributed sources.
- » **Scope and scale of datacenter resources.** The highly diverse and distributed nature of data and supporting compute resources introduces performance, reliability, and security risks in traditional datacenters, which modernization and automation can dramatically reduce.
- » **Localization of compute.** The extension of AI/ML/DL to include real-time analysis and rapid response requires a coordinated vision and strategy for deploying high-performance, accelerated compute resources and secure data storage in on-premises datacenters and edge locations.
- » **Streamlined resource management.** Even the most advanced organizations struggle to rationalize and coordinate information coming from multiple management systems as organizations must reach across traditional silos of expertise. Smarter, modernized datacenters increase operational efficiency and enable the IT organization to respond more quickly to the needs of the business.

The ability to innovate quickly and on a vast new scale is critical for organizations delivering new IT services based on emerging technology. With IT embedded in almost

At the core of all business priorities is improving the customer experience and ability to engage.

all new innovation today, datacenter resources and IT services need to be delivered rapidly while ensuring security of data and assets in all locations. At scale and in a distributed environment, delivering new resources and services quickly is an enormous task. Organizations that rely on autonomous infrastructure can reduce or eliminate tedious maintenance and management tasks that are prone to human error. Shifting to autonomous infrastructure also allows IT staff to focus on more strategic initiatives.

At the core of all business priorities is improving the customer experience and ability to engage. Emerging technology takes on the heavy lifting of turning data into actionable insights. AI and ML technologies help organizations more quickly understand problems and fix them, improve understanding and communication and, ultimately, avoid problems altogether. Organizations that prioritize the customer experience in their strategy will require investment in emerging technology. This strategy will enable them to win new business through the delivery of timely, innovative, and personalized new services and products.

Use of Emerging Technologies Requires a New Datacenter Vision

Data underpins all new innovations and emerging technology. IoT is where you collect the data, AI is where you make sense of the data, AR/VR are where you visualize the data, and blockchain is where you ensure trust in the data. All of these emerging technologies require modern IT and datacenters. The ability to prepare for the increased demand on IT staff and resources is a core difference between Thrivers and Survivors, and Thrivers are very different from Survivors in how they invest in and manage their datacenter resources (>60% of Thrivers have made significant investments in datacenter technologies to support emerging technology). Thrivers understand the importance of developing a strategy and vision to control the burgeoning volumes of data and instead realize their data capital. IDC believes that the ability to simplify data management is a key part of Thrivers' datacenter vision and is exemplified by Thrivers' increased investment in technologies that streamline and automate processes.

The business implications for organizations seeking to expand the use of emerging technologies and the corresponding competitive differentiation driven by these technologies are significant. This does, however, place step-change increased demands on datacenter resources. Business and IT organizations need to rethink the datacenter in the context of this shift beyond merely modernized datacenters. Thrivers understand that a datacenter is not a single building where IT infrastructure lives. These organizations recognize the need to embrace multiple IT service

delivery models and diverse datacenter resources to meet the need for IT service delivery and data aggregation across core and edge spaces. Modern IT to support emerging technology needs to tackle the following:

» **Focus on security.** Underpinning all new and existing datacenter demands is the need to focus on data and physical security. Rapid deployment of AI and analytic systems across all core and edge datacenter resources and delivery of new capabilities leveraging emerging technologies such as IoT, AI/ML/DL, AR/VR, and blockchain should include investments in new, enhanced processes and advanced technologies to ensure that data protection is consistent. Without a coordinated strategy to protect data across this new distributed and diverse landscape, organizations increase their risk. By adopting technologies that simplify management and rely on autonomous operations to ensure resiliency in service, Thrivers are reducing their risk. Risk is a major barrier to innovation, and Thrivers understand this well.

Thrivers are: 2x more likely to have enhanced datacenter security provisioning.

» **Reduce management complexity.** Thrivers report higher use of infrastructure technologies that simplify management and leverage autonomous and self-healing capabilities. Thrivers are 19.3x more likely to extensively use embedded big data, integrated analytics, and AI within their IT and datacenter management processes. Greater investment in advanced infrastructure has helped Thrivers overcome management complexities and shift to more autonomous operations. The use of these technologies also frees up IT staff from the day-to-day management tasks to spend more time on strategic initiatives.

» **Prepare infrastructure for the data deluge.** Thrivers have more advanced capabilities in storing unstructured data as well as the ability to enable high-performance computing capabilities (graphic processing units [GPUs] or field-programmable gate arrays [FPGAs]) in their datacenters. These same organizations also have the highest adoption of software-defined storage and networking, converged infrastructure (CI) and all-flash arrays.

Compared with Survivors, Thrivers are:

- **25x** more likely to invest in software-defined storage
- **23x** more likely to invest in CI
- **17x** more likely to invest in all-flash arrays for primary storage
- **46x** more likely to invest in storage for unstructured data
- **72x** more likely to invest in software-defined networking (SDN) or open networking
- **14x** more likely to invest in accelerated computing using GPU or FPGA optimized servers

“We are expanding our datacenter to support our use of emerging technologies and also adding automation and reaching into the cloud. We are making sure that data is readily available — we have multiple datacenters and we need to be sure that the data needed most can be available from any datacenter.”

- » **Leverage both on-premises and cloud infrastructure.** A number of interviewed Thrivers described using a multicloud strategy, or a combination of private and public cloud solutions, to buttress their ability to handle significant data growth and gain more IT agility.

“We are expanding our datacenter to support our use of emerging technologies and also adding automation and reaching into the cloud. We are making sure that data is readily available — we have multiple datacenters and we need to be sure that the data needed most can be available from any datacenter.”

“One of the big advantages of cloud and why we’ve had success with it is because we don’t have to worry about scaling our infrastructure quickly ... when there’s a use case that’s going to require scaling that, we choose cloud first.”

“We are moving more workloads to the public cloud. We will still have our datacenters and some data will remain on-premises, but more endpoint processes will be in the cloud.”

Unlocking the Value of Data

While many IT organizations struggle to simply survive the burgeoning volume of data by focusing on containment and control, leading IT organizations are making investments to turn their data into a wellspring that allows them to thrive in this new digital business landscape. These Thrivers are able to unlock the value of their data through the use of emerging technology and have the following capabilities:

- » They can ensure the proper use and custodianship of data about and from their customers.
- » They trust their infrastructure to always be available and ready to meet expanding workloads and handle new real-time, data-driven workload requirements.
- » They can connect and enhance a myriad of “things” by leveraging AI to drive insights, improve business decisions, and change customer experiences.

These thriving IT organizations are acutely aware of the need to continuously advance their datacenter strategy and have adopted a vision for agility, automation, and resilience. In doing so, they have also committed the time and staff needed to ensure that emerging technology investments are closely aligned with overall business goals.

“For our business model, BDA, AI/ML, and IoT are intertwined and there was no way to embrace one without embracing all three Our ability to focus on analytics had to grow exponentially, and we’re using machine learning to correlate patterns that define action or response stacks to us and embedding it in a service offering and our core processes.”

Understanding What It Takes to Thrive

IDC believes that developing a strong datacenter vision, as outlined previously, is the foundation that will determine whether an organization thrives or struggles to survive. To understand the steps that leading IT organizations take to adopt emerging data-centric technologies and the results their organizations can achieve through the use of these technologies, IDC conducted a survey of over 1,200 global organizations. This survey was designed to examine datacenter strategies, investments, and IT organizational approaches, and the survey results revealed notable performance differences among organizations (which IDC categorized as Thrivers or Survivors) in both their level of adoption of emerging technologies and the benefits they realize from their use of those same technologies. To provide additional depth on what sets Thrivers apart, IDC interviewed 16 organizations that have invested and deployed BDA, AI/ML, IoT, and/or AR/VR. The interviews delved into specific use cases to learn more about which technologies and practices are driving business success.

IDC’s survey and interviews revealed that organizations that thrive in their use of emerging technologies follow certain best practices. These organizations have a datacenter strategy and vision to create business differentiation via emerging technology adoption.

Thrivers Recognize the Interconnectedness of Technologies

The most important characteristic of thriving IT organizations (Thrivers) is that they understand the interconnected nature of emerging technologies and are developing expertise that complements their broad efforts to implement them. BDA, IoT, and AI aren’t independent initiatives; rather, each is a multiplier that dramatically improves the benefits gained from the others. A managed services provider interviewed for this study stressed the close linkage between these technologies: *“For our business model, BDA, AI/ML, and IoT are intertwined and there was no way to embrace one without embracing all three Our ability to focus on analytics had to grow exponentially, and we’re using machine learning to correlate patterns that define action or response stacks to us and embedding it in a service offering and our core processes.”* This approach also holds true with planned use of newer technologies such as AR/VR or blockchain, which Thrivers expect will further enhance benefits by improving experiences, altering behaviors, and enhancing trust.

This same understanding about the importance of leveraging all enhancements concurrently and consistently also applies to the IT infrastructure investment priorities of Thrivers. Virtually all companies are seeking to apply new hardware/software infrastructure solutions such as software-defined storage/networking, all-flash arrays, containers, and hyperconverged and accelerated infrastructure, but Survivors deploy

these technologies piecemeal to deal with tactical issues such as reducing cost or addressing performance bottlenecks. Thrivers recognize the importance of leveraging all of these infrastructure enhancements together to deliver a more consistent and flexible datacenter environment that supports their organization's digital innovation efforts.

Why It's Good To Be a Thriver

Organizations that are more advanced in their adoption and use of emerging technologies are achieving significant and demonstrable positive results for business outcomes and operational cost reduction. Stated simply, enterprises that move with the purpose to adopt emerging technologies and modernize their datacenters in support of business and operational use cases outperform those that do not. Both survey results and in-depth interviews confirm this conclusion.

Revenue and Profitability

Interviewed organizations recognize that they face a constant imperative to differentiate their businesses. If they cannot create and sustain differentiation, then they put their ability to win new business at risk and also increase the likelihood that competitors will take their existing customers. However, IDC's research shows that interviewed organizations have created differentiation through their application of emerging technologies, and this helps them protect their revenue bases by limiting customer churn and revenue losses associated with unplanned outages. Perhaps more important, emerging technologies enable these organizations to win new business through the delivery of timely, innovative, and personalized new services and products.

» Thrivers are able to capture 34% additional revenue — a significant impact for organizations. On average, Thrivers are achieving >2x higher profitability gains over Survivors. Following are examples of areas where additional revenue and profit are gained:

- **Winning new business** contributes to 13% higher revenue.
- **Protecting existing business** contributes to 15% higher revenue.
- **Reducing losses associated** with unplanned downtime contributes to 6% higher revenue.

“We’ve operationalized data in areas like preventive maintenance, talent assessment, procurement, and sourcing. We have reduced operational costs because of all these investments I think the planning process has improved to the point that we’re filling the shelves with the right merchandise. On material and inventory costs, I think we’re avoiding \$10 million to \$20 million per year in operational costs by getting better at the planning process.”

- » Thrivers are more advanced in their ability to leverage data capital to support sales activities, generating higher revenue and improved sales-related key performance indicators (KPIs), including the following:
 - **Developing substantially more deals** (74%) and **winning more deals** (36%), reflecting increased sales team productivity.
 - **Closing deals faster** (9% faster) and **increasing deal size** (5% higher), which contribute to higher revenue.
- » During interviews, a financial services company reported that it achieved **25–35% higher profits** by improving performance and optimizing costs across its operations with BDA and ML. A professional services company cited **increasing its revenue by 20%** through AI-driven sales of its services. A manufacturer reported that it was able to avoid **revenue loss of up to \$15 million per year** by implementing BDA and ML-driven monitoring of its equipment used by customers.

Operational Excellence

Interviewed organizations also noted that they are making their overall operations more cost effective by identifying inefficiencies, better understanding operational cost structures and inventory, and establishing more consolidated business operations.

- » Thrivers reduce operational costs by 2.7x more than Survivors:
 - A manufacturing organization explained: *“We’ve operationalized data in areas like preventive maintenance, talent assessment, procurement, and sourcing. We have reduced operational costs because of all these investments I think the planning process has improved to the point that we’re filling the shelves with the right merchandise. On material and inventory costs, I think we’re avoiding \$10 million to \$20 million per year in operational costs by getting better at the planning process.”*
- » Thrivers reduce the impact of unplanned downtime by 92% on average:
 - A manufacturing company commented: *“The potential loss associated with downtime is closing down the business. Now, we are much more able to track issues or complaints from the customers and have a closed-loop process.”*

“We want to enable our staff by giving better access to data to make better decisions ... we’re working on using AI to analyze the data and actually augment and complement the decisions with artificial intelligence. In some cases, it [the AI] actually makes decisions and takes action based on those decisions.”

- » Thrivers achieve 39% higher overall IT staff productivity:
 - An interviewed life science organization explained the value of better and more timely access to actionable data across operations: *“We want to enable our staff by giving better access to data to make better decisions ... we’re working on using AI to analyze the data and actually augment and complement the decisions with artificial intelligence. In some cases, it [the AI] actually makes decisions and takes action based on those decisions.”*
- » Thrivers enable teams across their organizations to work more efficiently and effectively by using their data capital, increasing their productivity levels:
 - Big data and analytics teams (48% higher productivity on average) benefit from more robust data and improved flow of data across business operations.
 - Application development teams (33% higher productivity) can use data to create more robust applications and features and speed up delivery thanks to more agile IT and data environments.
 - Sales (23% higher productivity) and marketing teams (8% higher productivity) benefit from better identification of new opportunities as well as cross- and upselling opportunities.
 - Customer support teams (20% higher productivity) benefit from AI- and ML-driven predictive identification of problems and issues, allowing them to better support customers.

Accelerate Innovation

- » Thrivers are able to deliver new IT services 64% faster because automated and data-driven delivery of IT services underpins innovation.
 - An interviewed retailer commented: *“We’re looking at AI for the entire IT department. Right now, it is one system but touching the entire business looking for issues and requirements that may need to be addressed ... We estimate a productivity increase, optimistically speaking, of 70% on repetitive tasks that people bring to IT.”*
- » Thrivers have a much higher rate of innovation when it comes to new products and features. They are able to deliver 30% faster on product enhancements and 46% faster on new products/services, both of which contribute to Thrivers being able to increase their delivery of new products and services by 2.4x more than Survivors.

“One of the things that we are driving down with our use of IoT is what we call returns. What happens is a customer is on a schedule for fuel delivery, and we get to the site and the customer doesn’t have the capacity for the fuel; then the fuel has to be returned to stock, which is costly. Now with the IoT solution, we have an accurate reading of how much fuel is needed for that site. We’re seeing a 10% return rate move down to about a 5–6% return rate, and it will be even less eventually.”

- » Thrivers’ application development teams achieve 33% higher productivity for application development teams, as they use data to create more robust applications and features and streamline their efforts with automated delivery of IT resources needed for development.

Improve Customer Experience

Interviewed organizations have leveraged emerging technologies to create value by better understanding and using operational data, which in turn helps them grow their customer bases (12% growth), increase their revenue per customer (6% higher), and even extend their geographic reach in some cases. Other study results also show the extent to which Thrivers improve their ability to serve their customers and in turn the customer experience:

- » Thrivers reduce customer churn rates by 25%, reflecting higher quality of services and products as well as improved ability to proactively respond to problems and other issues.
- » Thrivers increased customer satisfaction rates in terms of:
 - Improving their customer service levels, resulting in higher customer satisfaction (up to 75%) and reduced churn rates
 - Delivering new services and functionality in less time, reducing the time needed to provide customers with products (30% faster) and new product features (48% faster)
 - Establishing more cost-effective business models, allowing for differentiation in terms of value to cost (19% lower cost of business operations)
- » Thrivers achieve higher increases in customer satisfaction and retention rates than Survivors:
 - A natural resources company uses IoT to serve its customers more efficiently and reduce return rates. *“One of the things that we are driving down with our use of IoT is what we call returns. What happens is a customer is on a schedule for fuel delivery, and we get to the site and the customer doesn’t have the capacity for the fuel; then the fuel has to be returned to stock, which is costly. Now with the IoT solution, we have an accurate reading of how much fuel is needed for that site. We’re seeing a 10% return rate move down to about a 5–6% return rate, and it will be even less eventually.”*

“Our patients can obtain more accurate data about themselves, so they know what their results are with tremendously reduced waiting times Ultimately, this contributes to more revenue because patients are very happy with the real-time results.”

- A healthcare organization combines BDA and IoT to better serve patients with up-to-date information. *“Our patients can obtain more accurate data about themselves, so they know what their results are with tremendously reduced waiting times Ultimately, this contributes to more revenue because patients are very happy with the real-time results.”*

Thrivers Think Ahead, Experiment, and Are Willing to Adapt and Change Course

Interviews show that thriving organizations share similar approaches regarding investing in and adopting emerging technologies. Notably, they plan with the foundational assumption that emerging technology adoption is a longer-term process but ensure that their IT and business organizations have the flexibility and agility to recognize and take advantage of new opportunities and change direction if necessary.

Following are some of the Thrivers’ best practices when it comes to making datacenter investment decisions:

- **Connect investments in datacenter and IT resources to emerging technology initiatives.** *“We’ve reengineered our IT environment and brought in new capabilities to support our use of emerging technologies We’ve fully integrated this investment into a revised business model.” — A professional services company*
- **Design datacenter and IT for scalability because emerging technologies will require it.** *“These emerging technologies require a lot of horsepower and a lot of storage, so our IT solutions first have to be scalable. They have to scale horizontally because you never know. For example, you might start with 20 servers on the cluster, and then tomorrow you have to be able to scale up to 50 or even 100 nodes, and before you know it thousands of nodes are needed.” — A financial services organization*
- **Think beyond the initial investment to organizational preparedness.** *“It’s not just about making the investment — organizational readiness is required to make it happen and most importantly, the skill set to execute the strategy is required.” — A healthcare manufacturer*
- **See what works and be ready to change course.** *“We’re very comfortable being on the leading edge, and even the bleeding edge, if there’s an ROI for it. So we’ll try something out and if it doesn’t work quickly, rather than let it linger, move on to the next thing.” — A life science company*

“We’re looking at AI for the entire IT department. Right now, it is one system but touching the entire business looking for issues and requirements that may need to be addressed ... We estimate a productivity increase, optimistically speaking, of 70% on repetitive tasks that people bring to IT.”

Table 1 illustrates the extent to which these approaches that Thrivers share are paying off; Thrivers are realizing much more significant impact on business and operational KPIs than organizations that are less advanced in their use of each of these emerging technologies.

TABLE 1

Thrivers Outperform Survivors on Key KPIs	
Q. As a result of investments in emerging technologies, how much has your organization improved the following in the past two years?	
Variance in Performance (Thrivers/Survivors)	Thrivers Versus Survivors
Operational costs	2.7x
Number of new products and services offerings	2.4x
Reduction in capex requirements	2.3x
Profit	2.0x
Employee productivity	2.0x
Shorter time to market for new products and services	2.0x
Regulatory compliance	1.8x
Revenue	1.8x
New customer acquisition	1.7x
Employee retention	1.6x
Customer retention	1.5x
Customer satisfaction/loyalty	1.5x

n = 1,211
 Base = all respondents
 Source: IDC’s Global Emerging Technology Study, 2018

Thrivers have successfully made the business case for IT investment and secured funding for new and upgraded datacenters. Based on an analysis of investment plans and strategies for supporting emerging technologies, IDC believes Thrivers’ overall organizational strategies for innovation and datacenter strategies and investments are tightly aligned; datacenter capabilities deployed within Thrivers significantly exceed those of Survivors (see Table 2).

TABLE 2

Datacenter Hardware Capabilities of Thrivers Far Outpace Those of Survivors

Q. Which of the following datacenter investments have been made by your organization to keep up with changes in demand for increased compute, storage (including converged and hyperconverged infrastructure), and network capacity?

Variance in Performance (Thrivers/Survivors)	Thrivers Versus Survivors
Software-defined networking or open networking	72x
Storage for unstructured data (all-flash/hybrid arrays)	46x
Improved power and cooling infrastructure to accommodate emerging technologies with extreme power profile	40x
Software-defined storage	25x
Converged infrastructure systems (CI)	24x
Hyperconverged infrastructure systems (HCI)	17x
All-flash arrays for primary storage	17x
Accelerated computing using graphic processing unit (GPU) or field-programmable gate array (FPGA) optimized servers	14x
Improved data protection/control — replication, snapshot, backup, archive, continuous availability, and recovery	11x

n = 1,211
 Base = all respondents
 Note: Multiple responses were allowed.
 Source: IDC's Global Emerging Technology Study, 2018

The volume, diversity, and distribution of data and IT service needs have necessitated a change. Thrivers have understood the importance of developing a strategy and vision to control and adapt to the “data deluge” in order to maximize the value of data. IDC believes that the ability to simplify data management is a key part of Thrivers’ datacenter vision.

The early use of emerging technologies such as BDA, AI, ML, IoT, AR, and VR can drive an unprecedented new level of understanding and success for businesses across all industries.

Essential Guidance

The early use of emerging technologies such as BDA, AI, ML, IoT, AR, and VR can drive an unprecedented new level of understanding and success for businesses across all industries. The technologies allow organizations to develop innovative new services, improve operational efficiencies, and connect with customers in new ways — all based on an organization's ability to gather, store, protect, and leverage vast amounts of data.

But effectively deploying and using these technologies — and unlocking the value of data — requires a foundational shift in an organization's existing IT and datacenter strategies, processes, and execution. The integration of IT into all aspects of business innovation presents an opportunity to align IT strategies and goals with business goals and evaluate whether the existing levels of collaboration are effective for the organization. Enabling the early use of these emerging technologies presents a good opportunity for IT organizations to be at the heart of their company's new vision for growth.

IT organizations are at a critical juncture and need to consider the new skills, technologies, and vision that are required to successfully be at the center of a new business strategy that relies on IT and datacenter capabilities. The new scope and scale of managing and leveraging data in a highly distributed and diverse ecosystem will be daunting for IT organizations that do not reevaluate their approach or try to tackle the data deluge in a manual way. IDC's research shows that thriving organizations have a vision and strategy based upon the use of emerging technologies on a vast new scale that allows them to see the coming data deluge as an advantage, not a risk. Their vision includes investing in a total solution instead of managing and investing in different pieces or elements.

Leading IT organizations understand that the timing is critical to solidify their role in driving innovation across their company. They have embraced a datacenter vision that includes a mix of on-premises and off-premises cloud and traditional datacenter resources to increase their agility and reach.

Based on a study of the characteristics of leading IT organizations, IDC recommends the following:

- **Embrace autonomous infrastructure** that will eliminate tedious maintenance and management tasks and allow IT staff to focus on more strategic initiatives. Autonomous infrastructure will also be table stakes as datacenter resources are deployed in geographically distributed locations that may not have the right staff skills available at all times.
- **Invest in modernized infrastructure** that enables the organization to capitalize on the value of its data. For many organizations, this will require provisioning or leveraging datacenter resources in multiple locations.
- **Implement software-defined networking capabilities** to automate provisioning of workloads across internal, colocation, and cloud datacenters.
- **Standardize on a single management platform** or enable integration between multiple platforms to improve collaboration and oversight among organizational silos.

At its core, this shift is about enabling the organization to transition away from traditional decision making and processes that rely on human action and intuition to decisions and processes powered by data and technology. Organizations that make this shift can convert the data deluge into a wellspring of information that they can use to thrive in the new digital business world. Those that don't or can't make this transition will struggle to ride out and simply survive the inundation.

Appendix 1: Firmographics of Organizations Participating In In-Depth Interviews

To understand the impact on business and IT operations of implementing and using emerging technologies, IDC conducted in-depth interviews with 16 organizations that are already using at least two of the emerging technologies in a production environment. These organizations were identified because of their current use of emerging technologies to understand the use cases and associated business and operational benefits linked to emerging technology initiatives.

As shown in Table 3, these organizations were generally large enterprises (almost 50,000 employees on average) with large IT organizations to support significant business operations (>\$24 billion in revenue per year). Like most organizations,

this sample is challenged by rapid growth to its data environment (39% year on year on average) across distributed IT environments (20 datacenters on average). The sample is weighted toward the experiences of organizations based in the United States but also includes several organizations based in EMEA. It represents experiences of organizations in the following verticals: manufacturing (2), financial services (2), healthcare (2), retail (2), energy, insurance, life sciences, managed services, natural resources, professional services, software development, and telecommunications.

TABLE 3

Firmographics of Interviewed Organizations		
	Average	Median
Number of employees	49,453	19,250
Number of IT staff	2,753	275
Number of employees using IT services	44,964	18,400
Percentage of employees who are IT users	92%	100%
Ratio of IT users per IT staff member	50	24
Number of external customers	32.21 million	150,000
Number of business applications	543	300
Company revenue	\$24.22 billion	\$4.60 billion
Number of datacenters	20	7
Annual data growth	39%	33%
Countries	United States (13), United Kingdom, UAE, and South Africa	

n = 16
 Source: IDC's Emerging Technology IDIs, 2018

Use of Emerging Technologies by Interviewed Organizations

Interviewed organizations have unique and well-defined use cases and plans for emerging technologies, and their deployment patterns reflect this variety. Nonetheless, these organizations overall are already making significant use of these technologies, with almost all having BDA and IoT use cases in full or partial production, and most organizations already either with production or testing AI/ML use cases. Fewer organizations have implemented AR/VR, although most organizations reported either already testing the waters or planning on deploying these technologies at least to some extent in the next two years (see Table 4).

TABLE 4

Adoption of Emerging Technologies by Interviewed Organizations				
	Big Data Analytics	Internet of Things	AI/ML	AR/VR
Current use, full production	12	12	6	2
Current use, partial production	4	1	5	3
Current use, pilot	0	3	3	4
Current no use, but plans to use within two years	0	0	1	4
No plans at all to use	0	0	1	6

n = 16
 Source: IDC's Emerging Technology IDIs, 2018

Appendix 2: Survey Methodology

To understand the steps that leading IT organizations take to adopt emerging data-centric technologies and the results their organizations can achieve through the use of these technologies, IDC conducted a survey of over 1,200 global organizations. This survey was designed to examine datacenter strategies, investments, and IT organizational approaches, and the survey results revealed notable performance differences among organizations (e.g., Thrivers and Survivors) in both their level of adoption of emerging technologies and the benefits they realize from their use of those same technologies. Surveyed organizations had to have current or planned significant investments in at least one emerging technology use case involving BDA, IoT, AI/ML, or AR/VR. Verticals with early adoption of emerging technologies were prioritized for this survey and included banking, retail, healthcare/life sciences, and discrete manufacturing.

Appendix 3: Additional Performance Details

Tables 5 and 6 provide additional details on Thriver and Survivor KPIs and datacenter capabilities (e.g., an expansion of Tables 1 and 2).

TABLE 5

Average Gains in KPIs: Details				
Q. As a result of investments in emerging technologies, how much has your organization improved the following in the past two years?				
	Total Respondents	Survivor	Thrivers	Thrivers Versus Survivors
Operational costs	23%	14%	37%	2.7x
Number of new products and services	23%	16%	38%	2.4x
Reduction in capex requirements	22%	15%	34%	2.3x
Profit	22%	16%	32%	2.0x
Employee productivity	25%	18%	36%	2.0x
Shorter time to market for new products and services	23%	15%	30%	2.0x
Regulatory compliance	27%	19%	35%	1.8x
Revenue	22%	17%	29%	1.8x
New customer acquisition	23%	18%	31%	1.7x
Employee retention	24%	17%	28%	1.6x
Customer retention	25%	19%	28%	1.5x
Customer satisfaction/loyalty	26%	19%	28%	1.5x
Sample count	1,211	225	65	

n = 1,211
 Base = all respondents
 Source: IDC's Global Emerging Technology Study, 2018

TABLE 6

Datacenter Hardware Capabilities of Thrivers Far Outpace Those of Survivors: Details

Q. Which of the following datacenter investments have been made by your organization to keep up with changes in demand for increased compute, storage (including converged and hyperconverged infrastructure), and network capacity?

Organizations Having Deployed Capabilities Extensively (i.e., >50%)	Total Respondents	Survivor	Thrivers	Thrivers Versus Survivors
Software-defined networking or open networking	24%	1%	72%	72x
Storage for unstructured data (all-flash/hybrid arrays)	28%	2%	92%	46x
Improved power and cooling infrastructure to accommodate emerging technologies with extreme power profile	27%	2%	80%	40x
Software-defined storage	27%	3%	75%	25x
Converged infrastructure systems (CI)	26%	3%	71%	24x
Hyperconverged infrastructure systems (HCI)	24%	4%	69%	17x
All-flash arrays for primary storage	23%	4%	66%	17x
Accelerated computing using graphic processing unit (GPU) or field-programmable gate array (FPGA) optimized servers	28%	5%	69%	14x
Improved data protection/control — replication, snapshot, backup, archive, continuous availability, and recovery	30%	6%	66%	11x

n = 1,211

Base = all respondents

Note: Multiple responses were allowed.

Source: IDC's Global Emerging Technology Study, 2018

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