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Machine Learning Powers the Next Wave of

BUSINESS-CRITICAL SERVICES

WHITE PAPER

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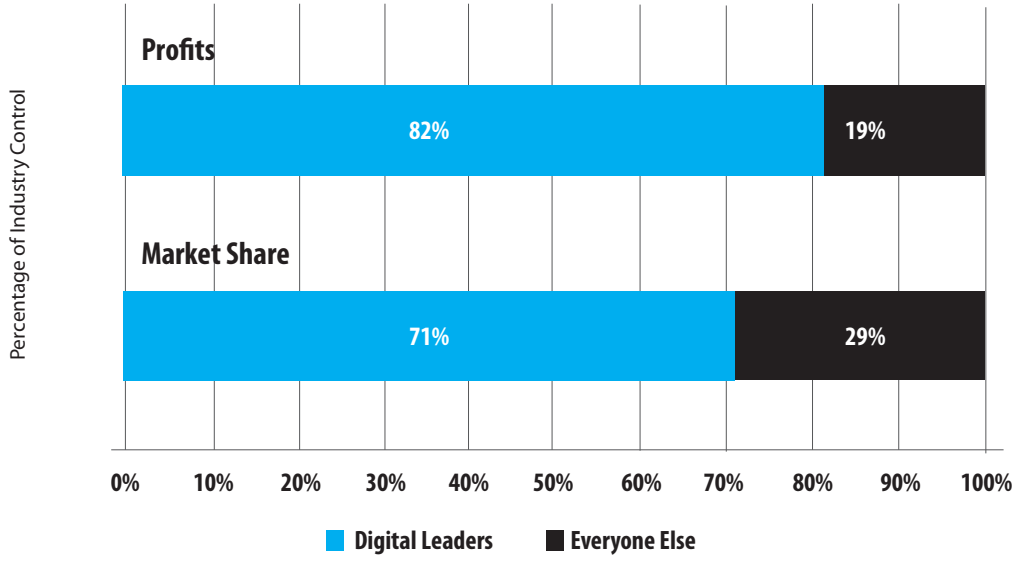
INTRODUCTION: DIGITAL BUSINESSES NEED TO REFOCUS IT PRIORITIES

Digital transformation continues to gain momentum. The ZK Research 2018 IT Priorities Survey found that 89% of companies have digital initiatives underway, up from 84% in the 2017 survey. The business landscape is changing rapidly, with established companies falling by the wayside and market leaders fading away. Underscoring the speed at which markets are transitioning is the fact that 55% of the Fortune 500 companies from the year 2000 have disappeared. This is because digital leaders control 71% of overall market share and 82% of the profits in an industry (Exhibit 1). In actuality, market leadership changes have always happened, but it used to take decades—whereas now, disruption happens continually.

Company leaders and line-of-business managers obviously play a key role in determining which digital initiatives to focus on, but the most successful companies have a tight partnership between IT and the business. The reason the technology organization plays such an important role is that digital transformation is based on technology innovation. One of the biggest challenges facing companies is that they do not allocate enough resources to drive innovation. The ZK Research 2018 IT Priorities Survey found that only 22% of IT budgets are focused on digital transformation, and the other 78% is used to maintain the current operating environment.

The heavy emphasis on "keeping the lights on" is holding organizations back. Company leaders need to work with the IT organization to understand how technologies such as the Internet of Things (IoT), cloud, mobility and machine learning (ML) can change business models, improve customer service and take employee productivity to new heights. It's important to understand that

Exhibit 1: Digital Leaders Hold More Market Share and Are More Profitable



Economic Data and ZK Research, 2018

ABOUT THE AUTHOR

Zeus Kerravala is the founder and principal analyst with ZK Research. Kerravala provides tactical advice and strategic guidance to help his clients in both the current business climate and the long term. He delivers research and insight to the following constituents: end-user IT and network managers; vendors of IT hardware, software and services; and members of the financial community looking to invest in the companies that he covers.

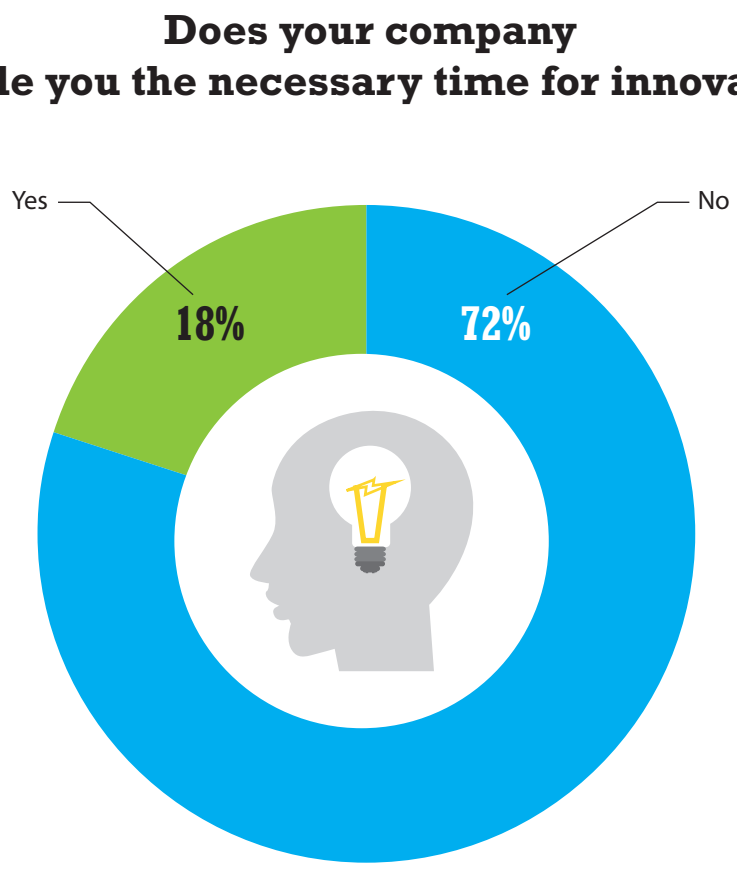
digital transformation is not a one-time event. Businesses may get a short-term competitive advantage by implementing new technology, but sustaining market leadership is based on continually recognizing market shifts and adapting faster than the competition. This requires a culture where the status quo is always being challenged and innovation is constant.

Success for digital firms is predicated on IT allocating more time and resources to innovation. However, only 18% of IT professionals believe they have time to innovate (Exhibit 2). Since it's unlikely that businesses will be increasing their IT budgets by any significant amount, the only way to allocate more people and budget to innovation is to divert staff and budget to digital innovation. At the same time, IT needs to drive greater operational efficiency in "keeping the lights on."

SECTION II: UNDERSTANDING THE ROADBLOCKS TO IT EVOLUTION

Digital transformation is the key to developing business agility. The traditional thinking about digital transformation is to use technology to quickly adapt to market conditions. Although this is true, digitization can be just as effective when it makes processes more efficient. An example of

Exhibit 2: IT Professionals Don't Have Time to Innovate



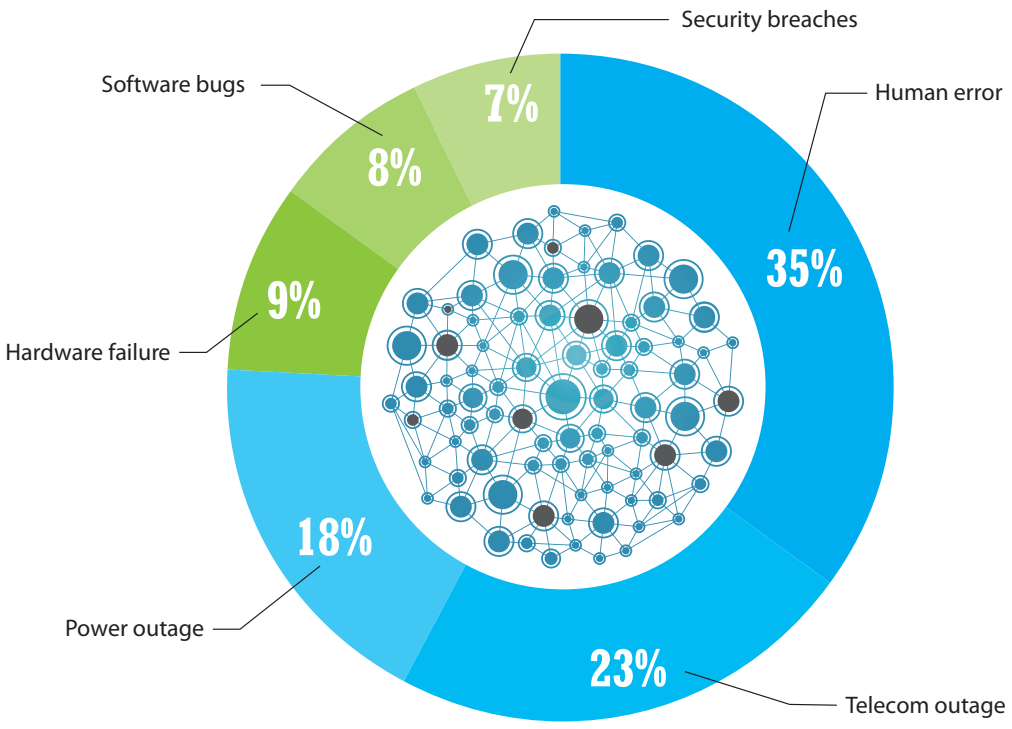
ZK Research 2018 IT Priorities Survey

digital agility is changing the IT operating model. In general, companies that execute faster than their competitors will gain a competitive advantage, but the legacy nature of IT operations hampers its ability to move at digital speeds and drive innovation. Traditional IT processes are manually intensive and very slow. From a network perspective, the lack of automation impairs the agility the business requires. The ZK Research 2018 Network Purchase Intention Study found that the average time for a change to be made network wide is four months, which is far too slow for businesses to capitalize on digital trends.

In addition to being slow, manual operations are highly error prone, which is why human error is the largest contributor to unplanned network downtime (Exhibit 3). Another troubling data point from ZK Research is that 90% of the time taken to fix outages is devoted to finding the root cause of the issue. So, even when outages are caused by software problems or hardware issues, the time to resolution is often days. This impacts the business, as applications become unavailable or perform poorly. Much of the focus of innovation in the digital era is on the area of customer service, so long outages will drive customer churn up.

Also, because IT has no way of predicting issues, high-level engineers often must fix problems, which distracts them from focusing on strategic initiatives. This exacerbates the problem of a lack of focus on innovation, as second-level engineers are often pulled into the troubleshooting process

Exhibit 3: Human Error Increases Unplanned Network Downtime



ZK Research 2018 Network Purchase Intention Study

Cisco's Business Critical Services are a set of subscription-based services focused on the transformation of a customer's IT platform.

when the business is being impacted. Given the cost of high-level engineers, their time is better spent working on initiatives to grow the business rather than troubleshooting network problems.

Automation has been viewed as a panacea to all network woes, but most organizations don't have the visibility or data to understand what to automate, nor do they have the skills to understand how to implement automation. Developing a strategy for automation requires analyzing network data to identify the problem areas in running the environment. The challenge for most companies is that the volume of data is so great that analysis can't be done with manual methods, as people can't correlate the data fast enough. However, advancements in machine learning have given organizations an advanced tool to "connect the dots" in the data to change the way IT is run. The biggest impediment to the use of machine learning is not having the data scientists and other skills required.

SECTION III: CISCO BUSINESS CRITICAL SERVICES USE MACHINE LEARNING TO ENABLE GREATER AUTOMATION

Cisco's Business Critical Services (BCS) are a set of subscription-based services focused on the transformation of a customer's IT platform—including engineering, technical strategy and operations—by delivering capabilities in the areas of design recommendations, architecture strategy, analytics, automation, compliance and security. BCS capabilities are provided in an à la carte manner, where each engagement is tailor made based on the customer's top priorities, needs and stage in the evolutionary life cycle. These services provide baseline deliverables and customizable capabilities to accomplish the following:

- Deliver near–real-time analytics and continuous visibility
- Speed up case submission from hours to minutes without human intervention
- Quickly test and deploy features to IT environments with new automation capabilities
- Automate compliance and remediation for recommended software and configuration upgrades
- Drive faster emergency response during a breach as well as proactive defense

Recently, Cisco has developed several new services that are powered by machine learning for better analytics and automation. Although there are a number of new services, they are all focused on the following goals:

- Achieving better operational efficiency and high availability through automation
- Improving business agility
- Enabling digital transformation
- Identifying "risk elements" in the customer infrastructure

Customers that can achieve these four goals will have the ability to divert people and budget away from maintaining the current environment, enabling more resources to be allocated to innovation. Also, the BCS capabilities provide the insights to help customers predict future problems, imple-

ment and fine-tune automation, correct problems faster and solve some problems that historically were not solvable.

Here are the specifics of Cisco's new Business Critical Services:

High-Touch Expert Care brings together Cisco's Technical Services (TS) Advantage services with BCS. These services go well beyond traditional break/fix services to help customers meet their business goals. Cisco has added several new high-touch expert care services that are enabled by a set of integrated tools and ML-based analytics, including the following:

- **A high-touch team** ensures customers make the most of the portfolio of services. Automation and ML have been used in businesses for years but are new to network operations. The high-touch, hands-on Cisco team ensures customers are using the right services to optimize the running of the network and drive innovation.
- **Service monitoring and reporting services** track the performance of business applications and other services. The output of the reports can help focus IT resources to increase IT staff productivity.
- **Incident and problem management services** keep systems operating at maximum uptime by reducing the time to repair through the management of incidents.
- **Asset management** tracks the utilization of IT assets, which can help with capacity planning and resource allocation. The ML algorithms can be used to determine when to upgrade or increase capacity.

Machine Learning

Machine learning (ML) is a field of computer science that enables software to learn without data and without the need to be explicitly programmed by people. The algorithms can make decisions or predict outcomes based on a model that includes actual data. The quality of insights determined by a machine learning algorithm is based on the quality and volume of data as well as the time the algorithms have had to refine their decision-making ability.

In the context of network operations, ML can be used to find "hidden insights" in the massive amount of data created from routers, switches and other infrastructure. ML should be thought of as a tool that augments the skill set of the network engineer to make better decisions in the areas of capacity planning, configuration management, troubleshooting and business/IT alignment. ML is also a foundational component of "intent-based networking," with a long-term vision of a network being able to secure and operate itself.

- **SLA tracking** can be used to ensure SLAs are being met for the various user groups.

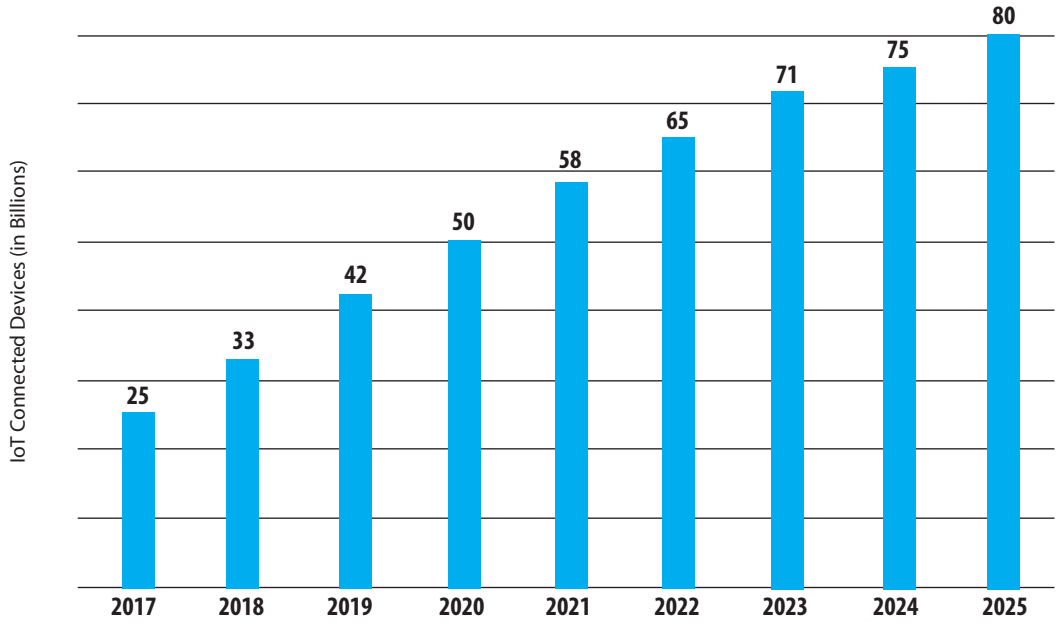
The high-touch expert care services address the life cycle of network operations with integrated tools and ML-based analytics.

Customized services address the unique needs of each customer. Instead of assuming "one size fits all," Cisco can tailor several of its services on a per-customer basis, including the following:

- **Customized Business Critical Insights (BCI)** are personalized to provide better business value, and they constitute Cisco's cloud-based analytics portal that provides IT with many capabilities such as Platform Insights and Software Lifecycle Management. BCI services are always on, cloud based and deliver near–real-time ML-based analytics by gathering data from the more than 2.7 million endpoints in Cisco's database of devices. As IoT devices grow from 25 billion in 2017 to 80 billion in 2025 (Exhibit 4), BCI services will become critical in making the IT environment better, more secure and smarter. More detail can be found at www.cisco.com/c/dam/en/us/services/collateral/services/platform-insights.pdf.

- **Unique data correlation** enables customers to apply ML-based analytics to a set of data that is customized to the organization. Without this customization, customers may

Exhibit 4: IoT Endpoints Set to Explode



ZK Research 2018 Global IoT Survey

need to change their operational processes to fit the data instead of tailoring the data to fit the company.

- **BCI application programming interfaces (APIs)** give customers the ability to integrate BCI with their own analytics and IT service management platforms. Cisco provides outbound APIs that cover more than 200 different variables and are in Representational State Transfer (REST) or JavaScript Object Notation (JSON) format.

- **Third-party inventory management** extends Cisco's BCS capabilities to cover the end-to-end network environment regardless of which vendor is being used. Most customers deploy multiple vendors, and now Cisco can provide the following services for non-Cisco network infrastructure:
  - Software and configuration compliance
  - Hardware and software inventory
  - Upgrades and configuration changes

Advanced analytics and automation services are aimed at using ML-based analytics to transform network operations. New services include the following:

- **Automated fault detection** uses ML-based analytics to open cases with Cisco's Technical Assistance Center (TAC) with no human intervention and leads to real-time detection of problems. The service has been enhanced to include support for complex, multi-sequence events and has an API so customers can define blackout windows for change management purposes.

- **ServiceNow integration** via rich APIs encompasses a cloud-based integration platform that seamlessly connects enterprise IT and service providers to enable automated multiparty service collaboration.

- **Geolocation** has been added to Cisco Platform Insights. The dashboard visually identifies device locations and associated risk conditions. The service now includes interactive maps, a timeline of events and trending of key data.

- **Fingerprinting** is the most advanced capability in BCS, where advanced ML is used to determine which endpoints in a customer's environment are at the highest risk of encountering issues. Cisco can provide this insight because its database includes millions of endpoints from more than 1,000 customers. The list of high-risk devices is available to the customer through the Critical Insights portal and is used by the network consulting engineer

in partnership with the customer to determine actions needed to reduce the risk in the customer's environment.

Security BCI services are the result of Cisco's expanded services to include cybersecurity. They leverage Cisco's AI-based engine and online portal to provide automated actions to better protect businesses. Security BCI services constantly monitor the network and execute near–real-time analytics. Customers can use the dashboard to obtain a real-time view of the threat landscape and get recommendations on how to improve protection.

SECTION IV: THE BENEFITS OF CISCO BCS

Cisco's new Business Critical Services are a set of subscription-based services that leverage machine learning to drive the following operational efficiencies:

Greater IT agility: Business agility is enabled by IT agility, but there is no "Easy Button" to become more agile. Cisco's BCS can guide customers through the process of evolving the infrastructure and operations from the rigid and brittle environment of today to a highly agile foundation that can be a business enabler.

Reallocation of budget and people: Customers that take advantage of the services will dramatically lower the cost of operations, so more budget can be allocated to innovation and growth initiatives.

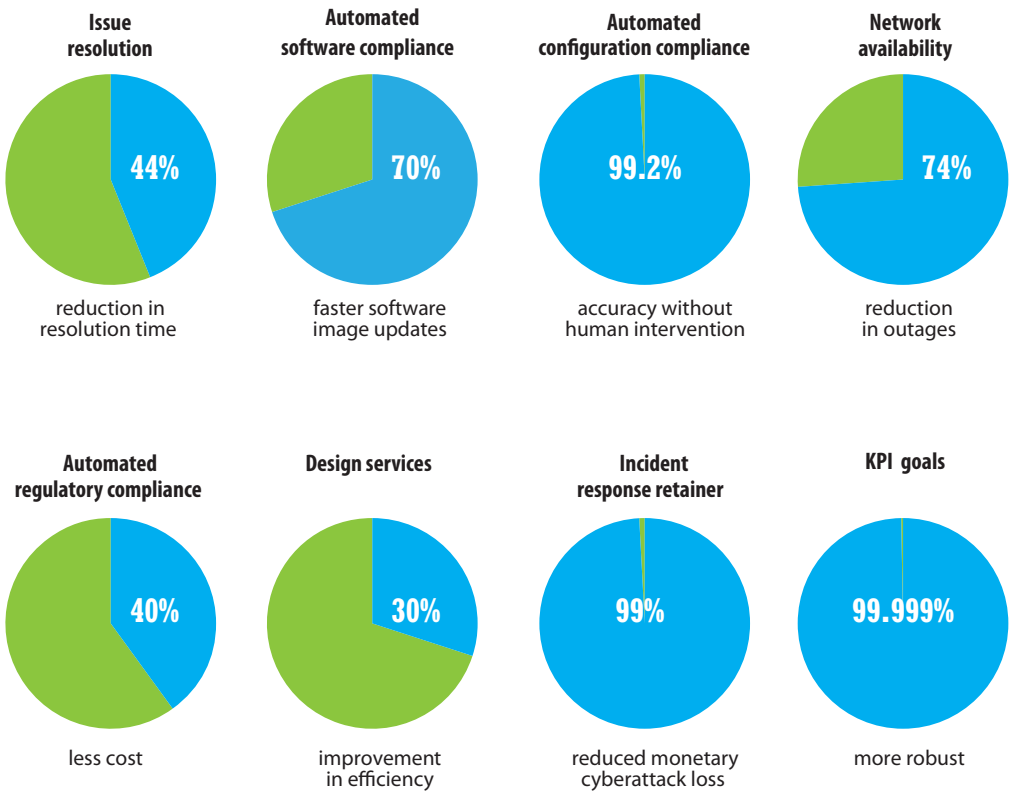
Reskilling of IT: Automating many of the mundane and repetitive processes can free up valuable time. Engineers can use this time to reskill themselves, providing long-term value for both the IT professional and the company.

Improved ease of use and integration capabilities: Cisco's new customized services can tailor the dashboards and insights to specific customer environments. This increases usability and simplifies the process of integrating into the customer's existing set of tools.

Better and more informed operational decisions: The services give customers quantified information to make the best possible operational decisions.

In addition to the above qualitative benefits, the value of the advanced BCS can be quantified. Exhibit 5 presents validated proof points aggregated from actual Cisco BCS customers regarding the services.

Exhibit 5: Cisco's Business Critical Services Liberate IT Operations to Drive Innovation



Cisco and ZK Research, 2018

SECTION V: CONCLUSION AND RECOMMENDATIONS

Digital transformation is changing the business landscape faster than ever. Companies must respond and transform or risk becoming irrelevant and going out of business. Digital transformation can only be accomplished by IT innovation, but most companies lack the necessary knowledge, skills, time or budget to drive constant innovation. Businesses are also constrained by resources such as a lack of budget or people. Cisco's Business Critical Services enable IT leaders to redirect valuable and knowledgeable resources to help drive innovation in growth initiatives.

Most companies today invest in analytics, and most vendors claim their service is powered by ML and AI, yet many of them struggle to show tangible value from their investment in analytics. Selecting a partner that provides tangible value is a key differentiator. For example, Cisco's Business Critical Services use data from millions of devices to predict which ones represent a high crash risk in a customer environment and determine what actions are needed to remediate the situation before an outage happens.

Change can only occur when IT organizations embrace automation and fundamentally transform the way they run their networks. Automating many of the day-to-day operational processes enables businesses to reallocate resources away from operating the IT environment and toward in-

novation to drive digital transformation. It's time for IT leaders to be aggressive with automation and use it as an enabler of innovation. To help companies get started, ZK Research provides the following recommendations:

Implement automation as a top-down initiative. Many IT professionals fear automation and view it as something that threatens their jobs. Also, the silos that currently exist within IT can be a barrier, as automation in one part of IT is limited in its effectiveness if the rest of IT does not use automation. CIOs and IT leaders must implement automation with support from executives, such as reorganizing the company to eliminate silos through the implementation of a common set of data and key performance indicators (KPIs).

Ensure adequate time is dedicated to innovation. This may seem difficult to do because so much time is dedicated to maintaining the current operating environment. Innovation must be viewed as the lifeblood of the company, as success in the digital era is based on rapid transformation.

Use services to guide you through the process. No matter how savvy an IT organization is, it's unlikely to have the skills or data scientists necessary to implement ML-based analytics to transform operations. IT leaders should look to their vendor partners to deliver a full suite of digital transformation services that can reduce operational costs, accelerate business agility and drive digital transformation. ZK Research believes that with BCS, Cisco is an excellent example of such a partner.

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