

IDC PERSPECTIVE

# Intelligent Digital Workspaces: Enabling the Future of Work

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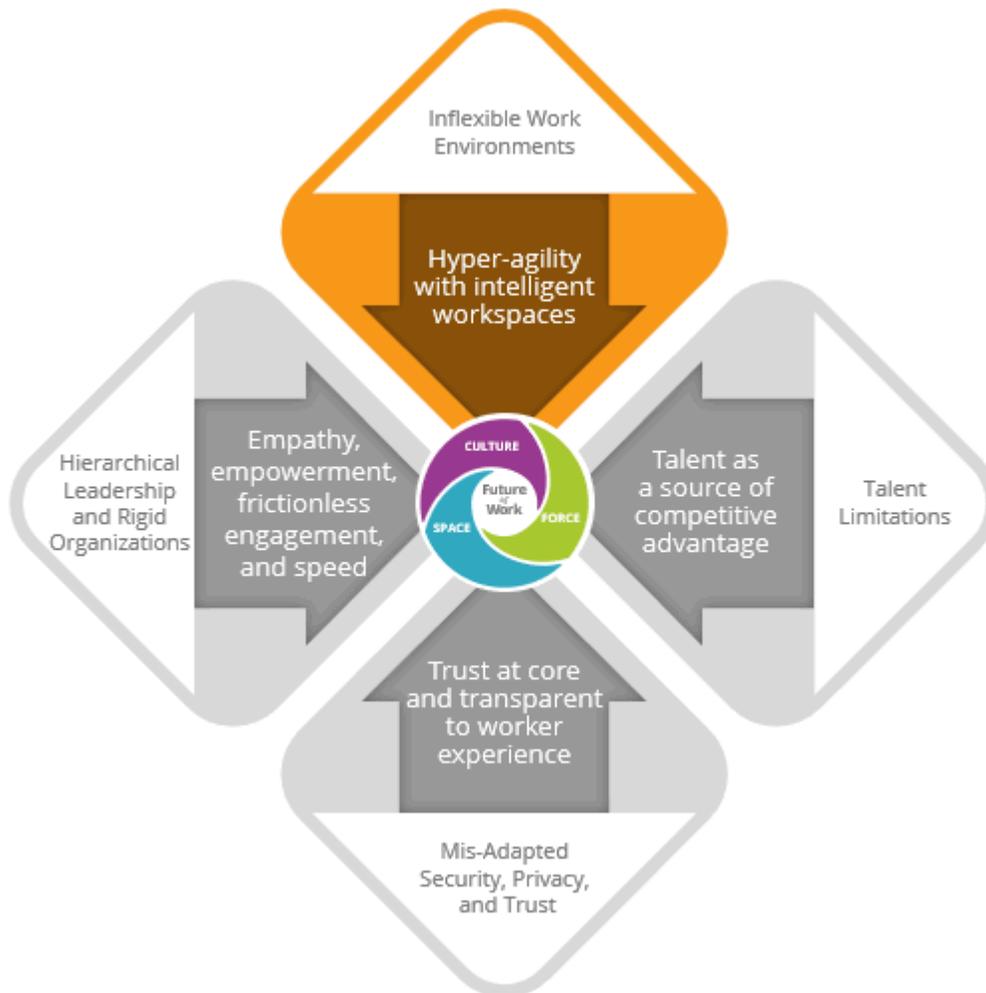
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EXECUTIVE SNAPSHOT

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FIGURE 1

## Executive Snapshot: Inflexible Work Environments



Source: IDC, 2020

## SITUATION OVERVIEW

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### The Future of Work: The Challenge of Inflexible Work Environments

Inflexible work environments have existed for as long as modern work. In many ways, modern technology only digitizes bad experiences, recreating inflexible frameworks in software or creating new barriers to productivity and efficiency. The 21st century economy requires workers to operate as agile, dynamic, and reconfigurable teams that can quickly adapt to business demands and new market requirements. A primary goal for today's organizations is to transform "head count" into a productivity-driving engine that increases business value. This requires the attraction and retention of first-class talent. To this end, it is critical that individual workers and teams operate in agile, flexible work environments, with technology as an underlying enabler and not a hindrance. However, the inflexible digital infrastructures in many enterprises – from end-user computing (EUC) enablement to success measurement – are not set this way.

The challenge of inflexible work environments is one of the four primary challenges that IDC identified as impeding work transformation (refer back to Figure 1). This IDC Perspective takes a deeper look at this challenge in the context of IDC's framework for the future of work – workspace, workforce, and work culture – and examines how well designed and thoughtfully implemented digital workspace technologies can infuse flexibility and dynamism into rigid work environments.

This will be crucial as the IT market overall moves into its next phase – multiplied innovation, where organizations scale digital transformation beyond just IT or siloed line-of-business initiatives to the very DNA of the entire organization. The timeworn challenge in all of this is the drag of legacy. The IT architecture in many organizations is still a jumble of 2nd Platform (client/server era) tools mixed with some 3rd Platform (cloud, mobile, and social) technologies. In IDC's 2019 *Future of Work Survey* of nearly 800 IT decision makers, about one-third of respondents cite this issue as their top barrier to work transformation initiatives.

The evolution of work environments throughout the first two decades of this century are neither agile nor dynamic enough to allow businesses to thrive, let alone remain competitive. IDC identifies the following challenges as common across most organizations with inflexible work environments. These are among the primary issues holding back businesses from transforming how their employees operate and interact:

- **Monolithic nonintegrated apps.** From a business software perspective, many organizations provide digital workspaces for employees based on cobbled together integrations and tie-ins with large, nonintegrated legacy application platforms. Left over from the eras of "big ERP," monolithic nonintuitive application platforms can bury critical tasks, processes, and workflows under layers of windows, menus, and other interfaces originally intended to boost productivity and speed. **Context switching.** An irony in the modern inflexible work environment is that many workers' attention spans are stretched too thin. According to IDC's 2019 *Future of Work Survey*, U.S. workers use an average of 8 apps to do their jobs, with more than a quarter of workers using 10 or more. When there's an app for everything, doing anything involves context switching – moving focus and attention from one digital task to another. This can result in making the average worker 40% less productive, according to research from the American Psychological Association. Moving from task to task, even in the confines of a computer or smartphone screen, can create similar drags on employee productivity and effectiveness. Intuitive and undisruptive context switching will be a requirement moving forward, but most of today's applications and data organizational structures are not set up efficiently for

this. **Security barriers.** Badly implemented security technologies that hinder worker productivity are a common trait of inflexible work environments. If remote or mobile workers are unable to access critical apps and data because of rigid or outdated VPN architectures or data protection policies, over time, this could cumulatively be as detrimental to a business as a single data breach. Bad implementations of password management, nuisance multifactor authentication prompts, and the requirement of "secure" (often less functional and clunky) versions of consumer apps and services can also stymie productivity and kink up critical workflows. When security prevents productivity instead of enabling it, this is often the result of technologies or policies applied as a compliance exercise – security as a box to check, as opposed to being implemented with an understanding of what is most important to protect and how to apply efficient digital protections. **Outdated key performance indicators (KPIs).** In most instances, businesses have KPIs or measures of success for digital technology rollouts, especially in horizontal technology deployments such as PCs, mobile phones, and business productivity software suites. There is a general assumption that all this technology – mobile computing, faster PC processing, AR/VR technology, cloud/web apps, and data access – must make workers more productive. However, most businesses are not effectively measuring the true effects of a technology deployment or initiative relative to overall business success.

To address these specific challenges impeding work transformation, IDC points to the emerging concept of the intelligent digital workspace. The intelligent digital workspace is where people, data, content, community, and context meet with the technological solutions workers need to do their jobs. Intelligent digital workspaces encompass multiple facets of modern digital work and are not limited only to carpeted offices and white-collar or "knowledge" work; they exist across every vertical industry and use case. Any workflow where digital technology has emerged has the potential to benefit from an intelligent digital workspace. A retail employee running a point-of-sale (POS) machine, a utilities line worker in an elevated bucket, and a surgeon all have unique physical workspaces that can incorporate digital technology. How well this technology can be deployed and supported and the level of data and resources the technology can effectively access are all factors in the "flexibility" of the environment, from the point of view of digital tools and technology.

The primary differentiator of the new digital workspace is intelligence. In the new work experience, the workspace is personalized for the user and provides the specific resources that worker needs for the task at hand. This view of the intelligent digital workspace has not yet been fully realized, but innovative technology vendors and service providers are rapidly making progress, effectively turning the traditional means of technology delivery on its head.

## The Benefits of Intelligent Agile Digital Workspaces

The inflexible workspace environment was constructed around the primacy of highly structured work, in which documented processes pass unambiguous outputs that aggregate into a business event (e.g., a sale, a box of widgets shipped to a buyer, or a properly formatted bank transfer and subsequent payment to a supplier). Work is highly predictable with a set schedule of tasks, and interruptions are handled as exceptions rather than the norm. A 1950s accounting firm, managing accounts payable with routing slips, is a good example of this kind of environment.

The agile workspace, in contrast, is constructed around the primacy of responding to work as it emerges from the chaotic data, people, process, partner, and technology environment of modern business. It creates a consistent context, maintains a flow of work, and organizes action by a combination of digital and human workers entitled to an array of data, digital, physical, intellectual, and workflow assets.

A characteristic of both work environments in the modern context is the enormous amount of data generated by the interaction of devices, interfaces, and infrastructure. This data is a problem for the inflexible workspace because it forces context switching, which kills productivity. And it's a problem for the foundation of the agile workspace with its focus on detecting, contextualizing, organizing, and executing work as it occurs.

Figure 2 introduces the intelligent digital workspace. The worker is at the center of the intelligent digital workspace paradigm. Universal Device Access is the initial interface to a digital layer of applications, tasks, data, and workgroups and communities. These interfaces, experiences, underlying data, and business IP are bound by the third layer – workspace infrastructure, which provisions and provides the guardrails, boundaries, and security tethers of the overall workspace, based on business policies, compliance mandates, and other controls and requirements. Artificial intelligence (AI), machine learning (ML), and analytics technologies proactively recommend the next best action and provide access to the resources required to complete that action.

**FIGURE 2**

**Intelligent Digital Workspace: Rethinking the Way Work Gets Done**



Source: IDC, 2020

**Benefits of the Agile Workspace**

The agile workspace provides the following benefits in this dynamic environment:

- **Consistent context:** The agile work environment organizes work into a single pane of glass, rather than a jumble of applications, interfaces, reports, and email. This allows the employee to focus.
- **Flow of work:** Using AI/ML and modern design, the agile workspace organizes work into a logical flow, minimizing interruptions and allowing the employee to deliver in the moments that matter.
- **Swarming teams:** Using prompted collaboration and adaptive workflow, an agile work environment organizes digital and human workers to address opportunities as they emerge.
- **Augmented process execution:** Structured work in the inflexible workspace is hampered by the number of interruptions created in trying to sort the vast amount of incoming data and by the context switching caused by the modern business environment. The agile work environment leverages AI/ML and modern design to sort that complexity into meaningful insights and actions before it arrives at a worker's desk, automating what can be automated and leaving the work only humans can do.
- **Support for behaviors as well as tasks:** The agile workspace supports critical behaviors as well as task execution. For example, a workspace designed to enhance learning and knowledge sharing may suggest interactive learning assets related to the current activity, may proactively reach out to mentors who have been highly successful at similar activities, or may provide suggestions for next steps drawn from previously successful attempts.
- **Anywhere, anytime:** As people increasingly work when and where they wish to, the agile workspace not only allows them to do so but also enables transparent access to the data, digital, physical, and social resources that are required to complete the work anywhere at any time.

### *The New World: How People (Now) Interact with Tech*

Over the past decade, business technology is becoming more consumerized and workers are becoming more tech savvy. As the web, including cloud and mobile technologies, became more popular with the average person, it delivered new ways for everyday problem-solving: If you need to know something, use a search engine or an app. If you need to reach someone, message them. If you need to collaborate, download an app. The average mobile user continues to become more tech savvy and collaborative and, as a result, is able to do more activities in less time. Many individuals remove their own barriers by leveraging technology, often ahead of enterprise readiness.

The bar for the average user experience is now set high. Good customer experience is now the best experience, mostly online, that he or she has with any company. The average consumer now expects one click to buy, two clicks to return, and real-time communications and alerts that follow him/her on his/her phone. When these consumers go to work, these become employee expectations and become key to attracting and retaining top talent.

Among these rising expectations is the growth of collaboration applications and the employee behaviors that support working together across silos and geographies. IDC research finds that 56% of all U.S. collaboration initiatives started as an "unauthorized project" to support line-of-business needs. The need for collaboration applications exists, and the benefits are real.

However, the intelligent digital workspace does more than just connect the work community; it provides the needed applications integrated with a communications layer, and it is customized for each person. It keeps content assets and context together, while providing enterprise governance and compliance.

The addition of ML and AI creates abilities that augment workers, including recommendations of content, next project steps, or who to include in a project for skills or internal social connectedness. As

an example, AI is enabling videoconference meetings to have real-time language translations, transcriptions, and to-do list assignments. The list of abilities across the product spectrum is growing and changing what workplace assets exist.

ML and AI in the intelligent workspace is creating the next generation of business analytics. The move from output production metrics to granular outcome metrics will fundamentally change what can be managed, measured, and rewarded.

### *The Three Layers of the Workspace*

Digital workspaces in the enterprise are made up of three distinct layers of technology: physical devices and spaces, digital interfaces and experiences, and digital workspace infrastructure. Each layer is defined as follows:

- **The physical devices and spaces layer** is made up of a combination of traditional, mobile, and IoT/peripheral devices. This includes traditional devices such as PCs, workstations, and laptops (and all associated hardware) as well as mobile endpoints (smartphones and tablets), other office-based peripherals (hardcopy multifunction printers, desk phones, conferencing equipment, kiosks, POS devices, and ruggedized computing endpoints) and sensors, and other IoT devices. In certain industries and verticals, intelligent operational systems – collaborative robots and smart, connected physical automation and processing systems – are also part of this layer.
- **The digital interfaces and experiences layer** integrates the data gathered from the physical and infrastructure layers, using a combination of modern designs and artificial intelligence to enhance the flow of work for the individual, the team, and the enterprise. If done right, these digital and physical layers interact seamlessly, with the help of the third layer.
- **The digital workspace infrastructure layer** ties these solutions together and provides initial and ongoing provisioning, management, access control, security, monitoring, and support for hardware and software deployed in end-user environments. From an IDC software taxonomy perspective, these components include unified endpoint management (UEM), IT service management, virtual client computing, IT asset management, identity and access management, and endpoint security software technologies.

### **Physical Workspace Layer**

The physical devices and spaces layer is how workers interface with the intelligent digital workspace. This includes traditional devices such as PCs, workstations, and laptops (and all associated hardware) as well as mobile endpoints (smartphones and tablets) and other office-based peripherals (hardcopy multifunction printers, desk phones, conferencing equipment, kiosks, point-of-sale devices, and ruggedized computing endpoints). While becoming somewhat commoditized over the years, endpoint computing devices are still a critical interface layer for employees. And the forces of consumerization, as mentioned previously, shape a wide range of preferences (Windows or Mac?), form factors (PC or smartphone?), and even ownership and adoption models (company owned or BYOD?). Intelligent digital workspaces must accommodate all of these options while extending security, management, and control capabilities across a diverse set of endpoints. The saying that "the glass still matters" takes on new relevance in a diverse enterprise endpoint computing environment where preferences and bias can be strong and as many as six operating systems must now be accounted for (i.e., iOS, Android, Windows, macOS, ChromeOS, and Linux). What devices are deployed relies heavily on use cases and industry scenarios. (Windows PCs may be fine for most, but not for creatives or software developers. Ruggedized or low-cost Android tablets may suffice in back-office or transactional

workspace roles while, for some firms with customer-facing retail or banking services scenarios, only the latest iPad will do). Physical devices and "things" in the digital workspace certainly go beyond PCs, desktop phones, laptops, smartphones, and tablets. Conferencing equipment, large-scale computing devices with touch interfaces (i.e., Microsoft Surface Hub), and smart digital assistants ("Alexa/Google/Siri, please start the meeting.") will also be part of a connected, digital workspace – or "workspace IoT" – environment.

## Digital Workspace Layer

The digital workspace is the modern-day control panel (or interface) for the flow of work, customized at the individual worker level. As mentioned previously, it unifies people, data, content, communities, and context to meet the technological solutions that workers need to do their jobs. In recent years, these solutions were often acquired by line-of-business leaders to streamline their work, often circumventing existing processes in the name of productivity.

Designed for easy access to the data, content, and integrated corporate IT solutions, workspaces cross internal silos, are fully functional across all devices, and support corporate privacy, compliance, and governance requirements. Their core functionality is to combine the flow of work (and not just workflow), conversation, and communication layers within a secure platform that enables integrated, easy access to other IT stack investments, customized for each worker.

The intelligent workspace integrates AI, machine learning, and on the increase, voice assistants and IoT-driven features such as employee proximity detection. As these technologies appear in the homes of the more tech-savvy workers, the expectations will accelerate their place in the workforce as soon as security, privacy, and governance solutions mature.

While technology adoption favors more intelligence in the enterprise to augment all workers, these are not meant as a form of worker control but rather to remove barriers that slow down work, make proactive recommendations about the next best action, and provide access to the resources required to complete that action. They also create an annuity in clean data and content, which can then be used to drive knowledge-powered solutions at the individual, team, and enterprise level. When paired with a culture of collaboration, the intelligent workspace becomes the basis for enterprise knowledge management.

## Digital Workspace Infrastructure Layer

Underlying the physical devices and software layers of the digital workspace are workspace infrastructure platforms, which tie these solutions together and provide initial and ongoing provisioning, management, access control, security, monitoring, and support for hardware and software deployed in end-user environments. From an IDC software taxonomy perspective, these components include unified endpoint management, IT service management, virtual client computing, IT asset management, identity and access management, and endpoint security software technologies.

While each of these technology areas are distinct markets and domains, IT suppliers are shifting from providing even more complex suites of products to creating relatively curated platforms that provide an integrated body of services in support of a business solution. This shift is further complicated by the evolving notion of a "digital workspace," a productivity environment in which IT resources (including applications, analytics, productivity, and reporting) are integrated together on a managed or unmanaged platform.

As management, security, asset tracking, and support around endpoint devices consolidate, vendors will have broader visibility of data on end-user device configurations, compliance states, and

software/apps inventories deployed in the enterprise. This is a big data source that, through artificial intelligence, can be used to automate tasks such as software deployment and discovery, security monitoring of end users' systems, and other management tasks that are part of basic client endpoint management platform functionality. This can help users of the technology more efficiently manage and secure large fleets of devices across a wide range of form factors while supporting complex policies, rules, and configuration models. The ability to virtually deliver apps and even entire desktop experiences – often called workspaces in the industry – is another key capability in the digital workspace infrastructure layer.

### **Where the Layers Interact**

The interaction of the three layers (device, interface, and infrastructure) enables the intelligent agile workspace and the key behaviors that enterprises need to drive to achieve business outcomes. In the current environment, this is most obvious in areas such as behavioral enablement, collaboration, resource entitlement to flexible roles, onboarding/offboarding, and the hybrid physical/digital workplace.

Behavioral enablement is sometimes mistaken for productivity enhancement because both focus on first minimizing context switching then gathering required digital and physical resources to achieve an end. But productivity focuses on the creation of a specified output (e.g., a report, a process document, or a manufactured good), while behavioral enablement focuses on organizing information into patterns and connecting people with similar interests to work toward ambiguous outcomes. Productivity is typically measured in key performance indicators, while behavior is measured with key behavioral indicators (KBIs).

Resource entitlement/assignment starts with onboarding, continues throughout the employee experience, and may well extend beyond formal completion of the work arrangement for an indefinite period of time. With 39% of companies reporting that they have or will have implemented "flexible roles" within the next 18 months, this entitlement must be dynamic instead of statically assigned to a specific position. These entitlements may include devices, interface configurations, and security arrangements/software within the infrastructure stack to enable critical process steps or behaviors. Examples include the suite of assignments, entitlements, and forms required to initiate employment; the management of information exposed in the interface based on geospatial and social (e.g., presence of teammates) location; and the management of retirement benefits after employment is complete.

The hybrid digital/physical/social workspace is the most obvious intersection of these three layers. In one of the previous examples, entitlements (infrastructure and security) to access (infrastructure), display (interface) applications, or information (infrastructure and interface) could be manipulated based on the geospatial (infrastructure) or social (interface) associations of a given employee. Coordinating and organizing the three layers is an ongoing act of design focused on balancing productivity and behavioral enablement.

### ***What Will Shape the Management of the Digital Workspace?***

Digital automation, AI, and ML are shaping the management of the digital workspace to achieve new levels of agility and efficiency. The sections that follow provide some specifics on where IDC sees this trend going.

## Cognitive Help Desk Services

Intelligent chatbots and, broadly speaking, cognitive technologies are transforming IT help desk support. They provide contextualized user support and make the user experience as seamless as possible across different channels.

However, as organizations are consolidating and centralizing their internal shared services into a common business support platform, cognitive technologies are going beyond IT help desk and taking over legal, HR, and other services to create a new intelligent digital workspace.

Cognitive technologies are typically aided by AI and equipped with natural language processing (NLP) so they can respond to employee requests via text or voice. They become the first line of response for support services, replacing low-skilled tasks and transforming time-intensive workflows into streamlined, automated operations.

Cognitive help desk services can empower employees, whether they're office based or on the move, with relevant support information for fast decisions, which has huge potential for business impact. Self-service becomes more sophisticated and includes wikis and intelligent search recommendations to help guide users to the right solution.

The industry is developing cognitive help desk solutions with significant impact on employee experience and business outcomes. A typical example is employee onboarding – by which new hires fill in benefit forms, background checks, and requests for devices – that has a significant impact on employee loyalty and productivity.

## *End-User Computing Management Advanced Analytics*

Advanced analytics monitor the health of EUC endpoints in real time. They can proactively detect, diagnose, and address anomalies before they cause work disruption. For example, IT admins can stop the rollout of a new app that is crashing or upgrade a PC's hard drive before it reaches full capacity. Furthermore, advanced analytics and visualizing tools can help with user profiling and optimizing the workplace stack for different personas, depending on employees' roles and work styles. And, crucially, they can identify problems in the adoption of new technologies (for example, employees not logging in or not using an app long enough) and support relevant change management programs. Advanced analytics are a game changer, shifting the IT support model from a reactive, ticket-based model to a proactive experience-led approach.

## *Digital Automation*

The digital workspace is rapidly becoming automated. From a management perspective, self-healing and automated remediation capabilities can notably impact employee performance with speed and ease (for example, if the rollout of a new app version is crashing, the solution can reprovision the last version of the app that did work).

However, automation is currently most effective when improving the security posture of a digital workspace. In this respect, intelligent policy automation in a "zero trust" security model is rapidly gaining market popularity. Intelligent policy automation can automatically adjust access controls, depending on the security risk score of a logging event. For example, it can prompt end users for further authentication (or rebuke access) in a high-risk score event.

## Cloud/as-a-Service Models

The appetite for a digital-workspace-as-a-service solution is growing across all companies, big or small. Coupled with an interest in subscription-based consumption models, IT departments are keen to outsource time-consuming tasks and shift in-house resources toward business-critical projects.

Generally, a digital-workspace-as-a-service solution includes EUC devices (PCs, smartphones, tablets, printers, etc.), UEM and security software, business productivity apps, advanced analytics, end-to-end life-cycle services (from design and consulting to management and device disposal), and a flexible as-a-service financing model with per-seat pricing. But vendors offer different combinations, depending on asset capabilities and partnerships.

Besides its management and security advantages, a digital-workspace-as-a-service solution is very attractive to employees, particularly if it offers them choice, design, and a uniform end-user experience. When employees have the right tools (i.e., secure and new devices, apps, and access to relevant enterprise content), they feel empowered to do their jobs.

## ADVICE FOR THE TECHNOLOGY BUYER

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- **Learn from your early workspace adopters.** Identify where collaboration applications are in use in the enterprise, learn who is using them and how, and use this as a starting point. They may have made mistakes that you can avoid. Existing solutions may be integrated into a larger solution or be the larger solution, depending on needs. Departmental requirements vary: marketing support and marketing communications, for example, may need to create teams that include partners, while engineering, IT, and support all carry additional needs. As technology is evolving quickly, think of what the needs will be, not just what they are.
- **Accommodate the new knowledge worker.** All connected employees, partners, and customers are redesigning how work is done. Knowledge workers today are anyone, with or without a desk and company email address. They all create content and data that create value for the enterprise. IDC has identified an increase in partners and end-user customers becoming part of an enterprise collaboration process. This is true for B2B and B2C companies. The consumerization of collaboration and other mobile technologies has created a collaboration-ready workforce. Partners and customers are slowly moving from the buyer-seller relationship to a maker-partner relationship where they are willing to help some businesses improve their offerings.
- **Have a workspace for every worker – thinking beyond office-based employees.** Intelligent digital workspaces can transform a team and individual workers across a multitude of vertical industries and use cases. Frontline workers, field workers, technical specialist in healthcare, miners, first responders, and educators all have unique digital technology requirements and challenges imposed upon them by technology and industry circumstances. IT leaders in every industry should interpret and visualize what an intelligent digital workspace means for their internal customers and constituents.
- **Tend to human-powered workspaces.** Like any community, there is a need for people to create, moderate, and support the success of the community. Often forgotten is the need for ample head count, increased awareness and governance, analytics analysis, and moderation for community success, just as there would be with an in-person community.
- **Look for technology platforms from the framework of the three digital workspace layers.** Organizations should consider any new technology purchase or implementation within the

context of the digital workspace layers framework – physical, digital, and infrastructure. For example, when considering software (at the digital interface level), can it be run on any type of device or is a special purpose required (thus, potentially introducing inflexibility)? If specialty devices are required, what is the management and provisioning framework for such endpoints?

## LEARN MORE

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### Related Research

- *Strategies for the New Work Experience* (IDC #US45711419, December 2019)
- *IDC FutureScape: Worldwide Future of Work 2020 Predictions* (IDC #US44752319, October 2019)
- *IDC MaturityScope Benchmark: The Future of Work in the United States, 2019* (IDC #US45367119, July 2019)
- *Projected Growth in the Roles of Digital Workers* (IDC #US44810819, May 2019)
- *IDC MaturityScope: The Future of Work 1.0* (IDC #US44752519, March 2019)
- *The Future of Work - The Future Is Now* (IDC #US44924319, March 2019)

### Synopsis

This IDC Perspective addresses the challenge of inflexible work environments in organizations and their detriment to productivity, worker creativity, and ultimately business value. This study defines intelligent digital workspaces as a framework for enterprises to deliver a diverse set of hardware and software resources to workers, which enables more dynamic and adaptable teams, supports individual and group productivity, enables competitive differentiation, and provides a safety net of security and compliance required in the modern digital economy and workplace.

"At the worker and group organizational level, digital transformation requires IT to leave behind old ways of thinking about how employees work with computers, software, and data and to rethink this in the context of an intelligent digital workspace," says Phil Hochmuth, program VP, Enterprise Mobility and Client Endpoint Management, IDC. "The intelligent digital workspace is not a product, service, or technological philosophical concept; it's the thoughtful deployment of IT resources and community to individual workers and teams, with the ultimate goal of getting things done and driving new business value."

## About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

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