

Introduction

The rapid growth of cloud computing is changing the way business is done, and nowhere is the impact more apparent than through the use of mobile tools and technologies. Cloud-supported mobility is altering the way workers interact and how companies securely connect to their customers and business partners. The mix of cloud, mobile, and big data increases the speed of decision-making, enabling a more dynamic and agile flow of information and knowledge across the globe.

This explosion of activity has created a growing need for mobile applications that manage data and tasks in a highly targeted way. As trends like personal technology in the workplace (i.e., bring your own device/bring your own app, or BYOD) have taken hold, opportunities and challenges have arisen both inside and outside of the enterprise—along with growing pressure for mobile services to perform on a consistently high level, across a range of devices. Real-time interaction is the new normal; people expect to have access to information anywhere and at any time.

These changes are significant in both scope and scale. As Shawndra Hill, an operations and information management professor at the University of Pennsylvania's Wharton School said recently at the Knowledge@Wharton website, "Mobile is going to take over in the next couple of years, and companies will have to pay attention to that fact."

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What is a cloud platform?

At its most basic, a cloud platform—also known as Platform-as-a-Service (PaaS)—is a system that delivers over the internet (and as a utility) the easy-to-deploy infrastructure and services needed to develop, prepare, and run applications, as well as other services, including application integration and portals. The pre-built infrastructure rapidly unlocks the key benefit of these platforms, which is to remove the considerable developer time and bandwidth traditionally required to make applications ready for use (e.g., server administration, managing OS patches, and managing upgrades) with on-premise alternatives. Instead, cloud platforms enable developers to focus solely on coding innovative applications. Cloud software typically works in "stacks," with Infrastructure-as-a-Service (IaaS) sitting at the bottom, Platform-as-a-Service (PaaS) in the middle, and Software as a Service (SaaS) positioned on top.

The New Digital Economy, a 2011 research paper by Oxford Economics produced in collaboration with AT&T, Cisco, Citi, PwC, and SAP, argues that mobility, big data, social applications, and clouds form the nexus of a new and powerful computing and business model. Businesses must understand both the business and technical fundamentals of this mobile revolution while identifying ways to exploit the disruption it brings. Platforms that support the next generation of business and information technology systems are a key way of cost-effectively leveraging these trends.

Cloud platforms provide the tools, technology, and infrastructure required to operate effectively in the new mobile world. They support the rapid deployment, secure updating of custom applications, content synchronization, and device management to make users more agile and flexible. They also support the unfettered exchange of data and information across multichannel environments that increasingly encompass smartphones, tablets, and laptop computers.

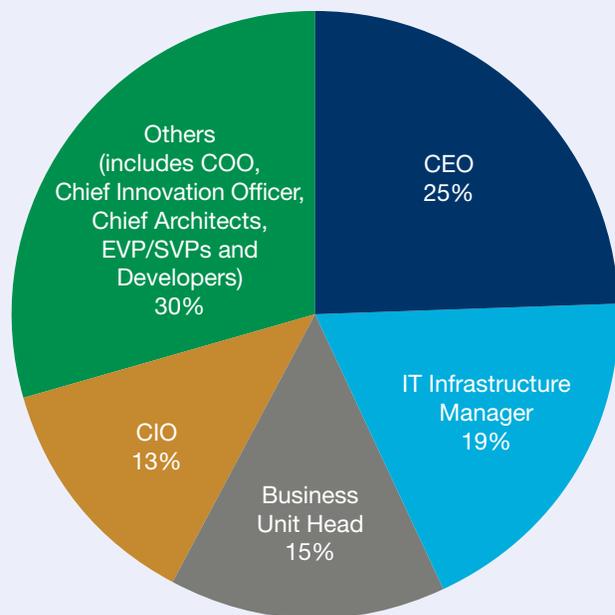
Our global survey of 200 senior business and IT executives shows companies taking a variety of cloud-based mobility initiatives that span the enterprise, from internal operations to interactions with customers and partners. These plans aim to achieve a broad range of goals, including increased efficiency, customer satisfaction, and business performance. To realize these goals and put mobility and clouds to work successfully, they will need a well-conceived strategy, the right resources, and a commitment to connecting people and systems in new and sometimes unfamiliar ways.

Who took the survey?

This report, the second in a series of papers that analyze the strategic adoption of cloud computing, is based upon a global survey of 200 senior business and IT executives, conducted in December 2012 and January 2013. The largest group of respondents (16%) came from the US, followed by Brazil, India, Mexico, and the UK (13% each); Germany (10%); Canada (9%); China (6%); Japan (4%); Australia (3%); and Saudi Arabia (3%). Respondents came from five industries: retail (29%), consumer products (28%), banking (25%), telecommunications (13%), and capital markets (7%). More than one-quarter of respondent companies had sales between \$1 billion and \$4.9 billion. Larger companies made a significant showing, with 10% of respondents reporting sales between \$5 billion and \$9.9 billion, and 12% over \$10 billion. Small and mid-size firms also were well represented: Nearly one in five respondents had sales of \$25 million to \$99 million, while 18% had sales between \$100 million and \$499 million, and 14% weighed in between \$500 million and \$999 million. Chief Executive Officers made up the largest group of respondents (25%), followed by IT infrastructure managers (19%), business unit heads (15%), and Chief Intelligence Officers (13%). Other titles included Chief Operating Officers (8%) and Chief Innovation Officers (7%), along with Developers, Chief Architects, and EVP/SVP of Technology, Operations, and Marketing.

In addition to the quantitative survey, we conducted interviews with executives at Mövenpick Hotels & Resorts Management, NYSE Euronext, and Verizon Terremark. We thank everyone who participated in the research.

Fig. 1: Respondents by title



Mobility matters

Over the last few years, mobile devices, apps, and content have moved into the mainstream and sparked talk of a “post-PC” era. By the end of 2013, more than half of all internet activity will involve smartphones, tablets, laptops, and other mobile devices, according to consulting firm IDATE. As Roger MacFarlane, Vice President, Technology & Systems at Mövenpick Hotels and Resorts, Middle East and Asia explains the decline of URL-driven access: “Dotcom has been replaced with iPads and iPhones. This creates entirely different expectations, and places fundamentally different demands and requirements on organizations.”

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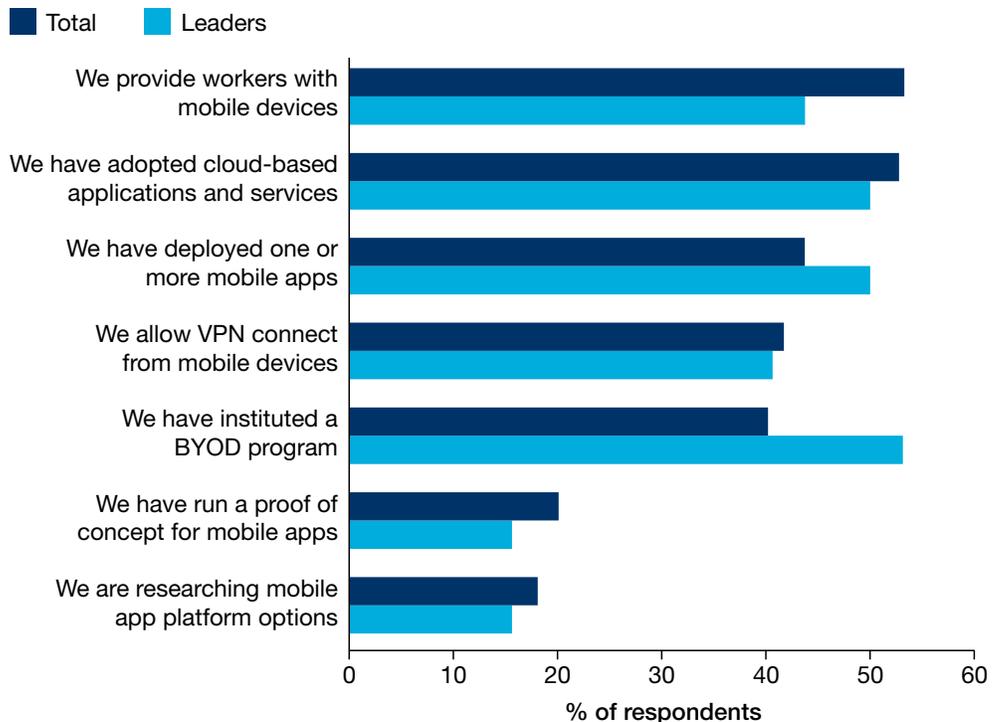
Roger MacFarlane, Vice President, Technology & Systems at Mövenpick Hotels and Resorts

Adds John Rote, Vice President of Customer Experience at online clothing retailer Bonobos: “Today’s emerging post-PC environment means that any improvements and development that take place for the desktop computing environment must carry over to mobile.”

Our global survey indicates companies have taken a number of approaches to cloud-based mobility. Cloud leaders—those survey respondents who are ahead of their peers in adopting and exploiting cloud technologies—are more likely to have deployed one or more mobile apps and to have instituted a BYOD policy. Yet these leaders trail the pack in some meaningful areas, including adoption of cloud-based mobile services and VPN access via mobile devices, indicating the dynamism of the mobile cloud arena. (Leaders are identified based on planned investment in cloud computing, adoption of cloud platforms by a majority of their business functions, and approach to managing cloud risk, with leaders opting for management by the risk or legal function.)

Fig. 2: Businesses absorb the cloud

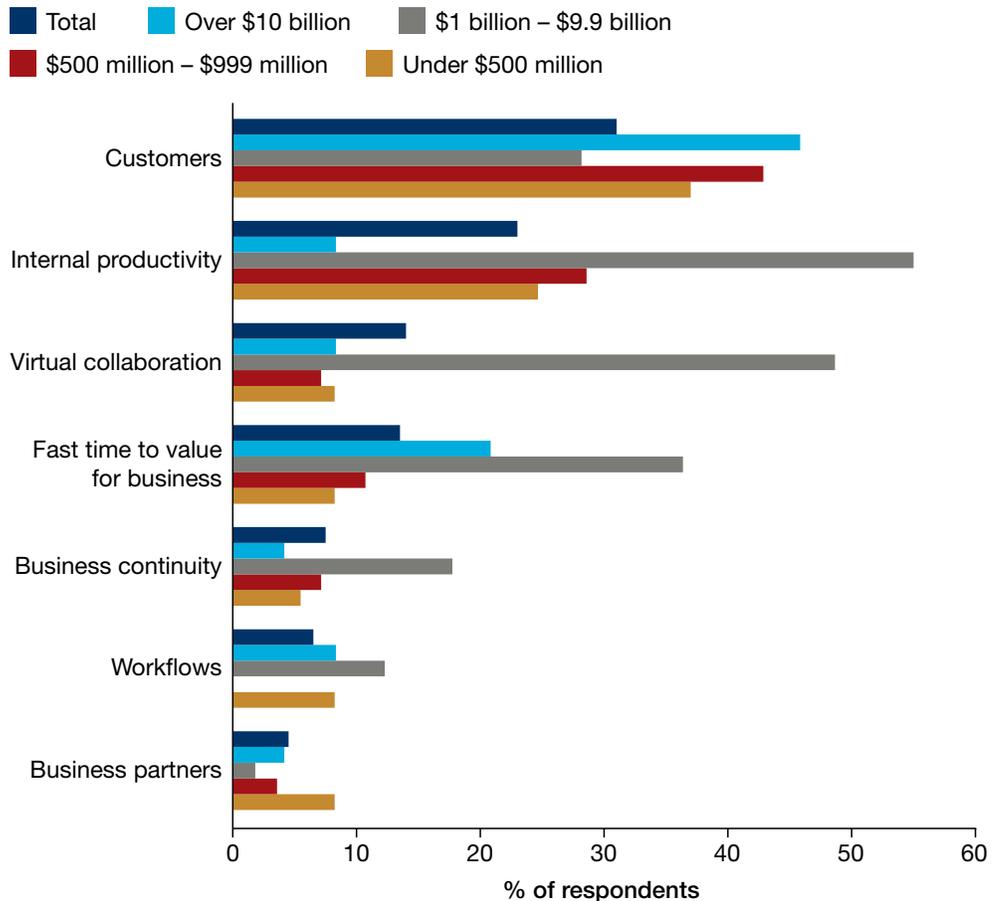
Cloud connections to internal systems and real-time data



Companies overall are focused on mobile cloud strategy, and tying it in to their overall cloud platform plans. More than four out of five respondents indicate that these technologies play a key role in managing customers—an area of particular focus for very large companies—boosting internal productivity, enabling collaboration, and unleashing faster time to value for the business.

Fig. 3: Customer needs a key focus for mobile cloud deployment

Companies focus on key strategic areas with mobile clouds



Increasingly, mobility encompasses B2B and B2C capabilities that deliver sales, service, and support in real time. This makes it important to build platforms that integrate with enterprise systems, tie in public and private clouds that connect various enterprise applications, securely connect mobile cloud services with on-premise systems, and integrate these tools with existing authentication systems and policies.

Clouds enable a number of important mobile capabilities for customers, who can check on order status and shipping information, open up service requests, and send e-mails or other corporate content from their smartphones and tablets. Increasingly, they can also use videoconferencing, instant messaging apps, and social media to interact with manufacturers, retailers, financial institutions, and other firms. But supporting customers with such channels puts greater demands on businesses to manage data streaming over multiple channels—and to do so quickly and efficiently.

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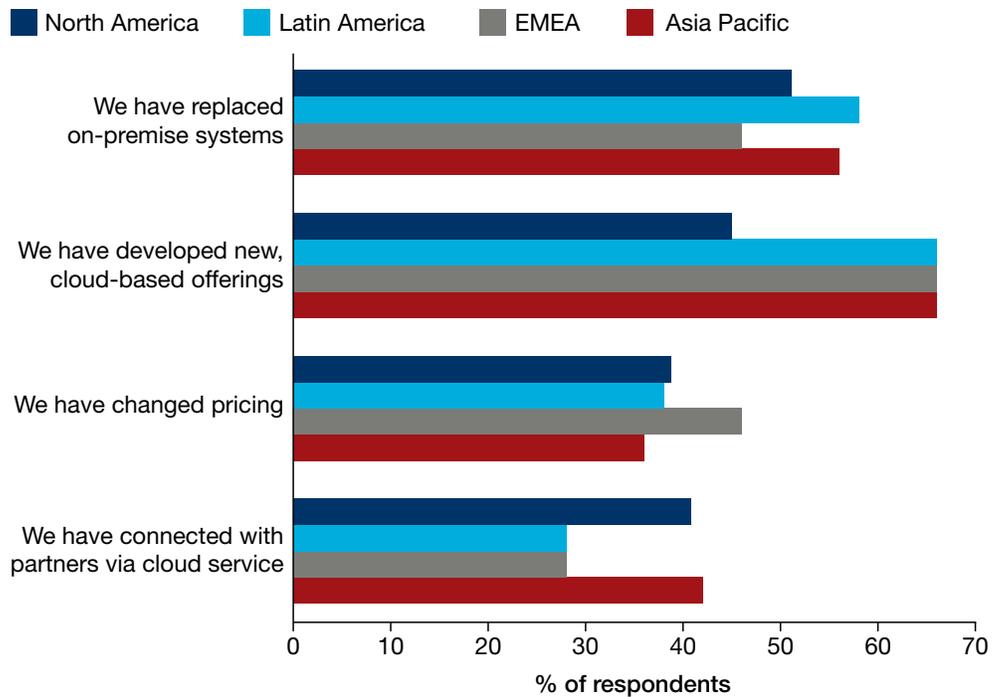
John Considine, CTO, Verizon Terremark

That requires companies to remap data management in profound ways. Says John Considine, CTO for Verizon Terremark: “As more and more people use mobile devices and access data from remote offices and the field, there is a strong argument that data shouldn’t reside in the data center. It should be stored in the cloud, which, by definition, is distributed. This makes data much more accessible and simplifies IT requirements.”

Mobile cloud platforms support a variety of business needs, with some variation in the rate of adoption in different regions. For example, 61% of survey respondents indicate that they use cloud platforms to rapidly deploy new services and capabilities, with North America’s weak showing bringing down the average. Meanwhile, 53% are using mobile tools to replace on-premises systems, with Latin America leading the way; 40% are relying on mobility to manage pricing more dynamically, a trend most pronounced in Europe, the Middle East, and Africa; and 35% are connecting to partners through cloud services, led by Asia Pacific and North America.

Fig. 4: Cloud platforms support diverse business goals

How has your firm used the cloud to create new services around mobile devices or mobile apps?



In addition to removing the need for on-premise infrastructure within the data center, mobile clouds can save costs and be rapidly updated to spur greater adoption of tablets and smartphones that cost less than conventional PCs. For some companies cloud deployments further reduce capital or operating expenses. And since mobile application distribution is a simpler task than managing client updates on laptops, these platforms can be more easily updated with the latest “trusted” app releases. Finally, analytics and reporting tools are easily deployed on a cloud platform and can be used to monitor device usage, billing, and updates. This, in turn, further lowers costs, reduces IT workloads, and, in the end, creates a more dynamic IT environment.

All of this means that business leaders are becoming increasingly familiar and comfortable with cloud platforms—and the use of mobility within these IT environments. The fact that cloud-based platforms are relatively simple to create and modify is appealing to business executives. In many cases, it is possible to set up an account and have full functionality available within minutes or hours. A traditional IT approach, on the other hand, can involve long waits for hardware and setup as staff handles OS installation, app installation, tuning, and hardening the environment. In addition, cloud platforms simplify policy enforcement and, in some cases, security requirements by creating a more uniform environment. In many instances, it is possible to view the entire IT space from a single dashboard and automate numerous processes.

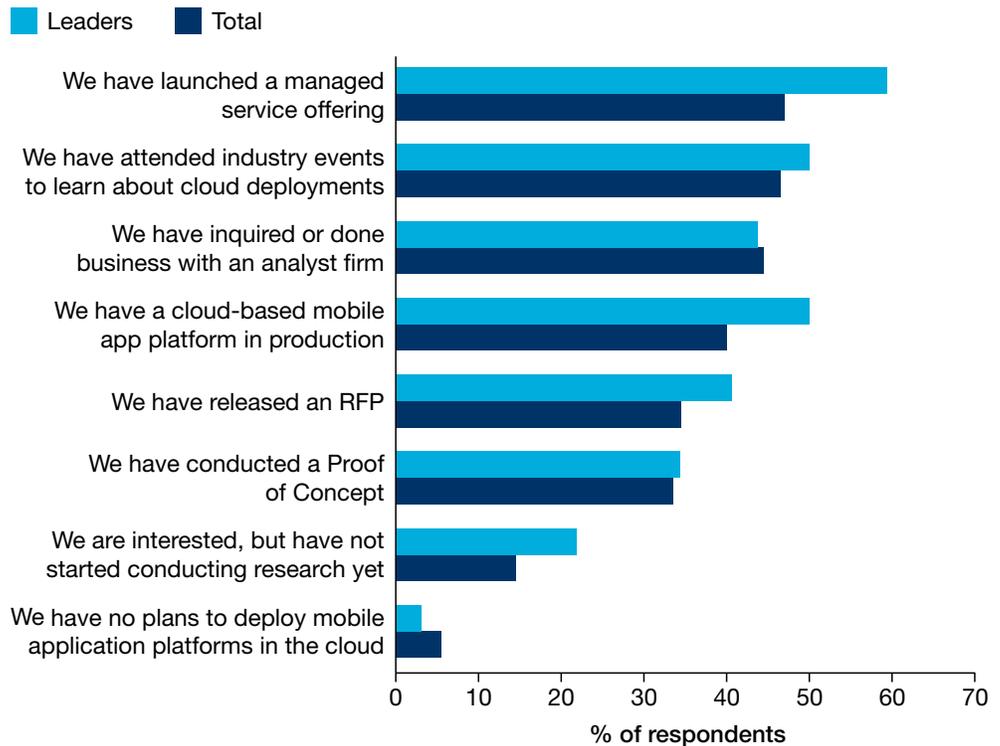
This last point is important, as nearly three-quarters of survey respondents consider mobile security a major consideration and only 11% say it is a minor focus. While many business and IT leaders remain skeptical of cloud security, the facts point to these platforms providing gains. (Our third paper in this series, *Building a Secure Cloud Platform*, focuses on security and governance issues).

Capturing mobile gains

A growing number of organizations are adopting IT frameworks that support the rapid deployment of mobile functions through cloud platforms. The survey finds that 47% have launched a managed service offering for mobility, 35% have released a request for proposal (RFP) for a project, 34% have conducted a proof of concept, and 40% have a cloud-based mobile app platform in production. Cloud leaders are significantly more likely than other firms to have a cloud-based mobile app platform in production.

Fig. 5: Preparing for mobile platforms

What steps have you taken to deploy mobile application platforms in the cloud?



They are using this approach to produce more robust applications and capabilities, and sometimes to provide platforms that enable business partners to develop mobile applications, services, and tools for their customers. In many cases, these cloud platforms deliver a more efficient business and IT model with far fewer roadblocks to data than traditional client-server architecture with standalone databases.

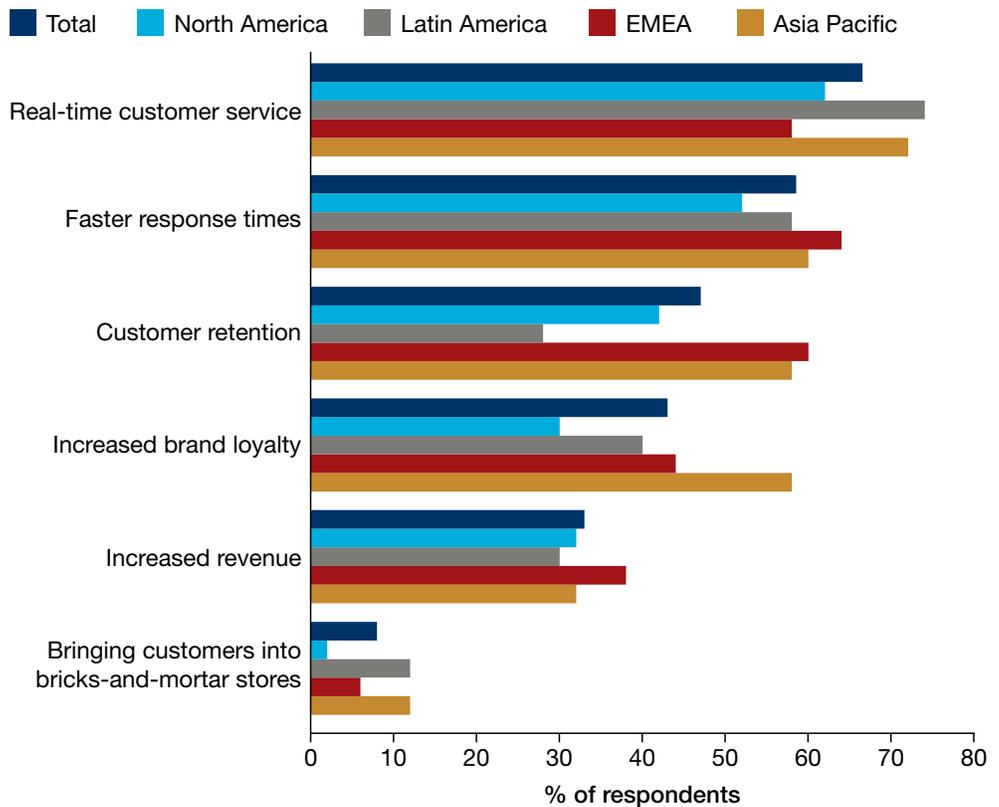
For example, NYSE Technologies, a large provider of software and data services for the capital markets industry, has built a cloud platform to support customer mobile app development, says Feargal O’Sullivan, Global Head of Alliances. While the firm does not build or offer its own mobile apps, it provides its corporate clients with a set of APIs and a cloud platform where code and apps reside—or where they can develop them. This eliminates what he calls the “heavy lifting.” Mr. O’Sullivan explains: “If a client requires an analytic engine or mobile distribution capabilities, we’re able to support it through a third-party approach that uses the cloud.” Simply put, the customer can plug in various components and services and create a product on the fly.

Mövenpick Hotels and Resorts has taken a slightly different tack. The hospitality company, with 71 hotels and resorts in 25 countries, has built a cloud platform that allows hotel properties to manage their own applications on an iPad, iPhone, or Android device. The idea, says Mr. MacFarlaine, is for hotels to “supplement their existing materials” with corporate content and seamlessly blend everything into a “great-looking and easy-to-use app.” This way, each property can communicate a desired message while the company maintains a unified look within the app. This helps boost branding. The self-managed capability provides greater flexibility, he adds: “Hotels can update promotions as often as they like, they can add images and descriptions, at zero cost.”

Like NYSE Technologies and Mövenpick, other enterprises are using cloud platforms to address a variety of customer needs through mobile deployments. Among the most prominent: real-time customer service, cited by 67% of the respondents; faster response times (59%); better customer retention (47%); increased brand loyalty (43%); and higher revenues (33%).

Fig. 6: Mobile clouds support strategic initiatives for businesses

Companies have clear objectives with customer-facing mobile clouds



Organizations that achieve these objectives often report better customer relationships, improved internal productivity, better virtual collaboration, faster time to value for the business, better business continuity, improved workflows, and better relationships with business partners.

Organizations that achieve these objectives often report significant benefits, according to the survey. These include better customer relationships, improved internal productivity, better virtual collaboration, faster time to value for the business, better business continuity, improved workflows, and better relationships with business partners. Mobile cloud platforms can also create better business models. A retailer, for example, might use better channel integration to bring online customers into bricks-and-mortar stores.

Mobile cloud platforms can even generate new business models, as companies plug in structured and unstructured data, including social media feeds, geo-location information, and data from RFID tags, embedded sensors, audio streams, and instant messaging tools.

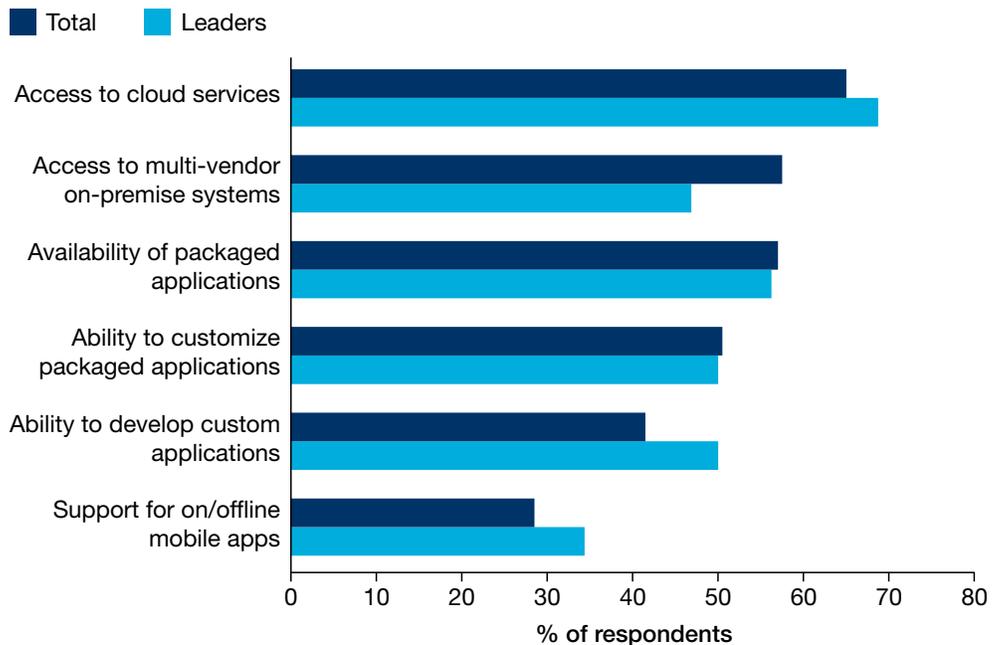
Mobile cloud platforms can even generate new business models, as companies plug in structured and unstructured data, including social media feeds, geo-location information, and data from RFID tags, embedded sensors, audio streams, and instant messaging tools. As the so-called “internet of things” takes hold, mobile devices are flooding businesses with data and fueling new opportunities.

Many companies are already putting mobile clouds to work. Nearly half of respondents use managed service offerings, while 40% rely on a cloud-based mobile-app platform for production. Just over one-third have conducted a “proof of concept” for a cloud-based mobile project. Only 6% say they have no plans to deploy mobile-application platforms in the cloud.

A number of features and capabilities are mandatory for organizations building out mobile cloud platforms. Nearly two-thirds of survey respondents (65%) say that access to cloud services via a mobile environment is essential. Meanwhile, 58% demand access to multi-vendor on-premise systems; 57% want access to packaged applications; and 51% desire an ability to customize packaged applications. Finally, 42% noted a desire to build custom apps. The need to customize systems, tools, and applications must be met without enduring the process of recompiling code and reprogramming systems and interfaces. These customizations often revolve around adding, changing, and removing fields; and localizing addresses and currencies to fit the conventions and marketplaces for different countries. The ability to standardize systems and data is a significant benefit.

Fig. 7: Essential features that cloud leaders demand

Must-have features for cloud-based mobile platforms



Security concerns are also top of mind. These include authentication of users based on existing systems, typically through username and password; single sign-on (SSO); and the use of certificates. What's more, a secure connection must extend to internal systems on the back end, regardless of the vendor. Finally, an enterprise requires tools that focus on data, including encryption, data loss protection (DLP), VM-specific security, endpoint protections, and strong service-level agreements with vendors. Without adequate protections, any mobile platform, content, and apps are at risk.

Navigating this new world of mobile clouds requires a new way of thinking. Traditionally, many businesses have adopted a mobile strategy based on tiers, often using a three-tiered architecture that encompasses client logic, server logic, and a database. A cloud platform simplifies this by connecting the user interface and application logic directly to the data cloud. This zero-infrastructure approach delivers a more flexible and scalable IT model, and allows an enterprise to rent infrastructure and bandwidth as needed. It also makes it easier for highly mobile internal teams, such as sales organizations, to access data via mobile devices.

Conclusion: Building a best-practice approach

Mobility and cloud computing are creating new opportunities and risks. It is critical to understand the strategic opportunities these technologies offer and build out systems and applications that support them. This means harnessing the strategic value of mobile tools, recognizing how cloud platforms can streamline and simplify IT, and understanding how clouds usher in new and powerful capabilities—many of which were not possible, or even thinkable, just five years ago.

Mobile cloud platforms require a good deal of planning and effort. Organizations must develop a cohesive and focused strategy and break down silos and departmental boundaries in order to achieve maximum results. It is also critical to adopt efficient workflows and ensure that solid governance and security protections are in place. Only then can an enterprise realize the full potential of mobility and construct cloud platforms that are truly transformative.

Several key factors drive optimal results from cloud-platform investments.

- **Organizations must leverage a hybrid platform approach to support mobile tools and technologies.** One of the most effective ways to put clouds to work in a mobile environment is through a platform-as-a-service (PaaS) model. It provides a pre-built infrastructure that can simplify provisioning, development tasks, and more. It also reduces or eliminates patching, upgrades, and an array of administrative and technical tasks.
- **Customers must be served in real time, and mobile systems must connect with on-premises systems.** Mobility demands a different mindset and approach. Customer, employee, and partner expectations demand solutions that stream data on demand. It is critical to connect databases and enterprise applications with newer web and mobile tools—including marketing, human resources, and finance—and allow data to flow in every direction. Cloud platforms remove infrastructure tiers and obstacles that complicate this task.
- **Online and offline support is critical.** Because users aren't always connected and groups may use the same applications and databases, it is critical to design systems so that they are able to sync data effectively. Clouds remove many of the obstacles and constraints associated with conventional databases stored on servers. They create a distributed computing model that fits the collaborative environment.
- **Silos and departmental boundaries must be breached.** Any cloud initiative requires cooperation and collective planning. Clouds increasingly drive niche business tasks within different departments. However, the value of data is magnified when enterprises can connect systems and clouds to create a more holistic and integrated approach.
- **There is a need for end-to-end visibility and lifecycle management.** An enterprise must have visibility across clouds and micro-clouds in order to understand data movement and workflows. It is critical to understand the value of data throughout its lifecycle in order to build the right systems and security.

- **Analytics and reporting are at the core of an effective mobile cloud.** It is necessary to track usage by mobile device, application, versions, content, and consistency in meeting performance needs. In addition, there is a need to track requests, and understand performance and response times in order to tune performance and eliminate bottlenecks. Finally, there is a need for end-to-end traceability to troubleshoot problems.
- **Organizations require robust security.** Authentication, firewalls, VPNs, data encryption, mobile device management (MDM), data leak prevention (DLP), and other systems are vital. What's more, an enterprise must connect to multi-vendor on-premise systems and external cloud services without any gaps or breakdowns. Clouds require a data-centric view of security.
- **Talent is a key factor for success.** Organizations must find new talent or retrain existing talent to put a cloud platform to work. The task of building new systems requires fundamentally different thinking and approaches than traditional IT models. It also demands different skills and an outlook that is focused on rapid deployment and managing highly flexible and modular technology components.

Bonobos takes a mobile approach to clouds

Clothing retailer Bonobos is only five years old, but it has already made waves in the world of fashion. The company has risen to the top of the men's luxury-apparel market, offering slacks, shirts, and casual wear online, and also at its New York City showroom and at Nordstrom stores. One key to the firm's rise is an array of cloud services and offerings that provides a level of flexibility and agility required to compete cost effectively, says John Rote, Vice President of Customer Experience. And mobility plays a key role in this new-era retail environment. "We make it a point to tailor the experience to the device and the browser it uses," says Rote. "Storing code, images, and content in the cloud and distributing it through a content-delivery network makes it easier for a designer or content creator to obtain what they need when they need it."

The company also caches images in different sizes and stores them in the cloud. This allows Bonobos to dynamically scale and optimize the images to a specific device. As a result, he says, "We are able to provide a better experience for customers." In addition, developers and programmers rely on cloud-based code to manage the website, e-commerce engine, and mobile experience. "We have multiple development environments that we can stage code in." In addition, "We are able to scale servers for multiple development and production environments. All of this would be much more difficult with a dedicated-server environment," Rote says.

And when Bonobos merges these production environments into a single release, "We are able to do so seamlessly—and conduct load testing and other tasks in a mirrored environment that customers don't see. We know that what we introduce will be robust and won't cause latency issues or crashes. The cloud allows us to scale up and down in a way that simply isn't possible in a traditional environment," Rote explains. With both retailing and computing changing fast, the Bonobos mobile style is more than a fashion trend.

Key differences by company size

Small companies: under \$500 million

Medium-small: \$500 million–\$999 million

Medium: \$1 billion–\$4.9 billion

Medium-large: \$5 billion–\$9.9 billion

Large: over \$10 billion

- Smart-phone adoption is a moderate to significant focus for 95% of large organizations but only 71% of small companies.
- 90% of respondents at medium-large organizations indicated that demand for mobile services is a moderate to significant focus. This compares with 75% at both medium and large organizations, 73% at small companies, and 71% at medium-small firms.
- Medium-sized firms are the most likely to have launched a mobile managed services offering (31%). This is followed by 28% of small companies, 15% that fall into the medium-small range, 11% in the large category, and 9% in the medium-large group.
- Medium-large companies are most likely to have conducted a proof of concept for a mobile app platform (50%). Medium-small companies were least likely (24%).
- Medium-large firms are also most likely to have a cloud-based mobile app platform in production (50%). This is followed by medium-sized organizations (46%), large companies (41%), medium-small firms (36%), and small firms (34%).
- About 9% of medium-sized organizations indicated that they have no plans to deploy mobile app platforms in the cloud. Only 4% of large and small companies reported no plans for a mobile cloud platform.
- Mobile security is taken more seriously at larger organizations. It is a significant focus for 46% of large organizations, 45% of medium-large firms, 34% of medium-sized firms, 32% of medium-small firms, and 37% of small businesses.

OXFORD

Abbey House, 121 St Aldates
Oxford, OX1 1HB, UK
Tel: +44 1865 268900

LONDON

Broadwall House, 21 Broadwall
London, SE1 9PL, UK
Tel: +44 207 803 1400

BELFAST

Lagan House, Sackville Street
Lisburn, BT27 4AB, UK
Tel: +44 28 9266 0669

NEW YORK

5 Hanover Square, 19th Floor
New York, NY 10004, USA
Tel: +1 (646) 786 1879

PHILADELPHIA

303 Lancaster Avenue, Suite 1b
Wayne PA 19087, USA
Tel: +1 610 995 9600

SINGAPORE

Singapore Land Tower, 37th Floor
50 Raffles Place
Singapore 048623
Tel: +65 6829 7068

PARIS

9 rue Huysmans
75006 Paris, France
Tel: + 33 6 79 900 846

email: mailbox@oxfordeconomics.com

www.oxfordeconomics.com

