ICT Report
Datacenter, Managed, and Cloud Services in Saudi Arabia

CITC Publications 2015

ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

The economy of the Kingdom of Saudi Arabia, the largest ICT market in the Middle East, continues to expand, spurred by the increasing adoption of the latest information and communication technologies. Over the past few years, the market has witnessed a shift toward software- and services-led growth.

The datacenter, managed, and cloud services markets are among the fastest-growing segments, and this trend represents a significant development opportunity for the country.[1] CITC conducted two extensive studies in 2011 and 2015 to analyze the trends in the services market, and this report describes the key findings and outlines a set of recommendations for the further development of this dynamic market.

The key findings of this report are summarized below.

- **Market Growth:** In 2014, spending on datacenter, managed, and cloud services totaled SAR 609 million, SAR 912 million, and SAR 189 million, respectively. The spending on these services has been growing tremendously over the past four years: spending on datacenter services increased by 48% between 2011 and 2014, and spending on managed and cloud services grew by 55% and 373% respectively, between these years. All three markets are expected to grow rapidly over the next five years, surpassing SAR 1 billion, SAR 1.4 billion, and SAR 476 million, respectively, in 2019.

- **Investment in Datacenters:** Saudi organizations continue to invest in their own datacenters in order to consolidate their IT infrastructures. In addition, the demand for rentable datacenter space offered by commercial datacenter providers increased from approximately 17,100 sq. m in 2011 to 24,300 sq. m in 2014, and is expected to reach almost 39,500 sq. m in 2019.

- **Popular Services:** Email, applications, and web hosting are the most popular uses of datacenters among Saudi organizations. Demand for infrastructure capacity and services, including dedicated server, managed server, and storage hosting, is not as widespread. Business continuity and disaster recovery services are becoming increasingly popular as organizations become more aware of the business and IT risks related to disasters. They are beginning to see the value in backing up their data and systems in order to have fully redundant IT systems with appropriate failover capability.

- **Access to Better Technology:** The study shows that many organizations are realizing that procuring services from a datacenter, managed, or cloud services provider can give them access to better technology than they could implement on their own.

- **Domestic ICT Providers:** Domestic providers have been very active in offering datacenter, managed, and cloud services. Telecommunications providers dominated this market in the past; now, however, smaller companies are beginning to have an impact with portfolios that are both advanced and innovative, which is enabling them to become highly competitive in several market segments.

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1 Datacenter, managed, and cloud services are defined in Appendix B and introduced in Chapter 1 of this report.

1 INTRODUCTION TO DATACENTER, MANAGED, AND CLOUD SERVICES

1.1 EVOLUTION OF ICT SERVICES

For several decades following the installation of the first ICT systems, functions related to administration, planning, development, deployment, maintenance, and staff training and management were, by and large, performed by internal ICT staff. However, in the past two decades, the rising cost of ICT systems, shortage of skilled workers, challenge of keeping pace with technological advances, and growing complexity of ICT operations have led organizations to outsource an increasing number of their ICT functions to external providers. This trend led to the birth of the global ICT services industry, which has flourished and matured. Today, services provided by ICT companies constitute one of the fastest-growing areas in the global ICT industry. Broadly speaking, such services can be categorized as follows: professional services, support services, datacenter and managed services, holistic outsourcing services, and cloud services. The evolution of these services is characterized by three phases of increasing sophistication and maturity of adoption and use (see Figure 1).

Figure 1: Evolution of ICT Services[2]
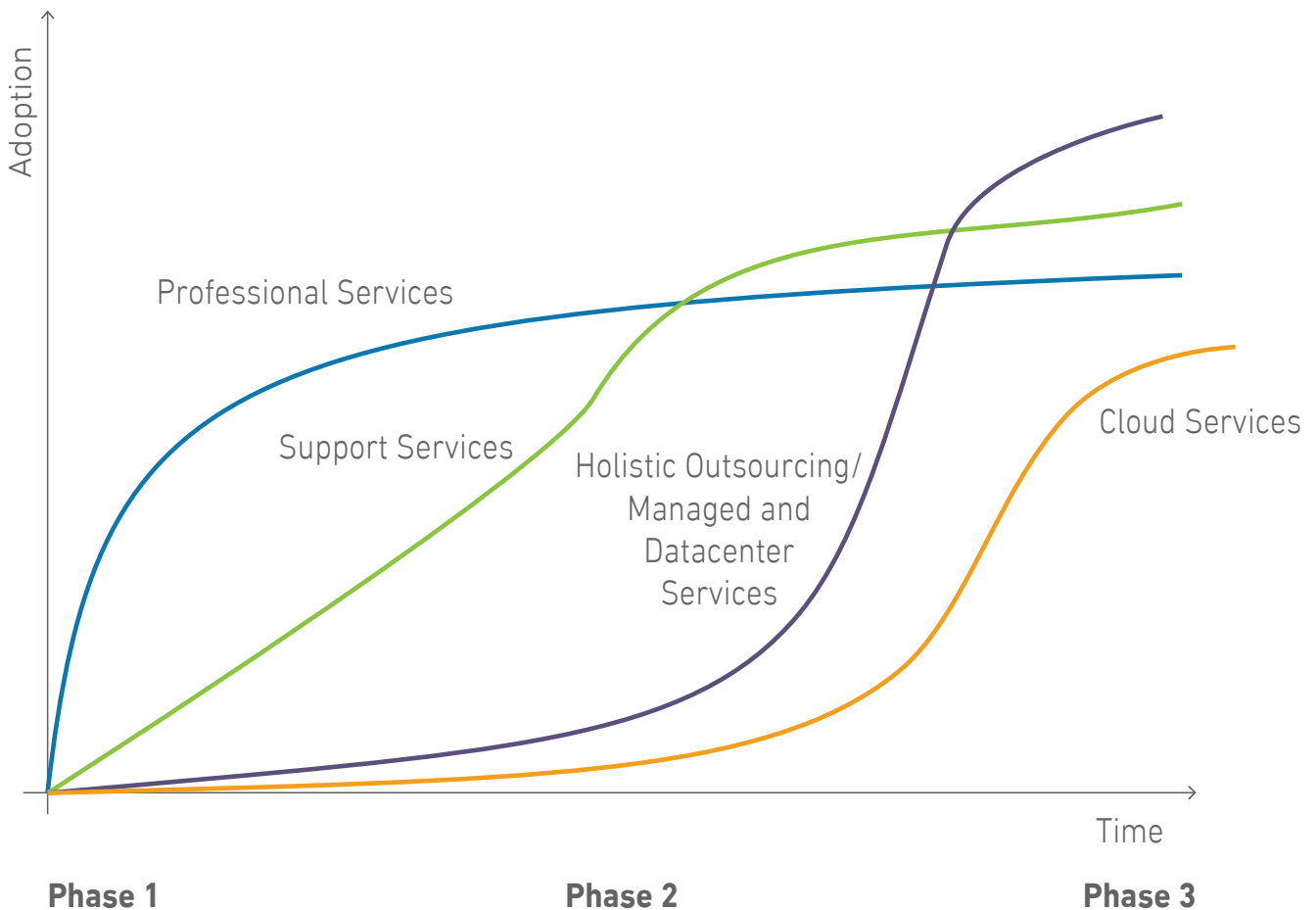
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2 IDC Government Insights, 2015, and IDC IT Services, 2015

1.1.1 PHASE 1: PROFESSIONAL AND SUPPORT SERVICES

An organization's early efforts at using ICT services tend to focus on expanding its ICT system's footprint, and in many cases particularly on deploying basic ICT infrastructure. An organization is often constrained by the limited availability of professionals with specific technical skills in its IT department. Due to rapid technology shifts, the development and retention of staff skilled in the latest technologies has become an arduous task. In order to address this challenge, organizations are beginning to procure specific skills for specific projects from ICT providers, often only for the duration of those projects. These services are called professional services, and examples include the deployment of accounting systems, human resources management solutions, ERP applications, network integration, and ICT infrastructure consolidation. Emerging economies such as Saudi Arabia typically record substantial growth in these services.

As more ICT systems are deployed, support emerges as the next big challenge for ICT managers. Examples of support services include break-fix services, PC desktop support, and software application support. Initially, such services are mostly customized; however, as competition intensifies, providers will look to make their services less expensive by bundling multiple services into standardized packages—a strategy that enables them to leverage economies of scale.

Over time, as their ICT operations expand, organizations come to recognize the need for long-term contracts with their support service providers. These arrangements lay the foundation for the market to evolve to the next phase: holistic outsourcing, managed, and datacenter services.

1.1.2 PHASE 2: HOLISTIC OUTSOURCING, MANAGED, AND DATACENTER SERVICES

Outsourcing

In the next phase of market maturity, organizations become more amenable to outsourcing, not just of specific ICT tasks but of entire processes and operational environments. The term outsourcing is often used generically to refer to a variety of arrangements. Some outsourcing contracts involve transferring the management of entire ICT operations to an ICT service provider. Such outsourcing models, collectively referred to as holistic outsourcing, are underpinned by long-term agreements that run between 5 and 10 years and are often accompanied by complex, stringent contractual terms. Such agreements are risky for the customer organization, as they significantly increase its dependence on a single provider.

The complexity of the model and the risks related to provider lock-in deter many companies from entering into holistic outsourcing contracts. Many opt to break them up into smaller outsourcing projects. Services offered through such contracts have come to be known as managed services, and they typically address specific components of an organization's ICT operations.

Managed Services

Managed services typically involve a one- to five-year contractual arrangement in which a service provider takes responsibility for managing part of an organization's

ICT infrastructure, applications, or operations. They are essentially mini-outsourcing contracts that can be delivered either onsite, by deploying ICT personnel at the organization's premises, or in an automated and remote manner, in which case the service is hosted and delivered from the provider's datacenter. They are also more cost-effective for organizations given that technical experts and infrastructure are shared among several organizations.

Managed services differ from holistic outsourcing in a number of ways. They do not usually include the transfer of ICT assets or personnel to the provider and, as mentioned above, typically run for a shorter period than outsourcing contracts (see Table 1). Examples of managed services include the management of LAN/WAN environments and the maintenance and management of ERP applications.[3]

Table 1: Comparison of Datacenter Services, Managed Services, and Holistic Outsourcing

	Datacenter Services	Managed Services	Holistic Outsourcing
Contract Length	Medium (1–3 years)	Medium (1–5 years)	Long (10+) years
Value of Contract	Medium to High	Medium to High	Very High
Delivery (Onsite, Remote, Both)	Remote	Both	Both
Hosted in a Third-Party Datacenter	Yes	Yes	Occasionally
People & Asset Transfer	No	Rarely	Yes
Levels of Automation	High	Medium	Low

Low	**Complexity**	High

As demand for managed services grew, providers began exploring means to automate delivery in order to optimize costs, improve efficiency, and reduce dependency on human resources. For example, they started investing in datacenters for the purposes of hosting and delivering these services. In addition to providing remote services, these datacenters typically host websites, applications, and hardware infrastructure for client organizations. These services provide the foundation for the development of a datacenter services market.

Datacenters and Datacenter Services

An organization's datacenter facility is a controlled physical environment for storing and managing its servers, networks, and other computer equipment. In a small organization, a datacenter may be just a small "closet" that houses a single server and network patch panel. In larger organizations, on the other hand, a datacenter generally includes a raised floor space that houses most of the organization's ICT systems and supports enterprise-wide operations. Datacenters are usually classified according to the way they

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3 More detailed definitions of different managed services can be found in Appendix B.

are designed and built. The Uptime Institute[4] categorizes datacenters into four tiers (1–4). These tiers signify the varying levels of redundancy and availability of data within a datacenter, with Tier 4 being the highest level.

Datacenters can also be classified based on ownership into captive and non-captive. Captive datacenters are owned and operated by an organization to support its own activities. These can be managed and maintained by the organization's internal IT department, an ICT service provider, or a combination of the two. Non-captive datacenters are wholly outsourced. In the case of a non-captive datacenter, a service provider builds a datacenter and leases space to its client organizations, allowing them to host their applications and/or infrastructure without having to build their own (captive) datacenters.

The services offered by a provider from its datacenter are broadly referred to as datacenter services. They include the hosting of servers, storage devices, applications, content, and networking equipment. The most common types of datacenter services are co-location hosting (sometimes referred to as housing services), managed hosting, webhosting, and hosted application services.[5] Demand for datacenter services has experienced rapid growth, globally and locally, due to an increasing number of organizations looking to avoid the high capital outlays and operational costs involved in building and operating self-owned datacenters.

1.1.3 PHASE 3: AUTOMATED AND SCALABLE CLOUD SERVICES

In the global context, ICT services are entering a new phase of maturity that promises to provide even greater efficiency, automation, and scalability. This phase is characterized by the emergence of a new model, cloud services, that takes the concept of packaged, standardized, and outsourced services to the next level by enabling the delivery of these services from the cloud. Similarly to managed and datacenter services, cloud services are delivered from a datacenter and offer an alternative to the traditional onsite ICT services model. The characteristics that set it apart from hosted and managed services are a higher level of automation, self-provisioning capability (under which the user can procure services online without manual intervention), and a pay-per-use billing model.

Types of Cloud Services

• **Public Cloud Services:** A one-to-many model in which services are delivered by a provider to a large number of clients.

• **Private Cloud Services:** A model in which the cloud is deployed within the private environment of the organization; the services provided are designed specifically for its needs and are limited to its own users.

• **Hybrid Cloud Services:** A combined approach in which the organization consumes some services from an internal private cloud and others from an external public cloud owned by a provider.

Cloud services can also be categorized in terms of the technology on which the service is based. Here, again, are three main types:

• **Software as a Service (SaaS):** This enables users to rent software from a provider on a pay-per-use basis. The provider hosts the software on central servers and delivers it as a service over the internet (public) or intranet (private).

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4 http://uptimeinstitute.com/publications#Tier-Classification
5 More detailed definitions of datacenter services can be found in Appendix B.

- **Platform as a Service (PaaS):** This provides a development platform for software developers through which they can write code that is then uploaded to and compiled on the provider's server. PaaS is typically utilized to develop, test, deploy, host, and maintain applications in an integrated development environment.

- **Infrastructure as a Service (IaaS):** This allows users to rent computing infrastructure, such as server and storage capacity, on a pay-per-use basis.

1.2 OVERVIEW OF THE DATACENTER, MANAGED, AND CLOUD SERVICES MARKET IN SAUDI ARABIA

Datacenter, managed, and cloud services are the fastest-growing segments in the Saudi ICT services market. Spending on datacenter services amounted to SAR 609 million in 2014, while spending on managed services was SAR 912 million. Comparatively speaking, spending on public cloud services was low last year, at SAR 189 million. While the overall ICT services market is forecast to expand at a CAGR of 12.4% through 2019, the datacenter, managed, and cloud services market segments are expected to grow far more rapidly over that period, at CAGRs of 13.4%, 18.2%, and 36.6%, respectively. While the overall ICT services market is predicted to reach SAR 19.9 billion, the contribution of these market segments will increase significantly by the end of 2019, surpassing SAR 1.1 billion, SAR 2.1 billion, and SAR 898 million, respectively, as illustrated in Figure 2.

Figure 2: Datacenter, Managed, and Cloud Services 2011-2014 Market Size and 2015–2019 Forecast[6]

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Cloud Services	40	63	131	189	290	426	614	741	898
Managed Services	587	665	775	912	1,090	1,299	1,537	1,800	2,101
Datacenter Services	412	434	525	609	711	824	939	1,044	1,143

■ Datacenter Services (SAR Million)   ■ Managed Services (SAR Million)   ■ Cloud Services (SAR Million)
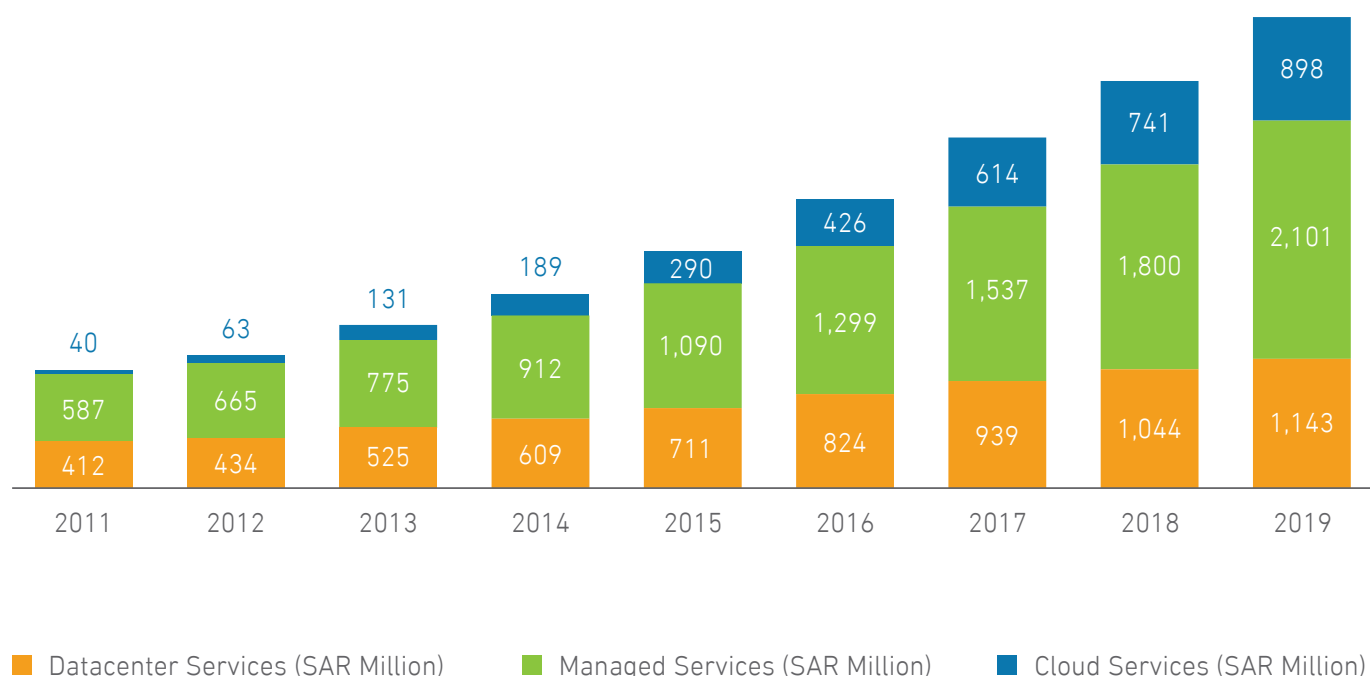
6 CITC Datacenter, Managed Services, and Cloud Survey, 2015, research based on information and data gathered through interviews with datacenter, managed, and cloud service providers (see Appendix A for more details).

2 DATACENTER, MANAGED, AND CLOUD SERVICES: ATTITUDES AND USAGE IN SAUDI ARABIA

2.1 INTRODUCTION TO ADOPTION TRENDS FOR DATACENTER, MANAGED, AND CLOUD SERVICES

Recent research conducted by CITC shows that the datacenter, managed, and cloud services market in Saudi Arabia is on a growth trajectory; however, the adoption level is still behind more mature ICT markets, such as the U.S. or Western European countries.

The decision to outsource to a datacenter, managed, or cloud services provider is typically driven by the need to reduce costs and improve operational efficiency, as well as by the desire to outsource functions that are considered non-critical to the organization's capabilities or not core to business operations. By using these services, organizations also gain immediate access to the latest ICT technologies.

Datacenter, managed, and cloud services in emerging countries have additional drivers, namely the need to address the shortage of technical skills and lack of adequate infrastructure. Many organizations see outsourcing as a practical means of overcoming these challenges. It is important to understand that the adoption of these services is not uniform across emerging economies; trends vary from country to country. Adoption is often highly dependent on supply-side factors, including the availability of commercial datacenters, the managed and cloud services offerings, the quality and cost of bandwidth, and the competition within the provider landscape.

Currently, business-continuity and disaster-recovery imperatives are also driving the adoption of these services in mature and emerging ICT markets. Ideally, disaster-recovery systems should be hosted in a separate location from the main systems and connected through a network that offers redundancy. However, owning two datacenters to facilitate this structure would be very expensive; therefore, organizations prefer to locate their disaster-recovery system in a facility owned by a datacenter provider.

2.2 ADOPTION OF DATACENTER, MANAGED, AND CLOUD SERVICES IN SAUDI ARABIA

In order to assess the current state of adoption and usage of datacenter, managed, and cloud services, CITC conducted an extensive study among Saudi organizations in the public and private sectors. This survey focused on penetration and usage rates, usage patterns, and the key drivers of and inhibitors to adoption.

In this study, CITC surveyed 780 organizations—all with at least an internet connection—and conducted in-depth discussions with another 206 organizations. It also conducted 19 in-depth interviews with various service providers and ICT influencers and enablers, such as large datacenter owners, regulators, and government stakeholders. The results of the survey were compared to the outcomes of a similar survey conducted in 2011, when CITC surveyed 1,048 organizations, and conducted in-depth interviews with 321 of these organizations, along with 26 service providers, ICT influencers and other stakeholders. More details about the research methodology can be found in Appendix A.
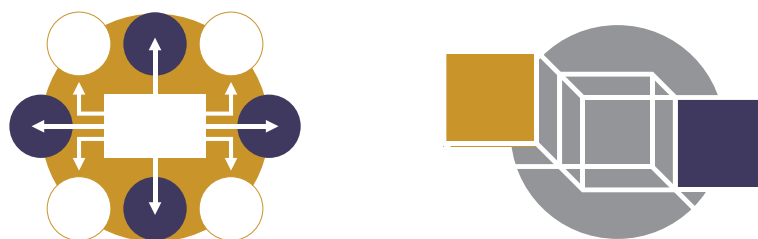
2.2.1 CO-LOCATION[7]

The survey found that 80% of Saudi organizations have installed servers, compared to 72% in 2011. The majority of these companies (93%) use very basic facilities, such as server closets and server rooms, to house them. Only 7% of Saudi organizations have built full-fledged datacenters[8] to house their ICT systems; however, CITC expects this figure to rise over the next few years, as an increasing number of organizations shift from decentralized, silo-based ICT operations to a centralized model wherein ICT systems are concentrated in centralized datacenters. The growing need for server and data storage capacity is driving this trend.

The survey results show that most organizations in Saudi Arabia currently prefer to have direct, internal control over the operation of their datacenters. They are reluctant to place their servers in a commercial datacenter or to co-locate their systems. Only 3% of the respondents have co-located their servers in a commercial datacenter; however, 25% of the respondents rely on ICT service providers to manage their server infrastructure—this represents a 10% increase over the last four years. High prices, low service quality, security issues, and concerns about loss of control all act as inhibitors to adoption. These inhibitors and challenges are described in more detail in Section 2.3.

However, adoption is picking up, driven mainly by the opportunity to gain access to a more advanced infrastructure: almost one-half (47%) of the respondents cite the utilization of a higher-quality (higher-tier) datacenter as one of their top three drivers for choosing to locate their servers in a commercial datacenter. Better datacenter internet connectivity is seen as a driver for 39% of those surveyed, and almost one-third (31%) of the organizations believe that co-location would allow them to keep up with the latest technology trends. While in 2011 the need to address a lack of internal skills was the top reason for co-locating cited by one half (50%) of the respondents, this number decreased to 24% of the organizations in 2015. The lack of internal skills is still a significant problem for many organizations, however, as IT managers are becoming better educated about the benefits of co-location, infrastructure factors are gradually gaining importance.

2.2.2 DATACENTER SERVICES

The survey shows that email, application, and web hosting are the datacenter services that most organizations currently use. Infrastructure services, such as dedicated server, managed server, and storage hosting services, while not used as widely, are expected to show the highest growth in adoption over the next three years. Business-continuity and virtual private server services are currently at the bottom of the usage list; however, CITC expects rapid growth in these services over the next few years as well (Figure 3).

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7 The definition of co-location can be found in Appendix B
8 CITC Datacenter, Managed Services, and Cloud Survey, 2011 and 2015

Service	Used in 2011	Currently Use	Plan to use within 3 years
Business Email	26%	55%	7%
Hosted Applications	16%	31%	14%
Web Hosting	20%	24%	19%
Dedicated Server	14%	20%	35%
Storage	14%	16%	24%
Managed Server/Storage Devices Hosting	10%	12%	32%
Virtual Private Server	8%	10%	19%
Business Continuity/Disaster Recovery	4%	8%	21%
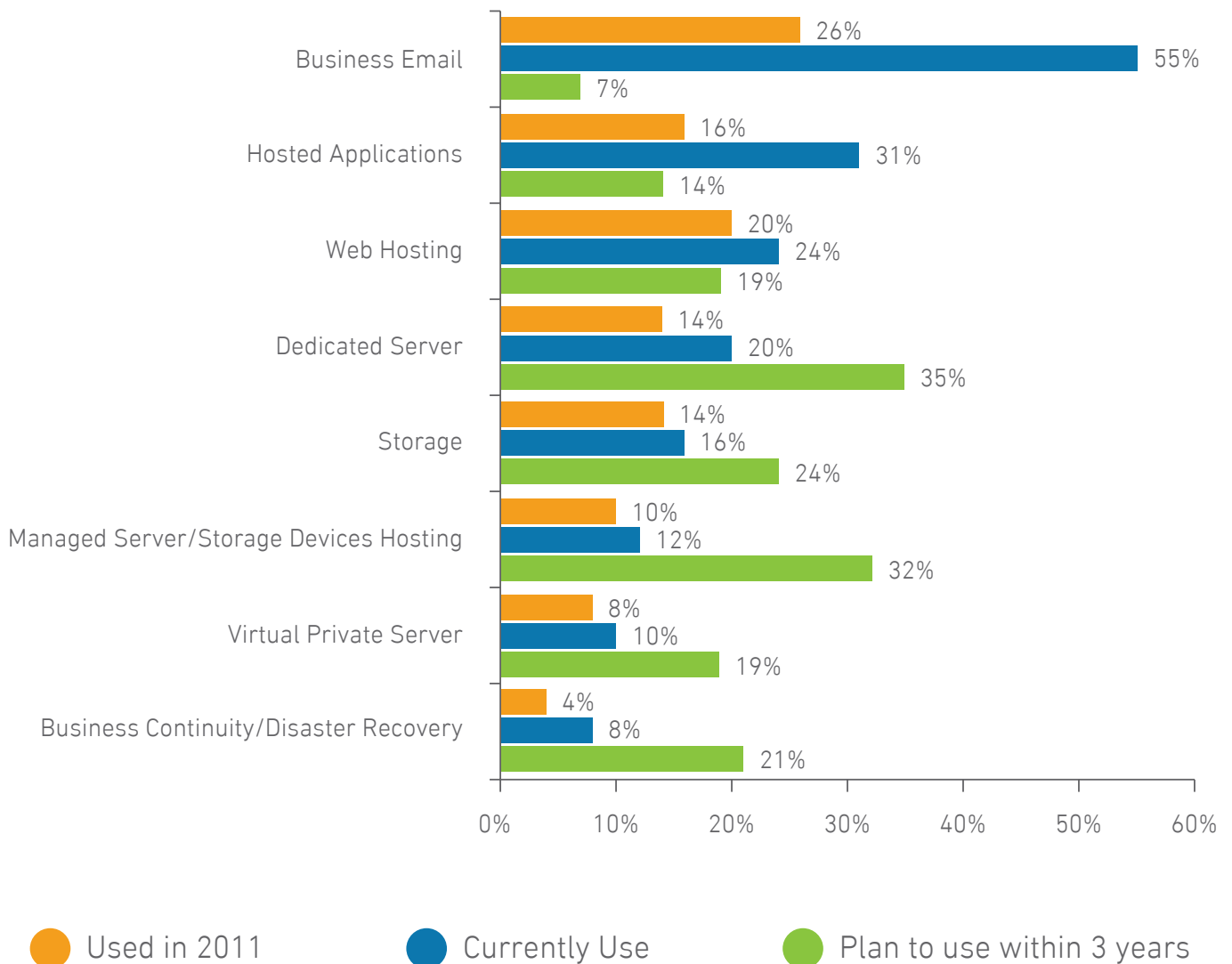
Percentage of of internet-enabled organizations that
are using or plan to use datacenter services

As cited by 47% (see Figure 4) of the surveyed respondents, the primary driver for organizations to utilize these services is the need to keep pace with technological change. A notable trend can be observed in the IT security area: more secure IT infrastructure as a key driver is cited by 37% of respondents in 2015 compared to only 15% of organizations in 2011. Other key drivers are the need for better deployment of IT resources (26%) and moving from a CAPEX to an OPEX model (24%).

9 CITC Datacenter, Managed Services, and Cloud Survey, 2011 and 2015

Figure 4: Drivers for Utilizing Services Delivered from a Commercial Datacenter[10]

Keeping up to date with latest technology — 47% (Declared in 2015), 42% (Declared in 2011)

More secure IT infrastructure — 37% (Declared in 2015), 15% (Declared in 2011)

Faster deployment of IT resources — 26% (Declared in 2015), 36% (Declared in 2011)

Reduce CAPEX and move to OPEX — 24% (Declared in 2015), 19% (Declared in 2011)

Reduction of IT staff headcount — 20% (Declared in 2015), 14% (Declared in 2011)

Better connectivity — 19% (Declared in 2015), 17% (Declared in 2011)

Reduce total cost of ownership (TCO) — 17% (Declared in 2015), 26% (Declared in 2011)

Lack of internal skills — 13% (Declared in 2015), 21% (Declared in 2011)

Lack of budget to build an internal datacenter — 13% (Declared in 2015), 19% (Declared in 2011)

Flexible payment options (pay for what you use) — 11% (Declared in 2015), 14% (Declared in 2011)

● Declared in 2011   ● Declared in 2015

Percentage of of internet-enabled organizations that are using or plan to use datacenter services

2.2.3 MANAGED SERVICES

Among the organizations that use managed services, most prefer to use services related to desktops, storage, applications, and network management (Figure 5). The management of desktops requires a greater number of resources but relatively less specialization, while managing other ICT systems requires more specialized skills. Managed services can address these challenges effectively. Furthermore, as the complexity of ICT operations increases, organizations are beginning to procure sophisticated services such as security, unified communications, business continuity, and disaster recovery as managed services.

10 CITC Datacenter, Managed Services, and Cloud Survey, 2011 and 2015

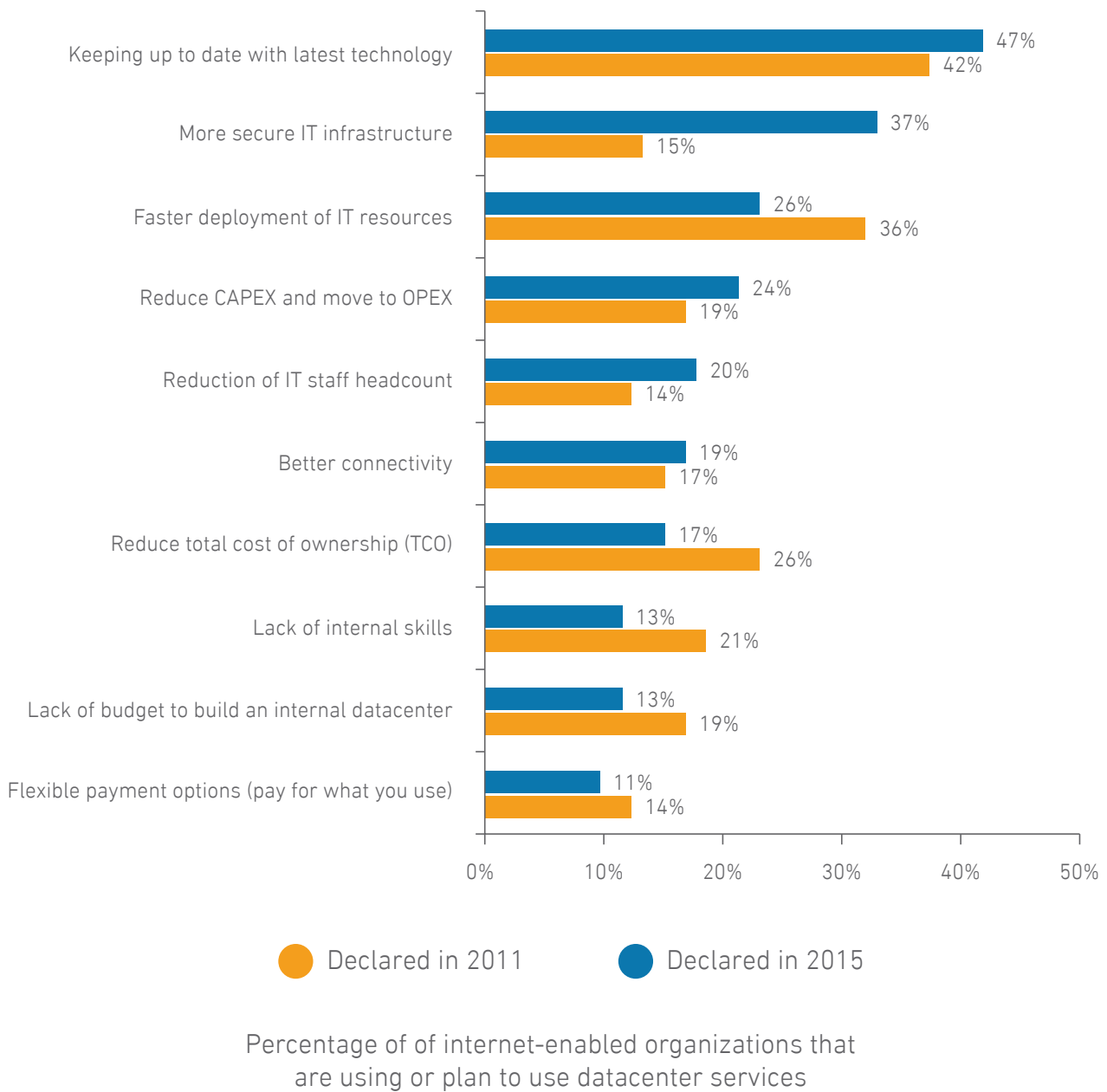*Figure 5: Managed Services Currently Being Used or Considered for Use*[11]

Desktop/PC Management
- 8%
- 19%
- 30%

Applications Management
- 5%
- 18%
- 21%

Managed Storage
- 6%
- 16%
- 31%

Managed Network
- 6%
- 15%
- 20%

Managed Business Continuity/Disaster Recovery
- 2%
- 13%
- 23%

Managed IT Security
- 4%
- 11%
- 31%

Managed Server
- 3%
- 11%
- 21%

Managed Unified Communications
- 4%
- 10%
- 19%

● Used in 2011   ● Currently Use   ● Plan to use within 3 years
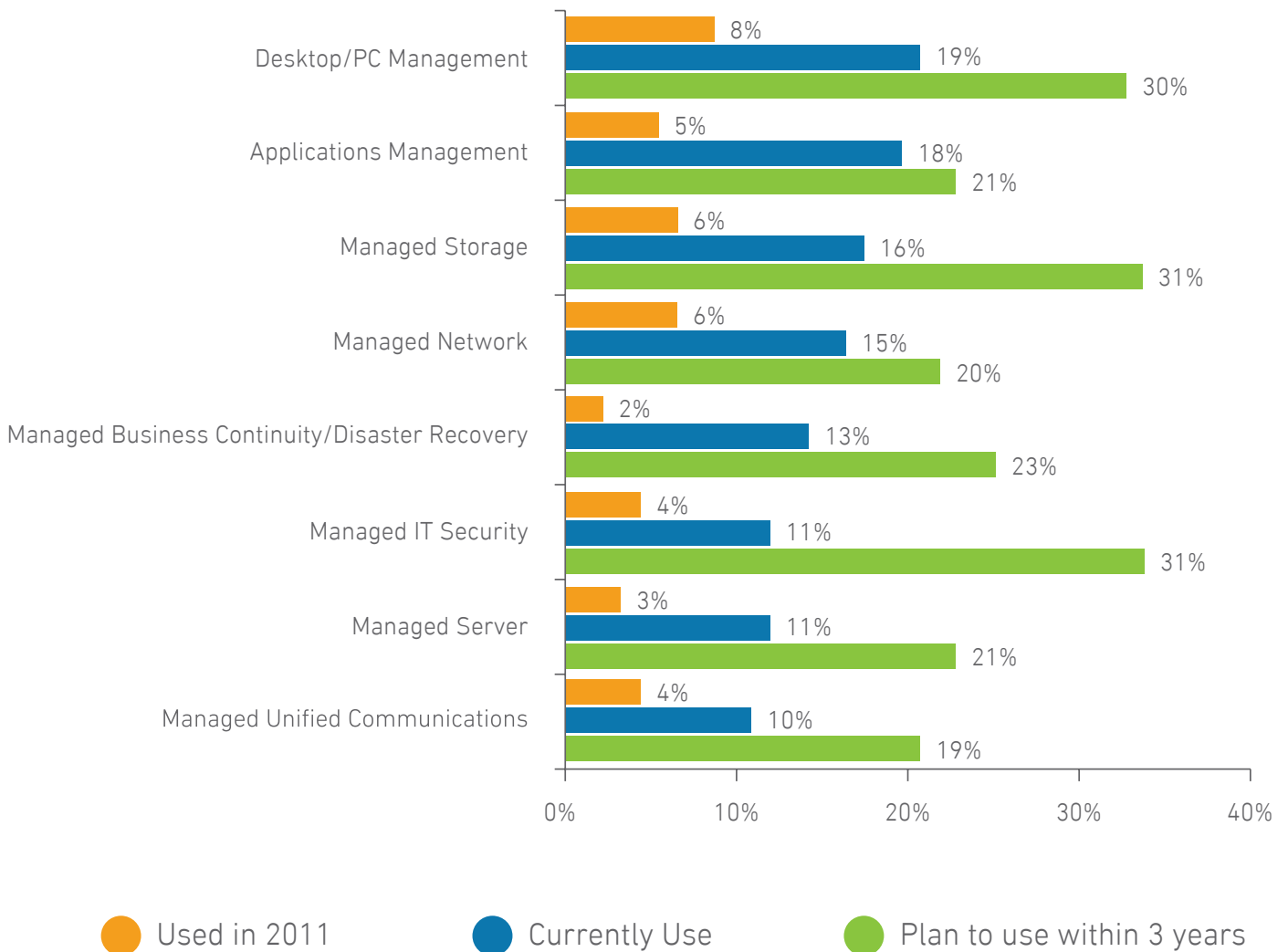
Percentage of internet-enabled organizations that are using or plan to use managed services

Managed services have proven to be a more popular form of outsourcing in Saudi Arabia. Several factors have contributed to the rise in demand for these services, especially the increasing approval of outsourcing the management of non-core business functions. Almost one-half (46%) of the surveyed organizations cited this as one of the reasons for utilizing managed services (see Figure 6). Additionally, as with datacenter services, organizations recognize that managed services can help them keep pace with the latest technologies (46% mentioned this as one of their main reasons for using managed services).

Another reason for the increase in demand is that many organizations perceive managed services as a means to address the twin challenges of increasing complexity and spiraling costs. The demand for managed services increases as users gain confidence in the security of the services offered.

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11 CITC Datacenter, Managed Services, and Cloud Survey, 2011 and 2015

Figure 6: Drivers for Utilizing Managed Services[12]

Driver	Declared in 2015	Declared in 2011
Decision to concentrate on our core business	46%	52%
Keeping up to date with latest technology	46%	37%
Improve performance of IT infrastructure	29%	29%
Reduce CAPEX and move to OPEX	28%	11%
More secure IT infrastructure	28%	26%
Reduction in IT budget	27%	28%
Flexible payment options (pay for what you use)	18%	14%
Reduce total cost of ownership (TCO)	18%	17%

Declared in 2011   Declared in 2015

Percentage of organizations using or planning to use managed services

2.2.4   CLOUD SERVICES

Cloud computing in Saudi Arabia moves from the "hype" to the "test" phase. Among the cloud service users in Saudi Arabia, most prefer SaaS (21% of organizations as displayed in Figure 7), which is in line with global trends. It is often the most easily understood type of cloud service, and the most mature of the different cloud services available. Popular types of SaaS include email, finance and accounting, human resource management (HRM), customer relationship management (CRM), and security.

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12 CITC Datacenter, Managed Services, and Cloud Survey, 2011 and 2015

Figure 7: Cloud Services Currently Being Used or Considered for Use[13]

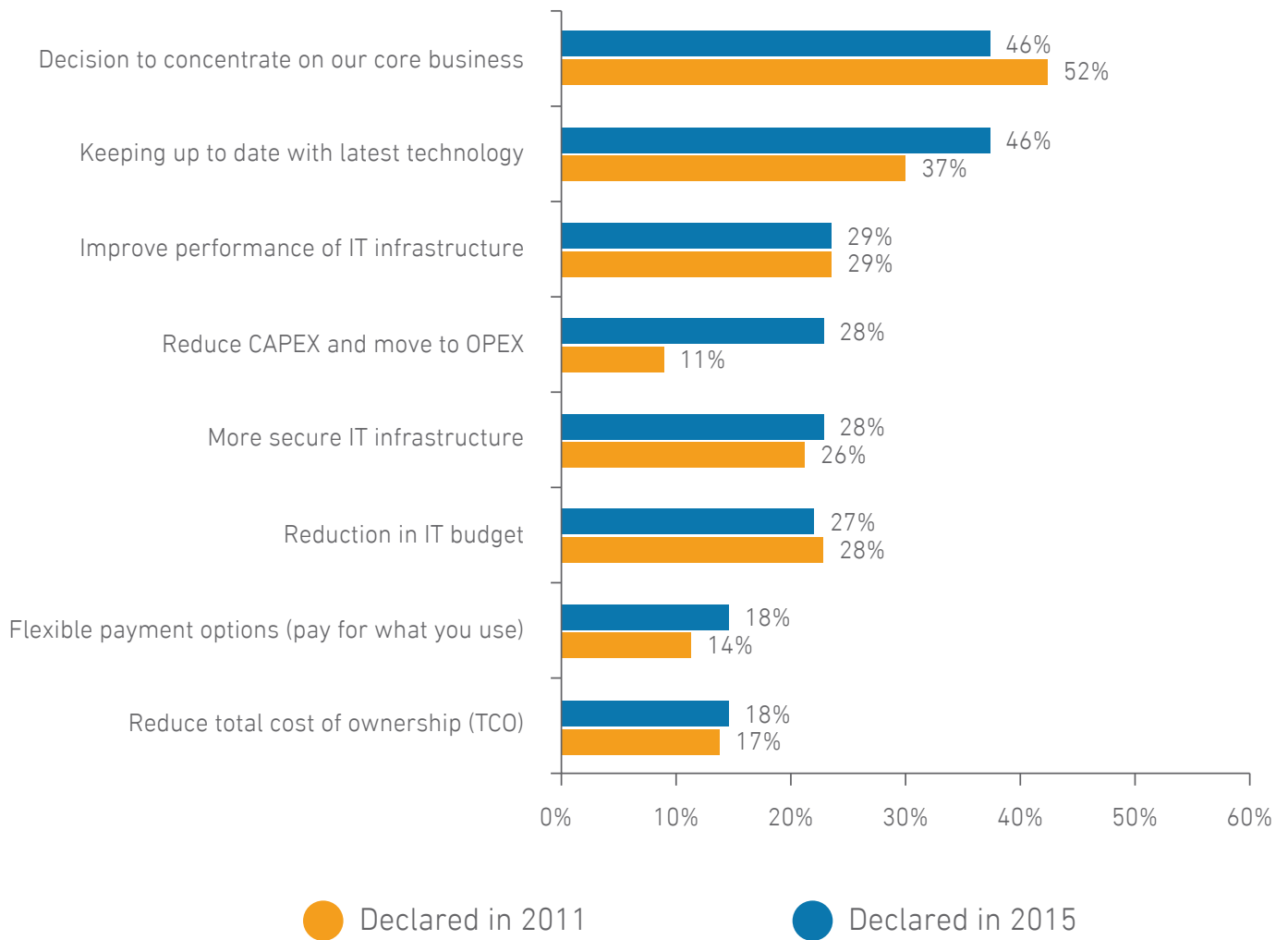|	
IaaS	4% / 9% / 27%
SaaS	5% / 21% / 19%
PaaS	1% / 5% / 5%

Used in 2011   Currently Use   Plan to use within 3 years
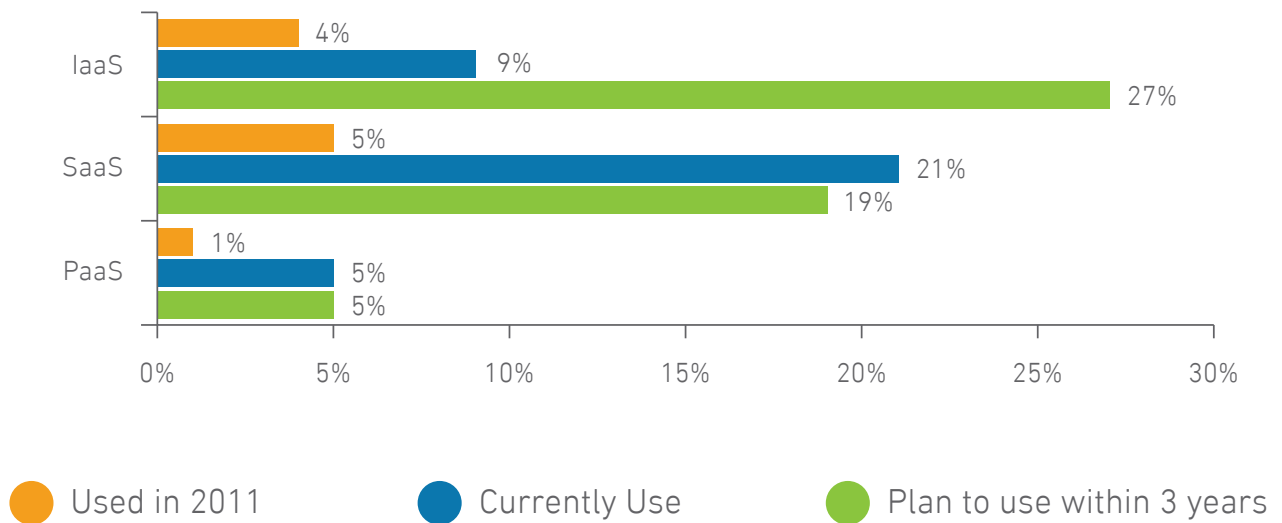
Percentage of of internet-enabled organizations that are using or plan to use cloud services

IaaS is currently used by 9% of organizations but represents the fastest-growing service type. It enables users to purchase computing infrastructure on demand in a very cost-effective, efficient manner without having to buy and physically install hardware. Users are also able to scale up or down as needed, and they only pay for what they actually use.

PaaS currently has the lowest adoption among various cloud service types (5% of organizations), but it has enormous potential as it offers a very cost-effective platform for developing and delivering software applications.

The key drivers behind the adoption of all three types of cloud services are cost savings and efficiency gains. Cloud services are, in general, significantly more cost effective than other types of ICT services because they are highly automated. This makes them very easy to deploy; business users can provision them as needed, with little or no intervention from the provider (this is known as self-provisioning). This can be very beneficial in the Kingdom, where advanced technical skills are lacking.

Currently, the cloud service provider ecosystem in Saudi Arabia is on a growth trajectory with multiple local providers either providing or developing cloud services (see Chapter 3 for more details about the cloud provider landscape). The market is expected to mature as more service providers enter and existing providers introduce more sophisticated services. The maturing of the supply side will also lead to greater awareness of these services among organizations and, in turn, boost adoption and usage.

13 CITC Datacenter, Managed Services, and Cloud Survey, 2011 and 2015

2.3 INHIBITORS TO ADOPTION AND CHALLENGES IDENTIFIED BY USERS

In addition to the drivers of the utilization of datacenter, managed, and cloud services, CITC has identified four key inhibitors and challenges, which hamper further adoption of these services: the high price of services, fear of loss of control, security concerns, and substandard quality of services.

2.3.1 PRICING

While many organizations surveyed for this report have already recognized the cost benefits of using datacenter, managed and cloud services, a high proportion of them still identified the high price of services as a barrier to adoption.[14] This situation is not unique to Saudi Arabia: Organizations in emerging economies often complain of the high cost of services. The datacenter, managed, and cloud services ecosystem in countries with less mature ICT industries is characterized by fairly limited competition (with few providers), higher communications costs, and levels of adoption that have not yet reached critical mass. Early on, when the customer base is low, providers try to recoup their datacenter investments in the shortest possible time, and, as a result, charge more for their services. However, as adoption increases, they tend to drop prices as they achieve greater economies of scale.

Pricing concerns are further complicated by the lack of price transparency among providers. Most services offered are highly customized, often with very little consistency in packaging and pricing, making it very difficult for customers to compare offerings from different providers. As competition intensifies, price transparency is expected to improve. Constantly decreasing connectivity prices will also support more attractive price packages.

2.3.2 LOSS OF CONTROL

Outsourcing datacenter, managed, and cloud services will require organizations' IT departments to give up some control. Customers must weigh the many benefits against this loss of control when making the decision to adopt these services. This mindset is likely to be eliminated as organizations become more familiar with the datacenter technology and process standards employed by providers and learn of the true risks related to the procurement of datacenter, managed, and cloud services.

2.3.3 SECURITY CONCERNS

Fear of loss of control is often linked to security concerns that can lead to strong objections to outsourcing. An investigation of security concerns as an inhibitor revealed that these concerns were related to data misuse by the datacenter provider's employees, and security vulnerabilities in the infrastructure (including data connections and datacenter infrastructure). Other security issues (viruses, malicious software, and physical security) are less important.

Fear of loss of control and security concerns about remotely delivered services are commonly observed market inhibitors in both developed and emerging economies. However, the impact of these inhibitors on the adoption of datacenter, managed, and cloud services is relatively higher in less ICT-mature countries, including Saudi Arabia. Saudi-specific cultural factors (discussed in more detail in Section 4.2) contribute to the increased impact of these inhibitors.

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14 CITC Datacenter, Managed Services, and Cloud Survey, 2011 and 2015

An analysis of security concerns among organizations using datacenter or managed services yielded some surprising results. While some users realized that the level of security provided by service providers is better than their internal standards (see Figures 4 and 6), many non-users are reluctant to lose control of their data as they don't believe the data will be secure enough. Further analysis of the security perceptions of datacenter, managed, and cloud service users, and an explanation of the controversial perception among non-users and users is provided in Section 4.4.

2.3.4   QUALITY OF SERVICES

The perception of Saudi organizations is that the general quality of datacenter and managed services is subpar and inadequate for the price paid. Some users expressed concerns over the failure of providers to meet service-level agreements (SLAs). As Figure 8 displays, substandard service quality is the key challenge highlighted by 37%, and not adhering to SLAs by 29%, of the organizations using managed services. In addition, 27% of the companies currently using any form of datacenter services complain about poor customer support from their service provider (Figure 9).

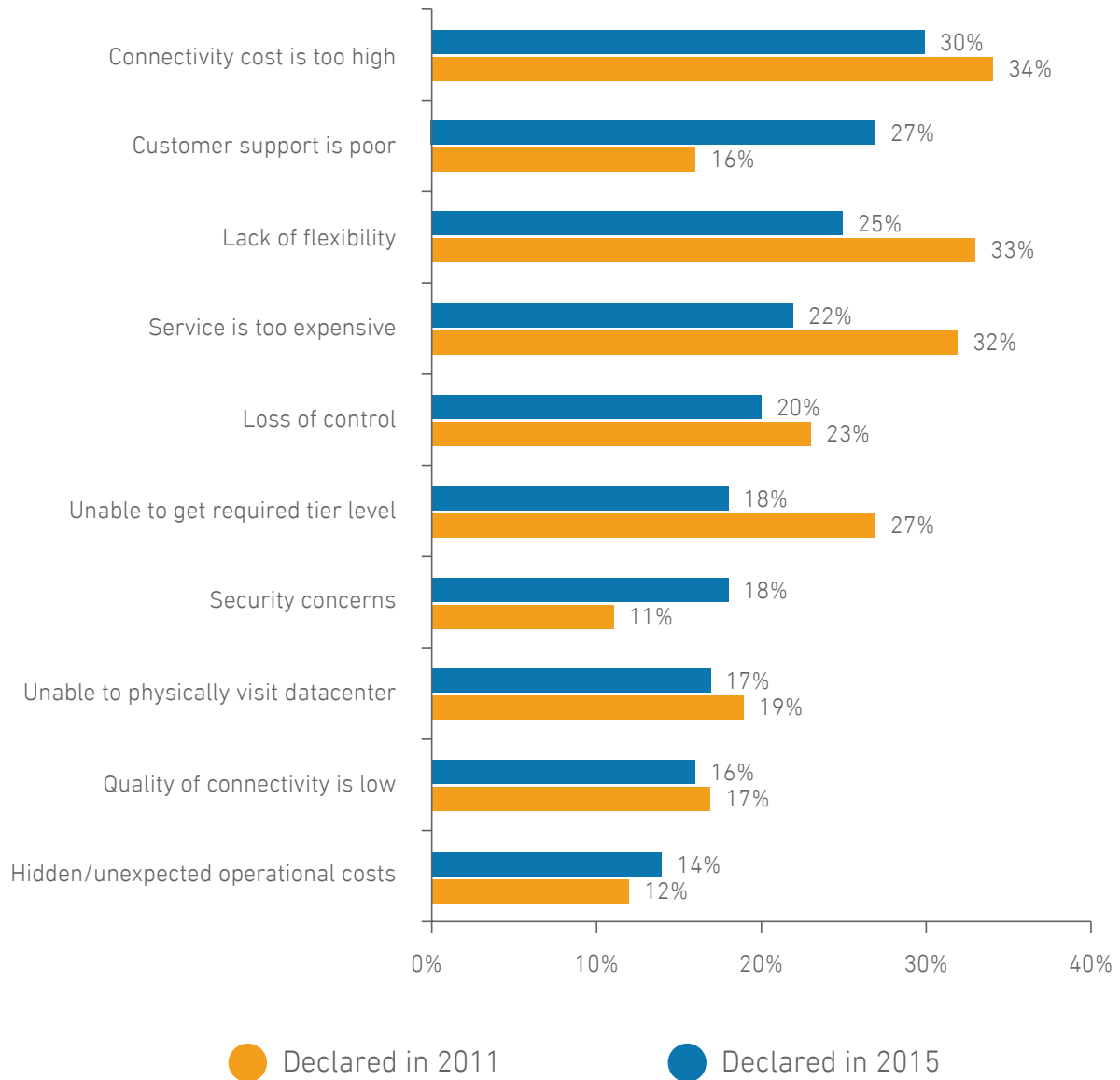*Figure 8: Organizations' Complaints about Managed Service Providers*[15]
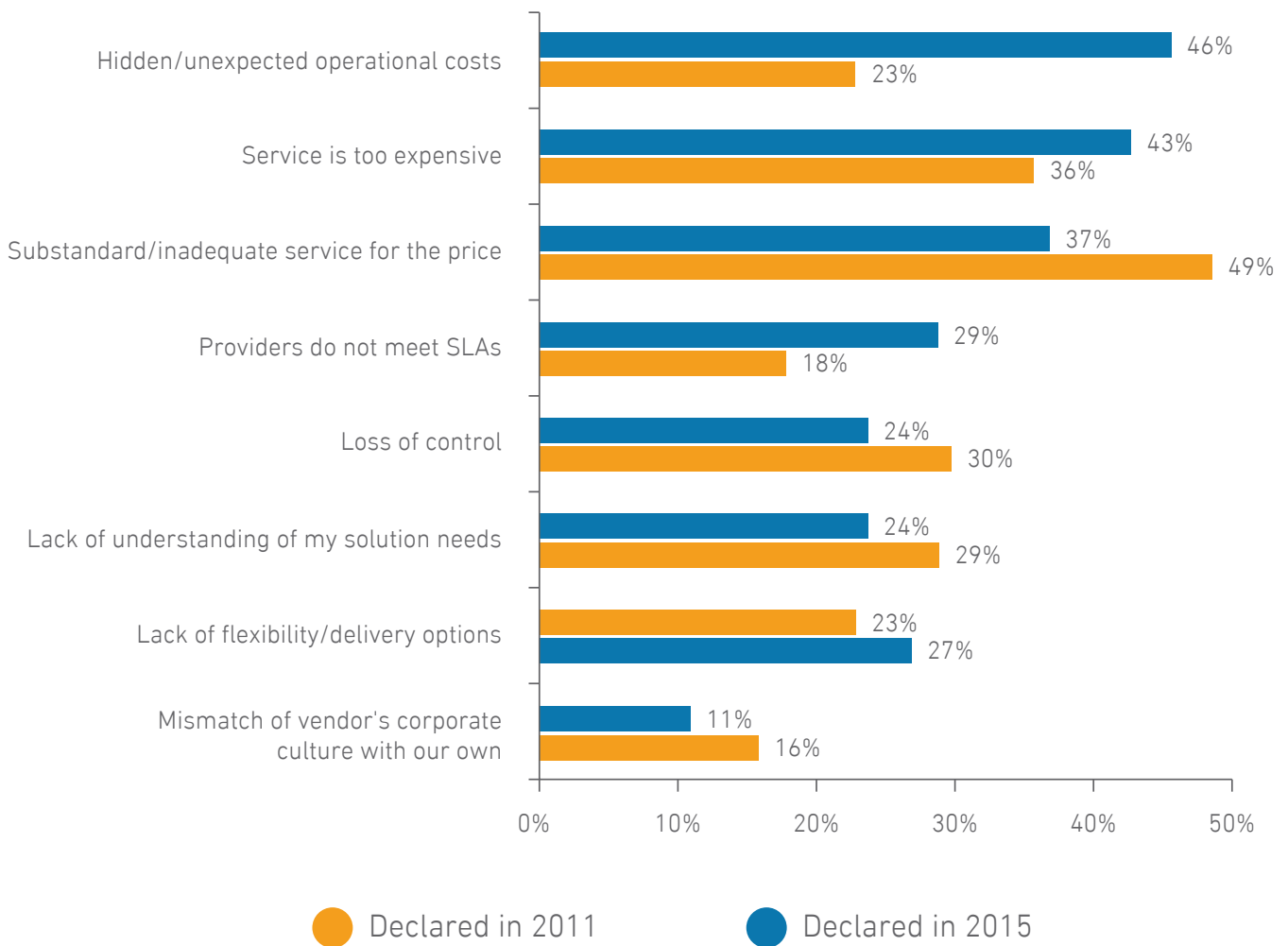
Percentage of organizations using any form of managed services
and reporting this area as a challenge

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15 CITC Datacenter, Managed Services, and Cloud Survey, 2011 and 2015

As competition among providers intensifies, prices are likely to fall and customers are likely to demand a better quality of service. Likewise, as the market matures, CITC expects the quality of the provided services to improve gradually. This is consistent with the trend in other countries, particularly maturing ICT countries such as South Africa, the Czech Republic, and Singapore, where intensified competition has resulted in lower prices and better quality of services which, in turn, has increased the adoption and usage of services.[16]

Figure 9: Organizations' Complaints about Datacenter Service Providers[17]

	Declared in 2011	Declared in 2015
Connectivity cost is too high	34%	30%
Customer support is poor	16%	27%
Lack of flexibility	33%	25%
Service is too expensive	32%	22%
Loss of control	23%	20%
Unable to get required tier level	27%	18%
Security concerns	11%	18%
Unable to physically visit datacenter	19%	17%
Quality of connectivity is low	17%	16%
Hidden/unexpected operational costs	12%	14%

Percentage of organizations using any form of datacenter services and reporting this area as a challenge

16 A detailed definition of SLAs and an overview of typical SLA components can be found in Appendix B.
17 CITC Datacenter, Managed Services, and Cloud Survey, 2011 and 2015

2.4 SUMMARY AND FUTURE OUTLOOK

Datacenter, managed, and cloud services are driving evolution in the ICT industry. The Saudi ICT service provider ecosystem is developing rapidly, and this will help to fuel growth in the ICT services industry, resulting in better, cheaper, and higher-quality services for users in the Kingdom. It is critical for service providers to continue building awareness of the operational and financial benefits of these services, allay fears related to security and connectivity, and address concerns about high prices in order for the next level of adoption to take off.

A comparison of results of the surveys conducted by CITC in 2015 and 2011 yields interesting insights on the adoption of datacenter, managed, and cloud services in the Kingdom:

- ICT managers are now more aware of the potential benefits of adopting datacenter, managed, and cloud services. The 2011 survey results pointed to a lack of awareness of offerings available in the market and their benefits, and this was highlighted by ICT managers as a key inhibitor to adoption. In contrast, the 2015 survey results indicate that managers are now more aware and appreciative of the technological and cost benefits of these services. They see outsourcing as an effective way to counteract internal ICT skills shortages. Access to better ICT infrastructure, TCO optimization, and shift from a CAPEX-heavy to an OPEX-heavy model are increasingly becoming compelling value propositions for adoption.

- As organizations grow in size and maturity, they demand more services at higher quality levels from providers. During the early stages of market development, service providers invested heavily in datacenter infrastructure and services portfolios; however, as the market matures and the intensity of competition increases, providers tend to invest more in customer relationship management. Several providers interviewed by CITC for this report said that improving service quality and enhancing customer relationships are major priorities for them.

- Saudi organizations are becoming more familiar with internationally accepted ICT security standards. Security threats are a major inhibitor to the adoption of new technology for a large number of organizations. Many organizations are of the view that the ICT infrastructure of ICT service providers is more secure than their own. Certificates and procedures offered by some providers are quite advanced and superior to those employed internally by organizations.

Table 2 summarizes the key drivers and inhibitors related to the adoption of datacenter, managed, and cloud services in Saudi Arabia.

Table 2: Summary of Adoption Drivers and Inhibitors for Datacenter, Managed, and Cloud Services

Drivers	Inhibitors
• Desire to reduce the complexity of enterprise ICT environments, coupled with increasing demand for computing and storage capacity	• Security and data privacy concerns • High cost of top-quality network connectivity
• Desire of organizations to consolidate ICT infrastructure and improve cost efficiency	• Substandard quality of services and insufficient customer support
• Growing maturity of the provider ecosystem in the form of increased service availability and market development activities	• Lack of clear, transparent pricing models from providers and associated difficulties in comparing prices

3 PROVISION OF DATACENTER, MANAGED, AND CLOUD SERVICES IN SAUDI ARABIA

Global Trends: The Converging ICT Service Provider Ecosystem

Globally, the ICT service provider ecosystem is undergoing significant changes. In the past, service providers were easy to differentiate by the main technologies they implemented, operated, and supported. The most common types of global technology provider include, but are not limited to:

- **Independent software vendors (ISVs):** Companies specialized in designing, producing, and selling software and related services.

- **Multinational hardware vendors:** Companies specialized in designing, producing, and selling hardware and related services.

- **Systems integrators (SIs):** Companies specialized in designing, reselling, implementing, and supporting a variety of ICT solutions, including hardware, software, and networking.

- **Communications service providers:** Companies specialized in the electronic transmission of information and related services. These include telecommunications service providers (fixed and mobile), internet service providers, and providers of cable and satellite communication services.

Significant consolidation and convergence have occurred in the provider landscape in recent years, driven by two main factors. First, different types of technology provider are looking to gain greater market share and are building up their technology infrastructure and service portfolios accordingly. Whether through acquisitions, partnerships, or the establishment of new companies, most technology providers are looking to expand beyond their core business.

Second, as highlighted in Chapter 1, the way ICT services are delivered and consumed is evolving into a more automated and flexible model. This evolution is also driving changes in the ICT service provider landscape, as new channels of service delivery require far more integration than they did in the past. Datacenter, managed, and cloud services are highly dependent on a strong, robust communications network. They are also characterized by automated, integrated, and innovative ICT technologies, and as such, require software, hardware, and communications technologies to be converged and delivered effectively. A need for deeper integration is also driving this industry-wide consolidation and convergence. This is particularly true of communications service providers, which have invested aggressively in datacenter, managed, and cloud services, and can thus no longer be strictly defined as telecommunications providers, internet service providers, or satellite internet providers, but more accurately as ICT providers.

A new global services ecosystem is developing. In addition, new types of provider are emerging, including pure-play cloud providers (e.g., Google, Salesforce.com, and Amazon), datacenter providers (e.g., Savvis, Terremark, Equinix, and Rackspace), and ICT providers (e.g., Orange Business Services and BT Global Services). It is important to note that even with these new providers, the lines between provider categories are not definitive, due to a significant amount of crossover. It is likely that this blurring of borders will continue, resulting in a highly converged ICT ecosystem where traditional technology provider categories will no longer be relevant.

The Saudi Datacenter, Managed, and Cloud Service Ecosystem

This ICT ecosystem evolution has also taken place in Saudi Arabia. In line with global trends, different types of service provider are looking to diversify and are consequently reinventing themselves, bringing different services to the market and constantly moving forward. To date, communications service providers (particularly telecommunications providers), internet service providers, and satellite internet providers have been the most active. When it comes to datacenter, managed, and cloud services, the Saudi provider landscape is converging. The cloud market in Saudi Arabia is on a growth trajectory, and a number of companies offer cloud services, including one domestic pure-play cloud provider.

Table 3 lists some of the major providers of these services in the Kingdom:

Table 3: Key Datacenter, Managed, and Cloud Service Providers in Saudi Arabia (in Alphabetical Order)

Provider	Category	Datacenter, Managed, and Cloud Services Portfolio
Abdulla Fouad	Systems integrator	Managed services
Acxiom MENA	Systems integrator	Datacenter services (infrastructure hosting)
Detecon Al Saudia (DETASAD)	Communications	Managed services, datacenter services (infrastructure hosting)
EBTTIKAR	Systems integrator	Managed services
EJADA	Systems integrator	Managed services
Al Moammar Information Systems	Systems integrator	Managed services
EXA Serve	Hosting provider	Managed services, datacenter services (web hosting, infrastructure hosting, hosted applications)
Inteltec	Communications	Datacenter services (infrastructure hosting)
JCCS	Systems integrator	Managed services, datacenter services (web hosting, infrastructure hosting)
MDS	Systems integrator	Managed services
Mobily	Communications	Managed services, managed security services, datacenter services (infrastructure hosting, hosted applications), cloud services (Public cloud / Private Cloud services)
NashirNet	Hosting provider	Datacenter services (web hosting, infrastructure hosting, hosted applications)
Sahara Net	Communications	Datacenter services (web hosting, infrastructure hosting, hosted applications)
STC Advanced Solutions	Communications	Managed services, datacenter services (infrastructure hosting), cloud services (IaaS)
Synoptic	Systems integrator	Managed services
ITC	Communications	Datacenter Services (infrastructure hosting)
NourNet	Hosting provider	Datacenter services (web hosting, infrastructure hosting, hosted applications)

In the sections that follow, the Saudi ICT service provider landscape will be described and analyzed in more detail.

3.1 COMMUNICATIONS SERVICE PROVIDERS

In line with global trends, Saudi communications providers have started pushing a portfolio of datacenter, managed, and cloud services. These companies include telecommunications providers, ISPs, and other communications (such as satellite) providers.

- **Telecommunications providers:** This segment has been active, with Mobily and STC providing a broad range of datacenter and managed services that play to their strengths in networks, communications, and security. These portfolios are now expanding to include cloud services. Mobily in particular has launched a range of managed and cloud services, mainly by establishing and leveraging partnerships with global vendors like IBM (for private cloud services and managed services) and Virtustream (for public cloud services).

- **Internet service providers (ISPs):** Many ISPs in Saudi Arabia have also been diversifying their portfolios away from solely connectivity and internet services. For example, STC Advanced Solutions (formerly known as Awal IT Services) now has a specific focus on ICT and cloud services. Sahara Net and Nournet are other examples of ISPs that have expanded into datacenter services and have invested in the construction of new datacenters to position datacenter services within the local market.

- **Satellite internet providers:** Saudi Arabia has a number of satellite communications players to cater to the needs of various, often remote regions (e.g., oilfields). These providers are now offering a broader portfolio of ICT services. For example, Detecon Al Saudia (Detasad) and Inteltec started as satellite communications providers, but now both offer ICT services, specifically datacenter services, and have invested in Saudi-based datacenters to support the delivery of these services.

3.2 PURE-PLAY CLOUD PROVIDERS

To date, very few global pure-play cloud providers have focused aggressively and directly on the opportunities available in Saudi Arabia. However, some of these providers have made inroads through local and regional partners, which tend to help with business development, consulting, onboarding, and limited customer support, and play a vital role in education and market development. While limited uptake has occurred in Saudi Arabia so far, these partners are optimistic, given the high interest emerging among Saudi organizations for various cloud services. Key local partners for international pure-play cloud providers include FVC, SSBS and Rawan Company for Google, and Aphidas, NSI and Cloud Concept for Salesforce.

A testament to the expanding landscape for cloud is the fact that a domestic pure-play cloud provider, ClouDEX, is active in Saudi Arabia, having launched activities in 2011. ClouDEX is a joint venture of two companies, Detecon Al Saudia and EXA. This partnership enables the companies to combine EXA's experience in web hosting with Detecon Al Saudia's experience in telecommunications, datacenter, and ICT services. Together, they have introduced a range of cloud services targeting Saudi organizations.

3.3 HOSTING AND DATACENTER PROVIDERS

A number of global providers focus solely on offering hosting and datacenter services while expanding their service portfolios to include cloud services, thereby leveraging their existing datacenter infrastructures. These companies include Rackspace, Savvis, Equinix, and Terremark. Some (e.g., Equinix) are carrier-neutral, in that they support multiple internet service providers and operate essentially as datacenter

space wholesalers. Globally, many ICT service providers host within these wholesale datacenters. This enables them to provide datacenter, managed, and cloud services without having to outlay the heavy capital investment required to build their own datacenters. For carrier-neutral datacenters, wholesale providers enable them to utilize the services of multiple ISPs without being tied to a single provider, as would be the case with telecommunications providers or ISP hosting.

To date, these global providers have not invested in local datacenter infrastructure to support Saudi clients. Furthermore, the Saudi market remains dominated by local communications providers, and wholesale, carrier-neutral facilities are needed. As mentioned earlier, smaller ICT companies that do not have the necessary capital to invest in datacenter facilities often choose to host in third-party datacenters. Furthermore, they generally prefer to host in wholesale, carrier-neutral facilities rather than in those of communications providers.

Most datacenter providers in Saudi Arabia also have other focus areas. Nournet, Nashirnet and Saharanet, who have recently expanded their portfolios to include a wider range of datacenter services, still provide their traditional ISP portfolio of services. Mobily, through its partnership with global cloud providers like IBM and Virtustream, has developed a broader cloud service portfolio. Other local datacenter providers, like Detecon Al Saudia or Saudi Intl'tec offer VSAT satellite services, network integration services along with outside plant (OSP) engineering services.[18]

3.4   SYSTEMS INTEGRATORS

Datacenter services are often one component of systems integrators' broader service portfolio. In order to retain clients and keep up with newer service delivery models (such as datacenter, managed, and cloud services), many ICT service providers have either invested in their own datacenter infrastructure to support these services, or have partnered with a datacenter provider to offer a complete solution.

According to CITC's research (and as reflected in Table 3 above), most systems integrators in Saudi Arabia focus primarily on managed services. Very few of these providers have the datacenter infrastructure to support the remote delivery of services, and they thus tend to offer either purely onsite services, or in very few cases, a combination of remote and onsite managed services. These local providers include Jeraisy Computer & Communication Services Company (JCCS), Saudi Business Machines (SBM), MDS Arabia, Al Moammar Information Systems, EBTTIKAR and EJADA. Most of the systems integrators interviewed for this study claimed that their ability to offer onsite services is a competitive advantage. Most believe that Saudi organizations are not yet entirely comfortable with a completely automated and remote service delivery model, so their ability to be onsite is valued by their clients. When it comes to providing cloud services, most systems integrators in Saudi Arabia are focused on implementing a private cloud solution for their clients, where they are better equipped to leverage their skills in integration, virtualization, consulting, applications, and infrastructure for specific clients than to sell public cloud services to a broader spectrum of prospective customers.

18 OSP refers to the physical cabling and supporting infrastructure and any associated hardware.

3.5 SUMMARY AND FUTURE OUTLOOK

3.5.1 PARTNERSHIP

Datacenter, managed, and cloud services are highly automated and, as such, offer efficiencies of scale that traditional ICT services could never achieve. The challenge for service providers is that a significant upfront investment is required in order to build the back-end infrastructure and applications to support such a highly automated service environment. Providers that are able to leverage existing infrastructure (such as telecommunications providers, ISPs, pure-play providers, and datacenter providers) have a short-term competitive advantage, as the investment required could be prohibitive for ICT service providers that have focused on delivering traditional professional ICT services. However, the latter tend to have deeper relationships with their clients and more experience in delivering their services, and they have a competitive advantage in being able to offer a broader portfolio of services. Accordingly, partnerships between providers with strong ICT service skills and those with the infrastructure to leverage them are likely to accelerate in Saudi Arabia.
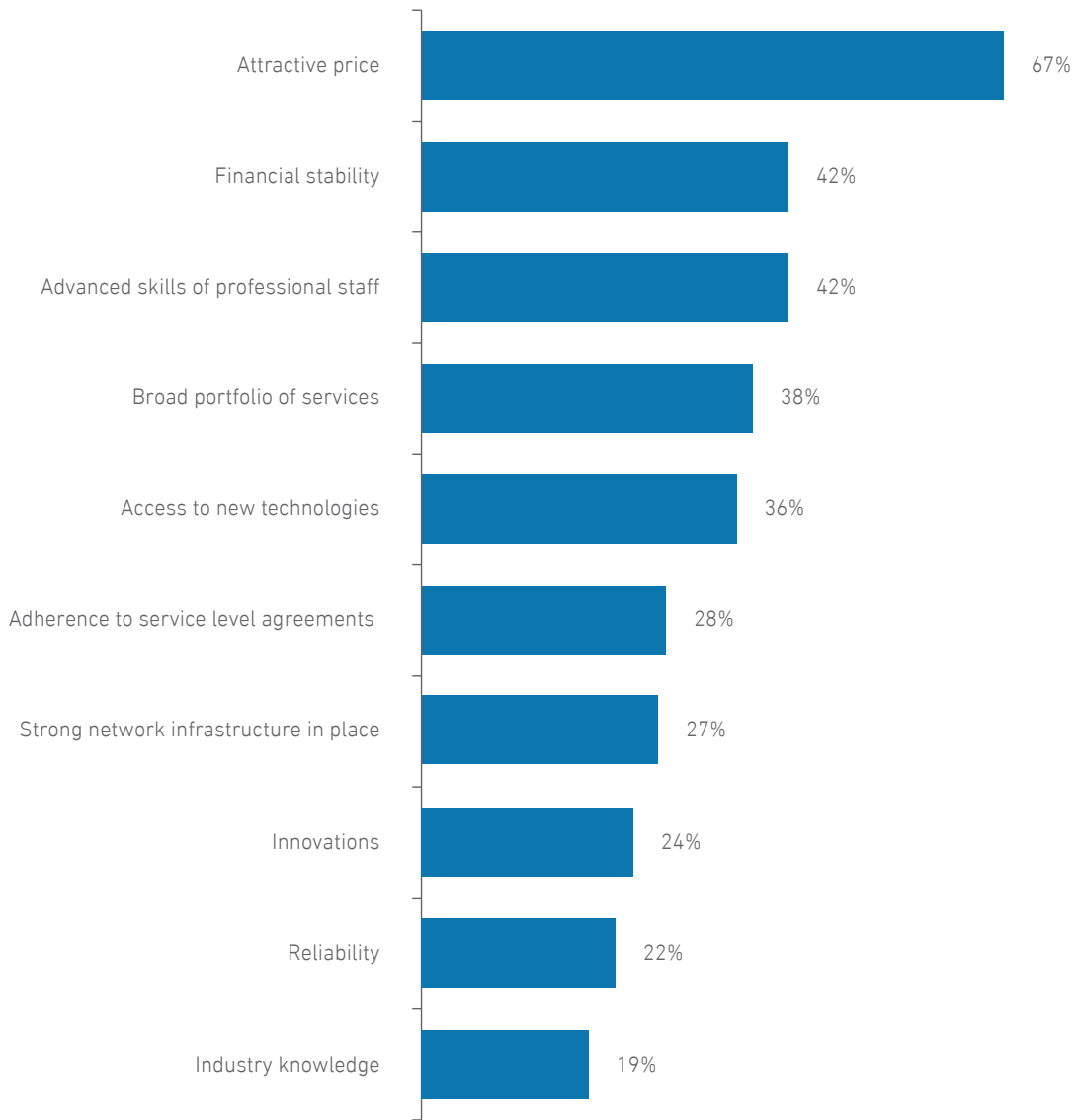
3.5.2 NEED FOR INCREASED AWARENESS

The datacenter, managed, and (especially) cloud services markets are still in the early stages of development in Saudi Arabia, where providers are testing their service portfolios. These early stages are characterized by low market awareness of solutions, technology, and provider availability. Substantial efforts are required to raise the awareness of available offerings and educate users on their potential benefits. The small and medium-sized business (SMB) segment, in particular, shows minimal levels of awareness due to relatively low ICT maturity among businesses in that segment. ICT service providers should, therefore, invest in their service portfolios and promote their solutions and the associated benefits more directly to SMBs. CITC is ready to assist local ICT providers in these endeavors; this report is an example of such assistance. CITC also supports the local ICT industry by promoting product and service portfolios in the ICT Companies Directory (available at ictdirectory.sa).

3.5.3 EXPECTATIONS FROM PROVIDERS

According to the findings from CITC's research (see Figure 10), pricing, financial stability, skills, broad portfolio of services and access to new technologies are all factors that Saudi organizations consider when looking for a provider of datacenter and managed services. In order to succeed, service providers will have to articulate the technical benefits and skills they offer, in addition to demonstrating their ability to provide services in a cost-effective and reliable manner.

Figure 10: Expectations from Datacenter or Managed Service Providers[19]

Attractive price	67%
Financial stability	42%
Advanced skills of professional staff	42%
Broad portfolio of services	38%
Access to new technologies	36%
Adherence to service level agreements	28%
Strong network infrastructure in place	27%
Innovations	24%
Reliability	22%
Industry knowledge	19%

Percentage of organizations considering individual factors

19 CITC Datacenter, Managed Services, and Cloud Survey, 2015

4 ENABLING DATACENTER, MANAGED, AND CLOUD SERVICES

While Chapter 2 analyzed different attitudes and usage patterns of the users of datacenter, managed and cloud services, and Chapter 3 discussed characteristics of the service provider landscape, this chapter examines a set of factors shaping the overall datacenter, managed and cloud services ecosystem affecting both the supply and demand sides.

4.1   ICT INFRASTRUCTURE

Datacenter, managed, and cloud service ecosystems cannot flourish without viable ICT infrastructures. The key elements of this infrastructure are reliable and cost-effective internet connections, high-quality datacenters, and cost-efficient and readily available ICT services.

In the past few years, ICT infrastructure in Saudi Arabia has shown tremendous growth and improvement. Fixed broadband subscriptions, including DSL, fixed wireless (Wimax), and other fixed lines, has tripled from 1 million in 2008 to more than 3 million in 2014, and 43.2% of households currently use fixed broadband. The number of internet users grew from 9.3 million in 2008 to 19.6 million in 2014, which represents 63.7% of the population.[20]

The impressive growth of ICT infrastructure in Saudi Arabia bodes well for the future adoption of datacenter, managed, and cloud services. This is particularly true for organizations with large and distributed networks and mobile workforces, as these organizations rely on a pervasive and extensive broadband network to ensure the delivery of these services to all locations. However, some areas still need improvement in order to ensure the healthy growth of the ecosystem.

4.1.1   COST OF CONNECTIVITY

While prices of mobile service packages in the Kingdom are lower than the average for Arab countries and among the lowest worldwide,[21] prices for fixed medium- and high-speed broadband in the Kingdom (over 15Mbps), while below the levels seen in other Arab countries, are three times higher than the Organisation for Economic Co-Operation and Development (OECD) average.[22] In general, lower connectivity costs increase the affordability, and hence the adoption of datacenter services. They also enable certain organizations, such as financial institutions, to connect a large number of sites and deliver connectivity-demanding services outside urban areas.

4.1.2   AVAILABILITY OF DATACENTER FACILITIES

A critical enabler for the adoption of datacenter, managed, and cloud services is the availability of high-quality, commercial onshore datacenter providers that lease space for datacenter services and provide back-end support for the delivery of managed and cloud services. Until recently, few such providers existed in Saudi Arabia, and that hampered the uptake of these services. However, recent investments into new datacenter capacity have improved the availability of commercial datacenter infrastructure. Telecom operators, in particular, have been at the forefront of expanding their datacenter footprint across Saudi Arabia by investing heavily in greenfield
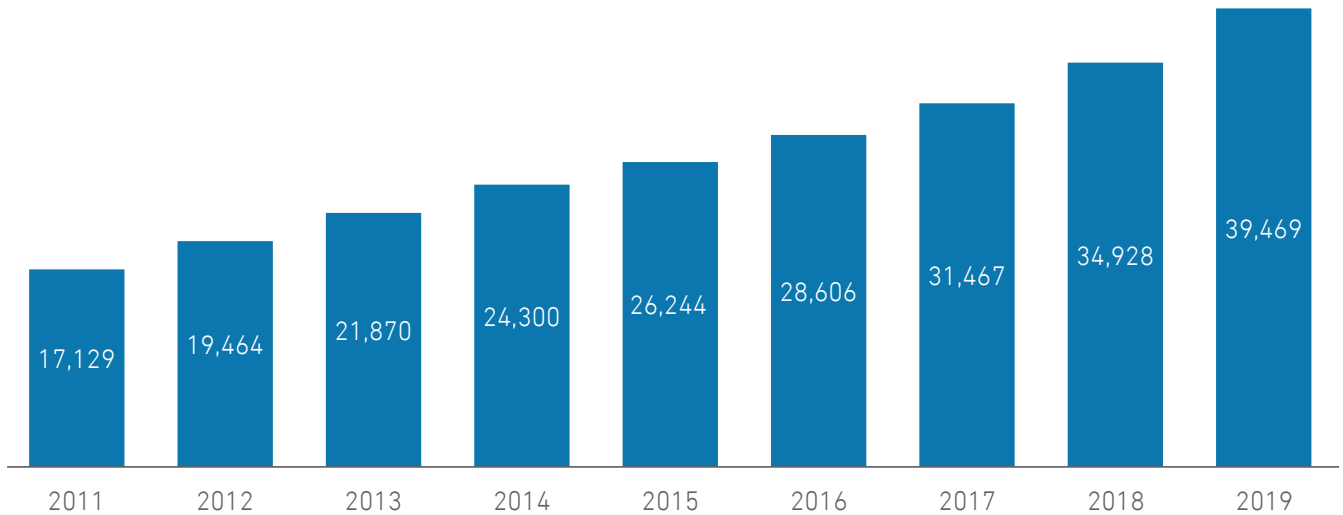
20 ICT Indicators in the Kingdom of Saudi Arabia (2014) (available at citc.gov.sa)
21 CITC Annual Report 2014
22 2013 Telecommunications Retail Prices Benchmarking Report for Arab Countries, TRA Bahrain, prices measured in USD/PPP

datacenter build-outs across the Kingdom. CITC estimates that in 2014, approximately 24,300 sq. m. of rentable datacenter space was available in Saudi Arabia, as displayed in Figure 11.

Figure 11: Rentable Commercial Datacenter (Raised) Floor Space (sq. m.)[23]

2011	2012	2013	2014	2015	2016	2017	2018	2019
17,129	19,464	21,870	24,300	26,244	28,606	31,467	34,928	39,469

4.1.3   SHORTAGE OF MISSION-CRITICAL FACILITIES

While the number of commercial datacenter facilities is increasing, few high-end mission-critical facilities exist, such as those classified as Tier 4. According to Uptime Institute, only Mobily's Melgha II datacenter in Riyadh is certified as Tier 4 for both constructed facility and design documents.[24] Tier 4 datacenters are expensive to build and possess unique advanced capabilities, such as two fully redundant and independent sources of electricity and connectivity. Organizations in industries like finance and the military need a high level of redundancy for their mission-critical systems to enable these services.

4.2   CULTURAL FACTORS

Organizations in Saudi Arabia are generally risk averse and highly security conscious. As such, they prefer to retain control and internalize as many business functions as possible. IT departments are no exception. The issues of data security and privacy are becoming increasingly important. The risk of severe ICT failure is also a major concern. These concerns mean that Saudi IT departments are increasingly looking to purchase solutions and services that limit the risk of downtime and security breaches.

All ICT service contracts result in some loss of control for the organization. This is particularly true for datacenter, managed, and cloud services, because they are outsourced to external providers and involve high levels of automation. The fear of losing full control over data is inhibiting the adoption of ICT services in Saudi Arabia; however, in the future, Saudi organizations are expected to develop a more trusting relationship with their ICT service providers. This will result in them being more open to newer, more automated technologies and services.

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23 CITC Datacenter, Managed Services, and Cloud Survey, 2015 and research based on informationt and data gathered through interviews with datacenter, managed, and cloud service providers (see Appendix A for more details).
24 https://uptimeinstitute.com/TierCertification/certMaps.php

In general, Saudi organizations are rarely enthusiastic about adopting emerging technologies, such as those covered by this report, and very few organizations want to be first adopters. Instead, many organizations have adopted a wait-and-see approach, and are seeking successful (local) case studies and examples before considering the use of these services themselves. Naturally, the government sector is expected to take a leading role and to outline adoption roadmaps.

In terms of the capital investment climate in Saudi Arabia, investments that generate steady income are preferred to long-term, high-risk investments that generate little immediate revenue but may generate an eventual large payout. Building datacenters, managed services, and cloud services requires large upfront investments into facilities, hardware, software, security solutions, and ICT skills, and many medium-sized domestic ICT service providers are reluctant to make such investments. The market is therefore dominated by telecommunications providers and international ICT service companies. This will likely lead smaller domestic ICT service companies to rely on leased datacenter capacity already available in the market.

4.3 ICT SKILLS

CITC's ICT Report on ICT Workforce in KSA[25] concluded that the ICT skills deficit is one of the most critical barriers to the development of the ICT sector in Saudi Arabia. The report estimated that between 2014 and 2017 the ICT sector will create 61,500 new jobs, while the domestic education sector is only able to provide 23,700 Saudi ICT professionals. Thus, the cumulative ICT workforce gap will balloon to 37,700 professionals by 2017.

The CITC ICT Report predicted that skills shortages will include new technology areas, such as cloud infrastructure, datacenter infrastructure management, IT security, and enterprise mobility—all essential skills for the development of the supply side of the datacenter, managed, and cloud services ecosystem. The ICT service provider interviews conducted for this report confirmed concerns on the part of these providers regarding their ability to develop and deploy datacenter, managed, and cloud services without sufficiently skilled professionals.

On the other hand, skills shortages can drive the adoption of such services among organizations on the demand side, as outsourcing can help to offset skills shortages. Additionally, the cost benefits can be substantial. Some professionals fear that outsourcing could lead to headcount reduction, but the more positive view is that it can free up resources from day-to-day operational tasks and allow them to be reallocated to more strategic projects and initiatives.

Datacenter, managed, and cloud services have great potential to increase the availability and affordability of ICT infrastructure in Saudi Arabia. This, in turn, will lead to greater consumption of ICT and hence create higher demand for ICT professionals, particularly in SMBs, which are normally very sensitive to price and skill levels.

4.4 SECURITY

A robust security environment is critical for the development of the datacenter, managed, and cloud services ecosystem. The volume and sophistication of cybercrime continue to increase, and users, providers, and government security teams need to constantly monitor threats and enhance the resilience of ICT networks. Government stakeholders are continuously addressing the need to enhance national security regulation frameworks (see Section 4.5 for more details), enforcement mechanisms, and educational initiatives; providers, on the other hand, need to focus on incorporating best-of-breed ICT security

25 ICT Report: ICT Workforce in the Kingdom of Saudi Arabia, 2015

solutions into their products and services. If not addressed adequately, a lack of security can quickly undermine technology adoption and hamper market growth.

The CITC survey revealed that security-related fears significantly inhibit the adoption of datacenter, managed, and cloud services in Saudi Arabia. While most security concerns are justified, many industry experts believe that some are exaggerated. The growing consensus among mature users and providers is that commercial datacenters are often more secure than in-house datacenters, especially in non-enterprise environments like SMBs. The survey results support this claim, as the following findings demonstrate:

- Organizations that have already adopted some form of datacenter, managed, or cloud services do not recognize security as a significant challenge, and only a small percentage have experienced security-related problems or incidents.[26]

- For 37% of datacenter service users and 29% of managed service users, the advanced security offered by commercial datacenters is one of the drivers for adopting such services.[27]

The favorable perception concerning the security of commercial datacenter infrastructure among the users of datacenter, managed, and cloud services was also confirmed when interviewing ICT service providers. Most local service providers have adopted advanced information and physical security solutions and standards because they are more able to invest into sophisticated security solutions that may be prohibitively expensive for individual companies to purchase internally. Providers also have a vested interest in ensuring the security of their clients' data, as a breach would damage the reputation of the provider and could seriously impact its business.

The contradictory levels of security concerns among non-users of datacenter, managed, and cloud services on one hand, and of current adopters and service providers on the other, signify a lack of awareness of real security threats among non-users. In order to reduce security concerns among potential adopters, ICT service providers, together with relevant government stakeholders, should continue their efforts to educate Saudi organizations about standard security and information protection practices. Examples of projects and initiatives focusing on the security area include:

- The National Center for Information Security (CERT-SA), which CITC launched to enhance cyber security, provides a healthy environment for electronic transactions, and attract foreign investors.[28]

- A national program, also launched by CITC, to increase awareness of information security. This program contains a range of time-based plans, information campaigns, measurement tools, objectives and strategies that focus on the public's awareness of information security.[29]

- A security integrated system, provided by the National Center for Digital Certification, for managing the public key infrastructure (PKI) and ensuring secure, efficient transmission and exchange of digital information[30]

- Initiatives by the Ministry of Communications and Information Technology, including the Dissemination of Digital Culture and Knowledge lectures along with the proposed National Information Security Strategy (NISS)[31]

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26 CITC Datacenter, Managed Services, and Cloud Survey, 2015
27 CITC Datacenter, Managed Services, and Cloud Survey, 2015
28 CITC Annual Report, 2014
29 CITC Annual Report, 2014
30 http://www.ncdc.gov.sa
31 http://mcit.gov.sa/En/MediaCenter/Pages/News/News-15032015_795.aspx

- Other government initiatives, such as the RAWAM information security awareness, education, and user certification program developed by the King Saud University's Center of Excellence in Information Assurance (COEIA).[32]

Some ICT providers interviewed for this report also welcomed CITC's efforts aimed at the development of a security framework consisting of policies and procedures for Saudi government agencies.[33] The interviewed organizations agreed that this framework will clarify responsibilities of vendors, ICT service providers and government organizations in managing security risks.

4.5 REGULATORY FRAMEWORK

In order to stimulate demand for datacenter, managed, and cloud services, it is imperative that a comprehensive, efficient, and easy to understand ICT regulatory framework is developed and enforced. Such a framework would aim to address several areas, including infrastructure, content, and various sector-specific concerns.

4.5.1 ICT INFRASTRUCTURE REGULATIONS AND LICENSING

The key pillars of the ICT infrastructure regulatory framework in the Kingdom are represented by the Anti e-Crime Act, an anti-spam policy, the e-Transactions Law, the Anti-Commercial Fraud Law, the Copyright Law, a dispute-resolution policy, and internet domain registration regulations. Additionally, CITC developed an electronic system for licensing and approving ICT equipment. In 2014, roughly 18,500 applications for customs clearance and licensing of ICT equipment were processed electronically.[34]

Compared to emerging economies, more mature countries have highly liberalized telecommunications environments and competitive ICT services markets. High levels of competition in the ICT market drive prices down and put the focus on service quality. CITC is thus currently working on a study focused on identifying the optimal approach to regulating cloud services. The objective is to increase the maturity of the services offered by ICT service providers in the Kingdom. CITC has issued a number of licenses for internet services and hosting infrastructure, which are fundamental pillars for providing cloud services.

4.5.2 CONTENT REGULATION

The General Commission for Audiovisual Media is responsible for developing and monitoring policies related to content for all communication channels. The Commission manages licensing and monitors all audio-visual media content and the activities of content service providers. In 2014 alone, the Commission, in cooperation with CITC, handled approximately 467,000 requests to investigate, block, or unblock content.[35] In order to drive greater awareness, CITC has published guidebooks on tools for safe internet usage, and lists of family protection programs and safe websites. A significant proportion of local Internet content resides in local datacenters, and this could be expected to increase even further over the next few years. Clarity and consistency in regulation provides confidence to ICT service providers and content providers to invest further in local datacenter capacity.

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32 http://news.ksu.edu.sa/en/node/102876
33 Interviews with ICT service providers. For details about the security policies and procedures, see Information Security Policies and Procedures Development Framework for Government Agencies, CITC
34 CITC Annual Report 2014
35 CITC Annual Report 2014

4.5.3 SECTOR-SPECIFIC REGULATIONS

Specific regulations have been introduced in different verticals prescribing what organizations can and cannot do with sensitive data. This is particularly true in the finance sector. These regulations have a direct impact on the usage of datacenter, managed, and cloud services in various sectors, given that regulatory requirements are typically reflected in outsourcing contracts. For example, the Saudi Arabian Monetary Agency (SAMA) has issued e-banking rules, outsourcing regulations and guidance on the use of ICT in order to establish and maintain high security standards in the Saudi finance sector. In addition, SAMA has formulated policies for data backup and recovery, and guidelines for banks on which datacenter categories they should use. These regulations impact how datacenter, managed, and cloud services (and outsourcing in general) are adopted and used by financial institutions licensed by SAMA. For example, rules governing the locality of sensitive customer data encourage financial institutions to use captive datacenters and ensure more control. Other ministries, including the Ministry of Health (Saudi Health Information Exchange Information Security Policy[36]), and Ministry of Commerce and Industry (draft E-Commerce Law[37]) have formulated policies that affect data locality, security and governance, directly impacting the uptake of managed and datacenter-delivered services.

4.6 SUMMARY AND FUTURE OUTLOOK

As discussed in Chapter 2, specific factors affect organizations' use of datacenter, managed, and cloud services in Saudi Arabia, and other factors, outlined in Chapter 3, impact the provisioning of such services by ICT providers. In addition, the enablers discussed in this chapter shape the maturity of the ecosystem.
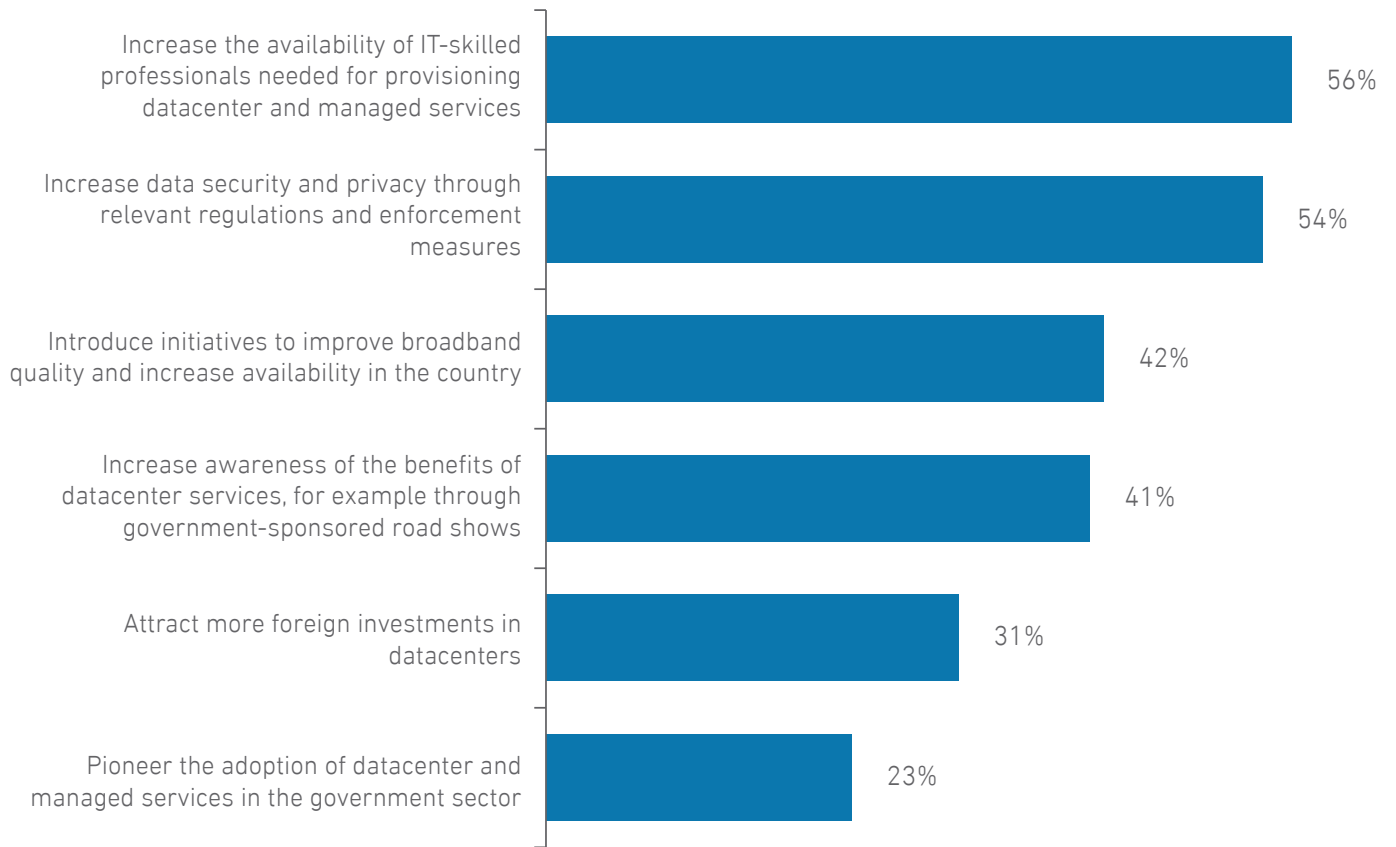
In order to stimulate growth in the datacenter, managed, and cloud services industry, all relevant stakeholders, providers, customer organizations, and government authorities should work together to set priorities around enablers specifically addressing ICT infrastructure, cultural factors, ICT skills, security, and regulations. The inhibitors identified in this chapter that need the most attention are high connectivity prices, a reluctance to outsource, ICT skills shortages, and a lack of awareness of security technologies and standards.

In order to set priorities and develop programs for the datacenter, managed, and cloud services ecosystem, CITC asked for suggestions from organizations (Figure 12). Establishing programs to address the lack of ICT skills was the focus area cited most often, while improving security environment came in second. Improving broadband availability and quality, launching educational campaigns highlighting the benefits of datacenter services, attracting more foreign investment, and developing the adoption of datacenter and managed services in the government sector were other suggestions.

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36 http://www.moh.gov.sa/en/Ministry/eParticipation/Policies/Pages/Policy.aspx?PID=3
37 https://mci.gov.sa/LawsRegulations/Projects/Pages/ec.aspx

Figure 12: What Can the Government Do to Encourage the Adoption of Datacenter and Managed Services? [38]

Increase the availability of IT-skilled professionals needed for provisioning datacenter and managed services	56%
Increase data security and privacy through relevant regulations and enforcement measures	54%
Introduce initiatives to improve broadband quality and increase availability in the country	42%
Increase awareness of the benefits of datacenter services, for example through government-sponsored road shows	41%
Attract more foreign investments in datacenters	31%
Pioneer the adoption of datacenter and managed services in the government sector	23%

Percentage of respondent organizations who agreed with recommendations

38 CITC Datacenter, Managed Services, and Cloud Survey, 2015

5 AFTERWORD

This report provides timely analysis of rapidly emerging technology services markets. We sincerely hope it will become an important guide for readers from a broad range of entities, including ICT providers, users, policy makers, and other stakeholders, as they shape their ICT strategies.

As highlighted in this report, the datacenter, managed, and cloud services ecosystem in Saudi Arabia is expected to maintain high growth over the next five years and has the potential to revolutionize the way in which ICT is consumed. However, reaching its full potential and capturing existing opportunities will require addressing a number of short-term challenges, which are listed below, along with recommendations to mitigate them.

- **ICT Infrastructure:** Reliable, available, and affordable internet connectivity is a key enabler for provisioning and using remotely delivered datacenter, managed, and cloud services. While impressive improvement has been made during recent years, the further reduction of connectivity costs and the improvement of connection quality are required if such services are to be widely used by organizations with distributed networks and mobile workforces and by companies with a large number of sites outside of urban areas.

- **Security:** As the findings of the study indicate, increased awareness of security technologies and processes and growing confidence in the security measures of providers are reducing the reluctance of organizations to outsource. The government, for its part, has increased efforts to spread IT security literacy among the public, and this can be expected to increase adoption and, in turn, unlock new opportunities for the datacenter, managed, and cloud services markets.

- **Customer-First Approach:** In addition to focusing on the technological aspects of their offerings, service providers should pay sufficient attention to building customer relationships in order to expand their markets. Providers that are able to offer better services and adhere to their service-level agreements (SLAs) will gain a significant competitive advantage over those that do not do so.

- **Licensing:** CITC is currently working on a suitable approach for regulating cloud services. This initiative is expected to develop confidence among users, increase the maturity of service offerings, and boost competition.

- **Government Leadership:** Pioneering the adoption of datacenter, managed, and cloud services in the government sector and promoting success stories will encourage the adoption of these services, especially in the private sector, which is traditionally risk-averse and reluctant to embrace new technologies.

The success of these measures depends on the participation and cooperation of various ICT sector stakeholders in Saudi Arabia. CITC would like to reach out to all public and private organizations, ICT vendors, telecommunications providers, and ICT policy makers to collaborate on specific ICT sector development initiatives aimed at increasing datacenter, managed, and cloud services adoption in Saudi Arabia.

APPENDICES

APPENDIX A: METHODOLOGY

In order to map the current state of ICT in Saudi Arabia and to assess the current developments and challenges related to the datacenter, managed, and cloud services ecosystem, CITC conducted extensive primary and secondary research.

Primary Research

CITC conducted 780 interviews with private companies and government organizations to measure the penetration of datacenter, managed, and cloud services in Saudi Arabia. The survey was undertaken in May and June 2015 on a representative sample of organizations possessing an internet connection.

In addition, CITC conducted 206 in-depth interviews with Saudi organizations to collect quantitative data about the current usage of, and key adoption drivers and inhibitors related to datacenter, managed, and cloud services. The organizations interviewed consisted only of companies that use servers or utilize datacenter services.

CITC conducted 19 face-to-face in-depth interviews with leading ICT companies that provide datacenter, managed, and cloud services; large companies investing in their datacenter infrastructures; and government stakeholders responsible for market regulation and development. The goal was to acquire comprehensive qualitative insights in order to assess the datacenter, managed, and cloud services market enablers; to understand the key challenges and opportunities; and to size datacenter, managed, and cloud services spending.

The results of the survey were compared with a similar survey conducted in 2011, when CITC surveyed 1,048 organizations—all with at least an internet connection—and conducted in-depth interviews with another 321 organizations. CITC also conducted 26 in-depth interviews with various service providers and ICT influencers and enablers, including large datacenter owners, regulators, and government stakeholders. The survey was carried out in December 2011.

Secondary Research

CITC conducted in-depth and wide-ranging secondary research, including the examination of a number of existing studies on the ICT sector in Saudi Arabia, as well as international sources documenting the progress similar countries have made and the best practices they have adopted.

APPENDIX B: DEFINITIONS

ICT Services: ICT services represent the provision of labor-based services that assist individuals and organizations in the implementation, management, and operation of computer systems, peripherals, storage, network equipment, and software. Organizations providing ICT services typically deliver some or all of a variety of services ranging from support to complete ICT operations, management, and outsourcing.

Datacenter: An organization's datacenter facility is a controlled physical environment for storing and managing servers, networks, and other computer equipment. In a small organization, a datacenter may be just a small "closet" that houses a single server and network patch panel. In larger organizations, a datacenter generally includes a raised floor space that houses most of the organization's ICT systems and supports enterprise-wide operations.

Datacenter Services: Datacenter services include the management of servers, storage devices, and networking solutions in a commercial (non-captive) datacenter. They often include related remote network and systems management, operating systems software management, and hardware maintenance services. Examples of datacenter services include housing services/co-location, server hosting, managed server/storage device hosting, hosted application management, and web hosting.

Co-location Services: Co-location services are defined as a customer's use of a commercial datacenter facility (i.e., physical floor/cage/rack space, network capacity, and HVAC/power infrastructure) in which the customer operates its own servers/storage systems, network equipment, and other types of infrastructure.

Managed Services: Managed services are a provider's management services for a client's ICT and network infrastructure. They can be onsite or hosted and delivered over a network. They, 1) do not usually include any transfer of ICT assets, 2) do not include any large-scale transfer of personnel to a provider, and, 3) generally don't last as long as outsourcing contracts. Managed services include managed networked infrastructure services, managed connectivity services, managed unified communications and collaboration, managed security services, managed business continuity/disaster recovery services, and managed application services.

Cloud Services: Business and consumer products, services, and solutions delivered and consumed in real time over the internet. Furthermore, a cloud solution has all or most of the following characteristics: is shared; offers a standard packaged service solution; enables self-provisioning and elastic scaling; enables usage-based pricing; is accessible via the internet; provides a standard user interface; and provides a service interface.

Service Level Agreement (SLA): An SLA is a legally binding document detailing the levels of service provided by a service provider to a customer. For datacenter, managed, and cloud services, a typical SLA includes the following sections:

- Definitions of the provided services
- Specifications and parameters of the provided services
- Guaranteed availability, serviceability, performance, and response time
- SLA monitoring and enforcement procedures (including penalties)

APPENDIX C: ABBREVIATIONS

CAPEX: Capital Expenditure
CERT-SA: National Center for Information Security
CITC: Communications and Information Technology Commission
COEIA: King Saud University's Center of Excellence in Information Assurance
CRM: Customer Relationship Management
ERP: Enterprise Resource Planning
FDI: Foreign Direct Investment
IaaS: Infrastructure as a Service
OPEX: Operating Expenditure
OSP: Outside Plant Services
PaaS: Platform as a Service
PKI: Public Key Infrastructure
TCO: Total Cost of Ownership
SaaS: Software as a Service
SMB: Small and Medium-sized Businesses
SAR: Saudi Arabian Riyal