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Reflections on the Nature, Manner, and Future of Sourcing

The essential part of creativity is not being afraid to fail.

—Edwin H. Land

What will the future hold for alternative sourcing in general and cloud computing in particular? There are reasons to believe it could become a transformational strategy that alters the focus and identity of IT organizations. The hype afforded particularly to cloud strategies suggests its transformational potential. *InformationWeek* columnist John Foley dubbed 2009 the year of the cloud and predicted growth rates of 20% in revenue for cloud-based services even in a down economy.¹ Many are familiar with Nicholas Carr's prediction that cloud computing would significantly shift the locus of computing to the individual and significantly scale back the role and importance of IT organizations.² On the other hand, we see among our survey respondents adoption of the cloud as a point solution, not a core strategy. Further, their responses suggest they expect their growth in adoption of alternative sourcing and cloud computing to be incremental. The prevailing sentiment was that it offers benefits but not at the level that would suggest it is going to transform IT.

Is it possible that we are like the proverbial frog in a slowly heating pot? Will we be transformed before we realize the degree of change we are undergoing? In this chapter, we look to the future of alternative sourcing primarily through the lens of cloud computing.

We chose to focus on cloud computing because of the attention it has garnered as a force for change. In addition, using a broad definition of cloud computing (software as a service [SaaS], remote data centers, etc.), we capture many of the alternative sourcing strategies included within the scope of the research. The chapter begins by presenting a framework for IT and institutional decision making about alternative sourcing. The framework proposes a model of thinking about where alternative-sourcing solutions are appropriate and practical by balancing an institution's need to control the provision of a service and the availability of substitutes to individual IT users (or departments). We then discuss the potential evolution of the cloud, including the future role for a private higher education cloud. At the conclusion of the chapter, we comment on the future of traditional alternative sourcing strategies such as the use of contract labor or corporate partners to operate an IT service on site.

Does the Cloud Change the Rules or Just Their Application?

Whether an institution is ready to accept the cloud's potential to transform IT or not, it must be prepared to deal with the impact it will have on how technology adoption

decisions are made. Like other forms of alternative sourcing, the cloud is a vehicle for delivering services. In and of itself, the cloud does not create new technology capabilities or new classes of IT services. It holds great promise to lower costs, speed technology adoption, and enable IT organizations to shed responsibilities in order to focus on higher priorities. Admittedly, the cloud is not the only strategy that can produce these outcomes. Economies of scale that lower IT costs will also be derived from multi-institutional collaborations, continued advances in Moore's law, and future technology innovations that will be available to self-operators as well as providers of outsourcing.

We are likely still three to five years away from knowing how transformative the cloud's impact on IT costs and services will be. What is more certain is that the cloud will change how institutions manage sourcing decisions. First, its continued growth and evolution will make multiple sourcing options available for more technologies. The cloud as it exists today has already broadened the options for Internet-delivered sourcing from traditional areas such as application hosting (application service providers [ASPs] or SaaS) to cloud-based storage, virtualized servers, development environments, and security applications. Continued adoption of the cloud across industries will expand the list of what is available. As a result, institutions will need to weigh their sourcing options for an ever-increasing number of technologies and IT services.

The second impact the cloud will have is to change the way sourcing decisions are made within institutions. An intrinsic nature of the cloud is that it increases the role of the individual in technology adoption decisions. In an essay contributed to the book *The Tower and the Cloud*, ECAR Senior Fellow and Deputy Director Ronald Yanosky described this as turning users into choosers. He writes, "Cloud computing creates new strings of user dependence that lead outward rather than

upward."³ Yanosky described the cloud's potential, if fully realized, to break users' dependence on central IT for their connectivity, applications, and support. Although the cloud may not reach this extreme anytime soon, it will pressure IT organizations to share the decision to adopt a cloud service with their users or risk seeing the user community make multiple, individual adoption decisions.

In the section that follows, we present a framework for institutions to use to develop a point of view as to where cloud services are viable and desirable alternatives to self-operation. The framework is intended as an enabler of a conversation between the IT organization, IT governance groups, and other stakeholders to develop an institutional point of view toward the cloud (and other forms of alternative sourcing). The framework can guide a sourcing decision made by the IT organization or a non-IT department trying to understand its own options for sourcing a local technology solution. It also advances a model that can help IT organizations recognize the value of the expanded choices available to individual departments or individual users and also help them place and position themselves as facilitators of cloud-based sourcing decisions rather than as institutional gatekeepers to the cloud.

Sorting Out Sourcing

Whether or not we are on the verge of extensive adoption of cloud computing, it is—and is likely to remain—a viable option for provisioning certain IT services. The commoditization of some aspects of technology, combined with the growing influence of the individual in technology adoption decisions, seems to make this a certainty. The task then for the IT organization is to develop a point of view on where and how to embrace it.

What makes this task particularly tricky is that it is a continuous rather than a static decision-making process. With sourcing options and sourcing providers proliferating and

technology following differential paths from leading edge to commodity, an IT organization can't set its sourcing strategy once and put it on the shelf. Rather, it requires more regular discussion that reevaluates the state of the technology and the provider market as a means to refresh the institution's sourcing strategy.

A Framework

Each institution will also have its own unique perspective on sourcing decisions. Each will bring its own tolerance for risk and unique capability to self-operate services. Therefore, to offer a one-size-fits-all prescription for how to source various technologies is unrealistic. Instead, we propose a framework that might enable institutions to shape their own thinking about how to approach the sourcing decision for individual technologies. The framework looks at each technology or service from two dimensions. The first dimension considers how tight a control the institution needs to maintain over the technology or service. The other considers how extensive a set of alternatives an individual user might have available as a substitute for an institutionally provided or arranged service.

For a variety of reasons, institutions may want to maintain control over which particular service or technology a member of the institutional community uses and how it is provisioned. Legal requirements (e.g., FERPA) obligate the institution to safeguard certain kinds of data. Concerns about the loss or theft of institutional or faculty-owned intellectual property might lead some institutions to want to control certain technologies as well. There are also strategic reasons such as maintaining tight integration among applications to enhance the user experience and make processes more efficient. Or, institutions may want to ensure that data being captured by a particular application or process is also captured and made readily available for management reporting or institutional research.

Control

The need to maintain tight control over the sourcing of technologies and services is a continuum. At the end points, it is relatively easy to think of examples to fit the framework. For example, virtually all institutions would place at the tightly controlled end of the spectrum enterprise applications such as payroll systems, general ledgers, or student records systems. For reasons of data integrity, sound internal controls, and risk management, institutions will want to control the sourcing decision for these applications and likely insist that all members of the university community use the same solution. This does not necessarily mean the institution needs to run the payroll system. Rather, it implies that there can only be one payroll solution in use.

At the other end of the spectrum are things for which the institution has little or no need to maintain tight control and likely has a very high tolerance for individuals to make their own sourcing decisions. Examples might include selection of a PDA or cell phone by a faculty member, or a student's choice of what word processing software to use. Generally, at this end of the spectrum one would expect to find technologies or services that do not store or manage sensitive institutional data and do not operate strategic business processes. Here, an individual's choice of a solution has little or no impact on other institutional users.

While the end points are easy to describe, the vast majority of technologies and services will fall in the middle of the continuum. Further, each institution is likely to have philosophically different perspectives on which end point (tight or loose control) it is closest too. For example, for one institution the choice of antivirus software might be a tightly controlled service to mitigate risk. For another the choice of antivirus software may be of little concern as long as each user has it. Or, there are technologies for which institutions may feel the need for some but not total control. For example, it might not be

important or feasible to require all faculty to use the same wiki tool in their classes. But, for reasons of security or supportability, the institution might want to place some limits on the range of possible solutions an individual can choose to adopt.

Availability of Substitutes

The need for institutional control is just one dimension of the framework that an institution needs to consider. The other important dimension captures the richness of the marketplace of substitutes that an individual has to choose from as alternatives to an institutionally provisioned or selected technology or service. As with control, the availability-of-substitutes dimension of the framework is also a continuum. At one end of the spectrum are the technologies and services for which the availability of substitutes is high. These are likely to be consumer products or commodity IT services. They will share in common a proliferation of options and an ease of adoption by an individual (or organizational unit). Using one of our previous examples, cell phones and PDAs exist at this end of the spectrum, as do e-mail, personal computers, and arguably office productivity software.

At the low end of the availability-of-substitutes spectrum are those technologies that are complex, emergent, or unique, so that there are few if any substitutes and the feasibility of an individual's executing an independent adoption decision is very small. At this end of the spectrum one might place a payroll system (few substitutes, too complex for an individual adopter), high-performance networks (complex, few substitutes), or a faculty effort reporting system (unique).

As one would imagine, there is also a vast middle ground to this continuum. As technologies move from emergent to consumer product, they pass through a transitory period during which there are some alternatives, but often these are immature, lack universal standards, or are provided by companies

that may not ultimately be there in the end. There are also some technologies that will only *move* toward the consumer product end of the spectrum but never reach it. These might include some of higher education's more specialized applications for which there is arguably some choice (e.g., financial aid systems), though they are far from being consumer products.

Using the Framework to Guide Sourcing

Institutions need to balance two questions when selecting an approach to sourcing IT services. The first is, how much do we need to control this service? The second is, how hard will it be for the institution to achieve this level of control given broader consumer markets and likely individual sentiment? As we observed earlier in the chapter, cloud computing empowers individuals to make their own sourcing decisions for a broad set of technologies—so broad that institutions cannot afford to stay silent about their preferred sourcing model without risking, as Yanosky puts it, “seeing the user community itself fill the vacuums in support and enterprise authority.” Yanosky also points out that it is impractical for institutions to manage the complexities of the cloud by “locking it down” and barring users from accessing it.⁴ Instead, institutions need to engage their policy makers and IT governance bodies in a more nuanced discussion of sourcing options. By plotting a technology or service along the two dimensions of the framework (need for control and availability of substitutes), institutions can develop an underlying rationale for their sourcing decisions.

We recognize that an institutionally controlled service can also be outsourced. In our framework the difference is who makes the outsourcing decision. For a technology or service that requires tight control, the decision whether to outsource would be tightly controlled as well and likely made by the IT

leadership in consultation with appropriate governance groups. The decision would be uniformly applied across the institution. For a market-driven service that does not require tight institutional control, the decision is made by the individual user or user department. We comment later in the chapter on how institutions can approach the decision to self-operate or outsource a service for which they need to maintain tight institutional control.

Institutional versus Market Provisioning

As Figure 9-1 illustrates, institutions have three broad sourcing options for provisioning technologies and services: institutional, market, or managed choice.

Institutional

In cases where the need for tight control is high, the institution should arrange for the

provisioning of a technology or service. These are the areas for which the institution has a large interest in seeing a consistent approach to where the service or technology is obtained and how it is delivered. These are also the technologies for which regulatory compliance and security are paramount objectives. Institutions are likely to want to self-operate many of these technologies or services. Outsourcing may be desirable to realize cost savings or to plug skill gaps. However, the institution will want to broker the outsourcing arrangement and likely present it to users as an institutional service with little or no choice to use a substitute.

If the availability and practicality of substitutes is high, policy and/or a persuasive business case will be needed to keep individuals from making personal sourcing decisions to adopt alternatives to the institutionally arranged service. The need for policy and

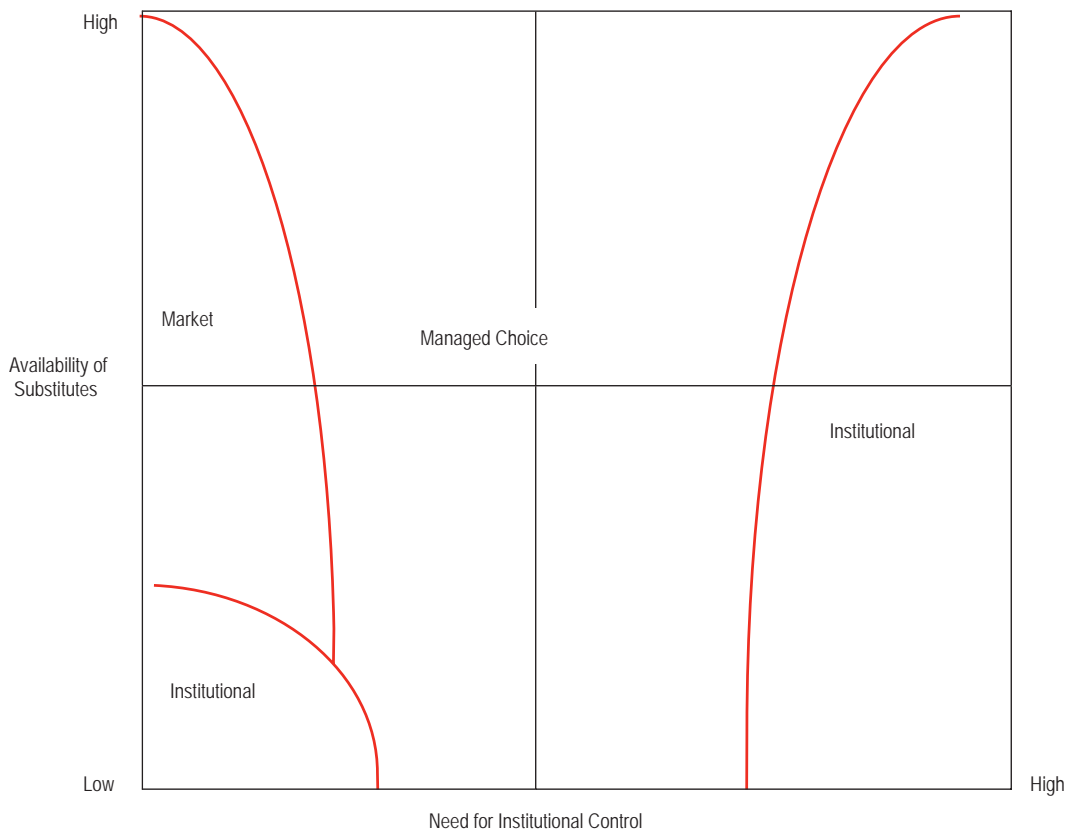


Figure 9-1. A Framework for Sorting Sourcing Options

persuasion is less for technologies and services having few if any viable substitutes.

Institutions may also find themselves to be providers of last resort for necessary IT services for which the availability of substitutes is low, even if the need for tight control is low as well. In these cases, an institutionally arranged or self-operated service may be necessary because users have nowhere else to go to get the service. Institutions need to monitor this category closely and confirm that there is sufficient need or strategic value to justify providing the service.

Market

At the other end of the spectrum are technologies and services for which the need for tight control is low and the availability of substitutes is moderate to high. For these technologies and services, the institution can step aside and let users adopt market solutions (e.g., cloud-based providers). If the institution is offering a service that is a close substitute for something available in the market, it can consider discontinuing its offering in order to focus on other priorities. Institutions also need not spend considerable time prearranging for market-delivered services for users, because they are judging the market to be mature enough and of low enough risk that individuals can be left to make their own sourcing decisions.

Managed Choice

Between institutionally arranged services and leaving users to choose from whatever the market has to offer lies a middle ground in which substitutes exist and the institution has a stake in maintaining some control over the technologies or services an individual uses. In this middle ground, needs are sufficiently varied and choice is too readily available to assume that users will be satisfied with a single institutionally identified option. Although there is a recognized need for some control, the requirements are not great enough or the

risks high enough (e.g., legal compliance) to assume that a persuasive enough case can be made for individuals to voluntarily ignore the choice that market/cloud is offering them.

Among the many choices available in this middle ground, some are likely to be preferable to others. Institutions might want to see their users adopt options with known providers who follow widely accepted standards and security practices. Or, as a practical matter, the institution might want to shrink the universe of options to make it more cost-effective to support individual users. The challenge then is how to move users toward a predetermined set of options.

An institution can follow two paths. The first is to try to use policy to mandate adoption of a preferred option or options. In some cases, this may be necessary (e.g., cases that are inching toward the high end of the need-for-control continuum), but it risks placing the IT organization in an adversarial relationship with end users. The challenges institutions have faced trying to mandate the use of a particular vendor for office supplies or to adopt a single travel agency illustrate the limitations of mandates.

The second path is to try to use incentives and information to move individuals toward an institutionally preferred option or options. It is this path that we are dubbing *managed choice*. The concept is for institutional IT organizations to help individuals make good choices when going to the market/cloud for services by predefining a set of "safe" choices. The safe choices would be those that the IT organization or its designee has investigated in concert with users and found able to both meet user needs and provide the services and safeguards that satisfy institutional risk management and quality objectives.

Institutions can use an array of incentives to promote their adoption. Prearranged contracts and purchasing vehicles can be used to make it easier for users to adopt services from these providers. Institutions can

offer enhanced services such as predefined integration with other institutional systems, single sign-on, or extended user support as additional incentives to promote adoption. Education and awareness campaigns can also provide users with information about the advantages of using the preferred options and the risks of using providers outside the preferred list.

Impact of the Cloud on the Framework

The framework is constructed to accommodate the evolution of technology and the maturation of the cloud. The successful growth of the cloud will shift the boundaries of the decision-making framework and place more technologies and services in the middle ground of managed services. This will create an even greater necessity for IT organizations to share decision-making authority with other divisions and departments to make cloud-sourcing decisions. As a practical matter, there will be too many sourcing decisions to make through a hierarchical process and too much user pressure to allow greater choice and flexibility to view these decisions as the exclusive province of the IT organization. The concept of providing managed choice recognizes the inevitable shift of decision making toward individuals that the cloud brings about without completely abdicating the IT organization's responsibility to influence good decision making.

Further development of the cloud should also create greater potential for more technologies and services to be completely handed over to the market. Student e-mail may be just a harbinger of other IT services becoming commoditized. As this occurs, IT organizations will face pressure from individuals to enable them to use the same tools and solutions on campus that they use for their other personal and professional activities. IT organizations will also be tempted to stop providing institutionally self-operated

or even institutionally arranged outsourced versions of these solutions in order to free up resources to focus on other IT priorities. Growth in the market category of services will be slower than in the managed choice category as institutions work through very real concerns about data security and complex questions about how having institutional IT organizations simply stop offering some IT services will impact branding, community, and collaboration.

Self-Operation versus Alternative Sourcing

We focused much of our discussion of sourcing strategy on the issue of when the institution needs to control the sourcing decision and when it should allow some or total discretion to the individual technology user. A further dimension of alternative sourcing is that institutionally arranged services and managed choice include options that are self-operated by the institution and options that are outsourced.

The decision to self-operate or outsource is another form of the classic make-versus-buy decision that IT organizations have long considered. When considering adoption of either a traditional site-based provider or a cloud-based service, institutions will need to weigh a familiar set of questions:

- ◆ Which option best provides the capabilities users require and the technical and operational standards the institution requires?
- ◆ Is this technology or service in an area where it is important for the institution to retain the ability to tailor the solution, or is it in an area where practice can be standardized without sacrificing an important goal?
- ◆ Which option offers the best combination of one-time and recurring costs, including acquisition, implementation, integration, maintenance, and support?

- ◆ What technical or functional risks does each alternative present and to what degree can these risks be mitigated?
- ◆ How does each solution impact the institution's ability to comply with regulatory requirements as well as its own policies regarding the safeguarding of data?
- ◆ What impact will each sourcing option have on the skills and capabilities of the IT organization? Would outsourcing leave the institution without skills in a particular area? What implications would result from a loss of these skills?
- ◆ How difficult would it be for the institution to change to an alternative provider or move back to self-operation should the outsourcing provider fail?

As institutions weigh these questions for various services, we think it likely that they will continue to find areas in which alternative sourcing proves a viable and desirable alternative. Alternative sourcing in general and cloud computing in particular seem well suited for technologies and services for which institutions have fairly uniform requirements, commodity technologies, or technologies or services for which the institution faces a scarcity of staff expertise. Long term, it also seems promising for institutions to turn to cloud services as part of their overall sustainability initiatives or to participate in economies of scale that can help to contain IT costs. Shared data centers, data storage, and SaaS continue to look like areas where growth in the use of alternative sourcing/cloud computing seems likely.

The Future of Sourcing: Evolution of the Cloud

In his book *The Tipping Point: How Little Things Can Make a Big Difference*, Malcolm Gladwell draws parallels between the spread of disease and the diffusion of social and consumer phenomena. Gladwell points to

three types of forces that, when combined dramatically, accelerate (or tip) the spread of disease from small outbreak to epidemic. He uses this same construct to understand the spread of a social phenomenon or consumer behavior from an isolated interest to a full-blown fad. The forces Gladwell writes about are the adoption of the trend or product by a few influential parties, a stickiness factor that makes the product or social phenomenon memorable, and the power of context, which refers to some external change that alters how people think about the product or issue. When these forces combine, adoption accelerates, becomes viral, and a tipping point is reached.⁵

Is cloud computing reaching a tipping point? Gladwell's three forces may be gathering, but they're likely several years away from causing a tipping point. We have seen influential and highly visible institutions adopt cloud-based solutions. The outsourcing of student e-mail to well-known corporate entities has the potential to demystify cloud computing and broaden engagement in discussions of the role of the cloud well beyond the IT organization. However, as our survey findings point out, we have yet to see influential institutions widely adopt cloud computing (or other forms of alternative sourcing) as integral parts of their strategies for delivering core services. A force that might drive a tipping point will occur when adoption moves from its current targeted or ad hoc nature to become more widespread and strategic. The economic crisis and the severe impact it is having on institutional budgets is a change in context that could drive institutions to look to the cloud as an alternative way of operating amidst very constrained resources. It would be foolish to rule out the possibility that a further worsening of the economy, the emergence of one or two other high-profile cloud applications, and the continued adoption by institutions viewed as leaders within

peer groups will cause a tipping point that greatly accelerates cloud adoption.

On the other hand, one could easily see a combination of forces that tip things in the other direction. What if the change in context is not a worsening of the economy but a significant information security incident at a cloud provider that causes personal data to be lost or stolen? Such an incident might cause leading adopters of the cloud within higher education to pull back from their earlier adoption decisions. A return to self-operation by a few influential parties would likely cause most institutions to abandon their plans to adopt cloud solutions. Given the cloud's relatively shallow roots in higher education, it would be foolish to rule this out as well. To this point, most of the adoption (at least among the respondents we studied) seemed driven by leadership interest and not a direct response to underlying business issues (e.g., cost containment, reducing energy consumption). This suggests that it would not take much of a scare to drive IT leaders away from the cloud.

IT leaders are likely to face forces that will both pull them toward and push them away from the cloud. Cost pressures, gaps in skills, and the need to free up staff to focus on higher IT priorities will be persistent challenges that will tempt IT leaders to more heavily invest their institutions in cloud computing. Concerns about data security and data privacy will also persist and provide an opposing force that will likely hold institutions back. Which of these forces proves greater will have a lot to do with how aggressively we see cloud computing grow in higher education and perhaps other industries as well.

Individual behavior will also have a say in which direction things tip. In fact, consumerism may be a third force that plays a determining role in defining institutions' future in the cloud. As faculty, students, and staff adopt cloud computing in their lives outside higher education, pressure on institutions to either

provide similar solutions or enable individuals to continue to use those same solutions in their institutional lives will increase. A desire to enable students to use a solution they already preferred (e.g., Gmail or Microsoft Live) seems to have played some role in institutional decisions to outsource student e-mail. We have certainly seen other instances of a consumer trend altering an institutional IT service. One need look no further than the impact that increased cell phone ownership had on revenue from landline telephones in dorms.

We also cannot rule out the possibility of a Gladwell-style change in context if the forces of consumerism and financial exigency combine to alter institutions' perception of the IT services they are required to provide. If budget deficits grow larger, some institutions might be tempted to declare a computer and office productivity tools the equivalent of the car that you drive to work—a personal responsibility, not an institutionally provided service. In this scenario, individuals would carry with them their personal computing device (e.g., PDA, netbook) and access their own cloud-based applications and storage as they move from job to job. Institutions would provision only those things that are unique and nontransferable across jobs. And the impact might not only be on staff. Students, by choice or necessity, could bring to campus the e-mail, storage, applications, Internet connectivity, and computer they used in high school or at work as their computing environment. Adjunct faculty could move from institution to institution bringing with them their own computing environment, including open-source instructional technologies and personal learning objects.

Of course, there are many concerns regarding the protection of institutional data and the preservation of institutional intellectual property that might derail this scenario. However, the fiscal constraints that higher education will face in the coming years are too severe to dismiss it out of hand. Likewise, were

corporations ever to move in the direction of individual responsibility for basic technology, the pressure on higher education to follow suit would grow.

The most likely scenario is one of incremental growth in adoption of cloud computing for at least the next three years. In the near future, we should see both more technologies and services sourced to the cloud and more institutions engaged in cloud-based sourcing. However, we saw nothing in our survey responses to suggest that this growth will be anything but a moderate increase in adoption (see Table 5-6). The forces that might accelerate adoption, such as growing consumerism, will likely be countered by the forces that work against adoption, such as concerns about data security. Even the significant strain on IT budgets is not likely to produce a significant acceleration of adoption. The most aggressive adopters of alternative sourcing among the survey respondents had greater expectations that increased adoption of alternative sourcing would help them adapt quickly to changing conditions or access critical IT expertise rather than contain future IT costs (see Table 5-8).

Respondents' attitude toward cloud computing is a reflection of higher education's broader conservatism toward new operating approaches or strategies. While higher education always has its share of early adopters, most institutions are more comfortable watching potential solutions mature in other industries first. Many also wait for leaders within their peer group to adopt a solution before they will consider it for themselves. This conservatism is a by-product of an institutional culture within higher education that provides relatively fewer rewards for taking risks and seeking out operational innovations, and a resource base that makes it more difficult to pursue innovations with uncertain outcomes. For the foreseeable future, this conservatism will constrain adoption of cloud computing until its benefits become more certain.

Continued Evolution of the Cloud

The course of adoption of the cloud will also depend on its evolution. As we observed in Chapters 4 and 5, institutions view decisions about alternative sourcing as a balancing of risks and benefits. If the cloud were to evolve in ways that make its benefits more certain or its risk less apparent, it might tilt more institutional decision making toward adoption. Although this might not rise to the level of a Gladwell tipping point, it could ensure continued growth in adoption that is both broader and deeper within IT organizations.

Can the Cloud Live Up to Its Promise?

The promise of the cloud rests on its potential to leverage scale to generate significant cost savings and provide greater agility and flexibility for organizations. To realize this potential, its cost savings need to be compelling enough to offer an advantage over self-operation and provide a sufficient profit margin for the provider. Or, it must provide significant workforce flexibility to justify operating costs that are comparable or even slightly higher than self-operation. Similarly, the promise of agility and flexibility needs to enable institutions to turn services on quickly and to easily scale up and down the amount they consume. This is a tall order, and it raises a natural skepticism that the cloud is just the latest in a line of methods and strategies that promised to transform technology only to disappoint.

It is unfair to hold the cloud (or any form of alternative sourcing) to the promised benefits that are attributed to it when at the top of its hype cycle. To borrow a phrase from Alan Greenspan, former chairman of the Federal Reserve, we are prone to irrational exuberance about the benefits of technology. However, there is reason to believe that the cloud could live up to a good portion of its promise.

In an ECAR research bulletin, Richard Katz, Ronald Yanosky, and I outlined several key factors that make the cloud different from past attempts to harness the power of the Internet to alter IT service delivery (e.g., ASPs and service bureaus).⁶ The first factor is technical. Maturity of standards throughout the technology stack combined with increased robustness of network connectivity and enhanced capabilities introduced by virtualization technologies position the cloud for success. Consumer interest in and acceptance of the cloud will likely spur increased investment by providers and increased adoption by organizations as they chase the demand created by a consumer market that is raised on applications like Google and Facebook. Greater levels of investment should spur refinements of offerings and generate greater scale economies. Likewise, the economic crisis is, as we posited before, likely to spur more organizations to look at the cloud as a source of workforce flexibility if not outright cost savings. This too will feed a virtuous cycle of investment, improvement, and adoption that could fuel the growth of the cloud. As these forces increase interest in the cloud, software development talent and resources will shift away from traditional software vendors to cloud-based models.

Toward Higher Education Private Clouds

The other development in cloud computing that could cement greater levels of adoption is the development of private clouds. Private clouds occupy a middle ground between historical computing models of central IT defining and running a service on behalf of the institution, and public clouds, which are designed to aggregate massive computing resources and make them accessible to individuals. The technology that enables private clouds is not new or different from that which drives public clouds. It leverages the same combination of networking, modular

hardware, virtualization, and web services to operate. The difference is that a private cloud is defined, controlled, and accessed only by the organization or organizations that use it. Government agencies such as the U.S. Department of Veterans Affairs and large corporations like GE have developed private clouds to create the capacity to leverage greater scale economies within their organization while sequestering sensitive data or applications from the public cloud.⁷

The emergence of private clouds designed for or by higher education could be an important development that accelerates adoption of cloud computing. Specifically, it might serve to lower the risk institutions perceive as inherent in cloud computing. Institutions would have more direct say in the governance of private clouds, which would presumably be operated by other institutions or consortia of institutions. In Chapter 4 we identified the emergence of more institutionally provided alternative sourcing options as a development that would cause respondents who completely self-operate to consider alternative sourcing. Private clouds would offer institutions an opportunity to entrust their data to a third party well versed in the regulatory regime higher education is subject to as well as the values and culture that influence its treatment of data.

Private clouds could emerge in higher education in several ways. Large institutions might create their own to first aggregate computing tasks within the institution (e.g., providing virtual servers to research faculty) and then extend their availability to other institutions. Consortia of institutions could be leveraged to deliver software or services to themselves and others (e.g., the Quali Foundation). Finally, regional and national associations (e.g., Internet2) could leverage their expertise and infrastructure to become higher-education-centric private clouds.

There is a risk that private clouds, while mitigating the risks of cloud computing in

general, could also dilute cloud computing's benefits. If higher education places too many idiosyncratic requirements on its private clouds or cannot amass sufficient participation to drive large-scale economies, the cost profile might not be too different from that of self-operation. If this were to occur, private clouds might still be of value to those institutions looking to the cloud to plug gaps in skill sets. However, this feels like it would be a lost opportunity to leverage the true promise of the cloud.

Private cloud providers must also be ready to reassure the community that they are not trading one kind of risk for another. Institutions may readily accept that private clouds would operate with values and standards that are aligned with their own. On the other hand, they may be quite skeptical that they will operate responsive, efficient, and customer-centric IT services. We suspect many institutions might more readily trust a corporation's ability to manage and deliver IT services than to trust them to safeguard data.

There is also a transaction cost to the formation of any collaborative venture. The creation of multi-institutional private clouds will require sustained leadership and the willingness on the part of the founders to invest the time and resources required to incubate and launch the idea. Certainly, the higher education IT community has been a source of successful collaborations in the past. However, the effort required to create private cloud consortia combined with the real possibility that they will be more costly to operate than public clouds will need to be weighed carefully against the benefits they might create.

Private clouds are not a panacea. They will bring with them their own complexities and shortcomings. However, they are likely a viable option for institutions in areas where higher education has needs that are unique. Public and private clouds are not an either/or

decision. There is likely a place for both in the IT organization of the future.

The Future of Non-Cloud Options

In the near future, we would not anticipate there to be any radical change in the adoption or availability of non-cloud-based alternative sourcing. As our survey respondents indicated, site-based outsourcing remains a viable path for delivering some IT services, particularly for institutions that face difficulty hiring or retaining their own staff. In fact, as some of the IT leaders we interviewed suggested, adoption of site-based outsourcing, including the use of contractors and consultants, may increase the longer staff cuts and hiring freezes remain in place.

In the long run, we would expect to see more site-based services offering to shift to public or private clouds in order to capture greater economies of scale. This seems highly likely for commodity technologies and services. Site-based models can offer institutions access to greater staff and managerial expertise. Unlike the cloud, they don't offer the potential to capitalize on scale economies that could reduce the cost of a service. In fact, they often add a provider's profit margin on top of the institution's cost to self-operate. Moving to a cloud-based service seems the only way to offer institutions enhanced skills and freed-up internal staff capacity at the same or lower cost. We would expect cost savings to become a more necessary outcome as the economic crisis drives permanent reductions in IT budgets.

A shift to cloud-based services that realize economies of scale will be predicated on both providers' ability to build scalable services and institutions' ability to adopt more standardized services. The success of the former depends on continued development of virtualization and other cloud-enabling technologies as well as continued growth in

demand for cloud services across industries. The latter is more a cultural issue and will depend on institutions' ability to standardize practice both within and across institutions. This will be easier for some areas (infrastructure) than others (business processes). The severity and duration of the economic crisis seem likely to play a large role in dictating just how extensively practice can and will be changed.

Preparing for the Future

Regardless of whether they grow incrementally or aggressively, cloud computing and other forms of outsourcing will be lasting parts of the IT organization's portfolio of sourcing options. In fact, it seems likely that they will become more prominent in the years ahead. For the IT organization, the question is then how to best position itself to effectively utilize alternative sourcing. In this section, we suggest an agenda for IT leaders and organizations to improve their readiness to evaluate, adopt, and manage cloud computing and other forms of alternative sourcing.

Understand your costs.

The IT sourcing decision is in part an exercise in evaluating how the cost of a contract service compares with the cost of self-operation. Being armed with an accurate understanding of the one-time and recurring costs of self-operation will better prepare an institution to negotiate with potential providers and to monitor the effectiveness of outsourcing decisions once they are made. This requires IT organizations to have a much better understanding not only of how they spend their budgets but also how their staff members spend their time. Staff time is often treated as a free resource in institutional decision making. However, the time staff spend creating and sustaining a self-operated solution is a real cost that must be accounted for.

Expand competencies in areas that help to create and manage alternative sourcing partnerships.

Several of the IT leaders we interviewed stressed the importance of building competency within the IT staff to negotiate and manage vendor contracts. However, negotiation skills are not the only competency that needs to be created if an organization is to prepare itself for more intensive use of alternative sourcing. IT organizations should also expand their competency as integrators of various technology solutions. As institutions increase their adoption of cloud computing solutions such as SaaS, the responsibility of the IT organizations to knit these applications together in order to support cross-organizational business processes and management reporting also increases. In addition, IT organizations will need staff with problem-solving and facilitation skills that enable them to analyze issues that cross vendor boundaries and bring IT staff and third-party partners together to look for the root cause of issues in cases where no single individual or firm will own all of the components of technology. This will require staff with broader technology and problem-solving skills as opposed to expertise in any single service or technology.

Tim Nesler, CIO at Santa Fe College, described the organizational evolution he is anticipating as an "IT Lite" model. He said, "As we outsource some services and delegate others around the college, we will become leaner. Technicians will be replaced by people who can do planning, architecture, and project management. We will shift more to an organization that manages external relationships."

Ready the technical environment.

To maximize flexibility of sourcing options, institutions will need a technical infrastructure that is aligned with current standards throughout the technology stack. Identity management will also be a critical enabler.

Combining multiple providers into a seamless experience for users will depend on a strong, federated identity management solution being in place. Federated identity management is already a critical need to enable the sharing of research data and other content across institutional boundaries. Managing identity in a cloud-based computing world will be even more complex and critical. Institutions will need to be able to provide their users with access to their own computing resources as well as those hosted by vendors and commercial partners. Without federated identity management there will be no efficient means of tracking and managing users' access rights as roles and affiliations change or as institutions shift service providers. Kevin Morooney, vice provost for information technology at Penn State, told us that he sees a need for institutions to work collectively with providers to forge an identity management solution. He said, "I think a lot about the challenge of managing identity in the cloud. We need to find a way to work collectively with organizations that provide cloud services to help them see that this is critically important to us."

Finally, it goes without saying that the very foundation of alternative sourcing and cloud computing in particular is dependent on institutions' maintaining robust, secure, and reliable network connectivity. As Rick Chlopan, CIO at Kentucky Community & Technical College System, observed, in a cloud-based environment the consequences of network downtime are severe. He said, "The network and the Internet have become our lifeblood. If it goes down, the campus comes to a halt and the only application we can run is Solitaire."

Engage IT governance groups.

As we detailed in Chapter 6, most alternative sourcing decisions will be made in concert with a variety of stakeholders. In anticipation of future adoption decisions, IT leaders should place the issue on the radar screen of IT

governance groups and advisory committees. A discussion of how to apply the framework presented in this chapter to individual institutional technologies and services might be an effective place to start. In addition, IT leaders should work with IT governance groups to establish a set of uniform criteria for evaluating alternative sourcing opportunities.

Define a strategy, or one will be chosen for you.

Remaining silent on alternative sourcing is not a viable option for IT organizations. The failure to articulate a point of view as to when and how to use alternative sourcing in the cloud computing era leaves the very real possibility that the collective actions of individual users will de facto define the institution's alternative sourcing strategy. It would be better for IT leaders to proactively engage their institutions in discussions of how to leverage the cloud and other forms of IT outsourcing than to try to stop or influence the efforts of individuals or organizations within the institution to adopt cloud services after the decision to adopt has already been made.

Where to Begin

EDUCAUSE recently interviewed some of higher education's IT leaders about where cloud computing might go next. Most believed there was a role for cloud services in the near future for higher education IT. Most thought it would be easier to move new services to the cloud than existing ones, and they predicted that adoption would be slowed by concerns about policy and control.⁸ Their opinions very much resonated with the findings of this research.

This same group also had a good deal of consensus around the services that would be the best candidates for sourcing to a public or private cloud-based solution in the near term. These services include⁹

- ◆ business availability/disaster recovery,
- ◆ computer labs for students,

- ◆ computing cycles,
- ◆ cooperative (library) collection development,
- ◆ desktop support,
- ◆ data storage,
- ◆ e-mail,
- ◆ ERP,
- ◆ identity services,
- ◆ IT help desk (tier 1), and
- ◆ telephony.

This list seems an appropriate place for any IT organization to start its discussion of an alternative sourcing strategy. Applying the control-versus-availability-of-substitutes framework to each of these technology areas and their component parts will help IT organizations develop a point of view about where alternative sourcing may be beneficial for them. Engaging stakeholders outside IT in these conversations will facilitate the start of an important dialogue about how and where cloud services make sense for the institution. Most importantly, it will cast

the IT organization in the role of proactive facilitator guiding individual parts of the institution to the right sourcing decision.

Endnotes

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7. Charles Babcock, "Time to Believe in Private Clouds," *InformationWeek* (April 13, 2009): 27–30.
8. Katz et al., "Demystifying Cloud Computing," 8–9.
9. *Ibid.*, 9–10.