

Economics of the Cloud: Business Value Assessments

Gartner RAS Core Research Note G00168554, Joseph Feiman, David W. Cearley, 25 September 2009, RA7 07042010

This research defines and quantitatively assesses the key business values of the cloud computing paradigm and compares them with the business values of a traditional on-site computing paradigm.

Key Findings

- It is possible to quantitatively assess values that an enterprise seeks in a cloud computing paradigm and compare them with the values it has traditionally gained from an on-site paradigm.
- With the adoption of cloud computing, enterprises will experience a decrease in some critical values that they used to gain from on-site computing. Yet, enterprises will experience increases in some other values.
- Overall, the business value of cloud computing is significantly higher than that of on-site.

Recommendations

- Enterprises should clearly understand the scale of trade-off (i.e., the degree of value of the gains and losses that come with cloud computing adoption).
- Enterprises should seek higher economic values, agility, creativity and innovation, simplicity, and social impact through cloud computing.
- For a higher value of trust and risk, enterprises should consider a traditional on-site paradigm.
- While our overall assessment places higher business value on cloud computing, users must assess the value in relation to specific types of cloud services and workloads before making final decisions.

ANALYSIS

This research introduces a computing paradigm value model that quantitatively assesses and compares the business value of the cloud and on-site computing paradigms. This high-level assessment enables enterprises to understand where cloud computing should be adopted, and for which values on-site should be used.

Note: “On-site” means that an enterprise uses its own hardware and software environment to build and deliver solutions. In the context of this research, cloud computing refers to an enterprise using services from cloud providers to build and deliver solutions.

Computing Paradigm’s Business Value Model

A particular computing style or paradigm can be evaluated based on how well it satisfies demand for particular business values. The cloud computing paradigm offers capabilities that hold the potential to deliver higher business values than the on-site paradigm. The business values against which the cloud computing and on-site paradigms are compared are listed in the “Value Category” column in Figure 1.

Our model measures the value delivered by a particular paradigm by its proximity to the ideal (i.e., in that case, the maximum desired value). It awards that ideal, maximum value with a score of 1.0. Respectively, a 0.0 score awards the minimal value. The business values assigned to the two paradigms are listed in the “Cloud, Value’s Score” and “ On-Site, Value’s Score” columns in Figure 1.

Some business values are more important than others. Therefore, we define the relative importance of business values in the model by assigning them weights that total 100%. Weights are listed in the column “Category’s Importance (Weight)” in Figure 1 and are graphically represented in Figure 2.

The relative (weighted) value is calculated by multiplying the value’s weight by the value’s score assigned to cloud computing and on-site paradigms – see columns “Cloud, Feature’s Relative (Weighted) Value” and “On-Site, Category’s Relative (Weighted) Value” in Figure 1.

The total value of the paradigm is calculated as the sum of all the relative weighted values for that paradigm – see the “Total Value” row in Figure 1.

The business value categories are defined as follows:

1. **Economics** – This parameter assesses the computing paradigm’s economic advantages and financial benefits, such as:

- Optimization of operational expense

Here, we give higher scores to cloud computing because it is better than on-site in:

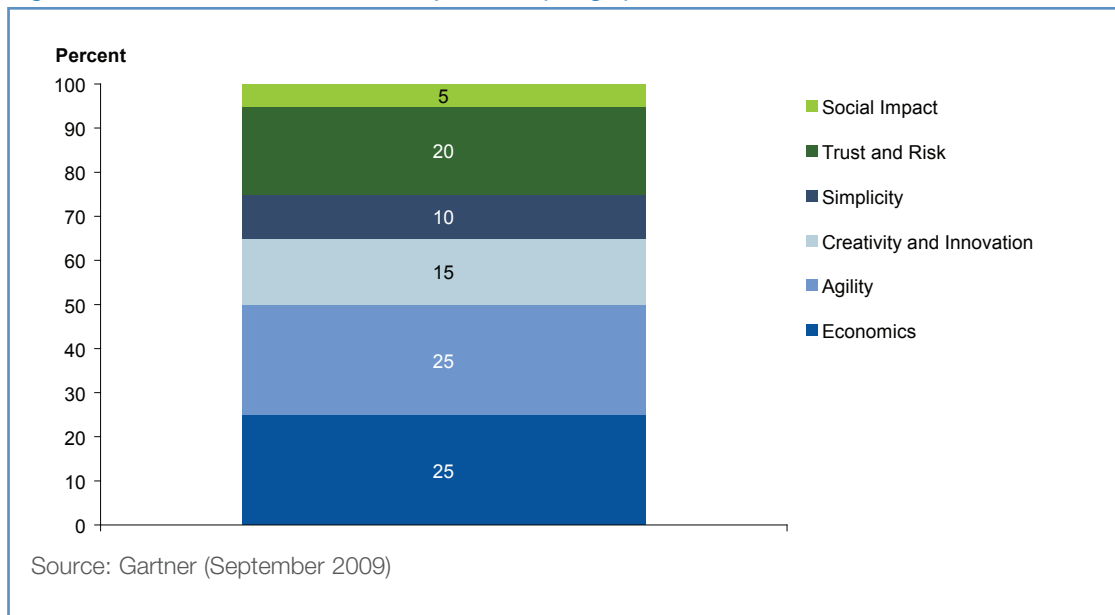
- Optimizing expenses (e.g., it offers a pay-per-use model for hardware and software functionality)
- Minimizing unnecessary costs (e.g., it does not charge for the features that come with software but are not used)

Figure 1. Value Model

| Value Category | Category's Importance (Weight) | Cloud | | On-Site | | Cloud vs. On-Site |
|-----------------------------|--------------------------------|---------------|-------------------------------------|---------------|--------------------------------------|-------------------|
| | | Value's Score | Feature's Relative (Weighted) Value | Value's Score | Category's Relative (Weighted) Value | |
| 1 Economics | 25% | 0.7 | 0.18 | 0.5 | 0.13 | 0.05 |
| 2 Agility | 25% | 0.8 | 0.20 | 0.6 | 0.15 | 0.05 |
| 3 Creativity and Innovation | 15% | 0.7 | 0.11 | 0.3 | 0.05 | 0.06 |
| 4 Simplicity | 10% | 0.7 | 0.07 | 0.4 | 0.04 | 0.03 |
| 5 Trust and Risk | 20% | 0.4 | 0.08 | 0.8 | 0.16 | -0.08 |
| 6 Social Impact | 5% | 0.6 | 0.03 | 0.1 | 0.01 | 0.03 |
| Total Value | 100% | | 0.66 | | 0.53 | 0.14 |

Source: Gartner (September 2009)

Figure 2. Business Values' Relative Importance (Weight)



Optimization of capital investments

Here, we give higher scores to cloud computing because it is better in optimizing capital investments (e.g., it enables lower capital investments in hardware, software and real estate; instead of investing in them, enterprises procure cloud paradigm's services)

- Long-term total cost of ownership of the IT paradigm that supports the business
2. **Agility** – This parameter assesses how well a computing paradigm supports business agility (i.e., speed and flexibility of implementing business changes). Here, we address issue such as:
- What paradigm makes it faster to achieve a business objective?
 - Which one makes it easier to support the implementation of the necessary business changes?

Overall, we give cloud computing a higher rating because of the following:

- Elasticity and use of shared resources inherent in the cloud paradigm.
- Cloud computing typically requires significantly less time and effort to provision additional resources for existing applications or new resources for new applications.
- The straightforward procurement model and use of shared infrastructure also lead to greater agility of the cloud computing.

To some extent, as the on-site paradigm evolves to embrace more of the tenets of cloud computing and becomes a “private cloud” environment, the difference in agility between external cloud and on-site will diminish. However, few enterprise users will be able to match the scale and elasticity of large external cloud service providers.

3. **Creativity and innovation** – This parameter addresses issues such as:

- Whether better support for new business models is impossible or hardly possible without that computing paradigm

Here, we give higher scores to the cloud computing paradigm. Cloud computing allows enterprises to more fully focus on business objectives and, therefore, allocate more resources to solve business problems, even the ones that were practically insolvable with the on-site computing paradigm (because on-site was taking its share of the overall available resources). As an example of a business model hardly possible with on-site, we can point to the computing enablement of users (almost) regardless of their position on the globe.

- Pool of talent

Here, we give higher scores to the cloud computing paradigm. Cloud computing enables IT availability to broader masses of individuals, thus creating a pool of talent that has not existed before.

- Better support for unique requirements specific to the particular enterprise

For the time being, we give a somewhat higher score to the on-site computing paradigm because it gets used to the customization of its users' requests, while cloud computing broadly practices same-for-all services. Over time, we expect that this disadvantage of the cloud will lessen with the expected growing sophistication of the cloud.

- Better support for enhancements in the existing business models (e.g., new types of interactions between customers, employees and business partners)

4. **Simplicity** – This parameter addresses issues such as:

- Which paradigm allows focusing (almost) entirely on business issues/objectives and rightfully treating IT issues as easily solvable

Here, we give higher scores to cloud computing. Cloud computing enables a model where each of the players focuses on the subjects that are their primary business and expert matter. Enterprise can focus on machinery manufacturing, financial services or youth education, while cloud providers focus on IT.

- Which paradigm makes it easier for businesses to scale and overcome IT bottlenecks (such as insufficient size and quality of material and human assets)

Here, we give higher scores to the cloud computing paradigm. With cloud computing, enterprises get access to a broadening market of service providers that can satisfy their needs without investing in establishing those services inside their own enterprises.

- Which paradigm makes it easier to start a new business model from cost/risk/time perspectives

Here, we give higher scores to the cloud computing paradigm. One of this paradigm's advantages is the enablement of small enterprises to get access to the IT services that were too expensive with the on-site paradigm, because many of them could not afford all the needed breadth of their own IT (along with their own hardware, software and human resources).

- Where entry barriers are lower

Here, we give higher scores to the cloud computing paradigm because it sets lower entry barriers with its pay-per-use model and there's a lower need to invest in its own full-breadth IT infrastructure.

5. **Trust and Risk** – This parameter is a measure of trust that exists between the enterprise and its IT services provider, and the ability to manage the risk that arises from using a particular paradigm. We consider the following issues:

- Which risks related to service reliability, availability and security arise
- How much control the user can exert over the IT services provider, what control must be ceded to the provider and what trust assurances exist

Here, we award higher scores to the on-site computing paradigm, because it has much greater control over its IT services provider.

- To what extent business data and application portability and ownership issues arise

Here, we award higher scores to on-site computing, because portability is minimal compared with cloud computing and, respectively, ownership is not as much threatened (e.g., code and applications remain on-premises rather than stored in the cloud).

- Whether best practices, standards, certifications and tools exist to adequately manage the risks

For the time being, we give higher scores to the on-site computing paradigm, because it has developed, over half a century, a more or less comprehensive set of best practices, standards, certifications and tools to manage risks, while cloud computing is still in the early stage of their development.

6. **Social impact** – This parameter addresses issues such as:

- Less negative environmental impact through the optimization of IT resources

Here, we give higher scores to cloud computing, because it enables enterprises to use less computing hardware and less energy for heating and cooling. It enables less pollution, less traffic congestion and less real estate construction of IT facilities (with cloud, there's less need to build separate facilities for each enterprise).

- Humanitarian help and services to the needy

Here, we give higher scores to cloud computing, because it enables, for example, services to be delivered to developing nations that have had limited access to IT sources (e.g., providing access to medical services, medical consultation and access to medical equipment via IT).

- Enablement of global collaboration

Here, we give higher scores to cloud computing, because it enables better access to computing regardless of users' geographic location. Users get access to any cloud provider, not necessarily to their own enterprises (access to which might be unavailable).

Comparing Paradigm Values

The "Total Value" row in Figure 1 shows that the total cloud computing business value is 0.66, when total on-site business value is 0.53 – i.e., cloud business value is 26% higher than the business value of on-site computing. This is quite a substantial difference. We can review contributors to the difference in Figure 3.

Figure 3. Which Cloud Features Provide Higher or Lower Value Than On-Site Ones?

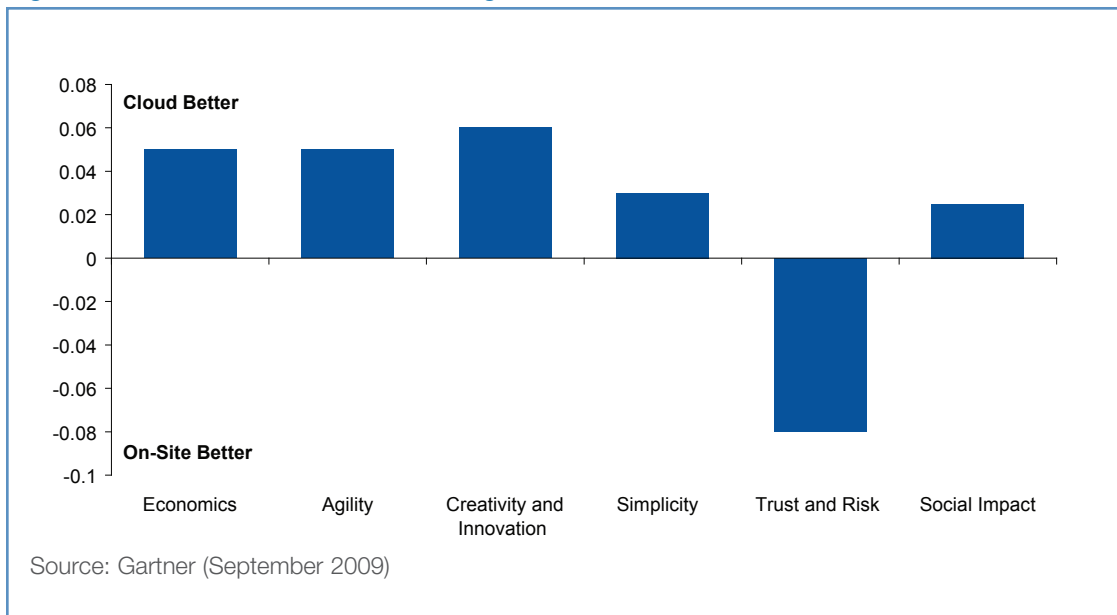


Figure 4. Proximity to the Maximum Value

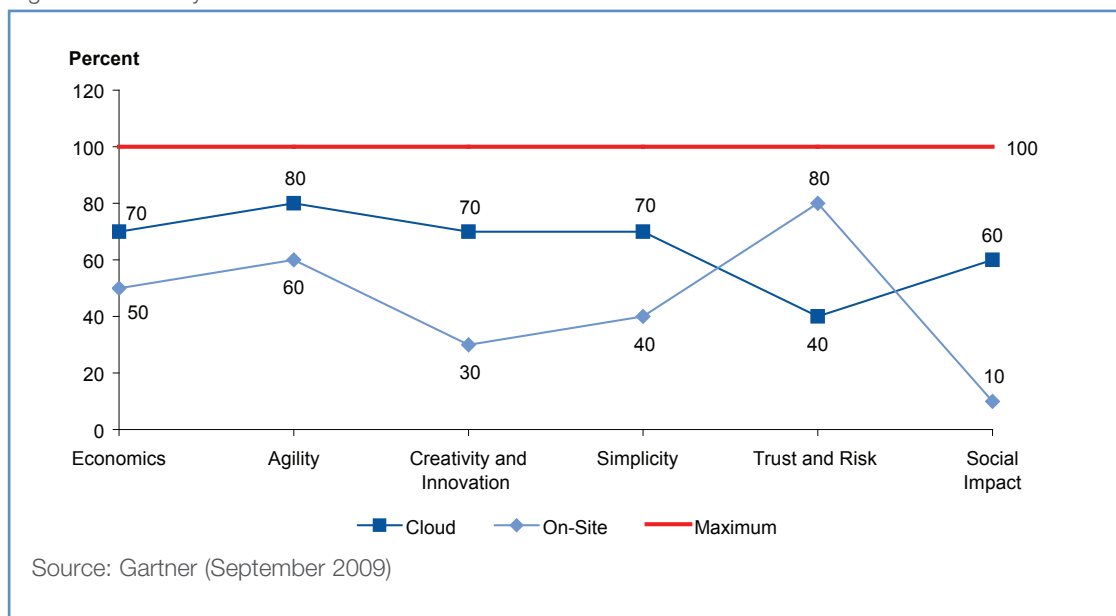


Figure 3 demonstrates that the cloud computing paradigm provides higher value for agility, economics, creativity and innovation, simplicity, and social impact than the on-site paradigm. The on-site paradigm provides higher value for trust and risk. Enterprises should determine which features are more or less important for their business objectives, and design their strategies by balancing the adoption of cloud computing with adherence to the on-site paradigm.

In Figure 4, we graphically depict how close our assessments are of the features' values to the ideal values that enterprises' IT organizations seek in those features.

Economics, agility, creativity and innovation, and simplicity of the cloud paradigm are closest to the ideal client expectations. Creativity and innovation, and the social impact features of on-site computing are the least capable of delivering on enterprises' IT expectations of business values.

Model's Level of Abstraction and Accuracy

The computing paradigm value model represents a higher-level abstraction of computing paradigms' values, and trades generalization of assessments for the accuracy. Although it points to the relative value at a high level, it should not be read as an endorsement of cloud computing for all users, services or workloads. Using the model as a baseline, users should adjust the relative weights and scores based on the particular type of cloud computing service and type of workload being considered.

Using this model as a base, Gartner plans to deliver other models that will address specific use cases in more detail, at a lower level of abstractions and with higher accuracy (for a particular use case).

Model's Weights and Scores

Weights and scores might change in instances such as the following:

- **Changing the paradigm's maturity:** Over time, scores or weights of some features might change due to the growing maturity of cloud computing, the possible innovation in on-site computing and new business use cases.
- **Enterprise size:** The paradigm's features might be valued differently by large enterprises and small or midsize businesses.
- **Industry:** The parameter's weights might depend on the industry (e.g., a nonprofit organization may give the social impact category a higher weight than a manufacturing enterprise).
- **Market specifics:** Weights and scores might change when value assessments are done for a market-specific model (e.g., for security cloud, hardware cloud and data management cloud computing).