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THE BUSINESS VALUE OF SOFTWARE QUALITY

Every organization builds custom software for the same reason: to create business value. An essential part of that value stems from the quality of the software. Low-quality software simply has less business value than high-quality software.

But why? What is the business value of software quality? The question isn't simple to answer. Software quality has many components, including functionality, reliability, security, performance, ease of use, and more. One way to examine this question is to divide it into two parts, looking separately at:

- The business value of quality in *externally* facing software, applications used by an organization's customers.

- The business value of quality in *internally* facing software, applications used by an organization's own employees.

In both areas, the most evident—and usually most important—aspects of quality's value come from the *absence* of quality. While high-quality software can provide direct business value (think of the advantages offered by a great user interface on a mobile phone, for example), it's more often the case that low-quality software destroys value. Because of this, understanding the business value of software quality means focusing largely on the harm caused when that value isn't present, both for externally and internally facing software.

The Business Value of Software Quality for Externally Facing Software

Many organizations, both in business and the public sector, create custom software for external users. If those organizations create great, high-quality software, it can provide significant value. When an organization creates low-quality software, however, business value that might have been created doesn't materialize. Even worse, existing business value might be damaged—the application makes a net negative contribution. Here are two very public examples of the latter situation:

- In April 2011, hackers stole the personal information of more than 70 million customers from Sony's PlayStation Network, the online gaming component of Sony's popular videogame console. The attackers reportedly exploited a known security vulnerability in older database software.

- In October 2011, Research in Motion (RIM) experienced a three-day email outage affecting users around the world. According to RIM, the cause was a back-up system that failed to work as expected when the primary system failed.

The business damage caused by low-quality software builds over time.

As anyone who reads a newspaper knows, these are just two examples from a large set; Sony and RIM are far from the only companies to have suffered public problems with software quality. Yet whatever the problem and whoever it affects, the business damage caused by low quality software builds over time. Figure 1 shows a typical timeline of the impacts.
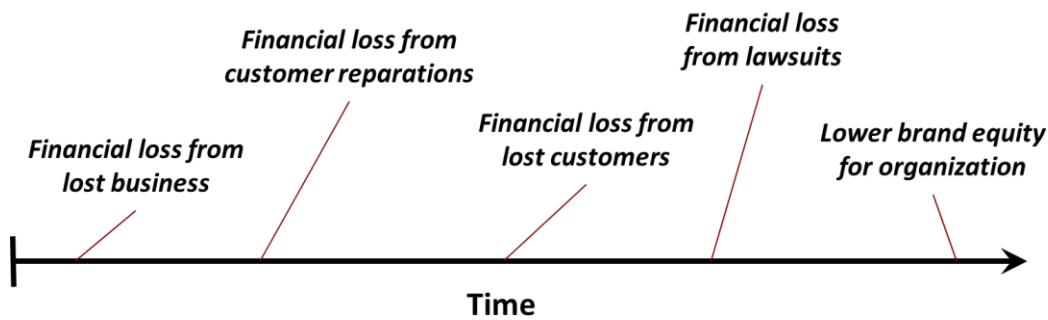
Figure 1: The business impact of low-quality external software used by an organization's customers ranges from immediate financial losses to lower brand equity.

With a typical external quality problem, such as those at Sony and RIM, the sequence of damages over time commonly includes the following:

- *Financial loss from lost business*. In response to the hacker attack, Sony shut down the PlayStation Network for several weeks, making it unavailable to customers. Similarly, RIM lost money from an unavailable service— customers can't pay for a service they can't use.

- *Financial loss from customer reparations*. Most businesses will try to mollify customers by making some kind of reparations. For example, Sony offered free gaming once the network was restored. The company also provided an identity theft insurance program at no charge for the affected users.

- *Financial loss from lost customers*. Quantifying the number of customers lost from low-quality software can be hard. Neither Sony nor RIM has published information in this area, for instance. Yet both are in very competitive markets—videogame consoles and smartphones, respectively—and it's all but certain that the quality problems they experienced cost them customers and the profits those customers would have brought. Especially with younger customers, for whom technology has always been part of life, the tolerance for quality problems is low.

- *Financial loss from lawsuits*. In some countries, including the United States, quality problems in external software inevitably lead to lawsuits from disaffected customers. Both Sony and RIM faced this problem, for example. And while these suits often drag on for years, they can inflict significant losses on the responsible organizations.

- *Lower brand equity for the organization*. A brand embodies an identity—it's how customers perceive a company. The essence of a brand's value derives from the experiences customers have with the company's offerings. Software quality problems significantly affect these experiences, and the damage builds up over time. With RIM, for example, the outage described above was the latest in a series of reliability problems, something that certainly erodes brand value. The way organizations respond to software quality problems also affects brand value. Many customers felt that Sony delayed disclosure of the PlayStation security breach, for instance, further damaging their view of the firm. Ultimately, lower brand equity leads to fewer customers and a less valuable business.

With externally facing software, quality problems create a cascade of negative effects for the business. Whether it's a security issue such as the PlayStation Network problem Sony experienced, a reliability problem such as RIM's email outage, or something else, building higher-quality software would have avoided these effects. The connection between business value and software quality is both real and significant.

Benefits of Quality for Internally Facing Software

While many organizations build software that's used by external customers, a large share of custom applications created by enterprises are internal—they're used primarily by the enterprise's own employees. As with externally facing software, high quality internal applications can bring significant business value.

Once again, however, the most important impact of quality happens when it's missing. Low-quality software can cause real business damage inside an organization. And as with the problems caused by low-quality external software, this damage builds up over time. Figure 2 illustrates some of the most common issues and the order in which they typically occur.
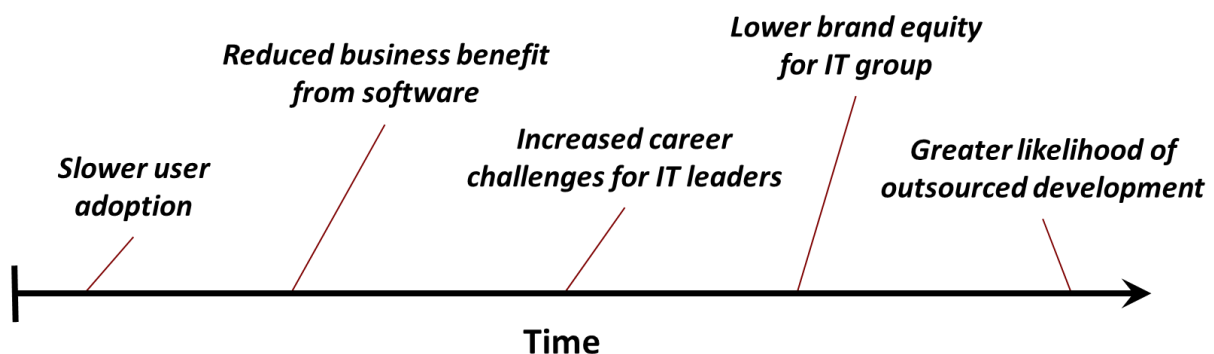

Figure 2: The impact of low-quality software deployed within an organization ranges from slower adoption to a greater likelihood of development being outsourced.

The effects of low-quality software used inside an organization include:

- *Slower user adoption*. Many aspects of software quality can affect how quickly users adopt a new application. Poor performance can make the software painful to use, for example, while a badly designed user interface creates a steep learning curve. Whatever the reason, an application that's adopted more slowly slows down whatever business benefit it's meant to provide. A hard-to-adopt application designed to improve a business process, for example, will take longer to provide those improvements then would a higher-quality application.

- *Reduced business benefit from software*. Even if an application doesn't have quality concerns that slow adoption, it might have other problems that show up as it's used. The most damaging of these are bugs, things that don't work as they should. An application that generates the wrong results clearly isn't providing the intended business benefits. Problems like this can even have an impact outside the organization. For example, the bond rating agency Moody's incorrectly assigned high ratings to billions of dollars in debt products due to a bug in the custom internal application the firm used to model risk. This error led some of its customers to

invest in products that were significantly riskier than they expected, then to front-page coverage in the Financial Times.

- *Increased career challenges for IT leaders*. Low-quality internal software has an impact beyond just the people who use it. The problems it creates also affect the careers of IT leaders whose teams build that software. Creating custom software consumes significant resources and thus should bring substantial business value. If it doesn't due to quality problems, the IT leaders responsible for that project are very likely to see their career options narrow. Successful custom software development necessarily implies creating high-quality software.

- *Lower brand equity for the IT group*. Low-quality software affects more than just the reputation of the people who lead its creation; it impacts the reputation of the entire IT group. Once again, it's useful to think about this in terms of branding. Just as customers develop feelings about a company based on their interactions with it, the business groups who act as customers of internal IT develop feelings about their IT group. For an IT leader, managing the brand of this internal IT group is of paramount importance. A significant part of doing this is producing high-quality software.

- *Greater likelihood of outsourced development*. When a company's brand becomes too damaged, its customers flee. The same thing happens to software development organizations in internal IT groups. A development group that produces too much low-quality software will end up with a damaged brand—its internal customers won't want to use it—and so face a higher likelihood of being outsourced. In the past, internal development groups frequently didn't need to have a high quality bar, since there wasn't much competition. Today, however, with the rise of widespread outsourcing, even internal teams must understand that creating high-quality software is an inescapable part of maintaining their brand value. In other words, it's essential to keeping their jobs.

High software quality is fundamental to getting business value from internal applications.

As with externally facing software, quality problems with internally facing software create a cascade of negative business effects. And even though the business value of quality in externally facing software might seem more visible—the quality problems experienced by Sony, RIM, and others get lots of publicity—high software quality is fundamental to getting business value from internal applications.

Conclusion

Whether it's used by customers or by employees, improving the quality of custom software has real business benefits. Investing in this area, whether for better tools, better training, better processes, or something else, can yield significant returns. Some of these returns are financial—your organization can avoid losses due to quality problems. Others are harder to quantify but no less important, such as avoiding the brand damage caused by a serious security problem. And for IT leaders, the returns can be much more personal, perhaps even determining the course of a career.

The truth is obvious: There's a strong connection between the quality of an application and the business value that application provides. As software works its way into the heart of every organization, every IT leader needs to internalize this reality. It's the only way to create the applications that modern businesses need.

About the Author

David Chappell is Principal of Chappell & Associates (www.davidchappell.com) in San Francisco, California. Through his speaking, writing, and consulting, he helps people around the world understand, use, and make better decisions about new technologies.