Innovative and Disruptive Technologies

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I n 1995, Clayton Christensen used the term "disruptive technology" to describe any kind of innovation that creates resistance when potential adopters balk at the thought of change and competing technologies fight against the prospect of being replaced.[1] Innovative and disruptive technologies, such as the PC and cell phone, have changed how we live and do business.

Disruptive Innovation

According to Wikipedia (itself innovative and disruptive), "A disruptive innovation is an innovation that helps create a new market and value network, and eventually goes on to disrupt an existing market and value network." The last few decades have provided many examples. Before the PC, computers were huge mainframes that occupied air-conditioned rooms and were tended by specialists in white coats. Before the cell phone entered the marketplace, telephones were heavy black instruments tethered to the wall by a cord. And before Wikipedia, encyclopedias came in 26-volume sets that salesmen peddled door to door.

Without disruptive technologies, human progress would likely be slower and not marked by quantum leaps due to certain advancements. This special issue focuses on computing technologies that show promise of being the next cycle of innovation and disruption.

In this Issue

In the first article, "Tablets: The Next Disruptive Computing Technology?" Marcelo Nogueira Cortimiglia, Alejandro Germán Frank, and Liziane Seben suggest that tablet computers are a disruptive technology, because they're constantly connected to the Internet and offer computational potential far beyond small embedded systems. Falling somewhere in between notebooks—which are more powerful but more traditional in the way they can be used by consumers—and smartphones—which tend to serve a more focused role in communication, socialization, and entertainment—the tablet has far more potential, thanks to recent advances in power management and usability. The authors assert that tablets have the potential to displace portable computers as our main computing device.

In "The Not So New Software Integration Challenge," George Hurlburt suggests that the problem of massive software integration and the associated testing and quality assurance is a disruptive problem that will require "holistic thinking at unprecedented levels." The ubiquitous nature of software and its relentless connectivity between handheld devices, embedded systems in consumer devices, and massively networked applications on the Web, and our ability to search and index such devices, systems, and applications, presents technical, social, and ethical challenges reminiscent of Horst Rittel and Melvin Weber's "wicked" problems.[2] Like wicked problems, which can't be attacked with traditional problem-solving methodologies, Hulburt suggests that addressing the problems of massive systems integration will require a new way of thinking—a disruptive paradigm shift in software design and deployment.

Finally, Jan Kallburg and Bhavani Thuraisingham recount the disruptive effects of the battle tank in World War I, the German

blitzkrieg strategy in World War II, and the strike helicopter in the mid 1960s and 70s, likening the evolution and human adoption of these technologies to cyberwarfare today. In particular, they review the motivations of sovereign states conducting offensive operations in cyberspace and argue that this new field of battle, previously the domain of hackers, has forever changed the nature of risks posed to civilian and industrial bystanders.

We hope you enjoy this collection of articles on disruptive technologies. ⓘⓣ

References

1. J.L. Bower and C.M. Christensen, "Disruptive Technologies: Catching the Wave," *Harvard Business Rev.*, Jan./Feb. 1995; http://hbr.org/1995/01/disruptive-technologies-catching-the-wave/ar/1.
2. H. Rittel and M. Webber, "Dilemmas in a General Theory of Planning," *Policy Sciences*, vol. 4, no. 2, 1973, pp. 155–169.

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