

Confronting Disruptive Innovation

Imagine that you fall asleep in 1993 and leave your desktop PC running. When you awake in 2013, you find it replaced by an iPad—PC use has declined and 50% of the population now uses tablet computers. Your tablet has lightning speed, new capabilities, and works wirelessly in “The Cloud.” It has flash memory in place of a hard disk drive, but no floppy disk or CD drives, and lacks a keyboard. Fear sets in as you have no clue how to use this new device. This is disruptive innovation at its best.

by Jill Gilbert

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In the environment, health, and safety (EH&S) arena, disruptive innovation ranges from continuous emission monitoring systems (CEMS) and process data historians to PCs, emission calculation spreadsheets, and enterprise EH&S software. Today, IT departments must deal with several emerging technologies at once—social networking, mobility, and cloud computing. Big data and predictive analytics are on the horizon. How do organizations stay on top of changing technology, and how do they decide what to adopt?

Disruptive Innovation

It's hard to envision living without electricity, color TV, the Internet, and mobile technology. Each of these is a disruptive technology, a new technology that unexpectedly displaces an established one. In *The Innovator's Dilemma*,¹ Clayton Christensen classifies technology as either sustaining or disruptive. Sustaining technology can be discontinuous or radical, or can rely on incremental improvements to an established technology. Sustaining technology improves the performance of established products for customers in a mainstream market.

Many organizations promote innovation through disruptive technology and prefer the term disruptive innovation. A disruptive innovation lacks refinement, may perform poorly when new, appeals to a “fringe” audience, and may lack a proven practical application at first. Sometimes, it results in worse performance than the item it replaces.

Most organizations adapt better to sustainable technology. With network and office software, they expect subtle changes and develop an upgrade strategy. In most cases, work goes on with little training or disruption. However, major disruptive innovations—like new enterprise software or upgrading from Windows XP to Windows 8—can disrupt work, with lost productivity until users are trained and adopt the technology.



Technology Adoption

An organization's strategy, direction, culture, and IT maturity can impact the success of adopting new technology. Two respected models explain technology adoption.

Technology Adoption Life Cycle

In his 1991 marketing book, *Crossing the Chasm*, Geoffrey A. Moore describes the "Technology Adoption Life Cycle" (see Figure 1), which uses five market behaviors to gauge the ability to adopt technology: techies, visionaries, pragmatists, conservatives, and skeptics. Techies adopt technology early because they think it is cool; visionaries see a competitive advantage; pragmatists seek practicality; conservatives seek proven and pervasive technology; and skeptics purchase technology at a discount at the end of its life cycle, when the next product available.

The "chasm" refers to the mindset differences between early adopters and the market majority. Technologies in the "bowling alley" do one thing well and replicate success to build market demand in other areas. A technology is in the "tornado" when it becomes a "must-have" product or "killer app."

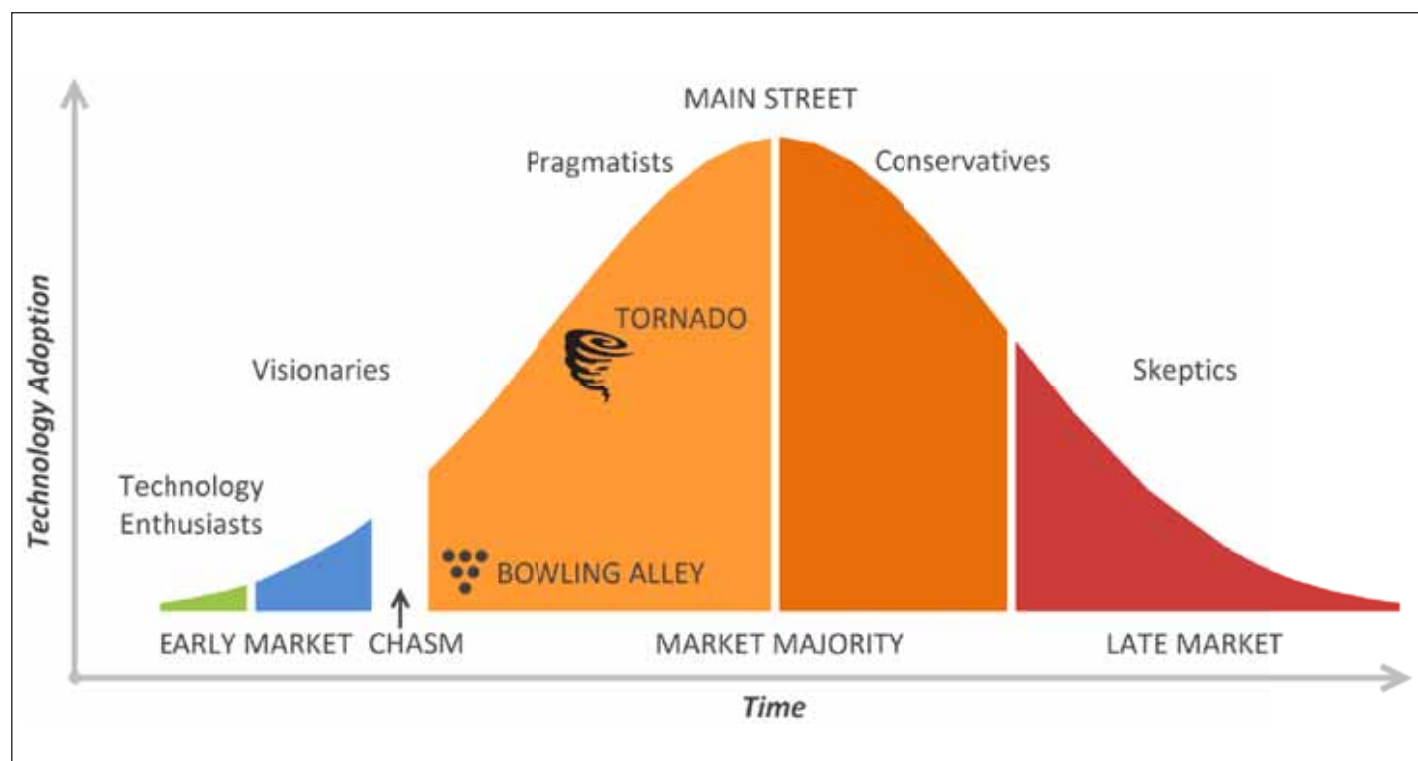
Figure 1. Technology adoption life cycle (adapted from *Crossing the Chasm*, Geoffrey A. Moore).

Market Traction, Maturity, and Saturation

In his May 2012 article in *Technology Review*, Michael Degusta's model divides market adoption into three phases: traction, maturity and saturation. Compare three disruptive innovations and their adoption in the United States (see Figure 2):²

- The telephone took 25 years to get traction, the time from consumer availability to 10% market penetration. It took another 39 years to reach maturity (40% penetration), and 18 more years to reach saturation (75% penetration).
- The smartphone took 8 years to reach 10%, another 2 to reach 40%, and less than 3 more years to reach 75%.
- The tablet took less than 3 years to reach 10% in 2011. Market analysts predict that tablets and smartphones will displace PCs in less than two years.

The market adopts some technologies slowly and others rapidly. The time from introduction to market saturation for the three technologies becomes shorter and shorter with each new technology. Is this because we morphed from an industrial to an information society in the 20th Century? Because technology allows shorter and shorter product



development cycles? Even with shorter product development cycles, the underlying technologies evolve over many years.³

Confronting Disruptive Innovation

Disruptive innovation presents a number of challenges, among them:

- **Sustaining innovation.** Large corporations are designed to work with sustaining innovation.
- **Subtlety.** Disruptive innovations may be subtle and difficult to recognize, or “in your face” like the Bring Your Own Device (BYOD) trend (see IT Insight—Tech Trends: Bring Your Own Device to Work, *EM* August 2012, 38–40).
- **Conflicting demands.** Even when recognized, a disruptive technology may compete with other priorities, and may not align with the organization’s strategy.
- **Choice.** Some disruptive innovations are a choice; others are not. Large organizations cannot expect to use electric typewriters and telephone message pads when the competition uses the latest PCs, tablets, and smartphones.
- **Consumerization.** Employees bring devices to work that we once thought had no place in business. IT departments must respond, as this trend will continue.
- **New user experience.** Disruptive innovations like smartphones, tablets, and touchscreen PCs provide a new end-user experience that is social, mobile, and enabled by the Cloud. These technologies also bring new interfaces like touch screens, app icons, and video chat.

Organizations must minimize disruptions and get on with their core business. Advice on confronting disruptive innovation includes strategic, technology, process, and human factors:

- Avoid dismissing disruptive innovation because it does not reinforce corporate goals, only to be threatened later when the technology takes off. If adoption is imperative, then find a way to align with corporate goals.

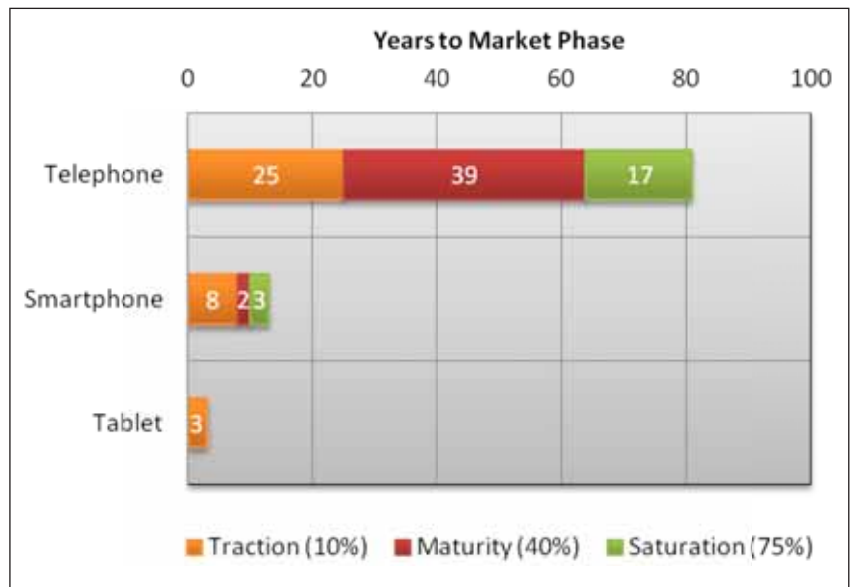


Figure 2. Technology adoption speed increased over the last century.

- Minimize disruptions by developing a strategy and a road map for each disruptive innovation. The strategy may range from “all in” to “wait and see.”
- Develop a technology road map and address adoption in an informed manner. If you know that your organization is not an early adopter, then observe the early adopters, avoid their failures and leverage their successes.
- Use a proven process when adopting disruptive innovations. Remember to address organization change management within the process (see IT Insight—Change Happens...Embrace It!, *EM* April 2012, 32–34).
- Provide adequate training to avoid compromising the core business. In the end, it boils down to people.

Epilogue

After staring at your iPad for a few minutes, you press the big button on the front of the glass panel and the tablet lights up. The user interface is easy to learn, and you find the help documentation guides you through some of the more advanced tasks. You need someone to explain “iTunes” and “social networking” and “apps,” but find using the tablet enjoyable. Thus, disruptive innovation need not be so disruptive after all! **em**

References

1. Christensen, C.M. *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*; Boston: Harvard Business School Press, 1997.
2. Degusta, M. “Are Smart Phones Spreading Faster than Any Technology in Human History?”; *Technology Review*, May 9, 2012 (www.technologyreview.com).
3. Evans, N.D. “Timing Your Move into Disruptive Technologies”; *Computerworld*, October 3, 2012 (www.computerworld.com).