



Electronic Publishing & Disruptive Technologies

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“Unprecedented uncertainty”

Paul Saffo of the Institute of the Future has said we are in a period of “unprecedented uncertainty” as to technology and its effects on our business.

What an accurate description...

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In February of 2004 the Copyright Clearance Center Board held a two-day strategic planning session and Paul Saffo, Director of the Institute of the Future, was invited to facilitate the meeting . In his opening remarks he described this as a period of “unprecedented uncertainty” as to technology and its effects on our business. That phrase struck me as being incredibly accurate.

We have been working for at least the last five years under “unprecedented uncertainty” – and perhaps for the past decade. One main reason is the phenomenon of “disruptive technologies”.



Disruptive technologies

“A disruptive technology is a new technological innovation, product, or service that eventually overturns the existing dominant technology in the market, despite the fact that the disruptive technology is both radically different from the leading technology and it often initially performs worse than the leading technology according to existing measures of performance.”

Wikipedia

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What is a “disruptive technology”? According to the Wikipedia – in itself something enabled by a disruptive technology -- “A disruptive technology is a new technological innovation, product, or service that eventually overturns the existing dominant technology in the market, despite the fact that the disruptive technology is both radically different from the leading technology and it often initially performs worse than the leading technology according to existing measures of performance.”



How disruptive technologies win

“A disruptive technology comes to dominate an existing market by either filling a role in a new market that the older technology could not fill ... or by successively moving up-market through performance improvements until finally displacing the market incumbents.”

Wikipedia

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Specifically, “A disruptive technology comes to dominate an existing market by either filling a role in a new market that the older technology could not fill ... or by successively moving up-market through performance improvements until finally displacing the market incumbents.”

Where did this idea come from and how does it relate to business activities?



“The Innovator’s Dilemma”

Book by Clayton Christensen (1997)

“...firms that succeed in one generation of innovation almost inevitably become hamstrung by their own success and thus doomed to lose out in the next wave of innovation”

“The Blood of Incumbents”
The Economist, Oct 28th, 2004

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Clayton Christensen, a professor at Harvard Business School, wrote a book called “The Innovator’s Dilemma” in 1997. The dilemma that firms face is that firms that succeed in one generation of innovation almost inevitably become hamstrung by their own success and thus doomed to lose out in the next wave of innovation. Just as they “disrupted” the previous era’s leaders, they are in turn disrupted by the pioneers of the next era. Let me borrow from a 2004 article in The Economist to summarize Christensen’s thoughts.



“Sustaining” innovation

“Sustaining” innovation is what incumbent firms engage in to sell ever better, more profitable, products to their most attractive and demanding customers

- reach a point where no appetite for more bells and whistles
- numbing complexity

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As The Economist article says: “To explain how this happens, Mr. Christensen distinguishes between two basic types of innovation. The first is “sustaining” innovation. This is the sort that incumbent firms are engaged in to sell ever better, and ever more profitable, products to their most attractive and demanding customers. An example might be Microsoft adding more features to Word, Excel and PowerPoint. If challenged by upstarts, incumbents almost always prevail. At some point, however, the technology goes into “overshoot”, where users no longer have an appetite for additional bells and whistles, and sustaining technology leads to numbing complexity.” [end quote]

By way of example, I can speak for many of my aging contemporaries who find themselves increasingly frustrated by the complexities of dealing with what should be simple devices – whether cell phones, printers, digital cameras, or wireless networks – but which turn out to be problems. You throw up your hands in disgust at the difficulty of getting basics done.



“Disruptive” innovation

“Disruptive” innovation targets the least demanding customers or “non-consumers” and offering something simpler or cheaper or both

- newcomers crush the incumbents because of different financial incentives and corporate cultures

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Returning to The Economist and Mr. Christensen, “It is at this point that the second, “disruptive” type of innovation becomes possible. Disruptive technologies target the least demanding customers in the current market, or even entirely new markets of ‘non-consumers’, by offering something simpler, or cheaper, or both...And in disruptive-technology battles, Mr. Christensen argues, newcomers to the industry almost invariably ‘crush the incumbents’.

“One reason is an asymmetry in financial incentives.” A disrupter sees new markets where the incumbent sees marginal or unprofitable business. But the disrupter then makes continued innovation until it is “good enough” to poach the incumbent’s main market.

“Another reason why newcomers prevail is a cultural malaise that infects incumbents.” Big, successful companies look at products and competitors. Disrupters look at real people and what they need.



Disruptive technologies and STM publishing

- personal computers?
- cheap storage?
- CD-ROMs?
- Internet?
- Web browsers?
- laptops?
- wireless technology?

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What disruptive technologies have STM publishers encountered?

-- Personal computers? Clearly these were very important but only disruptive when there was enough cheap storage capacity and power to handle the graphics associated with journals – text was not enough; it took a decade for PCs to really make the inroads needed for market changes for STM publishers.

-- CD-ROMs? Nope, only a distraction of the 1980s, not a long-term disruption.

-- The Internet? Yes, of course, but it was the World Wide Web in 1991 and more significantly Mosaic in 1993 that were the real breakthroughs affecting our journal publishing business.

-- Laptops? Wireless technology? I would say yes to both, as they increased the ubiquitous role of personal computers – the anytime, anywhere nature of computing and web connectivity.



Examples from Elsevier (1)

ADONIS, late 1970s-late 1990s

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Elsevier, together with a group of other STM publishers, started looking seriously at electronic dissemination in the late 1970s in a project called ADONIS. The idea was to scan and store journal articles on optical disk for print on demand. The technologies of the early 1980s were too expensive. There were only large \$40,000 optical workstations.

It was only later with the spread of personal computers and CD-ROM that Adonis project was a reality in 1991. Adonis thought it could ride the wave of the new technology. CD-ROMs were sent to ADONIS subscribers for local use.

However, for journals, CD-ROMS were soon understood to be only a distraction on the way to online delivery and a system such as ADONIS, which relied on CD-ROM, was quickly obsolete.



Examples from Elsevier (2)

TULIP, 1991-1995

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TULIP was an Elsevier project testing the delivery of scanned journals over local area networks, using locally-developed software. In 1991 we partnered with nine university systems, involving 17 universities in all. The idea was that each university would develop its own software to use the journals and that process proceeded with varying degrees of success. At the same time Elsevier was experimenting with using the Internet as a way to deliver the large scanned files to the universities. It was not a pretty process – at peak delivery times we were 5% of Internet traffic.

I recall vividly when Mosaic was introduced in 1993 in the middle of the TULIP experiment. One of our university partners said “You know, this just might be what we have been waiting for.” And, indeed, another struggling TULIP university threw up its hands and withdrew, having seen the future and deciding to now refocus on this easy, common browser approach.



Examples from Elsevier (3)

Elsevier Electronic Subscriptions

ScienceDirect

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By 1996 we had moved from TULIP to a commercial product called Elsevier Electronic Subscriptions that offered all Elsevier titles for local hosting. We had learned, however, and also offered software to manage storage and access. And in 1995 we started the design of what became ScienceDirect, our online service built on the Web browser. We aimed to be as “state-of-the-art” as possible at the time. We designed it in 1995, built it in 1996, beta-tested in 1997, rolled out in 1998, with full commercial release in 1999. The danger, of course, was that we were still learning what the web was all about and, using Lexis-Nexis as our partner, we also built using what quickly became legacy technology.

However, ScienceDirect succeeded because it was able to make use of a high-speed, inexpensive Internet and a local environment of ubiquitous personal computers and printers.



Where are we now?

- Traditional STM publishers are in the “sustaining” innovation phase.
- We are trying “to sell ever better, more profitable, products to [our] most attractive and demanding customers.”

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Traditional STM publishers are in the “sustaining” innovation phase.

We are trying to sell ever better, more profitable, products to our most attractive and demanding customers. We are adding bells and whistles, in some cases to ten year old technology.

I suppose we could be described as the incumbents defending existing customers and business, possibly at the risk of being displaced by those with nothing to lose in our markets and whose culture is different.



Today's "disruptive" innovators

Google and other search engines

and

those providing tools to support "user-generated content"

"From Netscape to the Next Big Thing"
Financial Times Aug 5, 2005

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It surely comes as no surprise that today's leading "disrupter" is Google and other search engines. Google has changed the game even for something as relatively minor in the broader scheme of communication as journal publishers and scholarly researchers. By enabling the discovery and links to anything on the public web – to say nothing of each "new-service-of-the-month" Google introduces – Google has turned publishing upside down. Authors post papers to websites – called "self-archiving" – and at least some reader traffic moves from the publisher's site to the author's. How much? Will this jeopardize subscriptions? We don't know yet – the jury is still out.

You can add to Google, the innovators providing tools supporting "user-generated content". Narrowly defined, that might be tools for blogging. But blogging is not so very likely to threaten scholarly publishing. But what of institutional repositories and those who have major ambitions for them? These may be part of the next round of disruptions in electronic publishing.

And what of Open Access? Can a business model be a "disruptive technology? Probably not – but the ideas behind Open Access will feed exploitation of available technologies.



A brief history...

- 1980s: the goal was to begin to explore what electronic dissemination meant for scholarly publishing
- 1990s: the goal was to move journals from paper to print as smoothly as possible
- 2000s: the goal is to make a business transition so that we are innovating and disrupting, not adding bells and whistles that complicate

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For those of use who have been in scholarly publishing for the last 25 years or longer, we have seen a lot of change and we know we are far from through. The question is, how do we avoid being sidelined by others. In the 1980s we were in a period of exploration. In Elsevier we called it the “let a thousand flowers bloom” period – try a lot of things and see if any work.

By the 1990s the goal was clear: move journals from paper to electronic distribution as smoothly and efficiently as possible. For a while we were actually disrupting the print technology with innovative offerings. But that period has largely passed. One could argue that in the last couple of years we have collectively been more engaged in adding bells and whistles, perhaps complicating rather than simplifying the lives of our users. I recall being told early on that you could make a success with an electronic product if you make it easier for someone to do something they have to do anyway. We forget that at our peril.



In conclusion

- If we get too far from our customer, we risk being displaced.
- The most recent example for Elsevier has been the development of Scopus.
 - Scopus was designed using a customer-centric methodology.
 - Teams were out in the field testing, testing, and testing.
 - The result: over 1000 customers in the first nine months since its release.
- This has to be model for STM publishers: know and honor your customer.
- And don't be afraid to disrupt your own business. If you don't do it, someone else will.

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Scopus was designed using a customer-centric methodology.

Teams were out in the field testing, testing, and testing. They would go back and adjust based on what users told them and then go out and test again. And the result is a product that users like.

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This has to be model for STM publishers: know and honor your customer.

And don't be afraid to disrupt your own business. If you don't do it, someone else will. Thank you.