Australasian Digital Theses Program and institutional repositories: who's disrupting who? Sample Paper with Guidelines

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Abstract

In 2003 I undertook a case study analysing the potential of the ADT, within the framework of Christensen's Theory of Disruptive Technologies (1997), to be a disruptive technology in the areas of academic libraries, higher education and academic publishing. I concluded that, while the ADT could have a disruptive impact on Australian academic libraries and the Australian Higher Education sectors, it also has the potential to be a sustaining technology in these sectors, whereas it had a much greater potential to disrupt scholarly publishing. In 2004, the ADT won further funding to expand and enhance the metadata repository that is the core of the Program. In the meantime, however, institutional repositories have continued to slowly develop very much in line with Christensen's Theory. So the question is: is the ADT a disruptive technology, or just a stepping stone paving the way for institutional repositories in Australia and New Zealand? This paper uses the Theory to analyse the current institutional repository activity in Australia and locates the ADT within that context. The paper makes predictions about the potential for the ADT to continue as a disruptive technology.

1. INTRODUCTION

The first half of this paper draws heavily on a paper I jointly authored for Educause in Australasia in early 2005 (Lafferty, Edwards, & Dovey, 2005). The second half of the paper speculates on the future of the ADT and indeed electronic theses repositories in general, with the advent of institutional repositories.

2. THE THEORY OF DISRUPTIVE TECHNOLOGIES

Clayton Christensen first proposed the theory of Disruptive Technologies in his book *The Innovator's Dilemma: when new technologies cause great firms to fail* (C. M. Christensen, 1997). Using the disk drive industry Christensen developed a theory for why mainstream, established, well-managed and successful firms fail when newcomers selling inferior technology enter the market.

The theory can be summarised as follows:

Mainstream organisations spend their time trying to meet the needs of their current customers, especially their top end customers, often providing functionality well in excess of that required by the bulk of the market. They invest in areas where returns are highest and pursue large markets.

Disruptive technologies usually start out with very limited functionality and usually only appeal to a very limited market. They are cheap and not very profitable. Over time, their functionality improves and they appeal to a broader, often untapped market.

Eventually the disruptive technologies have enough functionality to be 'good enough' for most people – including the bulk of the market currently serviced by the mainstream organisations. The mainstream organisations lose their business to the smaller newcomers who usually end up with an even bigger market than that of the companies they displace.

Christensen posits five principles to explain this apparent conundrum (C. Christensen, 2000) Companies depend on customers and investors for resources, rejecting ideas that don't meet their needs.

- Small markets don't solve the growth needs of large companies, so products that appeal to small markets are ignored.
- Markets that don't exist can't be analysed. Because nobody knows how an untried technology will perform, market research and sound planning have little relevance to a disruptive technology.
- An organisation's capabilities define its disabilities. An organisation's processes and decision making criteria define what it can and will do, but also what it will not or cannot do.
- Technology supply may not equal market demand. In fact, it may well represent technology oversupply. Because many products provide greater functionality than is really required, products that under-perform today in terms of customer expectations, will, as they improve, meet performance requirements tomorrow.

Disruptive technologies, by creating a new market for a different product usually undermine the competitive advantage of incumbent organisations. Another concept that Christensen introduces is that of sustaining technologies. These technologies may be radical and innovative, but they support the incumbent organisation in its core business – in continuing to do what it currently does successfully.

In Disruption in Education (C. Christensen, Aaron, & Clark, 2003), the authors expand the theory to identify two disruptive growth strategies:

Type 1: 'compete against non-consumption' and establish a completely new market for a product or service (C. Christensen et al., 2003 p.46).
Type 2: 'compete from the low end' by 'deploying a business model that profitably serves less-demanding customers that the market leaders are actually happy to shed' (C. Christensen et al., 2003 p.47). The low end of the market is generally not as profitable as the higher end. Customers at the low end can actually cost more to service than they return, hence market leaders are happy to discard them.

Leifer et al note that the radical innovation life cycle can be fairly lengthy – often ten years or longer (Leifer, O'Connor, & Rice, 2001 p.103).

3. ADT CASE STUDY
The 2003 case study attempted to test the Theory of Disruptive Technologies by applying it to the ADT and looking for causal or potential causal relationships between it and changes to the sectors upon which it impacts.

The ADT fits the definition of a Disruptive Technology in a number of ways. It is competing with non-consumption by attempting to provide access to Australian theses by people who have had difficulty doing so: it is not competing for the mainstream customers of academic libraries or commercial publishers. As a one-stop shop for finding Australian theses The ADT will presumably assist those researchers who currently have difficulty locating them, even through the National Bibliographic Database. It is providing access to a very limited product.

Early in 2003, the ADT did not have particularly good functionality, but it has improved and will probably continue to do so over time – A key attribute of a disruptive technology is that functionality improves over time, eventually appealing to a broader market (e.g. digital cameras replacing film). The ADT functionality and coverage has improved over time with the inclusion of metadata for non-electronic theses, the enhancement of the interface and now the appointment of DSTC (Wells, 2005) to take the ADT to its next stage..

As with disruptive technologies, it is impossible to quantify the future growth of the ADT. It has many of the attributes of a disruptive technology but also of a sustaining technology.

Academic libraries may find as the ADT functionality improves, and other OAI-compliant products develop, that traditional library users simply move to a technology and institution-neutral source that provides access to what they want in the form they want it, and is 'good enough'. It may provide access to a more targeted range of knowledge in a way they find acceptable.

However, it may *support* academic libraries by providing access their institutions' research theses. By raising the profile of academic libraries that embrace and promote it, it has the potential to re-invigorate those libraries within their institutions by increasing their relevance to the research being done by their institutions, rather than just providing access to the information created by third parties.

The ADT may provide Government and other external organisations/individuals with information they need to critically evaluate and compare research output at an institutional level. In this way

it has the potential to change the way institutions attract researchers, students and funding and in that way have the potential to disrupt the structure of Higher Education in Australia.

However the ADT can also sustain universities by raising the profile of universities and their research, and thereby attract researchers and students from a much wider quality pool.

> *'It is within the publishing model that the ADT has the potential to be most disruptive. It has the potential to train new researchers in alternative ways of publishing their research output via open access. It also has the potential to provide access to original research to an entirely new audience currently excluded from access to academic publishing by prohibitive pricing and licencing arrangements'* (Lafferty et al., 2005).

4. INSTITUTIONAL REPOSITORIES

One of the major global trends during 2004/2005 has been the increasing support by government departments and enquiries for institutional repositories. The UK House of Commons Science and Technology Committee has strongly endorsed government requiring that all publicly funded research output be deposited in institutional repositories(House of Commons Science and Technology Committee, 2004b p.3). Although the government chose not to take up the recommendations because of the untested nature of the business models involved (House of Commons Science and Technology Committee, 2004a)it did not reject the model of institutional repositories outright.

In Australia, the Department of Education Science and Training (DEST), through its Strategic Information Infrastructure grants has supported the ADT program, the ARROW (Australian Research Repositories Online to the World) project and the 'Towards an Australian Partnership for Sustainable Repositories (APSR)' project. It would seem to be clearly encouraging researchers to make their publicly funded work available freely, online.

In New Zealand the National Library is working with the Council of New Zealand University Librarians to investigate the development of institutional repositories for the New Zealand research sector. A working party has submitted a draft report to the New Zealand government recommending the establishment of a national framework for institutional repositories including a national resource discovery service (along the same lines as ARROW) and to support institutions in developing repositories(National Library of New Zealand, 2005) Interestingly, the draft report recommends the promotion of 'New Zealand institutions' presence in the redeveloped Australasian Digital Theses Program' (p.42).

The US National Institutes of Health has also strongly recommends self-archiving, although through its own outlet, PubMed Central (National Institutes of Health, 2005), rather than institutional repositories. Unfortunately, its policy is somewhat watered down from its initial proposal to request self-archiving within 6 months of publication. However anything other than mandating deposit remains voluntary, whatever the timeframe.

Clearly, then, in line with international trends, repositories of research information will be developed and tested across Australasia. While governments are clearly interested in the potential of such repositories they are (quite rightly) not yet prepared to mandate an untried approach to research publication and dissemination.

5. REPOSITORIES, THE ADT AND DISRUPTION

Common problems being encountered in the development of repositories include functionality and attraction of content. Both of these problems were encountered by the ADT, but are slowly being overcome. At least ten Australian universities have mandated electronic submission of theses (Wells, 2005 p.2). Content is therefore slowly building. Improved search functionality has already been incorporated and DSTC has been contracted to improve the functionality of the ADT including 'Google-enabling' the central metadata repository. It is clear therefore that the ADT is moving towards being 'good enough' to become *the* point of access to Australasian theses.

However, since the advent of the ADT, the evolution of institutional repositories has begun. Still, attracting content is a problem and functionality is also limited. ARROW is working with VTLS to provide to provide a more functional front end to the basic Fedora product. APSR is working with the Dspace to also investigate sustainable repository development.

If institutional repositories can attract the content required, and develop the functionality they currently seek, they may well overtake the ADT as the model for institutions to store and make their research available. In fact, the ADT may well contribute to its own demise. If new researchers become educated, via the ADT, in new ways to 'publish' their research, they may begin demanding a similar open access model for their future research output.

The ADT model provides a central metadata repository and distributed storage. The ARROW project is looking at a similar model, along with a national resource discovery service using harvested metadata (Payne, 2005).

Neither the ADT nor any institutional repository model in Australia at the moment could be accused of being 'mainstream' or of providing a technology oversupply that can be undermined by a newcomer. However, while the ADT is basically competing against non-consumption, as described earlier, institutional repositories are in some ways competing against mainstream publishers. They are generally being developed to provide open access to research publications that would formerly have only been available for a price through a conventional publisher (albeit online).

In some ways, the repositories are competing for the low end of the market. They are not demanding that the material has not been published before, so conventional publishers may retain revenues by publishing first. However, repositories are aimed at the low end of the market – those people who the mainstream publishers do not target because they are too much trouble to service.

Both technologies are in their infancy, aimed at different markets and both have the potential to disrupt the current paradigm. But will both still be here in ten years?

The ADT has a head start, but limited potential in terms of content. Institutional repositories have the potential to provide a much more diverse range of information but are still a long way off providing it – and as with the ADT, have no idea what the market will be for their product.

Along the way, institutional repositories must resolve much more complex intellectual property issues than those that have faced the ADT. They do not have the incentive for authors that the ADT may have: the institution cannot withhold a degree to ensure material is lodged.

Institutional repositories therefore still have a greater potential than the ADT to fail.

However, should they succeed, there is no reason that theses and dissertations should not be subsumed into these repositories. The New Zealand recommendations seem to suggest the ADT and repositories may exist side by side in the future, but it seems far more likely that each institution will make a decision to support only one technology, not two.

PREDICTIONS
At this point, a number of 'predictions come to mind:

Institutional repositories will give commercial academic publishers the jolt they require to have them respond to concerns about access to publicly funded research. They will modify their business models to provide open access to research within acceptable time frames, and institutional repositories will disappear before they have the chance to disrupt the current paradigm. Under this scenario, the ADT will flourish and continue to be the only game in town for providing access to Australasian theses and dissertations.

Institutional repositories will disrupt the current paradigm, changing forever the 'publishing' model for academic researchers. If this is the case, in Australasia, the ADT will become subsumed by institutional repositories and by a model of metadata repository such as ARROW which provides access through harvested metadata to the contents of all Australasian repositories.

I prefer the second prediction, but expect the first will to the case. Unless governments mandate public access to publicly funded research outputs, and develop incentives for compliance, it will be almost impossible to put a compelling case to our academic population.

But should the second prediction come to pass, then just like 14 inch disk drives and Kodak's Kodachrome Super8 film, the ADT will be no more.

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