PREPRINT

DISRUPTIVE TECHNOLOGIES ARE MUSEUMS IMMUNE?

Dr Suzanne Keene
Museum Studies, Institute of Archaeology
University College London
31-34 Gordon Square
London
suzanne.keene@ucl.ac.uk
http://www.suzannekeene.info
http://www.ucl.ac.uk/archaeology

Abstract
Digital technologies are often said to be 'disruptive technologies'. Well known examples are the effects on the music industry of downloading digital music files, and of digital photography on the photographic and image industry. The question is, will these developments affect museums, or are they for some reason immune to these disruptive effects? Possible candidates discussed include collecting digital materials, social software, and tagging, syndication and RSS, which may drive pressure for greater access to actual collections.

INTRODUCTION

Digital technologies, notably the internet and others digital, are often said to be 'disruptive technologies'. Well known examples are the effects on the music industry of downloading digital music files, and of digital photography on the photographic and image industry. There are many other examples: the replacement of travel agents by mobile phone shops in the high street, for instance. The question is, will these developments affect museums, or are they for some reason immune to these disruptive effects?

WHAT IS MEANT BY DISRUPTIVE TECHNOLOGIES?

This term is often encountered in articles in the financial and technological press. The notion originated with Clayton M. Christensen of the Harvard School of Management, in his book, *The innovator's dilemma*. [1] To quote from Wikipedia, itself an example of 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 that it often initially performs worse than the leading technology according to existing measures of performance.' [2] An author writes in *The Economist*,

> the dilemma is this: 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. … The disrupters … do not care about products. They observe real people, and specifically non-consumers, to see what jobs they are trying to get done.
>
> Disruptive technologies may either be those that serve customers who have no need for the full range of the high-end product, or else be so different from existing technologies that they create a market, at first taken up by only a few people, but which then becomes ubiquitous and displaces the products of the previously dominant organisations. It often suits incumbent organisations to ignore these developments at first, because it is not very profitable for them to serve these niche market customers. A disrupter might look at a hundred thousand or a million non-consumers and see a huge opportunity, whereas the incumbent sees a drop in the ocean. [3]

Disruptive technologies:

- are radically different from existing technologies.
- Initially perform worse by some measures than existing dominant ones.
- Appeal to a market sector that's not important and not served profitably by established technologies.

Digital technologies are not the only ones that are disruptive – far from it – in the steel industry, for example, smaller more flexible mills were developed that eventually put the massive steel mills in the USA out of business; in transport, will electric cars, at present with only a tiny market share, disrupt an industry that is dependent on high volume production of internal combustion cars?

THE EXAMPLE OF DIGITAL IMAGING

A notable example of a disruptive technology that is relevant to museums is digital imaging. It is having profound effects on the extensive photographic industry, which is seeing the market for film, developing and printing evaporate daily, and it is also disrupting the lives and jobs of the many professional photographers who make a living by creating images. Quoting Tom Ang, a professional photographer writing in Technology Guardian:

> the important changes - from nearly zero adoption to near-saturation of the market - took place in only five years. …
> The restructuring of the profession is more subtle, profound and distressing: experienced photographers are finding themselves marginalised, their darkroom skills discounted with a rapidity that makes the destruction of craft traditions by the industrial revolution appear snail-paced in comparison. ...
> The working day suddenly grew hours longer: with nightfall, we can't put our feet up. No, we sit at the laptop downloading images, captioning and backing up.

> And, if we are press photographers, we then have to edit the day's shoot before transmitting them. [4]

Will some museum professionals find that new technologies are forcing changes to their profession and careers, mirroring the experience of photographers? This might especially affect curators, whose knowledge is central to museums as knowledge organisations. There are already developments that will result in digital surrogates for knowledge and information provision.

THREE DISRUPTIVE TECHNOLOGIES

Digital objects

Digital imaging has been affecting museums for some time, and I believe it is set to continue on this trajectory. These technologies enable museums to collect digital objects and material rather than, or as well as, actual ones. Images are are seen as very valuable to museum collections: they provide a context for three-dimensional objects, and windows on historic places, people and events. Physical image collections commonly include tens or hundreds of thousands of prints, negatives and films. Museums already struggle to catalogue, preserve and provide access to collections on this scale. But, quoting Tom Ang again, 'It is impossible to be accurate, but with a world population of digital cameras exceeding a third of a billion on top of millions of film-using cameras still in use, it is likely that more pictures are taken every year than in the previous 160 years of photography put together.' [4]

Other digital technologies will enable the collection of different types of material, such as sound. The new area of intangible heritage has been introduced through the agency of UNESCO. [5] It is a reaction to what is seen in some countries to be an excessive preoccupation with tangible material culture. Intangible heritage includes theatrical performances, dance, music, storytelling, oral traditions and the like. In the UK we have the National Sound Archive, a vast treasure of intangible heritage. [6] Many museums, especially local museums, collect oral history recordings.

There is still a widespread misapprehension that collecting digital material is less demanding and costly than collecting physical material. Yet cataloguing and making digital files available is an enormously labour intensive task, and preserving digital recordings and images requires both technological and management skills and resources. Digital materials are different: they cannot survive the regime of benign (or even not so benign) neglect that has enabled us to inherit the vast physical collections of museums and archives of documents. [7]

Museums will not be able to ignore pressures to collect digital materials such as photographs and intangible heritage material. They will not be able to close their doors on the coming avalanche of digital images. How will they cope with the coming digital collecting bonanza? It will present challenges of an even higher order than they experience with physical photographs.

Social and collaborative technologies

There are popular technologies attracting many millions of users that are collectively known as social software. [8] These include online chat rooms, blogs, and contributive services such as *Furl* or *del.icio.us*, where one can store, catalogue and share with others all manner of online resources that relate to one's interest. [9] *Wikipedia* is the well-known collaborative encyclopaedia, where people contribute essays on subjects that are subject to editing and correction (or distortion) by other contributors. There are also contributive imaging services such as the well-known *Flickr*, where people store and share online images of every conceivable subject. [10] A similar but more focused website is *Geograph*, where the objective is to collect an image of every square kilometre of the British Isles, contributed by anyone who wishes to. [11]

An example from the museum sector is *Every object tells a story*. An engaging website, it provides facilities for people in and outside museums to contribute objects and stories. [12] Yet it bears the look and feel of the dead hand of officialdom, quite unlike the self-regulating community atmosphere of Geograph and Flickr, and indeed Wikipedia. These three latter are all self-moderating while *Every Object ...* has to be officially controlled. The *24 Hour Museum* sits somewhere in between. [13]

These social technologies do bear the signs of the disruptive. Used at first by a small number of technological and online games enthusiasts, they and others like them now attract many millions of faithful users. Are they relevant to museums, will they disrupt them? Referring to the model for disruptive technologies, the analogous service in museums, limited by old technology and the resource of knowledgeable staff, is enquiries. There can be very high demand from people contacting museums for all kinds of information, and no museum has really worked out how to deal with enquiries. But now there is the possibility of digitising specialist knowledge and creating collaborative spaces for building knowledge and information. It is a very important characteristic of museums to be sources of accurate knowledge about their subjects. Will this role be usurped by museum orientated Wikipedia and the like? Could this service, currently a reluctantly serviced embarrassment, be a point of disruption?

Tagging, searching and syndication

My third candidate technology for disrupting museums is the area of tagging and syndication. This refers to the move to tag information for others to use as they will, rather than for the provider to create the use for those who wish it. The major example of this sort of technology is RSS (really simple syndication) feeds, where providers tag their information and users can cause it to appear within their own websites, or on their screens, in a number of formats. [14] But other variations are evolving.

Online exhibitions provide examples of provider controlled information, where museum stuff is 'interpreted' by the museum for the benefit of grateful users. While there is undoubtedly a place for such pleasurable online experiences (one of my favourites is *Painting the weather,* from the BBC and the National Gallery) museums are a lot less inclined to simply make their material available for others to use as they will. Crucial to it is the question of how to categorize information. The Fine Arts Museums of San Francisco have run a project where volunteers have been invited to attach terms that they find meaningful to pictures, thus assembling what is known as a folksonomy, in

contrast to the taxonomy of terms that is normally constructed by professionals. These commonsense terms are ones likely to be found useful by the average visitor to the website. Together with the art history taxonomy terms, they form a *word soup,* nutritious for the image-hungry enquirer. [15]

I foresee and hope that these technologies will bring pressures to gain better access to, and make more use of, museums' physical collections. It is a rare museum, now, that lacks a computerised catalogue of its collections. Museum professionals usually claim that the public do not want access to detailed, plain catalogue information about what is in the collections: rather, they must be provided with selected material chosen for them.

Fig 1 somewhere here

If we look at a sister service, archives and record offices, they offer a different model. Their primary function is to enable and assist users to access the stored material for whatever purpose they choose. These services are experiencing enormous demand from ordinary people researching family history. Museums such as military museums which have archives and historic material also experience this. This in turn has been fuelled by a range of online finding aids that help users to understand where the records are, how they may be used, and list material that they can then visit to consult. As is well known, demand to access the 1901 UK census records when these were first put online by the National Archives (then the Public Record Office) caused the entire system to crash. It took months before it could be provided again. (There is an interesting commercial angle here. The system was provided through a public finance deal, and the copyright to the online data is now privately owned, initially by Qinetiq, in 2005 sold on to Friends Reunited for £3.3 million. Access to the summary listing is free of charge but more detailed records have to be purchased.) [16]

Will museums firstly find that they have to put their complete collections catalogues online? Already 'proportion of collections listed online' is a performance indicator for national museums. Will this then lead to demand to access the actual collections, and an entirely new business model for museums?

WHAT ARE THE PRESSURE POINTS?

We have identified some digital technologies that have the potential to disrupt the ways that museums currently function. But no matter what the potential is in theory, disruption only happens as a result of pressure on an organisation. There are many examples of commercial companies, or whole industries like the steel industry, being cataclysmically affected like this, [1] but museums are in a rather different category.

As public bodies they are not subject to the same market pressures as are commercial companies. Most of their funding is from governments: a relatively small proportion of their income is derived from the market. Central government is their biggest 'customer' and largely calls the shots. Museums receive this public funding because they deliver public goods that benefit the public in general, whether or not the individual actually 'consumes' directly what the museum offers. These goods include national or local status and identity, collective memory and a feeling of shared culture or cultures, a

permanent resource in the collections and a store of knowledge. Up to a point, this shelters museums as organisations from the unsettling technological context.

Government may choose to engineer financial pressures to approximate to a commercial market – as we are seeing this year in the UK health service. Or it may choose to set certain objectives or wishes as a consumer. Currently these are education, and social inclusion.

However, museums certainly are not immune to market pressures in the form of visitor numbers. If numbers of visitors decline catastrophically, as they did for the Victoria & Albert Museum at the end of the 1990s, then it is noticed (and marked, in that example, by the departure of the museum's director). These pressures are similar to those experienced by their commercial counterparts. Of course, not all successful companies thrive on the largest market share: they have the choice of choosing a particular segment (eg the rich upper classes) and selling to a few people at a high profit. Few museums are able to make this choice.

THE SITUATION OF MUSEUMS

Although they are not subject to the relatively straightforward laws of commercial survival, museums are not immune to different sources of market pressure. At present they see their main business as serving visitors – millions a year – and providing them with carefully selected and authored information. Primarily they provide an experience for people who visit them: they are in the leisure attraction and cultural tourism markets. As with any other business, their customers may simply choose to do something else. However, as actual venues, they are mainly competing on non-technological grounds.

This familiar, if competitive, scene could be disrupted by the three areas of technology discussed above.

Collecting

Museums will, I am sure, be compelled to extend their collecting into the virtual. This will bring pressures to curate and preserve digital materials and they will have to find, or redeploy, the resources and technology to do this. Possibly they may outsource it: in that case, they will have to be far more organised about cataloguing and managing these materials than they have managed to be in the case of the physical counterparts.

Having acquired the material there will be pressure to use it and make it available. Museums simply don't have the resources to do this themselves: therefore they will have to invite the public, in some manner, to do much of this job for them.

Communicating

This leads on to pressure to communicate and allow others to contribute to their resources, and to use them on their own terms, not those set by museums. At present the use of museum resources in this way – which, we should remember, are held in trust for the public, not owned by the museum – is rudimentary. In Canada the *Digital collections* programme was set up by Industry Canada, the government department,

specifically to allow non-museum people to use the digital museum resources that have been created through the Canadian Heritage Network and other programmes over the last decades. [17] This goes beyond the *Moving here* project, with the Museum of London, the National Archives and others as partners, which invites people to contribute their recollections about immigrating to the UK. [18]

The fish collection of the Australian Museum, in Sydney, is an excellent example of the sort of strategies museums could adopt. As well as the physical collection, the intention is to build a collection of images of fish in their natural environments. An Australia-wide network of interested people contributes these images. Copyright and use of images is agreed and contributors are formally accepted as contributors. Other information on the website includes a collection catalogue, welcoming information about students and researchers using the collection, and a list of professional publications that have drawn on the collections. [19]

Fig 2 somewhere here

Using collections

The third area is one where I really hope there will be disruption. This is the effect of digital technologies on the level and kind of use of museum collections, something that is discussed below. [20]

DISRUPTION FOR MUSEUMS

What pressures will cause these technologies to disrupt the current operations of museums? On digital collecting, I believe that museums will create their own pressures. The long established museum collecting strategy is 'if it can be collected, we will collect it', and to ignore the consequences. I foresee that this will continue. Large scale collections of digital materials will be made, some of which will survive. On tagging and syndication, communication and participation, it is pressures from government policies for social inclusion and participation that will most likely come to bear. I can see a few museums enthusiastically adopting these technologies, but I predict that most will carry on as they do now, regardless.

Fig 3 somewhere here

It is in the area of using collections that I hope museums will be disrupted. The pressure for greater use and access to collections would come from both individual users – we may see the example of family history research – but also from funding bodies and the public, who are noticing that there is a vast and underused collections resource that is stored, never intended to be exhibited. For example Brian Appleyard wrote in the Sunday Times under the headline, *A nation of hoarders*, 'They are full to bursting, yet still collecting madly. Have our museums lost their way?' The Museums Association in 2005 published a report of a thorough investigation that they conducted, *Collections for the future*. [21] If these collections – indeed, *the* collections – are not intended to be exhibited, then what are they being kept for? My answer is, for research, learning, creativity, memory and identity, and enjoyment. Yet museums are not in any way

geared up to provide for comprehensive regular access to and use of their collections. [22]

Demand may arise from the availability of online catalogues coupled with pressure to make better use of this costly resource. A few museums have begun to respond to pressures to promote their collections' usefulness to more diverse groups. There have been exercises in which members of black and ethnic minorities have researched the collections, and as a consequence contradicted the claim commonly made by museums that there is nothing in the collections that represents their cultures. If museums have to diversify away from their current all-consuming public focus on exhibitions this would be disruptive indeed.

I don't think that the myth that there is no need to put collections catalogues online is a sustainable position. Once information is digitised, pressure mounts to make it available. Once online it could lead to all sorts of interesting developments – more demand to visit and work with the collections, and more demand to contribute, as we can see in the case of the Australian Museum fish collection.

CONCLUSIONS

So what might be the consequence of this technological disruption?

In 1997 I wrote: 'A good fairy has touched our dusty old card indexes with a wand of gold. No wonder it is taking us a while to come to terms with what this means.' [23] The jury is still out on this. Museums are currently perceived to be knowledge organisations and information sources, part of their role as memory institutions. It is only since computerisation came along that such a thought was viable. Traditionally providers and sources of information, they have developed, held and supplied this either by knowledgeable people or else in fairly primitive records such as card indexes. The area of knowledge and information provision is one that is seen to be highly likely to be affected by digital and information technologies.

Museums are going to have to come to terms with new sorts of collecting, somehow. I hope they are also going to have to deal with much greater use of their collections and join in partnership with non-professionals. They have been losing curatorial expertise in favour of staff concerned with interaction with people – front of house for visitors, education and programmes. Why don't curators fight back by engaging the wider public in building the knowledge and information that is the essential part of the collections?

Perhaps museums will have to see their collections much more as a service to be provided, as are records and archives, rather than as a resource to be strictly controlled and released only with careful 'interpretation'. But if that was fully thought through it would have huge implications for the ways in which museums conduct their affairs and deploy their resources. It would have fundamental and disruptive resource and business implications. it would mean a whole new organisational psychology and value system for those who work in museums.

In fact, the museum might have to grant the wish of Mark Dion, the installation artist who extensively uses museum collections and ideas about them in his artworks: [23]

The museum needs to be turned inside out – the back rooms put on exhibition and the displays put into storage.

References

[1] CHRISTENSEN, C. *The Innovator's Dilemma*. Harvard Business School Press. 1997.
[2] WIKIPEDIA *Disruptive Technology* http://en.wikipedia.org/wiki/Disruptive_technology. Accessed: 8.5.06.
[3] ANON. Survey: Information Technology. The Blood of Incumbents. *The Economist.* Oct. 28th. 2004.
[4] ANG, T. Seeing the Big Picture. *Technology Guardian.* Nov. 24th 2005.
[5] UNESCO Culture. *The Convention for the Safeguarding of Intangible Cultural Heritage*. Signed 17 October 2003. 2003 http://portal.unesco.org/culture/ Accessed: 8.5.06.
[6] Website: *The National Sound Archive*. http://www.bl.uk/nsa
[7] KEENE S. Preserving Digital Materials. *The Conservator,* 26 pp.93-99. 2002.
[8] WIKIPEDIA Social Software. http://en.wikipedia.org/wiki/Social_software. Accessed: 8.5.06.
[9] Websites: *Furl*. http://www.furl.net; *Del.icio.us*. http://del.icio.us
[10] Website: *Flickr*. http://www.flickr.com
[11] Website: *Geograph*. http://www.geograph.org.uk
[12] Website: *Every Object Tells a Story*. http://www.everyobject.net
[13] Website: *24 Hour Museum*. http://www.24hourmuseum.org.uk
[14] WIKIPEDIA *RSS protocol*. http://en.wikipedia.org/wiki/RSS_(protocol)
[15] Website: *Fine Arts Museums, San Francisco. 'Thinker' image search*. http://www.thinker.org/fam/about/index.asp. Accessed: 8.5.06.
[16] Notebook: QinetiQ float is flogging the crown jewels. *The Guardian Business*. Jan 10th 2006.
[17] Website: *Canada's digital collections*. http://collections.ic.gc.ca/
[18] Website: *Moving Here*. http://www.movinghere.org.uk/
[19] Website: *Fishes. Australian Museum Fish Site*. http://www.austmus.gov.au/fishes/
[20] KEENE S. *Fragments of the World: Uses of Museum Collectins.* Elsevier Butterworth Heinemann. 2005.
[21] WILKINSON H (ed.). *Collections for the future.* Museums Association. 2005. http://www.museumsassociation.org/collections
[22] KEENE S. Becoming digital. *Museum Management and Curatorship*, **15** 3, pp 299-313. 1997.
[23] DION M. (ed. Richard Klein). *Mark Dion : drawings, journals, photographs, souvenirs, and trophies, 1990-2003.* The Aldrich Museum of Contemporary Art. 2003.