

Culture of Innovation

An economic analysis of innovation
in arts and cultural organisations

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Foreword

Seemingly a paradox exists in the arts: creativity and novelty lie at the heart of all artistic endeavour, yet funders call on arts and cultural organisations to be more innovative. Understanding this paradox is one of the reasons why NESTA embarked on the research on which this report is based.

Working with one of the world's leading cultural economists and two of the UK's premier cultural institutions, the report proposes a framework for innovation that can be used by both arts funders and arts organisations. It describes the rich ways that arts and cultural organisations innovate in audience reach, push out artistic frontiers and create economic and cultural value.

Culture of Innovation is the outcome of a novel research-led collaboration between NESTA, the National Theatre and the Tate. It is a Research and Development model we think should be taken up by arts funders and arts organisations more widely. I welcome your reactions.

Jonathan Kestenbaum

Chief Executive, NESTA

June, 2010

NESTA is the National Endowment for Science, Technology and the Arts.

Our aim is to transform the UK's capacity for innovation. We invest in early-stage companies, inform innovation policy and encourage a culture that helps innovation to flourish.

Executive summary

We propose a new framework for understanding innovation in arts and cultural organisations

Arts funders and policymakers increasingly call on arts and cultural organisations to be more innovative. Yet, there is little clarity about what innovation means in an arts and cultural context. This report addresses this problem by proposing an innovation framework that can be used by arts organisations and funders alike.

We stress innovation along four dimensions: audience reach; artform development; value creation, and business models. A cross-cutting theme is technological change. Digital technologies in particular raise the possibility that arts and cultural organisations can overcome the traditional constraints imposed by physical location, thereby expanding their audience reach. But they also open new avenues for developing the artform, create new sources of economic and cultural value, and spur new business models.

In this report, we analyse these issues through the prism of two of the UK's leading cultural organisations, the National Theatre (NT) and the Tate. Both organisations are widely acknowledged as leading innovators in their respective artforms. The scale of their operations allows us to use experimental techniques to develop quantitative research insights that are of importance to the wider arts and cultural sector.

What is the actual and latent demand from audiences for innovative work? How can cultural institutions use innovative digital technologies to reach new audiences? How can these technologies help them deepen their relationship with audiences? What novel methods can arts organisations use to value what they do? Do these avenues for innovation lead to the

development of new financial and business models?

Innovation in audience reach

The National Theatre employs a number of strategies to extend its audience reach. It reflects in its repertoire the diversity of the nation's culture. It uses new information technologies for audience development, and makes curricular resources available for teachers and students.

Econometric analysis of audience demand and new survey data collected for this research shows how the National balances the generation of revenue with its mission to extend its audience reach.

The National Theatre's NT Live broadcasts to digital cinemas have allowed it to expand its 'virtual capacity'. The audience for *Phèdre* over its whole run was doubled through the screening of a single performance on 25 June 2009. Almost half of the cinema-goers on that night said that the main reason why they had not seen *Phèdre* at the theatre was because the NT's location was too far away or because they had been unable to get tickets to see it at the theatre. While the great majority of the theatre audience had been to the NT in the previous 12 months, this was the case for only 41 per cent of the audiences that saw *Phèdre* in the cinema. Most audiences at the cinema screening were experienced theatre-goers, but a small but significant number (almost 10 per cent) had not been to any theatre in the previous year.

NT Live's most striking extension in audience reach was in terms of low income audiences:

one-third of cinema audiences had incomes of lower than £20,000 per year, compared with just over one-fifth in the case of the theatre audience. Clearly live screenings can help theatre overcome the traditionally-observed concentration of audiences amongst more affluent consumer groups.

It is apparent that NT Live complemented, not substituted for, the theatre in the eyes of the public. Indeed, over one-third of cinema audiences said that, having seen the NT Live screening of *Phèdre*, it was now more likely that they would attend a live performance of a play at the National Theatre, and almost the same number again said they would do so at another theatre. Consistent with this, our econometric analysis of audiences at the National Theatre suggests that districts in the catchment of participating cinemas were better represented at the NT box office than they would have been had their local cinemas not been part of the NT Live trial. There was no evidence of cannibalisation.

The Tate has for years been at the forefront in using new technologies to improve the visitor experience within its galleries. It is also now leading the way in its use of social networking platforms like Twitter. The content-rich Tate Online is a standalone resource for art lovers.

The Tate's website also expands the Tate's virtual capacity enabling access to the collection and to exhibitions, by lifting constraints imposed by a person's location, by their capacity to afford a ticket and by restricted opening times.

In our comparative study of the *Colour Chart* exhibition at Tate Liverpool in 2009 and the online exhibition which accompanied it, we found that the patterns of past gallery attendance for online visitors was broadly similar to that for visitors to the gallery. This suggests that online exhibitions are perhaps likely to appeal primarily to those already experienced in going to art galleries.

At the same time, it is also clear that the online exhibition allowed the Tate to diversify its audiences. Again, the most striking socio-demographic difference between online visitors and traditional gallery visitors lay in average incomes: 37 per cent of online visitors had incomes of less than £20,000 per year, compared with 27 per cent in the case of gallery visitors at Tate Liverpool. But there were other important differences too; for example, visitors online were significantly more ethnically diverse than those attending the gallery.

Like NT Live, *Colour Chart* online appears to have recruited visitors to the physical gallery, with almost half of online visitors saying that their experience had made it more likely they would visit an art gallery in the future. A significant minority of online respondents (13 per cent) had primarily looked at the exhibition website to help decide whether to see *Colour Chart* at Tate Liverpool. At Tate Liverpool, a majority (61 per cent) of respondents said that had they known about the exhibition website in advance it would have influenced their decision about coming to the gallery, but only 3 per cent of them said they would not have come. The complementarities work in both directions, with almost 60 per cent of online visitors saying they had visited an exhibition website after having been to an exhibition at a gallery.

Innovation in artform development

The National Theatre is committed to supporting new work by up-and-coming writers. In the five years to 2008, 45 per cent of NT productions were of plays by lesser-known contemporary playwrights. Our demand analysis uncovers the fact that plays by this 'innovative' group are not as popular amongst full-price ticket buyers; programming a play by this group is likely on average to lower full-price occupancy rates by between one and two percentage points. This illustrates the trade-off that arts organisations like the National face between the objectives of increasing audiences and advancing the artform through programming new writing.

One of the most intriguing results from the National's NT Live screenings is that, despite lower expectations, cinema audiences reported higher levels of emotional engagement with the production than theatre audiences. In particular, almost nine-tenths of NT Live *Phèdre* audiences claimed to have felt an emotional response to the play, and nearly two-thirds felt they had been 'transported to another world and lost track of time' (compared with seven-tenths and half of theatre audiences respectively). The NT appears to be developing the artform in a new direction, taking it 'beyond live' (Bakhshi, Mateos-Garcia and Throsby, 2010).

Advancing the artform by fostering the best in contemporary art has always been core to the Tate's mission. Between 2003 and 2007, 75 special exhibitions for which an entry fee was charged were mounted at its two London galleries, of which 44 per cent were classified as

contemporary, 33 per cent modern, and 24 per cent historical. Shows of contemporary art on average enjoy longer runs, and the mean entry price for contemporary exhibitions is about 25 per cent lower than for other types of show. 'Modern' art exhibitions generate the highest daily attendances on average, followed by historical and contemporary shows. Our demand analysis shows that, other things equal, revenues at a contemporary show are likely to be up to 20 per cent lower than for a modern show, again underlining the trade-off that arts organisations face between increasing audience numbers and supporting new work.

Innovation in value creation

Cultural institutions create value in many ways and for many beneficiaries, not only those who consume their services directly, but also in a broader sense for society at large.

Traditional impact studies have been criticised for emphasising 'measurable' economic benefits at the expense of what are usually seen as 'unmeasurable' cultural values. Fresh thinking is needed on how to articulate and, where possible, measure, the full range of benefits that arise from the work of arts and cultural organisations.

Our case studies of the National Theatre and Tate allow us to demonstrate how this might be done. The willingness-to-pay analysis gives direct estimates of the economic value that audiences attach to their experiences. We also include in our surveys a range of cultural value-related questions. This multi-disciplinary approach, looking at both economic and cultural value measures, permits us to explore the relationship between the two.

For both NT Live and theatre audiences for *Phèdre*, the elements of cultural value most clearly associated with consumers' economic valuation of their experiences, as revealed by their willingness to pay, are the aesthetic/symbolic value indicated by their emotional response, and the social value of the group experience. For the Tate, a response to the aesthetic qualities of the exhibition is also strongly related to the economic variables of willingness to pay for access in the gallery and willingness to donate after seeing the online show.

In the case of both NT Live *Phèdre* and the Tate, there are other significant dimensions to audiences' cultural experience that are not

picked up by their economic valuations. These findings help to strengthen the case for a stronger emphasis on accounting for the pure cultural values of the arts as distinct from their economic contributions, when assessing the public value created by cultural institutions.

Business model innovation

Arts and cultural organisations which are implementing innovative strategies along the dimensions described above are having also to explore new business models. On the demand-side, audiences expect ever more customer-oriented business strategies. On the supply-side, new technologies are shifting ways in which cultural institutions are identifying their customers and the nature of the services and experiences they offer. The need to experiment with new business models requires new funding streams – both private and public – with an appetite for risk.

Both the National Theatre and Tate are fortunate in having a sufficiently large volume of work underway at any one time that the risks of failure can be spread, allowing a disappointing result for one project to be offset by a success with another. Both organisations also adopt a sufficiently flexible business model that they can adapt financing structures to the needs of particular investors, donors and funding agencies – be it a quick-response investment fund used to raise capital at short notice for particular projects at the NT, or innovative part-gift part-sale-at-cost arrangements with philanthropists in the case of the Tate.

A common theme that we explore in our audience surveys of both NT Live and Tate *Colour Chart* audiences is the possible revenue potential for arts and cultural organisations from digital innovations. It is too early to say whether live screenings can be a sustainable, self-financing business model for the National Theatre, but the signs are promising. The National hopes that NT Live will already break even by the end of its second season. Our surveys reveal a significant demand for other formats such as live streaming online and DVDs.

The potential for art galleries to generate revenues from their online operations cannot of course be compared with cinema screenings of theatre. No major art gallery in the world that we know of is currently charging online visitors for accessing digital exhibition content. Consistent with this, the great majority of online

visitors did not think it appropriate to pay to visit an exhibition website in the future, though a significant minority, 20 per cent, said they would be willing to do so.

In contrast, half the online visitors said they would consider making an online donation to the Tate after seeing an exhibition website, though none did so when invited through the Call for Action we installed on the *Colour Chart* web pages. Understanding the disconnect between what online visitors say they are willing to donate and what they do in fact donate should be a priority for arts organisations.

The cultural and economic opportunities from digital

One sometimes hears that digital technologies are bad news for the arts, because of a perceived dumbing down of culture, competition from the Internet for consumers' attention and threats to traditional business models. However, our research shows that not only are new digital technologies bringing new audiences to arts and cultural organisations, they are creating new sources of cultural and economic value, and in some cases taking the artform itself in new directions.

This use of new technologies calls on arts and cultural organisations to develop new business models. It is too often assumed that consumers are unwilling to pay for cultural services consumed in digital format. Our research shows that consumers at least claim to be willing to pay for high-quality digital experiences, whether in the form of tickets for screenings of live performances or, more tentatively, donations to organisations which are perceived as creating public and cultural value.

Possible puzzles thrown up by our research include the lack of detected cannibalisation effects from the live screenings on the theatre box office, despite NT Live's evident success in preserving the live, and the disconnect between what Tate online visitors claim they would be willing to donate and what they do in fact donate when given the option to do so. The only way to address these puzzles is further experimentation on the part of arts and cultural organisations.

The importance of Research and Development (R&D)

We hope to have demonstrated through this study the benefits of that experimentation being research-led. That involves: upfront identification of clear research questions; a fit-for-purpose data strategy (including, if necessary, the collection of new data); application of rigorous research methodologies (quantitative as well as qualitative); and analysis of revealed (audience behaviour) as well as stated (surveyed) preferences. Using such methodologies, research studies can generate robust evidence to inform policymaking within institutions, amongst cultural funding agencies and in government.

Indeed, public arts funders, such as Arts Council, England, Creative Scotland and the DCMS, should actively seek out opportunities to support, and publicise the findings of, experiments which address questions of interest to the wider sector. A new research-led digital innovation fund should be set up for this purpose.

Partnership with the research community is crucial; in this regard the knowledge transfer arms of Research Councils such as the AHRC, ESRC and EPSRC have an important responsibility and contribution to make. Targeted investment, in what we have separately described as arts R&D, is also a cost-effective way that public funders can 'get more for less' in a tight funding environment: investing in the sector's capacity to innovate through investing in open prototypes and trials (Bakhshi, Desai and Freeman, 2009).

Controlled experiments with new business models should help attract the private sector too. Funding research-led trials of interest to the whole sector could be a fruitful new model of engagement for philanthropists and businesses: donors and sponsors wanting to make a long-run contribution to the artform may find their money is better spent in funding trials which deliver relevant learning for the sector as a whole rather than supporting individual projects.

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Part 1: Basic issues

1.1 Introduction and research questions

The concept of the 'creative industries' has emerged in recent years to describe those industries which mobilise talent, creativity and entrepreneurship to produce a range of creative goods and services. They are a dynamic sector of the economy, contributing significantly to growth in value added, employment and exports.

The arts play a central role in the creative industries, a role that complements their essential artistic and cultural functions. The arts sector ranges from small one-person ventures to large-scale cultural organisations operating in both the commercial and not-for-profit sectors. Policymakers increasingly recognise that these enterprises are a key part of the creative industries, both in their own right and as a source of ideas and talent feeding the wider creative industries and beyond (KEA European Affairs, 2006; Andari *et al.*, 2007; Throsby, 2008, 2010).

Publicly funded cultural institutions such as theatres and galleries are an important sub-group, nurturing and advancing the arts, whilst also creating public value. For much of the post-War period these organisations have operated in a reasonably benign climate, with stable consumer demand and relatively secure public funding. But this is changing.

Cultural consumption patterns are being radically re-shaped by the digital revolution, obliging arts organisations to re-think how they relate to their audiences. Financially, they face greater accountability for government funding, with increased emphasis on public value and efficiency, as well as growing pressure to find new ways to exploit their earnings

potential. The economic crisis has also made it more difficult to attract sponsorship and philanthropic donations.

In these circumstances, cultural institutions are reassessing their business strategies to ensure that they can still deliver the artistic and cultural objectives which are their fundamental and inalienable purpose (National Campaign for the Arts, 2009).

In most industries, innovation is a key to gaining competitive advantage and enhancing growth prospects in difficult times. But for cultural institutions, concepts like competitive advantage, product development and business models need a fresh interpretation. Indeed, there is no clear definition of innovation itself when applied to arts organisations.

Our lack of knowledge about the ways that artistic organisations adopt, utilise and contribute to innovation partly reflects a lack of a systematic understanding of how innovation relates to the core functions of such cultural enterprises. It also reflects the absence of an established methodology for analysis of innovation processes in the cultural sector. This gap in our knowledge could cause serious confusion, as arts funders call on the organisations they support to be more 'innovative' in their work without being explicit about what they mean by 'innovation' (McMaster, 2008).

The economics of innovation is a major area of economic theory and analysis. Our aim in this report is to develop an economic analysis of innovation applicable to a range of cultural institutions across the different areas in which they operate, and to generate robust empirical evidence, in particular on how they can use

innovative digital technologies to expand and deepen their relationships with audiences.

We focus on digital technologies for several reasons. First, these technologies are primary drivers of change in consumer behaviour (Molteni and Ordenini, 2003); thus strategies for innovation in cultural institutions are likely to look particularly to the use of new technologies in dealing with their audiences. Second, digital technologies have the potential to allow arts and cultural organisations to achieve a step increase in the audiences for their art and, in some cases, become major broadcasters of public service content in their own right (BIS, 2009). Third, since many creative products are easy to reproduce, store and transmit through digital means, digitisation has created unprecedented uncertainties for many creative enterprises, making it imperative that they find ways to reinvent their business models to capitalise on the opportunities and avoid the threats that the new environment brings.

To study the impact of these changes, we focus on two major national organisations – the National Theatre (NT) and the Tate Gallery – and use their experiences to help us answer a number of research questions:

- What is the actual and latent demand for innovative work from arts and cultural institutions amongst existing audiences and potential new audiences?
- How can cultural institutions use innovative digital technologies to reach new audiences?
- How can cultural institutions use new digital technologies to deepen their relationship with audiences?
- Are there novel concepts and methods that cultural organisations can use to value what they do and, if so, how should they be applied?
- Do all or any of these avenues for innovation lead to the development of new financial and business models for cultural institutions?

The experiences of the National and the Tate allow us to assess existing innovative strategies employed by the organisations, informed by an econometric analysis of audience demand for innovative art from both organisations over the past five years estimated from historical data. They also permit extensive research of the use of digital technologies in each

institution, based on new data derived from bespoke surveys of the NT Live experiment at the National Theatre, and the website that accompanied the *Colour Chart* exhibition at Tate Liverpool in 2009. In both cases we supplement the surveys with data collected on actual audience behaviour.

1.2 Report structure

This report starts with an attempt to define what innovation means to cultural institutions. This is followed by an examination of what we know about how their operating environment has been changing and how they have been responding. We then introduce our two in-depth quantitative case studies for the National Theatre and the Tate, providing major new insights into innovation in practice. In the final section of this report we review our findings and discuss their implications for cultural institutions and policymakers.

1.3 What does innovation mean to cultural institutions?

Historically, the discourse on innovation has assumed it to be of a functional, scientific or technological nature, reflected in indicators such as investment in formal Research and Development or the number of patents awarded (NESTA, 2007). But it is now widely acknowledged that innovation is much broader than this, and that traditional measures ignore innovations in sectors such as services which account for a dominant and increasing share of overall economic activity (DTI, 2007; Abreu *et al.*, 2008).

Miles and Green (2008) document high levels of innovative activity in the UK's creative industries which are 'hidden' from traditional measures of innovation. Stoneman (2009) identifies economically important changes of an aesthetic nature – which he terms 'soft innovation' – that are particularly prevalent in the creative industries. Innovation outside the business sector is also increasingly recognised as crucial for addressing social challenges. Mulgan *et al.* (2007) highlight innovations by not-for-profit third sector organisations and public sector bodies which respond to social needs.

DIUS (2008) concludes that "innovation is essential to the UK's future economic

prosperity and quality of life. It can be defined as the successful exploitation of new ideas, which can mean new to a company, organisation, industry or sector. It applies to products, services, business processes and models, marketing and enabling technologies”.

Yet, even these recent reports tell us little about innovation in publicly supported arts and cultural institutions. While an increasing number of studies point to distinctive innovative behaviours in the creative industries (Handke, 2008; Miles and Green, 2008; Potts *et al.*, 2008), none focuses specifically on the arts and cultural sector.

For example, in their study of product design, advertising, television production, and video games businesses, Miles and Green (2008) propose an innovation taxonomy which identifies a large number of ‘sites of innovation’ within five broad overlapping areas of innovation practice in creative businesses, all of which apply with varying degrees of relevance to arts and cultural institutions: firm innovation; innovation in production/pre-production; content innovation; user

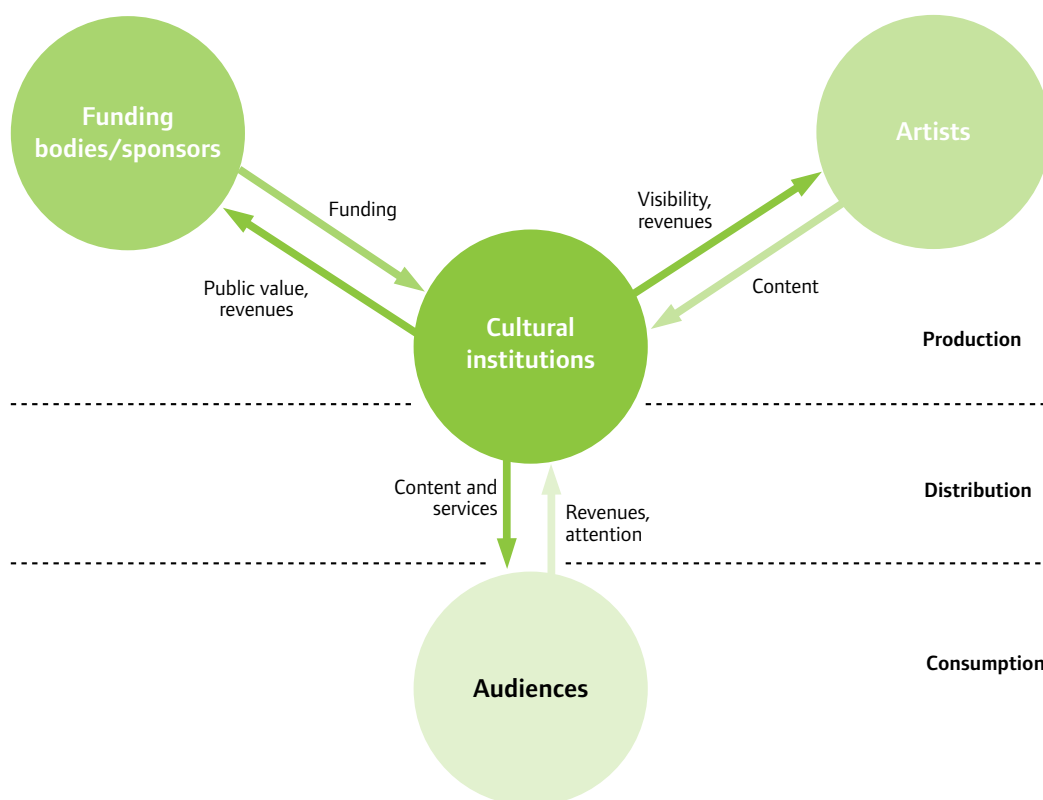
experience innovation; and innovation in communications.

Many publicly supported arts and cultural organisations would identify with these, but there are also significant differences in how these organisations relate to innovation, reflecting their specific characteristics which differentiate them from creative businesses more generally. In particular, publicly funded organisations have important not-for-profit objectives and as such their primary goal is not the maximisation of profit or shareholder value. Rather, they serve a broader social purpose, with multiple objectives reflecting their contribution to the arts and to the community in general.¹

One way to conceptualise innovation in cultural institutions is to see it as a response to disruptions in the ‘value chain’ that characterises their production and distribution processes. Figure 1 illustrates this value chain, differentiating between the production, distribution and consumption of artistic content on the one hand, and the flow of content, services and money on the other.

1. A more detailed discussion of cultural institutions as not-for-profit firms is contained in Appendix 1.

Figure 1: The value chain for cultural institutions



This value chain highlights the various trade-offs which cultural institutions face in pursuing their missions, including access versus revenue generation, creative vision versus responsiveness to audience, artistic experimentation versus revenue maximisation, and public value generation, which is difficult to measure, versus revenue generation, which is readily measured. Changes in consumer behaviour, rapid technological progress – particularly in the digital sphere – and shifts in the funding environment are all disrupting the terms of these trade-offs, forcing cultural institutions to re-evaluate their strategies.

1.4 Towards a definition of innovation in cultural institutions

These insights enable us to develop a working definition of innovation that suits both our theoretical and our empirical purpose. We identify four broad categories of innovation that are common to cultural institutions across the creative arts:

- **Innovation in audience reach:** this relates to the generation of new audiences, including through use of digital technologies such as live High-Definition (HD) broadcasts in the case of performing arts companies, and providing online access to collections in the case of art galleries and museums. Cultural institutions may also innovate in the depth of their engagement with audiences, for example by using knowledge resources online which enhance the audience's experience of artworks, by interacting with audiences on social networks, or by providing opportunities presented by digital technology for audiences to get involved in artistic creation itself.
- **Innovation in artform development:** one of the most significant innovative contributions cultural institutions can make is to the development of the artform in which they operate, through the encouragement of new and experimental work in their programming.
- **Innovation in value creation:** cultural institutions are searching for new ways to measure the economic and cultural value they create for audiences and their wider group of stakeholders, and to translate these into terms that policymakers, funding agencies, donors and private investors can relate to.

- **Innovation in business management and governance:** cultural organisations face challenges in strategic management that are peculiar to the artistic or cultural area in which they operate; dealing with these challenges requires a constant review of the organisation's business model and a search for innovative financing strategies in response to a changing funding environment.

We take this framework as definitive of the concept of innovation in cultural institutions in the remainder of this study.

1.5 The changing environment

As we noted earlier, the economic and cultural environment within which cultural institutions operate has changed significantly in recent years, prompting them to articulate their objectives more clearly and, in some cases, to consider new business models that can serve them. We identify four major drivers of change: technology, consumer demand, the funding environment and changing concepts of value creation.

1.5.1 Changing technology

We have observed already that a major driver of change in the behaviour of cultural institutions has been the information and communication technologies revolution that has transformed how business is conducted across the board. New technologies have provided opportunities for cultural institutions to re-think the ways in which they pursue their principal objectives.

Of course, many core activities remain unchanged – theatres still present live performances to physical audiences, galleries still display real art for people to look at. Yet, even here, improvements in technology have a role to play: theatres have better acoustic design, and can use video, projection and other devices in live performance, for example, and galleries have more sophisticated lighting, audio-guides, etc. for showing their collections. Meanwhile, more spectacular technological developments like satellite broadcasting and the Internet have opened up wholly new ways in which cultural institutions can re-imagine their relationship with audiences, with implications for their business planning.

1.5.2 Changing patterns of demand

Consumer behaviour is not static. So, cultural organisations must monitor the changing preferences and spending patterns of their

audience. These changes can have both short-term and long-term implications.

Recessions or flu pandemics can affect tourist movements and consumer expenditure in the short term, for example; the frequency of such occurrences over recent years has reminded arts and cultural organisations of the need for flexibility in their business strategies to enable them to respond effectively.

In the longer term consumers may adjust their cultural spending behaviour; for example, Ravanas (2007) notes that in North America many performing arts companies are experiencing fewer renewals by subscribers and season-ticket holders, prompting a move towards more flexible packages and a greater diversity of one-off offerings. Such a strategic re-positioning with customers may also widen the company's audience to reach demographic groups who are not currently theatre-goers or gallery-attenders (Gayo-Cal, 2006; Arts Council, England, 2008).

A broader trend is that consumers are spending more and more of their time and money on online leisure pursuits (Ofcom, 2009),² raising the possibility that they may cut back their spending on traditional arts activities. Concerns about such substitution effects are usually framed in terms of the impact that online leisure activities have on recorded artforms such as film and music, where the online experience and recorded art are arguably close substitutes, while the live performing and visual arts are widely presumed to be protected, as consumers value highly the 'real thing' (Arts Council, 2009a).

Yet, this may be too complacent. The most innovative arts and cultural institutions are already thinking hard about how the Internet and convergence in communications markets will affect their operation.³ There has been little previous research into whether such developments actively support or substitute for traditional cultural formats – a gap our study seeks partly to address.

The rapid growth of user-generated content, illustrated in the rising popularity of peer-review websites like www.yelp.co.uk and specialised content websites like the photographic site Flickr, may also have implications for arts and cultural institutions. Knell (2006) distinguishes between 'personalisation' of cultural goods and services and co-production: the first enables the consumer to tailor and personalise a cultural

experience, while the latter invites the user actively to help produce the art.⁴

Knell gives examples of leading edge personalisation of cultural services: one early case is the Welsh National Opera's decision to make music and video files of their performances available for download. But Knell argues that these have resulted largely from the creative decisions of individual artists in particular artforms (in particular music, contemporary visual art and media art). They have not reflected strategic decisions by arts and cultural organisations.

Hughes and Lang (2006) go further and describe emergent digital remix behaviours as an 'open source' approach to culture, where cultural products are increasingly 'ripped, mixed and burnt' into new cultural products. The availability of digital technologies has facilitated this participative culture, but its importance in the arts reflects the distinctive nature of cultural products: their meaning is ultimately only created by audiences, their value is realised as a social process and many are naturally akin to public goods.

Open source culture in businesses may have lessons for arts and cultural institutions too. Hughes and Lang (2006) argue that: (i) businesses must look for opportunities to sell products which are complementary to cultural products; (ii) community-based collaboration enabled by new technologies can outperform traditionally closed business solutions; and (iii) digital technologies, at least in principle, allow for the development of new business models which satisfy niche cultural demand (the 'long tail').

1.5.3 Changes in unearned revenue sources

'Unearned revenue' includes public grants and private donations. The pressures on government budgets, together with a drive for greater accountability in public spending, are affecting both the levels of funding allocated to cultural institutions and the terms on which it is provided. At the same time, the environment for private-sector finance has tightened significantly too (Toepler, 2006; Arts & Business, 2009; Arts Council, England, 2009b). As a result, not-for-profit arts enterprises are being obliged to adopt more active business strategies to attract new sources of financial support and to develop new ways of relating to existing sources.

2. Ofcom (2009, section 1.2.6) reports that UK consumers spent on average 25 minutes per day online in May 2009, compared with just nine minutes five years ago.

3. In this context, 'convergence' refers to the growing tendency for audio, video, text and picture formats to reach consumers using an increasingly concentrated range of consumer devices, including mobile platforms.

4. It is worth noting, however, that Arts Council, England (2009a) argues that online co-production of art remains a niche activity for 'leading edge' consumers – offline arts enthusiasts who are also highly engaged in digital technology.

1.5.4 Changing concepts of value creation

All these drivers of change affect the perception and representation of cultural goods and services and how they are valued by consumers. For example, there is a growing interest in assessing customer value, whilst government pressure has encouraged institutions to re-interpret how they create public value as part of their accountability.

These developments have occasionally generated controversy as in the debate about the relative emphasis on intrinsic and instrumental value in justifying public support for the arts (Holden, 2004; Bakhshi, Freeman and Hitchen, 2009).

In the creative industries, a useful way to represent the value produced by cultural institutions is to distinguish between the wider economic value generated by their activities and the cultural value of their output using appropriate artistic and cultural criteria (Throsby, 2010). This opens the way for new, more sophisticated assessments of the value created by individual arts and cultural organisations – reflected in our empirical analysis of the National Theatre and Tate. Digital technologies open up new possibilities for arts and cultural organisations to exploit their cultural assets and create more value. Performing arts bodies may be able to broaden their audience using digital formats to distribute performances, while art galleries and museums can reach new audiences by digitising their collections and archives.

Intellectual property (IP) rights are important here. Copyright allows artists and arts organisations to earn an economic return from their art. But the Internet has widened the potential for dispute: for example, in 2009, the National Portrait Gallery (NPG) challenged the Wikimedia Foundation over the latter's unauthorised use of digitised images of works that are under NPG copyright. But where copyright is held by others, organisations must clear those rights needed to distribute their content in new ways (as when a theatre company must clear performers' rights to show productions in new digital formats, or when an art gallery needs permission from the artist to digitise and display artworks).

Ivey (2009) discusses how entrepreneurs like Bill Gates long ago identified the potential for digitisation and the growing demand for media content built around cultural assets, to create economic value from collected artworks and archived content. Gates's IP-asset company,

Corbis, secured exclusive digital rights to collections including the National Gallery in London and the Philadelphia Museum of Art at bargain prices. Arts and cultural institutions must look hard at their IP assets and consider new opportunities to exploit them in the digital age.

Part 2: Innovation in cultural institutions: what do we know?

2.1 Overview

We have identified four dimensions of innovation that might be pursued by cultural institutions across the creative arts:

- Innovation in extending audience reach.
- Innovation in artform development.
- Innovation in value creation.
- Innovation in business management.

In this section, we provide a critical overview of some significant contributions in the literature which address these topics.

2.1.1 Innovation in extending audience reach

What is meant by 'extending the audience reach' for a cultural institution such as a theatre or gallery? This concept can be interpreted in three ways (based on McCarthy and Jinnett, 2001):

- Audience *broadening* – capturing a larger share of the population segment known to be traditional participants but who currently do not attend.
- Audience *deepening* – intensifying current participants' level of involvement measured, for example, by the number of attendances per individual per year, or by the degree of audience (active or passive) engagement with the artform itself.
- Audience *diversifying* – attracting new groups of consumers who would not otherwise attend.

Novel marketing methods could address all three potential audience goals by finding new ways to present the product. Since institutions compete with other cultural and entertainment activities, attractive marketing can improve competitive advantage (Andreasen and Kotler, 2002; McNichol, 2007). Some arts organisations operate in a monopolistically-competitive environment where non-price competition becomes an important element in business strategy: an example is symphony orchestras and other music ensembles in large metropolitan areas. Such organisations are likely to seek novel methods to package and sell their 'product' to differentiate their offer from other arts and cultural organisations.

Arts organisations have moved over the last decade from this sort of product development towards audience-based strategies. Such strategies may involve transaction marketing (building new audiences) or relationship marketing (building stronger relationships with existing audiences). Rentschler *et al.* (2002) investigate the latter, pointing to ways that organisations can retain the loyalty of repeat customers.

However, too strong an emphasis on customer orientation can deflect attention from potentially more useful marketing orientations such as towards competition or product improvements. Indeed, Voss and Voss (2000) cast doubt on customer orientation as a successful marketing strategy for not-for-profit theatre companies; they argue that when there are not-for-profit goals and high rates of intangible and artistic innovation, customers may not be able to easily articulate their preferences, leading them to rely on the talent of the artist to inform and challenge them.

Innovation in audience diversification involves the inventing of new programmes and the fostering of new partnerships to attract a wider range of social and economic groups, including immigrants, youth groups or ethnically diverse communities. Grams and Farrell (2008) document the experience of a number of not-for-profit arts organisations in the US, and argue that extending an organisation's audience reach into new territory is likely to require new targeted infrastructure within the organisation.

Notwithstanding these marketing strategies, perhaps the most radical avenue for innovation here is in the use of new technologies. In the first instance this might just involve the use of the Internet to provide service and product information, sell tickets or promote new activities. For example, national museums in the UK have used their websites effectively to increase access (Loran, 2005), and a recent report by the Arts Council, England (2009c) indicates that 94 per cent of the Council's 869 Regularly Funded Organisations (RFOs) have websites with either basic or 'rich' marketing functionality.

However, the more profound innovations come through the far-reaching potential of new communications technologies that are constantly being introduced.

There are three dimensions to this:

- *Interactivity* – the potential for two-way communication with the audience. Some websites allow users to mix their own music content or to produce their own artwork online, for example (Hughes and Lang, 2006; Knell, 2006).
- *Connectivity* – the capacity of the Internet to enable direct and high-frequency communication between and amongst providers and users of cultural services. Some cultural institutions create online resources to enhance the experience of audiences for 'live' artforms, or use social networking sites like Facebook or Twitter to enable consumers and audiences to share their critical reactions with both arts organisations and each other (Arts Council, 2009c).
- *Convergence* – audiences can access information wherever they are and using whatever device is convenient and appropriate, for example viewing live performances of theatre, opera and music at their local digital cinemas, or downloading

mp3 and mp4 multimedia arts content to handheld devices from arts organisation websites or third-party websites such as iTunes.

These three characteristics combine to open up enormous possibilities for innovation in how cultural institutions relate to existing audiences and extend their reach to new groups of consumers. Central to such strategies is a re-orientation of the focus away from product-centric towards experience-centric innovation (Sigala, 2005a); value is created through co-created experiences in which the operator (e.g. a museum), the visitor and the community of visitors all take part. To implement such innovative strategies managers must shift their focus from the product- or service-space to the experience-space as the locus of innovation.

The Arts Council's study of its RFOs indicates that the sector has a long way to go: only 4 per cent of RFOs have websites that can be regarded as standalone online resources for audiences, as opposed to straight marketing websites (Arts Council, 2009c). There is some variation across artforms, with 9 per cent of visual arts organisations having such standalone websites compared with only 2 per cent of theatres (where the costs of digitisation are likely to be greater).

Yet, the potential for new digital technologies to impact on arts and cultural organisations goes beyond the Internet. In theatre and opera, for example, new technologies have long involved repackaging performances in recorded form. More recent technological developments have enabled high-quality broadcasts of live performances in real time in alternative formats and in a range of venues. We discuss this further below.

2.1.2 Innovation in extending the artform

A particular aspect of innovation relates to the development of new work that has at least the potential to influence artistic trends and perhaps lead them in new directions. In the theatre this means not only producing new or previously unperformed plays but also developing new approaches to the performance of existing works. In art galleries, it refers mainly to the programming of contemporary art in all its forms, together with the education and information that can improve consumer understanding of new artistic trends.

Innovation in this area can take the form of product portfolio innovation, meaning changes in the mix of works presented, and radical

product innovation that introduces entirely new works.

Organisations can innovate along a path that is consistent with 'business as usual' by incremental means, a strategy likely to suit the preferences of existing customers. Although current audiences may eventually accept radical new works, Voss *et al.* (2006) suggest that this sort of innovation tends to target emerging rather than existing market needs. However it is done, it appears that product innovation of the 'content-creation' type is more common and widespread in the cultural industries than is innovation in the economy at large (Handke, 2008; Stoneman, 2009).

What constitutes artistic innovation in the sense defined here? Castañer and Campos (2002) define it as the programming of an activity that radically departs from existing art conventions, whether locally or globally. This enables innovation to be distinguished from mere novelty. Castañer and Campos note that artist-led firms are more likely to engage in product-based innovation than management-led firms.

Riskiness constrains the programming of new work (Di Maggio and Sternberg 1988). This is what Caves calls the 'nobody-knows' property (Caves 2000) of cultural production, where the likely demand for new products is uncertain and unpredictable. Thus, a gallery contemplating mounting an exhibition of works by a controversial artist or a theatre company programming a newly written play must take account of the uncertain effect on attendances and revenues that such initiatives are likely to entail. Safety first may seem like the easier option.

Does public funding affect such risk-taking? Some governments may prefer safety over originality to attract mass audiences to taxpayer sponsored events. However, such funding may also serve to relieve the financial pressure on recipient organisations, making them more willing to take risks. Pierce (2000) finds that local government funding tended to encourage conventionality in American opera companies, whereas federal funding did the opposite. In the end the problem for any organisation as portrayed by McMaster (2008) is one of balancing risk against the pursuit of excellence.

2.1.3 Innovation in value creation

Cultural institutions create value in many ways and for many beneficiaries, not only for those

people who consume their services directly but also in a broader sense for society at large.

The standard approach to interpreting such value within economics is to distinguish between use value and non-use value. The former refers to the benefit that consumers derive from their own consumption of the goods and services produced: a person attending a theatre performance enjoys a private benefit whose financial value to them is at least as great as the ticket price.

Non-use value relates to the wider community benefits that cultural institutions may provide: people may value the knowledge that opera houses exist even if they don't attend them themselves (so-called existence value). The monetary value of such public benefits can be assessed using techniques such as contingent valuation (CV) methods.

Arts organisations in many countries have undertaken economic impact studies to demonstrate their financial contribution to the local, regional or national economy (Bille and Schulze, 2006). Many such studies have been subject to criticism for overstating the economic benefits, perhaps by counting gross rather than net effects, or by including unwarranted multiplier effects (Seaman, 1987; Reeves, 2001; Sterngold, 2004).

Most such studies also concentrate on the impact of direct production and consumption expenditures and ignore the non-use value that is generated by arts and cultural activity. Yet, these non-use values are quite likely to be very significant to their overall economic value (Scott, 2006).

For example, in a study of public libraries in Norway, Aabø and Strand (2004) found that more than half of their total value was attributable to non-market effects, with only 40 per cent attributable to direct use. In 2003, the British Library used CV techniques to estimate that it provides over £363 million in value each year, the bulk enjoyed by non-users. This is over four times the level of its annual public funding (Pung, Clarke and Patten, 2004). In 2005, a CV study of museum, library and archive services in Bolton found that users and non-users valued the services at £10.4 million, 1.6 times the value of their public funding (Jura Consultants, 2005).

The interpretation of the value created by cultural enterprises has been placed into a wider context more recently as a result of the

promulgation of the concept of public value as a means of representing the value of publicly accountable organisations (Keaney, 2006). Pressure has mounted on museums, galleries and performing companies to demonstrate their social impacts on their communities and society at large (Belfiore, 2004). The result is that arts organisations are increasingly agents of social inclusion.

Clearly the social value created by such organisations is not adequately measured by market value (Nicholls, 2007), so alternative means of calibrating social effects have been sought. Some studies have tried to assess how audiences for the performing arts or visitors to museums and galleries interpret their experience in a social or community context. For example, Newman and McLean (2004) looked at the museum services of two UK local authorities which actively used museums to enhance social inclusion; they found evidence that museums and galleries could ameliorate the effects of social exclusion on certain groups in the community.

Yet, despite the clear role that cultural facilities play in building social capital, disquiet has been expressed that emphasis on the instrumental functions of arts and cultural organisations tends to overshadow their fundamental purpose – the creation of cultural value.

Debate stimulated by the publication of John Holden's paper on *Capturing Cultural Value* for Demos (Holden, 2004) raised questions about the growing prominence of instrumental criteria for public-funding allocations, at the expense of the essential artistic objectives of those organisations seeking support. This discussion was also raised in the context of cultural policy in the United States in the RAND Corporation's report on public funding for the arts in America (McCarthy *et al.*, 2004). In this study, the authors identified the intrinsic value of the arts as the missing link in assessing the value of artistic activities.⁵

Our review of the evolution of concepts of the value generated by arts organisations suggests that fresh thinking is needed about the interpretation and representation of the creation of value by such enterprises. At an institutional level, internal criteria for judging value need to be adapted to today's environment. Falk and Dierking (2008), for example, argue that such criteria need to be framed in terms of service to the specific needs of audiences, while maximising the

organisation's 'flexibility and ingenuity' in relating to internal and external stakeholders.

More broadly, however, a clearer understanding of value creation by cultural organisations is needed across the board. Of course, their economic contribution to national and local incomes and employment remains a very important dimension to the value they create, as do their various social benefits. And economic measures such as consumer surplus and willingness-to-pay are also closely related to the intrinsic value of the art (Bakhshi, Freeman and Hitchen, 2009).

But a complete picture of intrinsic value requires a reassertion of the importance of the cultural value that is essential to the existence and operations of organisations in the arts. The concept of cultural value as an element of value distinct from economic value has been recognised in a number of disciplines (Hutter and Throsby 2008).

Articulating the dimensions of cultural value has been a matter of some interest in cultural economics. For example, Throsby (2001) suggests that cultural value can be disaggregated into a number of components, including aesthetic, symbolic, spiritual, historical, social and educational value. Finding sharper means of representing and measuring these values may expose more clearly when economic and cultural values reinforce each other but also the sorts of tensions between economic and cultural imperatives to which Frey (2008) alludes.

There is a wide range of research that has looked at the assessment of the values associated with artistic and cultural experiences, including experiences in the theatre (Olsen 2003; Reason 2004; Brown and Novak 2007; New Economics Foundation 2010) and in museums and galleries (Fairchild 1991; Jansen-Verbeke and van Rekom 1996; Prentice *et al.* 1998; Anderson 2004; Ipsos MORI 2006; Scott 2006). We also address these issues by probing the cultural and economic valuations of audiences in our case studies as discussed later in this report.

Much of this comes back to the issue of public value. The UK's tight public spending environment in the years ahead will surely increase further the pressure on arts and cultural institutions to demonstrate the value they create. Insofar as the Internet and other digital technologies create opportunities for these organisations to generate more cultural

5. For further discussion of the US case, see for example Brown (2006).

and economic value through expanding audience reach, there are strong reasons why they should invest in using innovative valuation techniques, and in collecting the data needed to apply them.

2.1.4 Innovation in business management

The changing environment in which cultural institutions operate has led to the development of new business models. Greffe (2008) points to digitisation, new consumption spaces and changes in the means of cultural production as leading to the emergence of very different business models from those that were characteristic of traditional forms of artistic organisation. These developments parallel the ways in which new business models are being put forward and adopted in the wider spheres of commerce and industry (Johnson *et al.*, 2008).

In the cultural arena, impetus towards the search for new business models arises from both the demand and the supply side. With demand, the shift from an organisation-centred to a more customer-centred orientation in business strategy (Andreasen and Kotler, 2002; McNichol, 2005) leads to new ways of interpreting value within the business model, promoting an approach that engages the consumer more. This move echoes the trend in cultural organisations noted earlier towards audience development rather than product development (Rentschler *et al.*, 2002). Such a move has been described by Weil (1999) as a shift from being about *something* to being about *somebody*.

On the supply side, it is primarily the advent of new technologies that have prompted the growth of interest in restructuring traditional business models. The ways in which cultural institutions identify their customers and their products, generate value, attract and keep their consumers and define the services they perform have all been affected by the digital revolution.

In the case of museums, for example, Minghetti *et al.* (2001) discuss the re-engineering of the role of museums in the cultural value chain; the engagement of such organisations with new technologies has evolved from the provision simply of an electronic brochure to their functioning as a multi-media platform serving a much wider community of potential visitors.

Indeed, the use of the value chain as an appropriate concept for interpreting business models of cultural organisations may itself be

changing in the digital environment. Keeble (2008), for example, suggests that in this environment the idea of a value *network* is a more appropriate representation of the interrelationships between firms and individuals involved in the supply of cultural goods and services.

The need for arts and cultural organisations to experiment with new business models requires new funding streams with an appetite for risk (Smith, 2010). In cases where there is a strong commercial value proposition this may involve arts and cultural organisations working out new project finance structures which compensate private investors for the risk they take. Where the risks are too great to attract private financiers, but the sector stands to gain from the experiment (through wider lessons, for example) cultural organisations need to negotiate new funding streams with arts funders (Bakhshi, Desai and Freeman, 2009). Bolton and Carrington (2007) argue that arts and cultural organisations should import innovative debt and equity instruments, such as patient loans, quasi-equity and venture philanthropy, which are increasingly common in the social enterprise sector.

It is apparent that in this final area of innovation in cultural institutions that we have identified, all of the other three areas are drawn together. If such organisations are to pursue innovative strategies for audience development, for advancing the artform and for representing value, they will need to adapt their traditional business models to deal with these new strategic directions. The ways in which our two case study institutions are confronting these issues, and the lessons that can be learned for further development in the sector, are an important aspect of this research.

2.2 New technologies: how are they being used?

At the outset, we noted that new technologies represent the most radical avenue for innovation in extending the audience reach of cultural institutions and in providing new forms of artistic experience for customers. This section outlines some specific developments in theatre and in galleries.

2.2.1 Theatre

Digital technologies are being used in several different ways by theatre companies worldwide in their everyday operations and in the process

of theatrical production. The first and most widespread is the use of websites as a means of providing information about shows, access to the theatre, ticket availability and prices, and so on. Online booking systems are now in almost universal use. Theatre company websites are also often used to provide behind-the-scenes interviews, glimpses of rehearsals, etc.

Secondly, theatre practitioners are using a range of new technologies in theatre production itself. Increasingly, directors and designers mounting plays for the live stage are employing a variety of audiovisual technologies to expand the expressive potential of their work.

The third application of new technologies in the performing arts is the recent move towards the live broadcast of productions to television, cinema or online audiences. Whilst audiovisual recordings of theatre productions have been available for some time, in the form of videos and DVDs of productions, or their broadcast on television, the emphasis on live transmission direct from theatres is more recent.⁶ It has evolved as technology itself has evolved, enabling high-definition high-fidelity transmission via satellite or the web to audiences.

The first live theatre broadcast to television on a large scale in recent times was the live screening on BBC Four in September 2003 of a performance of *Richard II* from Shakespeare's Globe Theatre in London. This was followed by the National Theatre's much larger NT Live project which is analysed in detail later in this research report. In 2009, a commercial venture called Digital Theatre was launched, in partnership with the Almeida Theatre, the English Touring Theatre, the Royal Court, the Royal Shakespeare Company and the Young Vic, which allows audiences to download theatre productions that can be viewed on screen.

The Metropolitan Opera first transmitted its performances into cinemas in 2006 and continues to do this today, now with the use of high definition. In 2007, the San Francisco Opera followed suit. Since 2008, Arts Alliance Media has similarly been distributing opera into cinemas either live by satellite or recorded in venues, including the first ever choral performance of Handel's *Messiah* broadcast across cinemas in the UK and Europe on Palm Sunday 2008, and operas from Covent Garden (www.artsalliancemediacom/Opera/htm).

Symphony orchestras and ballet companies, too, can utilise this technology. An example is the Berlin Philharmonic's Digital Concert Hall project, whereby concerts are streamed live or made available as video on demand on the web, accessible on payment for a 'ticket' (www.berliner-philharmoniker.de/en/media/digital-concert-hall). The next generation of live broadcasting to cinemas is likely to involve 3D transmission.

Some theatre companies and groups have been using video and other audio-visual methods in performances for many years. More experimental developments are exploring the use of virtual realities and other technologies in theatre production. For example, the Pilot Theatre company based at York, Theatre Royal has built a production of a play on MySpace, and has a theatre hub in Second Life. Another example is the 'Adding Machine' project at Bradley University in Illinois which in March 2007 merged real-time performances with the virtual to put actors from Florida and Canada on the stage in Illinois without their having to leave their university campuses. The production also involved virtual scenery, broadcast and recorded video, and avatar performers (<http://addingmachine.bradley.edu/>).

A number of organisations and academic units are actively involved with the development of new technologies for the theatre, including TAPRA (the Theatre and Performance Research Association) in the UK; the US and Canadian Institutes of Theatre Technology; the Gertrude Stein Repertory Theatre in New York; and the Conservatory Theatre and its partners in Florida, Illinois and Canada. Overall, it is apparent that there is a great deal of potential for new technology applications in the theatre, but that these are still very much in their infancy. As means towards extending the theatrical artform, these sorts of innovations may however play a significant role in the future.

2.2.2 Art galleries and museums

The use of new technologies by museums and galleries took off during the 1990s and grew rapidly during that decade. In 1995, the Virtual Library of Museums listed 120 museum websites worldwide, and a year later this number had grown to 400 (Keene, 1997). Originally, the websites simply duplicated familiar museum products, providing information about exhibitions, events, opening times, etc. Development was constrained by cost, poor visual quality and lack of technical sophistication (Barbieri *et al.*, 1999: 27).

6. Interestingly, live drama broadcasts were common in the early days of television because the recording technology was too expensive for the broadcasters, though such dramas tended to be studio-bound.

In fact, the transition from mass presentation of information to individually-tailored experiences has been a gradual one. An important line of development has been to convert standardised interpretation materials such as wall texts into personalised presentations using mobile hand-held devices.

The technology for conveying such information has advanced rapidly with the introduction of specialised audio functions, speech-activated devices, and so on (Stock and Zancanaro, 2002; Rocchi *et al.*, 2004). Such developments can transform the interpretive and educational function of the traditional docent or tour guide role to what has been termed a 'cyberdocent' (Rayward and Twidale, 1999), a virtual guide who takes on not just the informative and instructional activities of its human equivalent, but also new forms of expression enabled by the additional functionality that the technology provides.

After the turn of the millennium the use of new technologies has grown rapidly, giving rise to the terms 'museum without walls', 'post-museum' and 'virtual museum' (Hooper-Greenhill, 2000: 152–153). The idea of an entirely virtual museum, which visitors attend only in cyberspace, clearly opens the way for extension of audience reach not just across socio-economic groups but in spatial terms as well. The requirements of online museum audiences are at least two-fold: a demand for query-based access to known and trusted collections; and a need for more fluid and wide-ranging communications focused on particular events and conversations (Geber, 2006).

These demands are being met in a variety of ways by existing museums and by new organisations devoted solely to online provision. The more 'authentic' the online experience becomes, the greater the potential for diverting consumption to the 'virtual' experience, with possible implications for visitor numbers at the home institution (Sigala, 2005b).

Nowadays, museums and galleries use new technologies for a range of functions both in the museum itself and on the web. In the physical museum, these functions include multimedia tours; interactive kiosks; simulation and virtual reality experiences; wireless connectivity enabling live feeds of information and tools; sound, laser and light shows; IMAX presentations and 'theme park-like' attractions.

On the web, they include: online access to collections and databases; online exhibitions (text, image, audiovisual); virtual exhibitions (including 360-degree room views); virtual museums (including on Second Life), the use of real and imaginary exhibition and gallery spaces; downloadable and streamed multimedia content (audio, video, podcasts); interactive gallery maps; dedicated sites, games and play spaces for children and young people; personalised spaces – creating own favourites and tagging objects; use of social media networks (blogs, Facebook, Twitter, Flickr, YouTube); and shopping online (exhibition tickets, merchandise).

Of course, many of these applications have been in existence for some time; however, their functionality is enhanced as the technology improves. Table 1 outlines the nature of online access to permanent collections in a number of museums and art galleries. Table 2 summarises the extent to which these galleries also provide online tours of exhibitions which they mount.

Art galleries are also experimenting with federated content – shared digital media content between institutions which is designed to be self-managing to support reporting and rights-management in a peer-to-peer network⁷ and mobile augmented reality – using camera-equipped mobile devices to take photographs of objects and receive immediate overlays of information.⁸

7. Examples of sites doing this are www.artbabble.org and www.smarthistory.org.

8. For example, see The Nokia Research Center <http://research.nokia.com/research/projects/mara/index.html> and http://futureexploration.net/blog/2009/06/the_emergence_of_mobile_augmen.html.

Table 1: Online access to permanent collections in selected museums and art galleries

	Search collection online*	Access to individual records for some/all objects in the collection	High-quality zoom	Multimedia content
National Portrait Gallery, UK	✓ (160,000)	✓	×	× (Transcripts available of on-the-floor multimedia content)
The National Gallery, UK	✓ (2,300+)	✓	✓	✓ (Video, audio, podcasts)
The Tate, UK	✓ (66,062)	✓	×	✓ (Video, audio, podcasts, Google mapping, iPhone apps)
British Museum, UK	✓ (1,800,000+)	✓	×	✓
Centre Georges Pompidou, Paris	✓ (60,000+)	✓	×	✓ (Video, audio, podcasts, webcams)
Musee du Louvre, Paris	✓ (35,000+)	✓	✓	✓ (Video, audio, webcams, personal space)
Musee d'Orsay, Paris	✓	✓	×	Personal space only
Uffizi Gallery, Florence	×	✓	×	×
Rijksmuseum, Amsterdam	✓ (100,000 only in Dutch)	✓	×	✓ (Audio, podcasts, games, iPhone apps)
The Hermitage, St. Petersburg	✓	✓	✓	×
Prado Museum, Madrid	✓ (3,000)	✓	✓	✓ (Video, audio, games)
Vatican Museums, Vatican City	×	✓	×	Audio only
J. Paul Getty Center, Los Angeles	✓	✓	× (1 object only)	✓ (Video, audio, games)
MoMA (Museum of Modern Art), NY	✓	✓	×	✓ (Audio, video, interactive, iPhone apps, personal space)
Metropolitan Museum of Art, NY	✓	✓	✓	✓ (Video, audio, podcasts, personal space)
National Gallery of Art, Washington	✓	✓	This function is only available in the virtual exhibits	✓ (Video, audio, podcasts, interactive)
Smithsonian National Portrait Gallery, Wash. D.C.	✓ (12,000)	✓	×	✓ (Audio, video, podcasts)
National Art Gallery of Canada	✓	✓	×	✓ (Video, audio, webcams)
Virtual Museum of Canada	✓ (795,075)	✓	×	✓ (Video, personal space)
Powerhouse Museum, Sydney	✓ (74,662)	✓	✓	✓ (Video, audio, podcasts, games)
Te Papa Tongarewa, Wellington	✓ (150,000)	✓	✓	✓ (Video, audio, podcasts, interactives)

*The bracketed figures in this column refer to the number of digitised objects in the collection which members of the public can search and discover more about.

Table 2: Vicarious online experiences of collections and exhibitions in selected museums and art galleries

	(1) 360 degree room view	(2) Interactive floor plan	(3) Supplementary online engagement for current on-the-floor exhibits	(4) Other online tours and virtual museum/gallery experiences
National Portrait Gallery	×	✓	×	×
The National Gallery	×	✓	×	×
Tate Galleries, UK	×	✓	✓	×
British Museum, UK	×	×	✓	✓ (Themed tours)
Centre Georges Pompidou, Paris	✓	✓	×	×
Musee du Louvre, Paris	✓	✓	✓	×
Musee d'Orsay, Paris	×	✓	×	×
Uffizi Gallery, Florence	×	×	×	×
Rijksmuseum, Amsterdam	×	×	×	✓ (Virtual exhibits)
The Hermitage, St. Petersburg	✓	×	×	×
Prado Museum, Madrid	×	×	×	×
Vatican Museums, Vatican City	✓	✓	×	×
J. Paul Getty Center, Los Angeles	×	×	×	✓ (Themed video gallery tours)
MoMA (Museum of Modern Art), NY	×	✓	✓	×
Metropolitan Museum of Art, NY	×	×	×	✓ (Themed tours)
National Gallery of Art, Washington	×	×	✓	✓ (Themed tours)
Smithsonian National Portrait Gallery, Washington	×	✓	✓	×
National Art Gallery of Canada	×	✓	×	✓ (Virtual exhibits)
Virtual Museum of Canada	×	×	✓	✓ (Virtual exhibits)
Powerhouse Museum, Sydney	×	×	✓	✓ (Virtual exhibits – currently inactive)
Te Papa Tongarewa, Wellington	×	×	✓	✓ (Virtual exhibits)

Part 3: Empirical application: the case studies

3.1 Background to the empirical research

There are several reasons for choosing the National Theatre and the Tate as the basis for our project's empirical investigations. First, concentrating on just two institutions using formal experimental techniques enables a deeper exploration of the issues involved than would a more superficial study of a larger number of cases. Second, the National Theatre and the Tate are publicly-funded arts-related enterprises with significant economic and cultural profiles. Both are exemplary UK cultural organisations that are international leaders in their respective fields of the arts. Both play an essential role in maintaining and celebrating great artistic traditions.

But they are not only concerned with the arts of the past; they see themselves as leaders in promoting new work that will provide new directions for artistic developments in the future. They make a major contribution, within their own artforms and beyond, to cultural life at home and abroad and they play a significant role in the UK's creative economy. Both organisations are playing a leadership role in developing innovative strategies for reaching new audiences, expanding the artform, exploiting digital technologies and creating public value.

Our empirical work covers two major aspects of each of the case-study institutions' operations:

- First, we assess existing innovative strategies employed by the organisations, informed by an econometric analysis of audience demand for innovative art from the organisations over the past five years estimated using historical data.
- Second, we examine the use of digital technologies in each institution, based on new data derived from bespoke surveys of the projects involved – the NT Live experiment at the National Theatre, and the Tate's exhibition web offer accompanying the *Colour Chart* exhibition at Tate Liverpool in 2009.

In both cases, we supplement the survey data (which give what economists call information on consumers' *stated* preferences) with data collected on actual audience behaviour (that is their *revealed* preferences), which gives a greater degree of confidence in our results.

A. The National Theatre

3.2 Innovation in the National Theatre

The National Theatre comprises three stages: the Olivier, the Lyttelton and a smaller, flexible space, the Cottesloe. It also maintains the NT Studio, a space for developmental work for the National's main stages and for theatre as a whole. Founded in 1963, the National moved to its present building on the South Bank in London in 1976.

The mission of the National Theatre is directed towards maintaining and re-energising the great traditions of the British stage and expanding the horizons of audiences and artists alike. Its objectives include the widening of its audience and its programming to reflect the diversity of the nation's culture. It takes a particular responsibility for the creation of new work. The National has a forward-looking agenda that involves innovative practice in all four of the areas we are considering.

3.2.1 Audience development

The National Theatre employs a number of strategies to extend its audience reach. It seeks deeper engagement with its existing audience and ways to attract new audiences especially from groups not traditionally regarded as regular theatre-goers.

New information technologies are used extensively for audience development, including the website e-trailers (short promotional trailers for productions) and documentary films giving insight into a production or behind-the-scenes access, interactive screens in the bookshop, and the use of Tessitura Software to monitor and analyse audience characteristics and trends.

To some extent these activities are simply good business practice, maintaining sound customer relations and ensuring the long-term replacement of old audiences with new ones. However, the emphasis on audience development also connects with a loftier vision – extending engagement with live theatre as widely as possible in the community.

The pursuit of this vision influences the National's pricing policy. A balance has to be struck between the need to earn box-office revenue to help maintain the National's financial viability and keeping prices low enough so as not to deter audiences, especially those least able to afford a ticket.

Our econometric analysis of recent price and attendance data for the three National Theatre stages, discussed in more detail in Appendix 2, indicates that the demand for full-price tickets is quite inelastic with an estimated price elasticity of approximately -0.25 overall (see Appendix 2, Tables 30 and 31).⁹ This implies that while raising these prices would cause a marginal decrease in occupancy rates, it would also increase total box-office revenue. However, the National Theatre does not raise prices even with likely sell-out performances, because it does not want to limit the affordability of tickets.

One of the most successful strategies in terms of extending the audience has been the Travelex season. This initiative, where £10 tickets are offered to a number of shows, is identified by the National as a way to broaden the audience by making theatre available at prices comparable to going to the cinema. Beginning in 2002 with an offering of four plays, the Travelex season sold its millionth £10 ticket during 2009. In addition, the National

has an Entry Pass, a membership scheme for 15-19 year-olds offering £5 tickets to encourage attendance by this demographic.

The National Theatre aims to reflect in its repertoire the diversity of the nation's culture, which can also be seen as a means towards attracting a more diverse audience to the theatre. Its repertoire in recent years suggests a programme that reflects a multicultural Britain, including Roy William's *Sing Yer Heart Out for the Lads* (2002); Kwame Kwei-Armah's trilogy *Elmina's Kitchen* (2003), *Fix Up* (2005) and *Statement of Regret* (2007); and Ayub Khan-Din's *Rafta, Rafta...* (2008). The theatre's 2008 Annual Report notes that *Rafta, Rafta...* "drew South Asian audiences in numbers not previously seen" at the National.

The NT has been using its website to extend its contact with existing patrons and reach new audiences. In addition to the usual information and booking services, the site features *Discover: Online* (www.nationaltheatre.org.uk/discover), where one can take a virtual theatre tour, learn about current performances (with videos of actors discussing the play), go backstage and download educational resource packs on past plays. This facility is also linked with the website *StageWork* (www.stagework.org), designed for students in conjunction with the Department for Culture, Media and Sport, and which hosts extensive curricular resources for teachers.

The community is also engaged by the development of the National Theatre's interior and exterior spaces as a cultural centre where a variety of attractions and activities are mounted throughout the year that are enjoyed by a wide range of people who may not be going to see a play. Its success in engaging the wider public at large in this way could be followed by other organisations with suitable buildings and surrounding spaces.

Arguably, the most significant innovation in expanding the audience reach undertaken by the National Theatre in recent times is NT Live. This initiative involves satellite broadcasts of a live performance of a play to cinemas throughout the UK and abroad. It has not just expanded audience numbers but has also drawn into the theatre a range of people who do not or cannot attend performances in the theatre itself, as our survey analysis found (this is discussed in detail below).

9. Nevertheless there may be some greater price elasticity downwards, as indicated by separate analysis of the Travelex pricing arrangements which provides evidence of consumer responsiveness to the concession prices offered.

Table 3: Number and type of theatre productions: National Theatre, 2003-2008

	No. of productions		No. of performances (mean) no.	Full price (mean) £	Concession price (mean) £
	no.	%			
Type					
Play by well-known playwright pre-1900	14	12	50.1	23.31	15.81
Play by well-known playwright 1900-1960	13	11	50.5	21.28	15.37
Play by well-known playwright post-1960	29	25	51.6	22.76	16.63
Play by less well-known playwright pre-1995	8	7	46.6	23.38	16.40
Play by less well-known playwright post-1995	52	45	53.4	22.73	14.90
Total	116	100	51.8	22.69	15.60
Written Category					
Play written after 2000	65	56	56.7	23.26	15.78
Play written 1900-2000	34	29	42.4	21.48	15.21
Play written before 1900	17	15	51.8	22.89	15.74
Total	116	100	51.8	22.69	15.60

Note: Prices are adjusted for inflation and are expressed in real terms at 2008 levels. Further details of the play classifications are contained in Appendix 2.

3.2.2 Extending the artform

An essential contributor to the National's capacity to produce new work is its use of the repertory system which enables up to seven or eight productions to be running in its three spaces at a given time. Analysis of the National Theatre's repertoire across its three stages between 2003 and 2008 demonstrates the importance the National attaches to presenting new work. Table 3 shows that over this period more than half (56 per cent) of the 116 plays presented were written after 2000.

Our econometric analysis also demonstrates the strong positive impact on attendances from programming work by well-known contemporary writers such as Alan Bennett and Tom Stoppard.

In these circumstances the fact that 45 per cent of NT productions in this period were of plays by lesser-known contemporary playwrights is an indication of the theatre's commitment to putting on new work by up-and-coming writers.

This is particularly noteworthy given that our demand analysis shows that plays by

this contemporary 'innovative' group are less popular amongst full-price ticket buyers; programming a play by this group is, all things being equal, likely on average to lower full-price occupancy rates by between 1 and 2 percentage points (Appendix 2, Table 31). These results illustrate the trade-off between the objectives of increasing audiences and advancing the artform through programming new writing, emphasising the importance of a business model calibrated to achieve an appropriately balanced outcome.

Innovation in extending theatrical practice is the rationale for the existence of the NT Studio which acts as a developmental laboratory not just for the National but for theatre more widely. The Studio provides opportunities for writing, directing and acting talent that may go on to work in the main stages or in the industry. Work at the cutting edge of theatre is encouraged, including exploration of the use of new technologies in sound, film and video. About 15-20 per cent of the new productions developed in the Studio transfer to the main National Theatre stages.

Of course, presenting new work can be risky. Take the production of *Jerry Springer the Opera* which began at the Battersea Arts Centre as a twenty-minute performance. It was developed and performed at the Edinburgh Fringe Festival, and then came to the National in April 2003. At the time, the theatre's decision to open the season with this new piece of writing was seen as a considerable artistic risk (Dempster, 2006). However, the show went on to considerable acclaim and subsequently transferred to the West End, and was filmed by the BBC. Similarly *War Horse* illustrates the way in which the National Theatre can nurture and develop an initially risky work which eventually becomes a commercial success.

The NT's Director describes theatre as an 'irreducibly ancient' artform – although there is constant innovation in content and delivery, the fundamental connection between live performers and an audience remains the same. This acts as both a constraint and a challenge for theatrical innovation, a challenge to which the National has responded through its focus on new work and the encouragement of new talent. Given the risks associated with such innovation, it is not surprising that it is less common in the commercial theatre. It remains for the subsidised sector, where the National Theatre plays a leading role, to assume a significant responsibility for ensuring that theatrical drama continues to develop.

3.2.3 Value creation

The interpretation of public value in an assessment of the work of publicly subsidised performing arts companies has a number of facets. Importantly, value creation has to do with the two dimensions discussed above: the building of audiences and the advancement of artistic practice. As we have noted, the National gives these forms of value prominence in its mission statement and devotes considerable resources to finding innovative ways to pursue them. It also does a lot of educational work.

At a more general level, the National creates value for the theatre industry and the theatrical profession at large. It supports the work of other theatres and hosts writers, directors, developers and composers who take up residence in The Studio. Creative artists who are given the opportunity to develop their talents at the National go on to work in the wider commercial and non-commercial theatre, film and television industries. Sometimes they return to the Theatre after stellar careers in other media. This constant fluidity

in the relationship between subsidised and commercial performing arts is of considerable benefit to both, a benefit still largely unquantified.

Internally, value is created for individual artists through the challenges the Theatre puts to them to extend themselves in an environment that is at the forefront of the theatrical profession. The challenge may be taken up in sometimes surprising ways: a director, for example, might choose to do a production in the Travelex season, accepting half the normal budget they might otherwise have because of the artistic challenges such a project presents, and because of the nature and size of audience that the Travelex model enables.

The NT Live experiment offers an interesting potential source of new value creation. As well as expanding audiences, this project appears to be generating a new form of cultural value, as we discuss further below.

3.2.4 New business models

As with any organisation, business models in the performing arts have to move with the times. This is essential if theatres are to remain artistically and financially viable. Demand and financial support remain vulnerable today to unforeseen events such as the global economic slowdown, while there is also an imperative for a leading cultural institution such as the National to remain at the front line in terms of artistic growth.

In maintaining a flexible and forward-looking business model, the NT's strategies can be considered under several headings. Firstly, in putting together the programme for a forthcoming season, it must find the right ratio between likely box-office successes and riskier productions. There is no clear line of demarcation between these two categories, and a risky work may become a hit just as the expected box office smash can fail to win the expected audiences. The National is fortunate in being able to have a sufficiently large volume of work underway at any one time that the risk can be spread, allowing a disappointing result for one production to be offset by a success with another (Caves, 2000).

Another aspect of the National's business model involves pursuing opportunities for onward marketing of NT productions through West End transfers and in seeking other revenue-raising sources. For example, a quick-response investment fund is used to raise capital at short notice for particular projects. In

addition, partnerships with corporate sponsors and government agencies may enable new sources of support to be tapped. An example of a successful relationship with a funding body is the cooperative arrangement between the National Theatre, Arts Council, England and NESTA. NESTA has provided financial support for the NT Live experiment, on condition that the lessons from the experiment are shared widely with the sector.

The capacity of the National to adopt a flexible and responsive business model that is sensitive to, and integrated with, the artistic development of the company is greatly enhanced by its management structure. In the executive team the artistic, managerial and financial functions are closely linked, allowing a unified focus to planning. Management is relatively lean, enabling quick decision-making, and there is a high degree of trust among the management personnel. In short, the NT provides a good example of the sort of adaptive business model for a cultural institution that works well in encouraging innovation in all the dimensions that we are considering.

3.3 The NT Live experiment

Helen Mirren starred as *Phèdre* in the first NT play to be broadcast live via satellite to cinemas, on 25 June 2009. As part of the NT Live experiment, Nicholas Hytner's production of Ted Hughes' translation of Racine's play was seen live on 73 digital cinema screens at 70 unique sites in the UK, and was relayed to 210 further sites in the rest of the world. A total of 14,000 people across the UK saw that evening's production (excluding those who experienced it at the National itself). A further 14,000 people saw it live across Europe or on the same day in North America (allowing for time zone delays). Including those cinema audiences in other countries who saw the production at a later date, it is estimated that more than 50,000 people saw *Phèdre* as it was performed on 25 June. *Phèdre* was followed by *All's Well That Ends Well* on 1 October 2009, *Nation* on 30 January 2010, *The Habit of Art* on 22 April 2010. *London Assurance* will be screened on 28 June 2010.

3.3.1 The survey methodology

Who were the new audiences attracted by the showing of *Phèdre* live in UK cinemas? To find out, we worked with the NT and 35 of the participating UK cinemas to collect detailed

survey data from those who saw *Phèdre* in the cinema and those who saw it at the Lyttelton. The data allowed us to compare the NT Live cinema audience with the 'traditional' audience for National productions at the South Bank as represented by those attending the actual play. Attendees in both categories were invited to access the survey online after the show. For both the cinema and theatre audiences, socio-demographic data were also collected on-site from a random sample of attendees; these data were used to test whether there were any selection biases that might have arisen if those completing the surveys were not representative of the respective audiences as a whole (in practice such biases turned out to be negligible).

A total of 1,316 completed responses were collected from cinema-goers who saw the production on 25 June 2009, and a total of 1,216 responses were received from theatre-goers who saw the production on one of several nights in July and August (not 25 June, because the presence of camera equipment and discounted £10 tickets in the theatre that night made it an atypical occasion). In both instances the surveys were conducted online for NESTA by the firm Morris Hargreaves McIntyre, with the closing date for surveys on 31 July. The mean survey time was approximately 12 minutes in duration for the theatre-goers, and approximately 19 minutes for the cinema audience.

One distinctive feature of this production of *Phèdre* was the starring role of Helen Mirren, returning to the National at the height of her distinguished career. We recognised that her 'star' appeal could have made it an inappropriate vehicle for judging the success or otherwise of NT Live. Accordingly, we also carried out a similar survey of cinema audiences at the next NT Live showing, Marianne Elliott's production of *All's Well That Ends Well*, transmitted live to cinemas on 1 October 2009. The data from this survey have enabled us to check the robustness of the *Phèdre* findings.

The surveys were designed to address the following specific research questions:

- *Audience building*: how has NT Live grown the audience overall?
- *Audience widening*: has it brought in new socio-demographics?

Table 4: The decision to attend the performance

Variable	Response	Theatre	Cinema
		%	%
The main reason to attend	To see Helen Mirren	60.3	18.6
	Interest in the play	30.4	19.6
	It was a National Theatre production	6.0	21.1
	To see a theatrical performance broadcast in the cinema	-	34.8
Other factors that were important or very important in the decision to attend	Convenience of the venue (transport and parking)	71.2	90.6
	Ticket cost	68.2	72.5
	The ambiance of the venue (theatre or cinema)	72.4	59.2
	Comfort at the venue	73.2	67.8
	Seeing the actors up close	70.2	75.3
Reason for attending the cinema screening instead of the theatrical performance	Geographical distance to the National Theatre	-	31.5
	Didn't consider buying a ticket for the theatre	-	13.8
	Preferred seeing the cinema performance	-	12.8
	The theatre performance was sold out	-	12.6
	Wanted to see the performance in the cinema before buying a theatre ticket	-	2.4
Reasons for attending the cinema screening	Would have attended the cinema performance if the theatre had sold out	80.8	-
	Would have gone to the cinema as well as seeing it in the theatre	16.9	-

- *Audience deepening*: has NT Live given audiences new and valued cultural experiences?
- *Changing attitudes*: has it encouraged people to expand their consumption of the theatre, either broadcast or at the theatre?
- *New revenue streams*: what are audiences willing to pay for live screenings? How do these numbers compare with willingness to pay for traditional theatre? How do they compare with other forms of digital transmission of theatre?

In drawing up the questionnaires to address these questions, we consulted a range of previous research on the evaluation of cultural experiences, as discussed in an earlier section of this report.

We consider our results under each of the above headings.

3.3.2 Audience building: growing the audience

It is clear that the NT Live broadcast expanded the audience for the National Theatre's production of *Phèdre* significantly. The theatre audience for the play over its entire run was 54,500, so this single broadcast performance almost doubled the audience, taking account of the world-wide response. In the UK, the broadcast made the production available to many who would not otherwise have been able to see it; almost one-third of the cinema audience gave the National Theatre being too far away as the main reason why they had not seen *Phèdre* at the theatre (Table 4). At 13 per cent, a significant share of audiences who attended the cinema screening reported that they did so because tickets for the theatrical performance had sold out. NT Live allowed the National Theatre to expand its 'virtual capacity' to bring in these audiences.

Table 5: Past attendances of theatre and cinema audiences

Those who have attended:	In the past 12 months		Between 1-5 years ago		More than 5 years ago or never	
	Theatre %	Cinema %	Theatre %	Cinema %	Theatre %	Cinema %
A play in a theatre	96.4	91.3	2.6	7.5	1.0	1.2
A play at National Theatre ^(a)	94.1	41.3	3.5	25.8	2.4	32.9
A play at National Theatre ^(b)	-	50.6	-	23.4	-	26.0

Note: (a) Full sample. (b) Cinema sample excluding those for whom NT is “too far away”.

As well as expanding the audience geographically, the broadcast also drew in people who were not regular National Theatre goers. The great majority (94 per cent) of the theatre audience for *Phèdre* had been to the National Theatre in the previous 12 months, but only 41 per cent of the cinema audience had been there (Table 5). Indeed, one in five cinema viewers (21 per cent) indicated that their main reason for attending was to see a National Theatre production (Table 4). Almost 10 per cent of the cinema audience had not been to any theatre in the previous year, compared with only about 4 per cent of the theatre’s audience, indicating a small but significant number of theatre-goers drawn either for the first time, or into going back, to the theatre (Table 5). (Just over 1 per cent of the cinema audience had either never been to the live theatre before or had not been for at least five years).

These observations are reinforced by comparing the extent to which the two audience groups can be regarded as regular cultural consumers. As part of our research, we compiled an indicator or score for each survey respondent based on whether they had been to a variety of cultural events including theatre, opera, music performance, visiting an art gallery or the cinema in the previous 12 months (Appendix 3 gives details). In this way we were able to classify members of the audiences according to whether they had had extensive, moderate, little or no cultural exposure in the previous year. The survey data indicate that the proportion of cinema attendees who had had little or no cultural exposure in the previous year was more than twice as great as the proportion in the theatre audience (almost 7 per cent compared to 3 per cent). In other words, the screenings attracted more people

Table 6: Sources of information: proportions of theatre and cinema audiences who found out about the production of *Phèdre* by different means

Source of information	Theatre audience %	Cinema audience %
NT brochure	46.7	10.0
NT website	36.6	15.3
Cinema brochure	(.)	35.0
Cinema website	(.)	20.1
Email	27.0	12.0
Word of mouth	7.9	23.8
Press coverage	25.1	14.0

to theatre who were not otherwise significant consumers of the arts.

The majority of National Theatre audiences get their information about forthcoming performances from the Theatre's own sources – its brochures, website or member emails. The NT Live experiment opened up different avenues through which potential customers could find out about the performances (see Table 6). In particular, the majority of NT Live audiences found out about the production from the cinema where it was screened, mainly through its brochure and website.

Word of mouth played a much more important role in raising awareness of the screening – with 24 per cent of audiences identifying this channel at cinemas compared with only 8 per cent of theatre audiences. This finding suggests that the digital broadcast of *Phèdre* made it possible for the National Theatre to draw on established relationships between cinemas and their patrons all over the UK in order to reach people who might otherwise not have heard of the production. Indeed, over three-quarters of NT Live audiences had in the previous twelve months been to the cinema where *Phèdre* was screened, lending additional support to the idea that by broadcasting *Phèdre* in cinemas the National Theatre was able to harness them as local cultural hubs for the promotion of the production.

The 70 cinema venues which participated in NT Live *Phèdre* were spread right across the UK, reflecting the National Theatre's aim to reach as wide a constituency as possible. By including cinemas located in areas far from London, the National created opportunities for people to enjoy its work who, for reasons of distance, would have otherwise found it too costly to do so. At the same time, by including cinemas in the South Bank's commuter belt, the National allowed those who had wanted to go to the National Theatre but didn't find, or couldn't afford, a ticket to see the production, as well as, in principle, those who actually preferred – for whatever reason – to see the production screened live at a cinema.

The fact that some audiences had the option of seeing *Phèdre* at the NT or at a local cinema meant that by collecting detailed postcode information on audiences for *Phèdre* at the National Theatre, and comparing it with audience postcode data for similar NT productions, we could use statistical methods to establish whether NT Live drew in new audiences (say because it acted as a marketing

tool for the National) or cannibalised the National at the box office.

Appendix 5 contains the details of this statistical analysis. It shows that there is no evidence for cannibalisation effects at the NT's box office¹¹ – if anything, there were greater numbers of theatre-goers (on average over 50 per cent more) from the catchment areas of participating cinemas. It seems as if the NT Live broadcast of *Phèdre* on 25th June, as well as growing the audience through cinema audiences, also grew audiences at the National Theatre itself.

3.3.3 Audience widening: new demographics

The extent to which NT Live attracted a new type of audience to the theatre can be studied by comparing the cinema audience with the 'traditional' theatre audience (indicated by the NT in-theatre survey for *Phèdre*) and the population as a whole (56 out of the 70 participating digital cinemas were located in England).

As is generally characteristic of theatre-goers, both the theatre and the cinema audiences were older, and better off than the population as a whole, and contained a higher proportion of females. Comparison between the cinema and theatre audiences shows that NT Live attracted a higher proportion of females, and a larger proportion of those 65 and older – this demographic accounted for a quarter of all attendees in the cinema audiences, compared with one-fifth at the theatre (see Table 7).

The biggest difference between NT Live cinema and theatre audiences was in terms of their incomes: NT Live attracted a significantly higher proportion of low-income groups. The traditional theatre audience was much better off, with 35 per cent of respondents earning more than £50,000 per year, compared with just 18 per cent of the cinema audience. Price is clearly a significant determinant of entertainment choices in general and the theatre is no exception – we noted earlier the success of the Travelex season in attracting audiences to the National Theatre with a ticket cost of £10; it was this same price that brought *Phèdre* within reach of those who might not have been able to afford a ticket to the main stage production (a finding supported by our analysis of the Willingness to Pay survey responses).

How effective is NT Live likely to be in spreading recognition of the National Theatre brand image amongst potential consumers?

10. In marketing, cannibalisation is the decreased demand for an existing product when its company releases a new and similar product. So, in this instance, the fact that the play was showing at the cinema could theoretically have led people who would otherwise have gone to the theatre to choose to see it on screen instead.

Table 7: Some demographics of National Theatre and NT Live *Phèdre* audiences

	Theatre audience %	Cinema audience %	English population %
Gender			
Male	35.9	27.7	49.1
Female	64.2	72.3	50.9
Total	100.0	100.0	100.0
Age			
Less than 25 years	2.4	3.5	31.0
25 – 44 years	21.3	19.5	28.7
45 – 64 years	56.9	51.6	24.3
65 years and more	19.5	25.4	16.0
Total	100.0	100.0	100.0
Income per year			
Less than 20,000	21.4	33.2	50.5
20,000 – 49,000	44.1	49.4	41.0
50,000 or more	34.6	17.5	8.6
Total	100.0	100.0	100.0
Cultural exposure in the last 12 months			
Little or none	3.1	6.6	(.)
Moderate	44.9	48.9	(.)
Extensive	52.1	44.5	(.)
Total	100.0	100.0	(.)

It is noteworthy that just over one in five of the cinema audience identified a desire to see a National production as the main reason for their attendance, greater than the numbers singling out Helen Mirren. Interestingly, this segment of the audience contained proportionately more females, low-income

earners and infrequent cultural consumers than the cinema audience as a whole.

3.3.4 Audience deepening: new or unexpected experiences

A significant question in evaluating the NT Live experiment is whether this new

Table 8: Expectations and actual outcomes

Expectation/outcome	Theatre audience		Cinema audience	
	Expected %	Actual %	Expected %	Actual %
To enjoy a social experience with others	24.3	80.0	26.2	81.2
To have an emotional experience	68.9	85.3	47.4	95.3
To have immersive experience	51.6	66.7	28.1	85.3

Table 9: Expectations and actual outcomes: some detail

The main experience expected	The actual outcome experienced	Proportion of audience with this expectation agreeing with this outcome (%)		
		Strongly agree	Agree	Total agreeing
To experience something new, a new way of presenting theatre	Broadcasting live theatre to a cinema screen opens up new ways of seeing this artform	64.6	32.5	97.1
To have a completely immersive experience and escape from the everyday	I was totally absorbed	71.6	23.0	94.6
To have an emotional or uplifting experience	I felt an emotional response to the play	56.3	32.4	93.7

way of experiencing theatre creates new or unexpected experiences for audiences? If so, are there new forms of cultural value generated, different from those generated by theatre in its traditional mode of production? Can these be measured in ways that can be used by funders to help evaluate their decisions?

To begin with, we compare the actual experiences of members of both audiences with what they were expecting. Table 8 shows the proportions of both the theatre and the cinema audiences who expected certain outcomes, and the proportions who actually experienced those outcomes. It is striking that the proportion of the cinema audience expecting to have an emotional or uplifting experience, and to have a completely immersive experience and escape from the everyday was significantly smaller than for the theatre audience, yet their actual experience was much greater.

The success of the cinema presentation in more than meeting audience expectations is probed further in Table 9, where the actual experience is shown for those members of the cinema audience who identified each of three specific experiences as the main ones they were expecting in attending the performance.

In all cases, a substantial majority of respondents agreed that their expectations had been fulfilled. It is also interesting to ask whether those members of the audience who did not mention each of the specific experiences in Table 9 as ones they were expecting to have, actually did have that

experience when they saw the screening. Our data show that indeed a majority of them did, though a smaller majority in each case than of those who did have the expectation.¹¹ Nevertheless, the conclusion to be drawn from all these considerations is that for many in the audience expectations were amply fulfilled, whilst others had some unexpected but nonetheless welcome experiences. In all expectation/outcome pairs, significantly smaller numbers of respondents reported that their expectation was disappointed.

Seeing a play in a theatre brings a number of different responses and reactions from audiences, reflecting the extent to which they are engaged, moved, uplifted or transported to another world. Quite a lot is known about the emotional and aesthetic value that audiences derive from live theatre.¹²

As discussed earlier, in this study we are interested particularly in the concept of cultural value as a means to describe the various qualitative aspects of value that are generated by artistic goods and services. We noted that the cultural value of such goods and services is a multi-faceted phenomenon reflecting a range of dimensions including the aesthetic qualities, the symbolic meanings, the spiritual connections, the social significance and the educational potential of the arts (Throsby 2001). So we can ask: are there new forms of cultural value generated by broadcasting a play to a cinema, different from those generated by theatre in its traditional modes of production?

11. For example, whereas 94 per cent of those expecting to have an emotional experience agreed that they had had an emotional response to the play, the proportion of those who had not mentioned expecting this experience who agreed they had had an emotional response was 83 per cent.

12. See, for example, Reason (2004).

Table 10: Experiences of *Phèdre* for NT audiences

Reported experience/opinion	Theatre audience			Cinema audience		
	Strongly agree %	Agree %	Total agreeing %	Strongly agree %	Agree %	Total agreeing %
I was totally absorbed	38.0	39.2	77.2	60.6	31.5	92.1
I felt an emotional response to the play	27.7	45.0	72.7	46.1	42.1	88.2
Didn't understand what artists were trying to convey	1.1	3.3	4.4	1.0	2.5	3.5
Transported to another world and lost track of time	12.1	35.7	47.8	23.3	39.9	63.2
Made me think of new ways of seeing things	5.4	27.3	32.7	12.4	39.2	51.6
Seeing in the company of an audience increased enjoyment	11.2	45.2	56.4	14.2	45.6	59.8
Did not engage intellectually	2.7	9.1	11.8	3.3	6.0	9.3
Wanted to talk about what I'd seen and experienced	26.3	57.0	83.3	41.5	48.4	89.9
My creativity was stimulated by the experience	10.4	30.3	40.7	17.4	37.9	55.3
I felt a bond with performers	11.3	40.4	51.7	19.0	51.1	70.1
Watching on screen would give/gave sense of what live theatre is like	2.8	13.1	15.9	14.5	42.7	57.2
Being in cinema very different from seeing play live	40.2	49.3	89.5	25.3	53.9	79.2
Experience met expectations	34.8	41.6	76.4	42.5	47.0	89.5
Cinema opens new ways of seeing this artform	18.8	55.2	74.0	63.8	32.8	96.6
Felt real excitement because knew performance live	-	-	-	43.6	40.7	84.3

Table 11: Cultural value indicators: National Theatre

Statement	Cultural value indicated	Cinema Audience Mean	Theatre Audience Mean
Absorbed	Aesthetic	1.49***	1.01***
Emotional response	Aesthetic / symbolic	1.29***	0.85***
New ways of seeing	Symbolic	0.54***	0.11***
Transported	Spiritual	0.74***	0.31***
Seeing with others	Social	0.58*	0.50*
Wanted to talk about	Social	1.30***	1.03***
Creativity stimulated	Educational	0.65***	0.29***

Note: The level of significance of the difference between the two means in each row is indicated as: * p<.05, ** p<.01, *** p<.001

Table 12: Likelihood of future attendance amongst the audience after having seen *Phèdre* in the cinema

	Another live play broadcast in cinema %	A performance at the National Theatre %	A performance at another theatre %
More likely	89.0	33.9	29.6
Less likely	1.6	2.4	0.8
No difference	7.9	61.3	68.1
Not sure	1.5	2.4	1.5
Total	100.0	100.0	100.0

In our surveys we asked respondents about their agreement or disagreement with a series of statements about the performance they witnessed. Table 10 tabulates the extent of agreement with these statements. Looking more closely at these results as potential indicators of cultural value, we can associate specific statements with one or more of the particular dimensions of cultural value noted above, as shown in Table 11. Using the full range of responses, we can assign a numerical score of -2, -1, 0, +1 or +2, to each response, where -2 denotes “Strongly disagree”, +2 denotes “Strongly agree”, and zero denotes neutrality. The table shows the mean scores for each of the cultural value indicators specified. Further detail of the calculation of these scores is shown in Appendix 3.

The strong positive reactions of both audiences are revealed very plainly in these tables, a tribute to the strength of all aspects of the production. But what is striking about these results is that in almost all aspects the experience of the cinema audience was stronger and more intense than that of the audience in the theatre.

To some extent this may be due to the novelty of the cinema experience heightening the audience’s perceptions. Note the strongly enhanced bond with performers enjoyed by the cinema audience, assisted no doubt by the direction and camera work that was able to bring vivid close-ups throughout the action (Table 10). These data do suggest that the live broadcast of a play does have the potential to generate new cultural experiences for audiences, an observation corroborated by the overwhelming agreement of both the cinema audience and the traditional theatre-goers that

broadcasting live theatre to a cinema screen opens up new ways of seeing this artform.

The ‘live’ and ‘social’ components of this seem to be crucial for audiences. Both cinema and theatre audiences enjoyed the ‘buzz’ of the live experience. For example, 84 per cent of cinema audiences felt real excitement because they knew that the performance they were watching was taking place ‘live’ at the National Theatre (Table 10). In both cases almost 60 per cent of audiences agreed that ‘seeing the play in the company of an audience’ increased their enjoyment.

This finding suggests that there are limits to the ‘anywhere, anytime’ attitude towards the consumption of cultural content. It would seem that there does exist a ‘right time’ (live, as it happens) and a ‘right place’ (a cultural venue, whether a theatre or cinema) to enjoy some cultural experiences.

Overall, we can conclude from this analysis that NT Live gave rise to positive cultural value across all the dimensions we have identified, with the strongest results recorded for the aesthetic and social components of cultural value. The relationship between the cultural and economic value generated is discussed below.

3.3.5 Changing attitudes

A possible effect of the NT Live experiment is that it will stimulate audience demand not only for further screenings but also for attendance at live performances at the National or at the theatre more generally. Given the strong audience satisfaction with their cinema experience, it is hardly surprising that a great majority (89 per cent) indicated that it was more likely they would come again; fewer

Table 13: Likelihood of future attendance by selected segments of cinema audience

	Those in the last 12 months who have not seen		
	Performance at NT %	Met Opera %	Play in a theatre %
Likelihood to attend live broadcast of a play in cinema			
More likely	88.7	88.7	88.5
Less likely	1.4	1.5	0.0
No difference	8.6	8.2	8.9
Not sure	1.4	1.7	2.7
Total	100.0	100.0	100.0
Likelihood to attend live performance at National Theatre			
More likely	36.3	34.4	34.5
Less likely	2.5	1.3	1.8
No difference	57.8	62.0	56.6
Not sure	3.4	2.3	7.1
Total	100.0	100.0	100.0
Likelihood to attend a live performance of a play at another theatre			
More likely	30.9	29.2	33.9
Less likely	0.7	0.3	0.0
No difference	66.6	68.9	60.7
Not sure	1.8	1.7	5.4
Total	100.0	100.0	100.0
n	731	784	113

than 2 per cent said it was less likely (Table 12). There were also signs of a stimulus to some cinema-goers towards attendance at live theatre with 34 per cent indicating that, having seen *Phèdre* at the cinema, it was more likely that they would attend a live performance of a play at the National, and 30 per cent saying it was more likely they would do so at another theatre.

What about ‘new’ audiences – those who had not been to the National Theatre in the previous year? Table 13 shows that 36 per cent would be more likely to visit the National as a result of having seen the NT Live production, and 31 per cent were more likely to see a play at another theatre (in both cases only slightly higher than for NT Live audiences as a whole). Somewhat similar results are found for those

who had not been to any play in the previous year or who had not seen one of the Met Opera performances in a cinema. Again, the results suggest there is some potential in the cinema broadcasting of live theatre to attract new audiences to the performing arts.

3.3.6 New revenue streams

Tickets to the live screening of *Phèdre* in the UK were priced at a uniform £10. Three-quarters of the cinema audience across the country regarded this as ‘very good value’ for money, with a further 20 per cent indicating that it was ‘quite good value’. Less than 1 per cent thought it ‘poor value for money’. When asked what they regarded as a ‘reasonable’ amount to pay for such a screening, responses ranged from zero to £30 with a mean and median around the ‘anchoring’ price of £10,

Table 14: Willingness to pay for screened and live performances by cinema audience

£	Willingness to pay for		
	Live screening: reasonable amount %	Live screening: maximum amount %	Live performance: reasonable amount %
0 – 4	0.1	0.1	0.1
5 – 9	13.0	1.1	0.4
10 – 14	71.8	34.7	6.3
15 – 19	12.8	45.1	8.6
20 – 24	2.0	14.4	23.7
25 – 29	0.2	3.0	23.0
30 – 34	0.2	1.0	20.2
35 +	0.0	0.6	17.8
Total	100.0	100.0	100.0
n	1,302	1,298	1,290
Mean	10.70	14.81	25.60
Median	10.00	15.00	25.00
SD	2.64	4.69	8.87
Min	0.00	0.00	0.00
Max	30.00	50.00	75.00

13. Note that 7 per cent of the cinema audience stated that they wanted to see *Phèdre* in the theatre but that it was too expensive. Of these consumers, the majority (77 per cent) thought the screening was very good or quite good value for money.

as shown in Table 14. When respondents were asked the *maximum* they would pay, they settled on £15, suggesting scope for a future modest price rise, echoing the price-inelastic demand for National tickets uncovered in our earlier econometric analysis of audience demand. Cinema-goers also recognised that a ticket to a live performance in the theatre would cost more than one to a cinema screening of a play, and that such a differential was appropriate.¹³ These consumers regarded £25 as a reasonable price to see a live performance of *Phèdre* in the theatre.

We analysed factors affecting willingness to pay for tickets to a broadcast screening amongst the cinema audience, or for tickets to another live play amongst the theatre audience (Appendix 2, Tables 32 and 33). The results indicate that the elements of cultural value most clearly associated with consumers' economic valuation of their experiences, as revealed by their willingness to pay, are the aesthetic/symbolic value indicated by their

emotional response, and the social value of the group experience. Interestingly, the aesthetic value indicated by the respondents' absorption in the show exerts only a weak influence on willingness to pay.

Turning to audience demographics, we note that in the case of both reasonable and maximum amounts, the willingness to pay is greater amongst older (at least for cinema) and higher-income people. Although not all the relevant coefficients are statistically significant, these results do suggest a higher readiness to pay amongst less frequent cultural consumers, again confirming the potential of NT Live to help in expanding the traditional theatre audience. Similar tendencies are apparent amongst those who had not been to the National in the previous year, with a relatively higher willingness to pay for cinema tickets amongst the less well-educated members of this group.

As discussed earlier, the live dimension was a core component of the National's experiment. It explains why the NT has at least not so far made its NT Live productions available on DVD and as internet downloads. Nonetheless, there does appear to be some appetite amongst audiences for them. We found that 29 per cent of the cinema audience for *Phèdre* and 21 per cent of the theatre would have been interested in purchasing a DVD of the performance if one had been available.

In the case of the cinema audience for the NT Live production of *All's Well That Ends Well*, 33 per cent said they would buy a DVD.¹⁴ In addition, almost half of the *All's Well That Ends Well* audience said that they would have watched this production if it had been streamed live online, and of these respondents 43 per cent said they would have paid to do so; the mean and median maximum amounts they said they would have paid were £7.36 and £5 respectively.

The implications of these results for the National Theatre's business model and the prospects for a wider adoption in the theatre industry of the cinema broadcast technology are discussed in the concluding sections of this report.

B. The Tate Gallery

3.4 Innovation in the Tate

The Tate consists of four separate venues: the original gallery on Millbank in London (now Tate Britain), and galleries in Liverpool (opened in 1988), St Ives (opened in 1993), and a second site in London, Tate Modern (opened in 2000).

The essential mission of the Tate is to 'increase public knowledge, understanding and appreciation' of British and international art. Pursuit of this mission has always been interpreted as finding new ways of broadening and deepening the audiences for art, and advancing the artform by fostering the best in contemporary art. Underlying these objectives has been constant attention to the other aspects of innovation that we have identified, a continuing re-examination of the notion of value creation and an awareness of the need for forward-looking business strategies in the planning and operation of the galleries' various activities.

3.4.1 Audience development

Two of the Tate's principal objectives relate to expanding audience reach by addressing audiences beyond the immediate visitors to its four galleries, and broadening the audience appeal through improving the quality of visitor experience. A number of programmes specifically target new audiences, especially young people, families and first-time visitors.

Will Gompertz, until last year the Director of Tate Media, explained the Tate's thinking on reaching new audiences:

"Young audiences are used to interacting with content in a way older groups aren't ... we live in an events culture. Permanent collections are free and anybody can come in and enjoy them. They're always there, so they can appear not as exciting as the latest exhibition – we had to bring some of that excitement and contemporary relevance to the permanent displays" (Diaz, 2007).

New technologies have helped improve the visitor experience within the galleries. In 2002 and 2003, Tate Modern was the first museum to pilot Multimedia Tour Systems (MMT) using handheld computers or Personal Digital Assistants (PDAs) on a wireless network in the galleries (Proctor and Burton, 2004). The UK's first multimedia tour for the Apple iPhone opened at Tate Liverpool's Gustav Klimt exhibition in 2008. In 2010, the Tate released the *How It Is* app for the iPhone or iPod Touch – an interactive interpretation of Miroslaw Balka's work in The Turbine Hall at Tate Modern. If visitors opened the iPhone app while at Tate Modern they unlocked a secret game.

The MMT provides background information on displayed works – in the form of video, still images and audio, with content that includes artists discussing their work – and interactive screens allowing visitors to individualise the content to their own interest and pace.

Wireless allows for messages and alerts to be sent to users when upcoming talks, films or programmed activities are about to start. Despite the attractiveness of such devices for enhancing the gallery experience, however, uptake has been relatively low for the main collection, where entry is otherwise free of charge, though it is greater at special exhibitions which visitors pay to view. Nevertheless, the Tate remains committed to further development of such applications in line with the world-wide trend towards

14. Of course, there will be biases in these survey responses if what respondents say they would do differs from what they would do in practice (Human Capital, 2010). There are survey design techniques available in such circumstances to minimise the bias. A more in-depth study of demand for currently unavailable formats, such as DVD, would need to employ such techniques.

Table 15: Number of exhibitions and mean ticket prices: Tate Modern and Tate Britain, 2003–2007

	No. of shows		No. of days (mean)	Full price (mean)	Concession price (mean)
	no.	%	no.	£	£
Exhibition type					
Historical	18	24	88	9.41	7.22
Modern	24	32	93	9.50	7.23
Contemporary	33	44	95	7.28	5.76
Total	75	100	91	8.52	6.59
Site					
Tate Modern	38	50	92	8.71	6.71
Tate Britain	38	50	90	8.31	6.44
Total	76	100	91	8.51	6.58

Note: Prices are adjusted for inflation and are expressed in real terms at 2008 levels.

personalising and individualising the gallery experience.

Its website is an important way in which the Tate interacts with its audience and reaches out to new audiences (Rellie, 2004). In common with other major art galleries and museums around the world, the Tate brand has become recognisable through its web presence. Since its launch in 1998, use of the website has grown continually and it is now estimated to attract over 18 million visits per year. The site is rich in content, with many opportunities for visitors to access information in a variety of formats. The development of the website has been much more about extending the Tate's range than creating new revenue streams. The use of other websites such as iTunes and YouTube has extended the potential reach of the Tate towards potential new audiences.

More recently, the Tate has been expanding its use of social networking platforms. For example, by February 2010, it had over 51,000 Twitter followers. It regularly invites the public to contribute their own photographs to Flickr photo-streams on themes relating to its exhibitions (as with the *Colour Chart* exhibition which we discuss later).

New technologies also support the Tate archive. Most obviously this relates to the digitisation

of the collection, which has been an aspect of the longstanding registration, cataloguing and information retrieval system. More recently, the virtual tour has been used to provide a permanent record of the show that preserves the detail of the exhibition in perpetuity and complements the printed catalogue.

To what extent are visitor numbers sensitive to the admission price for paid exhibitions? As part of this project we estimated demand functions from data for the different types of exhibition staged by the Tate over the period 2003–2007. Our estimates, shown in Appendix 4, Tables 37 and 38, indicate that demand amongst full price attendees aggregating across all types of exhibition is approximately unit elastic, meaning that a 1 per cent rise/fall in price, other things being equal, will cause a fall/rise in demand (total attendances) of an equivalent percentage.

However, we find that elasticities differ for different types of exhibition; in particular the demand by full price visitors to exhibitions of modern or contemporary art is found to be more price sensitive than for historical shows.

The estimated elasticity for attendance at both modern and contemporary shows by full price visitors is approximately -1.13, indicating that a reduction in admission price of a certain

percentage for such a show would raise attendances by these visitors by a somewhat larger percentage amount (Appendix 4, Table 38). Concession price attendees, however, are not particularly sensitive to price, due in part apparently to the fact that some such visitors are a 'captive market' – youth groups, school parties etc. Of course, the setting of admission prices is a delicate operation that has to balance the effects of prices on attendances and revenues, in pursuit of the Tate's overall mission.

3.4.2 Extending the artform

The boundaries of contemporary art are expanded through the work of innovative artists who are constantly exploring new forms of artistic expression. The Tate supports such artists by showing and promoting their work. The Turner Prize is one highly-visible focus for a critical public assessment of current trends in contemporary art. New technologies used as innovative means of artistic expression figure prominently in these trends – a number of artists shown in exhibitions or acquired for the collection work with video, sound and mixed media, moving beyond traditional modes of practice.

More generally, the Tate's commitment to extending the artform can be seen in the degree to which it programmes exhibitions of contemporary art in its two London and two regional galleries. Between 2003 and 2007, 75 special exhibitions (for which an entry fee was charged) were mounted at the London galleries, of which 33 (44 per cent) were classified as contemporary, 24 (33 per cent) modern, and 18 (24 per cent) historical, as shown in Table 15. Modern art refers to art post-1890 whereas contemporary art is work produced since the 1970s.

Shows of contemporary art on average enjoy slightly longer runs, and the mean entry price for contemporary exhibitions is about 25 per cent lower than for other types of show. Analysis of data for the different shows indicates that 'modern' art exhibitions generate the highest daily attendances on average (just over 1,500 visitors per day), followed by historical (1,250 per day) and contemporary shows (just over 800). Given that contemporary art is clearly a riskier proposition than historical or modern exhibitions, with lower revenue potential, the extent to which the Tate programmes contemporary shows confirms the strength of the gallery's commitment to contemporary art as an essential aspect of its mission.

This commitment is underlined when one considers the trade-off between increased audience and programming new work. As with the theatre, popular art shows attract large crowds, whereas more experimental work gets smaller attendances. Predictions from our econometric demand equations discussed in Appendix 4 show that, other things equal, expected aggregate attendance and revenue at a contemporary show are likely to be up to 20 per cent lower than for a modern show.¹⁵ As with the National Theatre, this example illustrates the quantitative trade-off between increasing audiences and advancing contemporary art. It reinforces again the importance of a business model which is sensitive to the achievement of a balance in the pursuit of these innovation objectives.

3.4.3 Value creation

The Tate's board and senior management recognise that public value relates not just to people coming through the door – otherwise only blockbusters would be mounted so that aggregate attendance numbers are maximised – but rather the gallery has a responsibility to a variety of stakeholders, including living artists; existing and potential audiences; corporate and private sponsors and benefactors; children and young people through the provision of educational programmes; future generations through the safeguarding of the collection; and society at large through the public interest in maintaining the strength and vitality of a leading cultural institution.

The provision of public funding carries with it an obligation to account for the various aspects of value the gallery creates. Since it is necessary to involve the public in defining outcomes to be achieved and in providing feedback on their achievement, the Tate collects a range of statistics and other information to monitor its success and to identify shortcomings. Such a process provides leads in due course to the development of new avenues for value generation, in line with good innovative practice.

3.4.4 New business models

The Tate's management believes that a cultural institution that embraces innovative art must also look to innovative business models. That is, it is thought essential to link artistic innovation to financial and operational innovation. The present environment within which the gallery operates is one of rapid change and considerable challenge both on the artistic front and to its business strategy.

15. With all variables held at their mean values, the linear versions of the demand equations shown in Appendix 4 Table 38 estimated for full-price, concession-price, and members predict a total attendance of approximately 110,000 for a modern show compared with 84,000 for a contemporary show.

Table 16: Number of unique visits per page between 29 May 2009 and 13 September 2009

Page	Hyper-link reference	Visits
Colourchart Homepage	www.tate.org.uk/liverpool/exhibitions/colourchart/	38,693
Colourchart Games	kids.tate.org.uk/games/colour-colour/	20,222
Colourchart Photos	www.tate.org.uk/liverpool/exhibitions/colourchart/photos.shtm	9,045
Colourchart Introduction	www.tate.org.uk/liverpool/exhibitions/colourchart/intro.shtm	7,703
Colourchart Artists	www.tate.org.uk/liverpool/exhibitions/colourchart/artists/	5,832
Colourchart Visiting	www.tate.org.uk/liverpool/exhibitions/colourchart/visiting.shtm	4,461
Colourchart Tour	www.tate.org.uk/liverpool/exhibitions/colourchart/tour.shtm	3,769
Artist – DUCHAMP	www.tate.org.uk/liverpool/exhibitions/colourchart/artists/duchamp.shtm	3,246
Artist – WARHOL	www.tate.org.uk/liverpool/exhibitions/colourchart/artists/warhol.shtm	3,225
Artist – HIRST	www.tate.org.uk/liverpool/exhibitions/colourchart/artists/hirst.shtm	3,114

Importantly, keeping the business model up-to-date has involved a re-structuring of revenue sources to enhance traditional revenue streams which rely on long-standing goodwill and brand recognition, but also capitalising on these strengths through finding new ways of raising earned revenue. This sort of strategy entails a re-orientation of the business model over time, including towards finding new ways to market content – publishing in a variety of media, merchandising, production and sale of film and other audio-visual material.

Another significant aspect of business model development has been the promotion of new ways of relating to sponsors, donors, corporate partners and individual benefactors. In dealing with potential sponsors, for example, the Tate undertakes impact studies in advance to show them what benefits they can expect from their support. Partnership deals can yield mutual benefits. For example, the Tate's longstanding relationship with BT has enabled the introduction of technologies that would not have been possible otherwise.

Innovative, flexible and imaginative thinking is also needed in constructing particular deals to suit the needs both of the gallery and the corporate or individual donor. For example, Anthony d'Offay offered his collection of more than 700 works through a part-gift part-sale-at-cost agreement, to be jointly managed by the Tate and the National Galleries of Scotland. The deal was struck in 2008 with the financial support of DCMS and several other

organisations, enabling the works to be seen in different parts of the country in recognition of d'Offay's particular interest in education.

The Tate is committed to continuing all these avenues of strategic innovation in the future. In its vision statement for 2015, the Tate sees itself as becoming more global, inclusive, diverse and entrepreneurial. Its priorities include developing the collection, promoting contemporary art, expanding audiences, and enhancing operational and financial performance.

3.5 The Tate Online experiment

Colour Chart was an exhibition at Tate Liverpool devoted to the moment in twentieth-century art when artists began to perceive colour as 'readymade' rather than as a vehicle of spiritual or emotional content. Running from 29 May to 13 September 2009, the exhibition featured the work of 42 artists including Damian Hirst, On Kawara and Marcel Duchamp. It attracted more than 19,000 visitors, or 200 on an average day.

As part of its promotion of the show, Tate Online featured an exhibition website which hosted a large amount of multimedia content giving information about the exhibition and the artists featured which could be either downloaded or streamed, including a multimedia tour that could also be downloaded

as an MP4 file from iTunes. Although the online content did not include webcams based in the Gallery, the experience offered to online visitors amounted to a 'virtual tour' of the show, since they could access many of the works in the exhibition in the context in which they were shown.

The *Colour Chart* web pages also featured educational resources and games geared at younger online visitors. These proved to be among the most popular pages (Table 16). Furthermore, the Tate used Flickr to enable members of the public to contribute their own colour monochromes to create a constantly changing *Colour Chart*. All the photographs posted were shown on Tate Online, and 36 of the images were used to produce a glossy *Colour Chart* poster which was displayed in the Gallery.

Over the exhibition's run the website attracted 66,190 visits. Because some online visitors may have made multiple visits to the *Colour Chart* webpages, this number is likely to overstate the number of unique visitors to some extent.

3.5.1 Survey methodology

Working closely with the Tate Liverpool and Tate Online teams we collected detailed survey data on both in-person and online audiences for the exhibition. The survey of online visitors was conducted with 2089 visitors to the *Colour Chart* website. The survey was accessed via the exhibition webpage. It was administered by the firm Morris Hargreaves McIntyre over the period June to September 2009, with a closing date of 13 September. The exit survey of visitors to the exhibition at Tate Liverpool resulted in 314 completed interviews. This face-to-face survey was conducted by the same company between 16 July and 31 August 2009.

The questionnaire for the in-gallery visitors asked respondents about their expectations about the show, why they had decided to come, what they had experienced as well as exploring other attitudinal issues. Standard socio-economic data were also collected. The questionnaire for the visitors to the exhibition online covered the same issues in the same terms as the in-gallery survey, so as to compare visitor experiences in the two different modes. This survey further asked about respondents' attitudes specifically to accessing exhibitions of visual art online.

Bias was avoided among in-person visitors to the exhibition by the procedures used to

randomise the selection of participants. In the case of the online survey, however, no control was possible over the final sample, and the characteristics of the full population of online visitors could not be reliably specified.

Visitors to the website – as with the gallery itself – found out about the exhibition from a variety of sources, including the Tate's own publicity and direct-mail contact. Arguably, those who happened to come upon the site as they were browsing the web are of particular interest, so we examined their responses specifically (almost half the sample). We found that their responses were almost identical to the complete sample, suggesting that the responses overall were unlikely to be skewed as a result of the various other means by which individual respondents were recruited. Therefore, we use the full sample as the basis for inference in this report.¹⁶

Mirroring the approach we took in the NT Live study, we used the survey data to address the following questions:

- *Audience building*: how has the virtual exhibition enabled the Tate to grow the audience for *Colour Chart* overall?
- *Audience widening*: has the availability of the exhibition online brought in new demographics?
- *Audience deepening*: has the online show given audiences new and valued cultural experiences?
- *Changing attitudes*: has it encouraged people to expand their consumption of the visual arts, e.g. by visiting an art gallery in person as well as online?
- *New revenue streams*: does the promotion of online content open up significant and sustainable new revenue streams to complement other sources of revenue in the Tate's business model?

In drawing up the questionnaires to address these questions, we consulted a range of previous research into the evaluation of cultural experiences, as discussed in an earlier section of this report.

3.5.2 Audience building: growing the audience

Making an art exhibition available online clearly increases the potential audience for the show, albeit in a very different context from that

16. Note that some respondents who found out about the survey through the Tate's direct-mail contact may have classified themselves as having come across the site as they were browsing when asked how they had learned of the online exhibition.

Table 17: Past attendances of gallery and online audiences

Those who have attended:	Past 12 months		Past 5 years	
	Gallery %	Online %	Gallery %	Online %
Another gallery – free exhibition	86.5	87.3	91.9	94.9
Another gallery – paid exhibition	77.6	72.0	87.7	85.4
Exhibition at Tate Liverpool	63.8	21.1	74.7	84.7
Exhibition at other Tate gallery	62.5	64.8	68.8	33.6

experienced by visitors to the gallery in person. Access to the online exhibition is obviously not constrained by a person’s location, their capacity to afford a ticket or restricted opening times. So, it is not surprising that the online presence increased the *Colour Chart* audience significantly. In fact, as we have seen, the number of visits may have been as much as three times higher.

Much of the expanded audience for *Colour Chart* was drawn from regular gallery visitors. Table 17 shows that the great majority of the online audience had attended an art exhibition in the relatively recent past; for example, around 87 per cent of them had

attended a free exhibition at some time in the past 12 months. Indeed, the patterns of past attendance amongst the online visitors are broadly the same as those of gallery visitors, suggesting more generally that online availability of an art exhibition is likely to appeal primarily to those already experienced in going to art exhibitions. (An obvious exception is past attendance at Tate Liverpool where, unsurprisingly, a far greater percentage of Tate Liverpool visitors had made such previous visits compared with online visitors).

Nevertheless, in terms of visitors’ broader cultural exposure in the previous 12 months, calculated as described in Appendix 3, the

Table 18: Decision to see this exhibition

	One reason %	Main reason %
In-gallery visitors		
Wanted to see this particular exhibition	50.5	40.7
Wanted to see a Tate Liverpool exhibition	24.9	20.5
Making a general visit to the gallery and this exhibition looked interesting/appealing	21.7	17.9
Online visitors		
Wanted to see this particular exhibition	24.1	16.6
Wanted to see a Tate Liverpool exhibition	8.8	3.5
Browsing Tate’s website and this exhibition website sounded interesting/appealing	47.0	40.6
Wanted to find out about this exhibition before coming to see it in person	12.9	9.1

online audience contained a smaller proportion of 'extensive' cultural consumers (24 per cent) than the gallery audience (32 per cent), as we shall see below (Table 19).

The motivation for visiting the exhibition differed markedly between the in-gallery and online visitors, as shown in Table 18. For the gallery-goers, the most frequently cited reason for attending the show was a desire to see this particular exhibition. Half of the gallery visitors gave this as one reason, with 41 per cent giving it as their main reason, whereas only 24 per cent of online visitors gave it as one reason and 17 per cent as the main reason. Just over 40 per cent of the web visitors gave as their main reason for visiting *Colour Chart* the fact that they were browsing the Tate's website and this exhibition looked interesting. A similar 'drop in' motivation was expressed by a substantially smaller proportion of the in-gallery visitors, fewer than 20 per cent of whom gave as their main reason that they were visiting the gallery and this show looked appealing.

'Word of mouth' was significant in attracting people to the exhibition – both at Tate Liverpool and online: 19 per cent of survey respondents at Tate Liverpool said they found

out about the exhibition because they had been "told by someone". This compares with 16 per cent of online respondents (7 per cent who had been "told by someone" and 8 per cent who had been "browsing on another website and followed a link.")

The survey evidence suggesting that the Tate managed to grow overall audiences through its online content is consistent with actual visitor behaviour. For example, we tracked the number of downloads of the MP4 multimedia tour, available both on the *Colour Chart* exhibition website and from iTunes. Figure 2 shows that the Tate expanded overall downloads of the tour by almost 50 per cent through making the file available on iTunes. It seems as if even galleries with the strong brand of the Tate, and which therefore are expected to be able to self-distribute their own content, can reach new audiences through third-party web services like iTunes.

3.5.3 Audience widening: new demographics¹⁷

The online availability of *Colour Chart* shifted the composition of the show's audience away from the traditional gallery demographic in several significant respects. First, the gender

17. Note that all the differences discussed in this section are statistically significant at least at the 1 per cent level.

Figure 2: MP4 track downloads per week

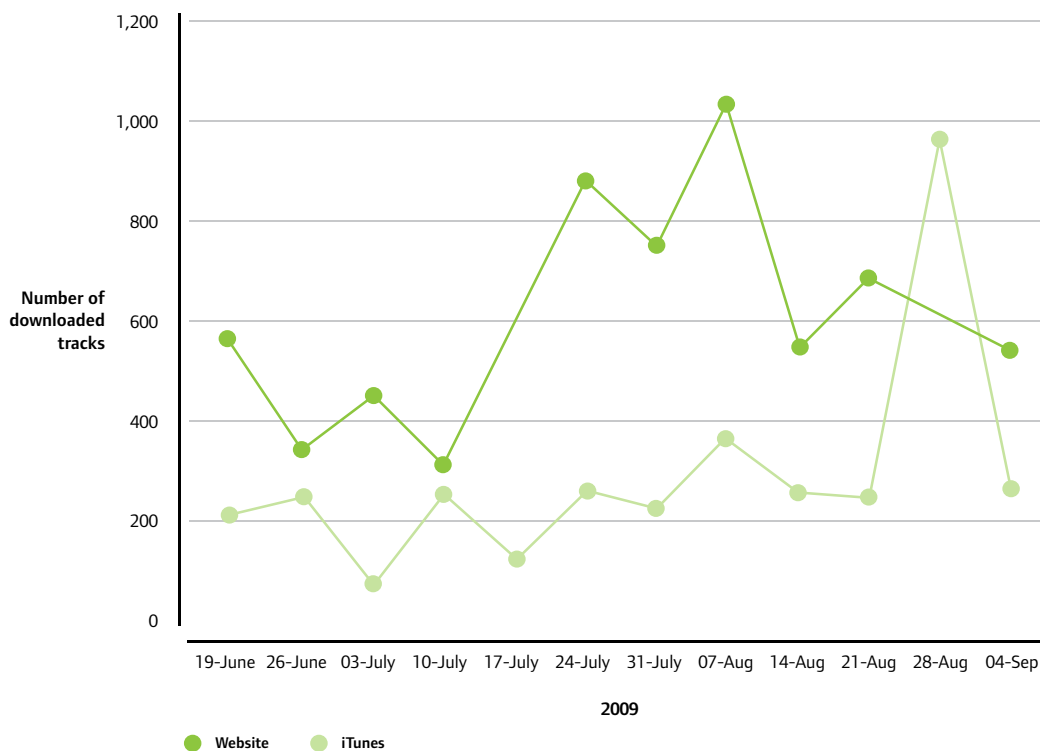


Table 19: Some demographics of gallery and online audiences

	Gallery %	Online %	English population %
Gender^(a)			
Male	38.7	27.4	49.1
Female	61.3	72.6	50.9
Total	100.0	100.0	100.0
Age^(a)			
Less than 25 years	15.6	6.8	31.0
25 – 44 years	36.1	47.1	28.7
45 – 64 years	40.0	40.6	24.3
65 years and more	7.7	5.6	16.0
Total	100.0	100.0	100.0
Income per year^(a)			
Less than 20,000	26.6	36.6	50.5
20,000 – 49,000	50.0	49.5	41.0
50,000 or more	23.4	13.9	8.6
Total	100.0	100.0	100.0
Cultural exposure in the last 12 months			
Little or none	18.8	16.2	(.)
Moderate	49.4	60.3	(.)
Extensive	31.9	23.5	(.)
Total	100.0	100.0	(.)

Note: (a) Respondents who ticked ‘prefer not to say’ are excluded

balance was changed; visitors to the online show contained proportionately more women than attendees at the gallery. Altogether, 73 per cent of online visitors were female, compared to 61 per cent of the gallery group. There was also a difference in the age distribution of the two groups, as shown in Table 19. The larger proportion of the audience in younger age groups in the gallery was very likely due to the number of young people who attended this show as part of an organised group. The online audience consisted predominantly of young to middle-aged adults.

The web visitors were more ethnically diverse than those attending the gallery, with a total of 31 per cent of them falling into categories

other than the ‘White British’ classification, compared with 25 per cent in this category amongst the gallery audience, and 13 per cent in the English population as a whole.

Echoing NT Live, perhaps the most striking difference between the two groups of visitors was in their income. The online offering attracted a significantly larger proportion of lower-income visitors (those earning less than £20,000 per year) and a correspondingly much lower proportion of the wealthiest group (more than £50,000 per year) than is evident amongst the gallery-goers (37 per cent vs 27 per cent and 14 per cent vs 23 per cent respectively). This result is consistent with the presumption that consumption of free online content is not

Table 20: Colour Chart web pages visited

Pages	Numbers visiting %
Introduction	80.2
Individual artist pages – looking at artworks/text	77.6
Events information	37.8
Individual artist pages – following links to other artworks/articles about the artist	25.6
Visiting and tickets	24.2
Flickr photo project	22.1
Individual artist pages – watching other multimedia content e.g. ‘meet the artist’ video	19.7
Shop	14.8
Saturation: Young Tate	13.3
Colour Colour – Kids game	12.6
Download multimedia Tour	11.3
Your photos	10.7
Total no. of respondents	2,074

likely to be particularly sensitive to income, given the extent of internet penetration into households in the UK.

Overall, it can be inferred that online access to art exhibitions has the potential to extend the range of consumers towards a distribution by income that is somewhat less skewed towards the upper end than is the case for traditional gallery visitors.

3.5.4 Audience deepening: new or unexpected experiences

In the case of broadcast theatre, attending a play in a cinema involves much the same physical activity for an individual member of the audience as visiting a theatre. But online consumption of an art exhibition is very different from going to the gallery. With *Colour Chart*, visitors who accessed the show via the web could look at most of the individual works, follow links to other artworks or information about the artists, download a multimedia tour, play a related game or visit the shop, all in front of their screens.

According to the survey, most online visitors (80 per cent) looked at the introduction to the exhibition, which gave some background to the themes of the show and the artists represented, generally accessing some or all of the works (Table 20). Almost four-fifths viewed

artwork images and text on one or more of the individual artist pages, and about a quarter of them followed some of the links to other artworks/articles about the artist in which they were interested.

Just over 20 per cent of respondents viewed the Flickr photo project pages and 11 per cent had chosen to download the multimedia tour. Altogether, the average amount of time spent by survey respondents on the *Colour Chart* website in a single visit was 14 minutes (broadly similar to the average duration of all visits to the *Colour Chart* website over the period the exhibition ran at Tate Liverpool as recorded by the web metrics). This contrasts sharply with the much longer time devoted to the show by gallery visitors, who spent on average 53 minutes in the exhibition. These differences set the scene for our discussion in this section of the contrasting experiences of online and in-gallery consumers in their enjoyment of the exhibition.

Visitors to an art exhibition do so with certain expectations about the likely experience. Likewise, people who access an exhibition website are likely to have some ideas as to what they might find. For example, visitors in either group might expect to improve their knowledge of contemporary art, to have an immersive experience and escape from the

Table 21: Expectations and actual outcomes

Expectation/outcome:	Gallery			Online		
	Expected (one reason) %	Expected (main reason) %	Actual outcome ^(a) %	Expected (one reason) %	Expected (main reason) %	Actual outcome ^(a) %
Improve knowledge of contemporary art	66.1	45.7	50.3	49.1	19.0	34.9
To have an immersive experience ^(b)	29.7	12.2	28.2	21.9	5.6	18.3
To have an emotional experience ^(c)	30.4	10.9	52.6	17.6	2.4	39.6

Note: (a) The proportion of respondents who answered “Strongly agree” or “Agree” to statement relevant to the outcome of each expectation; (b) Outcome statement: “I was transported to another world and lost track of time”; (c) Outcome statement: “I felt an emotional response to the works”

everyday or, perhaps, to have an emotionally uplifting experience.

Table 21 shows the proportion of the total visitors in each group who nominated certain expectations as one possibility or as the main thing they were expecting. The online visitors had lower expectations than the gallery attendees: two-thirds of the gallery visitors expected to improve their knowledge of contemporary art, whereas only half the online visitors had this expectation.

In all cases the proportion of online visitors who actually experienced a given outcome very significantly exceeded the proportion of those who were looking forward to that result as a primary expectation. So, for example, only six per cent of online viewers cited having an immersive experience as their main expectation, while almost 20 per cent actually experienced this outcome. The biggest differences between expected and actual proportions, shown in Table 21, are for the prospect of having an emotional experience. Only 2 per cent of the online visitors had

Table 22: Expectations and actual outcomes for the online visitors: some detail

The main experience expected	The actual outcome experienced	Proportion of visitors with this expectation agreeing with this outcome (%)		
		Strongly agree	Agree	Total agreeing
To improve my knowledge of the art and artists in <i>Colour Chart</i>	This exhibition has increased my understanding of colour in contemporary art	7.9	49.2	57.1
To improve my knowledge and understanding of contemporary art	This exhibition has increased my understanding of colour in contemporary art	3.2	47.2	50.4
To have an immersive experience/escape from the everyday	I was totally absorbed when I was looking at the <i>Colour Chart</i> webpages	13.3	43.4	56.7
To have an immersive experience/escape from the everyday	I was transported to another world and lost track of time	3.4	14.5	17.9
To have an emotional or uplifting experience	I felt an emotional response to the works	14.3	44.9	59.2

Table 23: Experiences of *Colour Chart* exhibition for Tate audiences

Reported experience/outcome:	Gallery			Online		
	Strongly agree %	Agree %	Total agree %	Strongly agree %	Agree %	Total agree %
Met my expectations	19.8	50.2	70.0	17.0	55.7	72.7
I was totally absorbed	16.9	45.4	62.3	14.4	41.7	56.1
I had difficulty navigating website	(.)	(.)	(.)	2.8	13.8	16.6
Increased my understanding of colour	7.3	54.3	61.6	8.5	46.7	55.2
I was transported	4.5	23.7	28.2	3.4	14.9	18.3
I had an emotional response	6.7	45.8	52.5	4.1	35.5	39.6
I didn't understand what the artists were trying to convey	1.6	10.3	11.9	1.5	6.1	7.6
Increased my understanding of contemporary art	3.8	46.5	50.3	2.9	32.0	34.9
I'd like to learn more	8.7	55.1	63.8	15.2	62.7	77.9
It gave me new ways of seeing things	10.9	56.1	67.0	10.1	47.1	57.2
Social enjoyment	13.8	35.9	49.7	(.)	(.)	(.)
It did not engage intellectually	2.2	8.3	10.5	2.4	9.7	12.1
Wanted to talk afterwards	11.2	60.1	71.3	7.4	40.5	47.9
My creativity was stimulated	16.8	50.2	67.0	9.0	43.8	52.8
Websites open new ways of thinking about art	(.)	(.)	(.)	19.7	60.9	80.6
Prefer online	(.)	(.)	(.)	3.5	14.8	18.3
Difficult to get sense of what artworks were like	(.)	(.)	(.)	4.4	24.2	28.6
Not seeing with other people made it less enjoyable	(.)	(.)	(.)	3.2	19.5	22.7
Not as good as 'real life'	(.)	(.)	(.)	37.8	45.6	83.4

a principal expectation of an emotional experience, yet slightly less than 40 per cent of them experienced this outcome. Similarly, for the gallery attendees, just over 10 per cent cited this as their main expectation, yet more than 50 per cent reported experiencing it.

Looking more closely at the relationship between expected and actual experiences for the online audience, we tabulate in Table 22 the outcomes specifically for groups having particular expectations as the main experience they were expecting. Amongst other things, we observe that:

- Fifty-seven per cent of those whose main hope was to improve their knowledge of contemporary art had this expectation fulfilled.
- Fifty-nine per cent of those expecting primarily to have an emotional experience did so.

Turning now to more detail about what both groups actually experienced, Table 23 shows the levels of agreement of both audiences with a variety of statements about what they had enjoyed or not enjoyed during their in-person or online visit to *Colour Chart*. We also probe more deeply into indicators of cultural value,

Table 24: Cultural value indicators: Tate Gallery

Statement	Cultural value indicated	Online visitors Mean	In-gallery visitors Mean
Absorbed	Aesthetic	0.54	0.61
Emotional response	Aesthetic / symbolic	0.11**	0.31**
New ways of seeing	Symbolic	0.56	0.65
Transported	Spiritual	-0.34	-0.23
Seeing with others	Social	--	0.66
Wanted to talk about	Social	0.35***	0.67***
Creativity stimulated	Educational	0.44**	0.63**
Understand art better	Educational	0.22*	0.32*

Note: The level of significance of the difference between the two means in each row is indicated as: * p<.05, ** p<.01, *** p<.001

where that is interpreted as having multiple dimensions including the aesthetic qualities of the works, the symbolic meanings, the spiritual connections, the social significance of the experience and the educational potential of the exhibition.

Following the methodology described in more detail in Appendix 3, we associate specific statements with one or more of these dimensions of cultural value. Using the full range of responses, we assign a numerical score of -2, -1, 0, +1 or +2, to each response, where -2 denotes "Strongly disagree", +2 denotes "Strongly agree", and zero denotes neutrality. Table 24 shows the cultural values associated with particular statements, and the mean scores for each of the indicators specified.

Both the online and in-gallery visitors reported positive experiences across all the cultural value indicators except for the "I was transported" statement, the latter result presumably reflecting that by intention this show was more academic than 'spiritual' in its impact.

Over half the online visitors reported that they were absorbed during their visit to the site, that they felt their creativity was stimulated, and that the exhibition gave them new ways of seeing things; somewhat more than a third had an emotional response to the works, and felt the show had increased their understanding of contemporary art.

Even so, the proportion of in-gallery visitors who experienced each of these benefits was greater in every case than for the online audience. These results suggest that, at least in this instance, the online delivery of the exhibition could not match the intensity of experience to be gained from seeing the show in the gallery.

However, the differences do not run entirely in one direction. The data in Table 23 suggest that a curiosity to learn more about the artists and their work was stimulated to a greater degree amongst the online viewers than for the gallery-goers. A significant majority (81 per cent) of those accessing the show via the Internet believed that websites open up new ways of thinking about art.

But the fact remains that the two modes of seeing the exhibition were very different, with 29 per cent of online respondents saying it was difficult to get a sense of what the real artworks were like. Separately, 45 per cent of online respondents said that the two modes of seeing the exhibition were too different to make a comparison.

So, how could the online content be improved? Sixteen per cent of respondents suggested ways to make the *Colour Chart* website more attractive. The most popular suggestions were to provide higher resolution images of the works (to enable the viewer to zoom in more effectively) and to enable a virtual 'walkthrough' of the real exhibition.

Table 25: Likelihood of future attendance amongst the audience after having seen *Colour Chart* Exhibition

Statement	Online		Gallery visitors
	Another exhibition website %	Another art gallery exhibition %	Another art gallery exhibition %
More likely	60.3	46.6	58.4
Less likely	2.0	0.7	2.6
No difference	34.7	50.9	39.0
Not sure	3.0	1.8	0.0
Total	100.0	100.0	100.0
n	2,077	2,071	308

Both online and Tate Liverpool exhibitions prompted visitors to want to talk to others about what they had seen. This was true of 71 per cent of Tate Liverpool respondents, but also of 48 per cent of online respondents (Table 23), suggesting that the appetite that audiences have for ‘continuing the dialogue’ after their visit to a gallery is echoed online too.

Moving beyond this exhibition, respondents were asked which features they valued most in exhibition websites in general. The two most common features, nominated by more than 70 per cent of respondents, were both provided by the *Colour Chart* website: a list of all the artists included, and text and images of specific works in the exhibition. Almost two-thirds (61 per cent) of respondents wanted information on an artist’s technique – how they made the artwork.

Other features, indicated by half the respondents or more, included: high resolution images of the artwork to zoom into and a virtual ‘walkthrough’ of the exhibition. Being able to have a full-screen immersive experience navigating a range of content in one screen was mentioned by 26 per cent of those responding. Altogether, these responses provide an indication of possible future lines of development to improve the attractiveness of online showing of visual art exhibitions.

3.5.5 Changing attitudes

The fact that the *Colour Chart* exhibition website provided a positive and worthwhile

experience for many of the online visitors is confirmed by the numbers (60 per cent) who indicated that, having seen this show, they were more likely to visit another exhibition website in the future (Table 25). The online exhibition was also successful in stimulating viewers towards visiting an art gallery, with 47 per cent of respondents saying it was more likely that they would do this (compared with 58 per cent of the in-gallery audience who said that their visit to *Colour Chart* had made it more likely). This reflects the latent potential of cultural consumption on the web to generate visits to the corresponding “real” or “live” cultural event.

We noted above the elements of cultural value experienced by online and in-gallery visitors to *Colour Chart*. Which of these experiences were influential in affecting their likelihood of further visits either to web exhibitions or to art galleries?

An econometric analysis reported in Appendix 4, Table 39 indicates that amongst the online visitors, the role of the show in helping them to understand contemporary art better was the most significant factor affecting their likelihood of looking at another online exhibition website and also of visiting an art gallery, thus reinforcing the importance of the website as an education tool. For the in-gallery visitors, the extent to which they were ‘transported’ by the show was the most important stimulus to their attendance at future gallery exhibitions (although, as we saw earlier, only a minority of visitors felt this way about their experience).

Table 26: Likelihood of future attendance by selected segments of online audience

	Those in the last 12 months who have not been to:			
	Another art gallery exhibition - free %	Another art gallery exhibition - paid %	Exhibition at other Tate gallery %	Tate website %
Likelihood of visiting another exhibition website				
More likely	59.4	64.6	62.5	62.4
Less likely	5.4	2.1	2.1	3.5
No difference	30.3	30.2	31.8	29.8
Not sure	5	3.1	3.6	4.4
Total	100.0	100.0	100.0	100.0
n	261	577	723	574
Likelihood of visiting another gallery				
More likely	53.3	52.1	52.4	50.4
Less likely	0.8	0.5	1.1	0.9
No difference	43.3	45.3	44.3	46.4
Not sure	2.7	2.1	2.2	2.3
Total	100.0	100.0	100.0	100.0
n	261	576	722	571
Likelihood of visiting Tate <i>Colour Chart</i>				
More likely	58.4	57.4	57	54.1
Less likely	0.8	2.7	3	3.4
No difference	23.2	25.2	25.1	27.4
Not sure	8	6.4	8.1	7.2
Visiting Tate Liverpool is not possible	9.6	8.4	6.8	7.9
Total	100.0	100.0	100.0	100.0
n	125	298	370	292

The surveys contain further evidence of complementarities between the online and gallery exhibitions. A significant minority of online respondents (15 per cent) had primarily looked at the exhibition website to help decide whether to see *Colour Chart* at Tate Liverpool. Almost three-quarters (71 per cent) of online respondents and around two-fifths (39 per cent) of in-gallery visitors had previously browsed an exhibition website and then

followed this with a visit to the same exhibition in the gallery.

At Tate Liverpool, 61 per cent of respondents said that if they had known about the online exhibition of *Colour Chart* in advance, they would have looked at it, and doing so might have influenced their decision about coming to Tate Liverpool: one-third of all respondents in the gallery said they would still have come to

Table 27: Willingness to donate to the Tate: Online visitors

Amount willing to donate (£)	Frequency amongst:	
	Full sample ^(a)	Those saying they would consider donating but haven't yet
0	55.0	2.0
1 – 5	34.0	74.6
6 – 10	7.6	15.9
11 – 20	2.3	5.3
21 or more	1.2	2.2
Total	100.0	100.0
n	1,928	816
Mean	3.29	6.96
Median	0.0	5.00
SD	12.21	17.34
Min	0.0	0.0
Max	320	320

18. This applies to those living within commuting distance of Tate Liverpool only.

Note: (a) Including those refusing to donate as zero.

see the exhibition; a quarter said they would have decided whether or not to have come depending on what they thought of the show seeing it online; and only 3 per cent said they would have seen the exhibition online and would not have come to the gallery.

The complementarities work both ways: 60 per cent of online respondents said they had visited an exhibition website after having been to an exhibition in a gallery, and almost half (47 per cent) of Tate Liverpool visitors indicated that seeing the show in the gallery had made it more likely they would also have a look at the exhibition online.

An important issue is whether or not the provision of online exhibitions can change the consumption patterns specifically of those who are not frequent or habitual consumers – will it bring in new audiences both online and to the gallery? Our data indicate that people who had not been to an art exhibition of any sort in the previous year or had not visited the Tate website were influenced to about the same extent as others to do so; that is, well over

half of them indicated they were more likely to visit another online or gallery exhibition as a result of their experience in accessing *Colour Chart* online (Table 26). Furthermore, it should be noted that the online show prompted more than half of these irregular consumers to indicate they were more likely, having seen the show online, to visit it in person.¹⁸

3.5.6 New revenue streams

Finally, we turn to the capacity of online exhibitions to generate new revenue streams to complement other revenue sources in the Tate's business model.

Strikingly, half of online visitors said they had either donated already or would consider making an online donation to the Tate after seeing an exhibition website. This is greater than the 41 per cent of respondents at the gallery in Tate Liverpool who said they would in principle be willing to donate after seeing an exhibition like *Colour Chart* (no doubt this smaller proportion is partly explained by the fact that they had already paid £7.80 (or £5.90 concession) to see the exhibition).

Table 28: Willingness to pay and to donate: in-gallery visitors

Amount willing to pay (£)	For entry to exhibition		As donation
	Reasonable amount %	Maximum amount %	Maximum amount %
0	4.5	3.3	43.3
1 – 5	51.6	24.9	42.0
6 – 10	43.5	66.2	10.5
11 – 20	0.3	5.6	2.5
21 or more	0.0	0.0	1.7
Total	100.0	100.0	100.0
n	308	305	238
Mean	5.61	7.42	3.81
Median	5.00	8.00	2.00
SD	2.11	2.92	6.97
Min	0.00	0.00	0.00
Max	15.00	20.00	56.00

19. This is consistent with the finding in Arts & Business (2009) that the most important personal motivating factor for donors is the artistic experience.

Of the online respondents saying they would be willing to donate, the majority (75 per cent) nominated an amount between £1 and £5, with a mean of just under £7 and a median of £5; across the full sample (counting refusals to donate as zero) the mean potential donation yield per visitor amounted to £3.29 (Table 27).

Visitors to the website were also asked whether they would ever be willing to pay for online access to an exhibition website in the future. The great majority (80 per cent) said they would not, leaving however a small but not insignificant minority who would regard it as reasonable to have to pay a fee to enter such a site.

By contrast, the vast majority of the online visitors regarded it as reasonable to have to pay to see an exhibition in the gallery; when told that visiting *Colour Chart* in person at the Tate Liverpool cost £7.80 (or £5.90 for concessions), 82 per cent of online respondents said they would pay this amount to see the show.

These results indicate that, while charging for admission to a gallery exhibition is generally regarded as quite acceptable, imposing a fee for entry to an online exhibition like *Colour Chart* is, at this stage of development, an unviable option – consistent with the fact

that no visual arts organisation we know of anywhere is successfully charging for online access to its collections (though this does not rule out that a charge might be contemplated in the future).

Appendix 4, Table 40 reports an analysis of factors affecting willingness to pay for access and willingness to donate to the Tate by online visitors. All of the cultural values included in the analysis exert a positive influence on willingness to donate, with particularly significant effects from the aesthetic¹⁹ ('totally absorbed'), symbolic ('new ways of seeing') and social ('wanted to talk about what seen') aspects of value as perceived by visitors. Higher income and younger online visitors expressed a higher willingness to donate.

To test whether online survey respondents' willingness to donate would translate into actual donations we included a Call for Action on the *Colour Chart* exhibition homepage. Strikingly, no donations were collected from this source over the period the exhibition ran at Tate Liverpool. This may be a wider reflection of well-known biases in survey responses (Human Capital, 2010), but the size of the discrepancy is surprising. At least it raises a question as to whether galleries can 'monetise' some of the goodwill that clearly exists in the

eyes of the public if they can launch effective campaigns.²⁰ More experimentation will be needed before this issue can be resolved.

In addition to the direct contributions to revenue through donations that an online exhibition like *Colour Chart* can make, it should also be remembered that a web-based show may lead to increases in a gallery's revenue in other ways. For example, the stimulus to attendance at this or another paid exhibition in person at the gallery, which we observed above in the case of *Colour Chart*, will increase the gallery's takings. More generally, the exposure of the gallery's brand through the web exhibition may have a positive effect on future revenues in other more indirect ways.

Although our primary focus here is on the revenue potential generated by the online audience, it is useful to examine willingness to pay amongst the more traditional gallery-goers as a basis for comparison. Data for the in-gallery visitors indicate positive willingness to meet the cost of entry, with 65 per cent of the sample of gallery visitors regarding the entry cost as providing very good or quite good value for money, and 13 per cent regarding the value for money as being poor.

As Table 28 shows, the mean amount that visitors regarded as a reasonable price for entry to this show was £5.61, with a median of £5, and the mean maximum amount they were prepared to pay was £7.42, with a median of £8.

The mean amount the gallery visitors were prepared to donate to the Tate after having seen the show was £3.81, a greater amount than for the online visitors. Doubtless a higher willingness to donate amongst the gallery-goers was constrained by the fact that, as noted above, they had already paid something to see the show; 59 per cent of them, having paid for a ticket, did not want to pay any more as a donation.

Factors affecting willingness to pay an admission fee and to donate amongst the gallery visitors are analysed in Appendix 4, Table 41. These results indicate that engagement with what we take to be the aesthetic qualities of the show is an important influence on willingness to pay in all cases. Income is also significant in affecting the amount a person considers to be a reasonable entry charge, with higher-income individuals being willing to pay more. As with online

audiences, the willingness to donate is higher in younger visitors.

Because the technology of online provision as an avenue for giving access to art exhibitions is still very much in its infancy, it is difficult to draw firm conclusions as to the future revenue potential of this line of business development. Suffice to say that the *Colour Chart* experience as documented above provides some indicators as to how that development might proceed, and points to areas that warrant further experimentation from galleries, particularly in the area of online donations.

20. Arts & Business (2009) notes that how donations are made and the circumstances surrounding the donation occasion influences a donor's decision to give.

Part 4: Conclusions

4.1 Summary and wider implications

4.1.1 A new framework

Arts funders and policymakers increasingly call on arts and cultural organisations to be more innovative. Yet, there is little clarity about what innovation means in an arts and cultural context. This report addresses this problem by proposing an innovation framework that can be used by arts organisations and funders alike.

We stress innovation along four dimensions: audience reach; artform development; value creation; and business models. A cross-cutting theme is technological change. Digital technologies in particular raise the possibility that arts and cultural organisations can overcome the traditional constraints imposed by physical location, thereby expanding their audience reach. But they also open new avenues for developing the artform, create new sources of economic and cultural value, and spur new business models.

In this paper we have analysed these issues through the prism of two of the UK's leading arts and cultural organisations, the National Theatre and the Tate. Both organisations are widely held as leading innovators in their respective artforms. The scale of their operations allows us to use experimental techniques to develop quantitative research insights that are of importance to the wider arts and cultural sector.

What is the actual and latent demand for innovative work from audiences? How can arts and cultural institutions use innovative digital technologies to reach new audiences? How can these technologies help them deepen their relationship with audiences? What novel methods can arts and cultural organisations

use to value what they do? Do these avenues for innovation lead to the development of new financial and business models?

4.1.2 Innovation in audience reach

Innovation in audience reach has three elements: audience broadening, which involves attracting greater numbers of traditional participants; audience deepening, which means intensifying engagement with current participants; and audience diversifying, which is about attracting new groups of consumers.

The National Theatre employs a number of strategies to extend its audience reach. It reflects in its repertoire the diversity of the nation's culture. It uses new information technologies for audience development, including website e-trailers, virtual theatre tours and documentary material giving insight into a production or behind-the-scenes access. It makes curricular resources available for teachers and students.

The National has to balance revenue potential against extending its audience reach: both our econometric analysis of audience demand and the willingness to pay responses of NT Live audiences suggest that the NT could increase overall box office revenues by raising ticket prices. However, the National Theatre does not raise prices even with likely sell-out performances, because it does not want to limit the affordability of tickets.

Our research has showed how NT Live has allowed the National to expand its 'virtual capacity'. The audience for *Phèdre* over its whole run was doubled through the screening of a single performance on 25 June 2009. Almost one-third of cinema-goers said that the main reason why they had not seen *Phèdre*

at the theatre was because the NT was too far away. A further 13 per cent said that they had been unable to get tickets to see the production at the theatre.

While the great majority of the theatre audience had been to the NT in the previous 12 months this was the case for only 41 per cent of cinema audiences. Most audiences at the cinema screening were experienced theatre-goers, but a small but significant number (almost 10 per cent) had not been to any theatre in the previous year.

Perhaps NT Live's most striking extension in audience reach was in terms of low income audiences: one-third of cinema audiences had incomes of lower than £20,000 per year, compared with just over one-fifth in the case of the theatre. The potential of this technology to help overcome the traditionally-observed concentration of theatre audiences amongst relatively affluent consumers is clear.

One of the most noteworthy aspects of NT Live is how it complemented, not substituted for, the theatre in the eyes of the public. Indeed, over one-third of cinema audiences said that, having seen the NT Live screening of *Phèdre*, it was now more likely that they would attend a live performance of a play at the National Theatre, and almost the same number again said they would do so at another theatre.

Consistent with this, our statistical analysis of *Phèdre* audiences at the National Theatre suggests that districts in the catchment of participating cinemas were better represented at the NT box office than they would have been had their local cinemas not been part of the NT Live trial. There was no evidence of cannibalisation.

Turning to the Tate, we note that finding new ways of broadening and deepening the audiences for art, and advancing the artform by fostering the best in contemporary art, have always been core to the Tate's mission. A number of Tate initiatives specifically target new audiences, especially young people, families and first-time visitors.

The Tate has for years been at the forefront in using new technologies to improve the visitor experience within the galleries. It is also now leading the way in its use of social networking platforms like Twitter. The content-rich Tate Online is a standalone resource for art lovers.

Making an art gallery exhibition available online clearly increases the potential audience for a show, albeit in a very different context from that experienced by visitors to the gallery in person. The Tate's website expands the Tate's virtual capacity by lifting constraints from a person's location, their capacity to afford a ticket and from restricted opening times.

In our study of the *Colour Chart* exhibition online and in the gallery at Tate Liverpool, we compared the patterns of past gallery attendance of both groups of visitors, and found that the pattern for online visitors was broadly similar to that for visitors to the gallery – suggesting that online availability of an art exhibition is likely to appeal primarily to those already experienced in going to art exhibitions.

At the same time it is also clear that the online exhibition allowed the Tate to diversify its audiences. Echoing NT Live, the most striking socio-demographic difference between online visitors and traditional gallery visitors lay in average incomes: 37 per cent of online visitors had incomes of less than £20,000 per year, compared with 27 per cent in the case of gallery visitors at Tate Liverpool. But there were other important differences too, for example, visitors online were significantly more ethnically diverse than those attending the gallery.

Like NT Live, *Colour Chart* online appears to have recruited visitors to the physical gallery, with 47 per cent of online visitors saying that their experience had made it more likely they would visit an art gallery in the future. A significant minority of online respondents (13 per cent) had primarily looked at the exhibition website to help decide whether to see *Colour Chart* at Tate Liverpool. At Tate Liverpool, a majority (61 per cent) of respondents said that had they known about the exhibition website in advance it would have influenced their decision about coming to the gallery. The complementarities work in both directions, with almost 60 per cent of online visitors saying they had visited an exhibition website after having been to an exhibition at a gallery.

4.1.3 Innovation in artform development

Innovation in extending the artform relates to the development of new work that at least has the potential to influence artistic trends and lead them in new directions. In the theatre, this means producing new or previously unperformed plays, or developing new approaches to the performance of existing works. In art galleries, it refers to the programming of contemporary art in all its

forms, together with providing the knowledge that can enhance consumer understanding of new artistic trends.

The National Theatre is clearly committed to supporting new work by up-and-coming writers. Innovation in advancing theatrical practice is the rationale for the existence of the NT Studio, for example. And in the five years to January 2009, 45 per cent of NT productions were of plays by lesser-known contemporary playwrights.

Our demand analysis uncovers that plays by this 'innovative' group are not as popular amongst full-price ticket buyers; programming a play by this group is likely on average to lower full-price occupancy rates by between one and two percentage points. These results illustrate the trade-off that arts organisations like the National face between the objectives of increasing audiences and advancing the artform through programming new writing.

One of the most intriguing results from the National's NT Live screenings is that, despite lower expectations, cinema audiences reported higher levels of emotional engagement with the production than those who had experienced the play at the National Theatre. In particular, almost nine-tenths of NT Live *Phèdre* audiences claimed to have felt an emotional response to the play, and nearly two-thirds felt they had been 'transported to another world and lost track of time' (compared with seven-tenths and half of theatre audiences respectively). The NT appears to be developing the artform in a new direction, taking it 'beyond live' (Bakhshi, Mateos-Garcia and Throsby, 2010).

Advancing the artform by fostering the best in contemporary art has always been core to the Tate's mission. The Turner Prize is perhaps the most highly-visible focus in the public's eyes for a critical assessment of trends in contemporary art. More generally, the Tate's commitment to extending the artform can be seen in its programming of contemporary art exhibitions. Between 2003 and 2007, 75 special exhibitions for which an entry fee was charged were mounted at its two London galleries, of which 44 per cent were classified as contemporary, 33 per cent modern, and 24 per cent historical.

Shows of contemporary art on average enjoy longer runs, and the mean entry price for contemporary exhibitions is about 25 per cent lower than for other types of show. 'Modern'

art exhibitions generate the highest daily attendances on average, followed by historical and contemporary shows. Predictions from our econometric demand equations show that, other things equal, expected aggregate attendance and revenue at a contemporary show are likely to be up to 20 per cent lower than for a modern show. Mirroring our analysis of audience demand at the National Theatre, this result underlines the trade-off that arts organisations in general face between increasing audience numbers and supporting new work.

4.1.4 Innovation in value creation

Cultural institutions create value in many ways and for many beneficiaries, not only those who consume their services directly, but also in a broader sense for society at large. A number of studies have tried to quantify the economic impact of arts and cultural organisations by demonstrating their financial contribution to the economy. Many of these studies – commissioned by the arts and cultural organisations themselves – have been criticised for overstating the economic benefits. They also concentrate on the impact of direct production and consumption expenditures and ignore the non-use economic benefits that are generated by arts and cultural activity, even though the few studies that have been done suggest that these benefits can be very large.

Impact studies have also been criticised for emphasising 'measurable' economic benefits at the expense of what are usually seen as 'unmeasurable' cultural values. Fresh thinking is needed on how to articulate and, where possible, measure, the full range of benefits that arise from the work of arts and cultural organisations.

Our case studies of the National Theatre and Tate have allowed us to demonstrate how this might be done. The willingness-to-pay analysis gives direct estimates of the economic value that audiences attach to their experiences. We probe audiences' non-economic valuations of their experience by including in our survey instruments a range of cultural value-related questions, following previous work by a number of writers.

Our multi-disciplinary approach, looking at both economic and cultural value measures, permits us to explore the relationship between the two. For both NT Live *Phèdre* and theatre audiences, the elements of cultural value most clearly associated with consumers' economic valuation of their experiences, as revealed by

their willingness to pay, are the aesthetic/symbolic value indicated by their emotional response, and the social value of the group experience. For both cinema and theatre audiences, the aesthetic value indicated by the respondents' absorption in the show exerts a weaker influence on willingness to pay.

For the Tate, on the other hand, a response to the aesthetic qualities of the exhibition as measured by respondents' absorption is more strongly related to the economic variables of willingness to pay for access in the gallery and willingness to donate after seeing the online show.

Overall, these results provide some insights into both the complementary and separate effects of cultural and economic value of cultural institutions as perceived by audiences. Some aspects of cultural value clearly influence the economic decisions of consumers, but there may be other significant dimensions to the cultural experience that are not picked up by an economic assessment. Our findings help to strengthen the case for a stronger emphasis on accounting for the pure cultural values of the arts as distinct from their economic contributions, when assessing the public value created by cultural institutions.

4.1.5 Business model innovation

Arts and cultural organisations which are implementing innovative strategies along the dimensions described above are having also to explore new business models. On the demand-side, audiences expect ever more customer-oriented business strategies. On the supply-side, new technologies are shifting ways in which cultural institutions are identifying their customers and the nature of the services and experiences they offer. The need to experiment with new business models requires new funding streams – both private and public – with an appetite for risk.

Both the National Theatre and Tate are fortunate in having a sufficiently large volume of work underway at any one time that the risks of failure can be spread, allowing a disappointing result for one project to be offset by a success with another. Both organisations also adopt a sufficiently flexible business model that they can adapt financing structures to the needs of particular investors, donors and funding agencies – be it a quick-response investment fund used to raise capital at short notice for particular projects at the NT, or innovative part-gift part-sale-at-cost

arrangements with philanthropists in the case of the Tate.

A common theme that we explored in our audience surveys of both NT Live and Tate *Colour Chart* audiences is the possible revenue potential for arts and cultural organisations from digital innovations.

It is too early to say whether live screenings can be a sustainable, self-financing business model for the National Theatre. But the signs are good. The National hopes that NT Live will already break even by the end of its second season.

It is instructive to look at the experience of the Metropolitan Opera in New York in this regard. The Met Opera launched its live broadcasts on 30 December 2006 with Julie Taymore's acclaimed production of Mozart's *The Magic Flute*. The broadcast was carried in 100 cinemas in the US, UK, Japan and Norway. It is now in its fourth season, in just over 30 countries on 1,000 screens. The global audience in the 2008–09 season was over 1.1 million. It is now a profitable venture.

Our surveys revealed a significant demand for live streaming online too, with just under a half of the audiences at NT Live's production of *All's Well That Ends Well* saying that they would have watched a live stream. Moreover, 43 per cent of these said they would have been willing to pay to do so. And despite the centrality of the live experience, a significant minority (around 30 per cent in the case of both NT Live *Phèdre* and *All's Well* audiences) expressed an interest in buying a DVD of the performance if it had been available. This all adds to the revenue potential of the live screenings for the National Theatre.

The potential for art galleries to generate revenues from their online operations cannot of course be compared with cinema screenings of theatre. No major art gallery in the world that we know of is currently charging online visitors for accessing digital content, at least of the nature that was offered by the Tate in its website accompanying the *Colour Chart* exhibition. Consistent with this, the great majority of online visitors did not think it appropriate to pay to visit an exhibition website in the future, though a significant minority, 20 per cent, said they would be willing to do so.

Using an online exhibition as a means of generating donations, however, presents a different picture; half the online visitors said

they would consider making an online donation to the Tate after seeing an exhibition website. But despite this apparent willingness, none did so when invited to make a donation through a Call for Action we included on the *Colour Chart* webpages. Understanding this disconnect between what online visitors say they are willing to do and what they do in fact do should be a priority for arts organisations.

Lastly, it is important to remember that in addition to the direct contributions to revenue that online donations can make, a web-based show may lead to increases in a gallery's revenue in other ways. For example, the stimulus to attendance at paid exhibitions at the gallery, which we observed above in the case of *Colour Chart*, will increase the gallery's takings. More generally, the exposure of the gallery's brand through a web exhibition (and distribution of related content through third-party websites such as iTunes) may also have a positive effect on future revenues in other more indirect ways. Again, exploring this in further detail will help to inform future strategy for cultural institutions generally.

4.2 Conclusions

Our research has shown that not only are digital technologies bringing new audiences to arts and cultural organisations, they are creating new sources of cultural and economic value, and in some cases taking the artform itself in novel directions.

In the case of the National Theatre, as well as broadening and diversifying audience reach, NT Live appears to have had the less expected result of deepening the audience experience. And there is evidence that by doing so the NT is recruiting more people to traditional theatre, not fewer as would be the case if live screenings were cannibalising the theatre box office.

In the case of the Tate, digital technology – in this case, online – is also expanding the 'virtual capacity' of the Tate, recruiting new audiences for the galleries as well as providing new information and content to the public that would not otherwise be available. In both cases our research shows that the public value such innovations in a variety of ways.

This use of new technologies calls on arts and cultural organisations to develop new business models. Theatres of course will always perform

plays for their audiences and art galleries put on visitor exhibitions as their core offer. But the use of digital technologies is fundamentally reshaping the nature of the relationship that these organisations have with their publics.

Too often it is claimed that consumers of cultural experiences are unwilling to pay for services consumed in digital format (where the marginal cost of satisfying the additional customer is low, in the case of cinema seating, and zero, in the case of the Internet). Yet, our research shows that consumers at least claim to be willing to pay for high-quality digital experiences, whether in the form of tickets for screenings of live performances or, possibly, donations to organisations which are perceived as creating public and cultural value through their use of digital technologies.

Possible puzzles thrown up by our study include the lack of apparent cannibalisation effects on the theatrical box office despite NT Live's evident success in preserving the live, and the disconnect between what Tate online visitors claim they would be willing to donate and what they do in fact donate when given the option to do so. The only way to address these puzzles is further experimentation on the part of arts and cultural organisations.

We hope to have demonstrated through this study the benefits of that experimentation being research-led. Our approach has involved:

- upfront identification of clear research questions;
- a fit-for-purpose data strategy (including, if necessary, the collection of new data);
- application of rigorous research methodologies (quantitative as well as qualitative); and
- analysis of revealed (audience behaviour) as well as stated preferences (surveys).

Using such methodologies, research studies can generate robust evidence to inform policymaking within institutions, amongst cultural funding agencies and in government.

Indeed, public arts funders, such as Arts Council, England, Creative Scotland and the DCMS, should actively seek out opportunities to support, and publicise the findings of, experiments which address questions of interest to the wider sector.

A new research-led innovation fund should be set up for this purpose. Partnership with the research community is crucial; in this regard the knowledge transfer arms of Research Councils such as the AHRC, ESRC and EPSRC have an important responsibility and contribution to make. Targeted investment, in what we have separately described as arts R&D, is also a cost-effective way that public funders can 'get more for less': investing in the sector's capacity to innovate through investing in open prototypes and trials (Bakhshi, Desai and Freeman, 2009).

We believe that controlled experiments with new business models will help attract the private sector too. Funding research-led trials of interest to the wider sector is a possible new model of support by philanthropists and businesses: for example, donors and sponsors wanting to make a long-run contribution to the arts may find their money is better spent in funding trials which deliver relevant learning for the sector as a whole rather than supporting individual projects.

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Appendix 1: An economic model of arts and cultural institutions

Arts and cultural institutions are structured in different ways, often reflecting their funding arrangements. The standard model is a charity, which may or may not be supplemented with a profit-making trading subsidiary that channels its profits back into the charity using tax efficient mechanisms (Bolton and Carrington, 2007). Although a growing number of arts and cultural institutions are adopting innovative governance structures, notably establishing themselves as Community Interest Companies (CICs) which are less constrained than charities in their use of equity instruments (Voluntary Arts Network, 2007), the overall numbers are still small.

The great majority of publicly-funded arts and cultural institutions operate as not-for-profit firms, which is important as we build a conceptual framework for the economic analysis of these institutions. Their essential purpose is clearly not one of maximising financial profit. Through their cultural role, publicly-funded art galleries, museums and theatres serve a larger social purpose.

Several theories suggest why not-for-profit businesses emerge in market economies. One of the earliest was proposed by Burton Weisbrod, who argued that they exist to meet a shortfall in the supply of public goods by the government (Weisbrod, 1977). When the public sector finances such goods, it does so in order to accommodate the preferences of the median voter; as a result, people whose demand is for a greater supply will remain unsatisfied and will therefore be willing to support the establishment of a not-for-profit organisation to make up the shortfall. This, according to Weisbrod, explains the existence of not-for-profit firms in education, health, social services and the arts.

An extension of this argument is that people will donate money to not-for-profit firms because the firms are producing socially desirable output such as cultural or educational services and because donors believe the firms to be trustworthy (Rose-Ackerman, 1996). Henry Hansmann sees such donations as a form of voluntary price discrimination whereby consumers donate some part of their consumer surplus to organisations that are doing things of which they approve (Hansmann, 1987). An example of voluntary price discrimination is the pricing scheme adopted by the Metropolitan Museum in New York which allows visitors to choose their own entrance fee level.

Not-for-profit firms particularly in the arts, face unusual cost and revenue conditions. Many galleries and theatre companies have high fixed costs relative to variable costs, and a relatively low level of demand; as a result, their average cost of production is greater than their average revenue at all levels of output. In these circumstances there is no ticket price which will cover costs, so they have to rely on subsidies or philanthropy to stay in business. Since neither public funders nor private donors would do so if they thought that the recipient firm might pocket their money as profit, they tend to be incorporated as not-for-profit enterprises (Throsby, 1994: 12).

Economists have constructed models that depict the structure and mode of operation of not-for-profit arts and cultural organisations (Netzer, 2003). A widely recognised model portrays the firm as seeking to maximise both the level and the quality of output, subject to a break-even budget constraint (Throsby and Withers, 1979). A theatre company might try to attract the largest possible audience to its shows, whilst striving for the highest quality

standards in its productions. Though some arts and cultural organisations might want to pursue their vision ignoring the financial consequences, the reality is that cost and revenue outcomes impose a constraint on what can be done: if the firm does not cover its costs through earned and unearned revenue (box office and subsidies/donations respectively) over a given period, it won't stay in business.

Hansmann (1981) portrayed the objective of not-for-profit performing arts organisations as lying in a continuum between audience and quality maximisation. In a wider not-for-profit context, Steinberg (1986) described a similar spectrum as ranging from 'service maximisation' to 'budget maximisation', the latter echoing the quality maximisation objective of arts-related firms.

These models have been applied to specific types of cultural institution. Luksetich and Lange (1995) studied the behaviour of not-for-profit symphony orchestras to test the Hansmann hypothesis on voluntary price discrimination. Brooks and Ondrich (2007) attempted to infer management objectives from data for American public radio stations. Both studies yielded results that broadly support the underlying hypotheses concerning the range of objectives that not-for-profit cultural institutions typically pursue.

A quick glance around the arts and cultural institutions currently operating in the UK confirms their multiplicity of objectives – some couched as artistic and creative goals, some in terms of audience engagement, while others relate to their public and social impact.

These objectives, in turn, reflect the priorities of institutions' funders and sponsors. The objectives are mirrored in the heterogeneity of observed funding structures: museums and galleries, for example, are funded very differently from performing arts organisations. Even within artforms, funding patterns can vary enormously, with touring theatre companies having different financial structures from companies that own their own venues (Bolton and Carrington, 2007).

Drawing all these considerations together, we suggest that a generalised model of the behaviour of not-for-profit cultural institutions would likely specify at least five dimensions to their objective functions:

- Objectives relating to artistic or curatorial quality or standards, sometimes described as pursuit of 'excellence'.
- Objectives relating to access making their output available to as many and as wide a range of consumers as possible.
- Objectives relating to educational services, often through specific programmes to engage and educate young people.
- Objectives relating to knowledge – for museums and galleries this typically refers to a range of functions in archaeology, art history, anthropology or conservation practice; for performing arts companies it usually relates to developmental work on repertoire or performance practice.
- Objectives relating to social goals, for example community-based organisations with a mission to promote social inclusion and participation, or organisations devoted to arts in health care.

Within this generalised model, the pursuit of these multiple objectives – however they are weighted in terms of overall decision-making – must still be seen to be subject to a set of financial constraints that ultimately require a balance to be achieved between revenue and expenditure. In other words, the business model is one where the organisation:

- identifies objectives along the above lines;
- sets prices that strike the desired balance between accessibility, revenue raising and meeting quality goals; and
- seeks to develop as strong and diversified a portfolio of unearned revenue sources as possible.

Such a business model could be seen as a standard representation of not-for-profit behaviour as it has evolved in the arts and cultural sector over the past several decades.

Appendix 2: Econometric analyses: National Theatre

Demand analysis

Over the period 2003–2008 the National Theatre performed 116 plays at its three theatre venues on the South Bank of London. The data available for each production for our analysis included the following variables:

Attendances: full price (nos.)

Attendances: web price (nos.)

Attendances: concession price (nos.)

Price: full price (£ per ticket)

Price: web price (£ per ticket)

Price: concession price (£ per ticket)

Length of run (no. of performances)

Venue (Olivier, Lyttelton or Cottesloe)

Additionally, the data assembled for each show included a number of quality characteristics such as the date the play was written and the playwright's reputation, as described further below.

The full, web and concession prices were calculated as means for each show by dividing total sales for the season by total attendances. As such they are 'realised' prices, reflecting whatever discounting arrangements might have been used during the show's run. Note that full-price and web-price tickets are essentially the same, the difference between them being the method of purchase (full-price at the box-office in person or by telephone, web-price online).

In demand analyses for the performing arts, the usual measure of actual quantity demanded is the number of paid attendances over a given period. Such a measure is appropriate when a single venue of fixed capacity is in use.

In the present case we are dealing with three distinct venues with varying capacities both between each other, and to a lesser extent over time depending on the seating arrangements for particular productions. In these circumstances, a better measure of demand is the occupancy rate, measured as the percentage of available capacity taken up by paid attendances.

In this study we define the aggregate occupancy rate for full-price, web-price and concession-price tickets for a given production as the actual aggregate attendance in the price category divided by venue capacity x length of run (no. of performances). Total occupancy rate for a given production is then given as the sum of the occupancy rates for the three price categories, measured as a mean for the entire run. Note that occupancy rates calculated in this way will overstate actual occupancy rates slightly, to the extent that some tickets (returns) may be sold twice. In rare cases this may lead to apparent occupancy rates of greater than 100 per cent.

The following variables were defined as follows:

OCCFUL

Occupancy rate, full-priced tickets (per cent)

OCCWEB

Occupancy rate, web-priced tickets (per cent)

OCCFW

Occupancy rate, full- and web-priced tickets (per cent)

PRIFUL

Full price (£ per ticket)

PRIWEB

Web price (£ per ticket)

PRIFW

Mean full/web price (£ per ticket)

TREND

Time trend (1 to 116 for 2003-2008)

LYTTELTO

Play in Lyttelton Theatre = 1, zero or otherwise

OLIVIER

Play in Olivier Theatre = 1, zero otherwise

COTTESLO

Play in Cottesloe Theatre = 1, zero otherwise

SUMMER

Play opening in June, July or August = 1, zero otherwise

With all monetary variables measured in constant prices 2008 prices. In the tables of regression results presented, the prefix 'LN' indicates a variable measured in natural logarithms and the suffix '1' indicates a variable measured in constant prices.

Over the period studied the proportion of web-priced tickets sold has increased steadily with a corresponding fall in the sales of full-price tickets, as customers become more attuned to online purchasing across the board. A time-trend variable is therefore specified, with the first observation ($t=1$) based on the date of the opening night of *Jerry Springer: The Opera* (9 April 2003) and increasing in date order until the play with the latest date of opening in our data set ($t=116$), being *Oedipus* (8 October 2008), is reached.

Demand for a particular production depends on a number of factors, including importantly the type of play being produced. Various classifications of plays can be proposed in efforts to capture their qualitative nature – classic works, avant-garde or experimental works, musicals, comedies, etc. In this study we used the following classification which assigns plays to categories based on the prominence, reputation or recognisability of the playwright, and the period when the play was written or

first performed. This enables a differentiation between 'well-known' and 'less well-known' playwrights.

The well-known writers can be assigned fairly clearly to three periods: pre-1900 (e.g. Shakespeare, Chekov, Ibsen); 1900-1960 (e.g. Shaw, Tennessee Williams, Brecht); post-1960 (e.g. Stoppard, Bennett, Pinter). Lesser-known playwrights can be simply assigned as contemporary (plays first performed over approximately the last ten years) and earlier (plays first performed before this time).

This enables five dummy variables to be defined:

TYPE1

Play by well-known playwright pre-1900 =1, zero otherwise

TYPE2

Play by well-known playwright 1900-1960 =1, zero otherwise

TYPE3

Play by well-known playwright post-1960 =1, zero otherwise

TYPE4

Play by less well-known playwright pre-1995 =1, zero otherwise

TYPE5

Play by less well-known playwright post-1995 =1, zero otherwise

Descriptive statistics for these data are shown in Table 29.

The demand functions estimated from the above data for full-price and web-price attendees are shown in Table 30. Note especially:

- Since the relevant variables are measured as logs, demand elasticities can be read directly from the price coefficients in these equations; an overall price elasticity for full/web buyers of around -0.24 is indicated.
- The significant positive coefficients on the TYPE3 variables in each of the equations indicates the strong demand amongst these consumers for modern plays by well-known playwrights.

To examine the effect of programming plays by lesser-known contemporary playwrights (TYPE5) compared to all the others, an

alternative demand estimation is shown in Table 31. The significant negative coefficient of -0.1 on this variable in the combined equation is an indication that programming a work of this type will cause a clear reduction in occupancy rates, other things being equal.

NT Live analysis

In this section we present estimates of equations showing the influence of the cultural experiences of audiences in the cinema and the theatre for performances of *Phèdre*. The cultural value variables, listed in the tables as the statements from which they were derived, are measured as described in Appendix 3. Also included as explanatory variables in these equations are socio-demographic variables relating to income, gender, age, education and cultural exposure in the last 12 months; the

measurement of the latter variable is explained in Appendix 3.

The following estimates are presented below:

- Table 32 shows OLS estimates for the cinema audience of the willingness to pay for attendance at a live broadcast of a play at a cinema in the future. The amounts relate to a 'reasonable' and a 'maximum' level of ticket price. The estimates are derived for the full sample, and for the sub-sample of those who had not attended the National Theatre in the last 12 months.
- Table 33 shows OLS estimates for the theatre audience of willingness to pay 'reasonable' and 'maximum' amounts for a ticket to a live performance in the theatre.

Table 29: Descriptive statistics

Variable	Mean	Median	S.D.	Min.	Max.
Venue capacity (no.)	745	898	351	100	1167
Number of performances (no.)	52	51	26	5	178
Attendance, total (no.)	33,620	28,490	23,009	963	104,651
Attendance, full-price (no.)	14,544	11,975	11,312	405	56,252
Attendance, web-price (no.)	10,002	7,520	8,138	407	33,634
Attendance, concession (no.)	8,010	4,768	7,895	0	42,799
Attendance, comp. (no.)	1,063	900	830	50	5,537
Full ticket price, £	22.69	22.79	5.54	7.34	34.18
Web ticket price, £	23.38	23.85	6.08	7.36	35.49
Conc. ticket price, £	15.60	15.50	2.65	6.02	22.27
Occupancy rate, total (%)	88.8	92.3	10.4	62.1	101.6
Occupancy rate, full (%)	39.1	35.9	14.9	11.2	80.3
Occupancy rate, web (%)	26.2	24.2	11.5	3.2	54.1
Occupancy rate, conc. (%)	20.3	20.1	10.8	0.0	44.7

Table 30: Demand equations: all productions: types 1-4

	(1) Inoccfu1	(2) Inoccfweb	(3) Inoccfw
lnpriful1	-0.1381 (-1.10)		
lnpriweb1		-0.3502*** (-4.71)	
lnprifw1			-0.2364* (-2.62)
type1	0.0798 (1.07)	-0.0621 (-0.69)	0.0221 (0.31)
type2	0.1830* (2.36)	-0.0399 (-0.54)	0.0883 (1.27)
type3	0.2377*** (3.42)	0.0144 (0.17)	0.1873** (3.25)
type4	0.0404 (0.45)	-0.1820 (-1.93)	-0.0353 (-0.42)
summer	-0.0433 (-0.71)	-0.1846* (-2.51)	-0.0703 (-1.25)
Cottesloe	0.3106*** (4.20)	-0.2109* (-2.59)	0.1401* (2.27)
Olivier	0.2195** (3.10)	0.1213 (1.91)	0.1818** (3.09)
trend	-0.0063*** (-7.31)	0.0103*** (11.94)	
constant	-0.4675 (-1.06)	-0.8642** (-3.33)	0.1298 (0.43)
N	116	116	116
R ²	0.495	0.675	0.234
Adjusted R ²	0.45	0.65	0.18
F	19.81	28.79	5.47

t-statistics in parentheses

Note: Using heteroskedasticity-consistent standard errors. * p<.05, ** p<.01, *** p<.001

Table 31: Demand equations: all productions: type 5

	(1) Inoccfu1	(2) Inoccfweb	(3) Inoccfw
Inpriful1	-0.1656 (-1.29)		
Inpriweb1		-0.3652*** (-4.97)	
Inprifw1			-0.2565** (-2.77)
type5	-0.1666** (-3.04)	0.0408 (0.69)	-0.1036* (-2.15)
summer	-0.0406 (-0.64)	-0.1837* (-2.50)	-0.0696 (-1.17)
Cottesloe	0.3037*** (4.14)	-0.2227** (-2.86)	0.1338* (2.15)
Olivier	0.1887* (2.58)	0.0977 (1.59)	0.1478* (2.41)
trend	-0.0064*** (-7.55)	0.0102*** (11.29)	
constant	-0.1981 (-0.45)	-0.8399** (-3.25)	0.3077 (1.02)
N	116	116	116
R ²	0.474	0.666	0.185
Adjusted R ²	0.44	0.65	0.15
F	22.88	36.22	5.87

t-statistics in parentheses

Note: Using heteroskedasticity-consistent standard errors. * p<.05, ** p<.01, *** p<.001

Table 32: Willingness to pay for live broadcast, Cinema audience

	(1) log Reasonable amount for live broadcast ^(a)	(2) log Maximum amount for live broadcast ^(a)	(3) log Reasonable amount for live broadcast ^(b)	(4) log Maximum amount for live broadcast ^(b)
Totally absorbed	0.0279 (1.82)	0.0247 (1.21)	0.0062 (0.27)	0.0154 (0.53)
Transported	0.0081 (0.77)	0.0139 (1.04)	0.0149 (0.90)	-0.0059 (-0.29)
Emotional response	0.0223* (2.08)	0.0264 (1.62)	0.0255 (1.61)	0.0553* (2.47)
New ways of seeing things	-0.0224* (-2.22)	-0.0284* (-2.11)	-0.0298* (-2.11)	-0.0281 (-1.45)
Wanted to talk to others about what seen	0.0115 (0.98)	0.0281 (1.64)	0.0132 (0.77)	0.0359 (1.37)
My creativity was stimulated	0.0003 (0.02)	-0.0046 (-0.33)	0.0126 (0.88)	-0.0165 (-0.84)
Seeing with others increased enjoyment	0.0348*** (4.08)	0.0390** (3.29)	0.0366** (3.28)	0.0416* (2.39)
log Income	0.0291* (2.06)	0.0709*** (3.78)	0.0271 (1.39)	0.0701** (2.76)
Female	-0.0312 (-1.68)	-0.0199 (-0.84)	0.0425 (1.76)	0.0618 (1.92)
Age	0.0034*** (5.49)	0.0033*** (4.28)	0.0032*** (3.57)	0.0040*** (3.71)
Degree	-0.0389* (-1.98)	-0.0489 (-1.72)	-0.0578* (-2.10)	-0.0733 (-1.79)
Cultural exposure	-0.0042 (-0.89)	-0.0066 (-0.99)	-0.0082 (-1.35)	-0.0118 (-1.25)
Constant	2.0383*** (28.65)	2.1974*** (24.40)	2.0564*** (21.31)	2.1535*** (17.71)
Observations	736	736	407	406
R ²	0.12	0.10	0.11	0.11
Adjusted R ²	0.11	0.08	0.08	0.09
F	7.84	6.80	3.90	4.95

Note: (a) Full sample (b) Those not attending NT in the last 12 months
t-statistics in parentheses
Using heteroskedasticity-consistent standard errors. * p<.05, ** p<.01, *** p<.001

Table 33: Willingness to pay for live performance, Theatre audience

	(1) log Reasonable amount for live broadcast	(2) log Maximum amount for live broadcast
Totally absorbed	-0.0158 (-0.76)	-0.0305 (-1.35)
Transported	0.0039 (0.23)	0.0226 (1.30)
Emotional response	0.0637*** (3.42)	0.0588** (2.91)
New ways of seeing things	0.0247 (1.37)	0.0207 (1.16)
Wanted to talk to others about what seen	0.0057 (0.33)	0.0037 (0.20)
My creativity was stimulated	0.0028 (0.20)	0.0045 (0.33)
Seeing with others increased enjoyment	0.0321* (2.34)	0.0137 (1.05)
log Income	0.1178*** (6.82)	0.1299*** (7.41)
Female	-0.0463 (-1.91)	-0.0109 (-0.43)
Age	-0.0004 (-0.37)	-0.0028** (-2.67)
Degree	-0.0396 (-1.32)	0.0219 (0.74)
Cultural exposure	-0.0175* (-2.01)	-0.0107 (-1.24)
Constant	3.0367*** (31.43)	3.3462*** (34.54)
Observations	726	725
R ²	0.14	0.14
Adjusted R ²	0.12	0.12
F	7.80	7.60

Note: t-statistics in parentheses

Using heteroskedasticity-consistent standard errors. * p<.05, ** p<.01, *** p<.001

Appendix 3: Indicators of cultural exposure and cultural value

Cultural exposure indicators

The variable used to describe the level of 'cultural exposure' of respondents to the surveys was calculated as a score from the respondents' self-reported attendance at a number of cultural events in the past 12 months.

In the case of the National Theatre surveys, a respondent was given a score of 1 for attendance at each of the following:

- Performance at the National Theatre.
- Met Opera Live performance at the cinema.
- Play in a theatre.
- Opera or classical music performance.
- Dance performance.
- Museum or art gallery.
- Arthouse/independent cinema.
- A music or cultural festival event.

Therefore the created cultural exposure indicator for a given respondent in the National Theatre surveys can take on a value between zero and 8.

In the case of the Tate Gallery surveys, a respondent was given a score of 1 for their attendance at each of the following:

- Exhibition at Tate Liverpool/other Tate galleries.
- Play in a theatre.

- Opera or classical music performance.
- Dance performance.
- Museum or another art gallery (either paid for or free exhibitions).
- Arthouse/independent cinema.
- A music or cultural festival event.

Therefore the cultural exposure indicator for a given respondent to the Tate Gallery surveys can take on a value between zero and 7.

On the basis of these scores we classified members of all audiences into three categories on the basis of their 'cultural exposure':

- Little or no cultural exposure: score 0-2.
- Moderate cultural exposure: score 3-5.
- Extensive cultural exposure: score 6-8 (National Theatre) and 6-7 (Tate).

The means, medians and standard deviations of cultural exposure scores are shown in Table 34 on page 76.

Cultural value indicators

'Cultural value' is a term used in several disciplines to describe the cultural worth or significance of objects such as artworks or of experiences such as attending a theatre performance. Unlike the economic value of artistic goods and services which can be measured in financial terms, there is no single unit of account by which to measure

Table 34: Expectations and actual outcomes

Score	National Theatre				Tate			
	Cinema		Theatre		Gallery		Online	
	n	%	n	%	n	%	n	%
0	6	0.5	7	0.6	3	1.0	14	0.7
1	21	1.6	7	0.6	8	2.5	73	3.5
2	60	4.6	23	1.9	38	12.5	231	11.2
3	113	8.6	80	6.6	49	16.1	354	17.2
4	218	16.6	164	13.5	47	15.5	451	21.9
5	311	23.7	300	24.8	59	19.4	449	21.8
6	321	24.4	326	26.9	54	17.8	306	14.8
7	215	16.4	261	21.5	46	15.1	183	8.9
8	48	3.7	44	3.6	-	-	-	-
Total	1313	100.0	1212	100.0	304	100.0	2061	100.0
Mean	-	5.12	-	5.43	-	4.47	-	4.25
Median	-	5	-	6	-	5	-	4
S.D.	-	1.58	-	1.44	-	1.76	-	1.61
Min.	-	8	-	8	-	7	-	7
Max.	-	0	-	0	-	0	-	0

cultural value, since this concept has multiple dimensions reflecting the various criteria by which cultural phenomena can be evaluated.

It can be suggested that the cultural value of, say, an artwork can be disaggregated into several specific elements representing the work's different dimensions of value (Throsby, 2001). Such constituent elements include the work's:

- aesthetic quality;
- symbolic meaning;
- spiritual resonance;
- social value; and
- educational value.

In our surveys we were interested in identifying, to the extent possible, the

generation of these sorts of cultural value for audiences as a result of their experiences in seeing the *Phèdre* production or the *Colour Chart* exhibition.

As outlined in the report, the survey questionnaires asked respondents their level of agreement or disagreement with a number of statements about their experiences. Some of these statements can be taken as being broadly indicative of one or other of the dimensions of cultural value noted above. So, for example, the statement "*I was totally absorbed*" could be seen as related to the individual's response to the aesthetic qualities of the performance or the artworks in the exhibition. Similarly the statement that the experience gave 'new ways of seeing things' could be seen as an empathy for the symbolic meanings conveyed by the art.

Accordingly, we calculated what we call 'cultural value indicators' by assigning a score to an individual's response to a series

of selected statements. The score for each statement for a given respondent was derived as follows:

Response	Score assigned
Strongly agree	2
Agree	1
Neither agree nor disagree	0
Disagree	-1
Strongly disagree	-2

Thus the created variable can take on a value between -2 and +2 for the response to a given statement by a given individual.

The selected statements (in abbreviated form) and the assumed cultural value as indicated by each statement are shown in Table 35, together with the means, medians, and standard deviations of the cultural value indicator scores derived as described above.

Table 35: Cultural value indicators

Statement	Cultural value indicated	National Theatre						Tate Gallery					
		Cinema Audience			Theatre Audience			Online visitors			In-gallery visitors		
		Mean	Median	SD	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
Absorbed	Aesthetic	1.49***	2.00	0.74	1.01***	1.00	1.05	0.54	1.00	0.96	0.61	1.00	0.99
Emotional	Aesthetic	1.29***	1.00	0.82	0.85***	1.00	1.02	0.11**	0.00	1.00	0.31**	1.00	0.99
New ways of seeing	Symbolic	0.54***	1.00	0.86	0.11***	0.00	0.91	0.56	1.00	0.88	0.65	1.00	0.87
Transported	Spiritual	0.74***	1.00	0.98	0.31***	0.00	1.08	-0.34	0.00	0.99	-0.23	0.00	1.07
Seeing with others	Social	0.58*	1.00	0.97	0.50*	1.00	0.96	--	--	--	0.66	1.00	1.01
Wanted to talk about	Social	1.30***	1.00	0.70	1.03***	1.00	0.82	0.35***	0.00	0.94	0.67***	1.00	0.90
Creativity stimulated	Educational	0.65***	1.00	0.87	0.29***	0.00	0.98	0.44**	1.00	0.94	0.63**	1.00	1.03
Understand art better	Educational	-	-	-	-	-	-	0.22*	0.00	0.81	0.32*	1.00	0.89

Note: * p<.05, ** p<.01, *** p<.001

Appendix 4: Econometric analyses: Tate Gallery

Demand analysis

Over the period 2003–2007 there were 76 separate exhibitions in the two galleries, 38 at each. The data available for each exhibition comprise the following variables:

Attendances: total (nos.)

Attendances: full price (nos.)

Attendances: concession price (nos.)

Attendances: members (zero price) (nos.)

Attendances: forecast or 'target' (nos.)

Price: full price (£ per entry)

Price: concession price (£ per entry)

Length of run (no. of days)

Cost of mounting the exhibition (£) comprising:

Marketing expenditure (£)

Other exhibition costs (£)

Site (Tate Britain, Tate Modern)

In addition, for each exhibition the available dataset includes a number of qualitative characteristics, such as the type of exhibition (classified according to the Tate's classification system as contemporary, modern, or historical), whether the exhibition is of a single artist (monographic) or a number of artists, seasonal factors and the amount of media attention generated by the exhibition.

The following variables and units of measurement are defined:

ATTTOT

Attendance, total (no.)

ATTFUL

Attendance, full price (no.)

ATTCON

Attendance, concession price (no.)

ATTMEM

Attendance, members price (no.)

ADFL

Attendance per day, full price (no.)

ADCO

Attendance per day, concession price (no.)

ADME

Attendance per day, member price (no.)

PRIFUL

Price, full (£ per entry)

PRICON

Price, concession (£ per entry)

COST

Total exhibition cost (£ '000)

MARK

Marketing expenditure (£ '000)

OTHER

Other exhibition costs, excluding marketing (£ '000)

DAYS

Number of exhibition days

SITE

Tate Modern = 1; Tate Britain = 0

With all financial variables measured in constant 2008 prices. In tables of regression results the prefix 'LN' indicates a variable measured in logarithms and the suffix '1' indicates a variable measured in constant prices. For the cost data, where some zeros occur, a constant of 100 is added to each observation before scaling and taking logarithms.

Variables indicating the quality characteristics of the shows are specified as dummy variables, where:

BLOCKBD

Blockbuster exhibition = 1, zero otherwise

CONTEMP

Contemporary = 1, zero otherwise

MODERN

Modern = 1, zero otherwise

HISTORIC

Historical = 1, zero otherwise

MONO

Monographic = 1, zero otherwise

MEDIA

Media mentions (no.)

SUMMER

Exhibition opening in June, July, August = 1, zero otherwise.

The variable BLOCKBD indicates a show that was expected to achieve an aggregate attendance of 200,000 or more. The MEDIA variable attempts to capture the extent to which the exhibition stimulated public debate and discussion within the arts community and beyond. It is likely that the extent of press coverage associated with an exhibition will raise demand and be instrumental in forming subjective quality judgements of an exhibition. The MEDIA variable is defined as the number of unique articles the exhibition received in The Times, The Financial Times, and The Guardian in the 12-month period surrounding the exhibition.

Descriptive statistics for the above variables are given in Table 36.

The OLS demand functions estimated from the above data for full-price, concession-price

and zero-price (members) attendees are shown in Table 37. Since the relevant variables are measured as logs, demand elasticities can be read directly from the price coefficients in these equations. Note especially the demand elasticity for full-price visitors of -0.96.

Price elasticities for full-price attendees at modern, contemporary and historical shows estimated separately can be seen in the equations shown in Table 38. We note that the elasticities for modern and contemporary shows are both approximately -1.13 according to these estimates, with a smaller (but non-significant) estimate for historical exhibitions.

Overall these results suggest that the price elasticity of demand for exhibitions at the Tate is approximately unit-elastic.

Tate Online analysis

In this section we present estimates of equations showing the influence of the cultural experiences of online and in-gallery visitors to the *Colour Chart* exhibition. The cultural value variables, listed in the tables as the statements from which they were derived, are measured as described in Appendix 3. Also included as explanatory variables in these equations are socio-demographic variables relating to income, gender, age, education and cultural exposure in the last 12 months; the measurement of the latter variable is explained in Appendix 3.

The estimates shown in the tables below are as follows:

- Table 39 shows logit estimates for the online visitors of the likelihoods of visiting another exhibition website and of visiting an actual exhibition in an art gallery. The table also shows the latter likelihood for the in-gallery audience, for purposes of comparison. In these equations the dependent variable is derived from the 'More Likely' response to the relevant question in the survey.
- Table 40 shows logit estimates for the online visitors of responses to the questions "Would you be willing to pay for access to an online exhibition?" and "Would you be willing to make a donation to the Tate?" after having seen the *Colour Chart* show.
- Table 41 shows OLS estimates for the in-gallery visitors of willingness to pay for

entry to an exhibition in a gallery, measured as nominated 'reasonable' and 'maximum' prices. The willingness to donate to the Tate is also shown.

Table 36: Descriptive statistics

Variable	Mean	Median	S.D.	Min.	Max.
Attendance, total (no.)	106,572	77,181	89,046	14,394	464,121
Attendance, full price (no.)	33,649	19,756	41,544	1,871	218,137
Attendance, conc. (no.)	35,741	26,242	28,294	4,174	130,978
Attendance, members (no.)	30,482	23,511	19,148	6,599	106,748
Attendance, compl. (no.)	6,568	4,709	5,724	761	32,776
Attendance per day, total (no.)	1,143	914	869	173	4,641
Attendance per day, full (no.)	357	227	407	23	2,181
Attendance per day, conc. (no.)	384	288	286	50	1,364
Attendance per day, mem. (no.)	329	281	185	73	1,067
Number of exhibition days (no.)	91.1	90	11.8	68	124
Price, full (£ per entry)	8.51	8.00	2.05	3.65	12.17
Price, con. (£ per entry)	6.58	6.13	1.46	3.65	9.73
Total exhibit. cost (£)	95,993	77,247	57,940	28,125	266,980
Marketing expenditure (£)	81,542	63,620	53,266	20,741	234,527
Other exhibit. costs (£)	14,452	12,661	9,275	4,185	63,520
Media mentions (no.)	35	29	35	1	231

Table 37: Demand equations: full-price, concession-price and members

	(1) lnattful	(2) lnattcon	(3) lnattmem
lnpriful1	-0.9603** (-2.72)		
lnpricon1		0.6441 (1.41)	
Days	1.2793** (3.14)	0.8255* (2.56)	1.0182** (3.25)
lnmark1	1.1173*** (7.17)	0.4208** (3.28)	0.4807*** (6.77)
lnother1	0.4132** (2.79)	0.1064 (0.79)	0.1084 (1.04)
Modern	-0.2959* (-2.30)	-0.0166 (-0.11)	-0.0531 (-0.46)
Historical	-0.0466 (-0.24)	0.2685 (1.50)	-0.2255 (-1.49)
Blockbd	0.3262 (1.55)	0.2308 (0.93)	0.2915* (2.06)
Site	0.2557 (1.52)	0.1949 (1.23)	0.2389 (1.80)
Summer	-0.0721 (-0.59)	-0.0796 (-0.64)	-0.1608 (-1.72)
Mono	0.0118 (0.10)	0.0245 (0.20)	0.0830 (0.90)
lnmedia	0.2347*** (3.72)	0.1311 (1.53)	0.1044* (2.12)
Constant	-10.8775*** (-5.62)	-0.9419 (-0.52)	-1.1793 (-0.77)
N	75	75	75
R ²	0.81	0.67	0.69
Adjusted R ²	0.77	0.61	0.64
F	27.09	13.73	19.82

t-statistics in parentheses

Note: Using heteroskedasticity-consistent standard errors. * p<.05, ** p<.01, *** p<.001

Table 38: Demand equations: full-price attendees, by exhibition type

	Full-price total attendance		
	(1) Modern	(2) Contemp.	(3) Historical
Inprifull	-1.1321 (-1.46)	-1.1289* (-2.47)	-0.5835 (-0.48)
Days	0.0031 (0.31)	0.0238*** (4.27)	0.0008 (0.08)
Inmark1	1.1395*** (4.70)	1.0357*** (4.79)	1.1717* (2.75)
Inother1	0.1537 (0.76)	1.0133*** (4.11)	-0.1585 (-0.41)
Inmedia	0.5036** (3.16)	0.2181* (2.81)	0.0948 (0.45)
Blockbd	-0.1754 (-0.50)	0.3820 (1.96)	0.7365 (1.56)
Site	0.1794 (0.64)	0.3730 (1.52)	0.0000 (.)
Summer	0.2629 (1.27)	-0.2528 (-1.40)	-0.5043 (-1.74)
Mono	0.1809 (0.97)	0.0659 (0.37)	0.0821 (0.25)
Constant	-4.0773** (-3.20)	-11.5905** (-3.78)	-0.8039 (-0.16)
N	25	32	18
R ²	0.92	0.82	0.82
Adjusted R ²	0.87	0.75	0.66
F	53.18	32.17	8.47

t-statistics in parentheses

Note: Using heteroskedasticity-consistent standard errors. * p<.05, ** p<.01, *** p<.001

Table 39: Logit estimations of selected likelihoods

	(1) More likely to look at another exhibition website ^(a)	(2) More likely to visit another exhibition in art gallery ^(a)	(3) More likely to visit another exhibition in art gallery ^(b)
Totally absorbed	0.2280** (2.62)	0.0163 (0.19)	0.2998 (1.41)
New ways of seeing things	0.0960 (1.04)	0.1203 (1.34)	0.2692 (1.10)
Transported	0.1551 (1.77)	0.1788* (2.15)	0.4228* (2.23)
Emotional response	-0.0416 (-0.49)	0.0191 (0.23)	0.0037 (0.02)
Wanted talk about what seen	0.1706* (2.08)	0.2042* (2.54)	0.1148 (0.55)
Understand contemp. art better	0.4601*** (4.81)	0.4845*** (5.21)	0.0136 (0.06)
Creativity stimulated	0.2165* (2.42)	0.1815* (2.06)	-0.1783 (-0.91)
log Income	0.0691 (0.87)	-0.0681 (-0.89)	0.0608 (0.29)
Age	0.0112* (2.19)	-0.0008 (-0.16)	0.0069 (0.55)
Female	0.1466 (1.02)	-0.1415 (-1.02)	-0.2276 (-0.65)
Degree	0.0843 (0.56)	-0.3348* (-2.34)	0.6929 (1.67)
Cultural consumption	-0.0435 (-1.10)	-0.0283 (-0.75)	-0.0233 (-0.27)
Constant	-0.4560 (-1.20)	0.3381 (0.93)	-0.7521 (-0.76)
Observations	1211	1208	179
Log likelihood	-708.3864	-759.8028	-110.7211
Chi-squared	166.9990	154.1903	21.3086
Significance level	0.0000	0.0000	0.0460

Note: (a) Online sample. (b) In-gallery sample. z-statistics in parentheses. * p<.05, ** p<.01, *** p<.001

Table 40: Willingness to pay and donate, Logit estimation for online visitors

	(1) Willing to pay to access an online exhibition	(2) Willingness to donate to the Tate
Totally absorbed	0.1598 (1.60)	0.1753* (2.09)
New ways of seeing things	-0.0679 (-0.65)	0.1993* (2.24)
Transported	0.1504 (1.59)	0.1409 (1.70)
Emotional response	0.0756 (0.79)	0.1001 (1.24)
Wanted talk about what seen	0.0470 (0.49)	0.1997* (2.51)
Understand contemp. art better	0.1338 (1.26)	0.1146 (1.26)
Creativity stimulated	0.0710 (0.68)	0.0700 (0.80)
log Income	-0.0139 (-0.16)	0.3412*** (4.42)
Age	0.0075 (1.34)	-0.0198*** (-4.06)
Female	-0.1678 (-1.06)	-0.2525 (-1.81)
Degree	-0.0518 (-0.32)	-0.2233 (-1.55)
Cultural consumption	-0.0562 (-1.32)	0.0268 (0.72)
Constant	-1.3123** (-3.17)	-0.2100 (-0.58)
Observations	1205	1210
Log likelihood	-614.8233	-764.5123
Chi-squared	34.8644	143.8630
Significance level	0.0005	0.0000

Note: z-statistics in parentheses. * p<.05, ** p<.01, *** p<.001

Table 41: Willingness to pay for gallery entry and donation, in-gallery visitors

	(1) Reasonable price to charge	(2) Maximum price to charge	(3) Maximum to donate
Totally absorbed	0.1092* (2.56)	0.1559** (3.32)	0.1331 (1.50)
New ways of seeing things	0.0834 (1.69)	0.1246* (2.23)	0.2047* (2.00)
Transported	0.0695 (1.84)	0.0521 (1.27)	0.0549 (0.70)
Emotional response	-0.0198 (-0.50)	0.0274 (0.64)	0.0335 (0.41)
Wanted talk about what seen	-0.0079 (-0.19)	0.0110 (0.24)	0.0034 (0.04)
Understand contemp. art better	-0.0256 (-0.58)	-0.0266 (-0.55)	-0.1012 (-1.11)
Creativity stimulated	-0.0591 (-1.52)	-0.0553 (-1.30)	-0.0251 (-0.31)
log Income	0.1276** (2.98)	0.0719 (1.54)	0.0313 (0.35)
Age	-0.0007 (-0.30)	-0.0015 (-0.56)	-0.0186*** (-3.57)
Female	0.0683 (0.96)	0.0691 (0.89)	0.2086 (1.42)
Degree	-0.0071 (-0.08)	0.1035 (1.14)	0.2322 (1.33)
Cultural consumption	-0.0314 (-1.82)	-0.0112 (-0.60)	0.0074 (0.21)
Constant	1.3030*** (6.51)	1.5297*** (7.03)	0.8766* (2.12)
Observations	179	178	181
R ²	0.17	0.19	0.14
Adjusted R ²	0.10	0.13	0.08
F	2.73	3.30	2.27

t-statistics in parentheses

Note: Using heteroskedasticity-consistent standard errors. * p<.05, ** p<.01, *** p<.001

Appendix 5: NT postcode analysis

By comparing the postcode distribution of bookers for the National Theatre's production of *Phèdre* with that of bookers for 'similar' non-NT Live productions, we are able to test whether audiences from catchment areas of cinemas participating in NT Live were over- or under-represented compared with what might have otherwise been expected. The former would be consistent with the idea that the live screenings recruited audiences at the National Theatre's own box office (say, because the live screenings acted as a marketing device for the theatre), while the latter would be consistent with NT Live having cannibalised ticket sales at the NT's box office.

To investigate this, the National Theatre pulled the individual postcodes for all bookers for *Phèdre* off their Tessitura system. In some cases individuals made multiple bookings. Where those bookings were made on the same date for the same performance, we treated the booking as a single booking. In cases where multiple bookings were made on different dates for the same performance, we removed all bookings other than the first from the dataset. In cases where multiple bookings were made on different dates for either the same or different performances we treated these multiple bookings as being different unique bookings. We then removed all non-UK postcodes from the dataset. This procedure resulted in 20,542 'unique' bookings.

We then placed these into different buckets, each representing a unique postcode district (see below for an example). In the UK, there are 2,981 unique residential postcode districts (excluding the Channel Isles and some non-residential postcodes in England and Wales), meaning that we were able to construct a 2,981 X 1 column vector with each cell

representing the number of unique *Phèdre* bookings from each postcode district. In turn, we then expressed each cell as the number of unique bookings from each postcode district as a share of overall bookings (so that the cells added to 1).

By way of illustration, if, for example, it had been that in our database of 20,542 unique bookings there were two from postcodes W4 1ZZ and W4 1YY and no others from postcodes beginning W4, we would say there were two bookings from the postcode district W4. These two bookings would represent (2/20,542) of the overall numbers of bookings.

The idea is to test whether this postcode distribution of bookings for *Phèdre* is statistically different from what might otherwise have been expected were *Phèdre* not to have been broadcast live to cinemas on 25 June.

We proxied the latter by computing equivalent postcode distributions for two productions that were identified by NT staff as being 'similar' productions to *Phèdre* – that is, they were shown at the Lyttelton theatre, at a similar time in the year to *Phèdre* and they might have been expected to attract audiences with similar overall socio-demographic characteristics.

The two productions chosen were *Never So Good* starring Jeremy Irons, which played at the National between 17 March and 14 August 2008, and Michael Frayn's *Afterlife*, which played at the National from to 3 June to 30 August 2008 (*Phèdre* played from 4 June to 27 August 2009). These served as 'control variables' in our econometric model. To allow for any seasonal differences in the postcode distribution for audiences we only included

bookings for performances from 4 June for *Never So Good* (although we tested how robust our results were to including the full sample of bookings – doing so made little difference).

Model 1

In our first model we tested for whether there were greater or fewer audiences from NT Live catchment areas. We regressed the share of *Phèdre* on a dummy variable, CINEMA, taking the value 1 in postcode districts where there was a participating UK cinema and 0 otherwise, together with the control variables for the other two productions. Results, shown in Table 42, were estimated using the Tobit procedure in STATA; results using OLS yielded qualitatively similar results.

The positive, and statistically significant, coefficient on the CINEMA dummy suggests there were greater numbers of *Phèdre* bookers from areas close to NT Live cinemas than might have been otherwise expected, at least based on audiences for *Never So Good* and *Afterlife*. Note that the coefficients on the *Never So Good* and *Afterlife* postcode distribution variables sum to over 0.97, which suggests that these two productions are serving as reasonable control variables in our model.

The 0.00019 coefficient on the CINEMA dummy variable means that the audience share at the NT of postcode districts which had a participating cinema was on average 0.00019pp higher than postcode districts which did not have a cinema participating in NT Live. In absolute terms this suggests that there were on average 11 bookings from cinema postcode districts compared with seven from districts without participating cinemas.

Model 2

Model 1 assumes that the impact of the live screenings on bookings at the NT was identical regardless of the postcode district where the cinema was located. Yet, one might reasonably expect that any positive or negative impacts the NT Live screenings had on *Phèdre* audiences at the NT would have been weaker the further away the cinema from the NT's South Bank location. So, for example, the ability of the live screenings to persuade individuals to book for theatre tickets would naturally have been constrained by

how far these individuals live from the NT (as proxied by where they saw the live screening). Likewise, NT Live *Phèdre* is much less likely to have led people to forgo a visit to the National Theatre (cannibalisation) if they lived so far away from London as to have precluded a visit in any case.

To test this, we included an additional variable in our model which had the effect of relaxing the assumption that the NT Live screening of *Phèdre* had the same impact on NT audiences regardless of location. This variable was constructed by interacting the CINEMA dummy variable discussed earlier with a variable, DIST, measuring the geographical distance between the postcode district in which the participating cinema was located and the South Bank in London.²¹ The results are also shown in Table 42.

These results were also estimated using the Tobit procedure in STATA; results using OLS yielded qualitatively similar results.

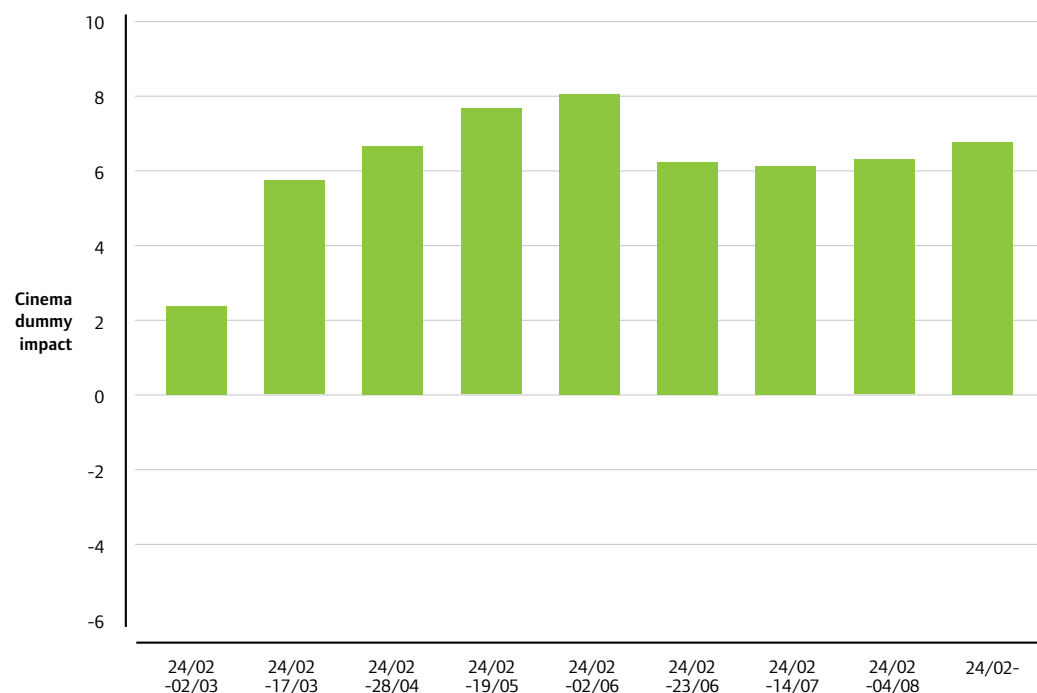
Here, the coefficient on the CINEMA dummy implies that a participating cinema right next door to the South Bank would have generated roughly seven more bookings for NT *Phèdre* than if there had been no cinema (as compared with four more in model 1 when all cinemas were assumed to have the same NT audience impact regardless of location). The coefficient on the variable which interacts the CINEMA dummy with distance from the South Bank suggests that a postcode district for a participating cinema located 100 kilometres away would have had only five more bookers on average than if there had been no participating cinema.

The lack of evidence for cannibalisation is consistent with the results from estimating the above model over different booking periods. Figure 3 plots recursive estimates of the implied impact on *Phèdre* theatre bookings that would arise from a cinema participating in NT Live right next to the NT's South Bank location. That is, we estimated model 2 using bookings from steadily increasing booking periods – the final observation covers the whole booking period, and therefore corresponds to the model estimates above.

Figure 3 shows that there were greater than expected numbers of *Phèdre* bookings from postcode districts including participating cinemas for all periods since the NT started taking theatre bookings on 24 February 2009. One interpretation, discussed earlier,

21. The postcode district distances data were supplied by Dotted Eyes Ltd.

Figure 3: The marginal impact of NT Live on *Phèdre* theatre bookings



is that the live screenings served to recruit audiences to the NT box office. The National first announced its plans for launching the NT Live season with *Phèdre* at a press conference on 14 Jan 2009. It announced at that stage that it would be working with the Picturehouse cinema chain and a number of others. A press release listing all participating Picturehouse cinemas was released on 3 March 2009. Participating independent cinemas were

announced when tickets went on sale at later dates. This all suggests that any impacts of the NT Live screenings on *Phèdre* NT bookings should have been smaller in advance of 3 March, consistent with the recursive results above. At a minimum, we conclude that there is no evidence of cannibalisation effects in the data, and some evidence indicating NT Live *Phèdre* recruited audiences to the National box office.

Table 42: Modeling the postcode distribution of audiences at the National Theatre

	Model 1	Model 2
Cinema	0.00019 (4.37)	0.00033 (4.91)
Cinema x Dist		-0.0000008 (-2.72)
Never So Good	0.48712 (35.66)	0.48290 (35.32)
Afterlife	0.48424 (45.37)	0.48478 (45.51)
Constant	-0.00016 (-19.19)	-0.00016 (-18.56)
Observations	2981	2931

t-statistics in parentheses

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