

Learned Publishing, 25: 107–114
doi:10.1087/20120205

Open access

central funds in

UK universities

**Stephen PINFIELD and
Christine MIDDLETON**

University of Nottingham

Introduction

Over the last decade, open access (OA) journal publishing has grown significantly. This has been enabled at least partly by changes in technology which have made the distribution of content online quicker, easier, and cheaper. Recognizing this, many research funders, keen to make the outcomes of publicly funded research publicly available, have introduced policies encouraging or requiring their grant-holders to make research outputs openly accessible. At the same time, many publishers have introduced new business models allowing content to be made OA, often upon payment of an OA fee or ‘article-processing charge’ (APC). A number of fully OA journals have been set up by publishers such as BioMed Central (BMC) and Public Library of Science (PLoS). A larger number of existing journals from established publishers have introduced policies allowing individual articles in subscription journals to be made OA on payment of an APC (known as ‘hybrid journals’).

One of the challenges for higher-education institutions (HEIs) in responding to these activities is to develop policies and business processes which enable authors to pay APCs. Institutions can encourage researchers to build APC costs into their grant applications so that authors themselves can pay costs from their direct research grant income when a project is still live. In addition, institutions can build the costs of APCs into their indirect cost recovery models and then make the funds available to researchers when required, often in the form of a so-called OA ‘central fund’.

This paper reports on the extent to which HEIs in the UK have set up central funds and similar institutionally co-ordinated approaches to the payment of OA APCs. It explores the barriers to the establishment of

ABSTRACT. *This paper reports on the extent to which higher education institutions in the UK have set up central funds and similar institutionally co-ordinated approaches to the payment of open access article-processing charges. It presents data demonstrating that central funds have only been set up by a minority of institutions and that the number of institutions has not changed significantly between 2009 and 2011. It then explores the barriers to the establishment of such funds and discusses recent developments that might lower these barriers. Finally, it provides a case study of the development of the central fund at the University of Nottingham in the UK and considers the sustainability of such an approach.*



Stephen Pinfield



Christine Middleton

© Stephen Pinfield and Christine Middleton 2012

such funds and also discusses recent developments that might lower these barriers. Finally, it provides an update on the central fund at the University of Nottingham and considers the sustainability of such an approach.

UK survey

Pinfield reported on the results of a survey carried out in 2009 of UK HEIs assessing the extent of the adoption of central funds for the payment of OA APCs.¹ It showed that 14% of respondents (8 out of 55) then had an 'institutionally co-ordinated approach to payment of a per-article OA fees (such as a central fund)'.

In 2011, the present authors repeated the survey to gain an insight into the current situation. As in 2009, the survey in 2011 was carried out in June/July via the LIS-SCONUL email discussion list for UK library directors. The same questions were used (see Appendix) in order to generate comparable data.

In 2011, there were 53 responses to the survey, one of which was excluded from the analysis because it came from outside the UK. The 52 valid responses (of which 29 had also replied in 2009) came from a variety of different types of institution (as was the case with the 55 responses received in 2009). 14 responses (27%) came from 'Russell Group institutions' – the larger research-led HEIs (compared with 11 or 20% in 2009). 19 responses (36%) came from 'pre-92 universities' – other research institutions (compared with 24 or 44% in

2009). 14 (27% came from 'new universities' – teaching-led institutions (15 or 27% in 2009). Finally, 5 responses (10%) came from other HE institutions (5 or 9% in 2009).

13% of the responding institutions (7 out of 52) stated that they had 'an institutionally co-ordinated approach to payment of per-article OA fees (such as a central fund)'. This is very similar to 2009: 14% then, compared with 13% in 2011. As in 2009, there was no correlation between institutional type and whether or not they had a central fund. Also, as in 2009, there was no clear pattern of how the central funds were administered: three by the library, three by the research support office and one jointly.

A significant number of research-led institutions commented that although they did not have a general central fund, they did administer centrally funds allocated by the Wellcome Trust to the institution to pay APCs, and that there were established procedures for researchers to claim these funds. One response from a large Russell Group institution was typical: 'There is a co-ordinated approach to allocating Wellcome Trust funding. Otherwise payment of per-article OA fees is not institutionally co-ordinated.' This arrangement seems typical for institutions which receive Wellcome funding for OA charges whether or not they have general central funds. It indicates that a larger number of institutions than have central funds are supporting OA publication in other various ways, something also indicated in a recent survey of Canadian libraries.²

Of those UK respondents without a cen-

13% of the responding institutions (7 out of 52) stated that they had 'an institutionally co-ordinated approach to payment of per-article OA fees'

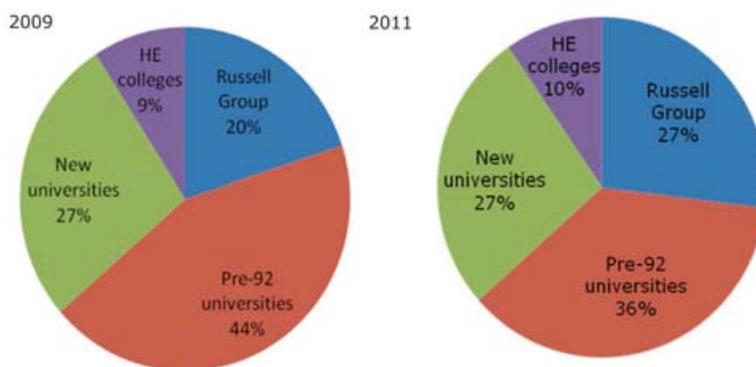


Figure 1. Responses by institution type, 2009 and 2011.

tral fund, 10% said that it was 'likely' that one would be created in the next 12 months. There were varying degrees of certainty in the responses to this question. The 10% in 2011 compares with 15% in 2009. It is relevant to note that of the institutions who responded in both 2009 and 2011, the two organizations who said in 2009 that they were likely to set up a fund in the next 12 months are indeed now operating one.

There was evidence from the responses to the survey that this issue was a current one in a number of institutions, often prompted by the library. One respondent commented, 'discussion is due on this in the autumn', another said it was 'very much on the agenda and under consideration in a Task and Finish Group on Library budgets'. A third stated, 'we want to move to a co-ordinated approach and are actively looking at other models in the sector'.

Some respondents indicated that the question of a central fund had been considered previously but had been rejected. One respondent commented, 'this was rejected when proposed and [there has been] no change in policy'. Another respondent stated that after some discussion in the institution on the merits of both OA repositories (the 'green route' to OA) and OA journal publishing (the 'gold route'), 'there is strong support for [the] Green but not Gold route with higher levels of the research community at [the University]'. Some respondents indicated that the current funding climate made it difficult to make the case for a central fund at present, especially as such a fund is often seen as a new cost to the institution. There was one comment that the institution had not set up a central fund partly because there was 'a feeling that a central fund will impose rationing and that decisions on what to support will be very difficult for any one party to make'. Some responses indicated that decisions had been made to maintain devolved arrangements and encourage researchers to use their direct grants or perhaps general research strategy funds.

The data gathered in the survey therefore show that the national picture in the UK has not gone through any sort of transformation between 2009 and 2011. The number of HEIs with central funds has in fact been sta-

ble over the two years – the difference between the 2009 figure of institutions with central funds, 14%, compared with 13% in 2011, is not statistically significant. There is evidence of the funding streams institutions provide to support OA publication being a live issue, but not one that has resulted in policy changes in most. HEIs, such as the University of Nottingham, that have set up a central fund remain in a minority.

Discussion of the data

Given that all seven UK Research Councils³ and 26 UK universities⁴ now have policies encouraging or requiring authors to make their articles openly accessible, it is perhaps surprising that there have not been more initiatives in HEIs to set up comprehensive policy and process infrastructures to ensure implementation of these requirements.

Most UK universities now have institutional repositories (IRs) providing a mechanism for their researchers to deposit pre- and post-prints of their articles. Of the 202 UK-based repositories registered with OpenDOAR (Directory of Open Access Repositories),⁵ 149 are listed as 'Institutional'. With IRs in place, some institutions may feel that they have fulfilled their obligations by providing a mechanism to support green OA. Some of the responses to the survey above implied this. However, publisher restrictions and embargoes, and the lack of motivation for many researchers to take the extra step required to deposit in this way, limit the benefits that this route can currently offer.

A further factor is that demand from authors for support to pay OA APCs is still limited. In some cases, access to journal articles for staff and students at research-intensive universities delivered through institutional subscriptions is managed so comprehensively and seamlessly that many do not realize how isolated and information-deprived those outside this community can be. They are not motivated as authors to share their own research in a more open way when their own information access is at least satisfactory; although many still acknowledge that their own access as readers could still be improved.

the UK has not gone through any sort of transformation between 2009 and 2011

At the same time, there remains a widely held belief amongst authors that OA publication is less prestigious. Following a recent large-scale study of about 700 chemists and economists across 11 universities in England, Schmoller, Jennings and Ferguson stated:

There was unanimity that if a piece of research was regarded as high value or important to one's career then the first thought would be to publish in a conventional journal with a high impact factor.⁶

This implies that making articles openly accessible and publishing in high-impact journals are mutually exclusive. Of course, this is not necessarily the case. Many high-impact journals offer an OA (gold or green) option, and additionally many new fully OA journals now have significant impact factors. However, it needs to be recognized that this perception of the link between OA and lower quality persists and continues to impact upon behaviours.

The SOAP Project (Study of Open Access Publishing) funded by the European Commission published its findings in January 2011.⁷ These showed that an additional key factor inhibiting publication of OA articles in hybrid journals was a perceived lack of funding. Most researchers seem to be unaware that publication costs can be built into grant funding or met from institutional funds. It has also been suggested by Hubbard that there might be some 'academic stigma attached to "vanity" projects and an association with "paying to publish"'.⁸

A major barrier at institutional level to the establishment of a central fund to cover OA APCs is that although costs can be recovered directly from grants during the lifetime of the project or as an element of indirect costs outside of the lifetime of the grant, in reality it is hard to relate the associated income to the publishing costs. These costs, therefore, usually appear to be an unnecessary additional expense. This is the case particularly when new business processes have to be established for managing micropayments for individual APCs. However, there are a number of developments on the horizon which could help to overcome this and the other current challenges.

Drivers for change

In preparing for the Research Excellence Framework 2014 (REF) many UK institutions are either developing an in-house system for managing research publications or are looking to implement a proprietary Current Research Information System (CRIS). Such initiatives will facilitate the linking of research outputs to particular grants or funding bodies, and this in turn will help to overcome the difficulty of linking publishing costs to specific research projects. This will be particularly beneficial for recouping costs from organisations such as the Wellcome Trust who provide funding specifically to support their researchers in publishing OA articles, or from organisations such as the British Heart Foundation and Arthritis Research UK who will fund OA costs after grants have finished.

Furthermore, specialised commercial services are now becoming available to assist with the payment of APCs to publishers. OAK (Open Access Key),⁹ for example, offers to manage accounts on behalf of institutions and so handle charges between publishers and authors. HEIs can outsource some of their administrative processes and can also gain management information on all activity via an online platform.

At the same time, publishers are introducing mechanisms to reduce barriers to managing OA publishing costs. BMC has for many years offered a prepayment scheme for members. Institutions pay an amount on deposit based on the publishing patterns of their researchers who can then submit articles with no further financial transactions. BMC also provides a 'dashboard' to enable participating institutions to monitor and manage their accounts. Other publishers such as Hindawi and the Royal Society offer membership schemes by subscription which either cover (Hindawi) or provide discounts (Royal Society) for OA publishing costs.

In addition to lowering of administrative and financial barriers to the institutional funding of OA publishing, mainstream academic cultures need to change if there is to be significant demand for funding of APCs. In particular, the perceived link between OA and lower quality needs to be broken. It

publishers are introducing mechanisms to reduce barriers to managing OA publishing costs

at an institutional level the drivers for greater acceptance of OA are more subtle but no less compelling

remains to be seen whether the launch of dedicated OA journals by major publishers such as BMJ and Nature will contribute to a change in this perception. Some fully OA journals are becoming widely respected. This includes *PLoS ONE*, a so-called 'mega-journal', an international peer-reviewed OA online publication with a very broad coverage which now has an impact factor which puts it in the top 25th percentile of ISI's 'Biology' category and is additionally leading the movement towards article-based metrics.¹⁰ Additional services such as this may contribute to creating positive researcher attitudes. Relying on journal impact factors alone is flawed as it is claimed that around 80% of a journal impact factor is attributable to around 20% of the papers.¹¹ Article-level metrics, on the other hand, indicated by citation and download counts provide a much more focused and timely assessment of the value of an article.

Time can certainly be an influential factor. OA publishing and dissemination often achieve more timely availability of research

outputs and this is increasingly being seen as an advantage. A professor interviewed by Schmoller, Jennings and Ferguson said,

Speed is the deciding factor for me, especially if it's something that I want to stake my claim and say that I'm the first one to have thought of this!⁶

Whilst this professor still only publishes about 10% of his or her output in this way, it is a sign that the benefits of OA publishing are being more widely appreciated.

At an institutional level the drivers for greater acceptance of OA are more subtle but no less compelling. The REF 2014 is allocating a 20% weighting to the societal and economic impact of research. It can be argued that if articles relevant to the community are published openly, then this will help, over time, to encourage and demonstrate societal impact. This possibility has recently been illustrated by several case studies in the 'Open access success stories' website sponsored by a number of European research funders.¹²

At the same time, research funders who already have policies in place requiring grant-holders to make research outputs openly accessible are now beginning to take a more robust stance on ensuring compliance. The Wellcome Trust has been particularly active in this area for the last two years but more recently in the UK a government White Paper on research states, “as an immediate step [towards greater open access], we have asked the Research Councils to ensure the researchers they fund fulfil the current requirements”.¹³ Whilst these requirements focus initially on populating OA repositories, raising the profile of the issue is also likely to encourage publication in fully OA and hybrid journals.

Another increasingly important aspect of the current ‘open’ agenda is in the area of research data. This has been demonstrated recently in the UK with the Royal Society investigation into Science as a Public Enterprise (which focused on research data sharing)¹⁴ and the launch of a new JISC (Joint Information Systems Committee) initiative in this area.¹⁵ Open data is not new. The first World Data Center (now superseded by the World Data System) was established in 1957–58,¹⁶ but the more recent development on open data linked to openly available research articles has the potential to become influential in this area.

It is likely that these factors combined will keep the need to set-up and maintain policy, technical, and financial infrastructures to support OA publishing and dissemination very much on the agenda of research institutions.

The Nottingham Central Fund

The University of Nottingham set up its OA central fund in 2006. The process of doing so has been described in detail by Pinfield.¹ Nottingham is a large UK research-led institution with 32,000 UK-based students (plus an additional 11,000 students based at its international campuses in China and Malaysia). It has a comprehensive coverage of subject areas (managed in five faculties: Arts, Social Sciences, Science, Engineering, and Medicine and Health Sciences). In the financial year 2010–11 (which ran from

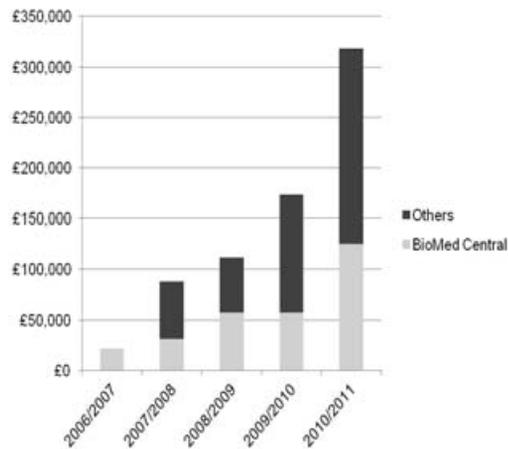


Figure 2. OA central fund costs at Nottingham.

August 2010 to July 2011), Nottingham turned over more than £500 million of business and received research awards of about £120 million. Its published output is estimated to be between 3,500 and 4,000 articles per year.

Over the period 2006–07 to 2010–11, the total cost of supporting the central fund has been £714,244 (£291,847 for BMC and £422,397 for non-BMC articles). Costs rose from £21,850 in 2006–07 to £318,615 in 2010–11 (as illustrated in Figure 2).

The mean average cost per article in 2010–11 was £1,216. The average for BMC articles was £1,077 and non-BMC articles £1,327. In 2010–11, the highest payment made was £3,095 and the lowest £72.

The claimants of the fund over the last five years have predominantly been from the medical and life sciences. In 2010–11, 71% of claimants came from the Faculty of Medicine and Health Sciences. 23% came from the Faculty of Science, but from within that faculty, most claimants were from the Schools of Biology, Biosciences, Psychology, Veterinary Medicine and Mathematics.

Over the five-year period of the fund’s existence, payments have been made to 70 publishers. Apart from BMC, only nine publishers have received payments for 10 or more articles. These are Elsevier (41), Springer (34), Oxford University Press (28), Public Library of Science (21), Wiley (14), American Society for Microbiology (13), Sage (11), Association for Research and

The mean average cost per article in 2010–11 was £1,216

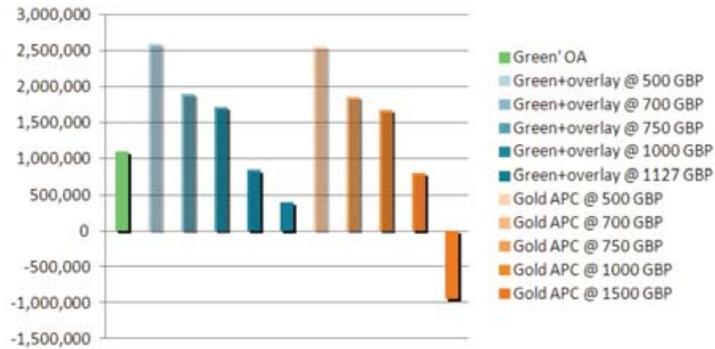


Figure 3. Costs for Nottingham of the different models.

Vision Ophthalmology (10), and BMJ Publishing Group (10).

Usage of the Nottingham central fund is thus growing steadily. It is, however, still at relatively low levels. The number of requests in 2010–11, 262, represents about 5% of the University's total output. This is concentrated in the medical and life sciences, perhaps reflecting the greater maturity of OA publishing in those disciplines. Anecdotal evidence suggests that Nottingham is paying more publication charges than this and that researchers are using direct grants (or other locally managed funds), as recommended in the Nottingham open access policy. It is, however, difficult to assess the level of such activity.

Sustainability

One important question about a central fund is that of sustainability. The issue of long-term sustainability has been usefully addressed by work carried out by Houghton *et al.*¹⁷ Their study, which has caused a great deal of debate in the field, examined costs and benefits of adopting different publishing and dissemination models: 'green' OA (a shift to OA via repositories in parallel with subscription publishing), 'green OA plus overlay' (a shift to OA via repositories with 'overlay' publishing services), and 'gold' OA (a shift to OA journals). Houghton *et al.* calculated the costs and benefits at a national level for the UK, and have since published similar studies for other countries.

Since the publication of the Houghton report, Swan has published a framework which allows individual institutions to

model their own costs for these different publishing and dissemination systems.¹⁸ Doing so is a far more accurate way to compare the costs and benefits of different systems for an institution than using the crude comparison of projected total costs of publication charges with actual current costs of institutional journal subscriptions. Comparing the default costs of different activities in Houghton *et al.* with figures from Nottingham for 2009–10 (see Figure 3), all of the green and green-plus-overlay possibilities deliver a saving for the institution compared with the current subscription model. The gold model represents a saving assuming APCs of up to £1,000, but the next step in the model of an assumed APC of £1,500 creates an additional cost for Nottingham.

Detailed analysis shows that the 'break-even point' in the model for Nottingham is a £1,255 APC. This is the point at which the gold OA model, assuming it replaces the current model, would cause no additional cost for Nottingham compared with costs of the current subscription system. The average APC for Nottingham in 2010–11 was £1,216 and in 2009–10 was £1,317. What this suggests is that the figure currently being paid is around the level that could make the gold OA publishing system sustainable from the point of view of an institution such as Nottingham in the long term.

More work on the system-wide long-term sustainability of different potential publishing and dissemination models is required. A 2011 report published by the Research Information Network and other funders in the UK has, however, made a significant contri-

detailed
analysis shows
that the
'break-even
point' in the
model for
Nottingham is
a £1,255 APC

tribution to the evidence-base. It recognizes the cost savings associated with green OA but questions its long-term sustainability. It regards gold OA as sustainable 'provided that . . . the average level of APCs remain at or below £1,995', the APC value which it identifies where 'academic institutions have a zero change in annual net costs'.¹⁹ Whilst this may be the case for the system as a whole, it is clear that an average APC as high as this upper limit would add significantly to the costs of institutions the size of Nottingham in the long term.

In the short term at an institutional level, sustainability also remains a challenge. OA publication charges represent a new cost at institutional level and allocating funds for this purpose without being able to easily shift money from other funds is difficult. This is especially the case when, despite the very challenging financial climate, institutions continue to face rising subscription prices as well as rising costs for OA APCs. Publishers should consider this issue seriously and could help institutions by having clear policies of adjusting subscription levels in direct relationship to income received from APCs. Avoiding both 'double dipping' (gaining income from subscriptions and additionally from APCs) and also the *perception* of double dipping is important to give credibility to the gold model.

Conclusion

Universities in the UK generally provide an infrastructure for green OA through the provision of institutional repositories but centrally co-ordinated support for gold OA publishing is still only provided by a minority. The situation has not changed in the two years between the surveys carried out by the current authors in 2009 and 2011. There are a number of possible reasons for this:

- Budgeting is difficult when APCs are averaging around £1,200. A small increase in uptake has a relatively large impact on spending.
- It is difficult to associate publishing costs with a related grant. This is important in order to check compliance with mandates and also to confirm that the expenditure

cannot be covered by the originating grant, for example, because it has ended.

- There is an administrative overhead associated with managing micropayments for APCs.
- There are difficulties associated with raising awareness of the fund amongst authors.
- There are perception problems amongst researchers linking OA with lower quality which affect current levels of demand.
- Where institutions are funding APCs and also continuing to pay journal subscriptions, this appears to be an additional cost (even though it can be built into the indirect cost recovery models for research).

It would seem that the current trends in scholarly communication have been insufficient in themselves to drive a rapid change in institutional policy and procedures, or in author attitudes and behaviours. However, there are some examples of good practice emerging which are likely to make an impact:

- Where research funders, such as the Wellcome Trust, provide an allocated sum to institutions, then the funding of gold OA is more easily facilitated. It is clear that even institutions without a general central fund are now normally managing Wellcome funds in a centrally co-ordinated way.
- Where publishers such as BMC, Hindawi, and the Royal Society offer prepayment accounts, membership schemes, or discounts, or when intermediaries offer to manage subscription payments, then the barriers to authors and administrative overheads are reduced and there is greater take up of OA options.
- Where publishers launch new OA journals and other OA value-added services, then greater acceptance of OA in the research community is promoted.
- Where research funders are beginning to require institutions to ensure compliance with their OA policies, then the creation of institutional frameworks to support OA is encouraged.

It is also likely that the increased interest in OA in the context of research evaluation

in the short term at an institutional level, sustainability also remains a challenge

(e.g. in preparation for the UK REF) and as part of a wider set of initiatives to create more transparency in the scientific enterprise (including greater sharing of research data) may provide a driving force to accelerate the current rate of adoption.

Acknowledgement

Thanks to Jurgita Juskaite for her work done on the Nottingham Houghton-Swan modelling.

Appendix: Survey circulated via the SCONUL and RLUK Directors' e-mail lists, June 2011

1. What is the name of your institution?
2. Does your institution have an institutionally co-ordinated approach to payment of per-article OA fees (such as a central fund)?
3. If it does, is the fund administered centrally in the institution or is it devolved to schools/departments?
4. If it is a central fund, is it administered by the library/IS department or the research support office (or elsewhere centrally)?
5. If you do not have an institutional fund (or funds), are you likely to in the next 12 months?
6. If you have an institutional fund, can you quote how many articles have been supported in the last year?*

*This question may take a little longer to answer. If you cannot answer it easily, we would still be interested to know your responses to the other questions.

References

1. Pinfield, S. 2010. Paying for open access? Institutional funding streams and OA publication charges. *Learned Publishing*, 23: 39–52. <http://dx.doi.org/10.1087/20100108>
2. Fernandez, L. and Nariani, R. 2011. Open access funds: a Canadian library survey. *Partnership: The Canadian Journal of Library and Information Practice and Research*, 6(1), <http://journal.lib.uoguelph.ca/index.php/perj/article/view/1424>.
3. www.rcuk.ac.uk/research/Pages/outputs.aspx
4. <http://roarmap.eprints.org/> (accessed 20 Nov 2011)
5. www.opendoar.org/find.php?format=charts (accessed 11 Dec 2011)
6. Schmoller, S., Jennings, D., and Ferguson, N. A further exploration of the views of chemists and economists on Open Access issues in the UK. A report commissioned by the Research Communication Strategy project at the Centre for Research Communications at the University of Nottingham, June 2011. Available at: http://crc.nottingham.ac.uk/projects/rcs/Chemists&EconomistsViews_on_OA.pdf
7. Dallmeier, Tiessen, Suenje *et al.* 2011. Highlights from the SOAP project survey. What scientists think about open access publishing. Available at: <http://arxiv.org/ftp/arxiv/papers/1101/1101.5260.pdf>
8. Hubbard, B., Hodgson, A., Fuchs, W. Current issues in research communications: open access – the view from the academy. 4th report to JISC, March 2011. Available at: http://eprints.nottingham.ac.uk/1480/1/RCS_March_2011.pdf.
9. www.openaccesskey.com
10. www.plosone.org/static/information.action
11. Neylon, C. and Wu, S. 2009. Article-level metrics and the evolution of scientific impact. *PLoS Biology*, 7(11): e1000242. <http://dx.doi.org/10.1371/journal.pbio.1000242>
12. www.oastories.org/
13. Innovation and Research Strategy for Growth. Department for Business Innovation and Skills, December 2011. Available at: www.bis.gov.uk/assets/biscore/innovation/docs/i/111-1387-innovation-and-research-strategy-for-growth.pdf.
14. <http://royalsociety.org/policy/projects/science-public-enterprise/>
15. www.jisc.ac.uk/fundingopportunities/funding_calls/2011/06/managingresearchdata.aspx
16. www.ukssdc.ac.uk/wdcmain/
17. Houghton, J. *et al.* Economic Implications of Alternative Scholarly Publishing Models: Exploring the Costs and Benefits. A Report to the JISC, January 2009. Available at: www.jisc.ac.uk/media/documents/publications/rpconomicoapublishing.pdf
18. Swan, A. Modelling Scholarly Communication Options: Costs and Benefits for Universities. Report to the JISC, February 2010. Available at: http://ie-repository.jisc.ac.uk/442/2/Modelling_scholarly_communication_report_final.pdf
19. Cook, J., Hulls, D., Jones, D., and Ware, M. Heading for the Open Road: Costs and Benefits of Transitions in Scholarly Communications. Research Information Network, 2011. Available at: www.rin.ac.uk/system/?les/attachments/Dynamics_of_transition_for_screen.pdf

**Stephen PINFIELD and
Christine MIDDLETON**
Information Services
University of Nottingham
King's Meadow Campus
Lenton Lane
Nottingham NG7 2NR, UK
Email: stephen.pinfield@nottingham.ac.uk