Publishing Research Consortium

RESEARCH REPORT

Access by UK small and medium-sized enterprises to professional and academic information

Mark Ware Consulting Ltd

Publishing and Elearning Consultancy

14 Hyland Grove
Westbury-on-Trym
Bristol BS9 3NR, UK

www.markwareconsulting.com

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Publishing Research Consortium

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Self-Archiving and Journal Subscriptions: co-existence or competition? An international survey of librarians' preferences

Peer Review in Scholarly Journals: perspective of the scholarly community. An international study

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Executive summary

Background

1. This report explores issues around levels of access to research journals by SMEs, drawing on three sources: a literature review and primary data from an online survey, supported by qualitative interviews. There are 4.7 million SMEs in the UK representing 99.9% of all firms and responsible for 59% of private sector employment. Rather than aiming to study this entire population, the report concentrates on high technology SMEs where there was a reasonable presumption of a potential interest.
2. The study was designed not just to look at SME use of journals literature in isolation but to put this into context by examining how important this information was to the company, both in itself and also in comparison to other kinds of information, and also how often SMEs made use of the information and how they obtained it. The study surveyed a wide variety of research journal users so that the SME responses could be compared to other (better studied) groups such as large companies, universities and colleges, hospitals and medical schools, and others. For more information and detailed analyses of all sectors, see the companion report available at the PRC website (http://www.publishingresearch.net).
3. Earlier work reported in the literature, although tending to focus on larger companies, has shown the importance of basic research to the economy and to the innovation process in firms. This work has emphasised that publications were only one of many factors involved in transferring knowledge from research to firms but has also shown that publications are an important one of these factors.

Importance of research articles

4. In this survey we have found that firms of all sizes said that information (of all types, not just research articles) was important to the success of their organisations but they only ranked it of being about middling importance or lower compared to other factors such as product and staff quality, leadership, attracting new customers etc.
5. When considering potential barriers to success, (lack of) access to information was seen as a more significant problem by SMEs than by large companies. SMEs ranked this fourth out of fourteen factors, while large companies ranked it 10th.
6. SMEs in this study gave a very high level of importance to research articles, ranking them ahead of other types of information such as technical information, reference work, technical standards or patents. The large companies also saw research articles as very important, though ranking them lower, behind technical information and scientific/technical standards. A likely explanation for this high importance is that the survey invitation made it clear that the study was focussed on those with an active interest in research information, thus selecting respondents with a predisposition to attribute a high importance to research articles.
7. Regardless, the survey findings make clear that there is a subset of SMEs for whom access to research literature is highly important to their success. This study has not, however, been able to estimate what proportion of all SMEs this subset would represent.

Access to research articles

8. SME respondents reported reasonably good overall access to the research literature, with over 70% of those for whom access to journal articles was important describing their access as fairly or very easy. Access had improved, with 60% of SMEs saying that access was better than 5 years ago.
9. SME respondents read about 112 articles per year on average, more than the 101 read by large company respondents, a frequency of reading which does not suggest major access barriers.

10. On the other hand, while access was fairly/very easy for the majority of 71%, this figure was less than for large companies (82%) or universities (94%), and it followed that there was also, by definition, a minority (29%) for whom access was fairly or very difficult.
11. Similarly, in a separate question, only 28% of all SME respondents (i.e. including those who for whom research information was less important to their organisation) described their access to research articles as good or excellent (compared to 46% of large company and 72% of university respondents).
12. A narrow majority of SME respondents (55%) said that they had recently experienced difficulty accessing a research article, and in this area they were substantially more likely to experience difficulty than those from large companies (34%) or universities (24%). The reported difficulty was most likely to be a payment barrier, followed by technical problems associated with online payment.
13. To put this into context, however, SMEs reported having difficulty accessing about 11 articles a year, which compared to the 112 articles that they reported reading was only about 10% of the total, and this proportion was only a little larger than that for large companies (6%) and universities (7%).
14. All respondents including SMEs made use of a wide range of access channels; even the least-cited channels (pay per view and public libraries) were mentioned by around a third of respondents.
15. The most frequently used channels (for all types of information) for SMEs were company subscriptions and licensed databases, which amounted to up to 42% of channel uses, followed by personal subscriptions and society memberships at 22%, and then open access sources (OA journals and institutional repositories) at 14% of channel uses.
16. The pattern of channel use by SMEs was substantially different from that employed by large companies and universities. Large company respondents depended much more heavily on their in-house information services and made somewhat less use of personal/society subscriptions.
17. Pay per view was a relatively less frequently used channel for SME respondents at only 5% of directly reported channel uses, though even so it was much more frequently used by SME than by large company and university respondents for both of whom it represented only a very small proportion of accesses at around 1% of uses. Nonetheless, almost a third of SMEs used PPV at least once per month, compared with only 14% of large companies and 7% of academics. The true scale of PPV in these organisations may be larger than reported by individuals, however, because of use of this channel by in-house information services or libraries.
18. Access via a local academic library and inter-library loan were both rare for both SME and large company respondents at only 1% or 2% of uses, probably for the reasons mentioned below in #20. (Again, individual respondents may not be fully aware of the level of ILL used by their information services or libraries.)

Options for improvement

19. Pay per view is not currently a frequently-used access channel and our interviews suggest that it has a number of unattractive features for users that are likely to limit its expansion in its present form. These include perceived high prices, compounded by the need to review the full text of irrelevant articles in order to identify relevant ones; uninformative or misleading abstracts requiring users to purchase blind; and inappropriate payment mechanisms for firms (as opposed to individuals).

20. Access via local academic libraries is currently negligible. A number of issues appear to hinder wider use by SMEs, including lack of interest or resources among libraries and perceptions of inconsistent or ambiguous publisher licences, but the major obstacle is the current requirement for access to be provided on a walk-in basis. SMEs want online access to content in the same way as do academic users of libraries. If online access to local higher education libraries could be provided, however, the combination of access and professional search expertise could be very attractive.
21. Many professional bodies have libraries or information services that offer access to information for their members. This can be strongly valued by members because it can be both cost effective and highly targeted to their specific information needs. Such libraries report difficulties in expanding their services online because budgetary or licensing constraints but if these could be overcome this could offer an attractive option for many professionals.
22. We speculate on whether a national licence for SMEs could be feasible, mediated perhaps by JISC (via local HEIs), the British Library or the PLS. Amongst other things, a much more comprehensive and quantitative study would be required to look at the absolute size of the access gap, the potential value of filling it (e.g. in terms of increased innovation and hence benefit to UK plc) and the potential for it to become self-sustaining.
23. Lastly, we consider the "iTunes" model, a speculative variant on PPV implemented in a centralised, much more effective way with substantially lower pricing. While a potentially useful *gedanken* experiment, the analogy fails in a number of areas, and the chances of its implementation seem slight.

Next steps

24. This study has produced a wealth of useful data on an area of access to information that has hitherto not been much studied. We believe, however, that it should be seen as a first step and that a more extensive study would be valuable to properly quantify the level of access by SMEs and the size of the access gaps reported in this study.

Companion report

25. A set of charts containing additional information and analysis from the survey is available as a companion report from the PRC website (http://www.publishingresearch.net/). See *Access to professional and academic information in the UK: a survey of SMEs, large companies, universities/colleges, hospitals/medical schools, government and research institutes*.

Background

Small and medium-sized enterprises

Small and medium-sized enterprises (SMEs) make up by far the largest fraction of the UK businesses. Definitions vary a little around the world but the UK and EU statistical offices define small business as those having fewer than 50 employees, with medium-sized businesses having 50-249 employees. The additional category of micro-businesses, that is, those with fewer than 10 employees, is also increasingly used[1].

In the UK in 2006 there were an estimated 4.7 million businesses; of these, 99.9% were SMEs and 99.3% were small businesses (<50 employees), the latter providing 48% of UK private sector employment and 37% of turnover. Conversely, UK large firms number only about 6000 but still account of 41% of private sector employment and 48% of turnover.[2]

A similar or even more skewed distribution is found in Europe; for instance micro-businesses dominate employment in Italy and Poland. Across Europe as a whole, 33% of private sector employment is in large firms (250+ employees), 17% in medium-sized (50–249), 21% in small (10-49) and 30% in micro-businesses (<10)[3].

This study is concerned with SMEs with a potential interest in accessing research journal articles. It would therefore be useful to know what proportion of the 4.7 million UK SMEs could be described as working in high-technology or science-based fields. Unfortunately these data do not appear to be available. Government statistics are recorded using the Standard Industry Classification (SIC2003) codes, which record the economic sector where the firm operates rather than the nature of its business, and it is impossible to determine the latter reliably from the former. So for instance an SME operating in the "water" sector might be a microbiological or environmental consultancy, or it might be a plumber. Similarly an SME in the pharmaceutical sector might be designing drugs or it might be providing hospitality for doctors[4]. Experts that we consulted at SME policy units at professional societies, at university technology/enterprise units and in government (BIS) were unaware of any available estimates of the fraction of SMEs that would be likely to be interested in accessing STM content[5]. It seems likely, however, that it would be a small fraction.

In terms of ICT infrastructure, almost two-thirds of SMEs (62%) were connected to broadband in 2006 according to Ofcom, with a slightly higher penetration among medium-sized businesses (70%). Although the data is not available, it would be surprising if the percentage were not much higher, indeed approaching 100%, among high-technology and science-based SMEs in 2009.

SMEs and innovation

Innovation – the development of new products and services, and of new methods and processes – is widely seen as the driving force of economic growth and prosperity. SMEs are responsible for much

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[1] The EU and US have additional financial criteria, e.g. under the EU definition an SME may not have a turnover exceeding €50m or a balance sheet total of €43m or more.

[2] http://www.berr.gov.uk/whatwedo/enterprise/enterprisesmes/research-and-statistics/statistics/page38573.html

[3] http://ec.europa.eu/enterprise/entrepreneurship/facts_figures.htm

[4] Or as Klevorick noted in 1995, the asbestos, tobacco and confectionery industries, all apparently very low-tech, depended on medical research information.

[5] Given the importance of the high-technology SME sector to innovation and economy, it seems surprising that the Government does not make more effort to produce statistics on their numbers.

of the innovation in the economy, even if larger firms are ultimately responsible for exploiting this innovation, and are consequently the focus of government policy[6].

Innovation and information

To what extent is innovation accelerated by access to information (and, specifically, the research literature) or, conversely, hampered by barriers to access?

A large number of studies have investigated what is the impact of basic research (i.e. as conducted largely in universities and reported in the journal literature) on the economy. Given that research costs amount to 2-3% of GDP in most OECD countries, this is clearly an important policy question but rather outside the scope of this report. This work does make clear, however, that the impact of such research is through multiple, inter-locking channels: increasing the stock of useful knowledge; training skilled graduates; creating new instrumentation and methodologies; creating networks and facilitating social interaction; increasing the capacity for technological problem-solving; creating new firms via spin-outs; and the provision of social knowledge (Martin 2007). Measurement of the impact of research is, however, very problematic, with issues including unrealistic models, non-linear processes with lots of feedback, problems with attribution of causality, other attribution problems, internationality and the difficulty of selecting appropriate timescales. There is thus an intrinsic limit to measuring the economic impact of research, with only partial indicators possible.

Mansfield (1998) reported that the sales of products that were directly attributed to academic research amounted to about 5% of total sales in 1994, and that estimated cost savings due to research were about 2% of total savings. These proportions were similar to an earlier study he did covering 1975–85. Looking at innovation, the proportion of new products launched in 1986–94 that could not have been developed (without substantial delay, i.e. at least a year) averaged 15%, varying between 5 and 31% depending on sector. Process innovations dependent on academic research averaged 11%. These percentages had increased between 1975–85 and 1986–94. The time lag between research and innovations had also decreased though Mansfield pointed out that this could be due to two reasons: faster exploitation by firms, or the research undertaken by universities might have become more applied. Lastly, in 1975–85 the smaller firms in the study had been more nimble than the large firms (i.e. they were able to commercialise academic research more quickly) but this advantage was largely eroded by 1986–94.

Opto-electronics SMEs

Hendry (2000), in a study of over 100 SMEs in the high-tech opto-electronic sector in UK, USA and Germany, found that SMEs made an important contribution to the commercialisation of emerging technologies and that universities were an important contributor to this process. Some 22% of the SMEs attributed new product ideas to university origins (comparable to Mansfield's findings), but of these most were formed directly out of a university environment ("spin-outs"). Around 75% of these SMEs made use of university resources (of which 24% made use of facilities and equipment; Hendry did not say whether "university resources" included access to the library or other information resources). These findings may, however, still be relevant to this study because university spinout companies are likely to include more sophisticated information users.

Sources of technical opportunities

Klevorick (1995) noted that technical opportunities for firms came from three sources: advances in scientific understanding & techniques; technology advances from other industries and other institutions; and feedback from own industry's technology advances. Presumably journals literature is only important to the first of these, and here only one of many routes for the transfer of knowledge.

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[6] e.g. see the EU's SME and Innovation portal at http://ec.europa.eu/enterprise/sme/innovation_en.htm

Other perspectives

Reviewing the evidence for the contribution of public science to innovation, Arundel & Geuna (2004) took a somewhat "half-empty" perspective in reporting Mansfield as "*only* about 10% of new products and processes could not have been developed, without a delay of over a year" (our emphasis) and cited a German study that estimated that 5% of new product sales in manufacturing were for products developed with the assistance of public research. They reported that the largest and most representative innovation surveys (the 1993 and 1997 CIS surveys) had found that public research is one of the least important sources of information for the innovative activities of firms. They also highlighted Cohen *et al.*'s (2002) conclusion that the first, second and third place results for longstanding methods of information exchange [i.e. publications, informal contacts, and conferences and meetings] point to the importance of "open science", in contrast to the [then] current policy emphasis on more formalised methods such as contract research.

Cosh *et al.* (2006) found that the "lack of information on technologies" came very low down the list of barriers to innovation in UK and US firms (9th out of a list of 11 factors). (Our survey asked a similar though different question on whether access to information in general was seen as a barrier to organisation success, see page 33 below.)

Access to university research

The PACE report (Arundel 1995) looked at innovation strategies in Europe's largest manufacturing and industrial firms. First, they established that university research was fairly well down the list of external sources of technical knowledge required for innovation: in descending order, these were technical analysis of competitors' products; joint ventures; suppliers; clients/customers; public research institutes and universities; and affiliated firms (i.e. linked through ownership structure). The differences between these sources were not especially large – they were all relatively important, though to greater or lesser extents. Basic research was of greatest value to high-technology sectors while practical outputs, such as new instruments, were of greatest value to the low-technology sectors.

Second, looking in more detail at the routes to obtaining public research, the report found that publications and technical reports were the single most important method, though this was fairly closely followed (in order) by informal contacts, public conferences and meetings, hiring trained scientists and engineers, joint and/or contract research and (to a lesser extent) temporary personnel exchanges. The more expensive methods of obtaining public research (e.g. contract research programmes) were positively correlated with firm or unit size "suggesting that financial cost is a barrier to the use of most methods". Interestingly, however, use of publications was not correlated with unit size, and the authors concluded financial cost appeared less of a barrier here.

The extent to which the findings from a survey in the early 1990s of R&D managers at the largest firms can be extrapolated to present-day SMEs is, though, an open question.

Impact of access barriers

If the journals literature is an important part of obtaining information about research, which in turn has a demonstrable impact on innovation, does it follow that barriers to access to journals will negatively affect innovation by SMEs? There appears to have been no work done on this question (and it is quite hard to see how it could be convincingly demonstrated given the multiple interacting factors that contribute to innovation) but some authors have assumed various negative impacts. For instance, Houghton *et al.* (2009), while acknowledging the importance of additional factors such the training of skilled graduates and their use of tacit knowledge to find and interpret specialised knowledge, assumed that subscription or licensing barriers to journals access (as contrasted to widespread open access) would reduce R&D efficiency and hence the social returns due to research, and estimated that such barriers were worth about £170m per year in terms of potential returns to UK public research forgone. This figure is, however, based on an unsupported estimate of the efficiency

gains and some critics have argued that Houghton under-estimated the levels of access enjoyed under present arrangements.

Perhaps to put this in context, De Saulles (2007) estimated that UK SMEs wasted between £3.7 and £8.2 billion in terms of time wasted through inefficient use of the internet as a research tool. This had nothing to do with access barriers but looked at SMEs' poor research techniques, lack of awareness of specialised services, and so on. He argued that government policy initiatives aimed at improving use of ICT (Information and Communication Technology) had focussed too much on the Communication and Technology and needed to balance this with the Information aspects.

In an earlier article, Bates (2004) reported it could often be cheaper for companies to pay for access to databases (such as Dialog) rather than waste time looking on the free web, although the evidence she presented for this was limited.

In a very different context (academic research), Rowlands & Olivieri (2006) found that access to a wider range of journals was a long way down the list of perceived barriers to biomedical research productivity.

SMEs and research journals

A search of the published literature on the specific topic of access to the research literature by SMEs has revealed very little, if any, prior work in this area[7]. Two rather similar studies, separated by a decade, have though looked at access by SMEs to patent information and more recently at access to grey literature, and both touched in passing on access to journals.

Patents

Hall et al. (1999) looked at the barriers to patent information in UK SMEs. The study was conducted in the late 1990s, prior to the widespread expansion and adoption of the web in this area (today's free online patent databases did not exist), which limits the relevance of their findings. They found that only the most high-tech companies referred to academic publications and that overall, firms received more information than they can readily assimilate. They considered three kinds of barrier to using patent information: first, lack of awareness, not knowing what value the information might serve or how to access it; second, the difficulty of finding, using and interpreting patent information (patents are notoriously opaque, incomplete and use involved legal terminology); and third, the hurdle of cost. They split SMEs into three groups: those for whom the patent literature was irrelevant (either because there was nothing that could be of use to the SME, or because the SME's innovations were not patentable); the unaware; and the aware (that were further subdivided into a gradation of users from "avoiders" up to "professional" users). Their recommendations included first, the development of a user-friendly interface, including well-written and well-indexed abstracts allowing sophisticated keyword searching; and secondly targeted training and support directed through regional bodies.

Grey literature

Much more recently, and more relevantly, Alma Swan (2008) investigated the access of UK SMEs to grey literature produced in UK universities. The primary data in the study was based solely on a small number of interviews (20) and so the findings have to be treated with caution insofar as there is no way of knowing how representative of the SME population they might be. One of the findings was that some SMEs needed to use the published journal literature on occasions (there was, though, no estimate given for the frequency of these occasions): "They find this difficult because of subscription barriers and because only limited access is available through their local university (if at all)". On this point, Swan recommended to JISC that SMEs be given advice on accessing and discovering OA literature.

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[7] For example, a search conducted by a professional information specialist for this study produced only three results, none of which was directly relevant

Current initiatives

RIN access studies

The Research Information Network (RIN) has sponsored four studies investigating different Barriers to Access issues[8]. One of these appears particularly relevant to this present study: Outsell UK is looking at how institutions manage access to information sources for non-members. In a second project Outsell is also looking at how researchers secure access to licensed content not immediately available to them (including requests to authors or colleagues in other institutions, use of pay per view, versions in institutional repositories, or of inter-library loan or document supply services). Unfortunately, none of these reports was available at the time of writing in July 2009.

JISC Merit

JISC's Merit project (Making Excellent Research Influential and Transferable) has the objective of making available to all users free of charge a collection of the best research outputs from UK universities, as selected by universities themselves as part of the Research Assessment Exercise 2008 (RAE 2008). The outputs would mainly take the form of high-quality peer-reviewed articles that have appeared in a wide range of scholarly journals, but it is planned also to include book chapters, conference papers, and multimedia. Although this will represent a small fraction of the total literature, it could potentially be valuable to SMEs, for instance in drawing their attention to sources of relevant expertise. At the time of writing, however, Merit had not launched and it was not clear to what extent it would be able to achieve its objectives.

JISC projects

A current JISC project in the Business & Community programme is "Enhancing SME engagement using technology; SME e-empowering; Enhancing SME awareness of web technologies".

HAERVI

The HAERVI (HE Access to e-Resources in Visited Institutions) project was promoted by SCONUL and UCISA to improve the service offered by HE institutions to visiting students and researchers from other HEIs who wish to access licensed e-resources[9]. It was therefore concerned primarily not with access by SMEs to academic libraries but access by other HE-based researchers. The project did, however, reach a number of conclusions of relevance:

- further work should be done to define a programme of activity to consider additional visitor categories including business users, which it recognised would have specific requirements
- the definition of walk-in access was not necessarily consistent between licences and it was not always clear if "walk-in" applied just to the library or to the whole institution. HAERVI recommended JISC and Eduserve move to a single definition with a strong preference for the whole institution
- the report also noted that a kiosk approach could be used to secure access to walk-in resources; work on the development of this was continuing.

We discuss walk-in use of academic libraries in more depth below (see page 39).

British Library

The British Library is a key player in providing access for SMEs to STM content, through its online catalogue, document supply and loan services, and its reading rooms. It specifically identifies SMEs

[8] See http://www.rin.ac.uk/barriers-access.

[9] http://www.ucisa.ac.uk/members/activities/haervi.aspx

as part of its audience and in its Content Strategy document it discusses focussing on facilitating knowledge transfer by helping STM-based SMEs to access the information they need, and points out that this area is "one … particularly relevant to DTI's [i.e. BIS's] innovation agenda … in our support for …SMEs".

Survey

Objectives

We developed a survey to explore issues around levels to access of journals literature by SMEs. With the resources available it would have been unrealistic and unproductive to have attempted to design a survey representative of the whole SME population, and in any case this would be wasteful because we can realistically assume that large parts of that population have no interest in journals literature. The study concentrated instead on high technology SMEs where there was a reasonable presumption of a potential interest.

The study was designed not just to look at SME use of journals literature but to put this into context by examining how important this information was to the company, both in itself and also in comparison to other kinds of information, and also how often SMEs made use of the information and how they obtained it. Rather than considering SME use alone, the study aimed to survey a wide variety of research journal users so that the SME responses could be compared to other (better studied) groups such large companies, universities and colleges, and others.

Methodology

The survey was therefore conducted exploring the value of and access to different types of information by information at a wide range of types of organisations, including SMEs. The survey responses were collected online. Respondents were recruited via email using source lists provided by a commercial list broker (subscribers to technical industrial/trade publications) and directly by publishers (subscribers to technical industrial/trade magazines, STM journals authors, and individuals who had purchased articles via PPV). The SME respondents came primarily from the lists of subscribers to industrial/trade magazines.

We were primarily interested in respondents who had at least some interest in the research literature and the invitation made this clear, inviting those who were "either active in research or whose work [was] dependent on research outcomes" to participate.

A total of 29090 emails were sent. Of these, at least 2700 were undeliverable ("bouncebacks"), leaving 26,390 (less the undelivered emails for which no notification was received). We received a total of 1131 completed questionnaires, or about 4%. This is a reasonable although not particularly high response for this type of survey; it is possible that the complexity of the questionnaire may have reduced the response rate.

Response

The total response of 1130 was broken down into four groups that were used for the analysis: SMEs (186), large companies, that is, those with more than 249 employees (111), university/college (470) and other non-corporates (mostly hospital/medical school, research institutes, government – 363). In this report we mainly compare the responses of SMEs to the larger companies and (to a somewhat lesser extent) to the university/college sector[10].

Sector

Although we do not know how representative the pattern is of the target high technology SMEs overall, there was a good spread of commercial sectors and work areas represented in the SME responses, as shown in Figure 1. The distribution of sectors was somewhat different between the SMEs and large companies, which may have some influence on the reported differences between the SME and large company responses. (For example, there were higher proportion of SMEs than large

[10] Additional information and analysis on the survey is included in a companion report available from the PRC website.

companies in science-based sectors like pharmaceuticals and chemicals, while the reverse was true in some more applied areas like oil & gas and aerospace.)

Table 1: Distribution of corporate respondents by organisation size

Size	***n***	***%***
Less than 25	*98*	33%
25 – 49	*33*	11%
50 – 249	*55*	19%
250 – 499	*23*	8%
500 – 999	*15*	5%
1000 – 4999	*26*	9%
5000+	*47*	16%

Age

The average age of SME respondents was about 45, which was very similar to the non-SME respondents.

Role

Respondents' roles were primarily R&D, management, advisory/consultancy and engineering (Figure 2). Differences in roles between SMEs and large companies were not large. The roles of university/ college respondents were of course quite different, being primarily research and teaching.

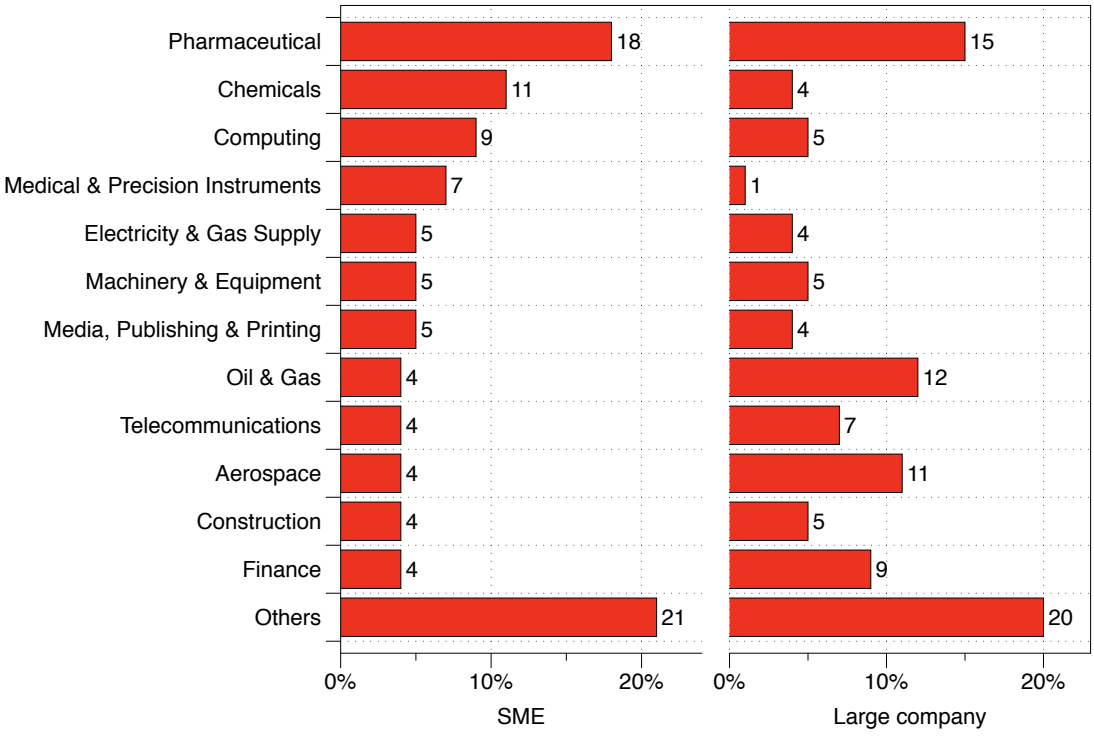

Figure 1: Distribution of respondents by industrial sector

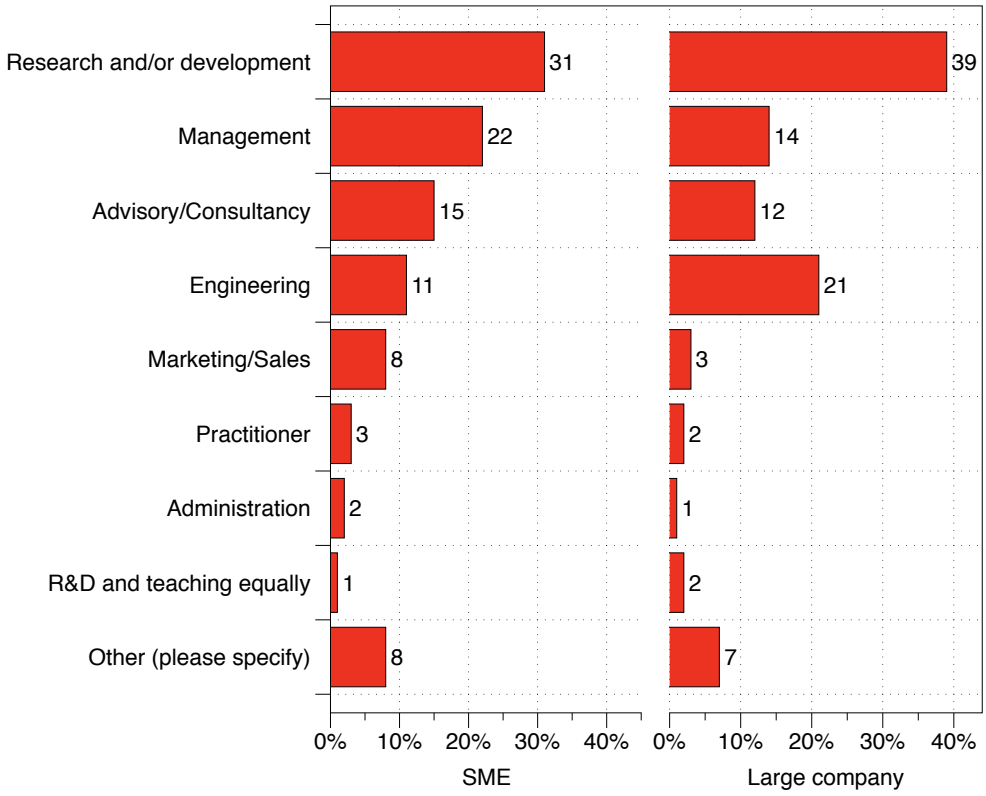

Figure 2: Respondents' roles

Area of work

Respondents described their areas of work as falling into a very wide range of subjects. The most common were materials science & engineering, chemistry & chemical engineering, health sciences and maths & computer science. These four categories made up about half of respondents in both SMEs and large companies.

Journal article access

Overall access levels

We asked respondents to describe their level of access to research articles using the same rating scale that had been used in earlier surveys of academics conducted by the CIBER group (Rowlands *et al.* 2004). The results are shown in Table 2, with the CIBER results included for comparison. (Note that the CIBER group recruited exclusively from active academic authors, so their results are only really comparable to our findings for the university/college respondents,) The results indicate that companies, and in particular SMEs enjoy on average lower levels of access to journal articles compared to academics. For instance, only 28% of SMEs describe their access as excellent or good compared to 72% of academics. This overall figure is potentially misleading, however, because it does not take account of the different information needs of companies and universities and colleges. That is, not all the companies in the surveys regarded access to journal articles as important, so it is not particularly surprising or worrying to find that these companies have not made arrangements for access.

Table 2: Level of access to research articles (Base: all respondents)

	SMEs (n=186)	**Large companies** (n=111)	**University/ College** (n=470)	**CIBER 2004** (n=3787)
Excellent (I have access to all the journal articles I need)	2%	7%	17%	15%
Good (I have access to most of the journal articles I need)	26%	39%	55%	46%
Varies (I sometimes have difficulty getting the journal articles I need)	56%	37%	22%	29%
Poor (I frequently have difficulty getting the journal articles I need)	14%	13%	4%	8%
Very poor (I always have great difficulty getting the journal articles I need	3%	3%	1%	2%

Access to information types rated important

To take account of varying information needs between the different groups, we first asked respondents to rate the importance of different types of information. (See below for details.) We then asked those who had rated access to journal articles as important to describe their level of access to them. As can be seen in Figure 3, over 70% of SMEs who considered access to journal articles as important regarded their level of access as “very easy” or “fairly easy”. Conversely, of course, we can identify around 30% of SMEs who regard access to journals as important but who described their level of access as “fairly difficult” or “very difficult”. We investigated the difficulties faced by SMEs later in the survey.

Compared to 5 years ago

Respondents were asked how their present access compared to 5 years ago (Figure 4). In each group those who said access was easier substantially outweighed those who perceived a worsening. The greatest improvement was perceived in universities/colleges, where 74% said it was easier compared to 10% saying worse. For SMEs the numbers were not as dramatic but still substantial, with 60% saying easier and 20% worse. The results for SMEs were very similar to those for large companies.

We did not ask in the survey for the reasons behind the changes but from interviews, we found that the reasons for SMEs reporting worsening access can sometimes be for reasons not directly connected to the journals system itself. For instance, the respondent might have moved from a university or large company where access was better, or the SME might have terminated a contract with a large client (such as a pharmaceutical company) which had been able to provide an access route.

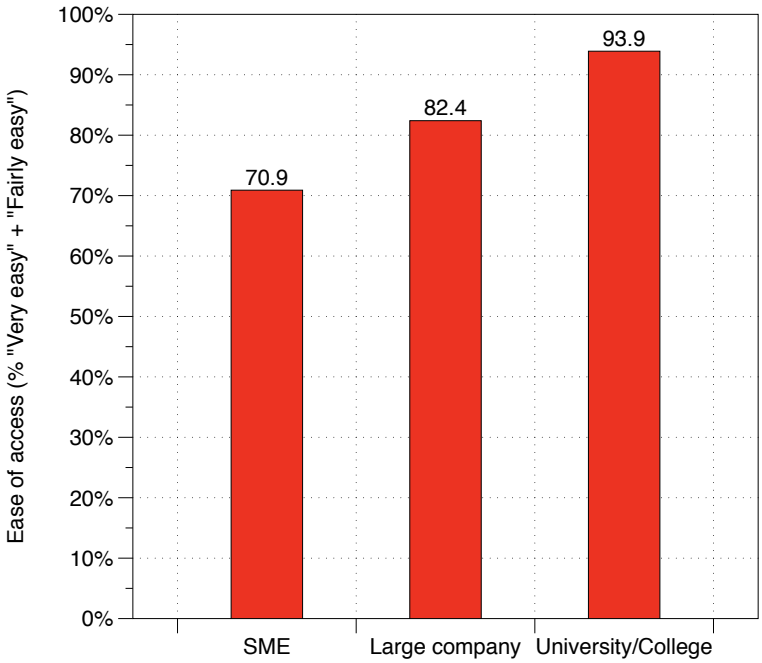

Figure 3: Proportion of respondents by sub-group for whom access to journal articles was important and that described their level of access to journal articles as "very easy" or "fairly easy" (the other categories offered were "fairly difficult" or "very difficult")

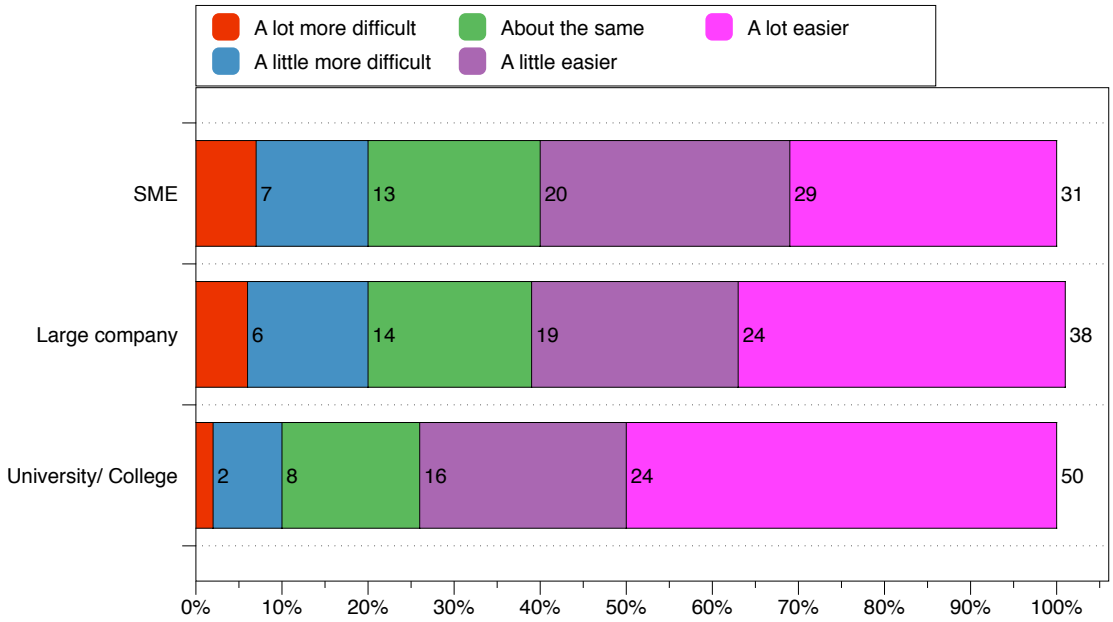

Figure 4: Reported change in level of access compared to 5 years ago

Frequency of reading journal articles

The SMEs' level of access (71% "very easy" or "fairly easy") was lower than large companies (82%) and universities/colleges (94%). Interestingly, however, we found that SME respondents reported reading a few more journal articles per year than large company respondents, and reading them slightly more frequently (see Table 3). The differences were not enormous but the fact that these

numbers for SMEs were higher than for large companies, rather than lower, suggests that the impact of the difficulties faced by SMEs in accessing articles may be more at the margin than a core difficulty.

Table 3: Frequency of reading journal articles and estimated numbers of articles read per year

Frequency	***SMEs***	***Large companies***	***University/college***
n	*186*	*111*	*470*
Several times per week	43%	30%	72%
Weekly to Monthly	43%	57%	27%
Less often	14%	13%	1%
No. articles read per year	112	101	169

Difficulties encountered

To look in more detail at the difficulties encountered in accessing journal articles, we asked the respondents who described their level of access to research articles as "varies", "poor" or "very poor" to say whether they had had difficulty in accessing a research article recently (see Table 4). For SMEs, 77% of those with less access said they had experienced a difficulty. Expressed as a percentage of the whole SME group, therefore, some 55% said they had had a difficulty recently, compared to 34% for large companies and 24% at universities & colleges. (This figure may underestimate a little because we only asked those with less access; there may have been some among those who described their access as excellent or good who also nonetheless had had difficulty in accessing an articles but we did not address the question to this group.)

Table 4: Respondents reporting that they had experienced difficulty in accessing the full text of a research article recently (Base: respondents describing access to research articles as "varies", "poor" or "very poor")

	SMEs		***Large companies***		***University/ College***	
	Less access	***All***	***Less access***	***All***	***Less access***	***All***
n	*134*	*186*	*57*	*111*	*129*	*470*
Yes	77%	55%	67%	34%	88%	24%
No	23%	-	33%	-	12%	-

Proportion of articles where an access difficulty was experienced

To put these difficulties into context, we asked respondents to estimate the average number of articles they found difficult to access and compared this with the reported number of articles read per year (Table 5). In this way, SMEs reported having difficulties accessing about 10% of articles read. These results should probably only be taken as indicative, as respondents' ability to recall such data can only be rough and ready, but they do not suggest large differences between the groups, though the proportion of difficult-to-access articles may be somewhat larger for SMEs than for large companies.

Table 5: Numbers of articles where access was reported as difficult compared to total numbers of articles read

	SMEs	***Large companies***	***University/ college***
Average no. articles read per annum	112	101	169
Average no. articles difficult to access per annum	11	6.4	12.4
% of articles with some difficulty accessing	10%	6%	7%

Types of difficulty

What was the nature of the difficulties that respondents reported? By far the single most frequent response was that the respondent found the article online but had to pay to access the full article (Figure 5). For these respondents, paying per article was not seen on this occasion as a convenient access route but as a barrier. The next most common reason given by SMEs was finding the article online but having technical difficulties in paying to access it. (We found in interviews that SMEs said hat the lack of a purchasing route appropriate to company purchase could also be an obstacle with PPV, not just the cost itself.)

For large company respondents, payment barriers represented half of the reasons given for difficulty, with difficulties relating to finding the article somewhat more important.

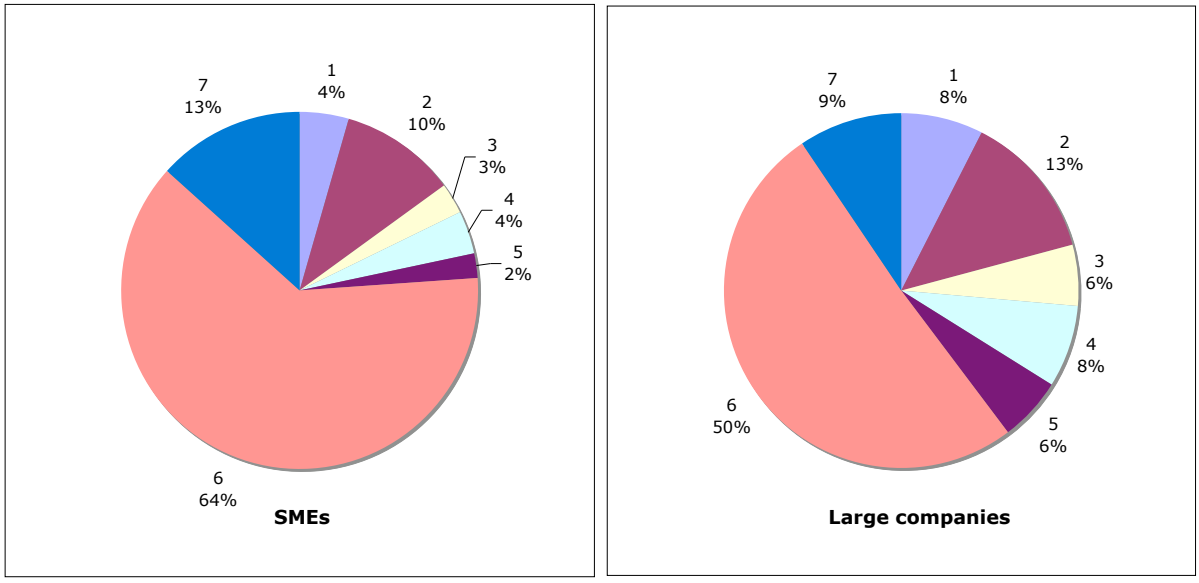

Figure 5: Breakdown of the reasons given for difficulty accessing a journal article for SMEs (left) and large companies (right). Key:
1 = Unsure how to find the article
2 = Searched online but could not find the article
3 = Could not remember the exact name of the author and/or title of the article
4 = Could not find the article in the library (library did not have a physical copy)
5 = Tried to access the article from home, but discovered I could only access it from work
6 = Found the article online, but had to pay to access the full article
7 = Found the article online, had to pay for it, but had technical difficulties paying

PPV – interviewees' views

In the interviews with SMEs we found a number of issues relating to payment per article:

- a minority regarded it simply as a cost of doing business and a practical way of accessing articles from a wide range of journals;
- the majority found price a barrier to a greater or lesser extent. They felt that the cost per article was (on average) too high for casual use, and that the price therefore meant they did not access articles that they would otherwise have accessed;
- a repeatedly-cited problem was that abstracts were incomplete, unhelpful or even misleading and that it was therefore frequently impossible to tell if an article would be of value until after the full text had been scanned, by which time it was too late;
- for example, a pharmaceutical consultancy described how it might find 60-100 articles of potential relevance to a small project from a PubMed search. Its client would not be prepared to pay say $30 each for all these (i.e. $1800–3000) and they could not afford to absorb this, so they had to select a few for purchase, try to find copies of others via other routes, or do without. By definition they did not know what they had missed this way but believed that it led to a lower value service.
- another problem cited by several respondents was that PPV via a credit card was not an appropriate route for their company purchasing procedures.
- current pricing was at a level that made SMEs think twice before purchasing, leading to them accessing fewer full-text articles than they would have otherwise have done. But it was clear the price would have to be very much lower (say £2-5, based on interviewee comments) before interviewees disregarded it, and combined with a corporate-friendly purchasing process

Use of PPV by those not reporting a difficulty

Having to pay for the article was the most common reason given by those who reported having a difficulty accessing a research article. For comparison we also asked those who had not reported a difficulty whether they had purchased an article during the last year. The results are shown in Table 6. The numbers of respondents to this question were very small, and hence the confidence in these findings is also low, but the figures suggest that around a third (35%) of SME respondents who did not declare a difficulty had also purchased an article, that is, they did not regard having had to pay as constituting a difficulty. Since some 45% of SME respondents did not have a difficulty, this would scale up to about 15% of all SMEs not regarding payment as a problem (i.e. 35% x 45%).

Table 6: Percentages of respondents who had purchased an article online (Base: All those who had not had a problem accessing the full text of a research article recently)

	SME	***Large company***	***University/ College***
n	*31*	*19*	*15*
Yes (%)	35	16	7
No (%)	65	84	15

Alternative routes

We asked those who experienced difficulty accessing an article to say what they did to obtain the article. Table 7 shows that a broad variety of approaches was tried. (We found a similarly broad range of channels was also used for accessing journal articles more generally; see page 30). It appears that

SMEs were more likely to look for an early version of the article on the web, while inter-library loan and contacting the author direct were more popular in universities.

Table 7: Methods attempted to obtain the article where respondent had experienced difficulty (Base: those who reported experiencing difficulty with accessing a journal article)

	SME	***Large company***	***University/ College***
Check access via your organisation's library or in-house information service	15%	30%	19%
Check access via your local academic library (if not based in academia)	7%	3%	10%[a]
Check access via a local public library	0%	0%	0%
Check access via a colleague's subscription	15%	8%	10%
Request an interlibrary loan from a library	7%	3%	19%
Approach the author directly	11%	5%	19%
Use a service such as patientINFORM, AGORA, HINARI, OARE etc. [b]	6%	5%	0%
Look for an early version of the article on the web	28%	24%	10%
Did not try any of the methods listed	11%	22%	13%

[a] These respondents appear to have misunderstood the question, since this option was intended only for the non-university respondents

[b] Respondents were probably mistaken if they thought they had used HINARI, AGORA or OARE, since these services are not available in the UK

Article discovery

Respondents who reported difficulty in accessing an article recently were asked in a follow-up question how they had learned about the article. Table 8 shows SMEs and large companies have generally similar profiles, though large company respondents make greater use of word-of-mouth. University respondents made much greater use of the specialist search engines and citations.

Impact of barriers

To get some sense of the potential area of impact of any difficulties of access, we asked respondents who had had recent difficulty accessing an article about their intentions in accessing the article. Table 9 shows that corporate respondents intended to use the article for work purposes or general interest. Looking in more detail within this sub-group, Table 10 shows the specific purpose for which the article was intended. Lastly, we asked how important was it to access the article in question (Table 11).

The bulk of intended uses were for help resolving a technical issue or for a background literature search. (The high proportion of "search" rather than "browse" modes is probably an artefact of the question design, i.e. the focus on a particular article which was hard to access, rather than reflecting the overall pattern use of journal literature by these groups.) Companies of all sizes intended a more applied use, that is, to help resolve specific problems, compared to universities where the article was much more likely to have been intended for a background literature search.

Table 8: Ways in which respondents learned about the article they reported having difficulty accessing (Base: respondents reporting difficulty in accessing an article recently)

	SME (n=103)	***Large company (n=38)***	***University/ College (n=114)***
Searching using a general search engine such as Google, Yahoo, LiveSearch	44%	45%	19%
Searching on a specialist search engine (e.g. Scopus, Web of Science, GoogleScholar, INSPEC, PubMed etc.)	36%	24%	54%
A cited reference in a publication	32%	34%	53%
Notified by a colleague or friend	5%	16%	3%
It was referred to on a speciality website	10%	13%	4%
Read about it in a magazine or newspaper	3%	8%	2%
Heard about it on TV, radio	1%	0%	0%

It appears that competitor intelligence is not an important use of the journals literature. We also asked about using the article for hiring (e.g. background check on potential candidates) but as this had virtually no responses we have omitted it from Table 10.

About half (55%) of the hard-to-access articles were rated important (i.e. rated 5–7 on a scale of 1 to 7) by SMEs, compared to 75% for universities.

Table 9: Respondents' intentions for the article that they had difficulty accessing (Base: All who have had difficulty accessing an article recently)

	SMEs	**Large company**	**University/ College**
	(n=103)	*(n=38)*	*(n=114)*
Use it for work purposes	86%	76%	59%
General interest	6%	8%	1%
Use it for my studies	6%	5%	28%
To get a better understanding of a medical condition either for myself or on behalf of a family member or friend	1%	3%	0%
Other (please specify)	1%	8%	12%

Table 10: Respondents' specific intentions for the article that they had difficulty accessing (Base: All who have had difficulty accessing an article recently, and intended to use article for work purposes or general interest)

	SMEs	**Large company**	**University/ College**
	(n=95)	*(n=32)*	*(n=68)*
Competitor intelligence	3%	3%	0%
Keeping up-to-date	17%	19%	10%
Help resolve a technical or clinical issue	29%	28%	13%
Background literature search	46%	44%	71%
Other (please specify)	4%	6%	6%

Table 11: Importance to respondents of the most recent article which they had difficulty accessing (Rating scale, from 1 = Not at all important to 7 = Extremely important. Base: All who have had difficulty accessing an article recently)

	SME	***Large company***	***University/ College***
% Important (i.e. rated 5–7)	55%	63%	75%
Mean importance	4.5	4.6	5.1

Area to improve

Respondents were asked to say which one of the important but hard-to-access information types they would like to see improved (Figure 6). For SMEs the two most frequent choices for improved access were market research reports and journal articles, while for large companies it was conference proceedings and market research reports, and for university/colleges it was conference proceedings and doctoral theses & dissertations.

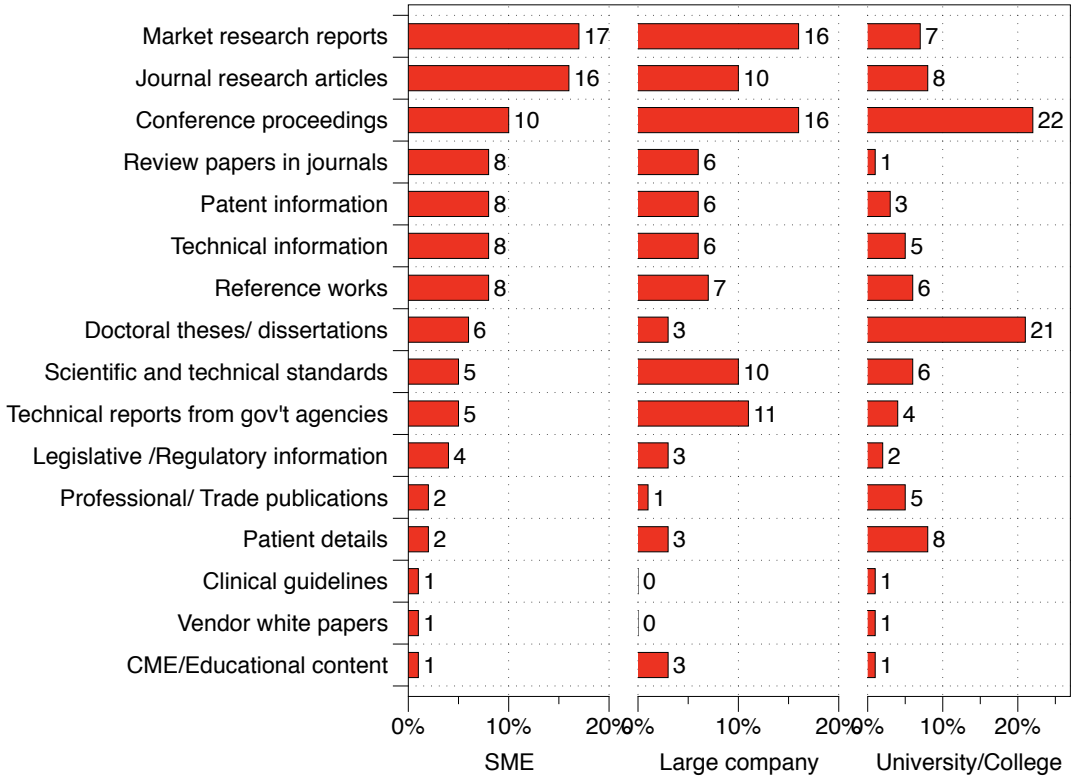

Figure 6: If you could improve access for one of the below information types which ONE would you choose? (Base: Factors considered important, and where access is perceived as difficult. SMEs: n=132, Large corporates: n=70, University/College: n=290)

Difficulties accessing other information types

Although we did not explore the issue in as much detail, we did ask respondents to say why they had difficulty accessing other types of information where they had indicated that they found access less than easy. For the different types of information there were a variety of payment and non-payment barriers mentioned (all quotes are from SMEs):

- Regulatory information: the main difficulty was not knowing where to find it
    - "Various bodies, no one point of contact"
    - "Mostly knowing where to find the information, searches in Google do not always yield useful results"
    - Scientific/technical standards were expensive
    - "You need to see the standard to see if it is worth the cost, but have to pay to see the standards"
- Technical information was difficult to find
    - "Material is spread diffusely across the internet and/or no single source is a useful guide to find it all"
    - "Do not have appropriate reference works - this info difficult to search for using generic search engines"
- Market research reports were often expensive
    - "They are not generally available except by purchase, and are very expensive"
    - "Unable to determine the quality and/or usefulness of the work without significant expense"
- Conference proceedings: lack of online availability and cost were cited as obstacles
    - "Lack of centralization; lack of internet posting"
    - "Lack of online availability and long-term archiving. Proceedings generally include only a part of the contributions"
    - "You have to pay for them"
- Doctoral theses were difficult to find
    - "They are not as readily categorised and visible as, say, conference proceedings"
- Patent information: respondents were not sure where to find information and costs were a barrier
    - "It seems more difficult than it should be to get free access of all patents and in English from a simple straightforward website. Also, the search facilities don't work very well. I often come across patents that didn't appear in a search"
    - "Not all patents registrations are available on-line"

Comparing the better and worse access groups

We were interested to explore differences between the groups with better and worse access. We split the respondents into the two groups describing their access to journal articles as "very easy" or "fairly easy" (95 SMEs) and "very difficult" or "fairly difficult" (39 SMEs). The numbers involved in the subsequent breakdowns are statistically small, so the following findings should be regarded as tentative:

- For both SMEs and large companies, those who find access to original research articles easier are slightly more likely to be from the pharmaceutical sector.

- There were no differences by size of organisation.
- SMEs in the service industries were slightly more likely to find access easier than those in manufacturing.
- Of corporate respondents who believe access to research articles is difficult, most then go on to select this as the one type of information they would like to improve access to (most popular response). Of corporate respondents who believe access to research articles is easy, the next most popular information types chosen for improvement are conference proceedings and market research reports (amongst larger corporates, technical reports from government agencies are also similarly popular).

Access channels

We would expect that SMEs used different channels to access journal articles, given for instance their relatively smaller resources and organisational structures compared to large companies and universities, and that this would both affect the current perceptions of access levels and also be relevant to any proposed solutions to improve access.

Respondents were asked to estimate their frequency of use of a variety of channels for accessing their information needs (not just journals). The first finding is that all groups make use (to greater or lesser extents) of a wide variety of channels. Figure 7 shows that even the least-cited channels for all types of respondent (pay per view and public libraries) were used at some time by around a third of respondents.

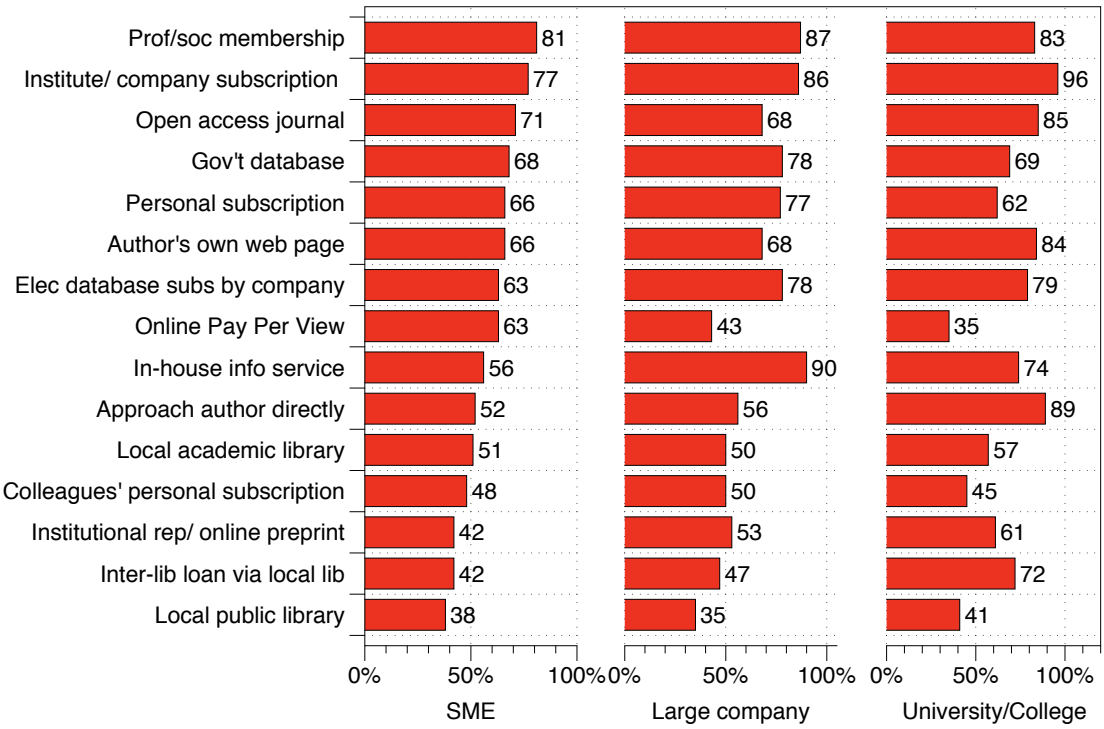

Figure 7: Proportion of respondents in each sub-group that made any use of the named access channels for all information needs (not just journals)

This analysis does not give a good idea of the relative importance of the different channels, however, because some channels were used substantially more frequently than others. If we plot the estimated monthly frequency of channel use (note, this is unlikely to the be same as article use), a quite different pattern emerges (Figure 8; note the different scales for each sub-group). This shows that SMEs use a

wide range of channels with no single channel really dominating. Perhaps surprisingly, the two most frequently used channels for SMEs were company subscriptions and in-house information services, although the next four most-used channels (personal subscriptions, company-subscribed database, open access journals, and society memberships) were used only a little less frequently. There were clear differences in access patterns compared to large companies and universities. In large companies the in-house information service is the clearly preferred channel (although this begs the question of which channels the information service used), followed by company-subscribed journals and electronic databases. For universities, institutional subscriptions to journals and databases dominate, followed by open access journals.

Reported use of open access journals by SMEs was proportionately similar to that in universities at about 10% of channel uses, and rather higher than that reported in large companies (7%). Other studies have shown that university users tend to over-estimate their use of open access journals because they confuse free-at-the-point-of-use access to licensed journals with open access. There is no comparable study of what SMEs might understand by open access, but it seems less likely that SMEs would confuse subscribed content for open access (since they don't benefit from Big Deal-type arrangements), so it may be that their use of open access journals is in fact relatively higher than universities.

With hindsight it might have been better to have separated access via the in-house information service from the other channels into a separate question, since it is a (value-added) intermediary to the other channels. It is probably reasonable to assume, however, that an information service would rely substantially on subscribed journals (online or in print) and licensed access.

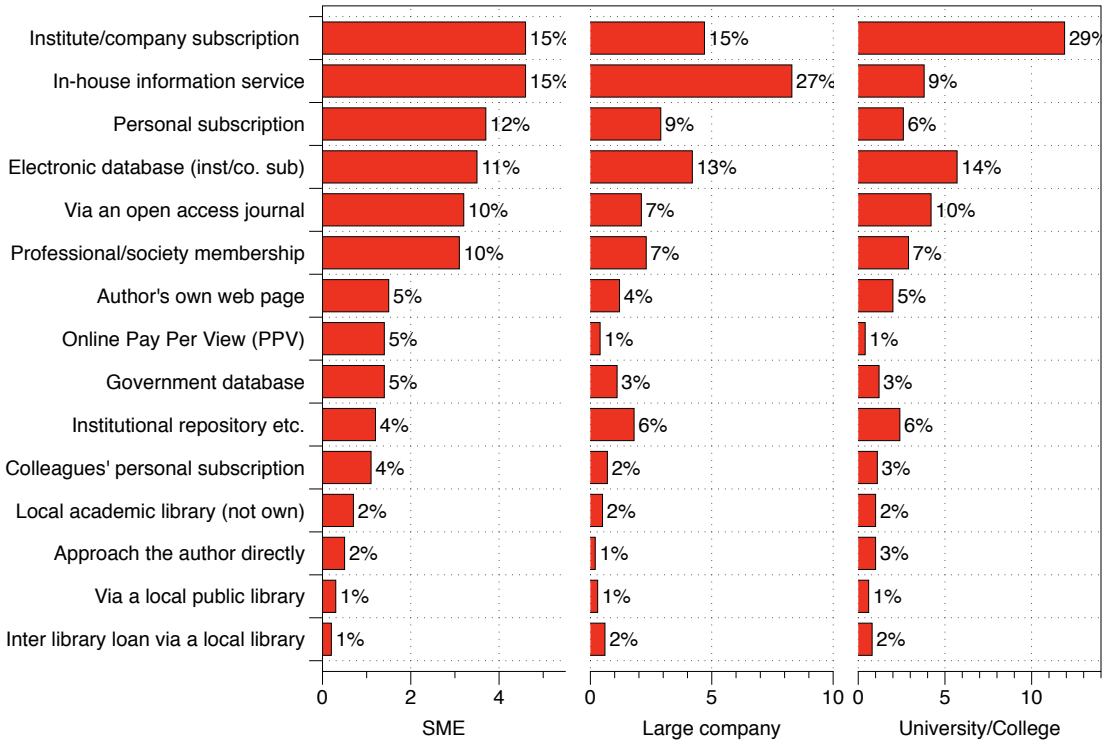

Figure 8: Estimated monthly frequency of use by sub-group and channel, for all information types (not just journals). The percentage figure beside each bar represents the proportion of total uses. (Note the different scales for each sub-group.)

Pay per view was a relatively less frequently used channel for SMEs, amounting to only about 5% of estimated monthly uses. Relatively speaking, however, this is substantially more use of PPV than is found in large companies and universities, where it was almost irrelevant at about 1% of uses in each case. It is possible actual PPV use may be higher than that directly reported if it were one of the channels used by the in-house information service. It should be noted that the question covered all types of information, only some of which are available via PPV channels.

Walk-in use of academic libraries is also an unimportant channel being only about 2% of reported channel uses for all the sub-groups.

Mediated access (that is, managed by a third party such as a librarian or information specialist, namely company subscriptions, in-house information service/library, electronic databases and inter-library loan) amounted to about 42% of channel uses for SMEs, compared to 57% for large companies and 54% for universities.

Success factors

At a very high level, we were interested to know how important organisations thought information in general was to their success compared to other potential success factors, and which of these factors presented the greatest barriers to success (Figure 9). Additional factors suggested by respondents included access to capital, knowledge of the market, networking/contacts, innovation and internal communication (values) and external communication (reputation).

For SMEs, access to information ranged seventh out of the 14 factors, while for large companies it ranked slightly lower at ninth. In both cases quality of staff and products was the most important success factor. We can say that respondents saw information, while not the single most important factor, among the factors important to their success.

Figure 9: Average perceived importance of various factors to the success of the respondent's organisation. (Rating scale: 1= Not at all important to 7 = Extremely important. Base: All SME and large company respondents (n=186 and 111 respectively))

Success factors vs barriers to success

To get a more nuanced view of the relative importance of these success factors, we also asked respondents to say of these factors which three were currently the biggest barriers to success at their organisation. (Other factors suggested by respondents were access to capital/finance and the global downturn.) In Figure 10 we plot for SMEs the importance score for each factor against an index representing the relative barrier to success for each.

For SMEs, far and away the biggest barrier to success was attracting new customers. Information, however, was also placed in the quadrant the group of factors that are both of high importance to success and represent relatively high barriers to success. For instance, SMEs placed information above leadership, technology, product range and quality, and staff (among other factors) as a barrier to success.

In comparison, large companies (Figure 11) rate information relatively unimportant as a barrier to success.

In comparing the other differences between the two graphs, we can see that many of the factors occupy similar positions. It is interesting to note, however, that apart from the big difference on perceptions of access to information, large companies see leadership and bureaucracy as bigger barriers than do SMEs, while large companies appear to find attracting new customers easier than SMEs.

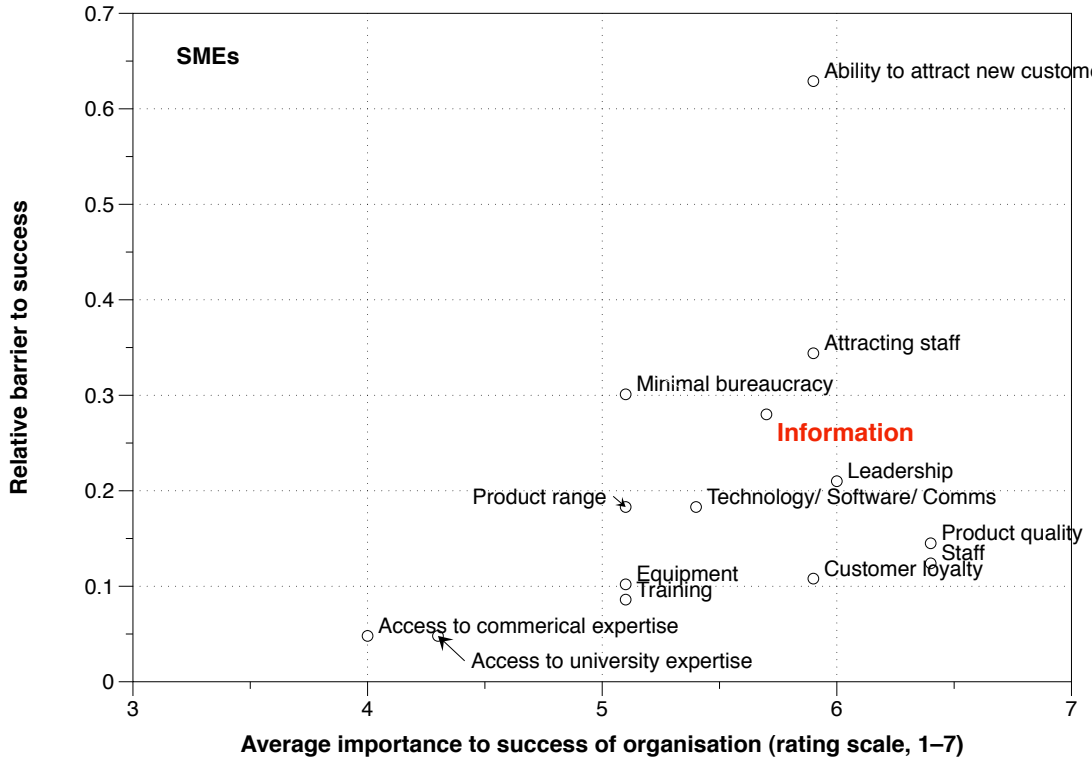

Figure 10: Success factors for SMEs. The importance of each factor is plotted against its relative barrier to success. (The index number plotted for relative barrier to success is the product of average rank position and proportion of base selecting factor.)

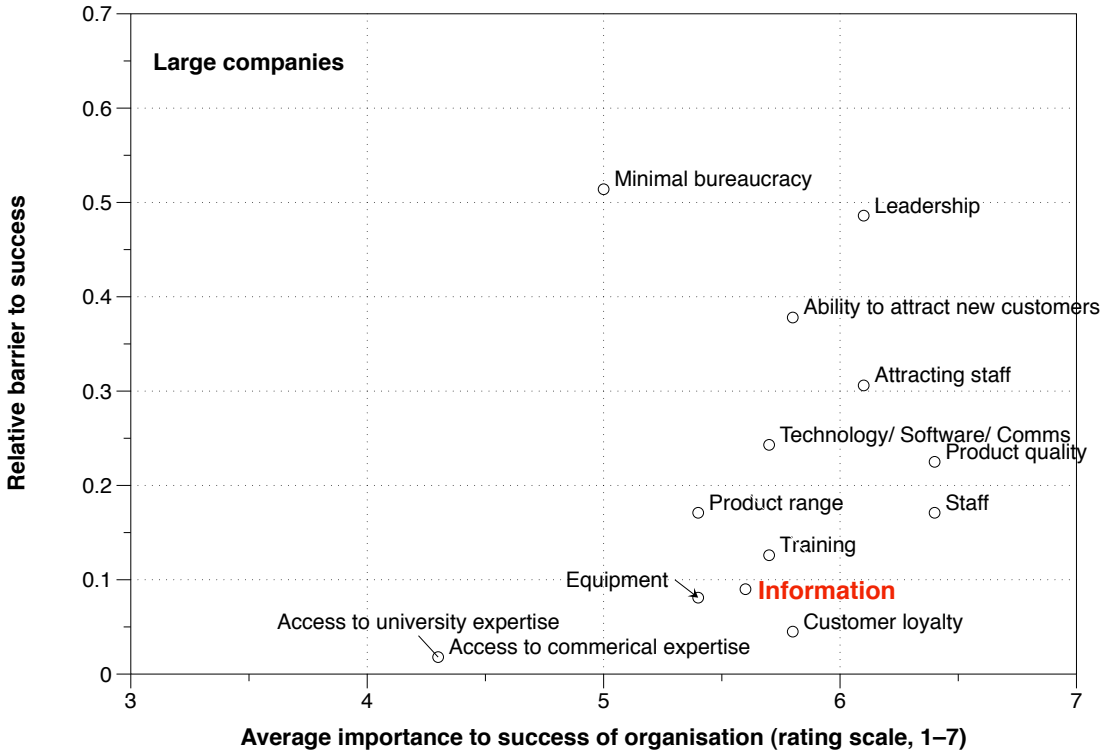

Figure 11: Success factors for large companies. The importance of each factor is plotted against its relative barrier to success. (The index number plotted for relative barrier to success is the product of average rank position and proportion of base selecting factor.)

Other information types

Importance

Next we asked to respondents to rate how important were various kinds of information. [11] Figure 12 presents the results ranked in descending order of importance for SMEs. For the companies in this survey, there was very little difference in scorings between SME and large company respondents, though they (unsurprisingly) showed a different pattern from university/college respondents. SMEs ranked journal articles (just) their most important source (though they were not strongly differentiated from technical information and reference works), while for large companies research articles were ranked third after technical information and scientific/technical standards.

It is highly unlikely that this is a general result for all SMEs, of course, but probably reflects the sample used for this study. Even taking into account that the sample was broadly of high-technology or science-based firms, it still seems surprising that the SMEs placed original research articles ahead of all other types of information.

[11] Respondents also suggested competitor activity, latest trends within industry, sales/operational data and original research, amongst others.

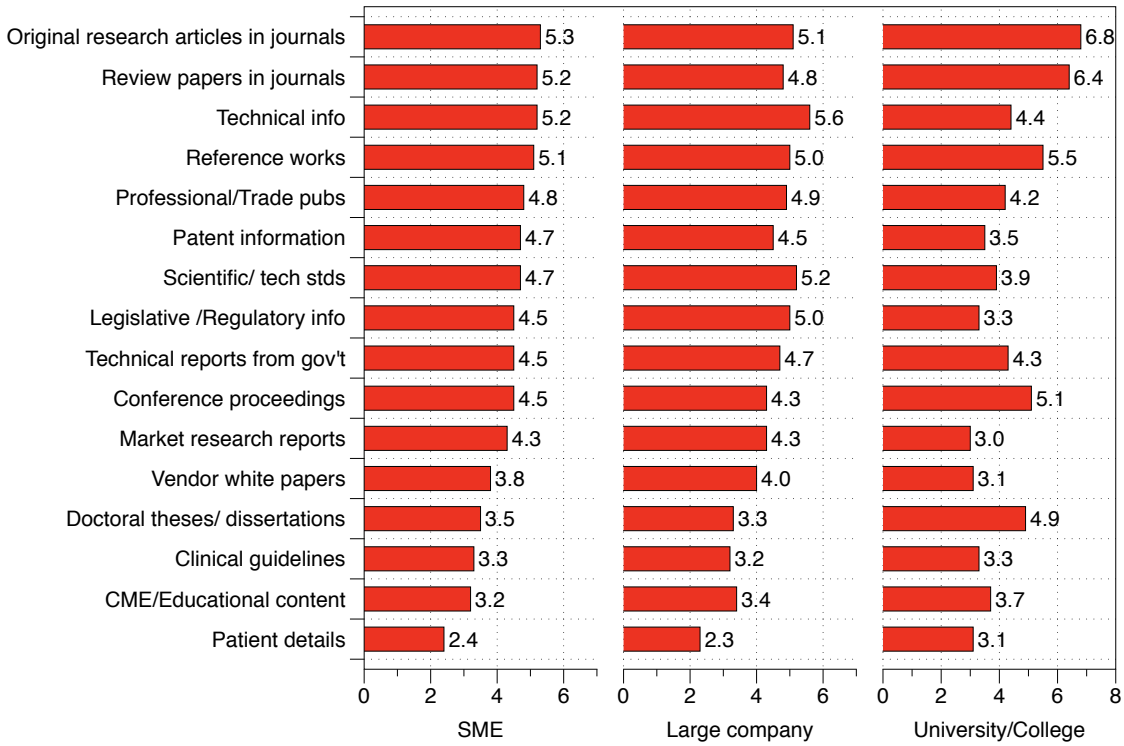

Figure 12: Average perceived importance of different types of information. (Rating scale: 1= Not at all important, to 7 = Extremely important.)

Importance vs barriers

It is interesting to compare the importance ascribed to different kinds of information with the ease of access for each. We have plotted these two variables for SMEs and large companies in Figures 13 and 14 respectively.

For SMEs, market research reports stands out among the information types with a greater than average importance but low ease of access. Apart from this, conference proceedings and then research articles were the least easy to access of the types of information with an average importance score greater than 4.5. (Though even here, over 70% of SME respondents said research articles were easy to access.) These results reflect the high priority SMEs gave to improving access to market research articles and research reports.

For large companies, market research reports again stand out for the combination of relatively high importance and low ease of access. Compared to SMEs, research articles were perceived as relatively easier to access among the group of high-importance information types.

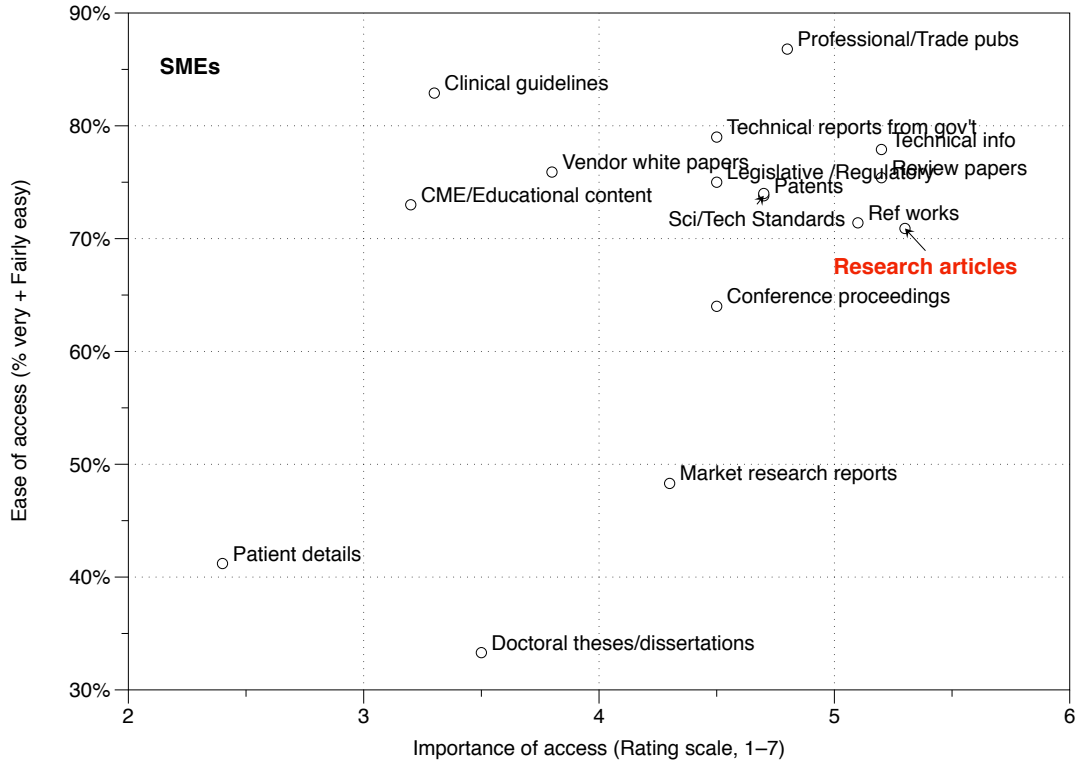

Figure 13: SMEs: Importance of having access to different kinds of information (rating scale, 1–7) compared to reported ease of access (% Very or Fairly easy; Note: level of access was only asked for those factors rated as important)

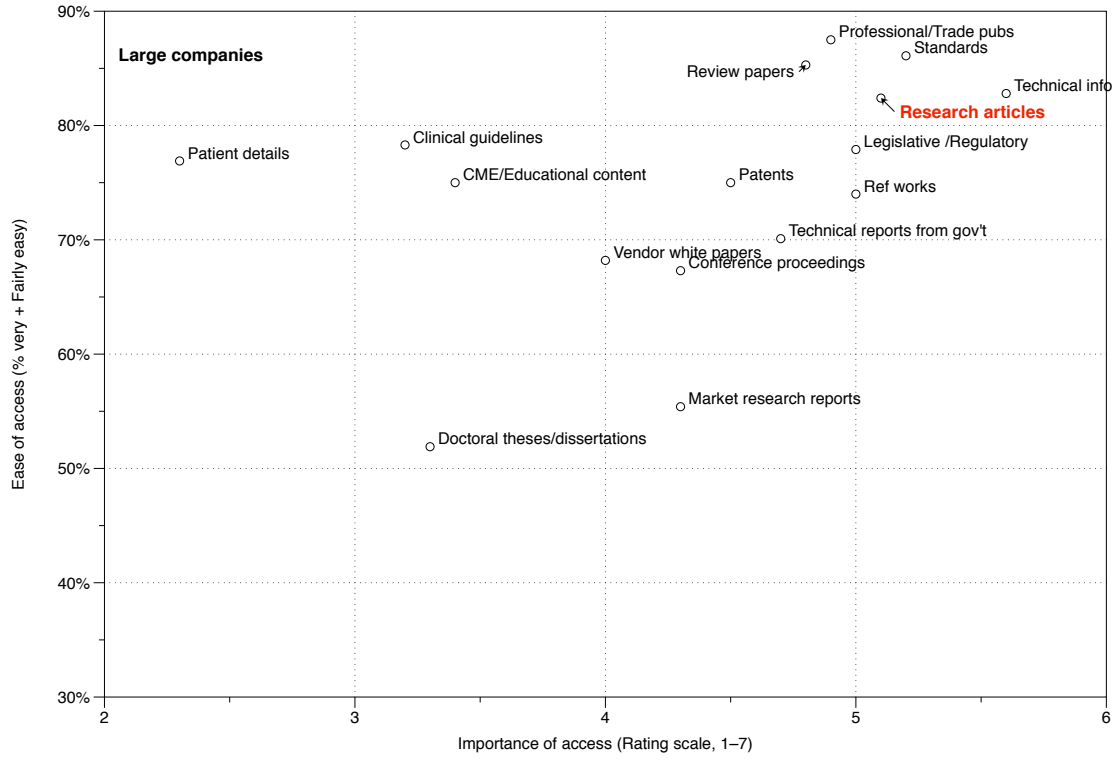

Figure 14: Large companies: Importance of having access to different kinds of information (rating scale, 1–7) compared to reported ease of access (% Very or Fairly easy)

Interviews

Introduction

In addition to the quantitative survey, we conducted a small number (12) of semi-structured interviews with SMEs. Interviewees were recruited from among the respondents to the survey (where they indicated they were willing to be contacted for further research), from personal contacts and from contacts made through a university enterprise and innovation network.

The purpose of these interviews was to obtain a deeper qualitative understanding of the issues facing SMEs in accessing and using the research literature. Apart from the small numbers involved, the interviewees were not necessarily representative of the wider population of high-tech SMEs: for instance, small consultancy businesses (and services generally) were probably over-represented (although there were interviewees in all size categories). Despite the small number of interviews, however, there was a good range of industries and fields covered: environmental decontamination, electronic engineering and semiconductor design, actuarial health studies, international energy policy, computer security, drug discovery, pharmaceutical product development, medical equipment and instrumentation, microbiology, veterinary pharmaceuticals and materials science.

Importance of journals

As for the main survey sample, journals were an important part of the information needs of the interviewees. Uses included quite basic science (e.g. drug development), through R&D, engineering, background developments, and regulatory uses (such as in pharmaceutical marketing).

Searching

While Google was the most-cited research tool, search behaviour was by no means naive. Across the 12 interviewees the following tools were mentioned: British Library catalogue (higher quality, more relevant results and more comprehensive); specialist subject sites (relevance, targeting); Scirus; PubMed (relevance, search tools); EBSCO portal (structured searching); library system provided by professional society library (search tools, relevance, click-through to content); library system via walk-in access (search tools combined with librarians' search expertise); and OVID (structured searching).

Browsing and awareness

Browsing and current awareness was fairly conventional, a mixture of scanning core journals, electronic Table of Content alerts, Google search alerts, trade/professional publications and vendor information.

Print

Although most (but not all) the interviewees worked primarily with online materials and valued their convenience, a repeated point was that online journals did not give as good a browsing experience as print. Table of contents and abstracts in particular were seen as a poor substitute for scanning the full text.

Access routes

Interviewees, reflecting the survey responses, used a wide range of access routes to journal articles. Subscriptions and online licensed content played a smaller part though, perhaps reflecting the smaller average size. Several of the interviews relied quite heavily on channels that were not included in the survey and so are worth discussing here:

- For smaller consulting firms, access to full text via their clients' resources featured several times. This was probably more easily facilitated where the client was the parent organisation from which the SME had been spun out.
- One consultant enjoyed excellent online access to virtually all the journals they required via the online library service provided by their professional association. This was charged at £50-70 on top of the standard membership fee, which was regarded as a substantial bargain. In addition the library offered search services (for an additional per-search fee). (See Lees 2007 for an account of the RSC's library service for members.)
- In general, PPV was not popular, as already discussed above. Pre-paid PPV carnets were mentioned in relation to offerings from IEEE and Wiley-Blackwell but in both cases the SME had decided to not to renew the services as they were not viewed as good value because the actual level of use had fallen below that anticipated.
- Several firms were enjoying access via the libraries of the universities where they had previously worked. It was not entirely clear whether this use would have been legitimate under the terms of the libraries' licences.

Walk-in access

Although access via a local academic library was barely cited in the survey (only 2% of channel uses), five of the interviewees were using or had used such access:

- one central-London based consultant relied almost entirely on the British Library reading room[12]
- one had continuing online access to their previous university's library collection
- three others had walk-in reader tickets but rarely if at all used them in practice. The reason given was the inefficiency involved in travel to the library.

Apart from those who already had equivalent access (e.g. via society online library) all the interviewees would have been interested in online access to an academic library collection but there was little interest in walk-in access because of the problems of travel (most were at least one hour in each direction from the nearest library), the restrictions imposed on use (e.g. downloading PDFs to the user's USB drive for use outside the library) and because of the poor fit with iterative research practices (e.g. a online downloaded PDF might be read in the evening and any promising leads followed up online at the time; using walk-in access would require repeated time-consuming trips that would not in practice take place, thus closing down promising avenues).

On the other hand, there was fairly widespread awareness of the value of professional librarians' service in helping with searching. (This was consonant with the relatively sophisticated search techniques used by this group.) Comments included:

- librarians can take the hard work out of searching – they could find things in 5 minutes that took him 3 hours
- although travelling to the library would be inefficient, one reason for doing it would be to access the search expertise of librarians.

Ideally the majority of interviewees would have been interested in online access to a local academic library's collection, with value given to the search tools and databases, not just the full-text access, and backed up by access to librarians' expertise. (Arguably this is provided by the British Library but the cost of this PPV model made this unattractive.)

[12] We should perhaps have included a separate category for use of the British Library but in the absence of this we grouped it with local academic libraries

Barriers and impact

There was a range of perceptions

- Only one of the 12 interviewees regarded the barriers as a major obstacle in themselves. Another found no problem getting the information he needed (he used British Library supply services) but regarded the cost as a potentially serious problem as clients were becoming more resistant to paying the full costs.
- At the other end of the scale, four regarded their current access as excellent and saw no barriers. This included interviewees, however, who enjoyed transitional access via their former employers/current clients that they expected would not necessarily continue indefinitely
- Most regarded the barriers as of "middling" impact – significant impacts but not so large they would describe them as "major". The general view was that the barriers created inefficiencies or "friction", for instance in wasting time searching for free versions on the web or via colleagues etc.
- As well as the inefficiencies created, there was concern that important information might be missed because PPV access discouraged scanning potentially relevant texts.

Discussion

Importance of journals to companies

Previous work, although tending to focus on larger companies, has shown the importance of basic research to the economy and to the innovation process in firms. This work has emphasised that publications were only one of many factors involved in transferring knowledge from research to firms but has also shown that publications are an important one of these factors.

In this survey we have found that firms of all sizes said that information (of all types) was important to the success of their organisations but only ranked it of being about middling importance compared to other factors such as product and staff quality, leadership, attracting new customers etc. When we went on to ask which factors presented the greatest barriers to success, however, access to information was found to be a much more significant problem for SMEs (who ranked it fourth out of fourteen factors), compared to large companies (who ranked it only 10th). This very high ranking in the barriers to success – ahead of factors one would normally think both critical to company success and difficult to achieve, such as leadership, product quality, customer loyalty, etc. – seems implausible at first sight.

We also found a very high, indeed surprisingly high, level of importance given to research articles (both original research articles and review articles). In fact SMEs ranked original research articles and review articles first and second respectively compared to other types of information. There was admittedly only a small gap between them and the next most important information types (technical information and reference works). Large companies also ranked research articles as important but they placed them behind technical information and scientific/technical standards.

A likely explanation, at least in part, for the high levels of reported interest in research articles is that respondents were self-selected (albeit from a targeted list) and the invitation made it clear that the study was focussed on those active in research or with an interest in research-related information.

One possible explanation for both the greater importance given to research articles by the SMEs compared to large companies and the higher ranking given to access to information as a barrier to success, might be that the SMEs in this study were more science-based or more R&D-oriented, focussing on product innovation or perhaps in consulting or specialist supplier roles, with the large companies relatively more focussed on commercial exploitation and marketing. (This would also be consistent with our finding that the SME respondents on average read more journal articles per year than large company respondents.) We have no real data to support this but it seems a plausible hypothesis for those in the service sector, though somewhat less plausible for the SMEs in manufacturing. Also, as we also noted earlier, the SME respondents were more likely to be in science-based sectors like pharmaceuticals and chemicals compared to the large companies, while conversely the large companies had higher representation from some more applied sectors such oil & gas and aerospace.

Whatever the explanation, though, the findings make clear that there exists a subset of SMEs for whom access to research literature is highly important to their success. We are not able from this study to quantify the size of this subset unfortunately (for instance as a proportion of total SMEs), but it would appear to us to be of sufficient size to warrant further study. One argument for this is that the primary source of recruitment for the SME respondents was specialist industrial/trade magazines, a fairly broad source. The lack of good data on the proportion of SMEs in science-based or high technology sectors surely deserves attention.

Access levels

SME respondents reported reasonably good overall access to the research literature. Over 70% of those for whom access to journal articles was important described their access as fairly or very easy. Some 60% of SMEs said access was easier than 5 years ago, compared to only 20% who said it was

worse. SMEs reported reading 112 articles per year, compared to 101 in large companies, a frequency of reading which hardly suggests major access barriers.

On the other hand, while access was fairly or very easy for the majority of 71%, this figure was less than for large companies (83%) or universities (94%), and it follows that there was also, by definition, a minority (29%) for whom access was fairly or very difficult. There were only four responses offered in this question, forcing respondents to opt for the "easy" or the "difficult" camp. When we asked a similar question of all respondents (not just those for whom access was important), using a different wording and (crucially) with an odd number of options, we found that only 28% of SME respondents described their access to research articles as good or excellent (compared to 46% of large company and 72% of university respondents), with the majority of SMEs plumping for the middling option of variable access ("I sometimes have difficulty getting the journal articles I need").

Some 55% of SME respondents said that they had recently experienced difficulty accessing a research article, and in this area they were substantially more likely to experience difficulty than those from large companies (34%) or universities (24%). To put this into context, however, SMEs reported having difficulty accessing about 11 articles a year, which compared to the 112 articles that they reported reading was only about 10% of the total, and this proportion was only a little smaller than that for large companies (6%) and universities (7%).

Journal articles were also the second most-frequently cited type of information that SME respondents would like to improve access to, after market research.

While overall access may be reasonably good, therefore, there is clearly some demand for journal articles that is not met at present.

Channels used

All respondents including SMEs made use of a wide range of access channels; even the least-cited channels (pay per view and public libraries) were mentioned by around a third of respondents. The most frequently used channels for SMEs were company subscriptions and licensed databases, which amounted to 42% of channel uses (assuming that in-house information services primarily used these channels), followed by personal subscriptions and society memberships at 22% and then open access (OA journals and institutional repositories) at 14% of channel uses.

The pattern of channel use by SMEs was substantially different from that employed by large companies and universities. Large company respondents depended much more heavily on their in-house information services and made somewhat less use of personal/society subscriptions. University respondents depended primarily on institutional subscriptions and licences.

Pay per view was a relatively infrequently used channel for SMEs at 5% of channel uses, though even so it was much more frequently used by SMEs than by large companies and universities for both of whom it was irrelevant at around 1% of uses. Nonetheless, almost a third of SMEs used PPV at least once per month, compared with only 14% of large companies and 7% of academics. The true scale of PPV use may well have been higher than that reported by individuals, however, because of use by any in-house information service (or library, in the case of academics).

Use of colleagues' personal subscriptions was more common in SMEs than in large companies but was relatively unimportant at 4% of channel uses.

Lastly, access via a local academic library and inter-library loan were both unimportant for both SMEs and large companies at only 1% or 2% of uses. As with PPV use, the true scale of ILL may be higher than reported by individuals because of use by in-house the information service or library.

Possible options for improving access by SMEs

Following Hall et al. (1999), we might posit that there are three kinds of barrier to relevant SMEs accessing research literature: lack of awareness, not knowing what value the information might serve

or how to access it; second, difficulties in finding, using or interpreting or assimilating the information; and third, cost barriers. The SMEs in this study were certainly not lacking awareness (though this may be an aspect of the study design, in particular the recruitment methodology, rather than necessarily representative of SMEs more widely), and the survey responses indicated that the most frequently-cited difficulty experienced by SMEs accessing research articles was in having to pay, following by technical difficulties associated with paying, although about 17% of the reported difficulties were associated with problems in finding the article.

SMEs have not historically been an identified target market segment for most STM publishers, who have tended to focus more on academic markets. This is obviously less true for publishers covering more applied areas such as engineering and computer science. Any perceptions among the more academic publishers, however, that SMEs typically do not subscribe and rely instead on PPV access are not borne out in this study.

In the following sections we shall examine some of the possible options that might be explored to improve access by SMEs.

Pay per view

Pay per view (PPV) access is not currently a very frequently used access channel, at least for the research-oriented SMEs in this study. Our interviews suggest that, as typically implemented, PPV is unattractive for a variety of reasons. First, the cost of individual articles at around $30 is seen as much too high, and the cost varies too much between publishers making it unpredictable[13]. Second, the effective cost per relevant article, if it were used in the same way one would use subscribed materials, would be perhaps an order of magnitude higher, because researchers need to scan the full text of many ultimately irrelevant articles in order to determine their actual usefulness. Third, related to the second point, journal article abstracts are seen as frequently uninformative or even misleading as to the actual full text of the article, so that purchasers are often buying blind. Fourth, the payment mechanisms are inappropriate, depending on individual credit card purchase rather than being account based. Although this last point should not be ignored, however, the problem with PPV was primarily with the cost rather than the mechanism *per se*.

Access via academic libraries

Access via a local academic library represented a negligible fraction of current use by both SMEs and large companies. The could be a number of reasons for this:

- librarians may not be keen to offer or promote such access. Anecdotal conversations with some librarians have suggested that this may be the case in some instances, with librarians feeling under considerable pressure to deliver services to support research and teaching, without taking on additional responsibilities.
- librarians may wish to offer access but feel constrained by restrictions (actual or perceived) in the publisher electronic licenses. The HAERVI project, for instance, found that the definition of walk-in access was not consistent between licences and it was not clear whether walk-in applied to the library buildings or the whole institution. The licences are also perceived to be unclear as to what a walk-in business user can do with the content; for instance, while the Nesli2 licence explicitly says that “neither recovery of direct cost by the Licensee from Authorised Users, nor use by the Licensee or Authorised Users of the Licensed Work in the course of research funded by a commercial organisation is deemed to constitute [prohibited] Commercial Use”, the Eduserv Chest licences clearly exclude commercial use such as consultancy.

[13] As noted below, this price is also now substantially higher than the effective prices paid by academics under “Big Deal”-type licenses; a 2009 RIN report gave the average cost for UK universities at £0.80 per full text download. It is common, of course, for unit prices to be lower when the customer commits to purchasing in bulk.

- lack of awareness of the possibility among SMEs. Based on the (small number of) interviews that we conducted, this seems a likely important factor. Among those not using academic libraries, nearly all had not considered it was a possibility.
- lack of awareness of the full value access might provide: apart from simply providing access to subscribed/licensed content, libraries can offer access to superior search engines and to professional librarians for search services. The interviewees who had experience of these aspects valued them highly, although there would of course be resource implications.
- unattractive restrictions on access: in the interviews we found little interest in walk-in access (as compared to online access to the collection). Walk-in access was seen as inconvenient, time-consuming and inefficient, and not a good fit for the way they did research, and restrictive in the way electronic materials could be used (e.g. restrictions on download of PDFs to a memory stick).

Our sense is that given the current very low levels of walk-in use by the SMEs in this survey (who were really quite savvy about accessing journals), and the objections raised in interviews to physical walk-in access, this channel is unlikely to become a major route for SMEs. It would clearly be of benefit to some, however, and it would improve matters to clarify licence inconsistencies and reduce restrictions on use. Overall, though, it would difficult to argue that physical walk-in access is the right solution for SMEs at a time when academics have themselves increasingly abandoned use of their libraries for access and HE library roles are being re-imagined (e.g. in the JISC Libraries of the Future project) as places for shared learning and social contact.

Society-mediated access

The interviewees who were most satisfied with their current access were those with online access via a university library and the one with access via his professional society's online library. The latter enjoyed access to a comprehensive, well-managed library covering his specific professional interests for a relatively low additional payment on top of the regular membership fee. Not all societies would be in a position to offer such a service (clearly it would be easiest for those, a minority of societies, with existing physical libraries) and its affordability would depend on the rates that publishers were prepared to negotiate. Examples of societies offering such services include the Royal College of Veterinary Surgeons, the Concrete Society and the Royal Society of Chemistry (e.g. see Lees 2007).

A study of the library services offered by 15 UK professional bodies with memberships ranging from 10,000 to over 100,000 (Linacre 2009) found that the typical library studied offered a reading room which received annual visits equivalent to 5% of the total membership. There was an online catalogue which was open to members and non-members, though this were generally not cross-searchable with other external resources. Where statistics were available, annual visits to the online catalogue were equivalent to 43% of the total membership. The typical library lent up to five items at a time to members and supplied documents as photocopies and faxes, with a few offering emailed articles. Most libraries offered members some controlled access to some ebooks and ejournals. There was a desire to move more fully online with a single sign-on to a greater range of resources. There were several obstacles to this, however, including constrained budgets, problems negotiating appropriate licences with publishers ("publishers either see an organisation's members as their potential subscribers and won't let them purchase content or see large membership numbers and charge prohibitive costs"), and licensing restrictions (e.g. on emailing articles or on providing copies for commercial use) and/or complicated administration involved with their Copyright Licensing Agency (CLA) agreements. Only two of the 15 bodies offered corporate memberships.

For appropriate societies, looking for services to carry them into the online age, however, providing access to information could be a option with a very high perceived membership value.

National licence via academic libraries

As noted above, the SMEs interviewed did not find walk-in access attractive for reasons of convenience etc. but would find online access mediated by their local university attractive (even if paid for, assuming it were offered at an affordable price). Is this feasible? It would require a number of elements to be implemented in a practical way:

- a national licence acceptable to a majority of publishers. This would presumably require restrictions that could reassure publishers that the access offered to SMEs (given they represent the vast majority of UK firms and 60% of private sector employment) did not cannibalise other paid-for access. Tying access to other services (such as innovation networks) might be a possibility.
- a lead body to negotiate such a licence. The body with the most experience in the area of negotiating national licences is JISC but its focus and remit is in HE and research rather than the SME sector. Alternatively a scheme might possibly be administered by the Publishers Licensing Society (PLS).
- a willingness and ability (in terms of resources and skills) on the part of university libraries and perhaps other university departments (such as those managing innovation networks) to administer and promote such a scheme to the local SME community

An alternative for negotiation and delivery of a national SME licence would be for the British Library to manage the service.

In either case, would Government be willing to provide resources to set up such a scheme? Amongst other things, a much more comprehensive and quantitative study would be required to look at the the total numbers of SMEs in the science-based and high-technology sectors with similar needs to those in this study, the absolute size of the access gap, the potential value of filling it (e.g. in terms of increased innovation and hence benefit to UK plc) and the potential for it to become self-sustaining. We believe such a study would provide valuable information on a less-studied (by publishers) sector.

The "iTunes" solution

Some commentators (e.g. Bilder 2009) have contrasted the billion-track sales of iTunes with the low use of journal PPV and suggested that journal publishers could learn from the former. Such a system would need to include (as a minimum) the following elements:

- a comprehensive aggregation accessed via a single portal/catalogue covering all the major publishers and journals, with good metadata combined with an intuitive user interface to allow ease of use
- a low price point, allowing impulse and/or bulk purchase. (Bilder noted that typical PPV prices of around $30 contrasted to the effective price enjoyed by UK academics of £0.80 per full text article under bundled licensing schemes, with the latter coincidentally almost identical to the iTunes price of £0.79 per track.)
- an option to preview the content in a meaningful way before purchase
- simple one-click purchasing, tied to a variety of account options (credit card and corporate).

Other iTunes features that might add value could be

- integration with desktop bibliographic and/or resource management software (e.g. Mendeley social reference management software[14])
- a recommendation engine (the iTunes “Genius” service)

[14] http://www.mendeley.com/

- inclusion of other media types (e.g. e-books, conference proceedings, perhaps market research reports and patents).

In practice, while elements of this could be attractive, the prospect of such a service emerging at a low enough price point to attract the SMEs interviewed in this study currently seems slight, primarily because of the likelihood of cannibalisation of other channels. Such a service could not easily be created by publishers themselves, since it would potentially fall foul of anti-competitive legislation (e.g. over price-fixing). It is also unclear whether a large enough market overall exists for PPV, however effectively marketed – STM journals are simply a much smaller market than music. The analogy also breaks down with the current absence of the equivalent of the iPod to expand the use of, and hence create demand for, articles supplied through this channel, although e-book readers such as the Amazon Kindle DX or even smartphones have been suggested.

Scope for further research

This study has produced a wealth of useful data on an area of access to information that has hitherto not been much studied. We believe, however, that a more extensive study would be valuable to properly quantify the level of access by SMEs and the size of the access gaps reported in this study. It would be important, as in this present study, not just to measure access gaps in terms of the numbers of individuals having problems accessing information at some point, but also to understand the context in which the problems arose, the frequency of the problems and the importance of the information being sought.

Government/industry collaboration could be fruitful in this kind of study. Possible approaches would be to use a larger and more robust sampling methodology; to involve business organisations such as Business Link, chambers of commerce and university innovation networks; and to involve government and perhaps other interested parties. Some possible sources of data not tapped in this study might include the British Library Direct records and the Publishers Licensing Society data from its business licensees. Another interesting, if challenging, approach might be to study how SMEs' use of literature changed if they were given unlimited access, and to study what difference this made in practice.

Appendices

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Questionnaire

Landing Page

Thanks for agreeing to take part in this survey. We wish to get a better understanding of how you access information and how important it is to you. The survey is short and will only take 10 or so minutes to complete.
You will be able to see the results to a number of the questions at the end of the survey.
Your response will remain confidential. We simply want to get a broad understanding of your information needs.
---

1. Which of the following describes your MAIN affiliation [SINGLE CODE]
[a] University or College
[b] Hospital or Medical School
[c] Industrial or Commercial
[d] Research Institute
[e] Governmental
[f] Non Governmental Public Health
[g] Member of the public
[h] Other
Please specify _____

Routing:
If Q1 = c or f then ROUTE 1 (commercial) SHOULD ALSO INCLUDE E and G and H
If Q1 = a, d, , , then ROUTE 2 (univ / college / research institute)
If Q1 = b then ROUTE 3 (hospital / medical school)

SUCCESS CRITERIA FOR AN ORGANISATION

2/4/6. Many factors are important when considering the success of an organisation. Please rate the below in terms of their importance for the success of your company / institute / hospital/ organisation ?
Quality of leadership
Quality of staff
Minimal bureaucracy
Training
Attracting quality staff
Quality of equipment
Information (e.g. research articles, research reports, patents, reference works, regulatory information etc)
Technology/Software/Communications

ROUTE 1 add:
Access to expertise via commerical consultants
Access to university researchers and expertise
Attracting new customers
Customer loyalty
Product quality
Product range

ROUTE 2 add:
Clear legal and ethical frameworks
Funding
Seed funding for new ideas
Autonomy to set research direction
Time to conduct research
Support for writing and costing proposals
Sufficient number of students

ROUTE 3 add:
Clear legal and ethical frameworks
Funding
Access to latest drug therapies
Patient information
Bed capacity
Sufficient operating theatres
Well maintained hospital (Clean wards etc)

[Scale]
1 2 3 4 5 6 7
Not at all important Extremely Important (Don't know/Not Applicable)

2b/4b/6b (open box)
Are there any other factors that we have missed out, that you believe are important when considering the success of your company / institute / hospital/organisation ? If so please describe below

BARRIERS TO SUCCESS

3/5/7. And, of the factors below which 3 are currently the biggest barriers to success at your company / institute / hospital/organisation ?

Repeat factors in previous question (with slightly amended wording)

Quality of leadership
Quality of staff
Too much bureaucracy
Training
Access to expertise/consultancy network
Attracting quality staff
Quality of equipment
Access to information (e.g. research articles, research reports, patents, reference works, regulatory information etc)
Technology/Software/Communications
Other (please specify)

ROUTE 1 add:
Lack of new customers
Lack of loyal customers
Product quality
Product range

ROUTE 2 add:
Unclear legal and ethical frameworks
Funding
Seed funding for new ideas
Autonomy to set research direction
Time to conduct research
Support for writing and costing proposals
Sufficient number of students

ROUTE 3 add:
Unclear legal and ethical frameworks
Funding
Access to latest drug therapies
Unavailable or poorly maintained patient information
Bed capacity
Sufficient operating theatres
Poorly maintained hospital (e.g. unclean wards)

Q7a.Overall, how would you rate the success of your organisation?

1 Extremely successful
2
3
4
5
6
7 Extremely unsuccessful (put in red)
98 Don't know or unable to say

INFORMATION NEEDS

8. When it comes to information, how important is it that you have access to the types of information listed below?

Patent information
Original research articles in journals
Review papers in journals
Conference proceedings
Market research reports
Vendor white papers
Technical reports from government agencies, white papers etc
Doctoral theses/ dissertations
Legislative /Regulatory information (e.g. tax information, employee rules, import regulations etc)
Scientific and technical standards (e.g. ANSI, British Standards Institution, IEEE Standards, ISO etc)
Professional/Trade publications
Technical information (e.g. characteristics of materials)

Reference works
Clinical guidelines
Patient details (e.g. medical history, insurance details)
CME/Educational content

[Scale]
1 2 3 4 5 6 7
Not at all important Extremely Important (Don't know/Not Applicable)

Q8a (open end)
Are there any other types of information that it is important you have access to? If so, please describe below

Q8b. And of the various information types which you consider important, how would you describe your level of access to them?

Very difficult to access
Fairly difficult to access
Fairly easy to access
Very easy to access

[list all types rated as top 3 importance at Q8]

Patent information
Original research articles in journals
Review papers in journals
Conference proceedings
Market research reports
Vendor white papers
Technical reports from government agencies, white papers etc
Doctoral theses/ dissertations
Legislative /Regulatory information (e.g. tax information, employee rules, import regulations etc)
Scientific and technical standards (e.g. ANSI, British Standards Institution, IEEE Standards, ISO etc)
Professional/Trade publications
Technical information (e.g. characteristics of materials)
Reference works
Clinical guidelines
Patient details (e.g. medical history, insurance details)
CME/Educational content

Q8c.
[Randomly pick one element where it has been difficult:]
You said that you thought accessing <information type> was difficult. Why was it difficult accessing <information type name>? [Open end]

Q8d If you could improve access for one of the below information types which ONE would you choose?
[Show options from Q8b rated as Fairly or Very difficult]
[If only one option rated as Fairly or Very difficult at Q8b, skip Q8d and automatically punch this option]

9. How often do you access information that you require via the following channels? [Tick all that apply]

DATABASE/INFORMATION SERVICE
Government database
Electronic database to which the institute/company subscribes (e.g. patent database, drug interactions database]
Institutional repository or online preprint server (e.g. arXiv, dspace)
Via in-house information service

SUBSCRIPTION
Personal subscription
Colleagues' personal subscription
Institute/company subscription (e.g. via access from desk top, or via your institute's library)
Professional/society membership

LIBRARY
Via a local public library
Via a local academic library (not your place of work)
Inter library loan via a local library

OTHER
Author's own web page
Approach the author directly
Online Pay Per View (PPV)
Via an open access journal (typically a journal which is free to access but where an author pays to publish)

[SCALE]
Daily
2-3 times per week
Weekly
Monthly
Every 2-3 months
Every 3-6 months
Annually
Less often
Never

10. Approximately, how often do you read research articles that appear in journals? [Single Code]
Daily
2-3 times per week
Weekly
Monthly
Every 2-3 months
Every 3-6 months
Annually
Less often

Never [Go to demographic section]

10b. Approximately how many research articles do you read per year, either in print or online?

1-25
26-49
50-75
76-99
100-199
200-499
500+

11. How would you describe your current level of access to research articles? [SINGLE CODE]
Very poor (I always have great difficulty getting the journal articles I need)
Poor (I frequently have difficulty getting the journal articles I need)
Varies (I sometimes have difficulty getting the journal articles I need)
Good (I have access to most of the journal articles I need)
Excellent (I have access to all the journal articles I need)]

12. How does your current level of access to research articles compared with 5 years ago? Would you say that access has become… [SINGLE CODE]
A lot more difficult
A little more difficult
About the same
A little easier
A lot easier
Don't know

[If Q11 answered as 'Very poor', 'Poor' or 'Variable', ask Q13a]
13a. You indicated that your access to journal articles was either variable or poor. Have you had difficulty accessing the full text of a research article recently? [SINGLE CODE]
Yes
No

[If Q13a answered 'Yes', ask the following 8 questions]
13b. Approximately how many articles have you had difficulty accessing in the last 12 months? [Write in]

_____

20. On a scale of 1 to 7, how important was it to gain access to the full text of this article, where 0 is "Not at all important" and 7 is "Extremely Important"? [SINGLE CODE]

1 2 3 4 5 6 7
Not at all important Extremely Important

15. In relation to the last article you had difficulty accessing, why was it difficult? [MULTI CODE]
Unsure how to find the article
Searched online but could not find the article
Could not remember the exact name of the author and/or title of the article

Could not find the article in the library (library did not have a physical copy)
Tried to access the article from home, but discovered I could only access it from work
Found the article online, but had to pay to access the full article
Found the article online, had to pay for it, but had technical difficulties paying
Other
Please specify_____

16. In reference to this article, how did you learn about it? [MULTI CODE]
Searching using a general search engine such as Google, Yahoo, LiveSearch
Searching on a specialist search engine (e.g. Scopus, Web of Science, GoogleScholar, INSPEC, PubMed, etc)
A cited reference in a publication
Notified by a colleague or friend
It was referred to on a speciality website
Read about it in a magazine or newspaper
Heard about it on TV, radio
Other
Please specify _____

17. Which of the following did you do to obtain this article? [TICK ALL THAT APPLY]
Check access via your organisation's library or in-house information service
Check access via your local academic library (if not based in academia)
Check access via a local public library
Check access via a colleagues' subscription
Request an interlibrary loan from a library
Approach the author directly
Use a service such as *patient*INFORM, AGORA, HINARI, OARE etc
Look for an early version of the article on the web
Other (Please specify)_____

18. How did you intend to use this article that you had difficulty accessing? [SINGLE CODE]
Use it for work purposes
Use it for my studies
General interest
To get a better understanding of a medical condition either for myself or on behalf of a family member or friend
Other
Please specify_____

19. How specifically, did you intend to use this article? [ONLY ask if Q18 = a or c]
Competitor intelligence
Keeping up-to-date
Help resolve a technical or clinical issue
Background literature search
Hiring (e.g. background check on potential candidates)
Other
Please Specify_____

21. Please give us some details regarding this article, as best as you can remember.

Approximate year of publication:
Name of author:
Title of article:
Journal Name:

[If Q13a answered 'No', ask Q14]

14. Have you paid to access an individual research article within the last year?
Yes (Go to Demographic section)
No (Go to Demographic section)

[All respondents from this point onwards]

We'd now like to ask you some brief questions about you

22. Approximately, how many employees are there in your organisation? [SINGLE CODE] (ONLY ASKED IF Q1 = c,e,f or h)
Less than 25
25- 49
50 -249
250 – 499
500 – 999
1000 – 4999
5000+

23. Approximately, how many students are there at your institution? [SINGLE CODE] (ONLY ASKED IF Q1 = a or d)
Less than 499
500 – 999
1000 – 4999
5000 to 14,999
15,000 to 24,999
25,000 to 30,000
30,000 +

24. Approximately, how many beds are there at your hospital/medical school? [SINGLE CODE] (ONLY ASKED IF Q1 = b)
Less than 49
50 – 99
100 – 299
300 to 499
500 to 999
1,000+
Not applicable

Note: g (member of public) is not routed through any of the above demogs

25. How would you classify the area you work in? [Single code]
Arts & Humanities

Astronomy
Biological Sciences
Chemistry & Chemical Engineering
Computer Science
Earth Sciences
Economics
Engineering
Environmental Sciences
Life Sciences (e.g. biochemistry, genetics, immunology)
Mathematics
Materials Science
Medicine & Allied Health
Neuroscience
Pharmacology and toxicology
Physics
Social Sciences
Other
Please specify _____

26. What is your specialty within this area?
USE SEPARATE EXCEL LIST
Sub-group classification (to be drawn from ISI groupings)
e.g a) above "A&H", would be from Architecture, History, Humanities, Law, Philosophy

27. What is the activity type of your organisation? (ONLY ASKED IF Q1 = c)
Manufacturing
Service

28. Which of the following best describes your organisation's sector? (ONLY ASKED IF Q1 = c)
Aerospace
Agriculture
Chemicals
Computing
Construction
Education
Electricity & Gas Supply
Finance
Fishing
Food & Drink
Forestry
Machinery & Equipment
Medical & Precision Instruments
Metals & Fabrication
Mining
Motor Vehicles
Oil & Gas
Paper
Pharmaceutical
Public Administration
Media, Publishing & Printing

Quarrying
Recycling
Rubber & Plastic
Telecommunications
Textiles
Transport
Water Supply

29. What is your MAIN role within your organisation? [SINGLE CODE]
Research and/or development
Teaching
Engineering
R&D and teaching equally
Marketing/Sales
Management
Administration
Practitioner
Advisory/Consultancy
Student [Post-graduate]
Student [Graduate]
Member of the public
Other
Please specify_____

30. Which of the following categories does your age fall into? [SINGLE CODE]
Under 25
26 to 35
36 to 45
46 to 55
56 to 65
Over 65
Prefer not to say

31. In what country are you based? [SINGLE CODE]

32. What is the name of your institution? (You do not need to answer this question if you prefer not to, but it will help us understand where there are specific issues with access)

33. Would you be happy to participate in some follow-up research, where we discussed in a little more depth your responses given above? [Ask only if corporate]
Yes
No [Finish]

The survey is now complete. Thank you for taking part in this important study.