

Recent Processes of Change from the Perspective of Academic Publishers

Niels Taubert

Like science itself, the academic publishing companies are characterised by a high degree of heterogeneity. They vary strongly with regard to their size, their products, their willingness and capability to innovate – there is obviously a relationship of correspondence between the publishers and their characteristics, on the one hand, and the different areas of science and their forms of announcing research results, on the other.¹ The ‘Future of the Scholarly Communication System’ interdisciplinary working group (IWG) invited representatives of three academic publishing companies as well as one editorial staffer to present this diversity and to ask which effects digitisation, economisation, an increased use of performance indicators, as well as medialisation have for the publication landscape. The objective of the discussions and interviews was to obtain a multi-layered picture of the publication landscape, which would reveal significant similarities and differences regarding the business models and positions towards the demands in science policy (for example, open access).

The evaluation of the conversations is organised as follows. In a first step, the four publishing companies – represented by the interviewees and their current position on the market – are introduced. Then, the effects the publishers have on the structure of the market is questioned. Here, the focus is on how the publishers position themselves with respect to central developments and which role they play with respect to the digitisation of the publication infrastructure. The spectrum of roles ranges from the protagonist, who actively participates in

¹ Schimank & Volkmann (2012: 170).

the design of the process, to the defensive market participant who, for various reasons, cannot play an active role and is rather a victim of the development. In a third step, the attitudes of the publishers regarding demands in science policy for open access to publications are contrasted. In addition to the basic position towards this development, the attitude towards green and gold open access (OA) models is also of interest. A second important demand in science policy is the creation of transparency. Since especially public funds are used to finance the scholarly communication system, there are calls for transparency of the cash flow. The positions of the publishers on this issue are fleshed out in the fourth step. The evaluation concludes with a summary of the findings.

1 Introduction of the publishing companies

Interviews with representatives from the following companies were conducted:

- Springer Science+Business Media
- Angewandte Chemie/Wiley-VCH
- Walter de Gruyter
- Lucius & Lucius

1.1 Springer Science+Business Media

The publishing group Springer Science+Business Media is a large publisher, and was represented by interviewees I-1 and I-2. According to the 2011 business report, the turnover was € 875.1 million (Springer 2011: 5). The group publishes more than 2 900 academic journals. The Web of Knowledge calculates a Journal Citation Report for 1 293 of these journals.² The majority belongs to the publishing company, and a large number of the journals are considered to be central in the respective discipline or field of research. Moreover, the group also publishes books and book series. The current digitisation project, Springer Book Archives, aims to make all titles that have been published since 1840 electronically available. It is assumed that after the project has been completed, a digital library will have been created that will include more than 100 000 titles. Finally, a number of databases are also part of the portfolio of the group.

The size and structure of the company are the result of a decades-long strategy of growth. Particularly the past 15 years deserve special attention since

2 This and information on the other publishers were found in the 2011 Journal Citation Report. For this purpose, all journals of the group represented in the Science Citation Index (SCI), Social Science Citation Index (SSCI) and Arts and Humanities Citation Index (A & HCI) were counted (see the Springer website under 'Imprints and Publishers', <http://www.springer.com/?SGWID=1-102-0-0-0>)

the acquisition activities have developed dynamically in this period. In 1999, the Bertelsmann Group bought Springer Verlag and included the publishers Gabler, Teubner and Heinrich Vogel in the group BertelsmannSpringer. Four years later, in 2003, the financial investor Cinven and Candover purchased the publisher Kluwer Academics and BertelsmannSpringer and merged these publishing companies into the group Springer Science+Business Media.³ With the acquisition of VS Verlag and its integration into the group as Springer VS, the aggregation stopped for the time being. In the recent past, ownership once again changed. After the investment trusts EQT and GIC had acquired a 90% share of the group in 2009 for € 2.3 billion, it was announced in mid-July 2013 that the publisher had been sold for € 3.25 billion to BC Partners.⁴

According to the company, Springer is a publisher that successfully operates in a global market and practises an international division of labour. Moreover, it views itself as a technological pioneer that advances and creates new developments in the context of digital publication. This became apparent in several passages of the interviews with the company's representatives. For example:

We are, of course, an international publishing company with German-Dutch roots since the merger with Kluwer Academic. Not everybody likes to hear this. We also meanwhile have more own employees in India than in Germany, and we are rapidly expanding in Asia, South America, and Africa. [...] What is really interesting, especially about Springer, which was not considered the most modern publisher, is that we were the first to provide an Internet platform for contents. Springer Link went live in 1996 – that is hard to imagine today. So, if people say Springer is a traditional publisher, old-fashioned and so on, then that is totally wrong. The revolution, especially in publishing, is behind us, that was the Internet. (I-1)

Due to its broad portfolio, the company has a significant position and is basically able to shape the market for academic publications together with other large publishing houses. The abovementioned strategy of acquisition has at the same time led to a reduction in the number of independent academic publishing companies and an increase in the number of journals belonging to Springer. In addition, the relationship to the customers of scientific publications – the

3 A short summary of the company's history can be found at <http://www.springer.com/about+springer/company+information/history?SGWID=1-175807-0-0-0>.

4 See <http://www.bloomberg.com/news/2013-06-19/bc-partners-to-buy-springer-science-for-4-4-billion.html>. The short periods in which ownership changed indicate that there are no long-term active portfolio strategies that aim at making a stable profit, but that rather these are businesses, which pursue maximising the difference between wholesale and retail sale prices of the object 'publisher'.

academic libraries – is of interest here. For a long time, the business model was to sell subscriptions for printed journals.

Already during the 1980s, prices increased in this model, which wasn't only due to the growth of the journals and their overall number or to cancellations of subscriptions by financially troubled libraries.⁵ There is evidence that journal prices in the subscription model do not primarily follow the costs of production but the price that can maximally be achieved, which has its limitation in the budget of the libraries. The discrepancy of production costs and market price is the result of several specificities of the market for academic publications. First, on the side of providers of publications – especially in the area of science, technology and medicine (STM) – there is a strong tendency of concentration, which has led some observers to describe the landscape as an oligopoly (see European Commission 2006: 50). Second, scientific journals are individual, non-replaceable goods. Since they have the objective to publish original research contributions exclusively, they differ from each other with respect to the published contributions and the research results that they present. Particularly those journals that are ranked high in the pyramid of reputation are 'must-have' journals and the demand is correspondingly inelastic.⁶ Third, there is also a speciality on the side of the customers, which makes it easier for the publishers to enforce price hikes. Publications are usually not demanded by scientists themselves but by libraries or library consortia. The demand for a publication and budget responsibility thus lies with two different actors (Brininger 2010: 334; Parks 2002: 324). For individual scientists, it is rational to signal strong demand to the libraries while remaining ignorant with regard to costs.

In the second half of the 1990s,⁷ the 'journal' product was supplemented by coarse and fine-grained units through which publications are commodified (Hanekop & Wittke 2006: 203–204; 2013: 151). In the age of digitisation, the commodity 'publication' comes in various forms. A smaller unit is the sale of or temporary access to individual articles;⁸ the larger unit is the sale of so-called 'journal bundles' (bundle deals or big deals). Following the discussion in the literature, big deals seem to be of large significance for the journal market.

5 The increase in prices is documented in the literature. See Kopp (2000: 1824), Panitch and Michalak (2005), European Commission (2006: 16), Kirchgässner (2008: 138) and Boni (2010: 294).

6 See Odlyzko (1997) and Wylly (1998). The latter compares the profit of the four largest academic publishers by means of different measurement numbers and takes the resulting rates of profit as indicator for the lack of competition on the market and the presence of structural problems, which make absorption of monopoly profits possible.

7 The exact time is hard to tell. In the literature, bundle or big deals are mentioned since at least 2001 (Frazier 2001), the pay-per-view model, at least since 1995 (Harnad 1995).

8 A rental can entail a transfer of different usage rights. Of significance are digital rights management systems, which make it possible to restrict usage to a certain period or to allow only certain ways of usage (for example, the creation of a printout).

Their role was also addressed in the interview between the IWG and the Springer representatives:

What we have today is that the academic publishers sell a lot of their journals in packages to universities, which corresponds to the legalities of the digital age, where those systems have an advantage that has a lot to offer. (I-2)

So where are the mentioned benefits of this model for the publisher? In big deals, journals are no longer disseminated individually. Instead, there is digital access to a group of journals compiled by the publisher. Both partners enter a binding contract for a certain period, which entails that the publisher caps prices for the package while the libraries are obliged not to exceed a certain percentage when cancelling their journal subscriptions. The advantage for libraries is that they gain access to journals at a relatively low price, while the advantage for the publisher is that they can bind part of the library budget in the medium term. As indicated in the interviews, this business model favours publishers who have a large portfolio of journals. A second aspect of bundle deals, which also strengthens large publishers as providers of non-replaceable products, is the confidentiality clause. The libraries are obligated to keep the conditions of the bundle contracts confidential. This prevents the market providing information to third parties.

1.2 Wiley-VCH

Interviewee I3 was not a representative from the management of a publishing company but a member of the editorial staff of the journal *Angewandte Chemie*. The journal is owned by a scientific society, the Gesellschaft Deutscher Chemiker (GDCh), and I3 was employed by the publisher Wiley-VCH at the time of the interview. This constellation already indicated the close connection between the society and the publisher. Wiley-VCH is also part of a larger group, namely Wiley-Blackwell. The name indicates that the group has emerged from a process that can indeed be compared to that of Springer Science+Business Media. The aggregation included a 90% partnership with VCH (1996), the acquisition of Van Nostrand Reinhold (1997), the acquisition of the publishers Hungry Minds (2001), Whatsonwhen (2006) and finally Blackwell Publishing (2007).⁹ The group can thus also be considered a large internationally operating publishing company and, according to its website, it had revenues of USD 1.743 billion in 2011. It publishes 1 500 specialised journals, 1 227 of which are indexed in

⁹ The history of the group is documented on its website. See <http://eu.wiley.com/WileyCDA/Section/id-301697.html>.

the Journal Citation Report (JCR) of the Web of Knowledge, and the company considers itself the largest publisher associated with scientific societies. Similar to Springer Science+Business Media, the company also publishes 10 500 books, anthologies, conference proceedings and databases. Wiley aims to cover all areas of science but also generates profits through publications that address a broader readership.¹⁰

With about 30 000 members, the GDCh is the largest German scientific society in the field of chemistry. Until 1996, the society published its contributions, which are aimed at scientific and professional publics, through its own Verlag Chemie. With the advent of digital publication, it sought a partner who was able to handle the changing standards, and found Wiley. The journal *Angewandte Chemie* is, so to speak, the flagship of the society. Contrary to what one would expect from the title, the journal is published in English, and is one of the most successful journals in the field: the JCR of 2012 shows a journal impact factor (JIF) of 13.455. The number of publications (citable items) is, according to the JCR, a remarkable 2 002. While there are six journals in the subject category 'multidisciplinary chemistry' that have higher impact factors of up to 40, these are significantly smaller and more selective in the choice of articles. Noteworthy here is the journal *Advanced Material*, which has an impact factor of 13.877 and 789 citable items, a notable number of publications. In the subject category, only *Chemical Communication* is larger with 3 408 publications and the *Journal of the American Chemical Society* with 3 176 publications. Their JIFs of 6.169 and 9.907 are, however, below that of *Angewandte Chemie*.

Due to this construction, the model of cooperation between the society and the publisher is the focus here.¹¹ There is a contract between Wiley and the society, according to which the journal is owned by the GDCh; the publisher is responsible for publication and pays a sort of lease. This model is also used by other scientific societies that are not able to publish their journals on their own and thus transfer this task to a professional publishing company. The publisher generates a turnover in this model by selling printed and electronic versions of the journal either individually or as part of a bundle to libraries. Part of this profit is given to the society and serves to cover their costs – for example, for editorial work and organisation of the peer review. In addition, the money is also used for activities that are outside the area of scientific publishing, such as the organisation of conferences, the endowment of awards or the promotion of young researchers. Such a lucrative lease model is, however, not possible with every journal but is subject to certain conditions. In order to generate notable

10 An example is the series 'For Dummies', which aims to provide knowledge in an easy to comprehend way. See <http://www.dummies.com/>.

11 The cooperation model goes beyond *Angewandte Chemie*, as of the 21 journals of the society, 20 are published by Wiley-VCH. *Angewandte Chemie* is, however, the most significant journal.

profits, the journal has to be outstanding and visible and of special value for the publisher.¹² This became obvious in the conversation with the interviewees from Springer who compared different types of cooperation between publisher and specialised societies.

And the societies come to us; there is, of course, a hierarchy. There are very good, powerful societies for which we would like to work, and there are smaller ones where we say, okay, that will not have much of an impact for us prestige-wise, but yes, we can also do that. With the larger powerful societies, it is mostly about how much money we pay them for the privilege to edit or publish their journals. These are tough negotiations. The societies hire advisors who really work out the best deal for them. And the publishers compete for the societies [...] But eventually it depends on how much prestige this journal has, that we can include it in our package, that librarians want to have it and, how much income the societies can expect from the publisher. (I-1)

According to this interviewee, for the publisher, the primary value of the journal of a specialised society is its significance as a potential flagship for a journal package. Renowned journals are of strategic importance in the bundle model as they enhance the attractiveness of the respective packages and lead to higher prices and better sales.

1.3 Walter de Gruyter

Walter de Gruyter was represented by I-4, a member of management. The publishing house is located in Berlin, publishes in several languages, and aims to provide communication channels for all areas of science. The extent of coverage varies, however. While the company is in a leading position in certain sections of linguistics, it lags behind others in the major areas of science. The portfolio is, however, broad and includes some interesting titles, such as the standard reference work in medicine, *Psychrembel*. Of the 120 journals, 45 are indexed in the Web of Knowledge. Among them are journals with some visibility in the respective disciplines. The majority, however, is ranked average or low with respect to their subject categories or JIF. The history of the company dates back to 1749 when the oldest of the five founding publishers (bought by Walter de Gruyter) started its business. According to its website, in 2011, its

12 The strategic value of the cooperation with the specialised society is emphasised by Wiley (1998), 'the acquisition of the VCH Group further strengthened Wiley's leadership in these markets'. See <http://eu.wiley.com/WileyCDA/Section/id-301697.html>.

turnover was € 42 million. The company profile and its self-conception are expressed in the following quote:

De Gruyter is, in a sense, a small publisher in many languages. We do, however, have the entire scope of an academic publisher ranging from archaeology to zoology. In some areas, we are the leading publisher. In linguistics, maybe internationally, but those are almost the exceptions. The challenge is how you cover this broad scope – science is not only STM but all areas from A to Z – to develop something technical, develop an offer that covers as much as possible? The communities think differently, the scientific discourse, scientific publishing is not the same everywhere. (I-4)

Similar to the two large publishers described above, De Gruyter has acquired smaller publishers up to the present: the acquisition of Max Niemeyer and K.G. Saur Verlag as well as Oldenbourg Verlag and the Akademie Verlag in 2013 should be noted.¹³ These purchases, however, were smaller in size and the aggregation is limited. Thus, the company is visible on the market but its position is much weaker compared to large publishing companies – it could be purchased by a larger player in the market. De Gruyter also uses bundle strategies for the dissemination of journal packages.¹⁴ In view of the smaller number of journals and the smaller number of highly reputed journals it can be assumed that De Gruyter is not able to bind parts of the library budget the way the larger publishers do.

1.4 Lucius & Lucius

The publisher Lucius & Lucius is a small publishing house led by its owner (represented by I-5). Its programme is limited in two ways. On the one hand, the focus is on certain disciplines, namely economics and sociology; the company also publishes a series on the history of agriculture.¹⁵ On the other hand, the language is mainly German.¹⁶ The company publishes 19 journals, of which three are indexed in the JCR of the Social Science Citation Index (SSCI). It has to be noted, however, that the two disciplines are covered only to a limited extent by the SSCI. Furthermore, the company publishes anthologies

13 See the fact sheet of the company at https://www.degruyter.com/staticfiles/pdfs/1410_Fact_Sheet_Imprints_de.pdf.

14 Information about the journals as well as their prices can be found at <http://www.degruyter.com/page/849>.

15 The series is the *Quellen und Forschungen zur Agrargeschichte*. See <http://www.luciusverlag.com/reihen/qfa.htm>.

16 Among the 19 journals, one is in English (*Review of Economics*) and there are individual monographs in English.

and monographs. It ended its production of educational books a few years ago. In the interview, the profile of the company was characterised as follows:

If I start with journals, that's an area which, with few exceptions, does not need subventions and despite a decrease in sales numbers still works. On the other hand, people complain about the increasing subscription costs. I have journals with 150 subscribers and I think it's quite an achievement that almost all publishers can publish these journals [...]. Without direct funding. [...] The only area in my company in which I will continue to sell monographs is a good series on the history of agriculture. (I-5)

The limited number of journals is an essential part of the company's portfolio even though sales are declining. The number of subscriptions is low, and varies between 150 and 700. In contrast to many of the journals owned by Springer (and also *Angewandte Chemie*), these are not 'must-have' journals, and cancellation on the side of the libraries would not necessarily raise a lot of attention. This explains why the maximum sales price is achieved early on and – from the perspective of the publisher – higher prices for additional services, such as a digital version, can hardly be set. For a turnover that remains the same, the costs of the digital version lead to lower profits.

Economically, monographs are not of significant interest to the publisher, as is expressed in the following statement:

The second area are the monographs. They are mostly financed, I would say they are productions on assignment. I don't look for this type of monograph. Rather, scientists, institutions, organisers of some symposia come and say, we want to print this. And we do that if it is economically possible. [...] The sales numbers have decreased dramatically meanwhile. We produce monographs of which we don't even sell 100 copies, it's pretty tough. (I-5)

In the area of monographs, the publisher does not actively seek to acquire manuscripts but is rather passive. This is due to the low expectations of profit. The publication of a monograph or anthology is usually only possible and economically feasible if it is funded. This can be the case if a certain number of copies are guaranteed to be sold or if there are additional funds for printing.

This publisher's position in the market is precarious. Due to their smaller size, the journals cannot be disseminated in the form of bundle deals but only individually. The sales of monographs suffer from the fact that large parts of the library budget are bound to bundle contracts with larger publishers (Kopp 2000). The owner has meanwhile retired, was not able to find a successor, and the publishing house was sold to De Gruyter as a consequence. Therefore,

Lucius & Lucius can be regarded as an example that illustrates the dynamics of a market that works against smaller publishers.

2. Effects of digitisation

The introduction of the publishing companies and the description of their positioning indicate that the market for scientific publications rewards size. Big players are able to make big profits and have a significant effect on the market. Through their activities in acquisition, they have an influence on the constellation of the providers, and through the development of products and their changes in price, they also influence the kind of demand. In this second step of the analysis, the focus is on the influence digitisation has on the strategic position of the different types of publishers. The presentation will be oriented towards the respective effects, which – if appropriate – will be described in more detail.

2.1 Investments in digital infrastructures

One major effect of digitisation results from the extensive financial investments which are needed for the development, maintenance and monitoring of an information and communication infrastructure. Here, two things need to be taken into account. First, the establishment of such an infrastructure is more complex than simply providing PDF files on a server that is connected to the Internet. The platform has to provide metadata and search functions, should be listed in library catalogues and search engines, and needs a rights management system which limits accessibility to persons who are in the possession of the necessary licences. For certain business models,¹⁷ it is necessary to connect the platform to electronic payment systems. Not only the dissemination of publications is based on a digital infrastructure: production processes, too, use electronic systems to a large extent. Online editorial management systems¹⁸ support the peer-review process and organise a workflow that ranges from submission to occasional linguistic editing to typesetting. Second, the development of a digital infrastructure does not end but is a process that constantly brings forth new challenges and waves of innovation. Current examples here are the connection of publications to research data in the

17 For example, the individual dissemination of articles.

18 Examples of such platforms are Editorial Manager (<http://www.editorialmanager.de/>) and Open Journal Systems (<https://pkp.sfu.ca/ojs>).

sense of enhanced publications, the goal being to replace PDF as the common format,¹⁹ or the connection to user-based data (usage-based metrics).²⁰

The development of digital infrastructures entails high investments, which are especially visible in the case of Springer. Interviewee I-1 describes these platforms as ‘very, very expensive’ and makes it clear that a large part of the company’s profit is invested in infrastructure.

The profit is not as large as with some competitors but it is a good business and in the past years, the profit was 24%. Of these 24%, about half were reinvested into the company, among others for the new Springer Link platform. One quarter was invested in other internal systems, and a quarter was dividend payouts to the owners. (I-1)

These investments represent one factor that leads to a differentiation of publishing companies’ positions. While large publishers, like Springer, are able to shoulder these costs and to develop a digital infrastructure actively on a broader scale, this is not the case for smaller companies. Their reactions differ. One possibility is to cooperate with a large publisher. As described in the case of a scientific society and by I-3, this can take place in the form of a lease model. In addition, two or more companies could cooperate, for example, by using the same online platforms or pathways of dissemination.²¹ Especially small companies are under pressure because of digitisation and particularly because of their limited financial resources.

It’s totally clear, we cannot even do the programming ourselves, we have to buy all the stuff from specialists or have something made in cooperation with our colleagues. A smaller publisher cannot even work in this area autonomously anymore, that’s a big problem for us. It’s becoming more expensive because this hybrid function is indispensable nowadays, and we have little say in the design, we have to work with kits that are offered somewhere on the market. (I-5)

With regard to digitisation, size is essential since it is a prerequisite to be able to shoulder the financial expenses necessary for the development of platforms. The creation of in-house expert units, as in the case of Springer, or at least the assignment of developmental tasks, are framework conditions under which opportunities for deciding on and designing an individual digital strategy

19 A much-discussed alternative is XML format.

20 For example, Altmetric (Aldie & Roe 2013).

21 For example, the partnerships of De Gruyter: https://www.degruyter.com/staticfiles/pdfs/1410_Fact_Sheet_Imprints_de.pdf.

emerge. Size is also essential with respect to the efficiency of the investment – the developmental costs for an infrastructure decrease with the broadness of its use.

2.2 Development of new products

Digitisation provides new opportunities regarding the product. In times of print, the product was, so to speak, what fitted between front and back covers, and there were only variations with regard to the number of such units that were subject to a transaction.²² Today, there is a diversification and the front–back cover unit has lost significance. Digitisation makes it possible to commodify publications in different formats and to develop a variety of business models. The bundle deals and individual dissemination of articles have already been mentioned. But there are also other types of products. One example is retro-digitisation of old and rare literature. Here, large and small publishers have different perspectives on the marketability of such a product.

We have continuously expanded archiving. One of the first things we did was the retro-digitisation back to volume 1, issue 1. Back to the 19th century. Of course, we did not offer that for free, not because we are good people and archivers, but because we saw a product that libraries wanted to have. We do the same now with all books. It goes back almost to the 18th century. [...] But once we are done, we have 100 000 titles in our archive that go back to the 1840s. (I-1)

This statement reveals that the goal is to make all of Springer's publications permanently available and that digital backlists of journals and rare monographs are seen as a product in which libraries are interested. In this context, it is not primarily about the sale of access to individual works but to larger parts or even the entire inventory of a digital library. Interviewee I-5 took a different position when asked about retro-digitisation:

I have thought about this question a lot. Today, I could put all my old books on a platform and then print them out in an on-demand system [...] I would then have about 20 000 titles. But you don't need [...] complex calculations to figure out what digitisation would cost and what the download probability of old data would be. So the treasure, that's my opinion, is totally fictitious. I don't earn money with things that are older than ten years. (I-5)

²² Thus, in the case journal publications, the distribution of journals in the framework of subscriptions or the distribution of single journal issues.

The diametric perspectives of marketability of retro-digitised publications lead to the question why this is so. Why does one publisher invest heavily in retro-digitisation while another one does not see any opportunity to gain money through this strategy? There are supposedly several factors that may affect the position of the publishers. Aside from the time span of the reception of a publication, a factor mentioned in the second interview passage, the average quality of rare works may have an influence on the marketability of retro-digitised inventories. A third factor is probably the language in which the works are published, as the sales market of English publications is larger than that of German ones. Moreover, the volume of retro-digitised publications may have an influence. The number of journals edited by Springer is well over 100 times more than that of Lucius & Lucius and the number of monographs already five times higher. Therefore, the interest of libraries for packages of retro-digitised publications may increase if the inventories are perceived as collections of certain significance with respect to their size and coverage of fields.

De Gruyter has developed an innovative model of retro-digitisation of out-of-print publications. It aims to transfer printed works into a digital product without having to shoulder heavy investments upfront.

De Gruyter has produced more than 40 000 book publications in 260 years, and it was quite clear from an economic perspective that we cannot and don't want to digitise all of them, regardless of rights. I mean there are also a lot of works where the author has been dead for 70 years, if you go back to 260 years.²³ There we just said, we let the user decide what he wants. That's the model we introduced with this edition three years ago. We only offer metadata of the 40 000 articles and then we let the users, libraries or researchers decide if they want a copy of this book printed, digitised or newly bound or an electronic version like a modern e-book, which is then made available as an e-book by chapters. (I-4)

In general, this strategy aims at a smaller product in which not a large part or even the entire inventory is combined into one product, but individual works are digitised and disseminated according to demand. This limits the financial investment at the beginning, but also the potential sales volume.

Another advantage of size is apparent with regard to the risks that the introduction of new products entails. Large academic publishers offer individual sales for the dissemination of individual journal articles, and a publisher such

²³ According to German copyright law, copyrights expire after a period of 70 years post mortem auctoris and publications can be copied and distributed without any restrictions.

as De Gruyter also follows this strategic model. An exception, however, is Lucius & Lucius.

That's a very special question, whether you want to sell individual articles. At the moment, I am ambivalent and cautious about that because I am worried that [...] it would kill the subscriptions. It could also be the other way around, that there are demands from people who would never have subscribed to the journal; then it would be an additional sale. The question is very complicated, and I have to say, the individual sale of journal articles is, at the moment, not one of my goals. (I-5)

The business model of individual dissemination, which became possible as a result of electronic publication, is not implemented here because the effects are unclear. It could lead to new income; however, it could also harm subscription models that are important for the publisher. The reason why the publisher in this situation pursues a risk-averse strategy needs to be seen in terms of its size. First, the financial resources for executing such an experiment are scarce. Second, in contrast to a large publisher, a small publisher does not have the opportunity to experiment with new business models in a separate area, which is large enough to gain experiences for the entire programme of the company, but small enough to keep the financial loss in case of failure at a minimum.

2.3 Making international division of labour possible

It has been mentioned above that digitisation not only concerns dissemination but also provides potential to reorganise the production process. Examples are editorial management systems, which allow a restructuring of all processes of scientific review and decision about publication of a manuscript up to the production of accepted articles on the basis of a digital platform. The implementation of such systems is complex, and it is a significant challenge, especially for smaller publishers.²⁴ Since the product (the publication) with all its previous versions and all related documents (such as reviews and correspondence between all involved persons) are digitally available, the systems could be used to outsource individual working steps and to have them completed at different locations. Such outsourcing took place in pre-digital times, after the founding of the first journals on behalf of the academic

²⁴ Here, Lucius & Lucius, whose journals do not use such a system, should be mentioned again. The publisher offered it to the editorial staff of its journals, who rejected it due to the small number of articles published each year. In view of the complexity and financial investments, the publisher was relieved by this decision, although he speaks of a 'grace period' until they do want to implement such a system after all.

editorial offices by introducing peer review. Here, scientists outside of the editorial staff were assigned to evaluate the worthiness of publication of articles on paper. This took place quite early in the history of journals and followed the criterion of competence. Online editorial management systems moreover allow outsourcing that follows the criterion of economic efficiency, namely outsourcing of individual working phases in production.²⁵ The employees of Springer in India are responsible for the technological production of the articles, i.e. the hardcopy printing and the compilation of issues. This shows that the systems are able to establish an international division of labour, which follows the principle of cost-minimisation. This potential of digitisation can, however, only be fully exploited by larger publishers, since such an outsourcing entails significant investments that will only be profitable with a large number of journals.

Overall, it can be stated that digitisation ‘rewards’ the size of the publishing companies in many respects:

- It is much easier for large publishers to produce the necessary investments for the establishment of digital infrastructures.
- Due to their financial power, large companies can co-determine the design of such infrastructures.
- With regard to the products, it can be said that size not only enables certain forms of dissemination – bundle deals – but special products are also marketable only if they have a certain size. This concerns, for example, the retro-digitisation of out-of-print inventories.
- Experimenting with new products and abandoning old and reliable business models could turn out risky for small publishers quite fast while larger publishers can control such risks.²⁶

3 Attitude towards open access

After analysing the effects of digitisation with regard to the size of academic publishers, the focus is now on the companies’ perspective towards open

²⁵ See Taubert (2012).

²⁶ Two more factors that reward size should be mentioned. On the one hand, there are so-called ‘cascading strategies’, in which a publisher has a hierarchy of journals and transfers articles that were rejected by one journal to another journal ranked lower in this hierarchy. This strategy aims at binding submissions to the publisher. On the other hand, there are services and other products that are connected to journal databases. Examples are the database Scopus, which gets its citation data from the Elsevier journal database, Science Direct, and the electronic evaluation tool, Sci Val. See <http://www.elsevier.com/electronic-products/scival>.

access. Aside from the general attitude, the attitude towards the two variations of green and gold open access will be illustrated.

3.1 Springer Science+Business Media

Springer describes itself as being open-minded and progressive with regard to OA publishing.

First, on open access: It's true, we are a bit more open or progressive or more willing to experiment than other publishers. [...] We said, good, if scientists want to have that, if the scientific community wants to have open access, who are we to say no? We are the publisher, and if they say, no, we would rather have it organised like this, we either have to try it or the options are to say no. Other publishers have done that. (I-1)

According to this statement, Springer considers itself – in contrast to other publishers – an actor who is oriented towards the needs and wishes of science. Looking at the activities of the company, it should be noted that this is not merely rhetoric, but that the demand for open access is, at least in part, being fulfilled. Thus, the self-archiving of articles published in Springer journals is allowed if it is the author version of the relevant contribution. At the time of the interview, this right referred to the self-archiving on homepages and in repositories. In reaction to the Finch Report (Finch Group 2012) and the recommendations of the Research Council UK, Springer tightened its green open access policy.²⁷ Now, the immediate self-archiving on a home page and archiving in a repository are allowed after an embargo period of 12 months. If, however, a file has been deposited in a repository before publication in a Springer journal, it can remain there.²⁸ The interview made it clear that there are reservations towards green open access:

The somewhat perverse thing about green open access is that the article will be put on a repository after an embargo period, and that the green open access model relies on a well-functioning subscription model. It could, however, lead in some disciplines, which are not centrally financed [meaning through

27 The policy is documented at <http://www.springer.com/gp/open-access/authors-rights/self-archiving-policy/2124> and on the Sherpa/Romeo-List at <http://www.sherpa.ac.uk/romeo/search.php?id=74&flDnum=1&mode=simple&la=en&format=full>. It is, however, disputed whether there can be a differentiation between self-archiving on homepages and an institutional repository. For example, a link on a repository could lead to a version on a home page. This makes it possible to use the functionality of the repository to find a document.

28 Changes in the green open access policy refer to a basic problem. These rights that publishers grant the authors could be revoked in the future. This can go so far that a publisher no longer allows self-archiving at all.

bundle deals], to the death of smaller publishers and smaller journals because they are no longer able to deal with it financially. I can guarantee you that no matter what will be decided on the EU or Federal level [...] Springer [...] will find models to advance. (I-1)

The attitude towards gold open access is quite different. This form of freely accessible publication is viewed as compatible with the interests of the publisher:

In the last two years, we agreed on a position, internally: gold model open access. We will do what is sustainable. We are neutral here. Neutral is the word that we use. The problem with open access, at least the golden version, is that it is ideal for disciplines that move rapidly, in biomedicine, for example, in genetics. Because these disciplines are mostly supported financially in a central manner. The social sciences, the humanities are another thing. Gold open access, where are the resources? It's about the resources. (I-1)

This emphasised neutrality of Springer refers to two business models of journals. The publisher offers a model on the side of the authors (gold open access) as well as one on the side of the recipient (subscription model), none of which is treated as priority. This indicates that Springer sees gold open access as an opportunity to maintain its position on the market and to make similar profits as in the subscription model. Economic sustainability is achieved through the following prices: in the case of gold OA journals – i.e. the Springer journals that are financed via article processing charges (APCs) – the fees range from € 500 to € 1 500.²⁹ Fees are higher in the case of optional open access/hybrid open access (Springer Open Choice), where open access to an individual article is paid for in an otherwise restricted journal. The APCs range from € 2 200 to € 3 000.³⁰ In this model, too, one aspect is viewed critically: while the model is compatible with Springer's economic interests, it currently only works in some areas of science due to lacking financial resources.³¹

29 See an overview of the Springer Open Programme at <http://www.springeropen.com/>.

30 <http://www.springeropen.com/get-published/article-processing-charges/how-much-is-springeropen-charging>.

31 Ways of financing are presently being created, among others, through partially DFG-supported publication funds. Its 'Guidelines for Open Access Publishing' state the following funding conditions: 'The articles to be published appear in journals that make all articles available over the internet to users free of charge as soon as they appear (pure, gold open access journals) and that they apply recognised and strict quality assurance procedures' (DFG 2013: 9). The APCs should amount to no more than € 2 000. Support for optional open access is ruled out, so as to avoid 'double dipping', i.e. dual payment for the same publication. Nor can publications that do not appear in journals be paid from these funds.

3.2 *Angewandte Chemie*/Wiley-VCH

The editorial staff member of *Angewandte Chemie* took a critical stance towards any form of open access. Freely accessible publishing is rejected in its entirety even though the interview did not reveal any clear position towards open access. Regarding self-archiving, the author is not allowed to deposit his or her article in a repository or on a home page. According to I-3, it is, however, acceptable for an author to link their publication list on their home page with the article published in *Angewandte Chemie*. Thus, the author's rights in terms of the journal are very limited. The informal exchange of PDFs is accepted, and the use of the Internet as a public place to deposit an article is understood as publication and therefore rejected.³² This rejection refers to the scientific idea that every research result should be published only once and that *Angewandte Chemie* provides appropriate accessibility.³³ Redundant publication is criticised. This is continued in gold open access. *Angewandte Chemie* offers optional open access.³⁴ But with 20 to 30 contributions per year and 0.4% of the number of articles published each year, the relevance of this model can be discounted. The publisher does not consider its interest in profits compatible with the interest of the scientific society in remuneration from an APC-financed model of gold open access.

Two kinds of connections are possible. In the case of the subscription model, the price of a journal or the profit that goes to a specialised society, as well as the quality are positively connected. High quality of a journal is a precondition for achieving high prices. In this model, the economic goal of maximum profit is equally oriented to the scientific goal of a stricter control of quality. In the case of the funding of a journal via APCs, the type of connection changes, according to the perspective of I-3. The profits of a journal are first dependent on the number of articles that are published and less dependent on their quality. The interviewee stated, however, that the conflict between gaining profits and controlling quality could be detrimental to the latter. The general view regarding the financing of gold OA journals via APCs is thus critical.

32 See the Copyright Transfer Agreement of *Angewandte Chemie*. Sending an article to individual persons is allowed; systematic dissemination, such as posting the article on a website or a mailing list is prohibited. See <http://media.wiley.com/assets/1540/98/ctavchglobal.pdf>.

33 This argument only holds if one takes a repository to be a place of publication, and the deposited version as a publication. The argument is countered, however, by the fact that not all functions of registration, certification, dissemination and permanent accessibility are guaranteed by a repository (Andermann & Degkwitz 2004: 36).

34 This is in the framework of Wiley's general model, OnlineOpen. The APCs are € 3 500. See http://onlinelibrary.wiley.com/journal/10.1002/%28ISSN%291521-3773/homepage/2002_onlineopen.html.

3.3 De Gruyter

The publisher De Gruyter is strongly engaged in the promotion of unrestricted access to scientific publications. It has a broad OA programme and seeks cooperation with libraries³⁵ and research organisations.³⁶ It has a green OA policy³⁷ that allows self-archiving of contributions in anthologies and journals 12 months after publication – in the publisher’s version.³⁸ There are, however, restrictions concerning the place of self-archiving, which is only allowed in institutional repositories and one’s own website.³⁹ Commercial archives are explicitly prohibited. This is understandable insofar as this could enhance the product of a competitor. The interviewee was against limitations in self-archiving, and thus had a more permissive position than the publisher.

And also the limitation that you cannot put your own contributions in some form or another on some server, I think has to be reconsidered because that limits visibility. (I-4)

With regard to gold OA, De Gruyter is open-minded as well. It offers an optional or hybrid OA option for all of its products including monographs, anthologies and articles in journals. Especially the acquisition of the OA publisher Versita in 2012⁴⁰ strengthened De Gruyter’s position on the market for gold OA journals. The fees for an article in an OA journal or anthology are currently € 1 750. In the following statement, however, I-4 made it clear that he did not view the financing of gold OA publications based on APCs for every individual article as seminal:

But that’s not the future, if you pay USD 3 000 so that your article is freely accessible. [...] I think there is a different way. The model that institutions [...] per se pay a kind of flat fee or support an entire journal as sponsor is a third way in the realm of open access which is more successful I think. I can imagine, just as an example, if Max Planck would say, hey, we want to negotiate a flat fee with this publisher for all Max Planck institutes, at least

35 Libraries are offered an institutional membership with reduced fees for OA publications. See <http://www.degruyter.com/page/1089>.

36 See the contract with the Max Planck Society on the publication of OA books at <http://www.degruyter.com/dg/newsitem/56/die-maxplanckgesellschaft-und-de-gruyter-schließen-rahmenvertrag-zur-publikation-von-open-accessbchern>.

37 <http://www.degruyter.com/dg/page/576/repository-policy>.

38 This version includes layout and page numbers, so that the article can be cited.

39 This leads to confusion, as a repository, such as arXiv.org, is not considered commercial but also not institutional.

40 See <http://www.degruyter.com/applib/newsitem/9/de-gruyter-erwirbt-versita-und-wird-zum-drittgrten-internationalen-open-accessverlag>.

for the contributions by Max Planck authors, that would be a much larger step towards gold OA than thus far. (I-4)

It should be noted that this criticism is not aimed at gold OA in general but only at a certain form of it. It is the starting point for further elaborations regarding financing of gold open access, and such steps have already been taken in the framework of a flat rate model, which allows research institutions certain volumes in journals or an entire inventory at reduced prices.

3.4 Lucius & Lucius

Lucius & Lucius also advocates open access to publications. There is no explicit policy on its website regarding green open access, so it must be assumed that self-archiving is prohibited.⁴¹ With respect to copyright issues and embargo periods pertaining to the secondary publication right, the attitude depends on the time span.

And then comes green road, and that practically means secondary publication rights, and that is of course a hot topic, which will probably decide the future of many journals and publishers, how this is solved. And if I think about the six months that are demanded by many radicals, I am certain that this would be the death of most journals and many publishers. [...] 18 to 24 months, that would be possible. Because you always have to think if the current subscription will be open so soon that the user says, oh God, tax policy in Ulm in the 14th century, I can wait till September until I read that, I don't have to have the subscription. But those are then works that we have. If you say, we want to have journals, then you have to develop differentiated, realistic rules for the embargo period that are in line with the market. (I-5)

The significance of the periods mentioned lies in the fact that the interviewee considered the period between primary publication and the deposit in a repository as the time in which the publisher makes money. The example of late medieval tax policy indicates that the deadlines should be adapted to the specific conditions of the respective disciplines, which are especially characterised by the progress in knowledge and pace of reception. In the case of Lucius & Lucius, it is not about maximisation of profits but about maintenance of the economic basis of the company.

41 The Sherpa/Romeo List also suggests this conclusion and states that self-archiving is not supported ('not formally supported'). See <http://www.sherpa.ac.uk/romeo/search.php>.

Regarding gold OA, the interviewee narrowed his perspective on the funding of such journals via APCs and did not take other models into account. Answering the question of functionality of the model depends on the context in which it is applied.

Yes, well, gold route is, as has clearly been said for a long time, an opportunity for the publishers, a business model that can work or not. It works badly in the German system so far, and especially in the humanities even worse because the funds are lacking. [...] The gold route should be viewed carefully. I just don't see a chance to carry it out in economics or social sciences in Germany at the moment. (I-5)

I-5 here used an argument that was already apparent in the interviews with representatives of Springer Science+Business Media, namely whether the model works depends on the available resources in funding. As Lucius & Lucius is oriented towards the German market, it is especially dependent on local research institutions and organisations.

4 Demand for transparency

A second demand from science policy concerns the increase of transparency with respect to financing of scientific literature. This is due to the fact that libraries and research institutions mostly use public money to create accessibility to scientific publications. The interviews revealed reasons for the lack of transparency:

- *Bundle deals:* While the individual and institutional subscription prices for journals are published on the websites of the companies, this is often not the case when it comes to bundle deals. Negotiations with libraries or library consortia are usually confidential and the contracts contain a clause that ensures this (Edlin 2004: 151 f. 90). Due to this confidentiality, prices and conditions of bundle contracts function only to a limited degree as an orientation for negotiations between other actors.
- *Discount for publication quotas:* In the case of gold OA financed by APCs, there is a possibility that there will be a similar lack of transparency as in the subscription model. While the APCs can be well compared for individual publications on the basis of publicised fees, it is already clear that the financing of individual publications will not be the only form of

APC-based financing. The possibility of deductions of contingents was mentioned several times:

There is always this discussion, yes, APCs, and if you now look at Springer, what does an article in your access programme in the hybrid model cost, that's € 2 000, that's crazy, because if you add it up, all articles, then they would make even more money. [...] I can tell you, it's the same with a new car, nobody will pay the list price. They make volume discounts, they negotiate with universities or societies that come to us and say, we publish about this much per year, how can we make a deal. (I-1)

Here, it can be assumed that negotiations between publishers and research institutions or libraries are confidential and not made public to third parties. Should it come to that, the information function of prices would also be lost in this kind of financial model.

- *Lease fee for journals or specialised societies*: The cooperation model between publisher and scientific societies (e.g. *Angewandte Chemie*) impedes an understanding of the money flows. Due to bundle deals, it is difficult to say which profits of the company can be attributed to an individual journal. And, due to confidentiality clauses, not even the prices for the bundles are known. In the lease model, it moreover remains unclear how the profits are divided between the publisher and the society and how high the overall profit of the society is from journals in general and *Angewandte Chemie* in particular.⁴²

Thus, the business models of the large publishing companies are responsible for the lack of transparency in the first place. As a result, the question for more transparency was aimed at them. The interviewees from Springer were rather reserved:

I can tell you, if there will be a committee that should determine what an acceptable profit is, then no. [...] As you know, we are happy to be part of all initiatives if there is a discussion, but I would have to know the details, and what exactly is being asked. We are on the stock market, there are certain things we do not make public. (I-1)

These reservations indicate that Springer's willingness to contribute to more transparency was limited. The member of the editorial staff of *Angewandte*

⁴² The interviewee did not mention concrete numbers but only described the basic characteristics of the lease model. The publicly available report of the Gesellschaft Deutscher Chemiker (GDCh) details the immaterial area, asset management, tax-purpose companies and economic operations. The income from the publication business is not displayed separately (GDCh 2011: 34).

Chemie provided a different answer. The demand for more transparency of pricing was raised in the interview three times, but the interviewee did not take a position regarding the issue. Here, too, it can be assumed that the willingness to participate was rather low.

5 Summary

The evaluation of the interviews with four academic publishing companies revealed important characteristics of a market that has strong tendencies towards concentration and is subject to the influences of a dynamic digital change. The most important aspects for the science policy design of publishing in general are summarised here.

- *Market imperfections:* The concentration of a significant number of journals in the portfolio of only a few publishers is one characteristic of the market. This structure, together with the specificity of the ‘journal’ product (non-substitutability) and a special form of commodification (bundle deals) is a precondition for the high profits in the STM field.
- *Structural dynamics of the market:* The structural powers of the market and the effects of digitisation work against the smaller publishing companies (rewarding size). It can be assumed that the process of aggregation is not yet over and that acquisitions of publishers or the economic death of smaller companies will continue to be observed in the future.
- *Innovative actors:* The role of promoting innovations in the area of digital infrastructures depends on the size of the companies and available resources. Herein lies some ambivalence. From the perspective of science, it is desirable that innovative publishers make a contribution to the advancement of digital publication and digital infrastructures. On the other hand, it is problematic if publishers orient their innovative decisions more strongly towards securing their position on the market and their business model than towards the needs of science.
- *Transparency:* Since the prices of journals are not shaped by the mechanisms of competition but by negotiations, a high degree of transparency is desirable in order to strengthen the position of publicly financed libraries in negotiations. In the transfer to an APC-financed gold OA model, it may well be that deductions of contingents lead to a similar lack of transparency in prices and price development.
- *Gold open access:* The four publishers showed different degrees of willingness to adopt gold OA models and the reasons for this varied. Aside from the unclear financial issues (money flow and available

resources), technological preconditions cannot always be fulfilled by the smaller publishers. On the other hand, the adoption of gold open access can also be counterproductive for the current business model.

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