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### Abstract

Digital Science is an umbrella brand unifying a set of diverse information services and data companies, including Altmetric, GRID, ReadCube, Dimensions, Labguru, Overleaf, Figshare, UberResearch, Peerwith, and others. Owned primarily by a large, privately held, multinational media conglomerate (Hotlzbrinck), Digital Science has long intrigued scholarly publishers even as it has served them, their authors, and various consumers (libraries, institutions, corporations, and individuals) in the scholarly and scientific publishing space. This article provides a current overview of Digital Science, focusing on some of the controversial aspects of the organization, its growing legacy, its relevance to publishers of various sizes, and its uncertain future.

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Digital Science was founded in 2010. It was initially a technical division of what was then the Nature Publishing Group. An executive there, Timo Hannay, was assigned to serve as managing director of the roll out. Hannay held this position until 2015, when he left the organization for personal reasons. That same year, the Nature Publishing Group merged with the publishing company Springer to form Springer Nature. From 2015 to the present, Daniel Hook has served as the chief executive officer (CEO) of Digital Science.

Positioned initially as an incubator of new services and businesses (Harington, 2014), Digital Science has evolved to become a major force in scholarly and scientific publishing. Its notable successes include Altmetric, ReadCube, Figshare, and Labguru (see Table 1 for all current Digital Science companies).

**Table 1: List of Digital Science companies**

Altmetric	Altmetric tracks and measures activity around academic research, pulling patterns and stories from hundreds of thousands of online conversations each month.
BioRAFT	BioRAFT helps institutions get organized around researcher safety through its enterprising laboratory safety, compliance, and training software.
Dimensions	Dimensions is a next-generation linked research information system that makes it easier to find and access the most relevant information, analyze the academic and broader outcomes of research, and gather insights to inform future strategy.
Figshare	Figshare is a repository where users can make all of their research outputs available in a citable, shareable, and discoverable manner.
GRID	GRID is a database of organizational identities, IP addresses, and other related metadata.
IFI Claims	IFI Claims supplies patent data in the research and healthcare sectors.
Labguru	Labguru helps researchers plan and document experiments, track progress, streamline lab logistics, and share results.
Overleaf	Overleaf is an online LaTeX and rich text collaborative writing and publishing tool that makes the whole process of writing, editing, and publishing scientific documents much quicker and easier.
Peerwith	Peerwith is a marketplace connecting researchers to experts in their field, offering a plethora of author services to ensure their academic work is ready to be communicated in the best possible way to enhance its scientific impact.
ReadCube	ReadCube offers tools to make the world of scholarly literature more accessible and connected for researchers, institutions, and publishers.
Symplectic	Symplectic is software that helps researchers, librarians, and their institutions collect, manage, analyze, and showcase their research. Its flagship product, Elements, is the world's leading research information management system enabling an institution's scholarly activities to be unified and understood with minimal manual input from academics.
TetraScience	TetraScience connects scientific instruments and equipment to the web so research teams can remotely monitor and manage experiments in real time and log data automatically.
Transcriptic	Transcriptic is a robotic cloud lab that helps researchers generate data while working remotely.
UberResearch	UberResearch helps funding organizations, nonprofits, and governmental institutions make more informed decisions about science funding, portfolio analysis, and reporting.

Some services, such as GRID, are free and provided under a Creative Commons 1.0 Universal (CCo 1.0) Public Domain license, serving as infrastructure elements for Digital Science overall, while serving a symbiotic role within the larger community.

Organized in a constellation framework, the various companies under the Digital Science umbrella are allowed to collaborate or not as they see fit. Each CEO is a truly autonomous chief executive. It is unclear how compensation and incentives are developed for the group, or if targets are provided at the individual company level, the group level, or some mixture of these two elements. The arrangement of resources arguably affords the management of the individual businesses the best of both worlds: access to important strategic partners within the same organizational superstructure, yet the independence to forge their own paths.

Digital Science is also known by those closest to it to receive unflagging support from the Holtzbrinck Group's leadership, which views the company as an important asset in future-proofing various elements of their business ventures (Hook, 2017).

In 2018, Digital Science launched its most ambitious and collaborative offering yet, called Dimensions (Schonfeld, 2018a). Dimensions synthesizes a wide array of data from across the Digital Science businesses to create a platform for citation data that has impressive reach and functionality, covering not only published articles but patents and grants. As an interesting aside, and with bearing on the strategic challenges facing Digital Science to be discussed later, Dimensions was the brainchild of Annette Thomas, who was an executive within Nature Publishing Group at the time of the Springer merger, and who departed the company shortly thereafter. After approximately two years, Thomas was hired as the CEO of Clarivate Analytics's Scientific and Academic Research arm, which oversees the Impact Factor and Web of Science. Thomas immediately began rebranding, acquisition, and business development activity in a manner that appears to foreshadow Clarivate Analytics competing heavily with Digital Science and, in particular, Thomas' prior brainchild: Dimensions.

### **Technical accomplishments and challenges**

Digital Science was early to many market segments, which has proven to be both a blessing and a curse.

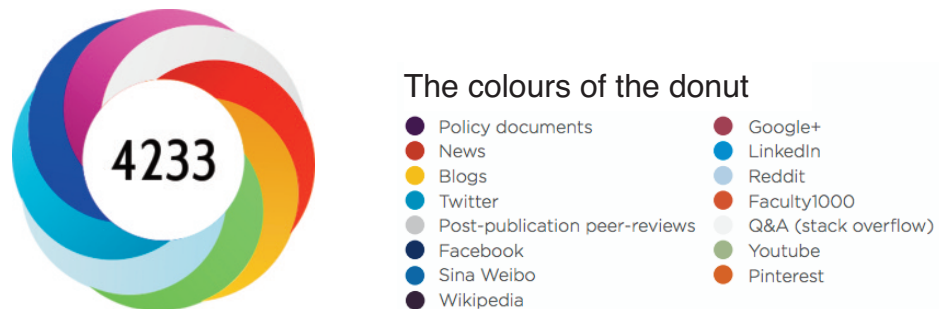
Major technical accomplishments have included the popular data, workflow, and publishing hybrid platform Figshare, which serves as infrastructure for a number of interesting publishing experiments, including ChemRxiv and others. The ReadCube service made interesting workflow and article-rental options a reality for publishers and consumers, with an elegant interface and user experience (UX) model. Altmetric seized on an important moment in the zeitgeist of scholarly publishing – the explosion of attention brought about by social media and the quest for article-level metrics – and capitalized through excellent engineering, clever design, and strong marketing. Newer offerings such as Overleaf seem to radiate the excitement of a start-up team, while providing a solution that is gaining traction. Labguru's electronic lab notebook has become mainstream, no mean feat as it has to pass muster with numerous corporate information technology (IT) and legal departments.

Being diversified makes Digital Science a difficult company to assess for specialists. Scholarly publishing professionals see some aspects of the company (Altmetric, ReadCube, Overleaf, Dimensions), while researchers see other parts. For example, Symplectic is not a company that is well-known to those in scholarly communications. However, Symplectic is reputed to be among the most advanced of the Digital Science companies, with a product called Elements that helps institutions, authors, and researchers gather research outputs with minimal effort. Elements has become an integral part of Dimensions, the combination product from Digital Science.

For Elements and other Digital Science offerings, integration with Dimensions could help them gain even greater traction. This is a good reason to think that for Digital Science, the whole may ultimately become greater than the sum of its parts. It also speaks to the interstitial technical work that must go on between the various Digital Science companies, products, and services to enable collaborations such as this, work that is non-trivial in scope or nature. Dimensions, for example, took years to realize.

However, being early to market can also lead to problems. For companies such as Altmetric, which relies heavily on social media in its scoring algorithm, the approach initially seemed solid, especially as its data aggregation was captured via the striking Altmetric donut (also called variably a “rose” or “rosette”) (see Figure 1).

Figure 1: The Altmetric donut, rose, or rosette



Altmetric has also built an excellent news- and blog-linking infrastructure. However, as social media has changed over time, Altmetric’s established algorithm has not aged well, with gaps and questionable weightings emerging. For example, LinkedIn ceased providing Altmetric with data, while Twitter began using a more algorithmic approach to its feed (rather than the strict reverse-chronology it started with), which has biased Twitter results toward what sells advertising. Newer social offerings such as Snap, Weibo, and WeChat are only partially supported, if they are supported at all.

The weighting algorithm for Altmetric, which is posted publicly, also presents problems, as it assigns weightings that no longer seem to make sense. For example, a Facebook post is weighted at 0.25 while a blog is weighted at 5.0, 20 times more – and neither is adjusted for reach, length, internal links, or other discoverable factors. Given the far greater reach and impact of Facebook worldwide compared to most blogs, this seems incongruous. It also appears difficult for Altmetric to revise its approach, as this could lead to a restatement of the entire metric. This commonly occurs for metrics

companies, as measuring something multiple times creates a *de facto* and self-referential standard that becomes hard to change.

ReadCube has also encountered problems as a first-mover. Technologies change, and the first ReadCube solution offered did not age well technologically. The baked-in limitations of the first technical approach have made it financially impractical to scale ReadCube into medium-sized or small market segments. It is simply too costly. This has led to ReadCube being a solution available primarily to the larger publishers in the market, and not to many nonprofit publishers, university presses, libraries, and smaller independents. This led Digital Science to create another product introduced in 2018 called Anywhere Access formulated for libraries, which has the potential to pivot the technical solution into a rebuilt ReadCube offering with greater scalability.

### **Strategic accomplishments and challenges**

Broadly speaking, Digital Science represents a major strategic accomplishment for the Holtzbrinck Group. It is a unique, interesting, innovative, and potent company with diverse assets focused on a market the family has a strong affinity with. It has talented executives and leaders, excellent technical solutions on a number of fronts, and a reputation within the market that is generally very positive. For any company, this set of accomplishments would justify a sense of pride.

As a culture, Digital Science is also striking, as it appears to those who know it and circle it regularly to be both humble and agitated, a rare combination for a start-up. This is probably to its benefit, and potentially stems from the natural vibrations coming from having a number of companies with digital DNA and start-up hunger positioned cheek by jowl.

Of course, with success comes competition, with the most notable now being the competition coming from a prior source of direction and inspiration: Annette Thomas, now at Clarivate Analytics. With Dimensions and Altmetric (and other offerings), Digital Science seems to be positioning itself as a metrics company, bringing more current technology and services to cracking the nut of research evaluation. This is Clarivate Analytics's customary zone. However, as an incumbent, Clarivate Analytics has been slow to spin up new technical platforms. Its ownership has been notoriously conservative in approach, a customary approach that Thomas' arrival combined with more pliable private equity ownership may help to change.

As a sign of this new approach, Thomas seems to be succeeding in integrating various Clarivate Analytics platforms, acquiring others, and securing funding for a broader long-term vision that, at first blush, appears primed to compete with Digital Science and Dimensions in particular, while also fending off Elsevier, which is itself investing heavily in big data solutions (acquiring Mendeley, Plum Analytics, and investing in the development of Scopus and SciVal over the past decade, a very deliberate and long-term approach). For Clarivate Analytics, Dimensions could represent an existential threat, so investment and strategic focus are more than appropriate. For Thomas, seeing her brainchild now positioned to ram her new company can only compel action.

Aside from this grand competitive scenario, there are other challenges for Digital Science. Altmetric appears to have a broad conceptual challenge baked into its name, which includes the term “metric.” Altmetric and others use numbers generated by their algorithm as comparative elements – as metrics similar to height and weight – to list articles by Altmetric score, compare articles across domains by Altmetric scores, and so forth. Yet, Altmetric personnel will assert during sales calls that its number is not a metric. This smacks of wanting to have it both ways – to have a metric you can disclaim whenever the metric comes under criticism.

Overleaf faces the strategic challenge of both trying to overcome a major market moat – the broad *de facto* standards of Microsoft Word and embedded or established L<sup>A</sup>T<sub>E</sub>X workflows for manuscript preparation – while creating a moat of its own against potential competitors. The first challenge is daunting enough. Authors like to work in tools they know, so shifting their preference is a non-trivial challenge of persuasion and belief in benefit. It is unclear if it will succeed at this. The second challenge – creating a moat around Overleaf that other competitors cannot cross quickly and easily – is significant as well. It is perhaps worth noting in reference to the larger competitive issue Digital Science faces with Clarivate Analytics that Clarivate Analytics owns ScholarOne, a mainstream and widely adopted manuscript submission system, and EndNote, a workflow tool. If Clarivate Analytics wishes through acquisition or development to bolt on a service such as Overleaf, it could scale adoption rapidly via ScholarOne’s or EndNote’s embedded user bases.

ReadCube faces challenges itself with new industry-wide access options under development that are designed to solve remote and off-campus access challenges. Solutions to these outside of ReadCube could shrink the article-rental market significantly. Other potentialities such as an EPUB-dominated future would also sideline ReadCube’s PDF-based technology. However, for now, the main challenges seem more pedestrian in nature: scalable technology, sales, and basic competitive positioning.

Dimensions itself faces challenges, especially in an era of open data. By making its offering feel and look so modern, and basing much of it on publicly available data (including patent data and data from GRID), Digital Science has opted to provide feeds of data at no cost for multiple use-cases, many of which are not expected from their potential competitor (Clarivate Analytics). This could work well for Digital Science, but it could also deprive it of early revenue and a reasonable market position for long-term growth.

Digital Science also has inspired a broader set of innovations in scholarly and scientific publishing, many of which may compete with Digital Science. Larger publishers have taken note of these, and many acquisitions by Elsevier, Wiley, Clarivate Analytics, Taylor & Francis, SAGE, and others indicate that while these companies did not incubate innovative offerings, they are willing and able to acquire strategic pieces to compete in new ways and in new market segments.

Digital Science itself seems to have posed a strategic challenge to the Holtzbrinck Group and SpringerNature during the initial public offering (IPO) attempted in mid-

2018. In this attempt to raise equity funding, the IPO was notable for a variety of reasons, not the least of which is that Digital Science was held out. In a market hungry for technology stocks, and which had seen Spotify, iZettle, and other IPOs succeed around the same time, keeping Digital Science out was a puzzling decision (Worlock, 2018). What started as an anticipated \$7 billion IPO sagged to \$3.2 billion before imploding entirely. There are various reasons for this, including open access (OA) publishing trends that make recurring revenues for content businesses in Europe far less secure. But the lack of a technology offset, such as Digital Science, in the IPO certainly did not help. This may represent yet another sign of the Holtzbrinck Group's faith in Digital Science, while serving as further clarification that the Holtzbrinck Group owns Digital Science, rather than SpringerNature (Schonfeld, 2017).

## **Conclusion**

Digital Science represents a major, long-term, and important strategic play in the scholarly and scientific publishing marketplace, and the Holtzbrinck Group leaders funding it deserve commendation for their consistent support of the organization, which seems to be succeeding on many levels.

Digital Science is arguably now in its third phase of development, evolving from a pure incubator under the guidance of Hannay into a diversified constellation of companies to now spawning a unified offering (Dimensions) from the DNA of the constituent organizations. Having expanded into the market in various ways, Digital Science has inspired and attracted competitors, while its technology and even some fundamental product concepts will require retooling to remain relevant, helpful, and current.

With larger publishers assembling their own technology stacks to compete on the turf Digital Science has played on until now in relative isolation, as well as the re-emergence of a major past leader in a competitive company (Clarivate Analytics), Digital Science may be facing a challenging test in the coming years. Can it upgrade its technologies quickly enough? Can it address the core conceptual issues of some products? Can it sell its major offering (Dimensions) effectively while conceding turf to open data advocates? In a market where "open science" tools are spawning rapidly, Digital Science has many things nipping at its proverbial heels (Conrad, 2018).

Another lesson here is that strategy is a long-term gambit, not a short-term, reactive game. Holtzbrinck Group, Clarivate Analytics, Elsevier, and a few others are taking years and years to build, test, refine, market, and integrate large strategic systems. These plays have been described as "supercontinents," and there is a lot to recommend the analogy (Schonfeld, 2018b).

As for the relevance of Digital Science to smaller publishers, the combination of technical relevance and pricing may place many of the services offered outside the reach of many smaller publishers. This may represent a baked-in bias of the company as it sprang from a large publisher owned by an even larger publishing group.

No matter what happens from here, Digital Science is a company to watch, as its diverse set of offerings provide multiple windows on the technology, viability, strategy,

and future relating to a variety of market dynamics and segments. It provides a useful lens on many aspects of the future of scholarly, academic, and research publishing, workflows, and analytics.

### **Website**

Digital Science, <https://www.digital-science.com>

### **References**

- Conrad, Lettie Y. (2018, August 30). Mapping open science tools. *Scholarly Kitchen*. URL: <https://scholarlykitchen.sspnet.org/2018/08/30/mapping-open-science-tools/> [October 28, 2018].
- Harrington, Robert. (2014, December 22). The incubator game: A conversation with Timo Hannay – managing director of digital science. *Scholarly Kitchen*. URL: <https://scholarlykitchen.sspnet.org/2014/12/22/the-incubator-game-a-conversation-with-timo-hannay-managing-director-of-digital-science/> [October 28, 2018].
- Hook, Daniel. (2017, November 8). “Who owns digital science” – that is the question. *Digital Science News Blog*. URL: <https://www.digital-science.com/blog/news/owns-digital-science-question/> [October 28, 2018].
- Schonfeld, Roger C. (2017, October 23). Who owns digital science? *Scholarly Kitchen*. URL: <https://scholarlykitchen.sspnet.org/2017/10/23/ownership-digital-science/> [October 28, 2018].
- Schonfeld, Roger C. (2018a). A new citation databases launches today: Digital science’s dimensions. *Scholarly Kitchen*. URL: <https://scholarlykitchen.sspnet.org/2018/01/15/new-citation-database-dimensions/> [October 28, 2018].
- Schonfeld, Roger C. (2018b). The supercontinent of scholarly publishing. *Scholarly Kitchen*. URL: <https://scholarlykitchen.sspnet.org/2018/05/03/supercontinent-scholarly-publishing/> [October 29, 2018].