



Scientific, Technical & Medical Investor Seminar

9 November 2022

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STM investor seminar Agenda

Overview and strategy	Slides 4-11
Primary research	Slides 12-16
Databases, tools & electronic reference	Slides 17-30
Technology	Slides 31-35
Concluding remarks	Slides 36-38

Q&A

Speakers: Kumsal Bayazit, CEO STM; Maxim Khan, SVP Analytics Products and Data Platform; Cameron Ross, MD Life Sciences Solutions; Josh Schoeller, President Clinical Solutions and Commercial Healthcare; Jill Luber, CTO STM



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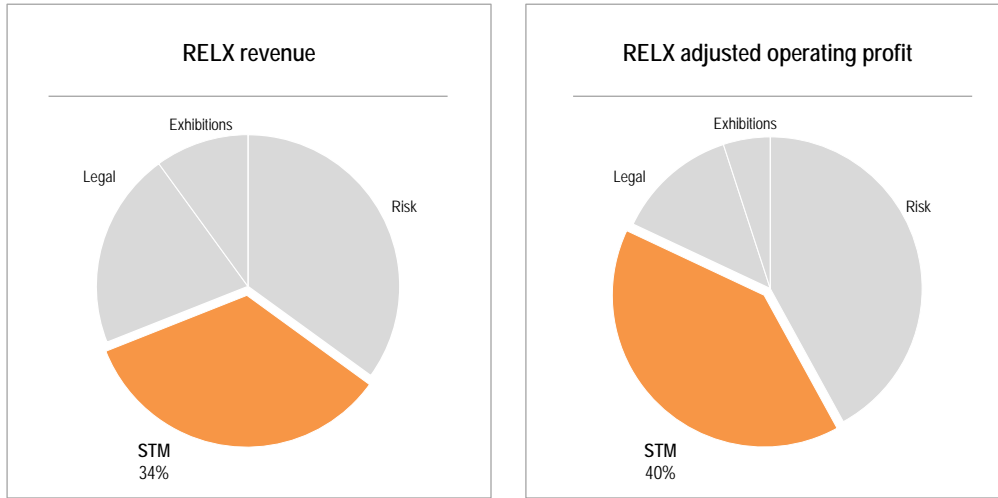
Overview and strategy



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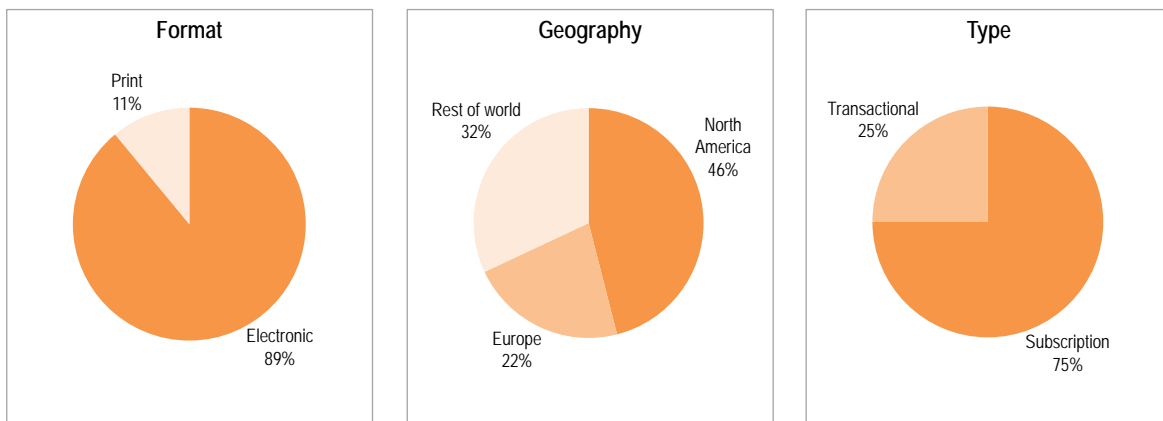
STM position within RELX H1 2022



• LTM STM revenues for June 2022 £2.7bn (\$3.6bn)



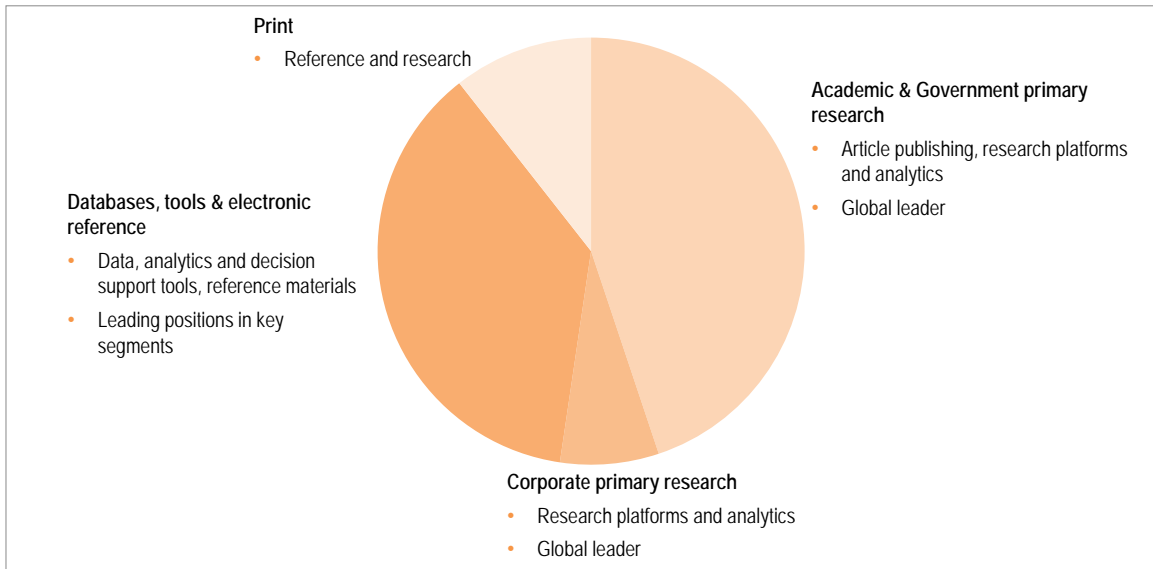
STM revenue by type H1 2022



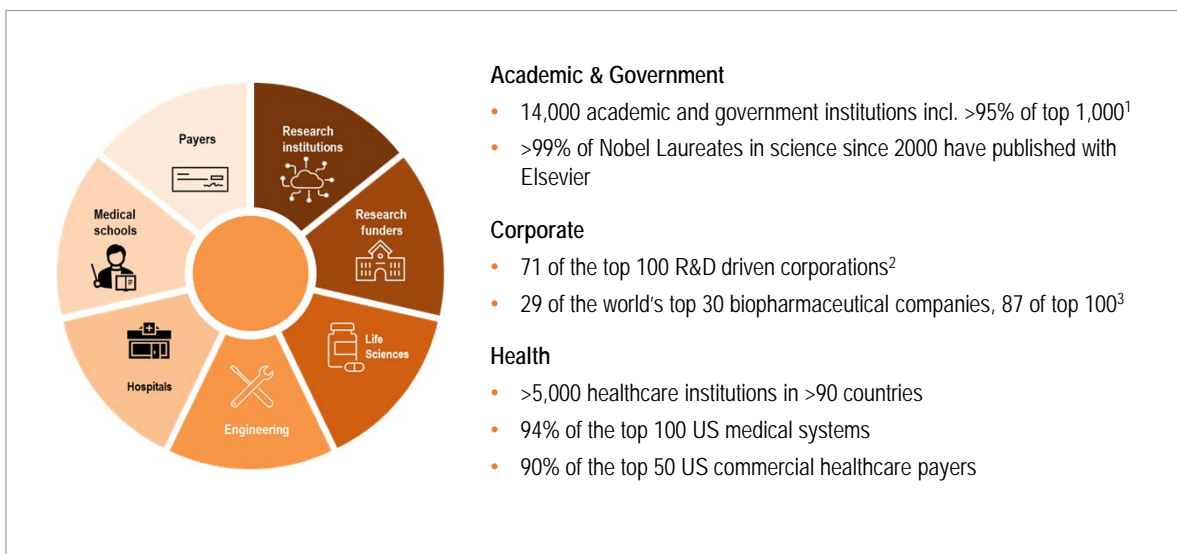
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STM by segment H1 2022

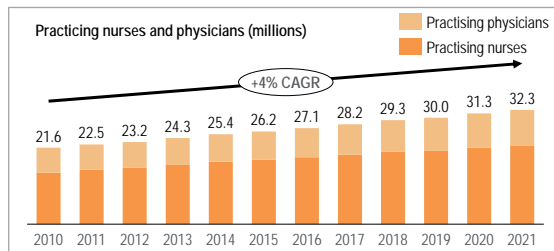
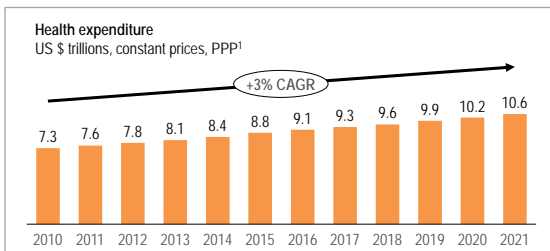
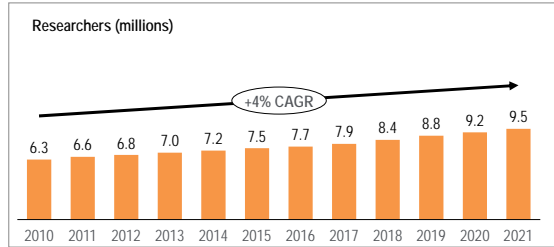
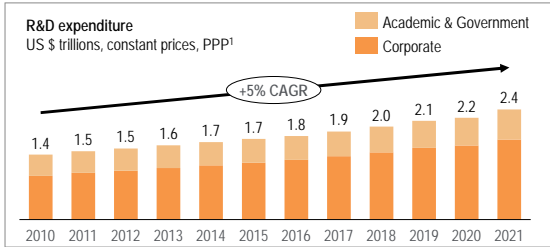


We serve a wide range of customers



¹ 'Top' position measured by volume of published research. ² Based on EU2500 list. ³ Top biopharmaceutical companies named by PharmExec

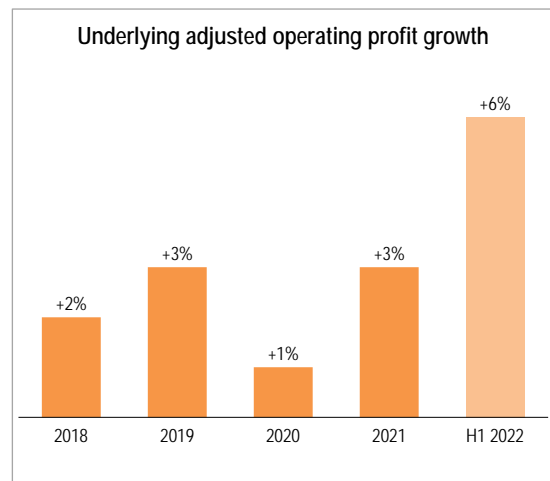
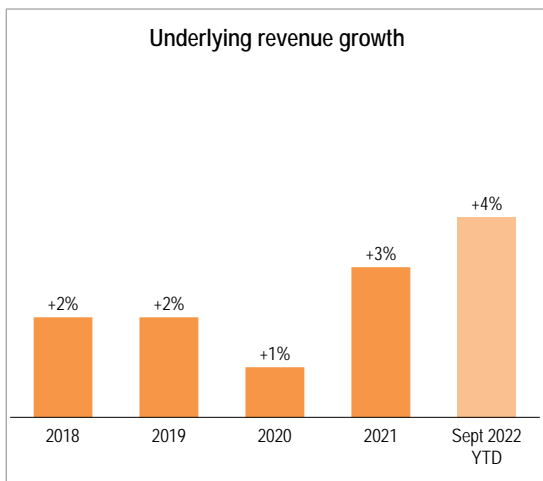
We operate in long-term global growth industries



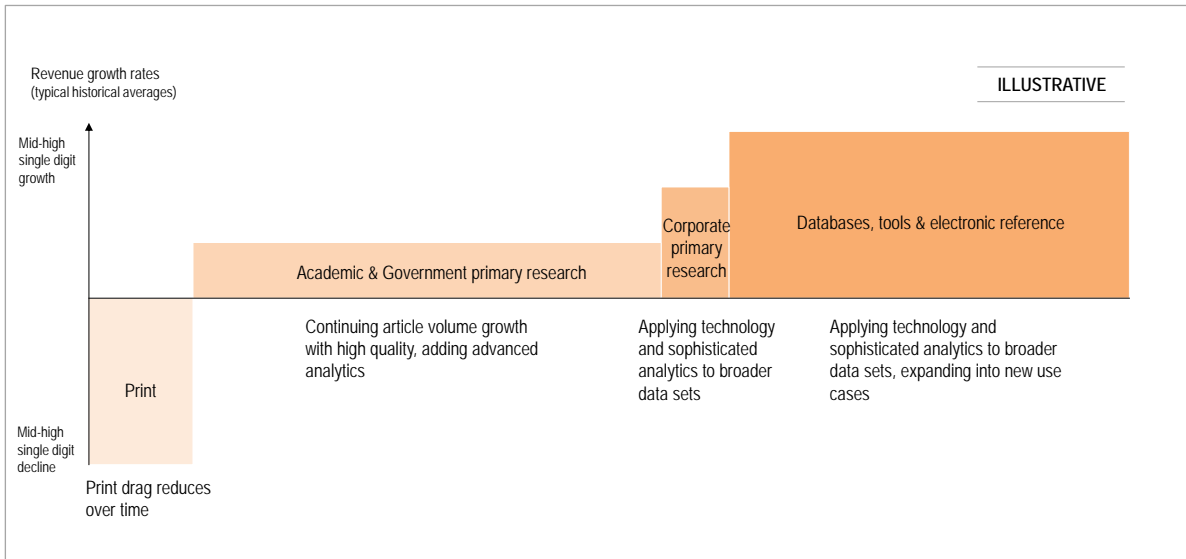
Includes countries with data available: >80% of OECD countries for all measures. Sources: OECD (Economic Outlook June 2022, Science and Technology Indicators September 2022, Health Care Resources July 2022), IMF (Global Economic Outlook, July 2022), World Bank, UNESCO (Science, Technology and Innovation June 2022), WHO (Global Health Observatory)
¹Purchasing power parity



Improving growth trajectory



Change in mix driving improved growth trajectory

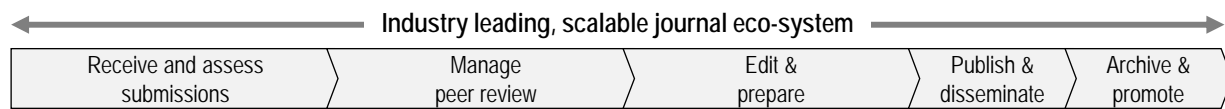


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Primary research

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We help validate, improve and disseminate science



Validate that articles are sound science and a good fit to our journals

- >2,800 journal brands
- >2.6m article submissions¹
- 6 authors per article
- 2+ peer reviewers per article

Helping authors improve their articles and edit for completeness and accuracy

- 32,000 editors
- 102,000 editorial board members
- 1.4m reviewers
- 94% of articles have content changes in peer review
- 95% of articles have content changes in production

Drive visibility, usability and global reach on leading platforms

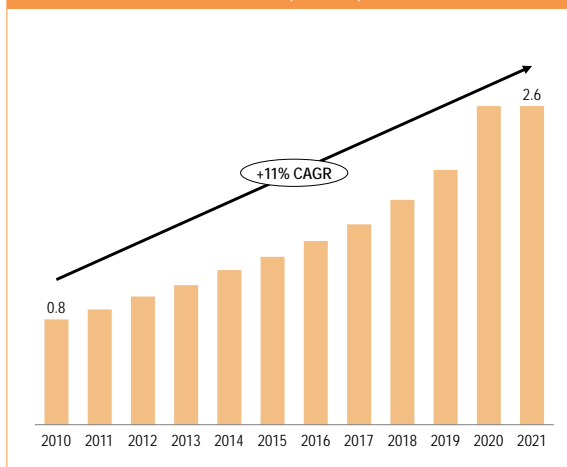
- >600,000 articles published¹
- 1.8bn articles consumed^{1,2}
- >20m articles archived

¹ Per annum
² Unique article views and downloads, adjusted to remove double counting

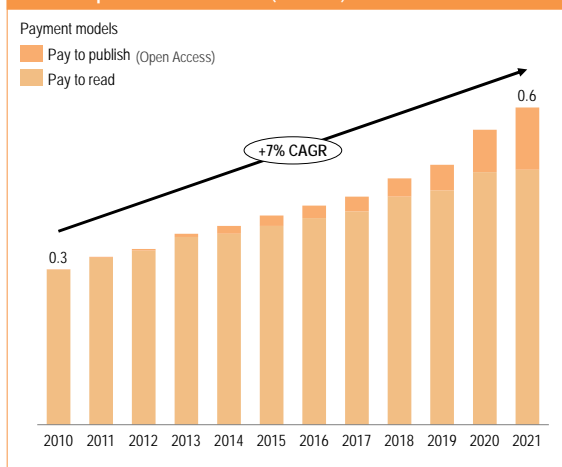


Strong article volume growth

Elsevier article submissions (millions)

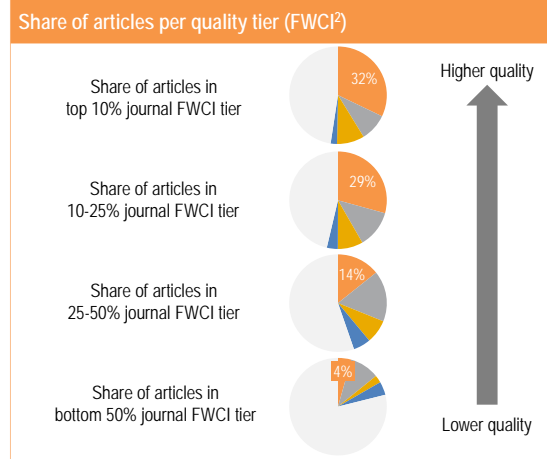
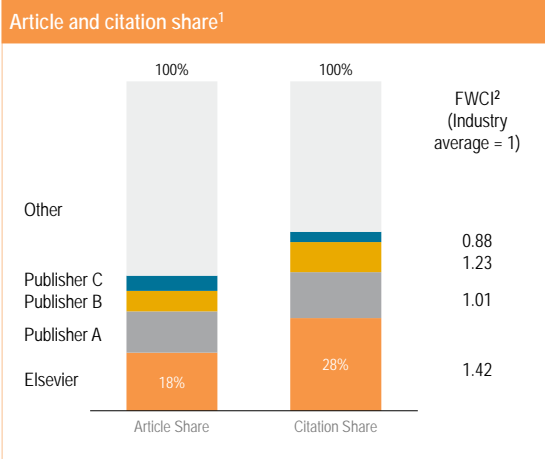


Elsevier published articles (millions)



Leader in quality

Primary research

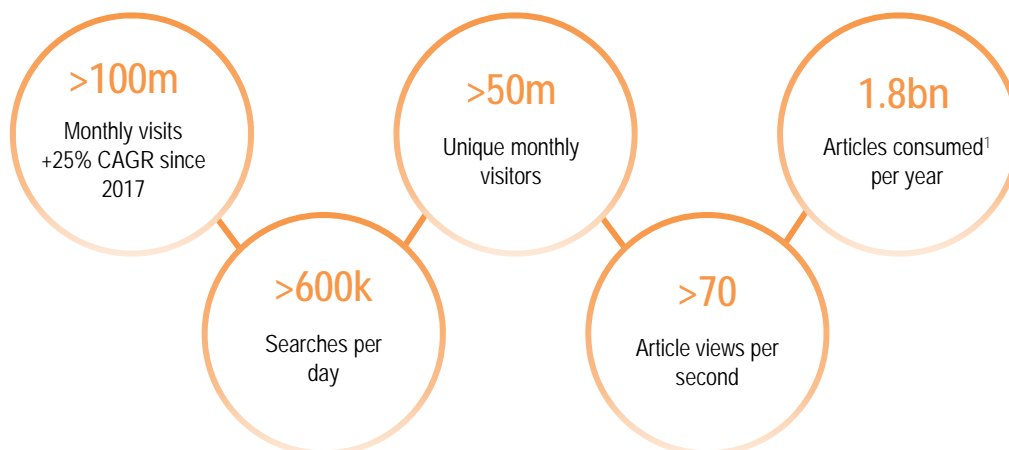


¹ Share of articles per publisher (published in 2016-2020) and share of citations (citations in 2016-20 in relation to articles published in 2016-2020).
² Field-Weighted Citation Index (FWCI) for articles published in in 2016-2020. FWCI is the ratio of citations received for each article relative to the normalised, expected average of 1. The ratio for each article is normalised based on the expected number of citations by article type, subject field, and publication year.
 Source: Scopus data



Leading research platforms with global reach and scale

Primary research



Increasing article volume, search and usability, adding sophisticated analytical capabilities

¹ Unique article views and downloads, adjusted to remove double counting.



Databases, tools & electronic reference

Helping customers solve critical and complex problems

Databases, tools & electronic reference

Segment	Academic & Government	Corporate	Health
Customers	<ul style="list-style-type: none"> Universities Government Funding organisations 	<ul style="list-style-type: none"> Research-intensive corporations, key segments: <ul style="list-style-type: none"> Life Sciences Chemicals Engineering 	<ul style="list-style-type: none"> Healthcare providers Healthcare payers Healthcare IT Pharmacies Medical and nursing schools
Objectives	<ul style="list-style-type: none"> Make funding allocation decisions Accelerate and improve research and collaboration Evaluate and benchmark research performance 	<ul style="list-style-type: none"> Support drug research and discovery Help engineering intensive companies drive innovation 	<ul style="list-style-type: none"> Support treatment selection and standardise care; enable evidence-based clinical decision making at point of care Measure and improve learning outcomes Support clinical and operational decisions with real time data

Combine content and data with sophisticated analytics and technology for specific use cases

Leveraging our four key capabilities to deliver analytics and decision tools

Databases, tools & electronic reference

- Deep customer understanding and domain knowledge
- Leading content and data sets, eg primary research, patents, drug databases, medical claims
- Advanced linking capability and sophisticated analytics
- Powerful technology in global, modular, scalable platforms leveraging RELX capabilities



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Academic & Government

We support different customer groups across the research eco-system

Databases, tools & electronic reference

Illustrative research workflow



Define and execute funding strategy



Define and execute research strategy



Manage faculty and research processes



Conduct research



Publish research

Who

Funders / government

Research offices and academic leaders

Researchers

What

Help funders and policy-makers establish funding strategy and priorities, manage award processes and assess funding performance

Help academic leaders develop institutional research strategy, build research teams, assess impact versus peer institutions, and manage faculty recruitment and progression

Help researchers to search and access content, identify topics and funding opportunities, find collaborators and choose the appropriate journal to publish in

Help researchers to publish research articles, preprints, datasets, conduct peer review, and perform editorial duties

Example products

- Analytical services
- Researchfish
- Expert lookup

- SciVal
- Scopus¹
- Data Monitor
- Funding Institutional

- Pure
- Interfolio Faculty Information Systems
- Digital Commons

- ScienceDirect
- Engineering Village
- Mendeley

- Editorial Manager
- SSRN
- Mendeley Data
- Scopus

1 Scopus relevant across workflow

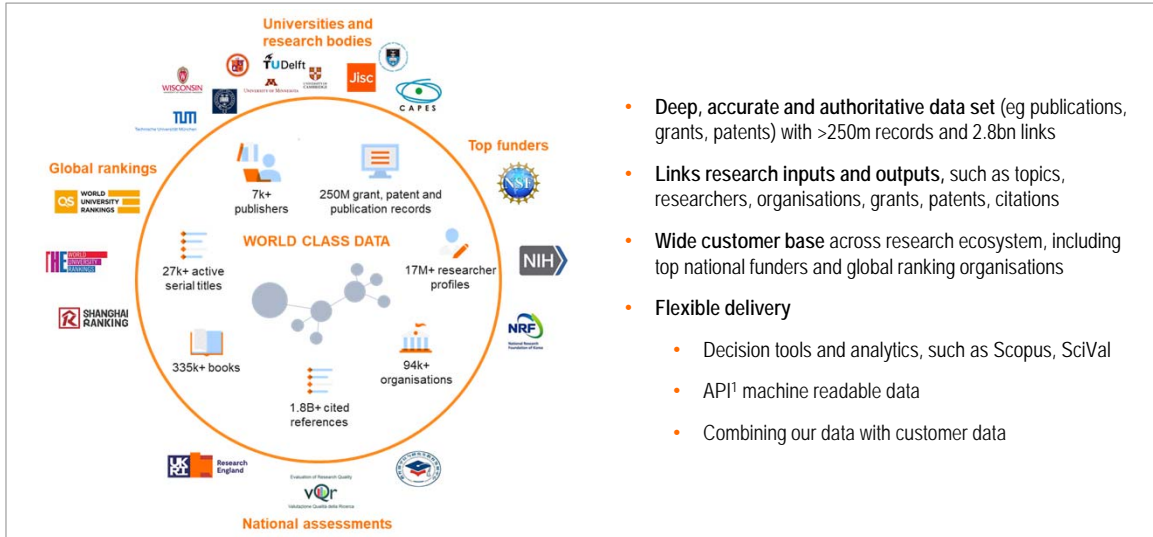


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Academic & Government Linked data powers our analytics products

Databases, tools & electronic reference



- Deep, accurate and authoritative data set (eg publications, grants, patents) with >250m records and 2.8bn links
- Links research inputs and outputs, such as topics, researchers, organisations, grants, patents, citations
- Wide customer base across research ecosystem, including top national funders and global ranking organisations
- Flexible delivery
 - Decision tools and analytics, such as Scopus, SciVal
 - API¹ machine readable data
 - Combining our data with customer data

¹ Application programming interface

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Academic & Government Product demo: SciVal

Databases, tools & electronic reference

Use case: A university wants to identify topics of research where it should leverage strengths and build capabilities in order to maximise research funding

Key issues:

- Research funding is a critical revenue source for universities; eg in the UK research funding is 20% of total university income¹
- Institutions need to know which topics have greatest funding potential and where they are best-positioned to compete

Solution:

- We use our network of over 1bn citation links and distil into ~96,000 topics and 1,500 topic clusters to create topic prominence metrics
- This enables universities to quickly assess which topics have greatest funding potential globally
- University leaders can view their performance in these topics, the performance of their peers, and the leading academics within each field

Benefits to customer:

- Enables university leaders to assess where they have highest potential to generate research revenue
- Equips leaders to make strategic choices about where to invest in terms of talent acquisition
- Helps to identify partnership opportunities – eg if a university seeks to build strength in a specific geography, it can identify potential academic and corporate partners
- Helps identify leading academics on a research topic to develop project-specific funding proposals and set collaborations

¹ HESA Finance Record, 2020/21

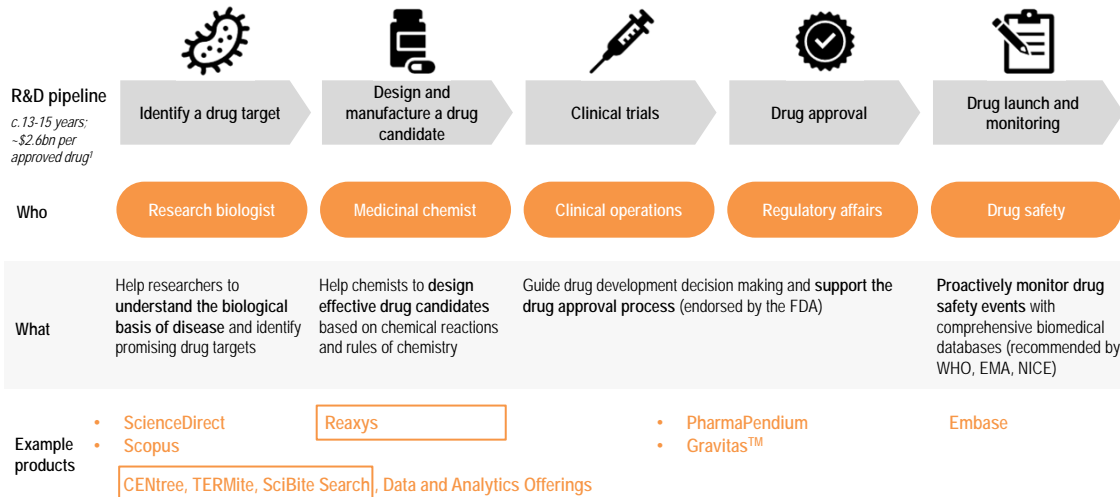
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Corporate In life-sciences, we support drug development process

Databases, tools & electronic reference



FDA: Food & Drug Administration, WHO: World Health Organisation, EMA: European Medical Agency, NICE: National Institute for Health and Care Excellence.
1 The pursuit of excellence in new-drug development, McKinsey, 2019

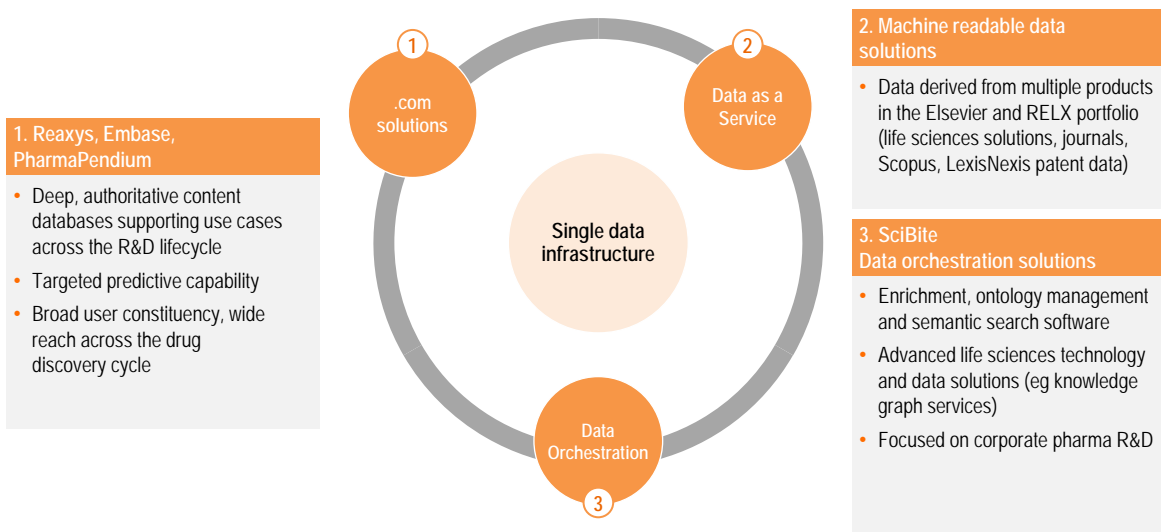


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Corporate We provide three interconnected solutions to life science customers

Databases, tools & electronic reference



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Corporate Product demo: Reaxys

Databases, tools &
electronic reference

Use case: A pharmaceutical R&D team wants to improve the efficacy of the drug development process and reduce the amount of time taken in trial and error to synthesise target compounds

Key issues:

- Chemists typically need to make 200-300 new drug candidates per project to obtain an effective compound¹
- Drug development is expensive and time consuming; it is critical to identify issues early, eg the suitability of a compound to disease pathway, efficacy, toxicity, existing IP, formulation issues, cost
- There are ~7m chemistry-related articles and patents released annually, making it challenging to address key questions

Solution:

- Comprehensive content and data from journals and patents: 256m substances, 60m reactions, 100m documents and 35m patents
- Data is enriched and linked, with AI analytics answering key drug development questions
- Predictive Retrosynthesis tool applying 400k rules of chemistry to provide alternative options to build a target compound and probability of success

Benefits to customer:

- Shortens drug development process by providing predictive tools and analytics which allow rapid exploration of IP, efficacy, toxicity, stability of alternative approaches
- Enables chemists to drive better outcomes by screening out compounds which are likely to encounter issues (eg cost, time to market, IP)
- Reduces time to market and research costs with the fastest access to new patents – 4x faster than the nearest alternative, and Retrosynthesis tool which provides practical routes for novel compounds within minutes

¹ Richard Law, Chief Business Officer, Exscientia, Bio-IT conference, 2021



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Corporate Product examples: CENTree, TERMite, SciBite Search

Databases, tools &
electronic reference

Use case: A pharma R&D team is embarking on a drug discovery project. The team wants to identify which genes are related to a specific disease presentation, and needs to search across both internal and external documents for relevant relationships

Key issues:

- Scientific content predominantly exists as unstructured text
- R&D data is often siloed and disjointed – eg a gene can have many different names across scientific sources
- As a result, data scientists can spend almost half¹ of their time collating, cleaning and preparing data

Solution:

- Tools supporting the digital transformation of scientific data to a machine-readable format
- *CENTree* enables the development of terminology to define how scientific data should be represented across an organisation
- *TERMite* extracts relevant information from scientific texts aligned to this terminology, transforming unstructured content into machine-readable structured, meaningful data
- *SciBite Search* then enables researchers to search this information for specific entities as well as the relationships between them - eg where a gene, an effect, and a disease are referenced in a specific relationship

Benefits to customer:

- Researchers can locate highly-specific data from millions of documents in seconds, saving substantial time in the R&D process
- Connects data that were previously in silos to help identify new R&D opportunities with disparate data assets – eg to identify new therapeutic benefits from an existing drug
- Interoperability of data sources across an organisation increases accuracy and saves time – eg enabling data acquired during M&A to be processed computationally
- Clean and structured data enables many other downstream applications, such as analytical dashboards and knowledge graphs

¹ The State of Data Science 2020, Anaconda



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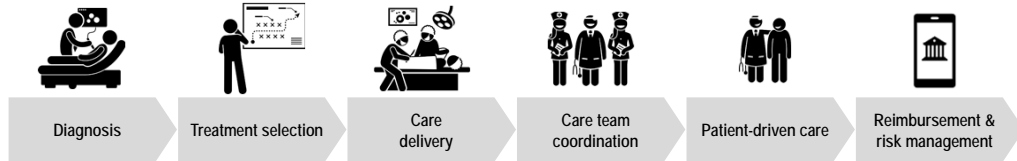
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Health

For healthcare providers, we support decisions across patient journey

Databases, tools & electronic reference

Illustrative
Clinical
Workflow



Who

Physicians (general practitioners & medical specialists), nurses, & allied health professionals

Care teams (nurses & allied health professionals)

Patients & caregivers

Payers

What

Help clinicians make better & more informed clinical decisions

Help clinicians select the best treatments & deliver the best care from within the workflow

Help clinical care teams stay aligned to best-practice care standards

Help patients understand their care treatments & recovery

Help payers optimise risk/reward and make operational decisions

Example products

- ClinicalKey¹
- Amirsys
- Gold Standard Drug Database
- Clinical Pharmacology

- ClinicalPath Pathways
- Order Sets
- Socioeconomic Health Attributes & Scores
- Gravitas™

- Care Plans
- Clinical Skills
- eLearning
- Transition to Practice

- Patient Engagement, PatientPass
- Keep Contact
- LexID for Healthcare
- MarketView
- Provider data MasterFile
- InstantID, LexID, ThreatMatrix

¹ ClinicalKey relevant across workflow



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Health

Product example: ClinicalPath

Databases, tools & electronic reference

Use case: A leading US cancer centre wants to ensure cancer patients are given optimum treatment at each step based on their disease presentation, results, and genetic makeup and in line with nationally accepted guidelines

Key issues:

- Lack of evidence-based standardisation of care in an increasingly complex field of oncology
- Novel drugs and treatments not always known to treating oncologist
- Unintended variability in care adversely impacts patient outcomes, readmissions and healthcare cost

Solution:

- ClinicalPath: expert-defined clinical guidance developed by top oncologists in the US (385 voting members and 24 Oncology Committees) and delivered into the workflow at point of care
- Pathway tailored to patient age, gender, medical profile
- Identifies targetable biomarkers and mutations supporting precision medicine

Benefits to customer:

- Personalised medicine with improved efficacy
- Enables accurate tracking of treatments and outcomes
- Promotes enrolment in relevant clinical trials that could improve patient outcomes. This can reduce the time to recruit patients by over 40%¹
- Used by 15% of medical oncologists in the US, treating more than 450,000 patients

¹ Based on data from a ClinicalPath customer



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Health

Product example: Gravitas™ de-identified health token

Databases, tools & electronic reference

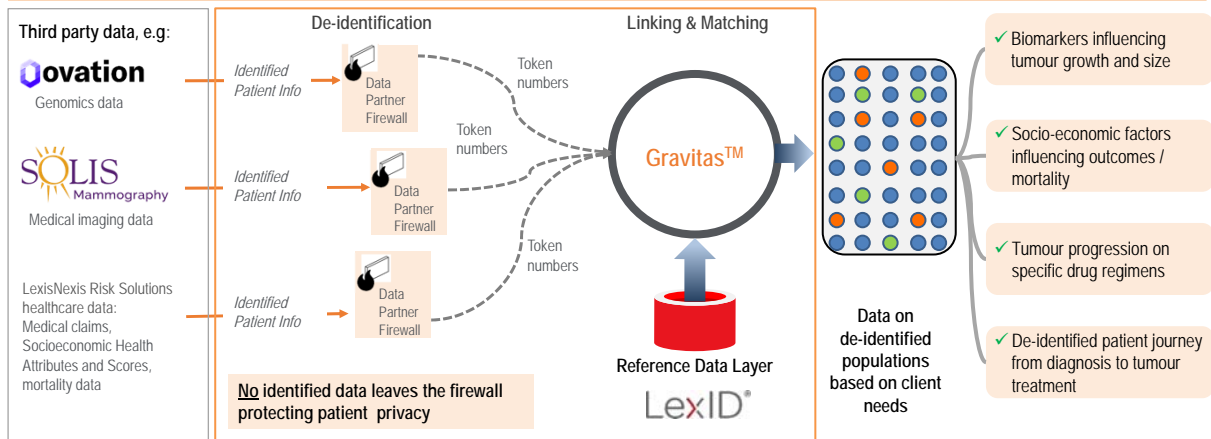
Use case: A large US research hospital wants to conduct a research study to identify factors that influence breast cancer tumor progression using various third party and patient data

Data ecosystem, e.g.

Our Gravitas™ tokenisation process leveraging LexID technology

Research cohort

Use cases and studies



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Summary - Databases, tools & electronic reference

Databases, tools & electronic reference

- Helping customers solve critical and complex problems for specific use cases across segments
- Delivering higher value add analytics and decision tools by combining deep domain knowledge, leading content and data sets, sophisticated analytics and powerful technology
- Driving strong growth through
 - New modules on existing products with new datasets and analytics
 - New use cases through organic product development and add-on acquisitions
- Leveraging RELX sister divisions' datasets; product and technology capabilities
- Constant experimentation and innovation drives product pipeline

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Technology

Role of technology at STM

Build **new products** and support innovation

Build and operate **data and technology platforms**

Ensure platforms are **reliable, scalable & secure**

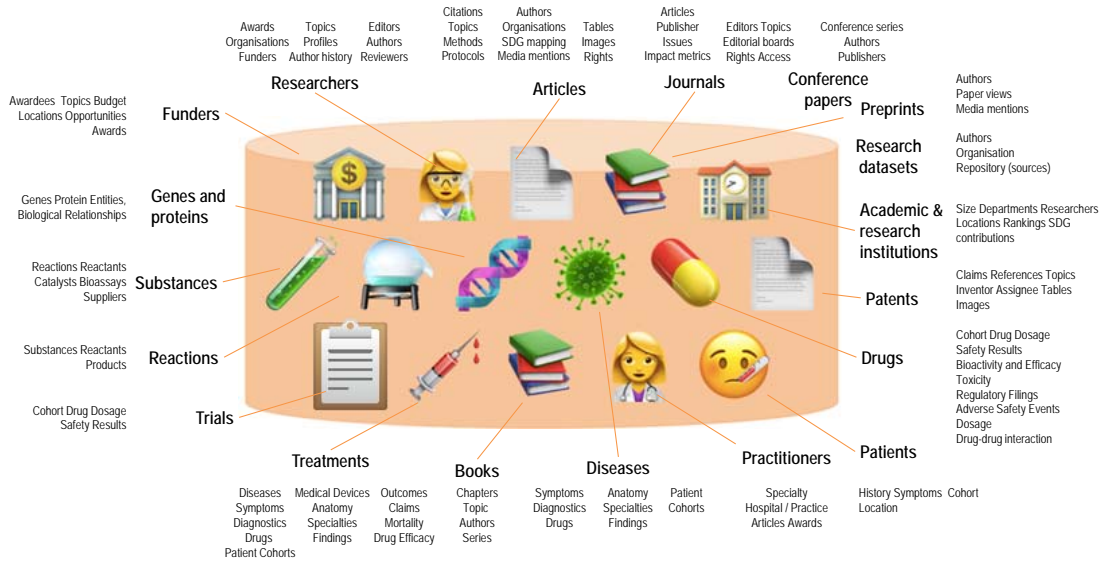
Support **operational efficiencies**

Global scale

- >2,500 technologists at STM and 10,000 at RELX
- >\$1.6bn RELX annual technology spend

Rich and deep STM data sets migrating to a common data model

Technology



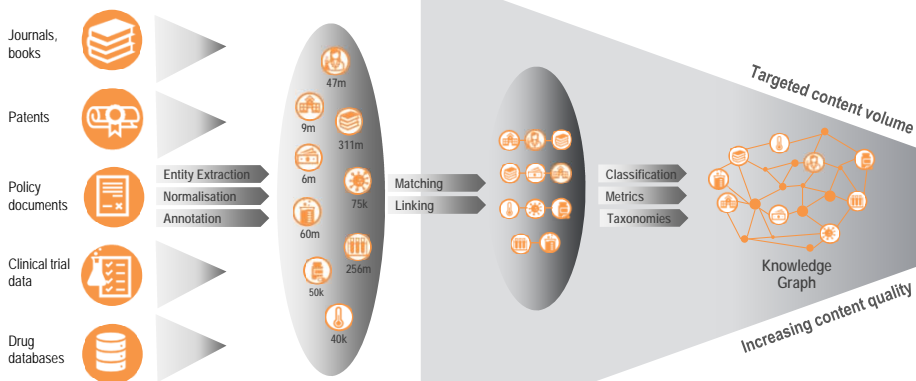
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Delivering insights and analysis to customers

Technology



Structured and unstructured content, eg

- >87m publication records, from >42k sources; >100m patents; >1m preprints; >20m datasets; >5m policy docs
- >50k drug database records; clinical trial data; clinical guidelines
- Identity data >280m unique individuals; >2.2bn medical claims, >9.5m providers and affiliations

Big data platforms

- High-quality & extensible natural language-based entity tagging & machine learning and rules-based linking
- Deep domain knowledge through proprietary data sets (eg taxonomies) and policies to link & represent key entities

STM product examples

- ScienceDirect[®]
- SciVal[®] Scopus[®]
- Aries[®] Pure[®]
- Complete Anatomy
- ClinicalKey[®] Reaxys[®]
- ClinicalPath
- SciBite Search
- CENtree[®] TERMite[®]

Customer single point of execution

- Modular product suites
- Flexible delivery platform

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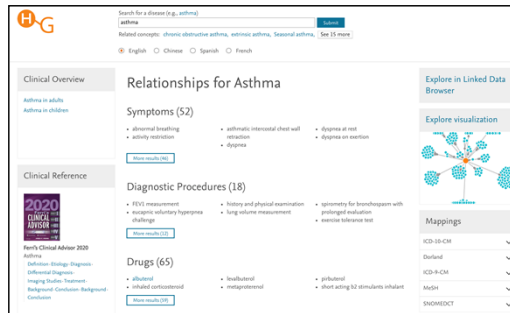
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Example: Elsevier's Healthcare Knowledge Graph

Elsevier's Healthcare Knowledge Graph connects healthcare concepts and relationships supported by scientific and clinical evidence

- Related medical concepts
- Mappings to external ontologies
- Clinical relations between different concepts from multiple sources
- Supporting literature and external references
- Multi-lingual content

Example:



- 400k concepts
- 8m relationships
- 75k diseases
- 50k drugs
- 63k procedures
- 90k symptoms



Concluding remarks

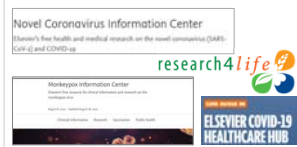


Positive impact on society

We contribute to advancing human welfare and economic progress through our science and health information, tools and analytics and by working in partnership with the communities we serve

Access to knowledge

- Support for health crises (HIV, Ebola, Zika, Covid-19, Monkeypox)
- Free access to research to patients and caregivers
- Founder and contributes ~25% of materials on Research4Life providing 125 developing countries with free and low-cost access to scientific research



Inclusive research and health

- Promoting diversity of participation in research & integrating diversity into research design
- Supporting inclusive healthcare delivery with product innovation, e.g. Complete Anatomy Female model, Shadow Health LGBTQI character simulation in nursing education
- Women on our editorial boards grew from 15% in 2016 to 29% in 2022, with The Lancet at 50%



Supporting UN SDGs

- Elsevier Foundation supports sustainable development projects with \$1.5 million annually
- Supports University Impact Rankings by Times Higher Education (THE), which measures progress towards the UN SDGs
- Measures contribution of universities and countries to SDG research



Climate action

- One Earth journal won 2022 PROSE award for original research on climate issues
- The Lancet's annual Countdown report assessing progress towards the goals of the Paris Agreement
- 2021 Pathway to Net Zero report exploring trends to maximise the impact of clean-energy research



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Summary

- Helping our customers solve critical and complex problems
- Operating with leading positions in attractive global growth markets
- Delivering higher-value decision tools by combining content, data, technology and analytics
- Continuing on improved growth trajectory through evolving business mix



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Q&A

Sell side analysts and institutional investors wishing to ask a question please dial in using the number and conference code below:

UK: +44 (0) 33 0551 0200 / UK Toll Free: 0808 109 0700
US: +1 212 999 6659 / 1 866 966 5335
Code: Quote RELX when prompted by the operator

