Beyond the horizon
What will the world of research look like 10 years from now?

A foresight study.

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(g.deakin@elsevier.com)

www.elsevier.com/connect/elsevier-research-futures-report
<table>
<thead>
<tr>
<th></th>
<th>Overview of approach</th>
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<tbody>
<tr>
<td>1</td>
<td>LITERATURE REVIEW</td>
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<tr>
<td></td>
<td>Understand current system, agents and trends</td>
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<td></td>
<td>January 2018</td>
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<td>2</td>
<td>INTERVIEWS WITH EXPERTS</td>
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<td>56, one-hour interviews with experts to explore and refine trends, drivers, decisions.</td>
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<td>February to May</td>
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<td>3</td>
<td>SURVEY OF RESEARCHERS</td>
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<td></td>
<td>Map motivations, perceptions and likely behaviours around changing trends. 2,055 responses</td>
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<td>March to April</td>
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<td>4</td>
<td>DEVELOP SCENARIOS</td>
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<td>2 workshops to build and refine scenarios</td>
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<td>April to July</td>
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<td>5</td>
<td>WRITE FULL REPORT</td>
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<td>Bring together all the findings for public release</td>
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<td>August to December</td>
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<td>6</td>
<td>LAUNCHED REPORT</td>
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<td>Presented and discussed findings at the AAAS in Washington</td>
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<td>February 2019</td>
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Scenarios constructed along three different dimensions

**SIX THEMES**
- Funding in the future
- Pathways to open science
- The academy and beyond
- Technology: revolution or evolution
- Building the future research info. System
- How researchers work: change ahead

**THREE SCENARIOS**
- Revolutionary Tech
- Evolutionary Tech
- Converged/Coherent

- Controlled
- Fragmented
- Open
Visualizing the future through scenarios

**Brave open world**

- Scenarios are plausible futures, but are not definitive predictions.
- No single scenario has to be “correct”
- They are built on current trends, or drivers, derived from literature, expert opinion and survey work.

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**Tech Titans**

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**Eastern ascendance**
Scenario one: 
**Brave open world**

**At a glance:**
**Open world of collaboration**

- Globally, state funders and philanthropic organizations have joined forces and pushed through the creation of open platforms.

- Open access (OA) is the norm, but the form of that OA varies by region; Europe is mostly gold, while North America and Asia Pacific is generally green. Rapid advances in technology mean these platforms flourish.

- Preprints thrive in this world and are linked to the final article versions, which are still recognized as the authoritative version. Researchers benefit from access to data in a variety of ways, for example, via bite-sized publications and dynamic notebook-style articles.

- The advances in AI and technology have also provided new methods of generating and communicating results.

- Journal publication plays a diminishing role in determining a researcher’s career progress. Increasingly, research is assessed against agreed societal impact standards.
In 10 years the success of research will be judged primarily on...

**S u r v e y  R e s u l t**

- Articles published in journals: 36%
- Either equally likely: 26%
- A range of outputs (incl. articles): 38%

**B a s e:** Researchers. N=2055
Scenario two: Tech titans

At a glance: “Big tech” in charge

- Industry and philanthropic foundations are the principal research funders.

- There have been significant advances in machine learning with sophisticated artificial intelligence (AI) products driving innovation. Advances are rapidly transferred to industry, but at the cost of jobs.

- A number of countries are leveraging sophisticated machine learning products in their research programs to address their own priorities and challenges. However, some sectors and states are struggling to adapt.

- Large technology and data analytics companies become the curators and distributors of knowledge.

- The way research is performed, changes enabling many researchers to work independently of institutes and even funders – “science-as-a-service” is emerging as barriers to entry are reduced or removed.
4). In 10 years the **creative force** driving forward new knowledge will be...

**QUESTION AND RESULTS FROM RESEARCHER SURVEY**

<table>
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<th>Response</th>
<th>Percentage</th>
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<tr>
<td>Researchers</td>
<td>42%</td>
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<tr>
<td>either equally likely</td>
<td>31%</td>
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<tr>
<td>New technology (incl. AI)</td>
<td>27%</td>
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BASE: Researchers. N=2055
6). In 10 years AI will be the criteria used to determine the appropriateness of an article for publication in a journal.
Scenario three: Eastern ascendance

At a glance: A multi-polar world

• China’s desire to transform into a knowledge-based economy has led to heavy public investment in research and development (R&D).

• The sheer volume of investment by China, and other research nations in the region, has made the East a magnet for international researchers.

• Open science practices have been adopted in some countries and regions, but not all.

• A lack of global alignment on grand challenges has resulted in inefficiencies in the international research system.

• Governments, industry and other research funders compete for scientific advantage through the controlled distribution and trading of data. When data is believed to hold no further commercial value, it is released.
2). In 10 years time, research will be principally valued for...

- Enhancing human knowledge: 33%
- Either equally likely: 34%
- Its commercial application: 33%

BASE: Researchers. N=2055
How we as Elsevier are preparing for the future

“Work to improve the information system supporting research around the globe”

- Our role is to help improve the information system supporting research
- Materially improving the information system requires a platform approach
- A platform approach can only be successful if interoperable, transparent, publisher neutral and with the user in control
THANK YOU

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