

# ScienceDirect

Maximizing Investments & Accelerating  
The Journey To Research Innovation



Based on a global, independent research study  
of the ROI generated by ScienceDirect in the corporate market

Special Report: #10 in a Series

## “The role of scientific knowledge in the journey to innovation”

### Survey objectives

Companies worldwide continue to rely on researchers to drive innovation - to develop novel products and processes that spur corporate competitiveness and growth. This study examines how access to existing technical knowledge impacts innovation, and ScienceDirect’s role in the journey.

Objectives	Page
1. The challenges faced by researchers.	3
2. The productivity that existing knowledge generates within each stage of the journey to innovation.	4
3. Opinions of content published by Elsevier.	5
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Ask your representative for case histories demonstrating how ScienceDirect helps scientists and engineers achieve their innovation objectives.

### 8 Key Takeaways

#### #1: “Innovation” - The #1 challenge of today’s researchers

- 5 of the top 6 challenges confronting researchers relate to innovation.

#### #2: Existing scientific knowledge - Utilized throughout all stages of the research process

- Existing knowledge is especially critical during the “idea/development” stage.

#### #3: Content produced by Elsevier - Rated superior to other knowledge resources

- Elsevier’s content is superior on issues such as authoritativeness, relevancy, practicality, and overall value for the investment.

#### #4: ScienceDirect - Content contributing to innovation in an extraordinary number of ways

- 99% of users agree that ScienceDirect supports the journey for research innovation.

#### #5: ScienceDirect - Empowering companies to achieve corporate business objectives

- Including - generating new product lines and patents, lowering the cost of research, and helping compete more effectively.

#### #6: ScienceDirect - 9 of 10 researchers state it shortens the research process

- On average, ScienceDirect saves researchers 24 working days per year.

#### #7: ScienceDirect - 9 of 10 researchers report it reduces the cost of research

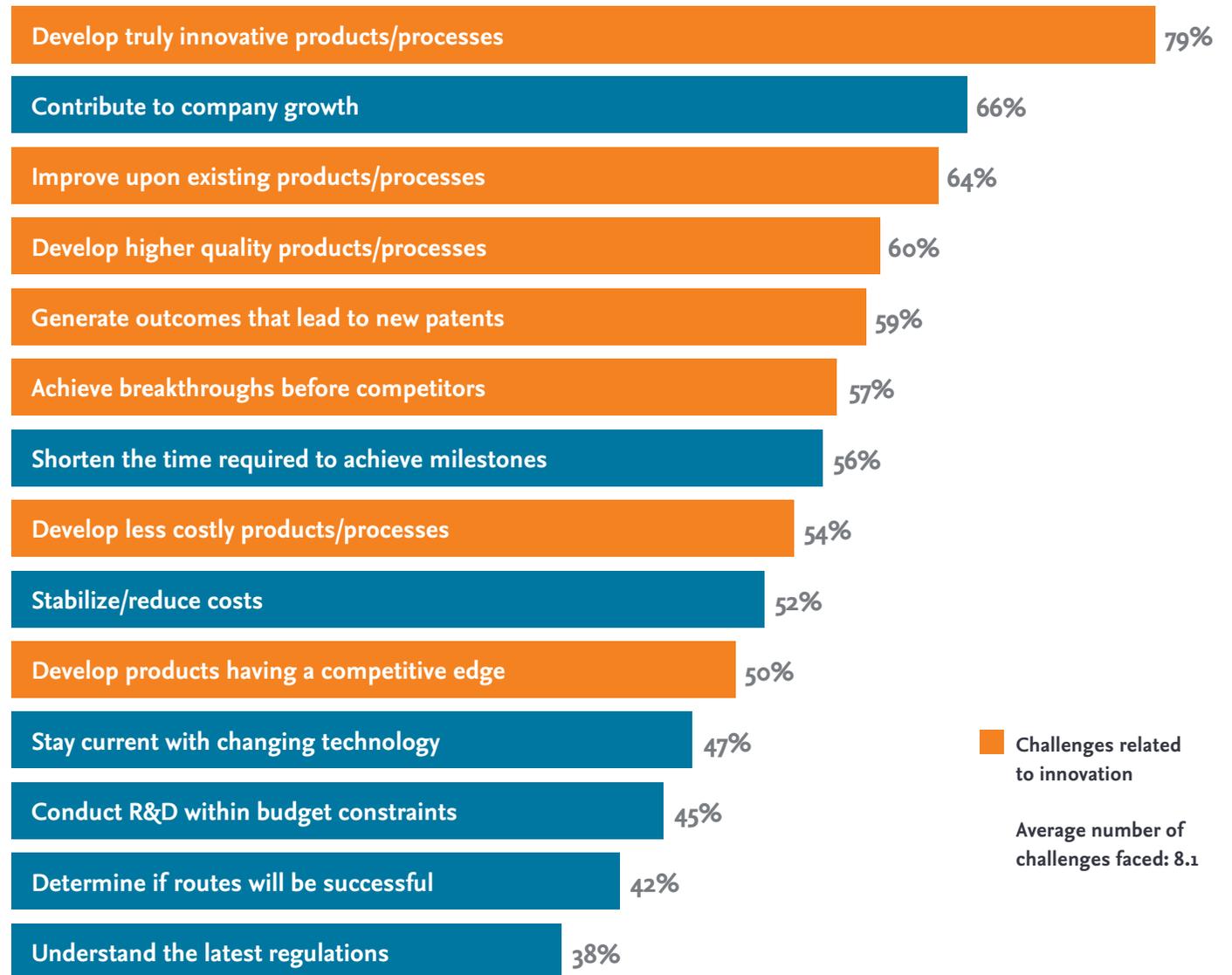
- On average, ScienceDirect reduces research expenditures by 14.4%.

#### #8: ScienceDirect - 9 of 10 researchers agree it’s “Accountable”

- ScienceDirect “enhances innovation, productivity, and/or advances the research process in excess of the cost.”

# The primary challenge faced by today's researchers: responding to demands for innovation

Five of the top six challenges confronting researchers relate to innovation for new and existing products/processes



# Researchers incorporate existing knowledge from a wide range of disciplines into all stages of the research process...especially into the “idea” stage

## Stages in the research process

### STAGE 1 - Developing ideas/gathering intelligence:

Searching the literature to stimulate ideas and gather comprehensive information; gathering competitive intelligence; staying aware of current advances; identifying the problem/opportunity.

### STAGE 2 - Experimentation:

Defining research strategy; planning the optimal method; gathering relevant intelligence/data; identification of potential scale-up issues; determining safety considerations, etc.

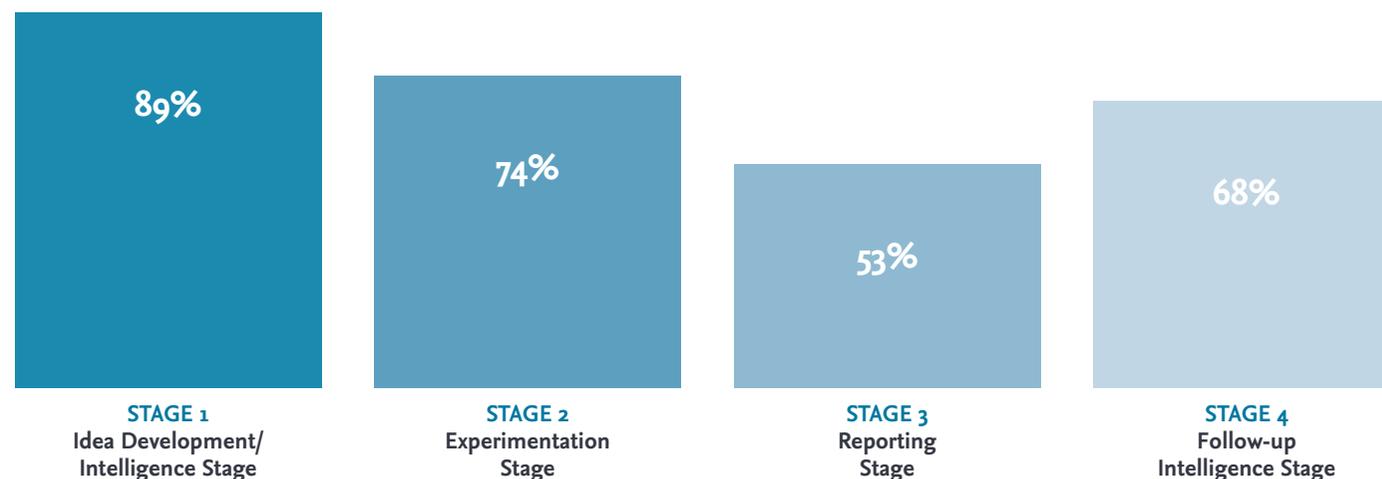
### STAGE 3 - Reporting:

Analyzing and summarizing findings; publishing results; reporting to peers; patenting; storing documentation, filing against regulatory compliance requirements.

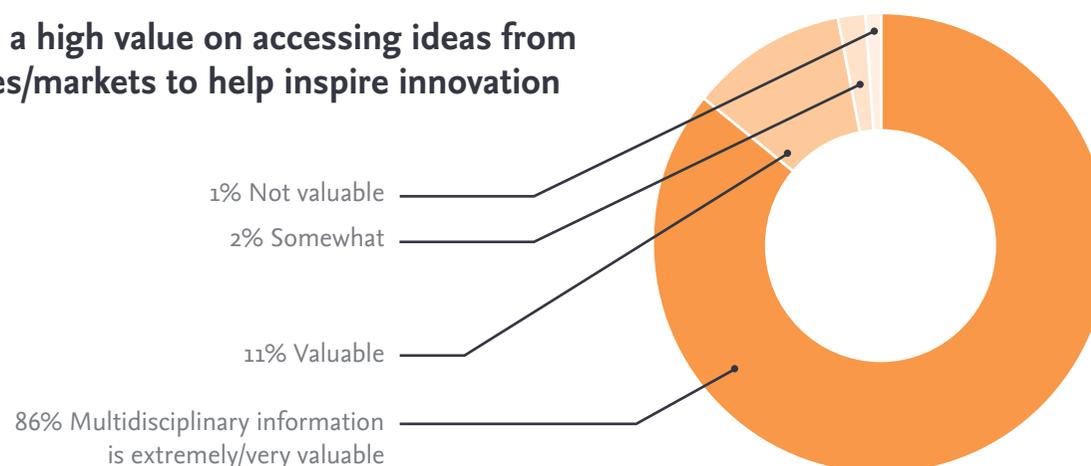
### STAGE 4 - Gathering follow-up intelligence:

Monitoring competitive responses; staying alert for new information on the topic; staying current with new, related regulatory rulings.

## Ratings of existing scientific/engineering knowledge as “extremely or very productive” throughout the research process”.



## Researchers place a high value on accessing ideas from multiple disciplines/markets to help inspire innovation and solutions.



# On a wide range of critical criteria, researchers rate Elsevier's content on the ScienceDirect platform to be superior to other knowledge resources

Elsevier's full text content offers a spectrum of advantages over other online knowledge resources

Criteria	Elsevier: Far Superior + Superior
Authoritativeness/credibility	67%
Reputation for quality content	69%
Reliability of content over time	65%
Content relevant to areas of research	63%
Content that's practical/usable	51%
Breadth/depth of content in a single source	64%
Content that is timely and current	59%
Overall productivity - value for the time invested	62%
Overall value for the financial investment	50%



Why Elsevier's content is more valuable than other online knowledge resources...

"Broad variety of sources help to inspire innovation."  
Regulatory Affairs Manager, Pharmaceuticals Firm

"Helps us in finding breakthrough ideas."  
Intellectual Property Management, Pharmaceuticals Firm

"Research reports have gone through a rigorous peer review. Not all journals have standards as high."  
Consultant

"Rigor of peer-review process assures quality."  
Marketing, Agricultural Firm

"Helps me find specific details not found elsewhere."  
Medical Professional, Scientific, Medical, Dental Devices Firm

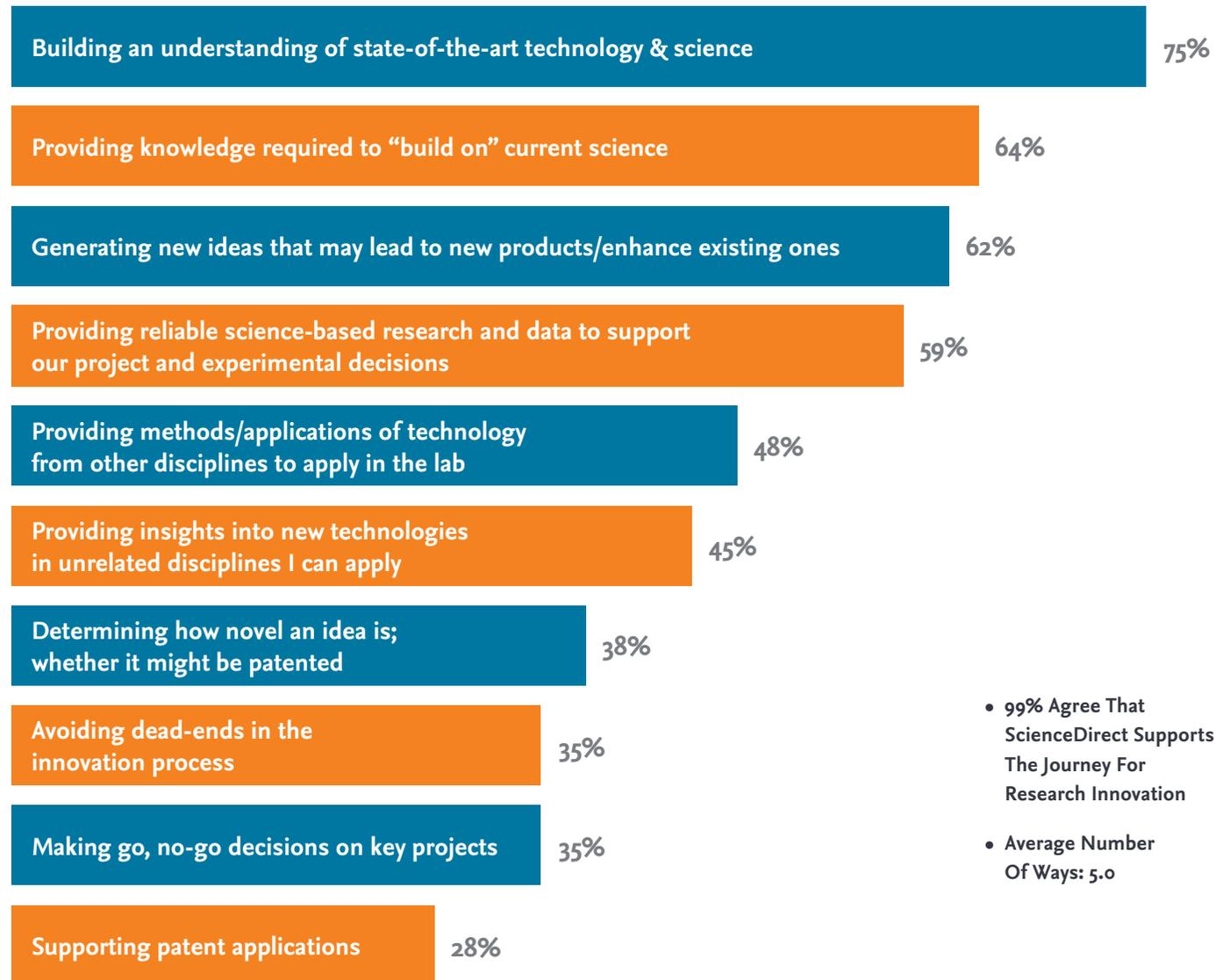
"Has wide diversity covering all parts of science."  
Scientist, Pharmaceuticals Firm

"Offers a wide range of interdisciplinary journals."  
Technical Staff, Independent Research Center

"The value is in the speed, accuracy and relevance of the retrieval of information, which seems superior to other online resources."  
Field Medical Science Liaison, Pharmaceuticals Firm

# ScienceDirect contributes to the journey for research innovation in an extraordinary number of ways

How ScienceDirect helps stimulate and support research innovation



- 99% Agree That ScienceDirect Supports The Journey For Research Innovation
- Average Number Of Ways: 5.0

# ScienceDirect also generates significantly greater productivity...including not having to repeat what has been accomplished by other researchers

## CASE STUDIES: How ScienceDirect has helped corporations achieve their research and business objectives

### The specific ways ScienceDirect enhances research productivity

Saves time by providing immediate access to knowledge	74%
Accelerates research by not repeating the work of others	55%
Saves time by reducing the number of sources we need to make decisions	53%
Reduces risks; ensures we have peer-reviewed information to validate investments	50%
Saves costs because we don't have to repeat the work of others	49%
Reduces the risk that we will overlook an important finding critical to our research	41%
Reduces risk by enabling us to validate our work with other researchers	34%
Reduces costs by avoiding erroneous experimental methods	30%
Reduces costs; avoids project "dead-ends"	28%
Improves competitiveness; brings projects to market earlier	23%
<b>Total, greater research productivity</b>	<b>98%</b>

**Type of business:** Pharmaceuticals.

**Researcher's position:** Technical management.

**Product worked on:** Pharmaceutical dosage form.

**Issue faced:** Long-term product performance change. Found multiple articles that supported potential mechanism, designed experiments to confirm mechanism. Launch delayed 1 year instead of canceled.

**What was learned:** Raw material aging mechanism.

**How information was applied:** Designed better experiments.

**Contribution of ScienceDirect:** Applied knowledge from non-pharmaceutical study.

**Impact on the project:** "Salvaged product launch (est. \$20 Million USD)."

**Type of business:** Chemicals/biochemicals.

**Researcher's position:** Technical management.

**Process worked on:** Polysorbate HPLC analysis from a challenging matrix.

**Issue faced:** Recovering polysorbate from an animal feed matrix.

**What was learned:** Columns and conditions to use for a generic HPLC/UPLC method to detect polysorbate 80. The matrix was different from ours but it gave us a starting point for method development.

**How the information was applied:** Developed a straightforward HPLC analysis method to detect polysorbate 80 method in an animal feed matrix.

**Contribution of ScienceDirect:** Although we developed a means to extract polysorbate 80 from the animal feed matrix, ScienceDirect gave us a starting point to develop the actual method.

**Impact on the project:** "500,000 USD."

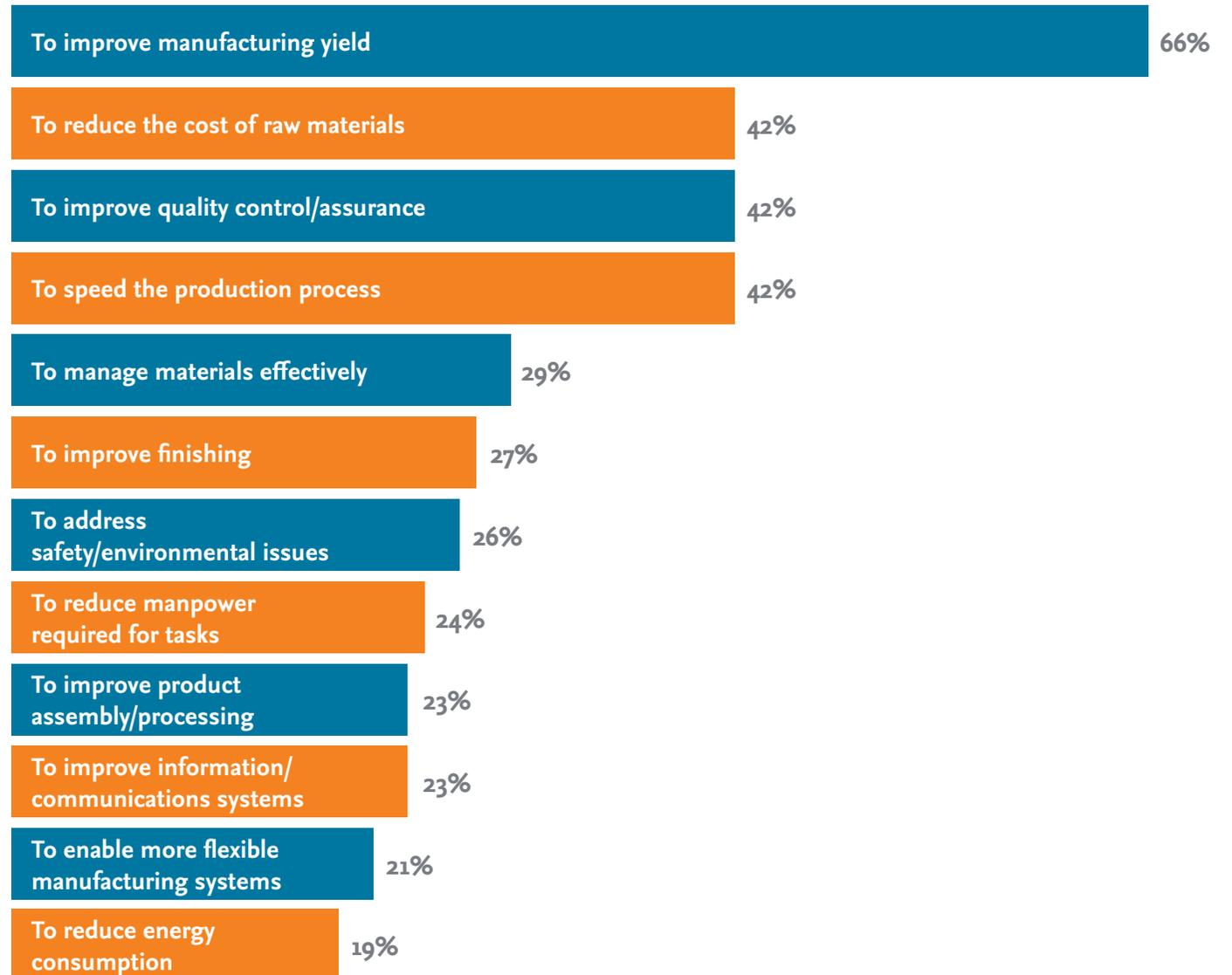
# ScienceDirect helps empower companies to achieve an array of corporate business objectives

The role ScienceDirect plays in achieving business objectives (based on “critical + very important + important”)



# ScienceDirect contributes beyond the lab...it also contributes to advancements in manufacturing/production activities

Ways in which companies apply ScienceDirect to help address manufacturing issues\*



\*Among the 33% of respondents that use ScienceDirect for manufacturing purposes.

# The more that researchers experience the contributions of ScienceDirect, the more they incorporate it into their work

The major reasons for the extensive use of ScienceDirect's platform - its intuitiveness, the ability to quickly find relevant content, and how efficiently it's organized

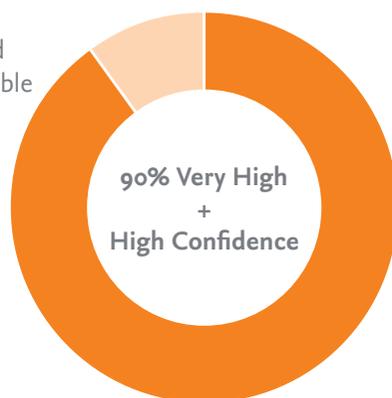
The frequency with which researchers access ScienceDirect	
Number of years using ScienceDirect	Average number of times used per week
Less than 1 year	1.0
1 - 3 Years	1.7
4 - 6 Years	5.5
7 - 9 Years	5.1
10 Years or more	7.2
All respondents	5.5

Amount of time spent per day using ScienceDirect's content	
Number of years using ScienceDirect	Minutes per day using Science Direct
Less than 1 year	27.8
1 - 3 Years	34.6
4 - 6 Years	35.1
7 - 9 Years	38.2
10 Years or more	51.0
All respondents	41.1 minutes

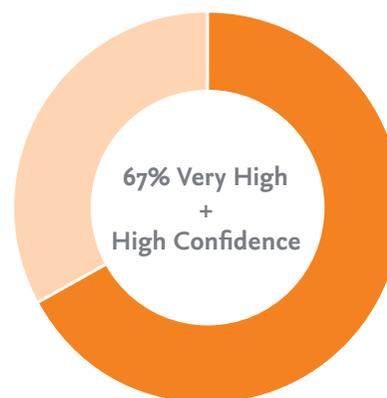
The ScienceDirect platform	Exceptional + Excellent + Good
<b>Intuitiveness</b> Ease of navigation from one area to the next	93%
<b>Search</b> Quickly locating relevant content	93%
<b>Overall organization</b> Structured to efficiently access information	96%
<b>Communications</b> Clear/readable instructions and content	90%

## When using ScienceDirect, researchers have a high level of confidence that they will develop the proper solutions

"The information you find is the most accurate, reliable information available."



"You are not overlooking or missing critical information that will support your research."



"You are working as effectively & efficiently as possible."



# ScienceDirect generates significant, measurable returns on investment

## Time saved by investing in ScienceDirect

Number reporting they save time by using ScienceDirect

88%

Average amount of time saved each day by using ScienceDirect

47.2  
Minutes  
each day per  
researcher

### Projection of time saved per researcher per year

Time saved each day	47.2 minutes
Number of working days per year*	240 days
Number of hours per year saved	189 hours
Number of days saved per year per researcher**	24 days per year

\*Excludes weekends and assumes two weeks of vacation. Assumes an additional week off for official holidays.

\*\*Based on an eight-hour day.

## Research costs saved by investing in ScienceDirect

(i.e. savings in the cost of labor to investigate approaches and conduct experiments, investments in research papers, savings in lab materials/equipment for additional experiments, etc.)

Number reporting they save research costs by using ScienceDirect

85%

Average reduction in research costs by using ScienceDirect

14.4%  
per company

### How researchers describe the accountability of ScienceDirect

**"Speeds research and innovation."** - R&D Management, Petroleum Institute

**"Enables me to get information more quickly than other sources, so makes me more efficient."** - Technical Staff, Food/Dairy/Beverages Company

**"Saving time & money because of simple way to download information."**  
- Scientist, Petroleum Company

**"Limits number of in-house experiments, which saves costs."**  
- Pharmaceuticals Firm

**"Reduction in time and cost."** - Technical Management, Petroleum Firm

### The impact if ScienceDirect were no longer available

**"Less inspiration, (would take) more time to find prior art."**  
- Regulatory Affairs Manager, Pharmaceuticals Firm

**"(We would be) doing experiments already done by others."**  
- Scientist, Biotechnology Research Company

**"Increased time to develop methods, more dead ends."**  
- Scientist, Pharmaceuticals Firm

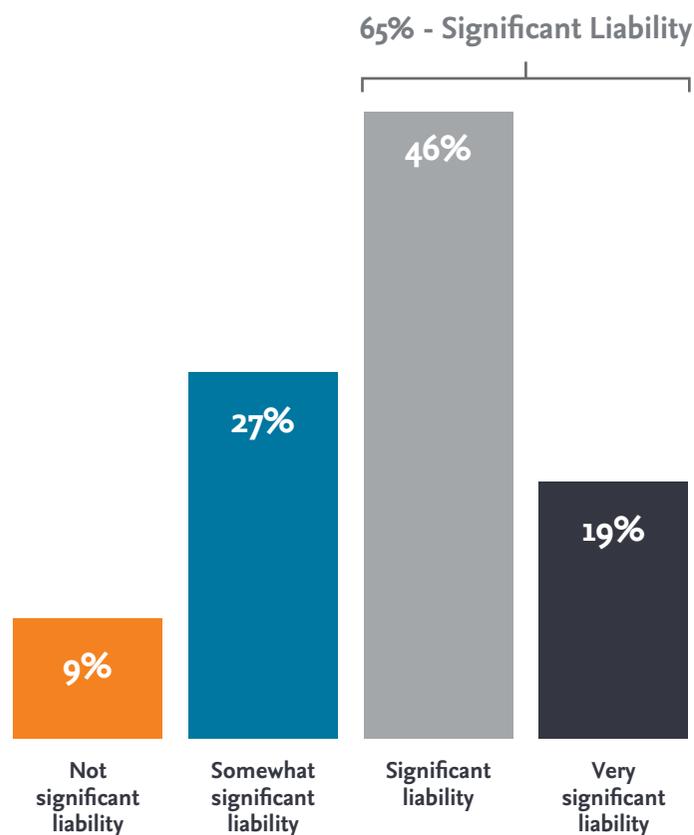
**"Ineffective use of time by chemists working at their benches."**  
- R&D Management, Biotechnology Research Company

**"Slower and more costly (research)."**  
- Corporate Management, Healthcare/Medical Service

**"More cost."** - Information Manager, Private/Contract Research Firm

Note: Includes the minority indicating 0% savings.

Researchers state strongly: not having access to ScienceDirect would result in a “significant liability”



## CASE STUDIES: How ScienceDirect has helped corporations achieve their research and business objectives

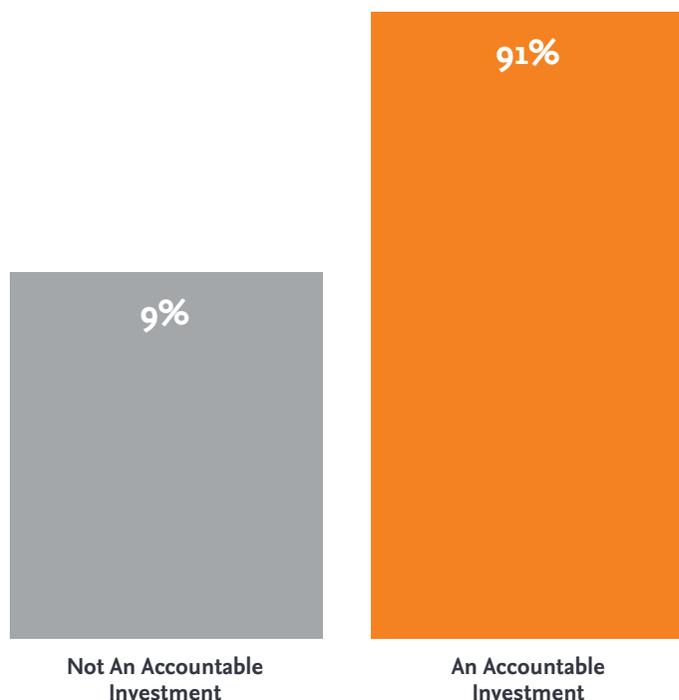
Type of business:	Private/contract research firm.
Researcher's position:	R&D management.
Product worked on:	Solar dryers, clothes dryers, cooling transistors, refrigeration, linear generators, energy harvesting and more.
Problem or issue faced:	Any problem.
What was learned:	The science applied, the experimental and simulation methods, the systems configurations, the mathematical models.
How information was applied:	I use ScienceDirect's knowledge for solving industrial problems.
Contribution of ScienceDirect:	I applied knowledge about refrigeration articles to create a new refrigerator model; used a control methodology for electrical consumption reduction of the clothes dryers.
Impact on the project:	"For clothes dryers, we can reduce the cost per device by USD 20 (during) manufacturing."

Type of business:	Biotechnology research company.
Researcher's position:	Project management.
Process worked on:	Biology and biotechnology/engineering.
Issue faced:	Plant biology.
ScienceDirect tools used:	Full-text articles; article back files; books/reference works.
What was learned:	Updates in the research project area
How the information was applied:	Developed better strategies for projects.
Contribution of ScienceDirect:	Effected a methodology for research; helped make an effective go/no-go decision, enabled a product to have a patent granted.
Impact on the project:	"50-60%."

## Virtually all researchers report that ScienceDirect is “accountable.”

“It enhances innovation, productivity and/or advances the research process in excess of the cost”

### CASE STUDIES: How ScienceDirect has helped corporations achieve their research and business objectives



Type of business:	Petroleum.
Researcher's position:	Project management.
Product worked on:	Development of welding procedure for a new pipeline under very high rates of CO <sup>2</sup> corrosion.
Problem or issue faced:	No defined industry guides - novel research required.
ScienceDirect tools used:	Full-text articles; article back files; books/reference works.
What was learned:	Metallurgy options & validation for some we had considered.
How information was applied:	It was useful in finalizing laboratory testing parameters and developing a welding procedure for qualification.
Contribution of ScienceDirect:	Applied a novel methodology not available elsewhere.
Impact on the project:	“Over 3M USD.”

Type of business:	Pharmaceuticals.
Researcher's position:	R&D management.
Process worked on:	In vitro screening for ion channel blockers.
Problem or issue faced:	Needing to collect information on existing blockers and the experimental conditions they were tested in.
What was learned:	Collected a dataset of over 30 existing compounds that block our targeted channel.
How the information was applied:	We created an SAR for designing new blockers of the channel.
Contribution of ScienceDirect:	Allowed us to collect existing data quickly to inform design of new candidate drugs (new product).
Impact on the project:	“Project was ultimately stopped, but we saved several man-months of discovery science time in getting this information.”

## “The role of scientific knowledge in the journey to innovation”

### Survey Methodology:

**The Research Organization:** Martin Akel & Associates, Nipomo, California, USA.

**Date Conducted:** February, 2016.

**Universe Studied:** 55,533 corporate market professionals in the Elsevier global database, for whom email addresses were available. Survey respondents were then qualified to include only those involved in R&D and those who use ScienceDirect.

**Market Segments:** The mailing list represented those in the corporate market - including process and discrete manufacturers as well as those in other businesses.

**Titles Selected:** Corporate and research managers; research staff members; information managers (librarians, etc.).

**Medium Used:** Email invitations and an online questionnaire.

**Identification:** The survey was sent out over the Elsevier/ ScienceDirect names.

**Incentives:** Contests for gift cards; a charitable donation.

**Response Rate:** 258 usable returns; overall margin of error (95% confidence level) = +/-6.2%.

### Respondents' Demographics:

#### Regions:

The Americas	51%
Europe/Middle East/Africa	33%
Asia/Pacific	14%
Other	2%

#### Types Of Businesses:

Processed Products Manufacturers	57%
Discrete Products Manufacturers	9%
Other Businesses*	33%

\*Biotech research, energy, healthcare services, independent labs, etc.

#### Number Of Employees Involved In R&D:

Average	2,278
Median	1,375

#### Annual Sales Revenue:

Average	US\$9.2 billion
Median	US\$5.8 billion

#### Annual R&D Budget:

Average	US\$395 million
Median	US\$85 million

#### Respondents' Titles:

Corporate/Business Management	4%
Research Management	39%
Research Staff Members	49%
Other (consultants, information managers, etc.)	9%

#### Types Of Research Conducted:

Basic	81%
Applied	98%

## LEARN MORE

To request information, case histories on the ROI generated by ScienceDirect, or to request a product demonstration, please visit [ScienceDirect.com](http://ScienceDirect.com) or contact your nearest Elsevier office.

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