IN SUPPORT OF THE PRIMACY OF SCIENCE

INTRODUCTION

rom climate change to the coronavirus pandemic, the public is looking to science to respond to the biggest challenges of our time. In fact, most people believe science should underpin the decision-making on the issues impacting their day-to-day lives. But progress is impeded when the discourse is allowed to be dominated by ideology and politics at the expense of facts. That's why the need for truthful, accurate scientific information is greater than ever — and leaders in government and business should stand in support of the primacy of science.



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UNDERSTANDING THE RELATIONSHIP BETWEEN SOCIETY AND SCIENCE

The modern world is made possible by science.

Science sits at the center of our technologies and gadgets; it fuels our power supplies; it makes the food we eat safe for consumption; and it treats and even cures a myriad of ailments and diseases that once were deadly. Virtually every modern amenity and convenience – from clean water and refrigeration to content streaming and GPS – is rooted in science.

But does the public's grasp of and respect for science matter? On a policymaking level, can inadequate scientific literacy — or the willful choice to ignore science — result in decisions and regulations based on ideology or political convenience rather than objective truth? Can the lack of science literacy leave societies ill-equipped to make informed decisions related to public health, climate change, technology, advances in genetics, and more?

Philip Morris International (PMI) believes it does. Scientific literacy plays an important role in educating policymakers about the smokefree alternatives to cigarettes that exist today for adults who would otherwise continue smoking, and the part they can play in tobacco control and harm reduction.

Earlier this year, PMI commissioned an online survey by independent research firm Povaddo. Fielded in June–July 2020, the survey was completed by 19,100 adults in 19 countries and territories across Europe, Asia, the Americas, and Africa. Our intent was to better understand people's interest in science, their access to and understanding of scientific information, and how they rate various sources of scientific knowledge.

This article summarizes these findings and explores the potential consequences of science not being leveraged to its full potential. The findings indicate that the world's citizens want governments and public authorities to prioritize science and fact over ideology, politics, and unsubstantiated beliefs. When authorities fail to do so, opportunities for progress are lost and potential solutions to critical global challenges — from climate change and COVID-19 to tobacco harm reduction — are hindered.

EXPECTING SCIENCE TO COME TO THE RESCUE

7796 of people are hopeful that advances in science can deliver solutions to society's biggest problems



TAKEAWAYS

Most people have high expectations of science. They "believe" in science, just as most people in previous eras believed in higher powers. There is a widespread expectation that science will find a way. We live in a world in which the miraculous is mundane, a world that to any time traveler from the past would seem to be full of magic. Thanks to the application of science through technology, we take for granted thousands of gadgets and services that once were the preserve of science fiction. Most of the time, we don't even notice them — at least until they don't work as expected.

In the personal domain, people enjoy many everyday marvels: hand-held computers thousands of times more powerful than those that enabled the Apollo 11 moon landing, high-speed wireless connections, global multiparty video chats, and the ability to watch virtually any movie or listen to any music from anywhere at any time. And in specialist domains, many can benefit from such wonders as rapid and affordable DNA sequencing, diagnostic imaging, and remote keyhole surgery.

In virtually all cases, most of us accept these marvels with barely a thought. It just appears, pushed forward by the rapid pace of innovation and expectations that the next thing will come soon. Technological advances have been happening so widely, so fast, and for so long that if a problem does arise, we now expect science and technology to have solutions at the ready, or to invent them quickly. There is a big divide, however, between the little problems of everyday life and the massive challenges facing the world, such as COVID-19, pollution, climate change, water shortages, deforestation, and species loss. Although these are planet-sized challenges, the respondents to our survey are hopeful that science will provide solutions.

Without mentioning specific issues, the PMI survey asked: Generally speaking, how hopeful are you that advances in science and scientific developments can deliver solutions to society's biggest problems? Across the sample, the balance of opinion shows clearly that there are a lot more people who are hopeful about science than not:

- 77 percent said they are hopeful (including 26 percent who are very hopeful).
- 20 percent are not hopeful (including just 4 percent who are not at all hopeful).

We don't know whether many respondents have specific ideas about how science could be applied to society's biggest problems. What we do know is that they have faith that these problems will be addressed — and ultimately solved — by science and scientists.



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THE ROLE OF SCIENCE IN SHAPING INFORMED DECISIONS

The survey indicates that people take a strong interest in science.

But it's concerning that, despite significant interest in scientific information, most respondents said they do not have easy access to it. We asked: *Generally speaking, do you find it easy or difficult to access reliable information about the latest scientific developments and studies*? Almost half the sample (48 percent) said they find it difficult, including 10 percent who find it very difficult.

It could be tempting to gloss over this finding, but a closer look at what is at stake when people have to make decisions in the absence of reliable information allows us to evaluate this shortcoming in a more comprehensive way.

According to the significant body of research exploring human decision-making – and in particular the roles of cognition, emotion, and intuition in this process – human thinking is shaped both by gut feelings and logical analysis. The former is quick, while the latter requires time and thinking based on the facts and evidence at hand.

Naturally, in situations where reliable information is scant, we have to rely more on our gut and use mental shortcuts, also known as *heuristics*, to reduce complexity and assist our decision-making. But what happens when we need to make a decision on complex matters for which we lack knowledge, experience, and expertise? Take, for example, decisions around protection during the coronavirus pandemic. If people are not able to access reliable information on the latest scientific developments and data, they will be less capable of analyzing the situation and understanding their options. What's worse, they may resort to unreliable shortcuts to make decisions – potentially including following what the neighbors are doing, what they feel good about doing, or accepting advice from a random group on social media. Moreover, when access to reliable scientific information is limited, people can be more susceptible to misinformation and hearsay.

Bottom line: People need access to reliable information in order to make informed decisions.

find it difficult to access reliable information about the latest scientific developments and studies

TAKEAWAYS

Most people have an appetite for scientific information, most feel confident in their ability to understand it, and most allow science to influence important decisions in their personal lives. Despite these overwhelmingly positive attitudes toward science, the majority of respondents indicated that they don't have easy access to reliable information about scientific developments and relevant studies — a concerning finding given that, in the absence of such information, biased assumptions or even life-endangering falsehoods may be more likely to influence their decisions.

reliable knowledge available on the subject.

What is needed from providers of science content to enable people to make better-informed decisions?

information that is grounded in robust empirical work conducted rigorously in accordance with established scientific principles. This means, among other things, that it should not mislead people — for example, by using headlines created to grab attention while misrepresenting the details of the work being reported.

Alongside the ethical dimension comes quality of content. Some science content is brief and simple. Some is long and detailed. Either way, at whatever degree of complexity it is communicated, it should present the most The deeper the level of complexity, the more it should reflect the nuances that are the mark of honest and balanced scientific reporting. The lower the level of complexity, the more it should guard against the risk of people coming away with overly simplified or misleading interpretations.

Moreover, science content should make clear what the implications of the content are for the reader/viewer in concrete terms, as well as what actions they might consider taking and choices they could make in light of these implications.

What conditions will give science content the best chance of positively influencing behavior change?

are interested

in new scientific

information

For consumers of science content to achieve better outcomes, they must not only have easy access to quality information but also reason to trust it. It is critical, therefore – especially in the health space – that public authorities and media platforms work to expose and, to the extent they can, eliminate fraudulent and unfounded assertions. At the same time, people need to be educated on how to assess the veracity of scientific information. This must include the ability (and desire) to differentiate between science content promoted by a celebrity or activist and science reports based on empirical, peer-reviewed work.

4.1% believe their governments do a poor job of communicating reliable information about the latest scientific developments

40% believe the media do a poor job of communicating reliable information about the latest scientific developments

TAKEAWAYS

Science content can aim to do more than keep people informed. It can aim to provide more robust information so that people can make better-informed decisions.

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THE DANGERS OF BAD SCIENCE

hat are the practical consequences of people being unable to differentiate between solid information and misinformation? What dangers lie in the public being denied access to unbiased and up-to-date scientific findings?

When interest in science goes wrong

The anti-vax movement provides a sobering case history of how the public interest in science can lead to negative outcomes. Although opposition to vaccination goes back to the 19th century, it is the anti-MMR (measles, mumps, rubella) version that has been having a big impact in recent decades.

In 1998, the British medical publication *The Lancet* published a paper linking the MMR vaccine to autism. The story ran for five years, garnering widespread coverage until an investigative journalist published an exposé in 2004. The paper was retracted by the co-authors and the publication 12 years after its initial appearance, but by then vaccination rates had dropped significantly. Even today, rates in some countries are still below those needed to prevent group infections, as some people reject vaccinations outright and others hesitate too long. Now measles is resurgent.

The anti-vax movement may turn out to be still more impactful as governments attempt to deal with COVID-19. According to media reports, even as researchers are racing to develop vital vaccines, some conspiracy theorists are alleging that a vaccine against On the other end of the spectrum, bad science — intentional or not — can limit oopportunities for progress. In the U.S., an August 2020 Gallup poll showed that one in three Americans would not get the COVID-19 vaccine if available today. Among the naysayers are anti-vaxxers, those who refuse vaccinations, but also a growing number of citizens who have lost trust because of perceived politicization of the science.

The real risk — similar to what we see in the field of innovative alternatives to continued cigarette smoking — is that the absence of accurate scientific information creates the conditions for "junk" or bad science to be used to set political agendas. In the field of tobacco and health, poorly executed scientific studies and skewed results shaped by bias are being used to sway the public against innovative alternatives to cigarettes. Because of this, policymakers in many countries are opting to stick with the status quo. They are still allowing the sale of cigarettes — the most dangerous form of nicotine consumption — while banning or restricting the sale of these alternatives. Good policymaking requires that ideology and personal beliefs be set aside and that all of the evidence be dispassionately evaluated.

Reinforcing public trust in science

At PMI, we believe that public access to good quality scientific information is critical. Only through unfettered access to such information can people make informed choices based on facts rather than gut feeling or ideology. At the same time, we must recognize that such access may not always be sufficient on its own. Addressing the problem of "society rejecting facts," *Science Daily* advocated: "Our common goal should be to return public trust in our research enterprise, which has done so much good for so many. [...] The more we can do as scientists to promote our guiding principles of rigor, transparency, honesty and reproducibility and to provide the best evidence possible and get people to understand [it], the greater the likelihood that they will listen to the message and follow it."

COVID-19 fits into an Orwellian government masterplan.

Importance for public policy

The COVID-19 crisis has given even greater prominence to the crucial role that science can and should have in informing policy decisions. It has also illustrated why public interest in science matters. People's interest and understanding of why policies are proposed affects their willingness to support the policies politically and adhere to them in practice.

The PMI survey found that the vast majority of those surveyed (84 percent) want their governments to take the latest scientific evidence into account when making policy decisions, but governments are not meeting expectations. Just over half of the respondents believe their governments are doing a good job of ensuring that science informs their decision-making processes.

In most instances, the effects of public policy take years or even decades to become evident. For example, the mandatory use of seat belts -a standard feature in cars today and probably one of the most common safety devices in modern history - was at first fiercely contested by segments of the population in the U.S. and elsewhere. But as research and data on road fatalities accumulated over the decades that followed, the initial claims that seat belts were ineffective, inconvenient, and uncomfortable have been dismissed for good.

It is entirely possible that two people will systematically examine the same robust scientific information and come to different conclusions. In the scientific world, it is expected that thinking will evolve, that consensus will change as new information and evidence emerge. After all, science often advances when a prevailing point of view is challenged and shown to be wrong. And no matter how difficult it may be to let go of long-held beliefs, the scientific mindset shows us the way.

Food for thought

Transparency and open debate are vital.

Governments, policymakers, business leaders, and citizens alike have a unique opportunity today to elevate science and scientific knowledge as a reliable force for good. Progress will depend on our collective ability to objectively examine the facts, move past our biases, and open ourselves to new ways of thinking. We must all work together to ensure that the policies our governments are instituting do not run counter to objective truths.

SURVEY METHODOLOGY

Povaddo conducted this online survey on behalf of PMI between June 25 and July 8, 2020. The survey was fielded among 19,100 general population adults ages 21 and older in 19 countries and territories: Argentina, Australia, Brazil, Germany, Hong Kong, Israel, Italy, Japan, Mexico, the Netherlands, Norway, the Philippines, Russia, South Africa, South Korea, Taiwan, the United Kingdom, the United States, and Vietnam. For the overall sample, there is a margin of error of +/- 0.72 percent at the 95 percent confidence interval.

READ THE FULL "IN SUPPORT OF THE PRIMACY OF SCIENCE" WHITE PAPER AT WWW.PMI.COM/SCIENCEFIRST

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