

RETURN ON INNOVATION
.....
*Opportunities
in Alberta's
Innovation System*

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ALBERTA ECONOMIC
DEVELOPMENT AUTHORITY

Advisors to Government

PREPARED BY
ENVISION ALBERTA
COMMITTEE

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Message from the Board Chair and the Envision Alberta Committee

Alberta Economic Development Authority (AEDA) is pleased to deliver this report, titled *Return on Innovation – Opportunities in Alberta's Innovation System*, that provides a thoughtful conversation-starter about ways to build on Alberta's successful innovation ecosystem and capitalize on the talent for innovation available in the province.

Alberta is about innovation. This was recently reaffirmed at the prestigious 2012 Manning Innovation Awards, which recognize that technological innovation can come at anytime, from anywhere, and from anyone. In 2012, Alberta had more award nominees than any other province in Canada, highlighting the creativity and wealth of ideas in our own backyard.

The challenge for Alberta is to move innovative ideas from the drawing board to the commercialization stage, and to make the steps in between as easy to access and navigate as possible. From financing and resourcing to marketing and all the steps that lead to a successful launch, these barriers to innovation should be minimized and policy should encourage commercialization from all sectors of the economy, whether through public or private efforts.

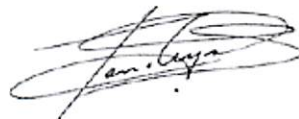
This report identifies Alberta's innovation policy eras and encourages gains in productivity and innovation in existing sectors rather than continued market diversification. The report also asks important probative questions to help policy makers explore how best to create the world-class innovation system Alberta is capable of fostering.

The considerations outlined in this report emphasize the significant role played by innovation in Alberta's economic development and the importance of creating a policy framework that increases Alberta's return on innovation. Alongside the report, AEDA welcomes future opportunities for involvement in discussions and activities that will improve our innovation ecosystem.

Sincerely,



Barry Heck
 Chair
 Alberta Economic Development Authority



Ian Reynolds
 Chair
 Envision Alberta Committee



Background

How effective are Alberta's current efforts in innovation commercialization for small and medium enterprises? This was the question posed of AEDA's Envision Alberta Committee in the spring of 2012 by Premier Redford.

The Committee took this question as the kick-off point in developing a project that would strengthen Alberta's innovation ecosystem. What might government do to improve the rate of success for the commercialization of intellectual property (IP) and innovation in general?

As the discussion and work progressed, it was discovered that the topic encompassed much more than could be addressed by the Committee to date.

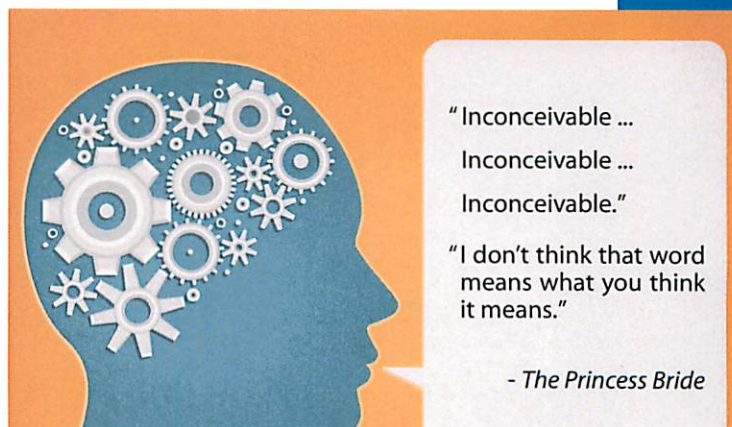
This paper identifies probative questions that focus on what Alberta needs to do to move forward in creating an innovation system that will spur research, innovation and commercialization of those ideas that have high return potential. The Committee hopes these questions will lead policy-makers to explore how Alberta's innovation ecosystem can be made even better.

Alberta has an opportunity to build on past policy successes and inspire a greater culture of innovation, taking a lead economic development position among jurisdictions in Canada and in the global marketplace. Our goal with this paper is to spark that discussion, encourage government to explore considerations brought forth by AEDA's Envision Alberta Committee, and ultimately help Alberta companies occupy lead positions within their respective industries.

Over the past two decades, the global race for research and commercialization has become a dominant part of economic policy. Sparked by tremendous wealth creation derived from internet and digital technology, biotechnology, genomics and nanotechnology, government expenditures have escalated in attempts to attract high quality people and to become the leading centre for "the next big thing."

Traditionally, funding and effort were focused on investments in research done at major universities across the world. Intellectual property policies were designed to stimulate the "commercialization of ideas" which would create a return on investment of public dollars back to the university to perpetuate further research and development.

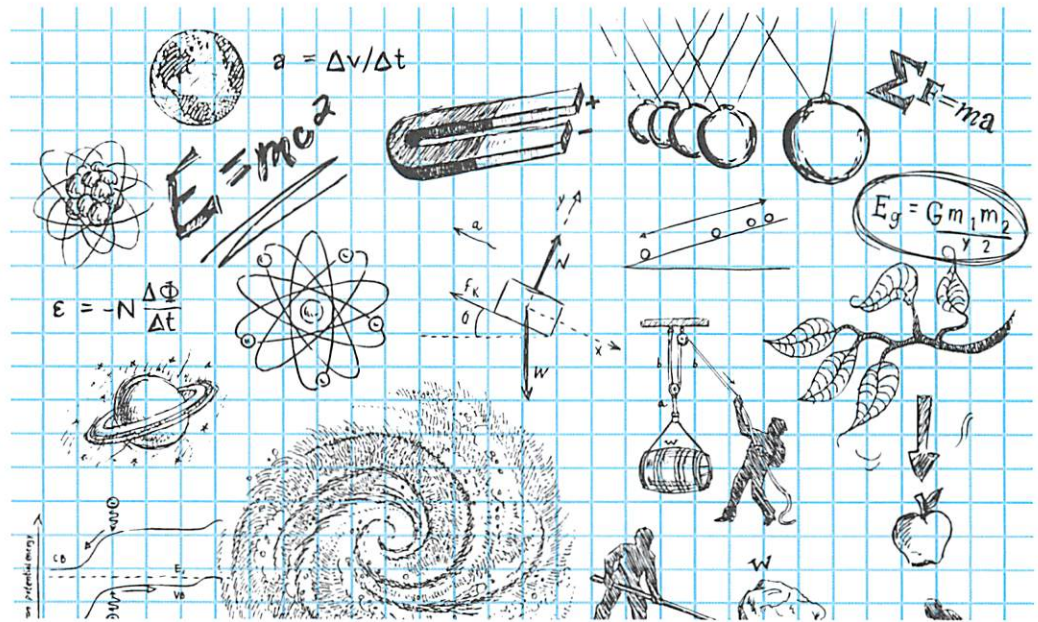
Then, around 1998-2001, when internet technologies began inflating the stock prices of technology-based companies, the funding focus quickly shifted from efforts in research to efforts in commercialization. Commercialization offices and private incubators proliferated and the "number of university spin-out companies" and "number of start-up companies" were emerging the measure of success for many jurisdictions.



"Inconceivable ...
Inconceivable ...
Inconceivable."

"I don't think that word means what you think it means."

- *The Princess Bride*



Alberta has acted no differently. Structurally, the innovation agenda was once tied to the Department of Economic Development in the 1990s, then spun out as its own Department of Innovation & Science in the early 2000s with the internet bubble, and finally embedded as part of the Advanced Education system over the past six years. The debate on best practices to foster innovation continues, and will likely continue, as there is no one model globally that has consistently delivered on the potential that was once envisioned: to help companies occupy a sustained leadership position within their industries.

The purpose of this document is to raise important questions about Alberta's innovation culture as it relates to research and commercialization, and help spur discussion about how the innovation system could be redesigned to better support economic policy. This document is not intended to be critical of past decisions, as those public policy decisions have built the essential building blocks for the renowned research and innovation capacity that exists today. However, as we look to the future, the Government of Alberta needs to continue to explore and refine its understanding of how research, commercialization and innovation supports its economic policy, and how its investment in research, innovation and commercialization generates a desired level of economic and societal returns.

In the quest to answer the question, "What opportunities exist to improve the return on investment and success rate from the research, innovation and commercialization system?," it is first important to define the language that we use when going from curiosity to innovation, and to review some of the assumptions used in the conversation, including our current focus on economic diversification rather than productivity and innovation. It is with these thoughts in mind that this document has been created by the AEDA Envision Alberta Committee.



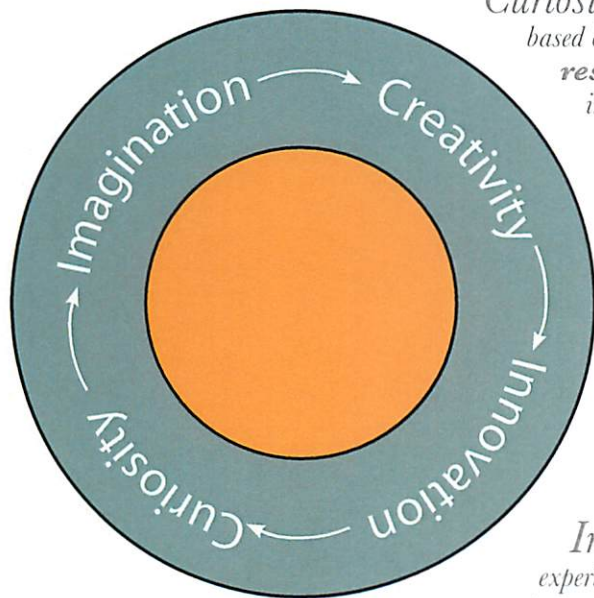
Essential Definitions

Before diving into an assessment of the innovation system, it is important that a common language be established. Words such as research, innovation, creativity, imagination, discovery, commercialization, curiosity are often used interchangeably when in fact they mean very different things. Below is a framework to be used to ease the conversation.

Innovation is the outcome and innovation is also the process, as defined by Richard Hawkins PhD, Professor and Canada Research Chair, as “the creation of better or more effective products, processes, services, technologies or ideas that are accepted by commercial markets, governments or society.”

Dr. Hawkins also defines innovation policy as “interventions by government that are meant to stimulate innovation, and to capture the new value it produces in the form of competitiveness, employment, productivity and growth.”

Accordingly, we will define Alberta’s innovation system as the collection of publicly funded institutes, people and programs that enhance the success of entrepreneurial, corporate and social innovations led by the current and next generation of business, community, academic and political leaders in Alberta.



Curiosity is the ability to frame relevant questions based on observation that, through **basic research** and discovery, stimulate the imagination.

Imagination is needed to transform the dream of what could be possible to the belief that something is possible, often done through the **applied research** process.

Creativity is the process of experimentation to prove the idea can be put into practice or into a product, otherwise known as **commercialization**.

Innovation occurs once the creative experimentation has proven successful and audacious enough to arouse a significant number of people’s attention to generate commercial or societal value.

Desired Outcomes

Alberta's innovation strategy is designed to achieve a combination of economic and social outcomes that benefit Albertans, Canadians as well as the global society at large. The desired outcomes of Alberta's innovation and the innovation process are as follows:

- Increased productivity and competitiveness
- Solving of major problems or challenges in our key industries
- Growth of new commercial entities or business units that create wealth
- Increased breadth and depth of the economy

These outcomes represent the responsibility of any first world government: to foster a culture of innovation and to embrace an ever evolving and progressing economy. These outcomes also go beyond the traditional measures of innovation - those being number of patents, levels of investment in research and development and levels of research capacity at major universities - which are grounded in technology policy as opposed to innovation policy. (See Innovation Canada: A Call to Action, October 2011, available at http://rd-review.ca/eic/site/033.nsf/eng/h_00287.html)

Innovation Policy Eras

Numerous eras of innovation policy in Alberta, including the recent major reorganization in 2009/10, have created a foundation that is equivalent to some of the best jurisdictions in the world. With significant strengths in research capacity at major universities and technical colleges, technology platforms in nano, bio, genome and ICT, and program funding for commercialization activities, the foundation has been established in Alberta and is positioned to be leveraged in the immediate future.

Although the "capacity-building" policy environment has created a strong and able foundation, the translation of capacity to industrial activity has yet to be achieved. Alberta's innovation policy environment has been weighted largely toward supporting the commercialization of university research—which remains essential to ensure a steady stream of research in the innovation pipeline. The next era of innovation policy likely will build on this foundation, not altogether shifting focus from applied research to industrial activity, but balancing the weight of both sides and broadening the scope of policy to consider industrial engagement and relevance, where the bulk of innovation occurs.



Fallacy of Diversification

Diversification has long been an economic term adapted to fit the political environment, and has accordingly lost much of its original meaning. In the 1970's, Premier Peter Lougheed put forward an agenda for diversification to broaden and strengthen the Alberta economy by reducing the cyclical impact of the oil and gas sector. Although diversification was interpreted to mean the diversification of industries, it was also meant as an overall strategy to diversify export markets, to diversify positions in value chains, to diversify products and services within traditional industries and to diversify the use of technology application among adjacent industries. The oil and gas sector was to be the epicentre and enabler of these diversification efforts, and would be the lead source of innovation within the province.

Unfortunately, diversification took on a modified meaning in the 1980s and 1990s, where the race for technology supremacy led to major efforts to diversify the economy through digital media, ICT, biotechnology, and nanotechnology as isolated industries. Although these efforts built tremendous research capacity, they have not stimulated innovation within our existing economic base to the level where Alberta-based companies are considered to be in a sustained leadership position within their industries.

Our major industries - oil and gas, agriculture, forestry, manufacturing, transportation and logistics, construction, financial services, education and tourism - have been the major industries of the world for the past century, and will likely continue to be the major industries of the world for the next century. Diversification beyond these industries, while seemingly attractive, may actually be wasteful because Alberta has no long-term competitive advantage. However, it does implore that innovation within these industries is of paramount importance in order for Alberta companies to maintain long-term leadership within their industries and for the Alberta economy to outperform other major jurisdictions in North America. Accordingly, our language should shift from industrial diversification to industrial innovation as the policy agenda for the next century.

Opportunity for Alberta

Innovation is both about doing new things and about doing the same things in a different way, which means something different for every company and every industry. And, given the large number of small and medium sized entities (SMEs) in Alberta, innovation will likely occur at the local level - on the front lines, in partnership with customers, within an existing process - rather than being driven by major research and development investments.

These sources of innovation increase the competitiveness and productivity of Alberta businesses within globally relevant industries such as energy, agriculture, finance, transportation, logistics, construction, petrochemicals and manufacturing. These sources of innovation also create long-term advantage, long-term wealth and long-term resilience of the Alberta economy.

The opportunity for Alberta is to align its world-class innovation system with its SME industrial landscape, to inspire a culture of entrepreneurship, innovation and competitiveness that will forever differentiate the province. That is the vision that resonates with industry, and that is the opportunity for differentiation in the global marketplace.

Considerations for Change

Turning our attention to the current innovation system in Alberta, there is tremendous recognition for the work completed over the recent past in breaking down the barriers that prevented alignment between the many players involved in making innovation happen. Moving from decentralized research entities to the Alberta Innovates model is considered by many around the world as the unified system that has the best opportunity to achieve significant success.

As mentioned on its website, Alberta Innovates' mission is to bring together businesses, government, and universities to collaborate and share resources, experts, and ideas across sectors. The group invests in research through long-term endowment funds, ensuring that investments are available for the long term and that the model provides access to resources through one point of contact, one agreement and one system. Such resources include researchers that are top experts in their field and one-of-a-kind infrastructure and equipment.

However well designed, the current Alberta Innovates model is still essentially a "version 1.0" and, like any great organization, it needs to continually improve and innovate in order to achieve its true potential over time. As the Government of Alberta strives to improve its innovation system and its return on investment in research and commercialization, the AEDA Envision Alberta Committee would like to present the following considerations for discussion, grouped as follows:

A. Considerations for Alberta Innovates

1. Explore consolidation opportunities available within the Alberta Innovates system that reduce overhead and duplication, and that improve the relevancy, efficiency, and effectiveness of the system by:
 - a. Creating an integrated information and management system allowing the real-time access to and sharing of data across industry participants;
 - b. Developing a unified, one-window approach that makes it easier for researchers, funding agencies, and other participants to navigate the Alberta Innovates system;
 - c. Designating a single decision-making body to determine the criteria for accessing and allocating funds and other resources within the innovation system.
2. Explore structural solutions and project prioritization practices that may help the Alberta Innovates system become more responsive and better coordinate to shift resources for breakthrough successes.
3. Identify specific, measurable objectives for the Alberta Innovates system that may be adopted in the government's result-based budgeting exercise.
4. Explore methods that could stimulate the interest of innovators to tackle pressing challenges in Alberta and in global jurisdictions

B. Considerations for Education

5. Explore how Alberta can establish its innovation priority to be entrepreneurial while continuing to invest in basic and applied research
6. Analyze what effect Alberta's intellectual property policy has on the rate of commercialization of university-based innovations
7. Explore how our K-12 education system can better breed a culture of entrepreneurship, innovation and competitiveness needed to ensure our labour force is constantly improving productivity and market leadership



C. Considerations for Government Structures

8. Review government procurement policies to explore how they could simultaneously meet government needs and stimulate new opportunities for entrepreneurs, SMEs and social innovators
9. Explore whether responsibility for innovation should reside within all government departments or whether it should be consolidated in a single ministry
10. Explore which entities—public or private—would best manage operating responsibilities, while keeping in mind the provincial government’s role in strategy development, policy formation and funding

These considerations strike at the heart of AEDA’s interest of aligning innovation policy with economic policy, and building on the foundation that exists for greater economic and social returns.

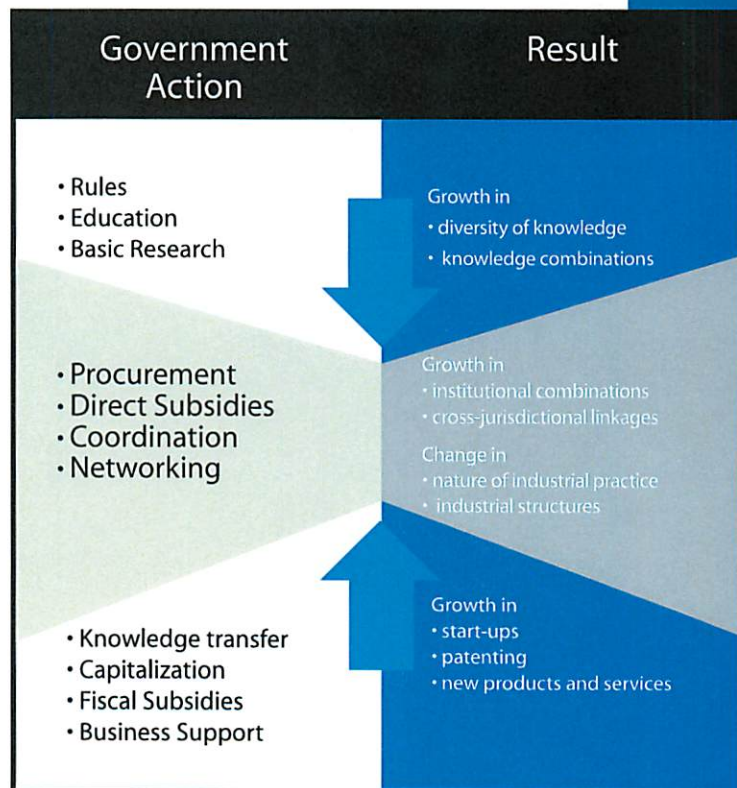
Role of Government

The essence of policy development is the asking of relevant questions, and encouraging the discussion between varying points of view. The AEDA Envision Alberta Committee has embarked on this goal by assembling this paper as an engagement document to generate discussion, identify areas for improvement, and collaborate on solutions.

As previously referenced, Dr. Richard Hawkins suggests that government can select from a menu of actions to spur innovation. Illustrated in Figure 1, government is able to provide a direct impact on the innovation system and guide the focus of knowledge and innovation by creating legislation, investing in education and funding basic research.

On the other end of the spectrum, government can take actions that garner more ambiguous—but equally important—impacts on innovation including facilitating knowledge transfer and commercialization; capitalizing new enterprises; delivering fiscal subsidies and providing direct business support.

Figure 1



However, it is in the middle of the spectrum where government can have the most direct transformational impacts.

This impact provides an outcome of industrial development and structural economic diversification in Alberta. Such actions include:

- the adoption of procurement policies that financially support new start-ups,
- the delivery of direct industrial subsidies,
- the provision of coordinating institutions, and
- the nurturing of networks of innovators, funders, and experts that collaborate in creating a successful innovation system.

The Government of Alberta has the ability to work within this spectrum and move beyond discussion and enact policy through legislation, organizational structure, priorities and the budgeting process. In a time when the world economy is in disorder, it is imperative that Alberta uses its strengths to accelerate its innovation, competitiveness and productivity to gain advantage when others falter.

Final Comments

AEDA's Envision Alberta committee believes that Alberta is well positioned to advance its research and innovation capacity and to build on the policies that have helped Alberta align disparate players to collaborate and innovate together.

However, Alberta should always be looking to improve its innovation system and ensure that businesses in the province aim to be global leaders in their respective industries. As illustrated in this document, curiosity is the first phase leading to innovation, and the Envision Alberta committee has framed some relevant questions designed to spur further research. The probative questions outlined in this report invites stakeholders to take a closer look at our present innovation system and explore where it could be improved to better support economic development in Alberta. The goal, now and forever, is Alberta's continued prosperity and economic competitiveness.

“Necessity is the mother of invention.

– Plato



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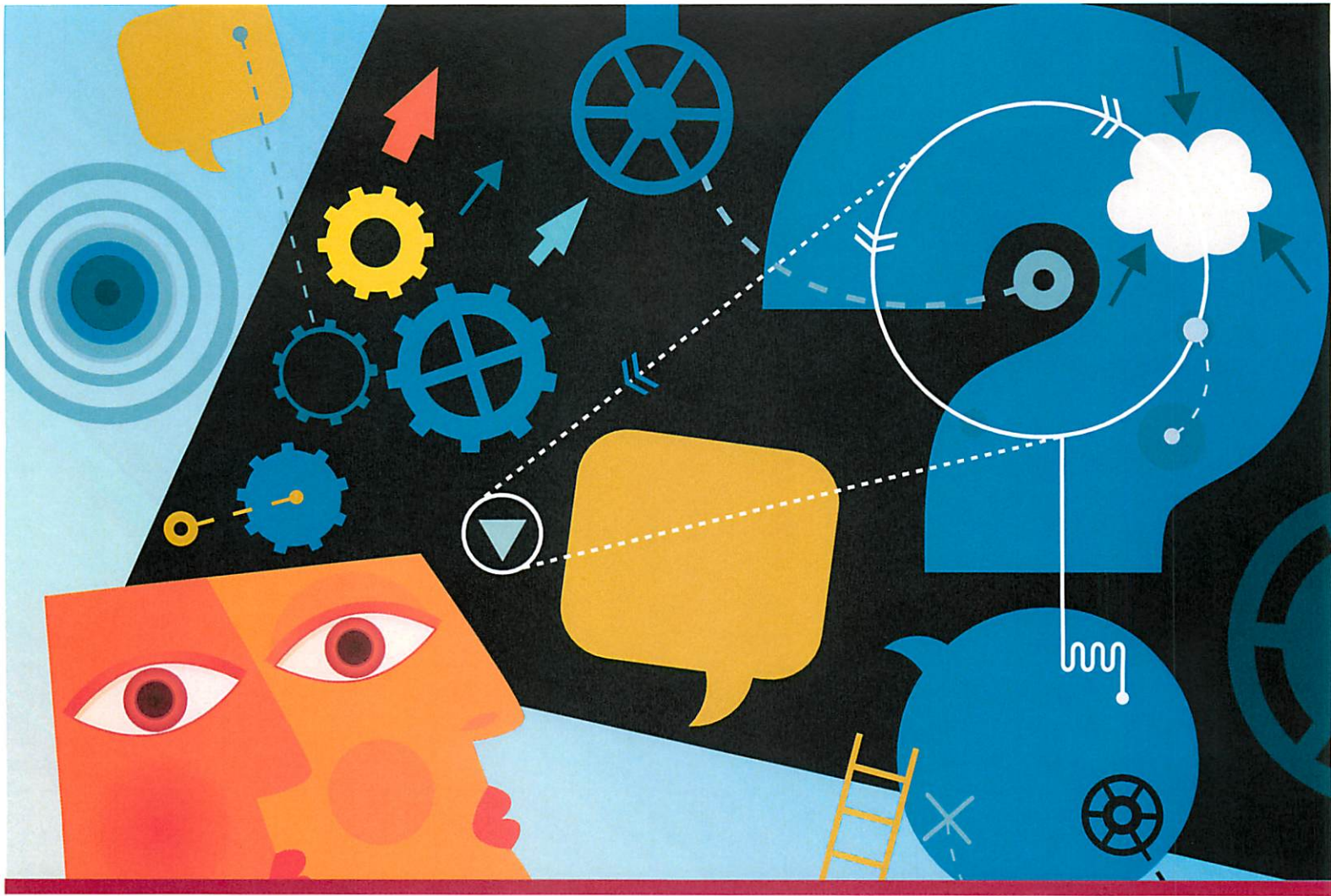
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