# Innovation, Technology and the Future of Work

## RBC Roundtable

Fall 2019

Organizations are in the midst of a period of profound change. Data is increasing at an exponential rate. Technology is advancing rapidly. Cyber threats are becoming common place. And the workplace is undergoing a significant transformation. Opportunities abound, but risk and uncertainty are omnipresent.

*"Innovation and technology are creating significant opportunities to help us better understand our clients and improve how work gets done."*

Helena Gottschling
Chief Human Resources Officer, RBC

## About RBC

Royal Bank of Canada (RBC) is a global financial institution with a purpose-driven, principles-led approach to delivering leading performance. Our success comes from the more than 86,000 employees who bring our vision, values and strategy to life so we can help our clients thrive and communities prosper. As Canada's biggest bank, and one of the largest in the world based on market capitalization, we have a diversified business model with a focus on innovation and providing exceptional experiences to more than 16 million clients in Canada, the U.S. and 34 other countries.

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# Introduction

This roundtable discussion provides the perspectives of seven RBC leaders on innovation, technology and the future of work, including their insights on how RBC is navigating today's dynamic business environment to develop solutions that support our clients.

**Helena Gottschling**
Chief Human Resources Officer

**Laurie Pezzente**
Chief Security Officer

**Foteini Agrafioti**
Chief Science Officer

**Holly Shonaman**
Chief Privacy Officer

**Carolyn Burke**
Head, Enterprise Payments

**Jennifer Stott**
Chief Data Officer

**Lisa Lansdowne-Higgins**
Vice-President, Business Deposits
& Treasury Solutions

# What is keeping you up at night?

## Lisa

### The magnitude of change

The magnitude of change from innovation and advanced technologies has never been more pronounced than today – ranging from the digitization of global supply chains, advancements in artificial intelligence (AI), new regulation and growing cyber threats to the emergence of non-traditional competitors, who are challenging industry norms. The forces of change also include an increasingly diverse client base with rapidly evolving expectations and consumption options.

# Helena

## Having the right people in the right roles

Innovation and technology are creating significant opportunities to help us better understand our clients and improve how work gets done. As the pace of change accelerates, my main concern is ensuring that RBC has the right people with the right capabilities in the right roles. Building a flexible and adaptable workforce, while doing what's necessary to attract and develop talent for the future, is critical.

The challenge is not unique to RBC. All companies need to evolve as they prepare their businesses and people for the future of work. This requires alignment and collaboration – between employers and employees, across industries, and between businesses and educational institutions.

# Laurie

## Availability of cyber talent

Finding the right cybersecurity talent is also part of this approach. To be future-ready, we require skilled and diverse cyber experts, including computer scientists, data scientists, cybersecurity analysts, threat hunters and investigators, as well as people with skills in education and communications. Many companies are investing in partnerships with academia and training programs to increase the talent pipeline.

The shortage of cybersecurity professionals means that it is more critical than ever for companies to seek diverse candidates to help fill the cyber talent gap. Forbes reports that only 20% of cybersecurity workers are women and, while that's up from 11% in 2013, there is an opportunity to further leverage this group.[1]

# Foteini

## Ethical AI

I am similarly concerned about talent availability across the AI landscape. According to a report by software industry entrepreneur JF Gagne, the AI talent pool currently stands at only 22,000 PhD-level experts worldwide.[2] While there has been a recent surge in AI investment by the Canadian government and the private sector, AI talent in Canada is still scarce. Only a fraction of organizations have AI programs and big tech companies outside our borders often scoop up the top talent.

Furthermore, as AI becomes more integrated into mainstream applications, ethical AI – encompassing a wide range of considerations such as explainability, privacy, accountability, transparency and bias – will be increasingly important.

# Jennifer

## *Balancing boldness and prudence*

In the complex world of data, I think it is essential to respect the trust of our clients by moving faster, transforming boldly and ensuring an acceptable level of risk. This includes a focus on the right things so that our innovation for one group is not creating vulnerability elsewhere.

At the same time, we must understand the inherent risks and explicitly manage them. From a Chief Data Office perspective, where data has been compared to gold or oil, a key consideration is maintaining the appropriate balance between boldness and prudence.

# Holly

## *Re-identification of anonymized data*

Client trust also extends to privacy, specifically the assessment of risk associated with the re-identification of anonymized data. There is growing recognition that, with vastly increasing volumes of available data sets and the enhanced capability of large-scale data processing, these data sets can be potentially re-identified. As a result, privacy professionals need to work with data experts to properly assess re-identification risks and ensure that appropriate controls are in place.

Another area of focus is RBC's efforts to guide the business through current industry developments such as open banking and the Personal Information Protection and Electronic Documents Act (PIPEDA) reform. Canada is a driver of innovation through trust in data management, and RBC has a key role to play.

# Carolyn

## *Creating a new future for payments*

From the payments lens, where RBC is focused on helping clients improve their business processes, a key pain point for clients is the preparation of expense reconciliations. Many small business owners continue to invoice clients and vendors in paper but get paid electronically, spending a great deal of time and energy reconciling these two channels.

By leveraging the right technology to modernize payments processing, we can create significant value for our clients. However, this is a team effort. We need to work with regulators, other financial institutions and industry stakeholders to create a new future for payments based on guiding principles and standards that keep our clients at the centre of everything.

# How is RBC utilizing technology and innovation to meet the evolving needs of our clients?

## Holly

*Building strong capabilities around APIs*

RBC has built strong capabilities around Application Programming Interfaces (APIs), utilizing this emerging technology to modernize the bank's technology platform, make our systems less complex and reduce development costs. RBC's innovative use of APIs mitigates risk through a single, standard interface that enables us to implement a particular feature across multiple applications once rather than many different times.

In addition, RBC was the first Canadian bank to launch an external API platform, RBC Developers™, which provides eligible external software developers, industry innovators and clients with access to select RBC APIs. Notably, our API technologies were recognized at the 2019 IT World Canada Digital Transformation Awards.

I should also mention that it is key to ensure that these new technology models are accurate and non-discriminatory. This includes ongoing monitoring and testing, as well as building new ways of assessing risk to align our risk appetite with RBC's business strategy. Privacy and data expertise are essential, supplemented by a mindset of ethical data use.

# Carolyn

## Utilizing data in a responsible manner

Responsible use of data is extremely important. When innovating and utilizing new technologies, first and foremost, we must take our role as stewards of client data very seriously so that client trust is not sacrificed for the next piece of flashy technology. Second, a client-centric approach is essential, providing innovative, secure products and solutions that meet client needs. Finally, we have to provide Canadians with the necessary tools to make informed choices about how they share their data with us and understand how they will be protected if something goes wrong.

Based on these guiding principles and consistent with Holly's comments, I believe that APIs will be the foundation for building the payments and data-sharing value of the future, ultimately becoming the definitive business-to-business channel. At the same time, AI will be required to manage, use and gain insights from the extraordinarily large amounts of payments data that will be exchanged in the modern economy and through open banking.

# Lisa

## Continuously adopting new technology solutions to support clients

The SWIFT gpi wire tracker is another example of how RBC is using APIs to support our clients, while simplifying the technology build and allowing our teams to be more agile in delivering solutions. Launched in 2019, this new capability enables real-time tracking of the status of wire payments.

In addition, we recently acquired WayPay, a Toronto-based startup that provides business clients with automated payments and accounts payable reconciliation tools linked directly with their Enterprise Resource Planning (ERP) systems through API integration. The architecture supporting this solution was built and designed on a cloud platform, utilizing both AI and API applications. The WayPay acquisition accelerates RBC's efforts to deliver a digitally-enabled banking experience for our business clients.

To maintain RBC's leadership position in today's environment of ongoing change, we must continue to embrace new technologies that help us deliver competitive solutions, relentlessly challenging the traditional assumption that what has made us successful in the past will continue to set us apart in the future: Are we being sufficiently creative and innovative, while remaining focused on developing relevant solutions for our clients? Are we effecting change in a way that is fast to market, sustainable and strategically sound for the long haul?

# Foteini

## *Investing in Canada as a home for AI-focused ventures*

As a leading AI voice in Canada, RBC is investing in this country as a global destination for the study of AI and a home for AI-focused ventures. Borealis AI, the bank's machine learning research centre, supports RBC's innovation strategy through fundamental scientific study and exploration in machine learning, investigating AI applications within and outside the financial industry to help deliver differentiated client experiences.
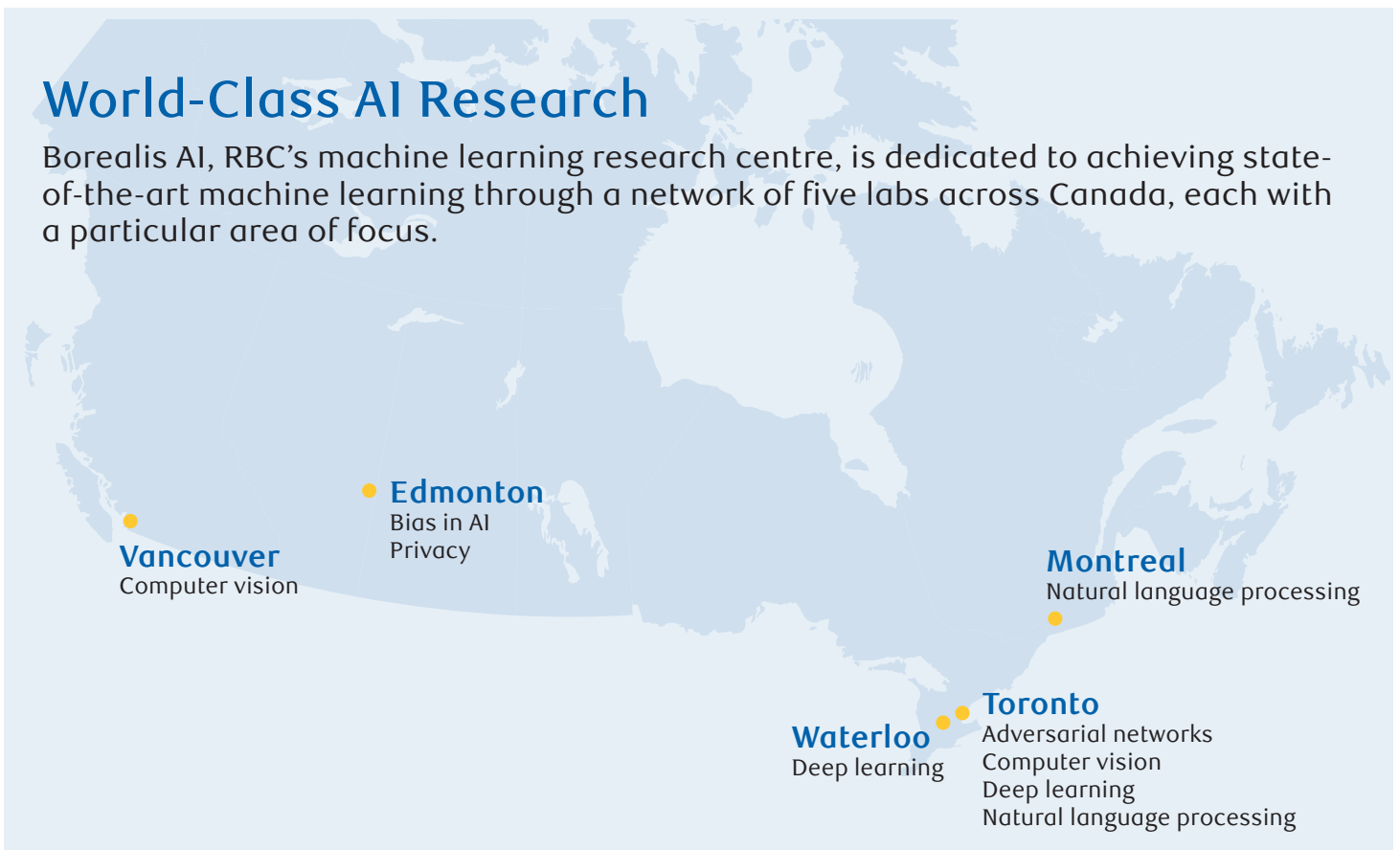
Typical applications of AI in banking include risk, fraud analysis and client service. In particular, I see a lot of promise in utilizing AI to help us better understand market risk and volatility. There are interesting underlying patterns that

machine learning can uncover, helping us to stay ahead of the game and be in a position to quickly adjust our products and services.

However, researchers want to pursue curiosity-based research. This is where additional value lies and real scientific advancements emerge. At Borealis AI, we provide the computational power, datasets and resources that allow top researchers to pursue their areas of interest in AI. While RBC is seeking to revolutionize the future of banking through our AI applications, we are also exploring ways to perform valuable, world-changing research that might apply to areas such as environmental science or healthcare.

# World-Class AI Research

Borealis AI, RBC's machine learning research centre, is dedicated to achieving state-of-the-art machine learning through a network of five labs across Canada, each with a particular area of focus.

**Edmonton**
Bias in AI
Privacy

**Vancouver**
Computer vision

**Montreal**
Natural language processing

**Toronto**
Adversarial networks
Computer vision
Deep learning
Natural language processing

**Waterloo**
Deep learning

# How is data transforming the financial services industry?

## Jennifer

### *Enhanced understanding of clients and how they use our services*

As Foteini mentioned, today's digital world is about more than just delivering financial products, which is comparable to a "dial tone." It is very much about how we utilize data to better understand our clients and how they use our services. This will enable us to extend these services beyond traditional banking—beyond the simplicity of paying bills on a mobile phone to the point that we are providing assistance before and after moving clients' money. Based on a new appreciation of the value that can be derived from data, we manage it quite differently. Above all, we view data as a critical asset.

With this in mind, RBC established RBC Ventures to leverage data and build innovative technology solutions that reach our clients well before they need banking services. Since its inception in mid-2018, RBC Ventures has created a number of game-changing solutions for our clients – internally, through the acquisition of startup firms and by collaborating with top brands. These initiatives range from *DRIVE*, an app that helps you stay up-to-date on maintenance and other auto services to *ownr*, a full suite of services to launch a new business (see list on next page for further details).

# Going Beyond Banking

RBC Ventures transcends pure banking to create meaningful solutions that touch every Canadian by building new ventures, acquiring or making investments in up-and-coming firms, and partnering with organizations that share our vision.

**ampli** is a cash-back app that gets you more from your everyday purchases

**Butter** helps organize memberships and subscriptions while earning cash rewards

**dipp** is an easy way to earn instant cash from a favourite neighbourhood merchant

**DRIVE** enables you to stay up-to-date on maintenance and other auto services

**GarbageDay** sends phone notifications to let you know when it is garbage, recycling or other collection days

**get digs** provides a convenient way for renters and landlords to pay and receive rent

**ojōhome** is a powerful real estate assistant that does the heavy lifting to simplify home searches

**ownr** offers a full suite of services to launch a new business

**prepped** provides access to a science-backed program to help launch your career

**SMART RENO** connects consumers to qualified renovation professionals

# Foteini

## *Improved delivery of services and insights to clients*

Everywhere we look across RBC, decisions are being made through the use of data. We take risks based on data. We catch fraud based on data. We use machine learning and data to get to the next level in the optimal delivery of services and insights to clients.

For example, the volume and speed at which information from news sources is proliferating make it difficult for financial analysts and other industry experts to stay abreast of the latest news relating to their sectors. The ability to track news real time, 24/7 and in any language renders AI a powerful tool for those who need timely and accurate insights.

To help meet this need, Borealis AI created Apollo, an AI platform that processes 20,000 news articles across more than 400 sources each day, delivering customized information that it determines to be most impactful. Using natural language processing, the platform identifies companies of interest, creates an internal representation of information about them and compares new information to what it already knows about the companies. By analyzing historical patterns of events, Apollo formulates opinions about the way companies will be affected down the road based on what it has observed in the news today. The traditional news clipping service has clearly evolved.

# Laurie

## *Stronger cybersecurity safeguards*

Discussion around effective data management needs to be a top priority. Cloud software company Domo recently reported that, by 2020, approximately 1.7 megabytes of data will be created each second for every person on earth.[3]

The availability of so much data provides huge potential to combine cybersecurity with advanced AI techniques in order for organizations to further strengthen their cyber safeguards. AI allows organizations to process significant amounts of data in the threat intelligence space, improve the efficacy of our models, and ultimately help combat fraud and cybercrime.

As an example, RBC is utilizing data analytics to protect our clients from fraud. By collecting and analyzing client credit and debit purchasing data, we are able to predict and even prevent fraud with greater precision. Furthermore, we employ AI to analyze 200 billion cybersecurity log events each month, freeing up our human teams to innovate and enhance RBC's cybersecurity capabilities, and keep pace with the fast-changing threat landscape.

While AI has significant benefits and potential, criminals are also utilizing this technology to launch cyber attacks. Over the next six to 12 months, keep your eye on ransomware and extortion as methods to obtain data and money. It is critical to keep up-to-date on the latest types of attacks.

# How can organizations make their businesses cyber-resilient?

## Holly

*Encourage every employee to be a "data citizen"*

A global survey of public and private organizations found that 34% of data breaches involved internal actors and a nearly equal number related to phishing,[4] reinforcing the importance of ensuring that employees at all levels of the organization understand how to use data responsibly.

For this reason, a comprehensive education program dedicated to helping employees spot phishing, social engineering and other cybercrime tactics is one of the key tactics that RBC uses to stay ahead of the cyber challenge. From mandatory privacy training to monthly privacy awareness communications, we are dedicated to a culture of privacy and risk awareness within RBC. Each of RBC's more than 86,000 employees across the globe needs to be a "data citizen."

In addition, RBC is continually enhancing our monitoring and testing practices. Whenever there's a breach or misuse of data at another organization, we take this as an opportunity to assess the adequacy of our policies and procedures as part of a commitment to the highest standards of data privacy.

# Laurie

## *Understand the full scope of vulnerable data*

According to Statistics Canada, one out of five Canadian businesses experienced a cybersecurity incident in 2017 with the cost of prevention, detection and recovery from incidents totaling $14 billion.[5] The first step for an organization to gain greater cyber-resiliency is to understand the full scope of the data that might be vulnerable.

Securing all data is generally not realistic from a cost perspective. It is important to identify which of your assets are most likely to be targeted and understand their value, as well as the associated risk if the data were lost. This needs to be followed by a discussion around risk tolerance, including potential financial and reputational impacts. Such an approach helps organizations determine how much to invest in protecting each individual asset and how to react in the event of theft.

At RBC, our team of cybersecurity experts is dedicated to preventing, detecting and investigating fraud and cyber incidents. Working 24/7, we employ cutting-edge technology and analytical techniques, including AI and data analytics, to protect our clients and the organization. RBC has more than doubled our investment in cybersecurity technology during the past four years and currently has a team of over 500 cybersecurity professionals, an increase of more than 55% during the past three years.

# Foteini

## *Adopt responsible AI practices*

Building and maintaining the trust of our clients through a cyber-resilient organization also extends to responsible AI practices. There is often pressure, particularly in the tech industry, to develop new technologies as quickly as possible and be first to market. The financial industry is presented with certain regulatory checks and balances that require us to be mindful of ethical AI and think carefully about how we are using technology to solve problems, ensuring that client trust and privacy are not compromised.

Consistent with our core values, it is critical for RBC to be at the forefront of shaping the ongoing conversation on ethical AI. In support of this objective, Borealis AI has a particular focus on advancing ethical AI through research on differential privacy and the explainability of machine learning.

# Bridging the Cyber Talent Gap

RBC is taking specific steps to help meet the growing demand for cyber talent:

- Founded the Rogers Cybersecure Catalyst, a national centre for innovation and collaboration in cybersecurity located in Brampton, Ontario

- Invested nearly $2 million in a partnership with the University of Waterloo to build a cyber lab and fund cybersecurity research

- Allocated $5 million over five years to support cybersecurity training and development within RBC

- Engaged in research at Ben-Gurion University's Cybersecurity Research Center in Israel to support the development of adversarial AI

# How can we prepare for the future of work?

## Helena

### *Lean into change and demonstrate resilience*

There is considerable research and opinion on the "future of work" and what the workplace will look like as a result of technology, innovation and disruption. Profound change is already underway. Automation and AI are enhancing processes, increasing productivity and freeing up time for more value-added work, such as building client relationships. We have the opportunity to reduce or eliminate repetitive tasks while providing insights to augment our human talent.

To compete, organizations must take full advantage of diverse perspectives and experiences, finding new approaches to solve problems for our clients and our own teams. This will require ongoing investment in skills such as leadership, critical thinking, empathy and creativity. For the immediate future, people in all roles will need core digital literacy, including a basic awareness of how innovation, data and technology can help solve business problems. Individuals in specialist roles will also need broad business knowledge and human capabilities such as emotional intelligence, empathy and influencing skills alongside their technical expertise.

Succeeding in the future of work will require the ability to lean into change and demonstrate resilience. As long as we continue to invest in diverse and innovative thinking, build relationships and develop human potential, I am very optimistic about the future.

# Carolyn

## *Learn and pivot when needed*

I agree. Successful employees in this era of rapid technological change will be those with the ability to learn and pivot when needed and, at the same time, build relationships.

We all talk about the pace at which technology and innovation are reshaping our industry but the human side of the business is equally important. In the payments industry, which has been largely unchanged over the last several years, technology advancements will only be as effective as the accompanying changes in behaviour.

Listening to our clients, understanding their needs and forging the right relationships to deliver the solutions and experiences they expect from us will never go out of fashion. But meaningful change, particularly in the payments space, can only happen when you have shared principles across the industry, the country and globally.

# Lisa

## *Embrace diversity to meet future challenges*

To elaborate on Helena's comments, I firmly believe that diversity is key to meeting the future challenges of our clients and employees. We need to foster inclusive workplaces and societies that nurture diverse ideas, experiences and perspectives. This will help us gain a better understanding of the different client demographics that we serve, spur innovation and drive economic growth. Such a focus on diversity will generate a ripple effect on our ability to attract new clients and successfully recruit the next generation of top talent to take our businesses to new frontiers.

It will also become increasingly important to ensure that we don't unintentionally incorporate old biases into the new solutions developed for our clients. The same principle applies when we are looking for and nurturing talent. We have to ensure an open mindset around how to find and engage talent in the global world.

# Foteini

## *Retain and attract AI talent*

Diversity is certainly a critical factor as AI transforms the workplace and the demand for skills in the field of AI continues to increase. Another key point – and something that I'm particularly passionate about – is the need to create AI jobs in Canada, as well as retain and attract AI talent here.

It is vital to collaborate with academia as part of efforts to keep AI talent at home. The

relationships that Borealis AI and other parts of RBC have with universities across the country and globally are helping to address today's AI talent shortage. These relationships will undoubtedly contribute to ensuring that future generations of machine learning innovation continue to see Canada as a trailblazing country for this research.

# What are your suggestions for clients and employees as they face the tide of change?

## Holly

*Embrace a privacy mindset*

Always embrace a privacy mindset, keeping privacy and responsible data use on the forefront of your everyday life at work and at home. Organizations that are transparent and trusted will succeed in delivering real value to clients.

When it comes to personal data privacy, reading privacy policies and ensuring that you understand what is happening with your data is essential. A small investment of time can yield tremendous benefits in understanding responsible data usage and how to protect your personal information. Legal and regulatory reforms will also help navigate the opportunities and pitfalls of data usage. However, such reforms are not a substitute for being proactive and maintaining a high level of personal awareness.

## Privacy Checklist

☑ Create strong passwords

☑ Keep online banking information secure

☑ Be wary of public Wi-Fi

☑ Be vigilant when shopping online

☑ Keep your email secure

☑ Protect yourself on social media

# Laurie

## *Educate yourself on the steps to protect digital assets*

You cannot afford to sit back and wait to be a cyber victim. Take a proactive approach and educate yourself on the steps to protect digital assets and online credentials.

RBC is doing its part to help clients protect themselves and their data. A wide range of tools and information on data protection are available on our website, including details of the latest "scam alerts." We are constantly providing our client-facing teams with education programs and resources to support client inquiries on cybersecurity.

# Jennifer

## *Recognize the significant value of data*

There is a growing conversation around data ethics and the importance of data to individuals and organizations.

For RBC, we cannot shake the foundation of trust that our clients give us. From an individual perspective, you need to know who you are giving your data to, what the purpose is, how it will be used, and with whom your data will be shared. It is critical to be informed and recognize the significant value that can be derived from data as a key asset.

# Foteini

## *Conduct a reality check on AI and machine learning*

We also need to conduct a reality check on AI and machine learning. While AI has advanced significantly in the last several years, the defining challenges have yet to be solved.

Today, machines can process large amounts of data and derive specific insights in very narrow fields. However, machines are unable to carry out high-level reasoning the way humans can or the way Hollywood would have you imagine – at least not yet. Science is working towards achieving general AI at some point in the future, but the ability to make autonomous decisions is very complex and we are not yet at that stage.

# Carolyn

## *Encourage employees to share ideas and constructively debate one another*

Change can sometimes be a challenge for large organizations like RBC with proud traditions and legacies. Importantly, no one is immune to change and anyone experiencing it is constantly wondering: How will I be affected? How will I feel?

I try to impress upon my teams that there is no one person with all the answers, and there is no one answer. It is important that employees speak up, share ideas and constructively debate one another so that we can bring to bear the diverse perspectives that make us successful. While you will never have complete certainty, you will put yourselves on a more confident path and be ready to adjust as necessary.

# Helena

## *View change as an opportunity to grow*

When considering talent strategies, businesses need to be future-focused, using data and trends to forecast skills requirements and anticipate how such requirements will evolve. Based on these insights, we need to attract talent with the necessary skills, while providing our existing workforce with resources to grow in their roles or take on new opportunities.

The best development approach combines many forms of learning, including meaningful on-the-job experiences along with mentoring and training. To hire a future-focused workforce, look beyond traditional credentials to seek more diverse talent than ever before. And beyond simply reacting to change, we all need to view it as a tremendous opportunity to grow, lead and evolve how we work.

# Lisa

## *Look for ways to engage clients*

I find myself constantly thinking about how to engage clients in today's ever-changing world. For example, we started client conversations on payments modernization and re-imagining the future of payments. RBC also introduced "Strategic Time to Market" sessions, which bring together a cross-section of clients as part of a "think tank" on the future of their businesses. These initiatives have helped shape the bank's vision for the future and enabled a step-change in how we engage with clients on the change that is happening all around us.