SYSTEMS INNOVATIONS: REIMAGINING THE ROLE OF PROFESSIONAL ACCOUNTANTS IN TODAY'S COMPLEX ENVIRONMENT
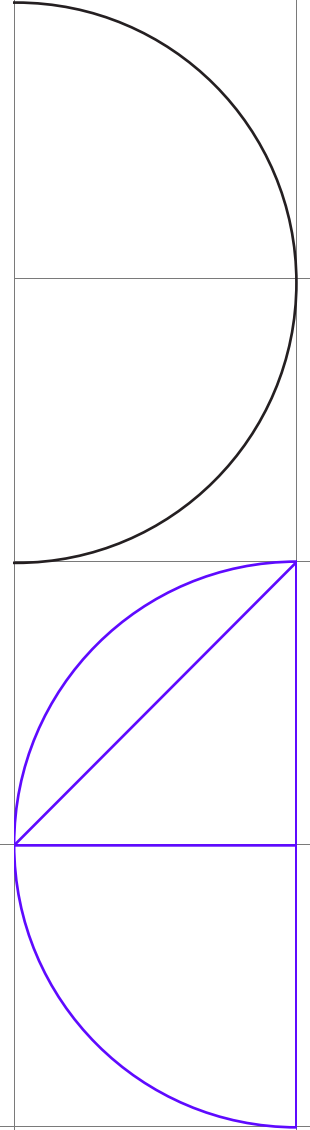
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INNOVATION NORTH

CPA CHARTERED PROFESSIONAL ACCOUNTANTS CANADA

INTRODUCTION

CPA Canada recognizes the challenges confronting accountants in the 21st century. The business environment has become so dynamic and interconnected that the detailed work that many accountants have traditionally done of collecting, organizing, and interpreting historical financial data is at risk of losing its efficacy. Accountants must adapt to these realities so that they not only provide reliable statements of the business that has been, but also offer a forward-looking perspective of what *will* be.

CPA Canada believes that accountants are "broad-minded, forward-thinking professionals" who can tackle complex and evolving environments.[1] This thinking was introduced in CPA Canada's 2018 "Foresight initiative," which offered a vision for the profession that fits the anticipated technological, social, economic, and environmental changes. The Foresight initiative envisioned accountants as delivering "insight about performance that enhances the ability of their organization(s) to more clearly foresee the opportunities that lie ahead."[2] By doing so, the work of accountants would be applied and be appreciated by a broader section of society. Achieving this vision will require CPAs to continuously learn and reflect on their role, engage with diverse stakeholders, and apply new ideas, tools, and insights in their daily work.

This report is the output of a collaboration between CPA Canada and Innovation North. Based at the Ivey Business School at Western University, Innovation North is cocreating a new approach to innovation with business school researchers and business executives. It is integrating systems thinking with traditional approaches to innovation – what we call systems innovation. Systems innovation will yield win-win outcomes for organizations, society, and the environment over the long term.[3]

This report provides CPAs with a foundation for building skills for systems innovation. After reading this report, CPAs will understand:
- why traditional innovation models fall short in today's complex and volatile business environment;
- how systems innovation offers a new approach to traditional innovation; and
- the importance of CPAs in catalyzing systems innovation.

Before we discuss what systems innovation is in detail, we first describe how innovators typically approach corporate innovation.

TRADITIONAL APPROACHES TO CORPORATE INNOVATION

The two most widely used traditional approaches to corporate innovation include stage-gate and design thinking. These approaches offer trusted tools that often reduce a problem to its core elements. In an informal survey of Innovation North's practice partners, we found that 40% use a stage-gate approach to innovation and 45% use design thinking.

The Stage-Gate Approach to Innovation

In the stage-gate approach to innovation, an idea must pass through a number of gates, for new products, services, or initiatives (Figure 1). Each stage imposes an increasingly challenging hurdle for the idea, before the idea moves through the gate. The first stage screens the idea and the final stage assesses the success of the launch. Through each stage, the project team sequentially builds the business case, undertakes technical assessments, develops the product, and then launches the product to market.

[1] https://www.cpacanada.ca/en/the-cpa-profession/cpas-and-what-we-do/what-cpas-do
[2] https://www.cpacanada.ca/foresight-report/en/index.html#page=1
[3] https://innovationnorth.ca/

Each gate is an up-or-out decision point based on predetermined criteria, such as strategic fit, market attractiveness, and technical feasibility. The process is methodical, fast, easy to execute, and allocates resources efficiently. Accountants, engineers, and innovators alike appreciate its systematicity. The stage-gate process was designed for new product development and is particularly effective for incremental innovations.

For example, 3M may see an opportunity to offer a new application for its adhesives. It will first assess the market potential of the adhesive. If there is sufficient demand, it will move to the next gate to ensure that the

new format meets regulatory hurdles. It will then refine the product and assess its financial viability.

The very strength of the stage-gate model also presents its greatest limitation. While the stage-gate model is systematic and can be applied with confidence, it also tends to be rigid and inflexible. It can kill creativity and stifles radical ideas early, based solely on their perceived impracticality. The incremental innovations that make it through the gates help organizations grow sales, but do not prepare them for or help them get ahead of macro disruptions.

Figure 1: The Stage-Gate Model
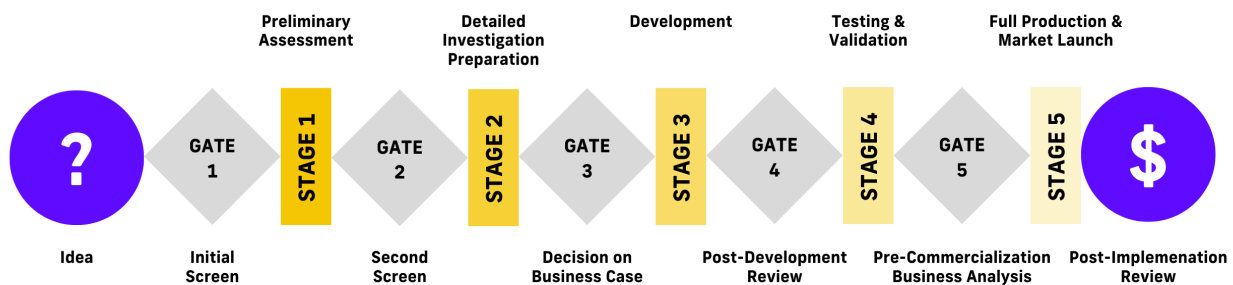
Source: Cooper, R. G. (1990). Stage-gate systems: a new tool for managing new products. Business Horizons, 33(3), 44-54.

Design Thinking

Design thinking takes a human-centred approach to innovation by focusing on the user. It seeks to design new products, services, or processes that better meet users' needs and desires than current offerings. Unlike the stage-gate approach to innovation, design thinking starts with a problem or challenge, rather than an innovative idea that needs to be interrogated. Further, the design thinking process is not a series of linear steps, but a series of fluid phases that include empathizing, defining, ideating, prototyping, and testing. Projects loop back through these five phases, especially the first three, as ideas are tested and refined (see Figure 2).

Design thinking works well when decision-makers can see a problem but do not understand its full scope. The approach helps innovators understand the problem from the user's perspective more deeply and then tailor the solutions to be desirable. The empathizing process can stimulate creativity in ways that the stage-gate approach does not.

Figure 2: The Design Thinking Process
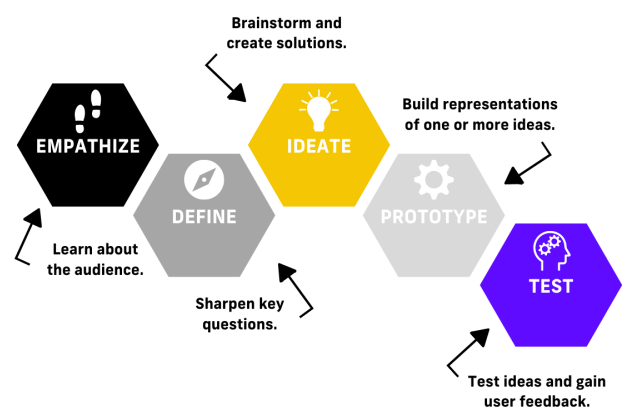
Design thinking is more flexible than the stage-gate approach, but its laser focus on the end user means that the wider context may be ignored. Users tend to focus on their immediate needs and may ignore the implications of the innovation on others, such as the community. In other words, there is no process inherent in design thinking to account for externalities. Users may, for example, want new packaging for their

food or new features for their smartphones. Yet, users are unlikely to consider the implications of the new packaging or smartphone on plastic and electronic waste. Designers, then, can inadvertently innovate products or services with unintended consequences on society and the environment.

Where Traditional Innovation Model Fails: GM Missed the EV Opportunity

Over 25 years ago, GM introduced the first electric vehicle (EV). The "EV-1" was produced from 1996 to 2003, but GM terminated EV-1 production based on a narrow assessment of their profitability. They sent them all to the crushers, despite protests from customers and environmental activists.

In recent years, the EV market has grown exponentially. Tesla, not GM, has been leading that growth. In 2021, Tesla's market share in the U.S. EV market was a whopping 66.3%.

GM's was only about 9%, despite their belated aggressive investment to profit from this booming demand. Now that GM has devoted to go all electric by 2035, they will be fighting to gain the ground they lost.

GM's decision to discontinue the EV-1 might have been different had they applied systems innovation (explained below) and understood that *systemic* changes, like increasing environmental concern, rising oil prices, and rapid improvements in technology, would inevitably lead to demand for EVs.

A SYSTEMS APPROACH TO INNOVATION

Today's volatile business environment calls for innovation with better foresight and an integrated understanding of systems. GM has long championed innovation. They launched numerous industry-leading innovations such as air conditioners and airbags. They were good ideas at the right time. However, as the pull-out box suggests, their failure to take a systems perspective meant that they did not exploit the full potential of EV technology.

By recognizing that the business environment is increasingly interconnected, complex, and dynamic, systems innovation can help organizations more accurately spot trends and contribute to a more desirable future.

Before we can describe systems innovation, we describe what we mean by systems and how systems innovators think.

What Is A System?

Systems are interconnected elements that are coherently organized in a way that achieves a purpose. Examples include the systems that make up our body (e.g., digestive system), a corporation, a financial market, a technological system, and public health care.

More and more places in which people live and work operate as systems, as the interconnections among things (broadly conceived to include stakeholders, products, objects, and organizations) multiply through the flow of money, information, people, and things, which has been accelerated by technology.

How Systems Innovators Think

Understanding systems is a crucial management competency in today's economy. Innovators who understand systems shift their focus from *things* to the *connections* among things. Seeing connections is the one attribute that shifts an innovator's paradigm, as they realize that there is much that they cannot see, much they cannot control, and much they cannot predict. Figure 3 compares a traditional world view and a systems view.

**Figure 3: Traditional Thinking Versus Systems Thinking**
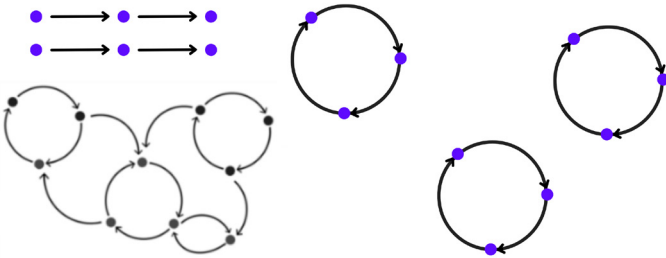
Innovators who take a traditional perspective and focus on things, rather than the connections among things, try to isolate a single problem and seek a single solution. They seek best practices, a new product, or a new service offering. For example, a traditional approach to innovation will seek the optimal location for a factory or the way the factory is laid out. Traditional innovators tend to deconstruct problems, believing that if they can get to the nub of the problem, they can find the right solution that leads to positive outcomes.

Systems innovators, on the other hand, know that the pursuit of the best answer and cause-effect analysis is elusive in a complex world of many interconnections. Systems innovators look for patterns and trends, rather than cause and effect. Innovators who understand systems are more likely to see multiple solutions, they are likely to see trends and know how to overcome barriers and resistance.

Systems innovators tend to set trends, rather than follow them, as they understand how to nudge systems. They proactively look for and manage risk, rather than putting out fires after accidents happen.

Systems innovators also see themselves as part of a system. They see themselves as part of a team, which is part of a department, which is in an organization, and so on up to the biosphere (see Figure 4). And, each of these systems at different scales interacts with each other. Because they see themselves embedded in interacting systems, they actively manage their positive and negative impacts on those systems. And, they know that each system possesses its own properties and principles. The culture of the team may differ from the culture of the organization, even though an organization comprises teams. Further, a well-functioning team does not necessarily mean a well-functioning organization and vice versa. A systems innovator, therefore, is attuned to both systems and knows which system to choose for the problem being tackled.

Figure 4: Systems Are Nested in Other Systems
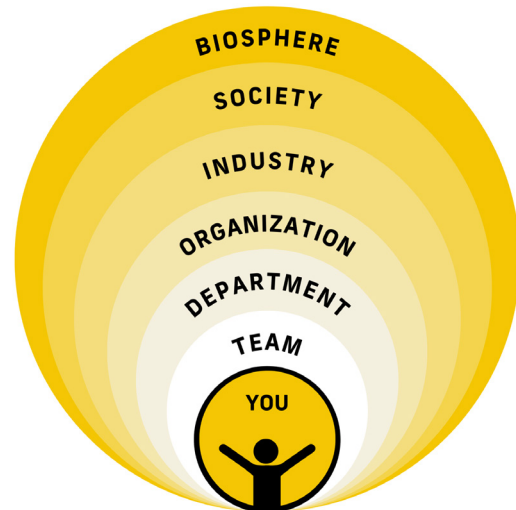
Systems innovators also know that they can't see many parts of the system. Not only is a system often large and complex, but many of the connections among the elements within a system are also invisible. So, unlike traditional innovators, they seek to gather all the information they can. Systems innovators know that they need others to help them see and understand the system. This view is reflected by the fable of the blind men touching different parts of an elephant. It is only their collective experience that reveals the elephant. A systems innovator recognizes the learnings offered by others – especially those with diverse perspectives – as the insights are unique.

What Is Systems Innovation?

Systems innovation takes design thinking, but the innovation process involves cycling through all five stages quickly and often (see Figure 5). Each stage reveals more of the system so that the innovation becomes more viable and less risky with each iteration of the cycle. As well, systems innovation does not seek to only secure one product or service, but a series of solutions that include tangible ones (e.g., products and services) and intangibles ones (e.g., changes in identity, language used). Both the tangible and intangible activities help to nudge the system.

Systems innovation builds on design thinking, but with key differences. First, systems innovation is completely iterative – from sensing to testing. It iterates not just in the first three phases, but throughout the entire cycle, as illustrated in Figure 5. Because a system cannot be fully known, prototyping and testing are critical in exposing systems insights. Once the organization prototypes, they revisit the stage of sensing again. Consequently, systems innovation becomes a series of nudges, rather than major product or service launches. In systems innovation, each action, no matter how small, is a step toward a desirable future.

Figure 5: Systems Innovation
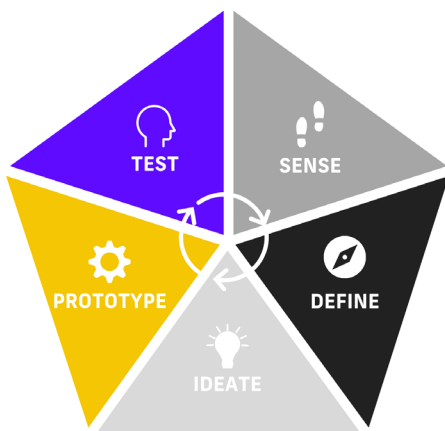
Second, systems innovation can start with a challenge or an opportunity. Either entry point leads systems innovators to sense an appropriate part of the system.

Third, systems innovation does not focus exclusively on the short-term interests of users, but on the other parts of the system salient to the challenge

or opportunity. For example, in the pull-out box, we describe how Suncor Energy tackled the challenge of reclamation. Systems innovation at Suncor would involve employees, local Indigenous communities and municipalities, conservation groups, and scientists in their analysis.

Fourth, systems innovation is guided by the corporation's purpose. Unlike traditional forms of innovation, which focus on the problem or opportunity, systems innovation visits and revisits the corporate purpose to ensure that the innovations are aligned. In volatile business environments, innovators can lose their way and chase new markets or lower costs, without considering the corporate values, mission, and purpose.

Applying Systems Innovation to Oil Mining

Oil sands mining in Canada creates pits and tailings ponds that impact the environment. Suncor Energy is a leading energy company operating in the oil sands, and works to reclaim the land it disturbs by facilitating the return of biologically diverse landscapes and naturally sustainable ecosystems.

Suncor mitigates disturbance by developing detailed reclamation plans that consider the impacts of its operations and embeds learnings from local Indigenous leaders and community stakeholders.

When the innovation team reframed the problem from fixing damage to imagining a flourishing landscape, they started to also reimagine mining. They focused on reducing the size of the land disturbed so that nature can restore the area faster.

Suncor, a company committed to systems innovation, works with systems including the natural environment, which means not only less environmental impact but also lower costs for production and improved health and safety for employees.

KEY SYSTEMS INNOVATION PRACTICES

Systems innovation also requires new organizational practices that aren't often used by design thinkers. These practices include:

1. Zoom out, not just in

Systems innovators start by zooming out to see the problem or opportunity in the wider context. They zoom out both in terms of time frames (long term), geography (distant), and context (broader). They then zoom in to understand the finer points of processes and near-term actions. They continuously zoom in and out, as it helps them see larger patterns, trends, and contextual factors as well as the details. This process of zooming in and out fosters wisdom and creativity.

2. Look left and right

Systems innovators actively seek to learn from people with different perspectives, not just those within their own context, to help overcome their biases and further foster creativity. It is important to seek the perspectives that are often neglected, such as Indigenous people, unborn future generations, and the natural environment.

3. Seek patterns, not causality

The feedback loops in systems make it difficult to predict and control outcomes. Systems innovators do not rely on linear models of causality based on observations of the past; rather, they seek to identify underlying patterns that indicate the direction of future changes. They do not ignore outliers that complicate the neat picture of reality; rather, they are attentive to outliers that might contain important information about deeper and invisible underlying systems and structures.

4. Foresight, not forecast and plan

Because outcomes are difficult to predict, systems innovators recognize the limitations of forecasting outcomes over the long term. They know there are multiple possible scenarios that should be considered. Foresighting encourages systems innovators to adapt and course correct, and it is central to how they work to shape a future that is prosperous and desirable for all.

A Case of Measuring and Assessing Systems Innovation: The Rikers Island Social Impact Bond Case

In 2012, Rikers Island, New York City's main jail complex, issued the first-ever Social Impact Bond (SIB). This SIB sought to tackle recidivism among adolescents incarcerated at Rikers Island. The SIB model offered investors a return only if the project was successful. Investors would fund a therapy program for incarcerated adolescents and be paid only if recidivism fell. However, this SIB failed to provide investors a return on their investment.

Researchers have argued that the Rikers Island SIB failed because the project leaders failed to take a systems perspective. They did not collaborate with local agencies in developing a strategy to target youth recidivism; they focused only on one pathway to success (therapy), and they applied only one metric of success (recidivism). Had the project leaders taken a systems innovation approach, they would have consulted widely, applied many interventions, and used multiple metrics of success, including economic stability and improvements to mental health.

HOW CPAs CAN CATALYZE SYSTEMS INNOVATION

Even though there are many benefits of systems innovation, its complexity makes it daunting. What's more, systems innovators find it hard to measure success, as the outcomes and impacts are often unclear, invisible, and take a long time to manifest. Sometimes the innovation yields powerful outcomes, other times, it just seems to fizzle out. Drawing boundaries and finding measurements can be hard, which is why CPAs are so critical in systems innovation.

CPA Canada recognizes the unique position of CPAs to address systems challenges. In 2020, CPA Canada proposed the "RAISE" philosophy: *Resilient + Adaptable + Innovative = Sustainable Enterprise*.[4] RAISE incorporates systems practices and aims to ensure long-term, sustainable economic and social value. In so doing, CPAs can help their organizations be more creative, resilient, and adaptable, while also broadening their mindsets to be able to connect systems and shape transformative change.

CPAs can play a key role in measuring the systems effects of corporate activities. They can also use systems innovation to improve their understanding of positive and negative risks. There is a growing need to apply human judgement and real-time data analysis to drive decision-making in a way that supplements what can be learned from financial records.

Here, we offer specific guidance to CPAs. Read the pull-out box about broadband service for further context.

[4] https://www.cpacanada.ca/en/business-and-accounting-resources/other-general-business-topics/sustainability/publications/new-mindset-raise-the-bar

Providing Broadband Service on Indigenous Lands

A global telecommunications company* sought to offer broadband network services on remote Indigenous lands. If the company took a traditional approach to innovation, it would have measured success through traditional measures, such as number of households served and quality of service. Aware of the systemic challenges faced by these communities, they sought out wider measures of success. They chose to learn more about the perspective of the communities they were serving by working with an Indigenous NGO.

They learned that they needed to measure success from the perspective of the Indigenous community. This required new sources of data, including community consultations, meetings with community leaders, site visits, and feedback surveys.

Through this process, they learned something counterintuitive. The Indigenous community members did not want broadband service 24-7 in all parts of the community. They wanted 24-7 access only at the community centre, so that people would come to the community centre. They also wanted to protect Indigenous knowledge and culture (e.g., stories and songs), especially for younger generations. These insights shaped not only the service they provided to this community, but it also shaped how they approached success in other communities they served.

*Actual names not disclosed.

Broaden the Scope of What is Measured

Organizations often view success through a narrow lens, focusing on the direct material impact of the product, service, or process on financial statements: the bottom line. This focus can blind the organization to its impacts on broader systems. It may overlook an opportunity to innovate in a way that shapes the system for the better, or it may miss how its innovation could damage the systems in which it operates.

Most financial data collected and interpreted by CPAs is based on past performance. This historical data may not help measure and assess the future impact of the innovation during a period of accelerated systemic change. Systemic impacts are particularly difficult to understand using conventional models, as the impacts are often downstream. When assessing the impact of innovation, CPAs should ensure that the financial and non-financial metrics selected to assess value should go beyond the short-term orientation to consider the impact of innovation on the future.

Overcoming these challenges to assess impact requires an understanding of the system, the interdependencies with other systems, and the drivers of change. CPAs can develop proxies by mapping out the components that create impact and understanding the mechanisms driving the changes. This mapping exercise is particularly useful in breaking down the broader future impact in the system into components that are more easily measured and assessed in the present.

Figure 6 illustrates a mapping process used by Terry Irwin and Gideon Kossoff of the Transition Design Institute at Carnegie Mellon. This is just one of many mapping frameworks available, but they offer insights into a new and important role CPAs can play in visualizing and measuring impacts.

Figure 6: Mapping the Problem or Opportunity for Systems Impacts
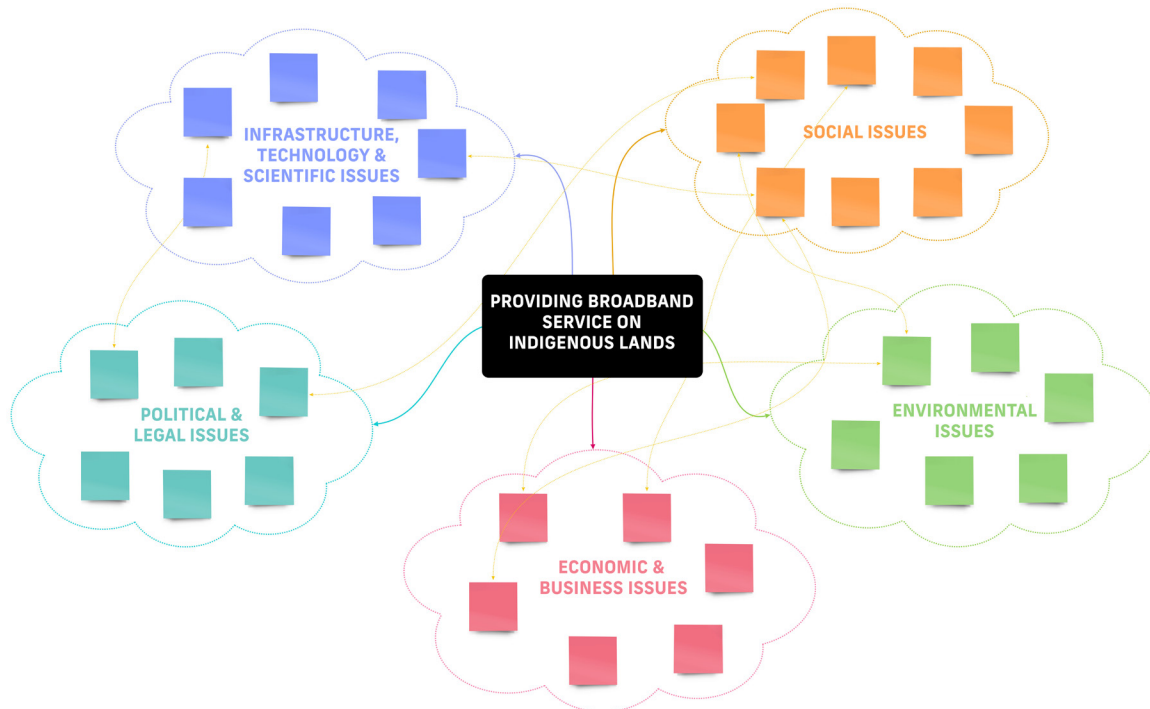
Template adapted from the Transition Design Institute, Carnegie Mellon University, 2021. Irwin/Kossoff

Go Beyond the Balance Sheet for Data

Measuring and assessing the wider impacts of the innovation requires creative approaches to sourcing data and identifying appropriate proxies. CPAs prefer measures that can be easily aggregated, synthesized, compared, and visualized. Most financial reports show these types of numbers.

CPAs can catalyze systems innovation by extending the data sources from which they draw information that include traditional and non-traditional data, such as anecdotes from stakeholders, social media, and consumer and community observations.

One growing opportunity is the use of data analytics, especially with the advent of Big Data and artificial intelligence. Large volumes of data can enable analysts to zoom out to reveal patterns that are difficult to see with a limited number of data points. And, where anomalies appear, analysts can zoom in to see granular detail. Big Data analytics requires new skills, such as learning to ask good questions to interrogate the data and determining the right level of detail for the data analysis.

CPAs should also be attuned to new and often hard-to-see data from novel sources that can help them develop a more complete picture of reality. They can move out from behind their computer screens and meeting rooms to engage more directly with stakeholders and communities. One important lesson will be a better understanding of what success looks like from different perspectives. The pull-out box above describes a telecommunications company that worked with an Indigenous NGO, who recognized the need to hear the stories and songs of Indigenous community members. The ideas generated from such activities can stimulate corporate innovations, as companies seek not to just drive financial returns, but drive those returns while meeting community needs.

CPAs are highly respected stewards of data reliability and integrity. As they explore different data sources and bigger data sets, they must update their understanding of data reliability. Traditionally, data used in financial analysis and reporting have been reliable due to the rigour and controls applied by CPAs and financial IT systems. CPAs leading the implementation of systems innovation will need to adopt new approaches and skills that apply to new types of data gathered from non-traditional sources.

Systems innovation requires listening to all types of people, not just consumers. It requires embracing values and perspectives different from one's own, and challenging one's assumptions.

Communicate in Diverse Ways

CPAs are highly trusted knowledge brokers within their organizations. As systems innovators who draw data from a breadth of sources, they can play an important role in communicating the significance of data to senior leaders. They could be tasked with conveying that the value or significance cannot be solely represented through numbers or in isolation from their wider context. In these instances, CPAs can use the language of systems innovation as a communication tool to explain the fundamental shift in business mindset that they are advocating.

By embracing complexity, systems innovators might find it difficult to capture the entire picture in a single PowerPoint slide. Even the linear format of a report might present communication challenges when more and more systemic factors are taken into consideration.

Stories and anecdotes can be a powerful tool for conveying complex messages in a condensed format (few communication tools are more time-tested). Visual tools such as graphs and infographics are other important tools that can combine numbers with other types of information. There is an increasing array of software options for creating visual messages.

CPAs should look for patterns that others don't see and be creative in how they explain the significance of these patterns. As systems innovators, they will supplement their role of reporting on what has happened as captured by numerical data with foresight about what lies ahead. Communication is a proactive contribution to the health of an organization.

Conclusion

Systems innovation is growing in popularity as corporate executives increasingly acknowledge that they are part of systems that are difficult to anticipate and change. They realize that system-wide changes pose hidden risks, yet create opportunities that can yield innovations that are both good for the organization and the wider systems in which they are embedded – including social, environmental, and economic systems.

More profoundly, systems innovation is seen for its potential to influence how systems evolve. Leaders understand the need for agile learning, new ways of thinking, new tools, and a better understanding of systems so they can innovate with shared visions of desirable futures.

Innovation North is developing some of these tools, drawing from the best research in the field and co-creating the ideas with partners from practice. CPA Canada is one of these partners, and they are actively seeking to innovate the accounting profession and the process of innovation itself. Over the next few years, we will be transforming these general principles into specific guidance and tools to be available for use by CPAs.

Innovation models need to be revisited and revised to match 21st century grand challenges. CPAs need to adapt their roles to align with the organization of the future, especially with respect to corporate innovation. Systems innovation offers forward-thinking CPAs opportunities to transform large and complex systems in ways that not only benefit their organization but are also environmentally and socially sustainable.
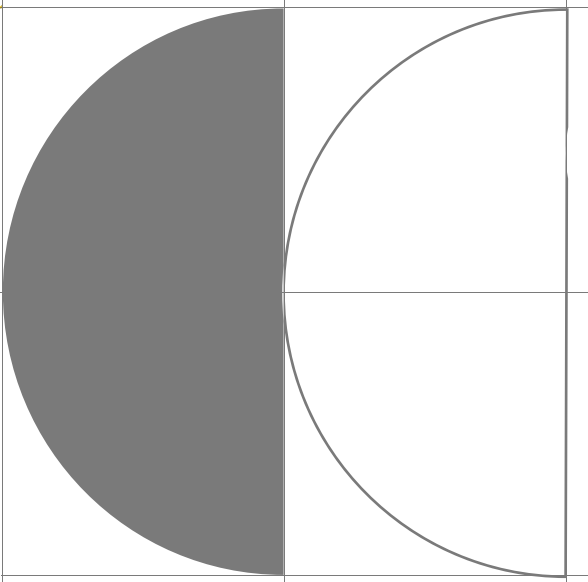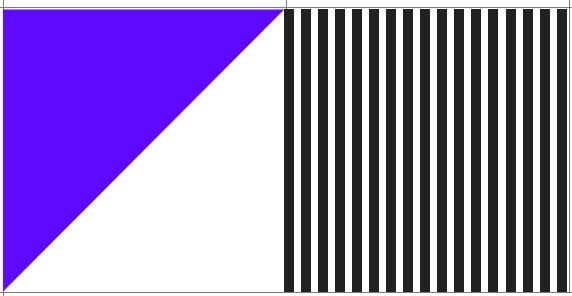
INNOVATION NORTH

Innovation North is fueled by the belief that corporations can create a future where businesses and society thrive. Created in 2019, Innovation North is the only collaborative that connects systems innovation researchers with large enterprises to help them integrate systems thinking into their business strategy through their innovation practices.

CPA CHARTERED PROFESSIONAL ACCOUNTANTS CANADA

Chartered Professional Accountants of Canada (CPA Canada) works collaboratively with the provincial, territorial and Bermudian CPA bodies, as it represents the Canadian accounting profession, both nationally and internationally. This collaboration allows the Canadian profession to champion best practices that benefit business and society, as well as prepare its members for an ever-evolving operating environment featuring unprecedented change. Representing more than 220,000 members, CPA Canada is one of the largest national accounting bodies worldwide.