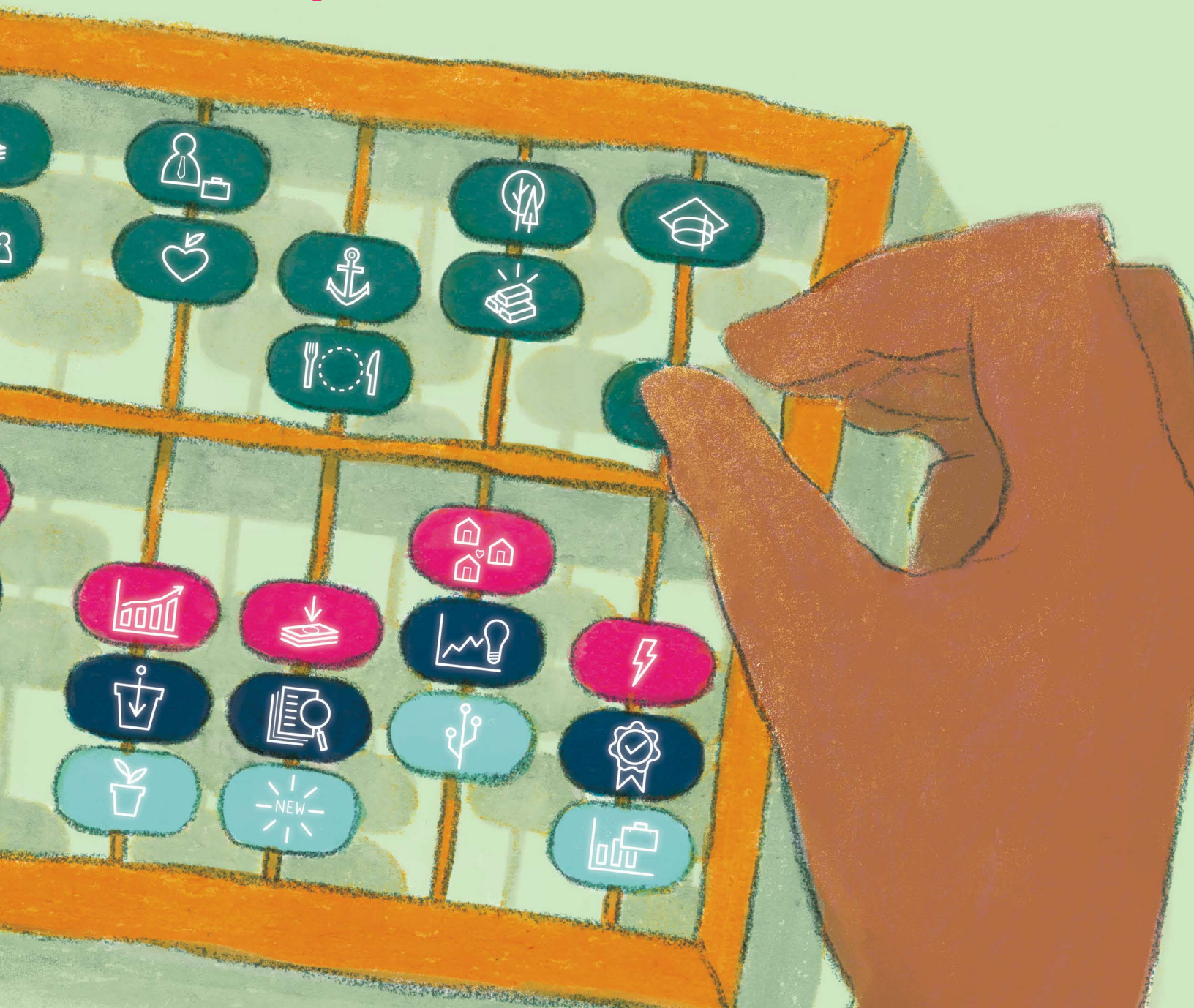


An Inclusive Innovation Monitor for Canada

Discussion Paper

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Innovation is essential to the economic and social well-being of Canadians. At the same time, innovation is not an unqualified good for all. Its benefits and risks are distributed unequally among different people and communities. Moreover, as many economists now recognize, how resources and opportunities are distributed affects innovation performance itself. Innovation ecosystems characterized by high inequality and low inclusion appear to perform less well on innovation than ecosystems with low inequality and high inclusion. In that case, understanding innovation performance and potential requires a clear picture of the state of inclusion and distribution, while understanding inclusion and distribution performance and potential requires a clear picture of the state of innovation.

How is Canada doing on inclusive innovation?

The Innovation Policy Lab at the Munk School of Global Affairs and Public Policy and the Brookfield Institute for Innovation + Entrepreneurship are partnering to produce an Inclusive Innovation Monitor to help researchers, leaders, and decisionmakers track and understand Canada's performance in inclusive innovation. We believe that designing policies and business strategies that contribute to better innovation performance and more equitable distributions of opportunities and benefits requires a clear picture of inputs, capacities, activities, and outcomes, and the relationships among them. Our Inclusive Innovation Monitor will provide policymakers, practitioners, and researchers with a clear picture of how Canada measures up on key inclusive innovation metrics and opportunities, in order to better understand how the variables are connected

and what policy levers we can pull to improve performance.

Because the monitor is intended to provide a foundation for leaders to make informed decisions and design effective policies, we want to ensure that it is accurate, meaningful, and practically useful for decisionmakers. This document outlines our preliminary thinking on the purposes, design, uses, and risks of an Inclusive Innovation Monitor. We invite policymakers, practitioners, and researchers to reflect on our proposed approach and offer insights and direction on how best to select, weigh, and present data and analyze results.

WHY AN INCLUSIVE INNOVATION MONITOR?

Innovation is a core ingredient in the prosperity and well-being of people and communities. New or improved services, products, and processes – and the business and social benefits they generate – shape economic performance, as well as individual and community well-being. As many reports and scorecards have revealed, however, Canada's innovation performance is lacklustre when compared with the performance of many international peers.¹ We need to improve Canada's innovation performance, and doing so requires a clear understanding of the various inputs, capacities, activities, and structural conditions that comprise the innovation ecosystem.

At the same time, economists and policymakers are realizing that a focus on innovation and economic growth alone is not enough. Innovation can generate substantial economic and social

benefits, but often those benefits are captured by a select few rather than more equitably distributed among groups and regions. Income inequality in Canada, for example, has remained stubbornly high after rising from the 1970s to 1990s.² Moreover, there is increasing evidence that inequality of opportunity and resources “obstructs, subverts, and distorts” innovation and growth by preventing the development and effective use of skills, knowledge, and creativity.³ In other words, not only does innovation have distributive consequences, but the distribution of opportunities and resources has consequences for innovation and growth.

COMPONENTS OF AN INCLUSIVE INNOVATION MONITOR

Given the interactions among innovation, inclusion, and distribution, we need a clear, data-rich picture of relevant indicators of innovation and distribution, as well as strong evaluation and analysis of strengths, weaknesses, and policy options for Canadian governments, businesses, and social and other organizations. We envision the Innovation Policy Lab - Brookfield Institute Inclusive Innovation Monitor having three core elements to address these needs.

- + We will begin to collect and organize relevant **indicators and data** that will serve as a resource for researchers, policymakers, and others focused on innovation and distribution. This will include data on a range of innovation inputs and capacities (e.g., public R&D, education and skills attainment, venture capital); innovation activities (e.g., technology investment, business R&D); innovation results (e.g., patents, start-up and scale-up rates, labour productivity); distribution of opportunities to participate (e.g., inequities in educational attainment, access to VC, entrepreneurship, employment by demographic group); and distribution of benefits and risks (e.g., poverty, income and wealth inequality).
- + We will develop a **scorecard** that compares Canada’s performance with international peers on a subset of weighted indicators of inclusive

innovation. Where relevant and comparable data are available, the scorecard might also compare performance at sub-national (e.g., provincial and regional) levels.

- + Based on the collected data and scorecard, we aim to produce **insight briefings** that explore and analyze various dimensions of Canada’s inclusive innovation performance, to provide decisionmakers with policy advice on how to build Canada’s strengths and address weaknesses. This includes gathering insights from other jurisdictions that perform especially well (or poorly) on key dimensions of inclusive innovation.

Does Canada need another innovation scorecard?

Yes and no. There have been many efforts to measure and assess Canada’s innovation performance. A number of domestic and international think tanks and consultancy firms have produced innovation and competitiveness scorecards and rankings that have generated substantial media attention. As well, a handful of NGOs (including the OECD, UNESCO, and the Council of Canadian Academies) have collected and curated innovation-related data in order to assess Canada’s innovation strengths, weaknesses, and opportunities.

Our aim is to produce a framework for regular, ongoing monitoring of Canada’s innovation and inclusive growth performance that is nuanced, evidence-based, practically useful, and provides a foundation for careful analyses of drivers, outcomes, and policies that shape performance. Moreover, Canada needs a monitor that adds a focus on inclusion and distribution to the conventional focus on innovation. We want to know not only how Canada is doing in terms of innovation capacities and performance, but also how opportunities to participate in and benefit from innovation are distributed among people and regions. To the best of our knowledge, there is not currently a Canada-focused initiative that measures, tracks, and assesses both innovation and distribution performance and how they interact.

WHAT IS INCLUSIVE INNOVATION?

WHAT IS INNOVATION?

How are we defining and thinking about inclusive innovation, exactly?

Start with innovation. Innovation is the process of using ideas and knowledge to develop new or improved products, services, or processes that generate value. This includes both the development and diffusion of innovations, covers both economic and social value, and applies to activities conducted by individuals, firms, communities, and/or economies as a whole.⁴ The process itself can run from the initial vision to the design, development, production, sale, and use of products, services, and processes.

Commonly associated with technology and technological change, innovation is a much broader phenomenon that covers new marketing methods, business models, organizational

structures and processes, management practices, and a range of other activities that produce value for firms, economies, and societies. Similarly, while new start-up and scaling firms are often viewed as emblematic innovation actors, established firms and sectors can be just as innovative as new and emerging firms. For example, changes in supply chain logistics by large, established firms have fundamentally transformed the retail sector.

The key criteria for identifying innovation are:

- + The emergence or adoption of a new or improved product, service, or process;
- + That generates new value.⁵

An innovation does not have to be new to the world. It can include products, services, or processes that are new to a particular firm, organization, or sector. An established organization that implements an existing technology to improve efficiency and lower costs is innovating because the change generates value. Similarly, a new health procedure might allow for more efficient or more accurate diagnosis and treatment for patients, thereby producing value in terms of better health or lower cost of services.

WHAT IS INCLUSIVE INNOVATION?

Until recently, innovation research and policy largely ignored questions of fairness and the distribution of opportunities and benefits. Greater focus was placed on identifying the causes of economic growth, as well as policies and activities that would position firms and economies to innovate more effectively. Concerns about the distribution of opportunities to participate in and benefit from innovation were considered in economic and social research more broadly, but not in innovation research and policy specifically. Over the past two decades, however, there has been greater recognition among economists and policymakers that the distribution of innovation opportunities, benefits, and risks matters, both for achieving fairness and for achieving better innovation performance and economic growth.⁶ But what does it mean for innovation to be more inclusive?

Innovation is *inclusive* when there are opportunities for all people to participate in the innovation economy, and a fair distribution of the benefits and harm produced by innovation.

Specifically, innovation is *inclusive* when there are:

- + opportunities for all people to *participate* in the innovation economy as workers (in good jobs with decent wages and security), entrepreneurs (if they choose), and consumers (with sufficient resources to lead good lives);
- + *a fair distribution* of the benefits and harm produced by innovation, including more attention to and management of where and to whom the economic and social gains of innovation and growth flow; and
- + opportunities for all people to *participate as citizens in decision-making about the priorities, direction, and regulation* of innovation.⁷

Note that the criteria for inclusive innovation are *interrelated*. The extent to which people *benefit* from innovation depends, in part, on the extent to which they *participate* in the innovation economy. One of the best ways to ensure a fairer distribution of the benefits of innovation is to have people employed in good, well-paying jobs. Moreover, ensuring equitable *participation* is shaped by *decisions about the priorities, direction, and regulation* of innovation. As well, the extent to which individuals with different perspectives and experience get to shape the *priorities and direction of innovation* is partly a function of the extent to which they *participate* in the innovation economy — as researchers, managers, workers, and consumers.

Why make innovation inclusive?

Persistent inequality in an age of technological progress and prosperity poses questions of fairness. When innovation and economic growth⁸ are strong, but only some people and communities are benefitting while others are being left behind – or even actively harmed – by innovation, we should be concerned. We should ask what changes private and public sector organizations could make in practice and policy to ensure that the economy works for everyone, and not a select few.

Moreover, there is growing evidence that inequalities – in income, education, and employment – can undermine innovation and economic growth. As well, inclusion and inequality prompt concerns about the sustainability of broader public support for science and innovation funding and activity.⁹ When certain people and communities are excluded from participating in and benefiting from innovation, we see increasing resentment towards science and innovation, and weaker innovation and economic performance.

Providing opportunities for all to participate can assist with a better distribution of benefits, improve success at the firm- and economy-wide levels, and enhance the basic and applied research

that provides a foundation for innovation. Research shows that:

- + gender and ethnic diversity can improve firm performance by ensuring that there is a better mix of ideas, perspectives, and networks on which an organization can draw;¹⁰
- + equality may be “an important ingredient in promoting and sustaining growth”, rather than a hindrance to efficiency and growth as conventional wisdom has held;¹¹
- + racially- and gender-diverse teams can improve the quality of both science and innovation by facilitating more open-mindedness, more deliberate consideration of possible outcomes, and more effective problem-solving.¹²

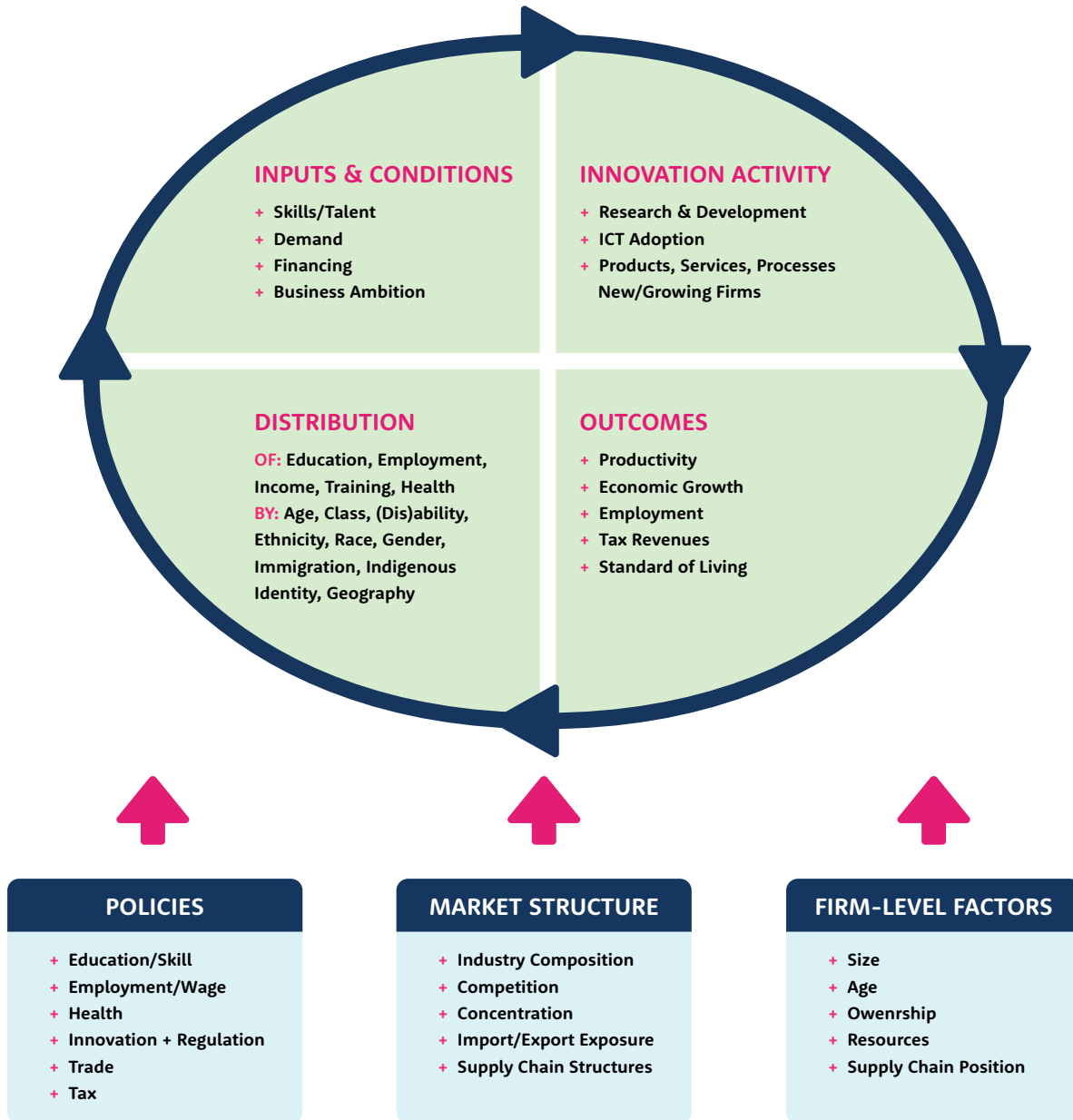
When large groups of skilled and talented people are left on the sidelines, and/or when concentrated wealth and high savings rates among wealthy individuals contribute to reduced private and public expenditure, innovation and economic growth suffer. Thus, ensuring that innovation is inclusive is a matter not only of fairness, but also a condition for successful innovation and economic growth.

Over the long term, we hope that our Inclusive Innovation Monitor will help to generate a better understanding of the relationships among different innovation inputs, capacities, activities, and outcomes; the distribution of opportunities to participate in and govern innovation; and the distribution of income, wealth, and opportunities. Although we have hypotheses on and evidence-based understanding of some of the relationships among these variables, we do not pretend to have a complex causal model of inclusive innovation drivers and results. For the first iteration of our monitor, then, we will curate data on a set of indicators that fit into a provisional framework of inclusive innovation, with the understanding that further research and analysis will help us to develop a clearer model over time.

Our draft inclusive innovation framework draws elements from the innovation-focused frameworks developed by the Council of Canadian Academies' Expert Panel on Business Innovation and Expert Panel on the Socio-Economic Impacts

of Innovation Investments, as well as elements of the inclusion-focused growth framework produced by the OECD.¹³ The CCA frameworks attempt to capture inputs and conditions that shape the choice of innovation as a business strategy, while the OECD inclusive growth framework incorporates distributive dimensions. Our framework brings these concerns together to offer an initial understanding of the relationships among innovation inputs/conditions, activities, and outcomes, and the distribution of outcomes and opportunities. The framework also highlights the role of policy, the structure and composition of the market (e.g., sector composition), and firm-level factors that shape innovation ecosystems, activities, and the distribution and redistribution of outcomes and opportunities.

INCLUSIVE INNOVATION FRAMEWORK



At this stage, we make no judgments about how to weigh categories or indicators, or the extent to which variables actually affect outcomes. Insights on those features will emerge over the course of developing and analyzing results from the Inclusive Innovation Monitor.

The framework captures the idea that inputs and conditions (such as the availability of talent and financing) shape businesses’ innovation opportunities and activities (such as the development of new or improved products and services or the adoption of new productivity-

enhancing technologies). This, in turn, affects economic growth, employment, and standards of living. At the same time, the framework captures the insight that the outcomes of innovation are subject to different distributions across a range of factors, and that, in turn, the distribution of resources and opportunities affects the extent and nature of future innovation inputs and conditions, who participates, and who benefits. Each of the dimensions of innovation and distribution are shaped by policies, the structure and nature of the market, and characteristics of firms themselves.

Table 1: Candidate Indicators

Ecosystem Inputs and Conditions	Innovation Activities	Outcomes	Distribution
People and Skills + PSE Graduates + University + College + STEM + BHASE + HS grads + Adult Skills (PIAAC) + Student Skills (PISA) + Digital Literacy + Entrepreneurial Ambition + Training & Devel + Emp Spend + Govt Spend Research and Development + HERD + GOVERD + R&D Personnel Research + Articles + Scientific Articles + Top-Cited Papers Indices Financing + Venture Capital + Private Equity Ease of Entrepreneurship Business Tax Rates	Business R&D + Intensity by sector/industry + Source of funding Technology Adoption + ICT Investment + Advanced Tech Use New/Improved + Products + Services + Processes New Firms Growing Firms Patents Copyrights Export Activities	Productivity + Overall + By sector + By region Employment + By sector + By key sectors + By region Income/Wages Economic Growth + GDP + GDP by sector + GDP by region Health Community Well-Being Environmental Health	For each of the categories below, differences by: + age + class + (dis)ability + ethnic/racial identity + gender identity + immigration experience + Indigenous identity + geography + rural-urban + region + province/territory Educational Attainment Labour Market Participation Job Quality/Security Employment Income/Wages Income Distribution Wage Gaps (by demographic) Wealth Poverty Intergenerational Mobility Health Community Well-Being Environmental Health

INDICATORS AND DATA

With a provisional framework in place, we can select indicators and data. In doing so, the central question is “are we measuring the right things and for the right reasons?”. That is, are we measuring things that truly capture innovation and inclusive growth performance, and are we doing so in a way that can provide accurate and useful insights for decisionmakers?¹⁴

To ensure that we can answer this question affirmatively, our approach to selecting indicators and data requires that we satisfy a set of necessary conditions. Thus, the key criterion for selecting indicators is whether they meaningfully capture some dimension of inclusive innovation input, activity, or outcome. When selecting data to report on the indicator, we are concerned with validity (i.e., whether the data accurately represent the thing being measured), reliability (i.e., whether the data consistently measure the thing across time and space), comparability (i.e., whether the data allow us to compare Canada and provinces to other countries and sub-national regions), and accessibility (i.e., whether the data are reasonably available for use).

We will select indicators and data that allow us to understand and offer a picture of both vertical and horizontal dimensions of distribution; that is, how opportunities and benefits are distributed across vertical dimensions, such as class and distribution by income share, and horizontal dimensions, such as age, (dis)ability, ethnic/racial identity, gender, immigration experience, Indigenous identity, and region. We will also select indicators and data that provide an accurate, meaningful, and useful picture of inputs to innovation (e.g., human capital, R&D, financing), innovation activities (e.g., ICT adoption, patents, firm creation and growth), and outcomes (e.g., growth, productivity, employment).

The table above presents a collection of candidate indicators for the monitor and scorecard that might meet the criteria described above. It includes indicators that are often found in innovation scorecards and distribution analyses, as well as some additional possibilities that we think could

be important. We expect that, ultimately, some of these may be excluded for one reason or another, while other indicators that are not listed could be added. We welcome suggestions about indicators to include and exclude, keeping in mind our criteria (i.e., meaningfulness, validity, reliability, comparability, and accessibility).

Data Cards

As we collect and analyze data for possible inclusion in the monitor and scorecard, we plan to produce short “data cards” on individual indicators that will present key data and discuss what a particular indicator means, why it matters to innovation and/or distribution, and what the data reveal about Canada’s performance (e.g., compared to other jurisdictions, over time, and relative to baselines or thresholds). These will help monitor users understand what an indicator can and cannot reveal about innovation and inclusive growth performance, and how to interpret what the data show about that performance.

Measuring innovation and inclusive growth entails a number of risks. Although we do not yet have strategies to deal with all of these risks, we will highlight those we think require careful thought and discussion.

Flaws in the Framework

Our framework is presented as provisional, non-causal, and subject to revision; nevertheless, it entails some causal implications, or at least hypotheses, that might not be true. For example, the framework assumes that the climate for new ventures – e.g., tax rates, ease of entrepreneurship, availability of risk capital – influences firms’ decisions to pursue innovation. However, until we collect and analyze the data, we cannot know for certain whether, and to what extent, these factors affect firms’ decisions to innovate. We will mitigate this risk by revisiting and revising the framework as we develop the monitor and analyze indicators and their relationships. Additionally, we will share data in raw, unweighted form on the central hub, to allow others to conduct their own assessments of inclusive innovation performance and the framework that underpins our analysis.

Flaws in the Data

Some of the innovation and inclusive growth data we use will be less than ideal in terms of validity and comparability, given cross-national differences in the ways data are collected and reported. For example, while the OECD shares data on research and development spending in tables that imply cross-national comparability, countries often use

slightly different methods to collect and report data to the OECD. Additionally, different agencies sometimes use slightly different definitions or concepts, as well as different indicators, when requesting and organizing data. For example, some jurisdictions have more restrictive definitions of “disability” than others, which means that differences in reported employment rates of people with disabilities might reflect different definitional boundaries as they do actual differences in employment rates. Where flaws in the data are egregious, we will exclude those data from our work. Where flaws are minor, but not inconsequential, we will use the data prudently and flag for others the potential risks. The greatest risk is that we use flawed data without knowing about its errors. In that case, we will have to rely on the observations and analyses of others to collectively produce awareness and improvement.

Metric Fixation

Another risk is that by developing and sharing a data-rich monitor, we nudge key actors to focus too much on indicators and data, and not enough on what those indicators and data truly represent. As Muller puts it, “what can be measured is not always what is worth measuring; what gets measured may have no relationship to what we really want to know.”¹⁵ For example, measures of patents are included on the assumption that they reflect researchers’ and firms’ development of new and valuable ideas; however, patenting activity might also reflect changes in the intensity of legal activity to protect existing ideas, with no corresponding increase in ideas themselves.

IMPROVING INNOVATION AND INCLUSIVE GROWTH

Ultimately, our aim with the Inclusive Innovation Monitor is to provide policymakers and practitioners with a rich source of data to better understand, and to develop policies and strategies to improve, Canada's innovation and inclusive growth performance. Equally important is our aim to better understand and highlight the mutual dependencies between innovation and the distribution of opportunities and outcomes. An innovation agenda that neglects equity and inclusion is both unjust and unwise.

We invite researchers, policymakers, and practitioners to consider our proposed framework, activities, and indicators, and to offer thoughts on whether our approach is sound and practically useful. We will continuously update the monitor

to account for what we hear and learn about what kinds of data and analysis best support decision-making and action. We know that Canada's innovation and inclusive growth performance must improve. Our hope is that the Inclusive Innovation Monitor will help to advance those goals.

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7. This three-pronged conception of inclusive innovation draws from the definition offered by Nesta in I. Stanley, A. Glennie, and M. Gabriel, *How inclusive is innovation policy? Insights from an international comparison* (London: Nesta, 2018). We recognize that there is disagreement about how to define some of the normative terms used here – including “good”, “decent”, and “fair” – and that some of that disagreement is “reasonable.” Recognizing that not providing full definitions of these terms leaves some ambiguity in the idea of “inclusive innovation” more generally, we believe that developing more robust definitions of normative terms is a job for democratic deliberation. At the same time, we follow the late Anthony Atkinson in holding that we “may well disagree as to how much inequality is acceptable while agreeing that the present level is intolerable or unsustainable.” For practical purposes, if we can agree on the “direction of movement” in addressing inclusion and inequality challenges, we can set aside disagreement about “the ultimate destination” for the time being (A. Atkinson, *Inequality: What Can Be Done?* (Cambridge: Harvard University Press, 2015)).

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