Expanding digital opportunity in Canada?
Summary of Theme IV research findings and policy implications

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I. Overview

The pace and pervasiveness of change driven by the digital economy is no secret. The ubiquitous use of digital platforms for commerce, major advancements in robotics and artificial intelligence, additive manufacturing, and the Internet of Things, along with big data, new algorithms, and cloud computing are anticipated to alter not just the nature of employment but the entire structure of the global economy, shaping the digital opportunity that goes with it. Post-industrial economic advantage in knowledge-intensive sectors requires the capacity to develop and apply digital technologies, and tends to concentrate in large, economically secure urban regions with abundant employment opportunities. In other words, economic advantage in the 21st century tends to go to those who are already advantaged.

As the 'digitization of everything' accelerates, we know much less about how the implications for those less well positioned to benefit. Particularly problematic is the potential for digital innovation to deepen, perpetuate, and entrench existing socio-economic, socio-technical, and socio-spatial divides. Presenting complex policy, and political, challenges, these digital divides represent deep fault lines that threaten to exacerbate growing 21st century inequality. *Creating* digital opportunity also necessitates *expanding* digital opportunity to people and places – and to people *in* places - on the 'wrong side of the digital divide'.

The CDO research projects under the theme of Digital Inclusion and Intelligent Communities aim to advance our understanding of the equity implications of the digital economy in Canada. This includes work on Smart Cities, rural and remote communities, ride-hailing and the platform economy and economic restructuring in mid-sized manufacturing cities. Asking whether and how digital opportunity is being created and for whom, each researcher explores the challenges, opportunities, and policy prospects for expanding digital opportunity to more people and places.

This report synthesizes the key findings across these five research projects that reflect on three questions:

- **How can we best describe Canada's digital divide(s)?**
- **What challenges & opportunities emerge in your research?**
- **What policy & program areas have the potential to expand digital opportunity to more people & places?**

II. Canada's Digital Divide(s): Challenges, Opportunities & Policy Implications

The CDO researchers find that, at present, the challenges for expanding digital opportunity in Canada far outweigh the prospects. Taken together, the concentration of digital economy benefits in a few large, globally competitive urban regions, the lack of infrastructure and skills in other places, and disconnects between those who develop, apply, and use digital technologies and those who don't, reveal deep and growing digital divides in Canada. Clearly market solutions alone will not redress these inequities. Other, more intentional forms of intervention are required.

Two intersecting themes cut across these research projects. First off, the negative implications of the digital economy are highly localized. In one way or another each study investigates the question of *local capacity*, examining what can plausibly be done at the urban scale to filter, mitigate, and adapt to these pressures. Uncovering a complex conundrum, they all find that while the local is a crucial locus of intervention, it is also the scale at which the ability to adapt to digital economy pressures is weakest. Much of the digital opportunity is powerfully shaped by factors beyond local control such as city size, industrial specialization, and geographic location. Small and rural communities and mid-sized manufacturing cities each face distinct disadvantages in terms of digital innovation and the skills and human capital to support it. Public service delivery is also fraught with divides between those who provide and those who use digitally delivered services.

Much digital opportunity is powerfully shaped by factors beyond local control such as city size, industrial specialization, and geographic location.

This gap implies an essential role for informed *public policies* at the national scale. Governments everywhere have an interest in supporting digital economy transformations that are socially sustainable and politically viable, yet the challenge of expanding opportunity to people, places, and sectors less able to keep pace is not adequately reflected in existing research, policy, and practice. It remains an open question of our time whether policy can better align economic and social goals, and better expand digital opportunity to bifurcated labour markets, restructuring local economies, disadvantaged neighbourhoods, and rural regions and remote communities, or if structural and market challenges will overwhelm policy potential. The researchers reflect here on the challenges and prospects for Canada.

Digital Underdogs: Economic Opportunity and the 'Ordinary' City[1]

Undertaking comparative research of urban policymaking for digital innovation and inclusion in four mid-sized restructuring cities in the US, Canada, and Europe, Allison Bramwell asks whether and how local actors coordinate strategically to encourage economic transformation to the digital economy. She finds that some urban policy innovation is evident in most places, but that it tends to be fragmented and ephemeral, indicating that strategic economic governance is difficult to sustain under these conditions. Insufficient policy capacity suggests that these types of cities are not 'resilient' to digital disruption.

Of relevance to expanding digital opportunity in Canada, the Ontario case demonstrates the weakest performance of the four on local policy capacity. Political conflict over resources and local development agendas compromises strategic economic planning in London. This is significant because of the province's unique position in the national political economy. Much national digital advantage is concentrated in Southwestern Ontario, but so is much mature manufacturing and the province has many deindustrializing 'ordinary' cities. We cannot accurately generalize from a single case study, but if London is any indication of local development capacity, left to their own devices these places could be in danger of permanently hollowing out.

Exploring the conundrum emerging at the nexus between local capacity and public policy in mid-sized restructuring cities that lack advantages of size and specialization, places on the 'wrong side of the digital divide' cannot be left to their own devices. Yet place-based policies intended to support the local knowledge networks essential to digital innovation will fail without careful attention to local context and the political challenges to capacity-building in these places. Public, private, and nonprofit actors genuinely want what's best for their city, but often compete to get their ideas on local policy agendas. With net out-migrations of the very investment and human capital assets they need to restructure, 'ordinary' cities juggle multiple policy challenges with insufficient institutional resources, including development expertise.

"Ride-Hailing: Economic Geography and Canada's Opportunity"[2]
"Creating Digital Opportunity: Digital Ride-Hailing in Canada"[3]

Examining the economic geography of ride-hailing and how it shapes urban economic and employment in Canada's emerging platform economy, the CDO research finds that the platform economy is contributing to growing socio-economic divides at inter- and intra-urban scales. With the potential to reduce congestion and emissions and improve multi-modal access, ride-hailing has some positive implications for mobility in Canadian municipalities but that these vary widely

[1] Allison Bramwell, Department of Political Science, The University of North Carolina at Greensboro and Research Associate, Innovation Policy Lab, Munk School of Global Affairs.
[2] 2 Shauna Brail, Director of the Urban Studies Program, University of Toronto and Senior Associate with the Innovation Policy Lab, Munk School of Global Affairs.
[3] 3 Betsy Donald, Department of Geography and Planning, Queen's University.

by geography. The rise of ride-hailing coincides with the continued decline of automotive manufacturing in southern Ontario. As innovation accelerates in electric, autonomous, and shared vehicles, Canada's advantages in digital technology and the automotive sector position Toronto, Waterloo, and Montreal to participate as secondary players in the global platform economy while disruption to employment in taxi services and automotive manufacturing are evident in most other parts of the province with "deep, negative and likely long-lasting spinoff effects". We conclude that the digital platform economy, and ride-hailing in particular, expands global digital opportunity for a select group of cities and a select cohort of talent, but has little positive economic impact for most other places. The economic geography of ride-hailing is "emblematic of the twenty first century: highly concentrated, highly uneven, driven by talent and innovation, dynamic and challenging."

Additional research on the platform economy with the same focus on digital ride-hailing, asks more specific questions about the impact on Canadian municipalities, finding that it has been uneven across cities, neighbourhoods, social classes, and 'digital communities'. Though there has been some improvement over time, she finds that major municipal regulatory gaps remain. The absence of enforceable rules alongside ambiguity about whether the costs of enforcement will match projected municipal revenues, means that ride-hailing services "operate in a grey zone" with little oversight to govern passenger safety, or provider insurance.

Noting the concentration of platform economy benefits in a small number of large Canadian cities, the researchers are dubious about the capacity of municipalities to manage the local economic implications of ride-hailing. Upper level governments not only play key regulatory roles but can also fund "pilot projects, investment attraction efforts, partnerships, investments in infrastructure, data collection, and research". Yet the scope for policy intervention extends well beyond ride-hailing to larger implications for urban mobility. Canada's lack of globally competitive headquarters and lag in research and investment in the multi-modal implications of ride-hailing relegates us to passive consumers rather than active producers. As our largest cities struggle with congestion and uneven economic advantage, the CDO research concludes that public policies to facilitate mobility investments are now more important than ever.

"Rural and Remote Regions on the Wrong Side of the Digital Divide?"[4]

With a particular focus on indigenous communities, CDO research examines how small towns and rural areas in Canada are responding to the digital opportunities and challenges in the 21st Century. Not surprisingly, there are major digital divides between larger urban centers and the rural, remote and Indigenous communities, making these communities less prepared for 21st century digital engagement. Lack of capacity and weak infrastructure with limited, expensive and unreliable digital connections inadequate for most contemporary and high-end digital applications are particularly acute.

[4] Ken Coates, Canada Research Chair in Regional Innovation, Johnson-Shoyama Graduate School of Public Policy, University of Saskatchewan.

Digital disruptions have accentuated the vulnerabilities and challenges facing most of these communities. Most towns have experienced a sharp decline in local services such as banking, public service delivery, and access to consumer goods as businesses and government agencies migrating their operations to digital platforms. Though there have already been substantial local job losses tied to technological innovations in the resource, agriculture and other sectors, a major dislocation of retail services due to e-commerce usage signals a general weakening of the local economies that lack the scale to attract investment.

The social and economic challenges of the digital divide for these communities and small towns in northern Canada are exacerbated by the lack of even rudimentary awareness of the implications let alone the capacity to redress them. This makes even more problematic the absence of systematic policy attention in Canada to 'bringing in' these communities to the digital economy. Coates argues that responding to growing employment and economic development gaps requires a rural, small town and northern digital strategy that makes national commitments to providing uniform infrastructure standards, high quality regional education and training programs, and targeted policies for small town and rural economic development. Yet rather than passively accepting digital economy effects, the research suggests the need for policy activism from within disadvantaged communities themselves to "move to the forefront of small-town focused research and development".

"Smart Cities"[5]

Research examining 'smart city' developments in Canada investigates competing definitions of 'smart cities' in the Canadian context, explore whether and how Canadian municipalities are using digital infrastructure for public service delivery, and how local stakeholders interact to shape 'smart city' practices. The primary rationale for adoption of smart city technology is the same across communities; enhanced quality of life for residents and sustained community health. However, there is evidence of significant divergence between the types of 'smart city' services being put in place by local governments and the relative importance the public places on such services. Differences in the views of residents and government officials regarding the type and form of delivery of these services suggests that city officials need to pay more careful attention to public opinion for smart city implementation. In their study of rural and remote communities, they find that collaboration is essential for smart city development.

Echoing the need both for supportive national public policies and local policy action 'from within', the research examines the local institutional dimension and how weak local capacity intersects with public policy gaps to compromise the expansion of socio-technical and socio-spatial digital opportunity in Canadian cities. From a public service delivery perspective, more effective public engagement and inclusion practices are needed without which the digitization of local services

[5] Nicole Goodman, Brock University and Zac Spicer, University of Toronto.

may have dire consequences for those without the necessary digital literacy or access to technology.

Along with improved transparency, outreach, and consultation with residents about 'smart city' developments, better "connecting the unconnected" to digital technologies involves improving access to broadband, building digital skills in low income communities, and implementing procurement programs for secure data collection and storage. Yet consistent with the other studies, we find that weak municipal capacity to regulate the privacy, data governance and the intellectual property rights challenges that accompany 'smart city' developments suggest the pressing need for a "national data governance framework" to govern privacy and intellectual property.

Weak local capacity intersects with public policy gaps to compromise the expansion of socio-technical and socio-spatial digital opportunity in Canadian cities.

III. KEY TAKEAWAYS: Digital Inclusion & Intelligent Communities

CDO researchers have identified the challenges and opportunities associated with the search for digital inclusion, a top priority of the Government of Canada, with digital inclusion and intelligent communities, emerging as two of the greatest opportunities of the 21st century. Digital innovation, which presents a variety of challenges, is absolutely key to the pursuit of inclusive economic growth. However, there are many groups being disadvantaged or marginalized by the pace and nature of innovation. These include workers being pushed into unemployment by technological change, whole regions (like the Canadian North and rural areas) that are being left behind, groups of people (Indigenous peoples, the disabled), and marginalized peoples within otherwise prosperous communities or regions. We summarize here the 'key takeaways' from this aspect of the research.

Is there a digital divide in Canada? The answer is clearly yes, but Theme IV researchers recognize the need to provide better definitions and to explain the concepts so that benchmarking and proper evaluations can be undertaken.

How are the benefits and opportunities shared? At present, the sharing is decidedly uneven. Evidence is growing that the world is shifting toward greater inequality. This could well be the unwelcome hallmark of the digital revolution.

Is there a Canadian model for digitally-enabled communities, of all sizes? The answer, at present, is no, but the intelligent communities movement has potential. At the same time, Canadian efforts lag well behind smart city installations in other parts of the world. Canada needs

to improve its efforts, without ignoring the special needs and interests of small towns, rural areas and Indigenous peoples.

Can CDO play a significant role in educating Canadians about the national benefits of technological change? At present, the high-tech sector is seen as an urban phenomenon, largely tied to a few cities (Toronto, Vancouver and Montreal). It vital that Canadians see the growth of the high technology industry in selected cities as being in the national interest and contributing, through tax revenues, investment, and related developments, to national prosperity and the redistribution of wealth and opportunity across Canada.

Is more to be learned from comparative research in other countries? There is a strong appreciation for the value of carefully constructed and realistic case studies and comparatives. Canada does well in some aspects of the digital revolution but lags well behind competitive nations in East Asia and Europe in many regards. In terms of digital inclusion, there is much to be learned by comparing Canadian developments to those in Scandinavia and other parts of Europe. Intelligent/smart community initiatives in Japan and South Korea, as well as Taiwan, Hong Kong, Malaysia and Singapore show what may be possible.

What are the key policy areas that will promote digital inclusion and the growth of intelligent communities? There are many fields of endeavour that could contribute substantially to improvements in the Theme IV target areas. These include:

- Education and training, with an expanded focus on polytechnics and colleges (and less of an assumption that universities are key to success);
- National standards for digital infrastructure are urgently required. The obviously crucial Internet quality and costs warrant the provision of uniform standards across Canada.
- Inclusive strategies require clear and careful attention. At present, the country is lurching toward greater inequality. Canada needs carefully developed context-sensitive strategies that address places and specific groups and target populations. These must be informed by a careful examination of existing inequalities, local capacities, and the uneven urban manifestations of technological innovation.
- Greater investment in digital infrastructure for rural and remote communities and greater focus on aligning the implementation of smart city/intelligent community strategies with the objectives of citizens will create multiple opportunities to use the new public spending on digital technology, including software and services, to create procurement opportunities for Canadian SMEs that are scaling up and to allow them to demonstrate the effectiveness of their products and services on a domestic platform to increase their export opportunities in global markets. Implementation of this recommendation will allow for a closer alignment of the goals of our digital inclusion theme with recommendations arising from the other three themes of the CDO project.

IV. NEXT STEPS for Research and Policy

(A) Future Research

CDO Theme IV members discussed several conceptual and theoretical issues important to the consolidation of a coherent and connected research program. Four such issues are perhaps most salient moving forward.

1. **Definitional**: The meaning of "inclusive innovation" remains contested in both the scholarly and applied policy literatures. It is important for CDO Theme IV members to bear in mind distinctions between "inclusive growth" (a potentially broad and encompassing project) and "inclusive innovation" (linked more tightly to the CDO digital agenda). An 'open' definition of inclusive innovation based on the OECD's work was shared at the Theme IV breakout discussion as a possible frame: "An inclusive innovation system is an innovation system in which opportunities to participate in innovation are broadly available to all and the dividends of innovation are broadly shared by all".

2. **Theoretical**: The conceptual/methodological challenges in understanding the causes and consequences of the digital divide are substantial, and the empirical research underpinning evidence-based policy recommendations remains 'work in progress'. A possible analytical framework to help structure future research and integrate findings could be:

    - Drivers of Innovation (eg. knowledge, networks, proximity)
    - Mechanisms in Exclusion (eg. access, opportunity, distance)
    - Interventions for Inclusion (eg. policy, practices, partnerships)

3. **Case Studies**: It was proposed that existing and emerging CDO Theme IV case study research could bring into focus the opportunities and challenges in "inclusive innovation" as the digital economy and its societal implications play-out in different cities and communities across Canada. It was emphasized that individual CDO Theme IV researchers are well advanced in numerous such case studies (eg. Indigenous community infrastructure investments, ordinary city workforce development/ecosystems, Smart/Intelligent cities, Gig and Platform urban economies) and that further sharing, comparing, and integrating of results in the project's final year would be valuable. Such dialogue could range across each of the governance, planning, and policy implications of the individual case study findings. It was also noted that such focused case studies could bring together the insights of academics, industry partners, and community representatives in creating digital opportunity through inclusive processes and outcomes.

4. **National Policy Framework**: While it was agreed that the evidence base for specific policy recommendations was still not yet settled in Theme IV, there was consensus that the digital economy issues of exclusion and opportunity demand a multi-faceted public policy response joining together the resources/expertise/networks of all levels of government in Canada and community-based stakeholders. In the language of urban and community development, public policies would need to create digital opportunity for both 'people and places'. To this end, it was suggested that a robust public policy strategy for inclusive innovation could be structured around three main types of intervention. The resulting framework addresses related targets through specific instruments:

    - Place-based (urban/community development)
    - Rights-based (individual economic opportunity/security)
    - Equity Lens (underrepresented/marginalized outreach focus)

(B) <u>Sharing Knowledge</u>

Theme IV plans to present its findings as follows:

CDO 2019: Members will present the results of their individual research projects.

CDO Theme IV members will seek an audience with federal government officials and potentially provincial government officials, coordinated by CDO partners.

Based on researcher availability, CDO Theme IV could prepare four collaboratively written (each with a lead author) papers. The projects will be presented in an accessible, policy-focused format and/or in scholarly paper(s) that are rooted in the literature and reflect the methodological innovations and insights that have emerged from Theme IV research. The four writing projects could include:

- **National Agenda for Digital Inclusion**
- **National Agenda on Intelligent Communities/Smart Communities**
- **Collaborative academic paper on digital inclusiveness**, capitalizing on the case studies and insights assembled by Theme IV members over the course of the CDO project.
- **Future Research Agenda for Digital Inclusion**, designed to highlight research gaps and opportunities, particularly those associated with policy signaling and urgent issues.