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REGIONAL ENTREPRENEURIAL MENTORING NETWORKS AS TRANSFORMATIVE INNOVATION POLICY: INSIGHTS FROM A SEMI-PERIPHERAL HIGH TECH HUB

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Abstract

This chapter discusses how regional entrepreneurial mentoring networks (REMNs) can play a transformative role in fostering and shaping entrepreneurial ecosystems. Focusing on Waterloo, Canada, a low-density outlier in high-technology markets, we explain how the region developed a widely distributed REMN. Second, we illustrate how this mentoring network enabled Waterloo-based actors to circumvent both geographical constraints and suboptimal national institutions by legitimizing high-technology entrepreneurship and diffusing advice about how to cope with these disadvantages. More specifically, mentoring encouraged aspiring entrepreneurs to target diverse business-to-business niches, enabling the region to compete in a surprisingly diverse array of high-technology markets. At the same time, this distinctive pattern of civic capital was poorly positioned to disrupt national barriers to high-technology entrepreneurship. Indeed, the emphasis on niching risks reifying those constraints. In addition to reducing the demand for reform, niching makes it harder to build coalitions and concentrate resources. In the long run, these relatively weak ties are also unlikely to generate the soft or hard infrastructure necessary to achieve social and environmental sustainability.

The concept of civic capital, or regionally grounded formal and informal networks that connect individuals and associations around a common vision for the community (Nelles and Wolfe 2022), has received increasing attention in recent years. In addition to being conceptualized as a source of local resilience (Telford 2022), a growing body of literature has also recognized the transformative potential of civic capital (Gartzou-Katsouyanni 2023; Safford 2009; Saxenian 1994; Storper *et al.* 2015). The most recent research has disaggregated the concept, distinguishing among different types of civic capital, each with distinct implications for regional development (Cicci and Ornston 2024; Creutzberg *et al.* 2024). This chapter examines how regional entrepreneurial mentoring networks (REMNs) shape economic restructuring and the construction of entrepreneurial ecosystems in particular. Typically analyzed within individual organizations, we examine mentoring networks on a regional scale, illustrating when and how regions connect seasoned entrepreneurs and younger founders to one another and the consequences of these dense, widely distributed networks.

To do so, we focus on the rise of high-technology entrepreneurship in Waterloo, Canada. Canadian high-technology aspirations, to the extent that they exist, have been frustrated by a legacy of natural resource dependence and branch plant manufacturing (Nicholson 2016), fragmented national associational governance (Atkinson and Coleman 1989), and laissez-faire innovation policy (Smardon 2014; Southin 2022). In this inhospitable environment (Breznitz 2021; Denney *et al.* 2023), high-technology entrepreneurship has often had to rely on regional or *civic* capital to increase connectivity, build a common identity, and invest in public goods (Creutzberg *et al.* 2024). After distinguishing mentoring from other forms of civic capital in section one, we use Waterloo and two contrasting cases (Ottawa and Toronto) to trace the origins, impact, and limitations of REMNs. In section two, we argue that REMNs are more likely to

emerge when entrepreneurs lead the process of civic capital formation. In section three, we illustrate how mentoring not only legitimized high-technology entrepreneurship and diffused generic knowledge within Waterloo, but also taught local entrepreneurs how to circumvent national, institutional constraints, most notably by specializing in highly technical, business-to-business niches. Section four explores the limitations of REMNs, including the Waterloo region's struggles to invest in more expensive or specialized collective goods as well as its failure to transform the national institutions that constrain Canadian high-technology firms. Section five concludes by exploring the implications for transformative innovation policy, with particular attention to less developed regions and environmental sustainability initiatives.

Regional Entrepreneurial Mentoring Networks: A Comparative Perspective

Canada provides a useful setting to study the impact of civic capital, especially as it relates to high-technology entrepreneurship. For over a century, the country's economy has been dominated by natural resource extraction, the manufacturing operations of foreign subsidiaries, and non-tradable, often oligopolistic, Canadian-owned firms (Atkinson and Coleman 1989; Smardon 2014). In addition to risk-averse financial institutions and a dearth of complementary service industries, laissez-faire provincial and national innovation policies have prioritized investments in basic human capital and R&D in ways that advantage large firms in established industries (Denney *et al.* 2023; Scharf 2022; Smardon 2014; Southin 2022). Any regional "change agents" (Grillitsch and Sotarauta 2020) seeking to challenge this "low-innovation equilibrium" (Nicholson 2016) by creating new developmental paths (Hassink *et al.* 2019; Tödtling and Trippl 2013) confront formidable obstacles. In contrast to collective action in other countries (Ornston 2012; Rothstein 2022), efforts to challenge Canadian, national-level

constraints have been consistently undermined by weak and fragmented national-level associational governance (Atkinson and Coleman 1989). These challenges are even more acute in less populous regions, which suffer from a scarcity of financial and human capital (Berkes and Gaetani 2020; Caragliu *et al.* 2016; Ornston 2021).

As a result, a growing body of Canadian scholarship (Cohendet *et al.* 2018; Creutzberg *et al.* 2019; Denney *et al.* 2021; Nelles 2014; Ornston 2021; Spigel 2017) has attributed the recent uptick in high-technology entrepreneurship to civic capital: the regionally bounded formal and informal networks that connect individuals and associations (Nelles and Wolfe 2022).[1] These networks perform three broad functions (Cicci and Ornston 2024). First, civic capital increases connectivity within the region, linking high-technology entrepreneurs to financial capital, advanced users, public programming and the wide range of complementary service providers that constitute an entrepreneurial ecosystem (Conteh 2020; Mason and Brown 2014; Wurth *et al.* 2022). Second, civic capital can facilitate investment in relevant public goods ranging from co-working space to collective investments in specialized education and R&D (Dalum *et al.* 2005; Farole *et al.* 2011; Sabel 1993). Finally, civic capital can foster a common identity or regional zeitgeist (Storper *et al.* 2015; Walshok and Shragge 2014), that not only shapes local behaviour, but also makes it easier to attract external resources, including public funding, private investment, and human capital (Anholt 2006; Ornston 2021).

The specific structure of civic capital varies widely across regions, complicating efforts to generalize its properties (Creutzberg *et al.* 2024). Toronto, Canada's largest city and financial capital (Bourne *et al.* 2011: 236), is characterized by relatively broad but weak ties within and

[1] This perspective also sheds light on the marked decline in high-technology entrepreneurship following associational breakdown in early 2000s Ottawa (Ornston and Camargo 2024; Spigel 2011) as well as the relative paucity of high-technology entrepreneurship in regions with excellent universities but lower levels of civic capital such as London (Bradford 2016) and Kingston (Donald and Hall 2016).

across its numerous associations, accelerators, and incubators (Cicci and Ornston 2024; Denney *et al.* 2021). Like other large cities with abundant financial and human capital (Storper *et al.* 2015: 177), these transversal ties have supported "cross-sectoral buzz" (Storper and Venables 2004), integrating high-technology entrepreneurs within different industry verticals and developing novel connections among them (Bramwell and Wolfe 2016; Denney *et al.* 2021). As a result, Toronto now boasts the largest entrepreneurial ecosystem in Canada, albeit one that has a harder time scaling enterprises than its American counterparts (Denney *et al.* 2021, 2023). While effective in overcoming the fragmentation characteristic of large metropolitan areas, this pattern of cross-sectoral connectivity is not particularly relevant for smaller, less diversified, capital-constrained cities (Asheim *et al.* 2016).

Here, we are more likely to observe deeper and narrower connections, organized around task-specific cooperation in research, skills development, or standard setting. Historically associated with mature industrial regions (Tödtling and Trippl 2004), Canadian case studies suggest that this "organizationally thick and specialized" (Trippl *et al.* 2018: 69) civic capital can also support movement into specific, high-technology markets by pooling capital and expertise (Cohendet *et al.* 2018; Creutzberg *et al.* 2024). In Ottawa, for example, early associational efforts such as Ottawa-Carleton Research Institute (OCRI, later renamed the Ottawa Centre for Research and Innovation and then reorganized as Invest Ottawa), mobilized private and public resources around the Ottawa-Carleton Centre for Communications Research, a focused ion beam facility, the Telecommunications Research Institute of Ontario, the Optical Processing and Computing Consortium of Canada, and a wide range of educational initiatives (Caughey 1984: 5; Cicci *et al.* 2023: 28–29; Julie 2016: 5; Niosi and Bergeron 1995: 55).[2] These projects enabled

[2] Invest Ottawa continues to specialize in task-specific cooperation as evidenced by its role in telecommunication and Internet of Things testbeds such as CENGN, ENCQOR, and Area XO (Creutzberg *et al.* 2024: 9; Haley *et al.* 2017).

Ottawa, a mid-sized region with a metropolitan population of roughly one million, to assume a deep albeit narrow position in the telecommunications industry.

In contrast to the cross-sectoral buzz or task-specific cooperation above, this chapter examines regional entrepreneurial mentoring networks (REMNs) as a distinct form of civic capital. Below, we argue that REMNs are more likely to emerge when entrepreneurs play a central role in constructing civic capital and are less common when they are marginalized from local associational governance (Cicci and Ornston 2024). There is extensive literature on mentoring, or the informal transmission of professionally relevant knowledge, social capital, and psychosocial support within voluntary long-term relationships (Bozeman and Feeney 2007: 731; McKevitt and Marshall 2015: 264), most notably within a single organization, such as a company or an incubator (Breznitz and Zhang 2019; Tötterman and Sten 2005). Initially focused on vertical ties between more established and junior colleagues (Kram 1985; Levinson 1978), there has been growing recognition of more lateral mentoring relationships (Kubberød *et al.* 2018) between coworkers (Kram and Isabella 1985), corporate teams (Eby 1997), support groups (St-Jean and Audet 2012), and peers (Parker *et al.* 2008). This evolution has coincided with the emergence of studies on *entrepreneurial* mentoring, where founders bilaterally share professional and psychosocial support (McKevitt and Marshall 2015: 264). Indeed, several studies have shown that mentoring programs helped to boost entrepreneurial intentions (Bellò *et al.* 2017), build self-confidence (St-Jean and Tremblay 2020), and lower startup barriers through the exchange of business knowledge (Brodie *et al.* 2017). We argue that REMNs benefit entrepreneurs in semi-peripheral hubs in two critical ways.

First, location-based mentoring networks can transmit critical tacit knowledge in an institutionally inhospitable environment. For example, Spigel (2017) describes how

entrepreneurs use these social networks to access key informational resources to launch their firms. In a Canadian context, large-scale investments in basic human capital and research mean that technical talent is rarely a binding constraint (Creutzberg *et al.* 2024; Nicholson 2016). However, capital scarcity and the dearth of complementary service industries remain a challenge, with successful organizations learning how to adapt to these challenges with clever improvisations (Herrmann 2009; Lange 2009). As this experiential knowledge is context-dependent or "spatially sticky" (Gertler 2004), it is often transmitted through face-to-face interactions among individuals who share trust and social networks (Rosenthal and Strange 2003; Stuetzer *et al.* 2014). To the extent that this occurs through a widely distributed network rather than a single relationship or a single organization, entrepreneurs can draw on a broader repertoire of experiences and strategies.

Second, REMNs possess the power to transform regional attitudes to inspire and legitimize entrepreneurial pursuits. Regional studies have demonstrated how individual perceptions of a region's entrepreneurial opportunities are shaped by their social network and peer interactions (Stuetzer *et al.* 2014). As such, the "regional social legitimacy of entrepreneurship" is a powerful force in influencing individual-level entrepreneurial intentions, particularly in less favourable locales for entrepreneurship (Kibler *et al.* 2014; Stuetzer *et al.* 2014). Mentoring networks can help entrench a region's collective attitudes towards entrepreneurship (Brodie *et al.* 2017) as a socially legitimate career by diffusing local success stories (Kibler *et al.* 2014), celebrating role models (Gibson 2004), and counteracting the stigma surrounding entrepreneurial failure (Staber 2007). This psychosocial support can be particularly important in semi-peripheral regions, where high-technology entrepreneurship has been rare or even actively discouraged.

While REMNs can thus transform regions in a resilient and sustainable fashion, exclusive or heavy reliance on mentoring can also limit adjustment, reifying local and national institutional constraints. First, mentor-inspired improvisations or adaptations to local conditions can undercut momentum for reform by encouraging local firms to specialize in ways that do not conflict with or might even complement suboptimal institutions. Second, REMNs and civic capital, more generally, are poorly positioned to address provincial and federal-level barriers to starting and scaling high-technology enterprises. In fact, strong regional collective identities can actively militate against the types of pan-national cooperation that are necessary for deeply transformative innovation policy (Southin 2022; van Weele *et al.* 2018). Finally, the relatively weak ties associated with mentoring do not alone ensure investment in the more expensive and specialized collective goods which are often necessary to scale enterprises, particularly in smaller, capital-scarce regions (Creutzberg *et al.* 2024). In addition to making it harder to concentrate resources (see below), underinvestment in public goods can hinder other regional goals, such as industrial upgrading (Gartzou-Katsouyanni 2023) or environmental and social sustainability (Nelles 2014).

To illustrate these points, we examine Waterloo, Canada, a region roughly 100 kilometers west of Toronto encompassing three cities (Cambridge, Kitchener, and Waterloo) and just under 650,000 residents (Statistics Canada 2022). A latecomer to high-technology markets, Waterloo is characterized by high levels of civic capital (Nelles 2014), but strikingly low levels of cross-sectoral buzz and task-specific cooperation (Bathelt *et al.* 2011; Creutzberg *et al.* 2024; Munro and Bathelt 2014; Ornston 2021). Collaboration, to the extent that it occurs, revolves principally around widely distributed mentoring networks with many peer-to-peer relationships (Cicci and Ornston 2024; Creutzberg *et al.* 2024; Ornston 2021). As a result, the Waterloo region provides a

unique opportunity to separate the causes and consequences of REMNs from other forms of civic capital. The analysis is based on a series of studies (Cicci and Ornston 2024; Creutzberg *et al.* 2024; Ornston 2021; Ornston and Camargo 2024), which include interviews with academics, politicians, policymakers, entrepreneurs, and other industry representatives in the Waterloo region (W, n = 51) between 2017 and 2021. To sharpen the contrast and increase analytic leverage, we situate Waterloo in a comparative perspective by drawing on secondary literature as well as fieldwork we conducted in Ottawa (O, n = 25) and Toronto (T, n = 37) between 2018 and 2023.

The Origins of Entrepreneurial Mentoring in Waterloo

While the institutional prerequisites for constructing entrepreneurial mentoring networks might be lower than other forms of collective action (Ornston and Schulze-Cleven 2015), the fact that many regions fail to develop a broader culture of mentoring (Spigel 2017) suggests that there is an important role for local leadership (Grillitsch and Sotarauta 2020). Comparative analysis of Waterloo, Toronto, and Ottawa indicates that the type of leadership matters, as local entrepreneurs are both more likely to demand, and are better positioned to introduce a REMN than either incumbent high-technology firms or civic elites. In Waterloo, mentoring networks were launched by local entrepreneurs, institutionalized to connect a wider array of actors and, ultimately, embedded within a regional culture.

While Waterloo has boasted a dense, associational landscape since the late 19th century (Nelles *et al.* 2005: 233), high levels of civic capital only recently extended beyond traditional industries such as agriculture and manufacturing to high-technology startups (Munro and Bathelt 2014: 221). For example, the University of Waterloo, the brainchild of a local rubber executive

and an example of regional cooperation in its own right (Bramwell and Wolfe 2008; Sa and Kretz 2015), was designed to serve local low- and medium-technology manufacturing enterprises. Without a high-technology industry, much less local venture capital or complementary services, the university acquired a reputation as a feeder school for US-based technology firms as enterprising engineers left for Ottawa, Toronto, Seattle, or Silicon Valley (interview W47). For alumni from the 1990s, "entrepreneurship was something you did if you couldn't find a job when you graduated …. It wasn't talked about or celebrated the way it is today" (interview W7).

As a result, local, high-technology entrepreneurs felt "isolated" (interview W43), even following the establishment of Watcom in 1974 and a small cluster of mainly university-based technology spinoffs in the ensuing two decades (Bramwell and Wolfe 2008). One industry veteran characterized Waterloo in the 1990s as "a wonderfully vibrant farming community [with] somewhat long in the tooth textile and automotive assembly areas, as well as a fledgling mathematics and actuarial area because of the insurance companies" (interview W13). In this environment, a founder remarked, "A lot of [entrepreneurs], maybe not all of them, viewed themselves as a bit of a rebel, the grassroots …. We wanted to learn from one another …. Because we had no one else to talk to" (interview W47). The Atlas Group, an informal, monthly support group, filled this need with a rotating host presenting a five- to ten-minute story followed by discussion and collective problem-solving. As an early member described it, "We didn't have a lot of local influences …. We recognized that we were all jetting around, all primarily export, all high R&D, and we never really had a forum to talk to other people in our situation (interview W47).

This club, which extended informal mentoring among University of Waterloo faculty to a wider range of firms (Ornston 2021: 398), was institutionalized as Communitech, an official industry association, in 1998 (Pender 2017: 199). Even though it was explicitly modelled after OCRI (see below), Communitech eschewed task-specific cooperation to focus principally on mentoring. This was partly a function of resource scarcity (interview W47), as Communitech lacked the funding or external connections to launch specialized programming (Cicci and Ornston 2024: 727). But it also reflected the influence of a diverse, entrepreneur-dominated board, which prioritized broad-based, sector-agnostic public goods, even following the rise of local flagship Research in Motion in the early 2000s (Ornston and Camargo 2024: 72–73). As an early employee described it, "Just about the best thing we did at [Communitech] was to move the focus away from [commercialization] towards expertise, EIRs [entrepreneurs-in-residence], and things like that" (Will n.d.). Even after Communitech developed more specialized programming, 15 out of 20 Communitech clients cited mentoring, particularly peer-to-peer mentoring, as an organizational strength (Cicci and Ornston 2024: 728), and these networks featured prominently in interviews with local industry representatives (Ornston 2021; Spigel 2017).

In addition to scaling informal mentoring networks with formal entrepreneurs-in-residence, dedicated peer-to-peer mentoring groups, co-working spaces, and events (Cicci and Ornston 2024: 728–729), Communitech and other regional leaders embedded mentoring into the regional culture by appropriating historical symbols of cooperation such as Mennonite "barn raising" (Bathelt and Spigel 2019; Ornston 2021). In the words of one interview subject, "We're from this Mennonite heritage, [this] whole concept of barn building, we help each other in times of need … Mentoring, let's start there. I'll spend four hours in this place listening, coaching, talking to people. That's my commitment to the community" (interview W19). One high-

technology employee credited Communitech for "creat[ing] a story where you belong, you see how you can contribute to the next wave of whatever might happen, and you feel ownership of [that]" (interview W33).

The celebration of mentoring as a social obligation and point of pride thus extended beyond Communitech to other actors as well. One entrepreneur credited his University of Waterloo economics professor, Larry Smith, a leading influence among student entrepreneurs (Ornston 2021: 399), for encouraging them to "pay it forward" (interview W2). As a result, mentoring has not only been institutionalized in Communitech programming but now extends across the community to the University of Waterloo and individuals not affiliated with either organization (Spigel 2017). As one interviewee described, "The support and assistance that exists for entrepreneurship isn't just found locally [in] an incubator, it's found throughout the community" (interview W7).

The prominence of mentoring in Waterloo is distinctive relative to the civic culture in other Canadian high-technology hubs. In Ottawa, association building preceded Waterloo, but it was spearheaded by large, incumbent, high-technology firms, most notably Nortel (Cicci *et al.* 2023: 28). Neither Nortel, its peers, nor the smaller firms within their sprawling supply chain had any particular interest in the generalized mentoring networks that underpinned civic capital in Waterloo. Larger firms did not need assistance commercializing new innovations, while smaller firms had no trouble finding local customers. As a result, OCRI focused on specialized research, training programs, and physical infrastructure (Cicci *et al.* 2023: 28–29). The weakness of peer-to-peer mentoring was compounded by the absence of co-working space until the creation of Bayview Yards in 2016 (Cicci *et al.* 2023: 30). When mentoring occurred, it was largely limited to the telecommunications industry, and it was not as widely distributed as Waterloo. For

example, in one study, only 25% of Waterloo's entrepreneurs knew their mentors in advance. By contrast, virtually all of Ottawa's founders did (Spigel 2013).

In this respect, civic elites' efforts to increase connectivity in Toronto were only slightly more successful. The largest and most ambitious effort to increase civic capital within Toronto's high-technology sector, the MaRS (Medical and Related Sciences) Discovery District, was launched by Dr. John R. Evans and a coalition of traditional industrialists, bankers, lawyers, and other community leaders. Designed to link government, universities, hospitals, multinational enterprises, startups, and supporting services within a single, centrally located hub, MaRS' formidable resources enabled it to launch a wide range of specialized programming (Cicci and Ornston 2024: 722–723). Whereas only 4 of the 20 Communitech clients interviewed mentioned programming as an organizational strength, 8 of MaRS' 16 clients did (Cicci and Ornston 2024: 722). Although this programming included senior advisors and entrepreneurs-in-residence, the lack of attention to mentoring led to a fragmented culture with few horizontal contacts. Interviewees familiar with both MaRS and Communitech described how MaRS was "big in a bureaucratic way" (W46) and "more difficult to navigate" (interview T15). As one investor framed it,

> You go into MaRS, you see this big atrium … and you get lost, right? I always found people have trouble with MaRS, because you couldn't understand MaRS by going in the front door. You had to sort of know people and work your way from … your own networks to really get with MaRS" (interview W47).

As a result, MaRS clients were more likely to rely on a single individual, typically a senior advisor, for advice (interview T17, T27, T28, T31, T32, T33, and T37). By contrast, peer-to-peer networking was rare, with 5 (out of 16) MaRS clients identifying it as an organizational weakness (Cicci and Ornston 2024: 724).

In this context, it is not surprising that one founder seeking "community" found it at Oneeleven (interview T37), an accelerator whose founders were more closely connected to the entrepreneurial community. The most successful efforts to strengthen and broaden mentoring networks were launched by entrepreneurs at the margins of the business community, not by flagship technology firms, traditional industry, or civic leaders. In Toronto, the organization that most closely resembles Communitech, TechTO, was founded by a pair of former entrepreneurs on a shoestring budget (Denney *et al.* 2021: 202). In Ottawa, OCRI (now Invest Ottawa)'s efforts to strengthen and broaden mentoring networks built on Fresh Founders, an informal support group launched in the mid-2000s by disaffected entrepreneurs, which mirrored the Atlas Group in Waterloo (Cicci *et al.* 2023: 30; Ornston and Camargo 2024: 70). In neither case, however, have entrepreneurial mentoring networks become as central to the organizational or regional identity as in Waterloo. This has had important implications for economic adjustment.

The Transformative Power of Mentoring in Waterloo

Waterloo's dense, widely distributed REMN diffused practical professional advice that was particularly useful for entrepreneurs confronting an environment characterized by weak innovation policies, a shortage of complementary services, and limited risk capital. Navigating a fragmented and ever-shifting innovation policy landscape, with conflicting federal and provincial priorities, was a challenge in its own right (Southin 2022). Communitech, like other designated Regional Innovation Centers (RICs) in the province of Ontario, played an important role in translating these opportunities into accessible language (Conteh 2020). As one high-technology employee remarked,

> One of the first things I did [when I moved here] was to join a peer-to-peer group at Communitech … The thing that struck me was the way the community was open and willing to share with each other. I came in as an outsider and I had people to reach out to with questions. How do I do SRED [Scientific Research and Experimental Development] tax credits? Who is the best person to go to? (Interview W5)

Mentoring also helped entrepreneurs adapt to the dearth of local venture capital and the fact that "marketing, sales, video, and other [services] don't exist here" (interview W6). Senior colleagues and peers advised colleagues on how to secure risk capital from Toronto and other cities (interviews W13 and W14), import human capital from outside the region (interview W5), and co-locate to customers (interview W38) and talent using dual office structures (interview W6). More recently, entrepreneurs have relied on peer-to-peer mentoring to learn about remote work, a promising solution to the challenges above that nonetheless require significant organizational innovation (interview W42).

More importantly, mentors repeatedly encouraged entrepreneurs to focus on highly technical, low-profile niches – as one regional leader characterized it, "hard, boring problems" (interview W41). The decision to focus on technologically complex but obscure business-to-business markets capitalizes on the abundant, high-quality engineering talent in Waterloo and Canada more generally, while limiting its reliance on scarce capital and marketing talent (interview W42). As one mentor described it, "I'm always telling students if you can find a business-to-business niche you're far better off than trying the big consumer plays, because [the latter] take incredible resources" (interview W39). Instead of specializing in a single sector like most smaller regions, Waterloo-based enterprises use a "scrapper" strategy to enter a wide variety of different industry verticals (Creutzberg *et al.* 2024)

Separately, mentoring delivered important psychosocial support (Aly *et al.* 2021; Kibler *et al.* 2014; Kram and Isabella 1985; Ornston 2021; Stuetzer *et al.* 2014) in a region where high-technology entrepreneurship "wasn't talked about or celebrated" (interview W7) in the 1990s. Interviewees repeatedly stressed the importance of "validation" (interview W2) and "role models" (interview W11), with one mentor remarking, "If a [colleague] says 'One of my employees wants to start a company,' I'm like 'Let me be your first investor, give you money, Let me help you and, frankly, I don't care what you're going to do, right?' It's that kind of cooperation and encouragement" (interview W42). As noted above, this supportive environment extended beyond Communitech. One university alumnus remarked, "At the University of Waterloo, you're surrounded by stories of grads who went on to start their own businesses" (interview W2), while another concluded, "If this person can do it, they had the same pedigree, why can't I do it as well?" (interview W38). By elevating what industry representatives in Ottawa and Toronto dismissed as middling successes (interviews O8, T2, and T8) into "rock stars" (W39), entrepreneurial mentoring networks inspired a wave of student-led entrepreneurship in the 2010s.

Collectively, these developments transformed Waterloo into a "low density outlier" in high-technology markets (Ornston 2021: 392). High-technology employment grew by 54% between 2001 and 2016, outpacing Toronto (25%) and Ottawa (-23%) and elevating Waterloo, the tenth most populous metropolitan region, into the top five in measures of high-technology employment concentration (Statistics Canada 2001, 2016). Prior to its amalgamation into the Toronto-Waterloo Innovation Corridor, Waterloo ranked second to Silicon Valley in startup density and was the only region with less than a million residents on Startup Genome's list (Compass 2015: 201; Startup Genome 2015).

Meanwhile, the breadth of Waterloo's REMN, combined with the celebration of "hard, boring problems," irrespective of industry, increased regional resilience, not only to the process of de-industrialization which impacted cities across Canada, but also to disruptive technological shocks (Ornston and Camargo 2024). Giving entrepreneurs the tools (and encouragement) to bootstrap their own development without large-scale grant aid, Silicon Valley-style capital infusions, or dependence on a regional anchor led the region to specialize in a surprisingly diverse array of sectors for a smaller region (Creutzberg *et al.* 2024). This sectoral diversity increased the region's resilience following the collapse of its largest firm, Research in Motion in 2013, which was once responsible for 40% of regional technology employment and over half of ICT sector employment (Ornston and Camargo 2021: 10). Despite RIM laying off almost three-quarters of its workforce, Waterloo's high-technology employment declined by only 2.8% and occupational measures of technology employment actually increased by 11% between 2011 and 2016 (Ornston and Camargo 2021: 9).

Civic capital in Toronto, specifically MaRS, and Ottawa functioned differently. MaRS' reliance on senior advisors and specialized programming enabled some startups to scale very rapidly, connecting them to capital and consumers (interviews T15, T16, T22, T23, T25, T27, T28, T30, T32, T33, and T37). Nonetheless, with a focus on a limited number of industry verticals (Cicci and Ornston 2024: 723), clients' experience tended to be hit-or-miss, determined by compatibility with their advisor (interview T17, T22, T25, T28, and T37). While these narrow and fragmented mentoring networks were not a problem for the city of Toronto as a whole, they proved more problematic in Ottawa, where deep, task-specific cooperation mobilized resources around telecommunications equipment. This pattern of civic capital enabled the region to scale new enterprises in ways that Waterloo and other mid-sized Canadian regions could not by

diffusing specializing technical expertise, inserting firms into local supply chains, and encouraging spinoff companies (Ornston and Camargo 2024: 68–69). The number of high-technology enterprises doubled between 1990 and 2000 (Spigel 2013: 98) and the region ranked first in per capita-adjusted measures of venture capital investment (Florida and King 2015: 13). But it also made the region much more vulnerable to the decline of its anchor firm, Nortel, with high-technology employment contracting sharply in the early 2000s and failing to recover as recently as 2016 (Ornston and Camargo 2024: 69). Fresh Founders, an Atlas Group-like organization, was a direct response to these deficiencies, providing a support network for Shopify and other software firms that did not benefit from OCRI's highly specialized research and educational infrastructure (Creutzberg *et al.* 2024: 557–558; Ornston and Camargo 2024: 70). OCRI, redubbed Invest Ottawa following its merger with the regional economic development agency, has recognized this weakness and placed greater emphasis on mentoring in recent years (Cicci *et al.* 2023: 33–34).

The Limits of Regional Entrepreneurial Mentoring Networks

The contrast with Ottawa illustrates how REMNs may represent a more feasible and sustainable form of civic capital, particularly for regions that do not benefit from big city cross-sectoral "buzz" (Storper and Venables 2004) or robust, institutionalized cooperation. However, as with any regional strategy, there are considerable opportunity costs to prioritizing REMNs over other forms of civic capital. Mentoring may have enabled Waterloo to enter a surprisingly wide array of high-technology markets from hardware to MedTech, increasing regional resilience to disruptive shocks, but the region has struggled to turn startups into scaleups. Waterloo not only lagged behind leading US technology hubs (Denney *et al.* 2023) but also, until recently, even

Toronto and Ottawa in scaleup activity (Cicci and Ornston 2024; Creutzberg *et al.* 2024). Waterloo's struggles in this space reflect three weaknesses: a failure to invest in specialized public goods, the region's limited political clout, and its inability to broaden or deepen its mentoring network.

First, Waterloo has largely failed to foster the deeper, task-specific patterns of cooperation required to support scaling or upmarket movement (Gartzou-Katsouyanni 2023; Hall and Soskice 2001).[3] For example, Communitech never developed the specialized programming which enabled Ottawa to mobilize resources around Nortel, elevating the entire industry within locally integrated supply chains. While a source of resilience to anchor decline (Ornston and Camargo 2024), larger firms have a tendency to outgrow the local ecosystem, contributing to local mentoring networks in the spirit of social solidarity, but deriving few benefits (interviews W2, W32). As one scaleup explained,

> I'm not learning as much from [another local firm]. We used to have the commonality of a large addressable market in the public sector. When you're starting some of those early, high level tips [are useful]. But we're in the business of [identifies niche] right now … That's pretty specific. So, then you start looking and saying, "Do I start relating more to someone because they're in proximity to me? Is proximity a valuable asset?" (interview W48).

In fact, scaling firms are not only less likely to benefit from REMNs, but their growth can actually become constrained by these networks. Specifically, the same mentoring networks that create "protective space" for young startups can inhibit scaling by reducing labour market churn (Zhang *et al.* 2023). To the extent that mentoring networks trap labour in less productive, smaller

[3] Former RIM co-CEO's Mike Lazaridis' large investments into quantum computing could represent an exception to this trend, but it is too early to assess their impact.

firms, it makes it harder for rapidly growing enterprises to hire local talent (interviews T2, T8, and W48).

Second, the region lacks the political clout to unilaterally disrupt the provincial and national institutions that make it difficult to scale high-technology enterprises, including a fragmented and laissez-faire innovation policy, weak domestic competition, low rates of technology adoption in the private sector, and risk-averse financial institutions (Breznitz 2021; Denney *et al.* 2023; Nicholson 2016; Southin 2022). While the Waterloo region has proven adept at securing more resources from provincial and federal ministries such as Innovation, Science, and Economic Development (ISED) (Ornston 2021: 403–404), it has not increased ISED's share of the federal budget or significantly altered federal innovation programming (Scharf 2022; Southin 2022). Doing so would require broadening its REMN into a pan-national political coalition spanning multiple different provinces.

Third and perhaps most importantly, Waterloo's REMN has inhibited efforts to deepen or broaden civic capital. Communitech's ability to cultivate a diverse array of startups and its accountability to the local entrepreneurial community has made it harder to mobilize resources around strategic sectors or firms (Cicci and Ornston 2024). Meanwhile, regionally bounded networks have reduced interest in pan-provincial or pan-national coalition building. Initiatives such as Canada's Tech Network (formerly the Canadian Digital Media Network), which connected Ontario RICs with incubators and accelerators across Canada, prompted concerns from long-time members that Communitech was losing its identity (interviews W43 and W47). More recent efforts to nationalize the organization have provoked an even stronger backlash (McIntyre 2023). The reluctance to engage in national action may be exacerbated by

specialization in slower growing, technical, business-to-business niches which do not require the kinds of systemic reform that other scaleups are lobbying for (Denney *et al.* 2023).

This is not to suggest that Waterloo's civic capital cannot be deepened or repurposed to advance other objectives. Public funding from the provincial and federal governments has enabled Communitech to address regional bottlenecks from transportation infrastructure to access to international talent (Ornston 2021: 403–404). Communitech also used regional civic capital to tackle social problems ranging from the shortage of primary care physicians (Ornston and Camargo 2024: 75) to COVID-19 testing and the distribution of personal protective equipment (Cicci and Ornston 2024: 730). But this broadening of Communitech's mandate beyond mentoring to social cohesion was not universally embraced (interviews W43 and W47), and other scholars worry that Communitech's growing stature within the region has crowded out other, more inclusive forms of civic capital (Nelles 2014: 105). There are, therefore, clear limits to the transformative power of REMNs.

Conclusion

This chapter introduced REMNs as a distinct form of civic capital in entrepreneurial ecosystems. The Waterloo case suggests that these networks can be particularly useful in communities with unsupportive framework conditions, diffusing a decentralized body of knowledge about how to navigate complex and poorly coordinated policies, adapt to a scarcity of capital and talent, and circumvent institutional constraints (Herrmann 2009; Lange 2009). Indeed, while limited in their ability to promote scaling in Waterloo, REMNs were crucial in accelerating the early-stage development of its entrepreneurial ecosystem.

By gathering and diffusing the tacit knowledge held by otherwise disparate actors, we hypothesize that REMNs could be an appropriate strategy for building entrepreneurial ecosystems in peripheral areas that lack sophisticated institutional and infrastructural support (Xu and Dobson 2019). For example, Galvão et al. demonstrated that a rural entrepreneurial mentoring program in Northern Portugal led to a significant increase in startup activity, catalyzing the development of a rural entrepreneurial ecosystem by creating relationships between local actors in higher education institutions, business associations and local development agencies (Galvão *et al.* 2020). Compared to other types of civic capital like task-specific cooperation, REMNs have demonstrated flexibility in the face of changing economic conditions, including disruptive technological change, shifting political priorities, and waning fiscal support (Conteh 2020). For instance, when traditional patterns of inter-firm coordination amplified the impact of Nokia's decline (Ornston 2020) and threw Finnish innovation policy into a "state of confusion" (Laasonen *et al.* 2020: 8), REMNs represented an important source of resilience. Organizations such as the Aalto Entrepreneurship Society eschewed traditional private-public and inter-firm partnerships to develop mentoring networks among students and alumni (Graham 2014; Ornston 2018: 99). This decentralized search and information sharing process seeded a surge in startup activity in the 2010s, the reinvention of the Finnish tech sector, and a reorientation of its innovation policy (Ornston 2018: 100).

This adaptability has important implications for transformative innovation policy, particularly as it relates to environmental sustainability. Here, the role of REMNs in helping transform attitudes towards high-technology entrepreneurship in Waterloo should not be underestimated. There is a substantial body of literature on how green transitions are often constrained by entrenched psychosocial (Hoffman and Henn 2008) and cultural attitudes

(Sovacool and Griffiths 2020) to environmental sustainability. With a focus on organizing intimate yet informal interactions between diverse actors across industries and sectors, REMNs are uniquely positioned to build the critical mass needed to shift local attitudes to overcome these barriers. For example, in Ontario, RICs, most notably MaRS, have sought to foster connectivity, including via mentoring relationships, within clean technology and social entrepreneurship. Christof Brandtner's study of US cities suggests that higher levels of civic capital can facilitate the diffusion of new, sustainable construction practices from pioneering non-profit organizations to public and private sector actors (Brandtner 2022).

We should not overstate the capacity of US municipalities, or regional mentoring networks, to achieve transformative national outcomes. Waterloo's REMN was more effective at creating "protective space" (Smith and Raven 2012) from suboptimal national framework conditions than advancing systemic reform (Breznitz 2021). To the extent that decarbonization is even more economically disruptive and politically contentious than high-technology entrepreneurship, "regime disruption" will be even more challenging, requiring robust, compensatory mechanisms which REMNs cannot deliver (Aklin and Mildenberger 2020; Meckling *et al.* 2022; Meckling and Nahm 2022). REMNs are more likely to catalyze transformative change when they lead to national coalition building and policy advocacy (Ornston and Schulze-Cleven 2015; Seidl 2023; Wilder *et al.* 2024). The circumstances under which actors "upscale" associational governance from the local community to the national level, however, remains understudied (Ornston and Southin 2025). To better understand the capacity of REMNs to deliver transformative change, scholars should devote greater attention to the interplay between regional mentoring networks and the national context in which they operate.

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