THE NEXT WAVE OF INNOVATION DISTRICTS

By Bruce Katz and Julie Wagner

It has been ten years since we released *The Rise of Innovation Districts* and boldly declared that the spatial geography of innovation was shifting in the world towards innovation districts. Our observation was that monoculture science and research parks were no longer aligned with the nature of modern innovation. Rather, innovation districts, which concentrate in small (mostly urban) geographies a broad mix of academic institutions, corporations, researchers, startups, skills providers, and entrepreneurial support entities, were better suited to advance creativity and collaboration by leveraging physical proximity, accessibility, walkability and density.

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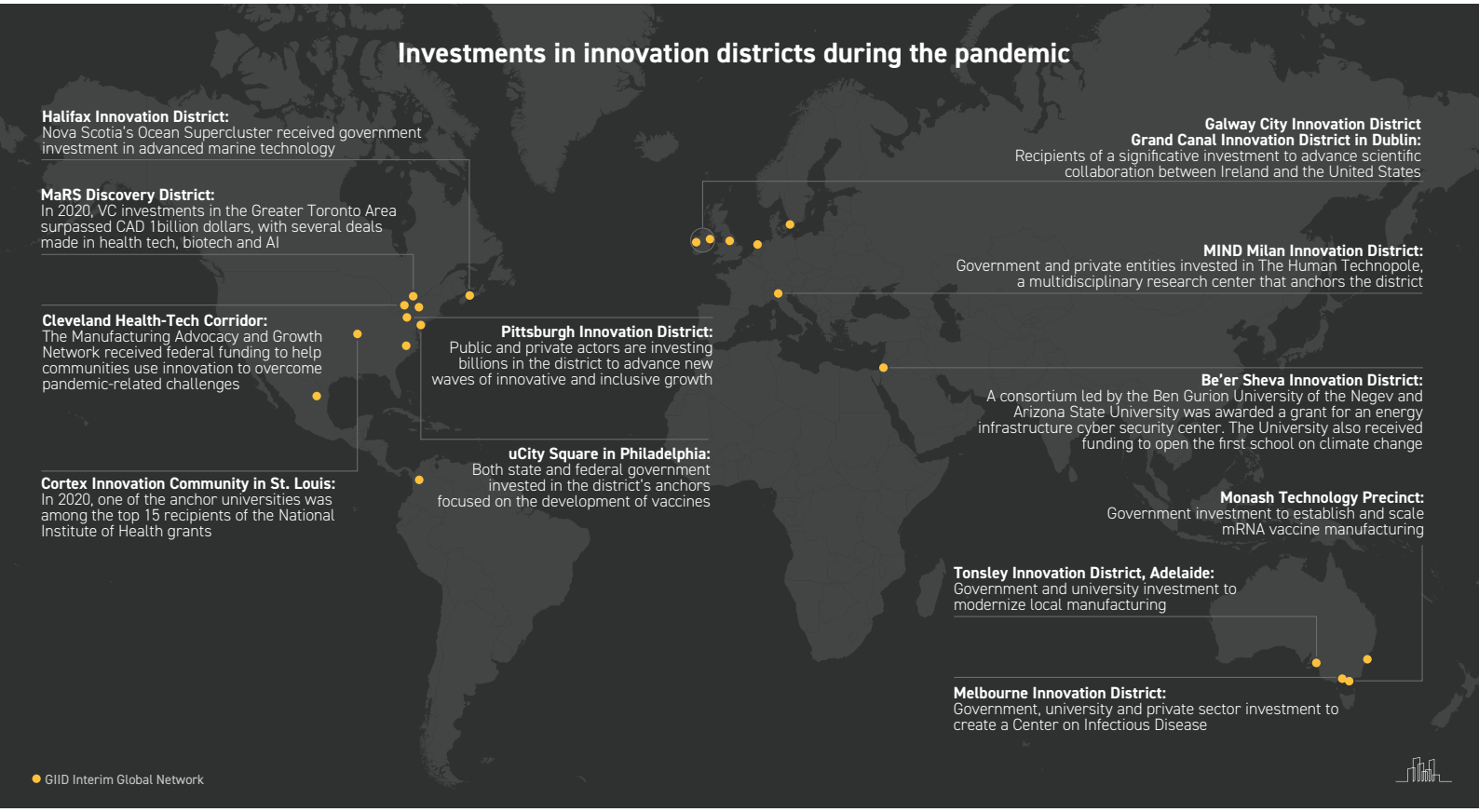
A decade later, the rise of innovation districts has proven to be a powerful market phenomenon rather than, as some claimed, a clever marketing or land development ploy. The release of the paper spurred tremendous interest from nearly all regions across the world and galvanized a group of researchers and practitioners to establish The Global Institute on Innovation Districts (GIID), a global reaching not for profit. Today, our analysis reveals there are over 150 districts emerging and evolving worldwide, pursuing ambitious agendas to become multipliers of growth, unlocking unique R&D and place-based assets.

Unlike many office districts, innovation districts have survived the pandemic's acceleration of remote work. Inventors in many

sectors of the economy need access to technologically complex and expensive equipment and infrastructure, which is impossible to reconstruct in the proverbial garage of start-ups. As GIID research has shown, while some districts took on new roles during the pandemic—including the local manufacturing of personal protective equipment (PPE), widescale deployment of testing and vaccines and the pioneering of new health solutions—the hubs that took a hit in occupancy rebounded quite fast. Many district leaders observed how anchor institutions helped undergird and secure their position when downtowns and other areas faced significant market loss.

Investment has also not waned in these places. During the height of COVID-19, our analysis demonstrates how funding for health-related research activities, including new translational facilities, manufacturing and production sites, spiked in many districts.



Source: GIID analysis of media outlets, government agencies and research organizations reports, 2021

In our view, the past decade and the pandemic itself have just been a prelude – a warm up – to what's coming. Large macro forces – the *de-risking* of global relationships, the *decarbonization* of the economy and the need to *diversify talent* – are transforming the role and relevance of innovation districts. These macro forces demand innovation – in technology, in financial products, in regulatory

policies, in business processes, in collaboration between universities, companies, startups, investors, skills providers, governments and adjacent communities. This innovation imperative, in turn, places a high premium on innovation districts where disparate players can come together to invent, test, adapt and prototype a broad range of solutions across multiple dimensions, specialized sectors, and stakeholders.

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As a result, a next wave of innovation districts is beginning to emerge, catalyzed by macro forces and public and private investments. They are shifting from centers of discovery to locales that both discover and deliver. In some cases, existing districts are embracing new partners and initiatives; in other cases, entirely new districts are forming. In this piece, we try to capture the disruptive dynamics at play, showcase examples of the next wave and hypothesize about what it means for policy and practice.

The Context: A Changing World

The heightened premium on innovation districts is the direct result of large, mega forces and unprecedented government, private, and civic investments.

de-risk

How regions are trying to reshore, nearshore, and smartshore in response to highly volatile markets and geo-political tensions

decarbonize

Government, institutional and corporate leaders—albeit unevenly—are **increasing investments in solutions and systems that reduce impacts on the environment**

diversify talent

Cities and regions seek new ways to grow local talent through new kinds of **education and training to become our future workforce**

Heightened geo-political tensions have made the *de-risking* of global relationships – and the reshoring, near shoring and friend shoring of advanced manufacturing and critical technologies – issues of national security. As Alejo Czerwonko, chief investment officer for Latin America at UBS Wealth Management, has noted "Countries and

companies are promoting resilience, security and safety over price and efficiency for the first time in over 30 years."[1]

At the same time, climate change is forcing the *decarbonization* of modern economies and radical changes in how societies design and deliver complex systems. In many countries, for example, climate change is requiring an industrial transformation of monumental proportions – in the electrification of our automobiles, the design, operations and location of our buildings and the generation and transmission of our energy.

These economic shifts are forcing companies to grow and *diversify talent* at an accelerated pace. The shortage of skilled workers is the single greatest impediment to realizing the necessary industrial/ energy transition. The diversification of talent is one of multiple strategies crucial to creating the level of equitable growth needed to offset profound social, racial, and economic inequalities found in many regions worldwide.

These macro forces are reinforced by major public and private investments, which are connecting the dots, in novel ways, between place and innovation.

- In the United States, the USD 280 billion Creating Helpful Incentives to Produce Semiconductors and Science Act of 2022 (CHIPS Act) and the USD 437 billion Inflation Reduction Act seek to, respectively, bolster US competitiveness, innovation, and national security and accelerate the transition to a climate economy. They are driving the reshoring of key industries (e.g., semiconductors), expanding investment in the commercialization of technologies, such as quantum computing, AI, nanotechnology, and clean energy, and stimulating the expansion of regional high-tech hubs.
- Similarly, NextGenerationEU, the European Union's EUR 807 billion recovery plan, together with the European Chips Act, which starts at EUR 43 billion and aims to strengthen Europe's competitiveness and resilience in semiconductor technologies, define a blueprint to make Europe the first climate-neutral continent by 2050.
- In Australia, a AUD 15 billion National Reconstruction Fund seeks to invest in strategic parts of the economy such as clean energy, advanced manufacturing, and critical technologies.

A more belligerent world is also having an immediate effect on defense spending. As Ed Luce recently wrote in the Financial Times, "The world is moving into a new type of great power rivalry."[2] According to a recent Stockholm International Peace Research Institute report, global military expenditure surged to a record USD 2.4 trillion in 2023. The United States alone spent USD 916 billion,

one-third of the total. As "technology transforms the battlefield," a new crop of companies, firms and investors are starting to occupy a space long dominated by large defense contractors, raising the potential for far-reaching, economy-shaping innovations. At the same time, other areas of government are investing in advanced technologies to spur new competitive advantages in this technology driven age.

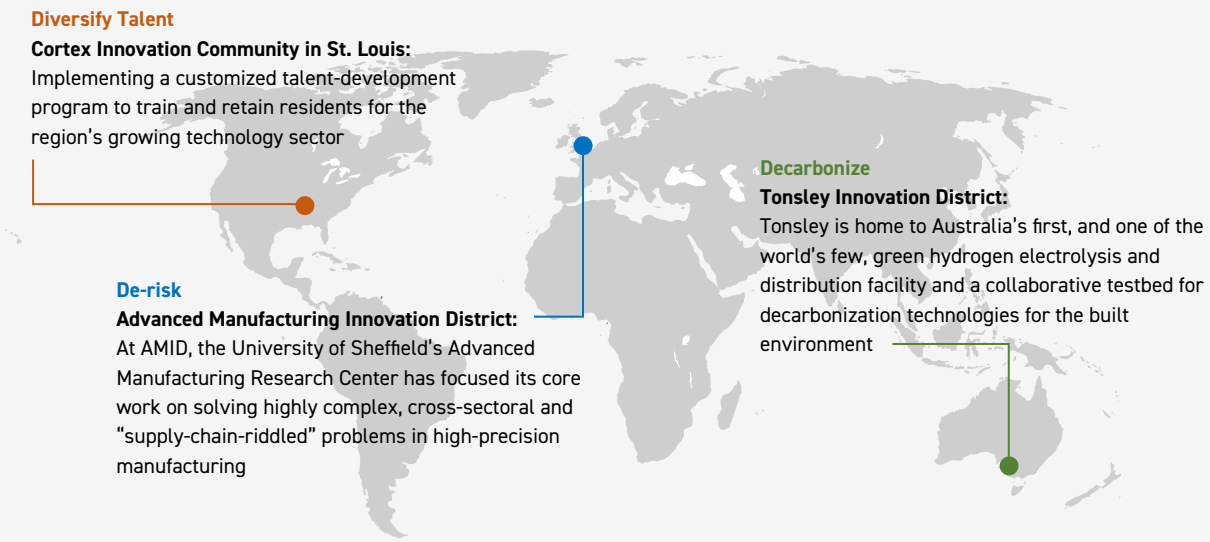
Government investments are being made alongside commitments through heightened partnerships between universities and by major industrial companies. Four major universities in Sydney, for example, conceived the Sydney Quantum Academy to accelerate the state's position in quantum computing. In Detroit, Ford Motor has made the restoration of the historic Michigan Central Station the centerpiece of an innovation district focused on mobility and transportation solutions.

The Response: The Next Wave of Innovation Districts

These macro forces, volatile and fast-moving, demand a new kind of radical innovation, giving innovation districts a new role and relevance. The imperative to innovate across multiple dimensions cannot be met in siloed labs or isolated research parks or by lone researchers or independent companies. Rather, it can only be addressed at scale in places where companies, researchers, universities, investors, skills providers and other supportive entities come together and leverage the physical proximity of talented workers, basic and applied R&D and next generation infrastructure. The strength of innovation districts lies in their ability both to invent and prototype breakthrough technologies as well as solve technological challenges that emerge from the accelerated surge in production and decarbonization. They are also naturally situated to serve as 'Living Labs' for new technologies and approaches that can be scaled to larger areas. Their compact nature facilitates rapid experimentation, efficient implementation, and validation of new strategies. They also foster interdisciplinary collaboration and engagement, essential to tackling the complexity of challenges raised by the drive to de-risk, decarbonize and diversify talent.

Examples of the next wave of innovation districts can be witnessed across the world.

Examples of how innovation districts are responding



De-risking

De-risking requires a tighter link between R&D and production and manufacturing and moves the rationale for action beyond national security into the security of markets

After decades of excessive offshoring and outsourcing, the reshoring of production, military and civilian, is forcing a renewed focus on all aspects of manufacturing excellence – technological problem solving, supply chain management and integrated value chain delivery. All this requires a tighter link between R&D and production and manufacturing and moves the rationale for action beyond national security into the security of markets given transportation and delivery interruptions experienced during the pandemic. For districts, and for other areas within broader regions, the response has been to strategically invest in and build manufacturing capabilities (cGMP, pilot, scaled bioprocessing) closer to, if not within, their own boundaries.

- At the Advanced Manufacturing Innovation District, the University of Sheffield's Advanced Manufacturing Research Center has focused its core work on solving highly complex, cross-sectoral and "supply-chain-riddled" problems in high-precision manufacturing. Their work hinges on close engagement with global-reaching Original Equipment Manufacturers (OEMs) to

resolve challenges facing "no room for error" industries such as aerospace, high-performance cars and machinery, and nuclear power facilities.

- In St. Louis, a broad-based network of companies and institutions are embracing the Sheffield applied R&D model, building an Advanced Manufacturing Innovation Center (AMICSTL) with a mix of federal, state, local and private sources of funding. Partners include Boeing, key universities (e.g., St. Louis University, the University of Missouri at St. Louis), and Greater St. Louis, Inc. (the metro's business leadership organization). Significantly, the new Center is located in the northern part of the City of St. Louis, one of the most disinvested neighborhoods in the United States.
- In the case of Monterrey, Mexico, the market phenomenon of nearshoring has led to a booming economy in industries, particularly those linked to aerospace, automotive, appliances and specific IT capabilities. With the state of Nuevo Leon attracting nearly 10 percent of Mexico's total foreign direct investment between 2016 and 2021, the university, Tec de Monterrey, anchors an emerging district, Innovation District Monterrey, which will include an agenda to inject innovative technologies and processes, such as sustainable manufacturing, smart materials and the capacity to produce materials drawing from waste produced by companies. Increasingly sophisticated and capable value chains within the region seek to reduce both the risk of company re-location and strengthen trade with its closest trading partners. As one observer has noted, the objective is to move from nearshoring to smartshoring—strengthening the value chain in Mexico for entirely new reasons.

De-carbonization

Combatting wicked challenges demand testing and experimentation in real-world environments conducted by individuals who work across sectors and disciplines

Combatting wicked challenges like climate change also requires more than technological fixes. They demand testing and experimentation in real-world environments conducted by individuals who work across sectors and disciplines. Deep empirical research of over 20 innovation districts by GIID surfaced some interesting revelations about their existing and most promising strengths. More than 70% of the innovation districts analyzed, for instance, specialize in fields such as advanced medicine and human health, but the research also identified growing strengths

in disciplines crucial for decarbonization and sustainable growth, such as biochemistry, plant proteins, marine biology, and advanced materials. This diversification shows the districts' potential to lead in the development of sustainable materials, biofuels, and alternative protein sources for food and energy security.

Further, these districts were found to primarily focus on four areas: reducing the carbon footprint through new building materials; developing new energy solutions to power their district or feed into a microgrid; undertaking interdisciplinary R&D focused on climate mitigation and climate adaptation solutions; and supporting clusters of spinoffs and startups focused on climate solutions. A growing number of districts are reinforcing these areas of focus with new technologies, such as digital twins, building sensors and software to track energy consumption and carbon production of buildings and other stationary sources.

- The Tonsley Innovation District is one such example. Located in a former automotive assembly plant, the district has the distinction of being home to Australia's first, and one of the world's few, green hydrogen electrolysis and distribution facility. The district, which comprises a university, vocational and training providers, industry partners and a residential community, is a collaborative testbed for decarbonization technologies for the built environment —delivering a renewable gas blend to hundreds of nearby homes. It focuses on distributed renewable energy (RE) generation, storage and distribution, material circularity, future mobility solutions, and Industry-4.0 manufacturing technologies to demonstrate a sustainable mixed-use environment. Importantly, Tonsley meets at least 60% of its total electricity needs from on-site renewables and is aiming for 100% in coming years.
- Large-scale renewable energy is a distinguishing feature of MIND, the Milan, Italy Innovation District currently being built on the site of the 2015 World Expo. Already home to an innovation ecosystem for companies focused on co-creating discoveries with various centers of excellence in life sciences including the Human Technopole Institute, the Galeazzi Hospital, and the social innovation philanthropy Fondazione Triulza, it will soon include the newly relocated science campus of the Statale University of Milan. Combining ample green and blue public spaces alongside plans for rental housing, retail and fully-electric local transport, this zero-carbon urban regeneration development deploys new technology systems that circulate, share and reuse energy powered only by renewable sources. This smart grid combines with a district-wide heating and cooling network to work like a giant thermal battery that can scale to an entire city. Previously deployed in a smaller innovation district in Lund, Sweden, reducing energy usage there

by nearly 75%, these cost- and energy-savings smart grids provide compelling evidence of the role districts can play in deploying new solutions for energy security.

- In Norway, Oslo Science City reflects the country's competitive edge in renewable energy. With more than 2000 scientists in the fields of climate, energy and the environment, this district is anchored by the University of Oslo and a constellation of research institutes, such as SINTEF, NGI, CICERO, the Norwegian Meteorological Institute and the Institute of Transport Economics. Collectively and individually, these institutions possess unique R&D capabilities across multiple climate dimensions, including solutions which mitigate against excessive drought or excessive water, which is a growing occurrence in cities and regions today. The combination of institutions at Oslo Science City and their affinity for working with company partners has led to novel research that is quickly scaled. Most notable are the capabilities of climate scenarios, building adaptation, and new mitigation strategies that demand expertise in disciplines such as civil and geo engineering, sensors, and complex real-time data analysis. One focus of the district is to leverage Norway's experience and expertise in carbon capture and storage (CCS) and scale up CCS technology at the city level to help Oslo achieve its goal of reducing carbon emissions by 95% by 2030.

In addition to Tonsley, MIND, and Oslo, other districts are leading in other important ways, such as setting aggressive carbon reduction targets that exceed national or city goals. These include the Central Innovation District in the Hague, Monash Technology Precinct in Australia, and PMC in South Korea.

Diversification of talent

The race for talent has drawn regional leaders to seek new solutions for growing local talent to fill the emerging occupations that are tied to advancing regional economic clusters.

Innovation is also necessary to drive social benefits and inclusive outcomes. The new economic order offers many opportunities to grow quality jobs, skilled workers, and local and minority-owned small businesses. The primary challenge found across nearly all advancing and transitioning economies is the lack of qualified and trusted talent. The race for talent has drawn regional leaders to seek new solutions for growing local talent to fill the emerging occupations that are tied to advancing regional economic clusters.

In the last five years alone, districts have increasingly oriented their portfolios to support and advance the growth of highly skilled local talent. This includes districts such as the Medellin Innovation District in Columbia, the Buffalo Niagara Medical Campus in the United States, and Randwick Innovation Precinct in Australia.

One more recent example of diversifying talent can be found in the Cortex Innovation Community in St. Louis. Their story demonstrates how districts can add new portfolios of work to address challenges that have historically limited their overall impact.

Over the past 20 years, the Cortex Innovation Community has transformed 200 acres of largely underused and vacant land into a growing cluster of companies in bioscience and advanced technologies. In 2022, Cortex opted to lead a regional effort to grow and diversify regional talent. Like many cities and regions, St Louis companies are fighting for talent while, at the same time, many local and regional residents remain unemployed or underemployed. In the greater St. Louis metropolitan region over 100,000 residents are underemployed while 7,000 cyber jobs remain vacant. Further, only 11 percent of cyber jobs are filled by black or brown workers in a region where those groups constitute 29 percent of the region's population.

Cortex is now using its convening power and capabilities to raise crucial funds to diversify workers in tech and cyber jobs. As a co-founder of the Global Center for Cybersecurity, Cortex provided crucial access to the region's top Chief Information Security Officers. These top leaders from the region's largest tech companies now help steer and validate initiatives to improve the hiring of regional talent into tech jobs. This has led to an increasingly integrated tech training partnership, which includes a system of connecting companies, workforce training providers, and local support organizations that residents trust—supported with infusions of catalytic funding. While nascent, since 2023, 537 individuals have graduated from the tech training partnerships with 97 graduates hired in tech roles. 75 percent of the graduates are people of color.

Where Now?

A next wave of innovation districts is gaining momentum given the structural changes underway in the global economy. The examples cited above telegraph where existing innovation districts are headed and explain why new districts are forming. The districts highlighted and many others are responding to fast-changing and highly volatile macro forces and the need to *de-risk*, *decarbonize*, and *diversify talent*.

The next wave of innovation districts is distinctive for multiple reasons.

- The sectors leveraging this innovation geography expand way beyond the traditional focus on life sciences to include advanced manufacturing for military and civilian purposes.
- The deeper emphasis on decarbonization is driving the use of basic and applied R&D to invent new clean technology products and solutions as well as organizing energy generation and distribution within the districts themselves to meet crucial carbon targets.
- The stronger emphasis on the diversification of talent includes the upskilling of workers for new production activities and a broader set of systems to drive inclusive innovation to address long-standing inequities.
- The districts are attracting a broader group of stakeholders, including manufacturing companies, utilities, university industrial design and engineering departments and hard tech startups.
- The districts ultimately are looking to engage a wider base of investors given the disparate resources and traditions of capitalization that support defense tech, clean tech, med tech and other favored forms of innovation.

Some regions or states are also seeking ways to connect a constellation of districts and other economic hubs to harness the imperative to innovate accentuated by these and other macro forces. The state of South Australia is one such example. It has prioritized several innovation hubs across this region to foster South Australia's knowledge and innovation ecosystem, as well as identify emerging economic clusters in industry sectors of global competitiveness to advance the broader economy. These districts and economic hubs include the Tonsley Innovation District mentioned earlier; the Edinburgh Defence Precinct, home to over AUD 1 billion in assets linked to military intelligence, surveillance, and reconnaissance; the Osborne Naval Shipyard, which is a state-of-the-art naval shipyard designing and constructing Australia's next-generation nuclear-

powered submarines; and Lot Fourteen, an innovation district which is becoming the central connecting hub for the broader statewide ecosystem with its growing cluster strengths in defense, space, cyber and critical technologies from start-ups to global high-tech corporates.

As Australia exemplifies, there is enormous potential to marry top-down planning and incentives from national/federal and state governments, including departments of defense and departments of industry and science, with the bottom-up organic growth of innovation districts that build on authentic and distinctive industrial assets and competitive advantages. The next wave of innovation districts is in its early formation but will be fast learners from these and other districts that pivot in response to new trends and powerful imperatives.

This article marks the beginning of deeper, more profound and impact-focused work with innovation districts across the world. It signals an intention for GIID to design and deliver an action-oriented agenda in concert with leading manufacturing companies, utilities and investors, national, state and local governments and private and civic practitioners on the front lines of change. The ambition is not just to codify the next wave but to catalyze new forms of funding and financing that enable innovation districts to maximize their problem-solving potential. The world is a complicated place, and it will only become more vexing. Districts will be one rational response—at the hyper-local level—to take on the challenges of our times.

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1 Michael Stott, "Investment boom defies political worries from Mexico to Brazil," *Financial Times*, 8/31/2023
2 Ed Luce, "China and the revenge of geopolitics," *Financial Times*, 7/18/2023