

A wide-angle aerial photograph taken from space at night, showing the Earth's horizon and a vast expanse of city lights glowing through the clouds.

ECONOMIC RECOVERY ACCELERATOR

SPRING 2021

A ROADMAP FOR POST-COVID-19 ECONOMIC
RECOVERY AND RESILIENCE FOR CITIES

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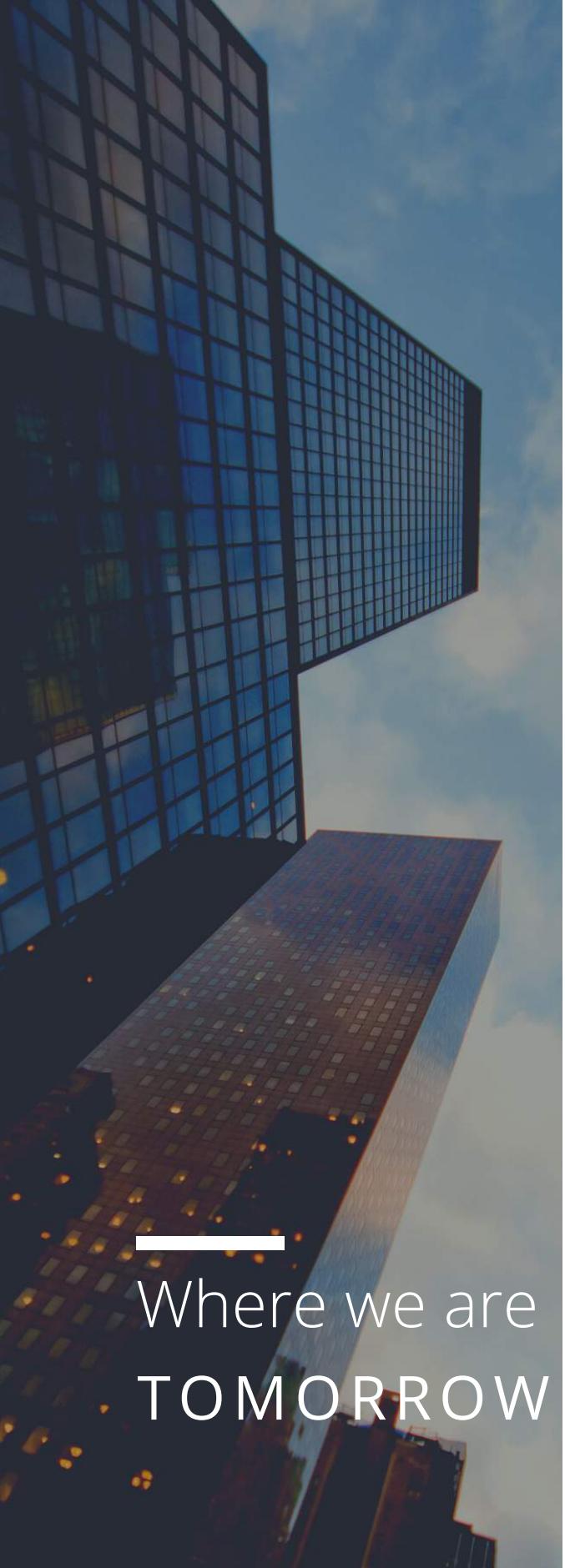
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This report contributes to City78's mission to help advance increased productivity and improved quality of life for all city dwellers. The views expressed, methods conceived, and solutions proffered in this work reflect the views of City78 and are independent of the views of any other organization, business, government, or institution. For questions and requests for further information or clarification, please contact us at connect@city78.org.



City78

Since its founding, City78 has been committed to creating new tools and approaches that empower decision makers by identifying urban needs and developing solutions that realize urban competitive advantage and improved quality of life for all.

Today's cities are faced with new and ever-evolving disruptions that force us to question our understanding of urbanism and the effective management of cities. City78 combines the disciplines of Geographic Information Systems, urban economics, city planning and design, land use policy, and economic development to design tools and solutions built around communities, engaging their cultures, identities, histories, and economies.

We ensure that city data remains a means of mirroring actions and interactions between people and their environment — interactions that shape the core identity of a community, be it large or small. These interactions reflect the nuances and complexities of the lived experience at a granular level, ensuring that human behavior informs the solutions we develop. Through the application of advanced technologies and artificial intelligence, City78 is able to distill and define urban cultures and history, with an ultimate goal of achieving improved quality of life and progressive organic growth.

This research is focused on developing strategies for accelerating economic recovery in response to the COVID-19 pandemic. In the words of Lewis Mumford, which ring true still today, "We are in an age of socially undirected technical advances. An age where mechanical and electronic inventions are exploding at a rapid pace, and in a direction ever further and further away from their human center, and from any rational autonomous human purpose." This is why the work of City78 is important and critical in today's evolving urban landscape, and why we and our partners seek to focus and refocus technological advances on the human center — where outcomes enhance urban economic productivity and increase quality of life for all city residents. The future is undoubtedly urban.

Where we are
TOMORROW

To learn more about City78, visit www.City78.org.

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INTRODUCTION

Cities post-COVID-19

Flexibility and adaptability are core attributes of the human experience. Throughout history, mankind has survived and even thrived through various events ushered in by unanticipated disruptions and unprecedented changes in conventional ways of life. It is therefore no surprise that the same core survival traits are mirrored in one of mankind's greatest creations — the city. Our innate ability to configure and reconfigure the urban realm is fundamental to society's ability to survive and evolve in time and space, through multiple generations and eras, and through natural and man-made disasters, including wars, extreme weather, and pandemics.

Today's cities, however, face an unprecedented challenge from COVID-19, a global health crisis that has been characterized by rapid spread and equally necessary rapid public response. We see how the same forces that drive urbanization and globalization — interconnected systems of seamless transfer of money, goods, services, people, and technology — have now amplified and accelerated the pandemic.

Looking ahead, the question is not if cities will recover from the present circumstances, but rather how they will function and adapt post-COVID-19. The configuration and success of cities will be greatly driven by how quickly they can achieve economic recovery, while at the same time protecting and enhancing neighborhoods where residents can successfully live, work, and play. **As has always been true, and is especially true today, it is essential that cities prioritize efforts to foster knowledge sharing, innovation, and productivity.** A retreat from cities and a departure from the recent advances of urbanization would be a retreat from a greater potential for human ingenuity and creativity, and antithetical to sustainable recovery in a knowledge-driven economy.

In this paper, we outline recommendations and tools that cities, and industries within them, can adopt to speed up economic recovery and limit the negative economic effects of the COVID-19 pandemic, while also securing public health now and in the future.

Elements at risk in today's city

While the COVID-19 pandemic led to a global shutdown of major cities across the world in 2020, the accompanying economic implications are still yet to be fully known and will likely last for several years to come. However, we have seen a number of cities and city-based industries adopt various policies aimed at protecting their workforces and maintain some form of economic activity to the greatest extent possible. This has led to a shift in models, where business, administrative, educational, and commercial processes are now largely driven by virtual communications and interactions. Of course, this is not new; remote and virtual work and telecommuting has been in practice for years. What is new, however, is the increased reliance on such systems.

To what extent this reliance will influence innovation and productivity is yet to be fully understood, but maintaining pre-COVID-19 levels of knowledge sharing and innovation, previously fostered by physical spaces and face-to-face interactions, will be critical for cities and metropolitan areas. The current economic situation calls for the strengthening of already existing systems rather than a total switch to systems with unspecified risk to the quality of knowledge sharing and innovation. Therefore, we at City78 propose an approach that seeks to maintain a balance between virtual and physical interactions, while highlighting at-risk socioeconomic structures that have historically enhanced innovation and knowledge sharing, as well as tools that can be used to preserve them and sustain economic recovery and resilience.

The following sections categorize our analysis for post-COVID-19 economic recovery into three core areas:

- Space & Place
- Elements at Risk in the Built Environment
- Assessing Place Identity: National & Global Rankings



SPACE & PLACE

According to American historian and sociologist Lewis Mumford, the fundamental human need to gather predated the need for a built environment of any kind. The city therefore began as “a meeting place to which people periodically return” (Mumford 1961). Modern architects and planners continue to hold the view that the built environment should be designed as an active response to the ever-evolving needs of its residents. Ultimately, buildings are merely empty shells unless people are there to lend them meaning and context. This meaning and context assigned to place by users cumulatively provides for the creation of cultural identities tied to and driven by place and shared by place makers and users of place (i.e., residents, workers, and visitors).

Place Identity

The development of place identity is a cyclical process: people come to identify with where they live, modify it in ways that meet their interests and needs over time, and are then in turn shaped by the environment they have helped to form. The loss of access to a place that has helped an individual forge place identity is inherently linked to a loss of one’s self identity. Attached to place are strong personal connections, life events, and memories that create a sense of imbalance or loss when access becomes limited, for instance through the restructuring of routines or the reconfiguration of space and its functions.

Places and spaces also play an integral role in facilitating a communal place identity, as they are where social bonds are formed through their ability to gather people with a shared purpose, culture, interest, and language (spoken or intrinsic). This place identity is the result of a shared spatial reality; events or factors that limit access to venues where these social bonds are typically forged inadvertently lead to a decrease in community attachment. **Ultimately, a sense of place and place identity is informed, shaped, and realized by the built environment.**

This sense of place helps communities avoid what Kevin Lynch calls “disorientation” (Lynch 1960). This concept of disorientation is derived from his theory of “imageability” and the product of legible place symbols that enable city dwellers to develop a mental map by recognizing distinct elements in the urban environment that define place. Lynch describes three elements necessary for the formulation of

an environmental image and a mental map: “identity (the recognition of urban elements as separate entities), structure (the relation of urban elements to other objects and to the observer), and meaning (its practical and emotional value to the observer).”

The Economic Effect

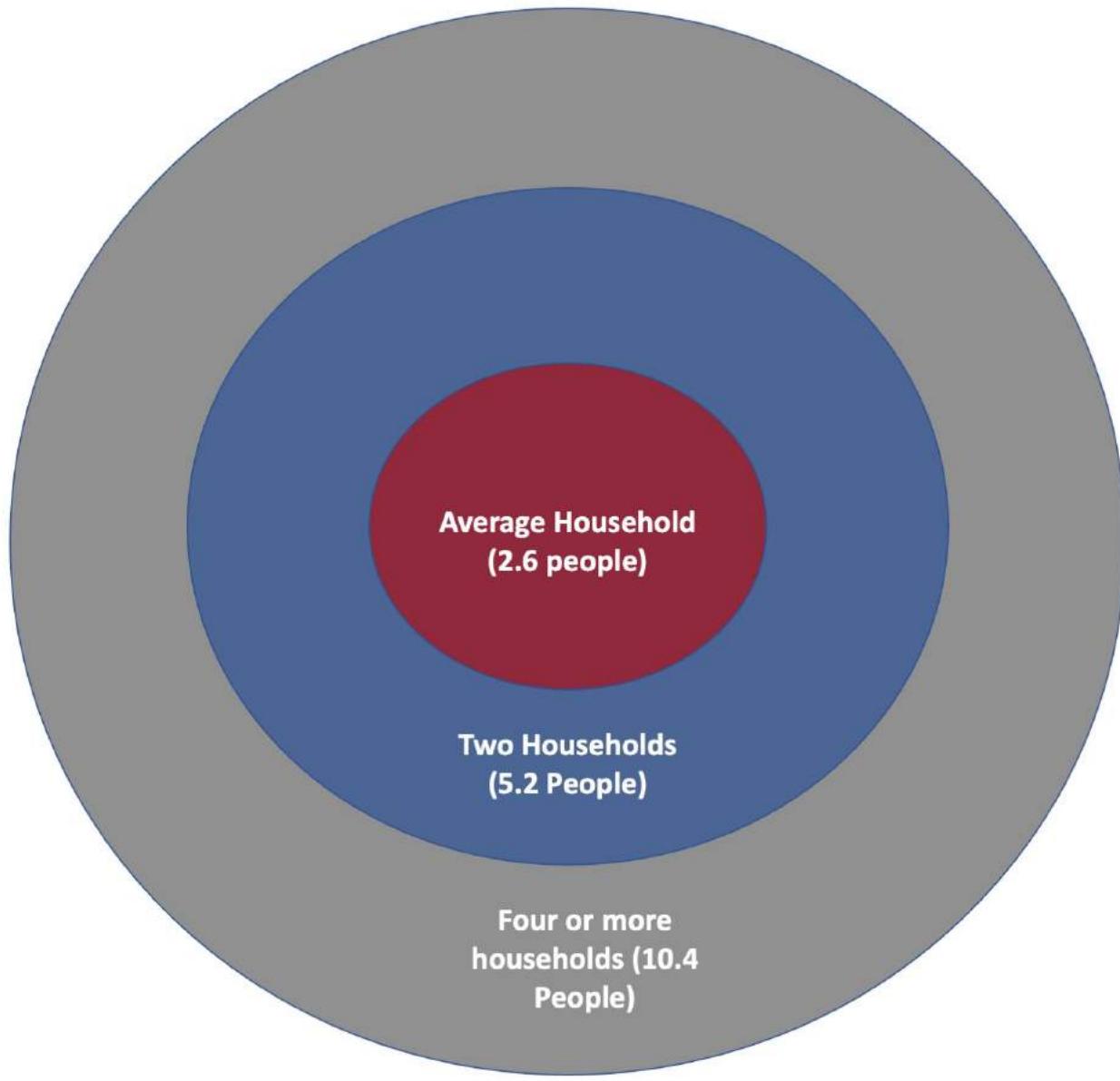
One of the most precise and concise definitions of a city remains that by Daniel T. O’Brien, who describes a city as a “spatial configuration of economic actors” (Daniel T. O’Brien 2018). From this definition, we infer the following additional definitions:

- **Spatial configuration:** Clusters of industries producing similar or complementary products or sharing a skilled workforce.
- **Economic actors:** A skilled workforce involved in knowledge sharing and leading to innovation and constructive problem solving; involved in a variety of associated economic activities.

Economic outcomes are thus anchored in a shared geographic and spatial proximity — determined, maintained, and modulated by the built environment. Therefore, the fragmentation or dispersal of economic actors, and/or limited access to elements of the built environment that they have ascribed meaning to, not only negatively affects the development of social bonds and community attachments, but also chips away at **the fundamental elements that have made cities economically successful for decades, if not centuries: the development of economic clusters and concentration of a skilled workforce, leading to innovation and problem solving** and, ultimately, agglomeration economies.

The interconnection of space — the living and built environment — to the development of innovative, problem-solving industry clusters, and its direct impact on economic growth, is a relationship that cannot be disentangled.

The phenomenon of agglomeration economies itself is a product of the spatial concentration of specialized clusters, powered by a convergence of skilled professionals that leads to knowledge sharing and transfer, and a reduction in the cost of production — together leading to increased productivity and economic growth for both the clusters and the broader economy. While virtual infrastructures are currently helping hold these agglomerations together, longer-term remote environments raise the likely risk of fostering the spatial separation and segregation of economic actors. There may be short-term gains and benefits of people being able to work remotely, and from different locations, but a complete shift to remote work would lead to severe shifts in the economic base of many, if not most, cities.



The Hyper-Localized Community: A COVID-19 Bubble

The hyper-localized community

One of the unintended consequences of the COVID-19 pandemic and its associated lockdowns and restrictions has been the renewed preference for, and reliance on, compact, walkable neighborhoods. With a greater emphasis placed on individual modes of transit, like walking and biking, paired against a decline in the use of public transportation, like buses and light rail, we have seen a remarkable trend toward hyper-localized movement and consumption patterns.

Due to the shift in lifestyles caused by COVID-19, people have replaced farther-flung travel and experiences — to other neighborhoods, cities, states, and countries — with local offerings. This renewed preference for localized living does not only emerge from the perceived comfort of proximity to desired offerings, but also from one's familiarity with a neighborhood — its spaces and places. Here, the **unique place identities of neighborhoods not only become engines of business activation, survival, and retention, but can also serve as the foundation for a gradual, measured expansion of COVID-19 bubbles** — building out from the household core to the trusted, hyper-localized community.

In planning post-COVID-19 economic recovery, the ability to extend personal safety bubbles beyond households into the immediate surrounding neighborhood will support localized economies — powered by a shared perception of trust and safety. This transition will depend on the ability of localities to replicate and maintain the same feeling of safety and health security experienced at the household level, in other public spaces and private establishments. The following measures could help achieve this expansion of personal safety to the public realm:

- **Best practice certifications:** Borrowing from the structures of previous performance certifications such as green building certifications, COVID-19 best practice certifications must aim to combine excellence in habitable space design with an emphasis on ventilation and social distancing measures (such as sanitization, mask wearing, and physical distancing).
- **Digital health credentials:** Currently in their relative infancy and rollout, digital health credentials aimed at monitoring the spread of COVID-19, for instance in the form of a smartphone app, can certify the health status of individuals entering a space — i.e., COVID-negative or vaccinated (once vaccines are widely available and administered).¹ This technology and practice will be especially effective and important when applied to spaces and events involving mass gatherings of people, such as in offices, at sporting events, and at live performances — the gathering economy.

¹ In August 2020, Georgetown University introduced a building badge system designed to grant access to buildings on campus only to those who have been tested and certified as COVID-19 negative. <https://www.georgetown.edu/news/update-on-building-access-procedures>

The hyper-localized workforce

Since the advent of lockdowns put in place due to the COVID-19 pandemic, a significant portion of the global workforce has transitioned to remote work environments and shifted to virtual platforms in order to sustain business processes and provide an alternative to in-person networking and knowledge sharing. As workforces recalibrate to accommodate work-from-home and remote work setups, there are important questions that remain unanswered around the lasting effects of these setups on productivity and innovation across sectors.

COVID-19 fatigue, with regard to social distancing measures, has led to people's increasingly relaxed adherence to public health guidelines and recommendations. But it could also lead to a more permanent shift toward remote work, which will undoubtedly have a tremendous effect on productivity, innovation, and problem solving.

To circumvent possible negative externalities arising from the unprecedented shift of business processes from face-to-face to virtual, we propose a model that minimizes potential risks associated with shared physical office space while preserving important factors related to worker performance, knowledge sharing, and overall output. This model adopts the basics of a hyper-localized community with the following office and workforce-specific iterations:

- **Localization of workforce to shared neighborhood office spaces:** Here workers are given the option of or assigned to workspaces based on their proximity to shared office spaces. These shared spaces could be existing or spaces undergoing adaptive reuse/conversions to shared office spaces.
- **Office leases re-imagined:** Under one proposed leasing scheme, a property manager or building management company could continue to manage a building, including enforcing digital health credentials for all building occupants, but could support higher occupancy rates by offering shorter-term leases to interested office tenants — assuming proper protocols are put in place and uniformly adhered to.

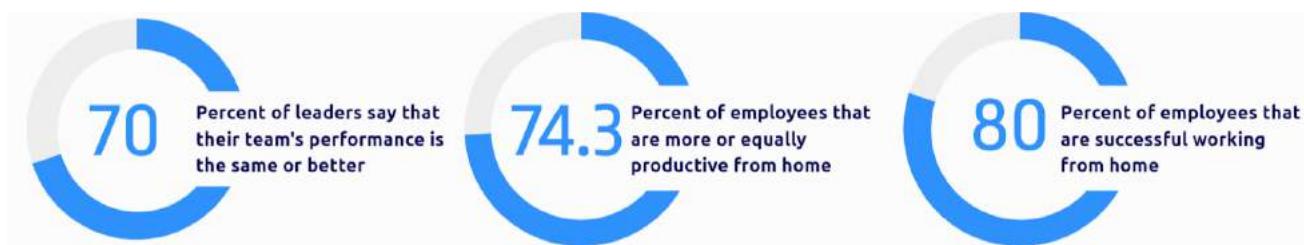
Working from home — the new standard?

To create a roadmap for post-COVID-19 economic recovery, City78 first gathered intelligence about the effects of extended telework status on overarching productivity and innovation. Before the pandemic forced thousands of companies and workers to adopt predominantly virtual processes, remote work, or "telecommuting," was already a growing trend in the U.S. and abroad. According to the U.S. Bureau of Labor Statistics, between 2005 and 2015, the number of U.S. employees who telecommuted increased by 115 percent. This remote work trend was supported by a growing body of research indicating that remote work boasts significant benefits for both employers and employees.

Studies found that companies saw a boost in productivity and were able to save money, while telecommuters improved their job satisfaction and work-life balance.

While the benefits of working remotely were becoming increasingly apparent, the drawbacks of remote work had also revealed themselves before the COVID-19 pandemic hit. In 2019, Buffer's State of Remote Work Report found that telecommuters struggled with unplugging after work, feelings of loneliness, and issues related to collaborating/communication.

Weighing both the benefits and drawbacks, before COVID-19, the consensus on remote work appeared to be extremely positive, but neither the positive or negative impacts of larger scale remote work adoption has ever been explored. Now, in a world of full-time remote work, updated survey data and research provides insights into the current state of working from home and how COVID-19 has shifted our perception of its advantages and disadvantages.



Data from Verizon 2020 Remote Work Survey and Global Workplace Analytics Global Work-from-home Experience Survey

Many of the employer benefits found before the pandemic still ring true. Employee benefits, however, seem to have shifted. While improved flexibility remains a constant, pre-pandemic remote employees reported that work-from-home provided sought-after time with family and work/life balance. Now the biggest benefits reported by remote workers are the lack of commute and not having to dress up for work.

B e n e f i t s o f W o r k - f r o m - h o m e

Pre-COVID-19

Flexible schedule

- (40%)

Working from any location

- (30%)

Time with family

- (14%)

Working from home

- (13%)

Amidst COVID-19

No commute

- (47%)

More flexible schedule

- (43%)

Don't have to dress up

- (33%)

Fewer distractions

- (28%)

Data from Buffer 2019 State of Remote Work Report

Data from Clutch State of Remote Work Survey April 16th 2020

The drawbacks of remote work have also been amplified. Remote employees now report difficulty collaborating with others more frequently than before the pandemic. And with the entire family at home, interruptions and distractions are a greater obstacle.

Challenges of Work-from-home

Pre-COVID-19

Unplugging after work

- (22%)

Loneliness

- (19%)

Collaborating and/or communication

- (17%)

Distractions at home

- (10%)

Data from Buffer 2019 State of Remote Work Report

Amidst COVID-19

Harder to collaborate with co-workers

- (33%)

Interruptions

- (27%)

Harder to stick to a routine

- (26%)

Unplugging after work

- (22%)

Data from Clutch State of Remote Work Survey April 16th 2020

Therefore, in many ways, the consensus remains the same: **remote work has some considerable benefits for both employers and employees, but the benefits are maximized and the consequences minimized when employees work remotely only part time.²**

There is, however, a great deal of information that remains unavailable. Research from before and amidst the pandemic includes little insight into the impact of working from home on problem solving, innovation, and knowledge generation. Additionally, while collaboration is more difficult working from home full time, survey data indicates that virtual collaboration tools are not the issue. So if the tools are not the problem, what is?

While typical office workers were still operating mostly remotely after months of lockdowns, City78 set out to further explore the impacts of remote burnout and whether the benefits and drawbacks of remote work, initially assessed in March and April 2020, still rang true months later. Our Work-From-Home 2020 Survey attempts to fill in the knowledge gaps and understanding related to the wide-scale shift to remote work.³

Through the survey, we sought to gauge respondents' work-from-home experiences to better understand the benefits and challenges surrounding remote work. It was designed as a 10-minute

² For additional discussion on the concept of burnout as it relates to remote work, see City78's article "Burnout and Remote Work." <https://medium.com/city78/burnout-and-remote-work-5f4b6fd6c5a5>

³ City78 Work-From-Home Survey 2020: <http://bit.ly/City78-work-from-home-survey>.

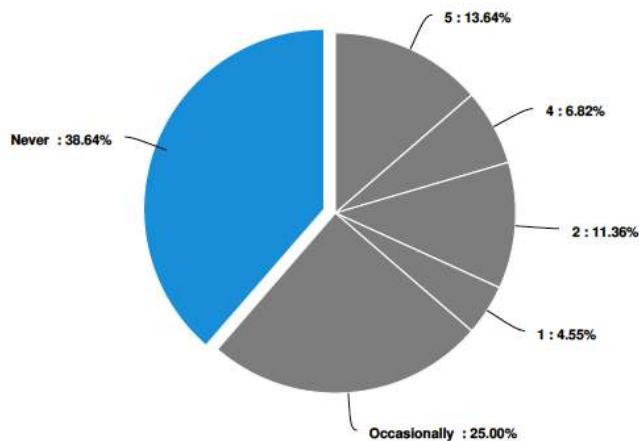
survey, comprising 20 straightforward questions relating to work-related routines and tendencies, both before lockdowns due to COVID-19 and after. Responses were anonymized.⁴

When asked how many days they worked from home before COVID-19 and after, there was a clear reversal from respondents saying they never or occasionally worked from home pre-pandemic (38.6 percent and 25 percent, respectively) to working from home five days a week during the pandemic (75 percent). Work hours also shifted. Since pivoting from mostly in-office work to working from home due to the pandemic, more people reported both starting their days earlier (increasing from 19.6 percent to 29 percent) and later (increasing from 6.5 percent to 15.8 percent).

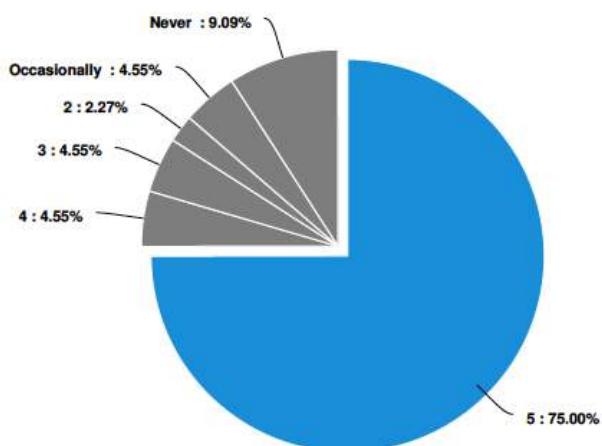
Likewise, more people reported ending the day earlier (those recording an end time of 4 pm increased from 2.2 percent to 21.1 percent) as well as later (those recording an end time of 7 pm increased from 6.5 percent to 15.8 percent). These results illustrate a wider range of hours that people report working from home versus hours working in an office.

Both of these shifts — most people working from home full time and a wider range of hours reported working from home — will have, and in fact already are having, an effect on work behaviors and how people interact within and across organizations. In addition to the physical separation experienced from colleagues working remotely, we posit that

Before COVID-19, about how many days a week did you work from home?



Now about how many days a week do you work from home?



⁴ In total, 92 people responded to the survey between July and September 2020, with 48 completing it in its entirety (52.17 percent completion rate). The highest percentage of respondents said they worked in "public administration" (28.57 percent), followed by "professional, scientific, technical services" (20 percent). With regard to personal income, the highest percentage reported earning between \$50,000 and \$74,999 (28.57 percent), followed by \$75,000 to \$99,999 (22.86 percent). The age group with the highest percentage of respondents was 21 to 29 (42.86%), followed by 30 to 39 (28.57 percent).

greater irregularity in work times (outside of the standard 9 am to 5 pm office culture pre-COVID-19) translates to greater perceived feelings of disconnection amongst workers — and therefore potential **loss of shared productivity and innovation**.

The survey also included questions related to how respondents would rate the impact of working from home on certain areas of work. One set of questions asked about the impact on the respondent's own ability to innovate and the impact on their company's ability to innovate. Overall, respondents recorded a lower positive impact on the company's ability to innovate versus their own individual ability to innovate (23.5 percent versus 29.7 percent, respectively). Additionally, when asked about the quality of their output and their company's output, respondents recorded a higher positive percentage for their own individual quality of output versus their company's (38.9 percent versus 27.3 percent, respectively).

Here again, City78's work-from-home survey results illustrate that the near-universal shift of office workers collaborating in a shared space of an office to working from home has had a divergent effect on individual versus company-wide productivity. As our earlier research suggests, remote work tends to benefit workers at the individual level in terms of their own output and ability to innovate; however, this effect is less pronounced company-wide. Further, we can expect the gains from working from home to decline over time, as the adverse effects are amplified (such as distractions caused by family members also at home). But even more important to highlight, these findings further emphasize the **importance of in-person collaboration in the setting of a shared office space with regard to a company's overall output and ability to innovate**. We can expect a negative compounding effect over time as people continue to work remotely and are not afforded the benefits of interacting with coworkers in person.



ELEMENTS AT RISK IN THE BUILT ENVIRONMENT

Office: collaborative space for knowledge sharing and innovation

While many have foretold the “death of the office” in post-COVID-19 cities, it is unlikely these physically shared spaces will completely disappear due to the intrinsic power they have to facilitate community, build company culture, and provide a break from the distractions and struggles of workers’ home lives. Additionally, certain industries (such as manufacturing and to some extent engineering and design) require interpersonal interaction in a physical location in order to remain operational. Without the office, workers can continue to have virtual social interactions with their colleagues, but the real benefit of these relationships — particularly informal knowledge transfer — would likely be devalued as the quality of interaction becomes less human and personal.

The exact future of the office is uncertain, but it is likely to be defined by two trends: the first being safety, and the second being a sense of uncertainty about people’s return, as even the most rigorous sanitation processes might not be enough to fully rebuild trust. Teleworking, which was already increasing in popularity among American workers pre-pandemic, continues to gain traction as a preferred method for many. Therefore, **the future of the office is dependent on the ability of companies to be creative in determining solutions** and building their own procedures that fit company culture, address employees’ levels of comfort, and make the office a place where ideas are shared and solutions to problems are developed.

We already see how these solutions require a reexamination of office space and usage. For instance, offices will need to incorporate clear and engaging signage to communicate proper safety and use of shared space. Open-concept floor plans, which had already been declining in popularity pre-pandemic, may be a thing of the past, or will at least be approached with greater scrutiny; while attention to ventilation and air flow will attract much more attention. At the same time, **companies must address the need for increased integration of automation and technology**, extending from remote office setups to shared office space. And new policies can help allay fears of too much in-person contact, for example the introduction of staggered work days and arrival times. Ultimately, the challenge for office

work remains developing a balance between virtual and face-to-face interactions in a way that secures public health and at the same time ensures continued economic recovery, growth, and innovation.

Retail: hubs for local goods, local economies, and unique place-driven experiences

In January 2021, roughly nine months into public restrictions and lockdowns due to the coronavirus outbreak, 44.3 percent of U.S. small businesses said COVID-19 had a moderate negative impact on their business, while 30.7 percent cited a large negative impact (U.S. Census 2021). Due to local guidelines and regulations, most small businesses now require customers and employees to wear masks and maintain six feet of distance. However, in order to uphold this spatial distance while continuing to maintain a unique, place-driven experience, there are several considerations retailers — especially small businesses — must consider. These considerations primarily revolve around **creating a space that is an experience-based culture hub rather than a material-based storefront** — integrating programming as a way to engage consumers beyond traditional shopping hours, for instance combining a store with a local nonprofit, coffee shop, or restaurant to strengthen local place identity, or strengthening the level and quality of customer service.

Restaurants: places for communion with others

According to CBRE, a commercial real estate services and investment firm, "COVID-19 has hit the \$2.5 trillion food & beverage industry harder than any other sector of the economy, with restaurants accounting for 60% of the 16.8 million jobs lost between March 19 and April 9" (CBRE 2020). And while the industry remains in peril, much is uncertain as well about its future. Delivery and outdoor dining have provided some revenue for restaurants in the short term; however, the loss of outdoor dining space during cooler winter months has proven even more perilous for restaurants that were just barely hanging on. Additionally, the degree of comfort consumers have in physical dining is highly variable, based on geography and the severity of public spread of the virus — meaning that restaurants have minimal control of in-person dining volumes.

In order to stay ahead of the virus as much as possible, **restaurants must therefore take aggressive action in areas they can control**. This includes continuing to push to-go and delivery options through social media and creative advertising; signaling to consumers that they are taking the pandemic seriously through clearly marked, in-store sanitation measures and social distancing; expanding offerings like to-go liquor options; expanding contactless payments and digital menus; and teaming up with other local restaurants and small businesses to reach a wider base of consumers. Private design firms are also beginning to offer restaurants suggestions on how to reimagine their spatial orientation while accommodating for social distancing. Ultimately, creative and aggressive actions, especially continued federal and municipal aid, loans and grants, are needed if restaurants are to survive through the continued uncertainty of the months ahead.

Arts and entertainment: communication of local culture, heritage, ideals, norms, and values

Due to the fact that large gatherings will remain, at worst, prohibited or, at best, limited for the foreseeable future — and that much of the arts and entertainment industry revolves around bringing many people together in one place — the future of the industry is precarious and will likely require many creative adaptations. These adaptations include implementing extremely rigorous sanitation policies to keep venues safe and reassure wary patrons; implementing timed and reserved ticketing policies; and, where possible, remodeling spaces to accommodate open ventilation and greater social distancing, such as with wider aisles and fewer seats.

The creation of virtual experiences can further reduce the need for large crowds, while at the same time bringing arts and entertainment to neighborhoods that traditionally have had limited access to cultural offerings. The adaptive use of spaces such as parking lots and parks to hold performances can also serve to **expand reach to new audiences and take advantage of public space**.

Institutions of learning: centers of collaboration, knowledge sharing, and innovation

Most universities and public school systems remain in a constant state of uncertainty with regard to in-person versus virtual learning environments and practices due to the threat of the spread of the coronavirus. However, there are many ways to capitalize on the benefits of online learning — which offers flexibility, adaptability, and scalability — to create hybridized learning plans. This adaptation is beneficial in the context of public health measures related to COVID-19, but it is also responsive to **the future of education being learner-centric**, meaning formal education can be much less prescriptive than it traditionally has been. A hybridized learning model also creates the potential to offer more alternatives to traditional coursework, such as mentoring, internships, service learning, and project-based learning. In addition, this model could be less expensive than traditional in-person higher education and can allow for increased flexibility in course scheduling, serving to further democratize educational offerings to less affluent or privileged would-be students.

Yet the benefits of in-person education must also be emphasized, as many students feel more connected to their peers and have an easier time learning when sharing a classroom. It is also difficult for working parents and low-income families to fully adapt to an online curriculum, regardless of how well thought out it may be. In order to provide the most benefit from an in-person education, schools must be able to devise systems for testing, tracing, and isolating and quarantining staff and students. Like office spaces, schools must also put in place policies on social distancing, sanitation, and PPE use, and clearly communicate these policies to students through creative graphics and signage.

Additionally, schools must prioritize place and community identities. This can be done by reprioritizing common spaces, both physical and digital, for highest and best use. For example, outdoor spaces could serve a dual purpose as collaborative working spaces. Classrooms could also be designed as flex space in order to facilitate social distancing, accommodating a variety of setups tailored to fit students' needs and giving students more autonomy over their education.

Open and public spaces

COVID-19 has spurred two major trends in the use of open and public spaces, the first being the democratization of public space and the second being the reorganization of public space away from traditional uses. These trends are likely to continue into the future, as tactical urbanism and associated spontaneous, low-cost interventions help reinforce place identity, allow people to social distance, and give people a sense of ownership over the built environment. There will also be a continued movement away from homogenized space, as public space becomes more sustainable and responsive to the natural environment. Additionally, frequent and easily understandable signage throughout parks and public spaces that communicates sanitation and social distancing protocol is critical in order to ensure that people enjoy being in public space simply for the shared spatial reality and opportunity for serendipitous interactions that public space offers.



Commercialization of public open space: restaurant and retail locations in downtown Washington, D.C., within a 0.5-mile radius of open space and public right-of-way. (Source: City78)



**PEDESTRIAN
WALKWAY**

The closure of streets to private automobiles as a public response to COVID-19 has also provided a much-needed shift to a human-scale, more pedestrian-friendly, and more equitable urban environment. This reconfiguration of the public realm allows ground-floor businesses to take advantage of public space by extending their operations to the adjoining sidewalk or the open street, while at the same time complying with health and safety guidelines. Many cities have seen the benefits of this activation of open space and should look to make these changes more permanent. The increasing commercialization of the public right-of-way to facilitate socially distant retail and restaurant operations is beneficial in blending the physical environment with unique spatial experiences, leading to the further democratization of space and strengthening place identity.

ASSESSING PLACE IDENTITY: NATIONAL & GLOBAL RANKINGS

Even as the COVID-19 pandemic has raged on, competition amongst cities for the attraction of investment and economic growth has persisted, and is now perhaps more fierce than ever. The economic shifts ushered in by the pandemic, and the accompanying negative effects on business processes and economic activity, have created the need to restructure and re-forecast economic performance for cities and regions worldwide. A major factor contributing to this shift has been the promptness in response to and in containing the pandemic and the ability of cities to ensure a return to near-normal (if not "new normal") business processes; this response has been central to cities' relative success in getting back on track to continued economic growth and expansion. Simply put, cities that are experiencing limited spread and less deaths attributable to the pandemic, have been able to sustain some level of economic activity and better manage their place reputation and identity.



[View City78 Global City Ranking Story Map](#)

National rankings

In order to gauge the comparative potential of large cities in the United States, based on the effects of COVID-19, we at City78 created a national city rankings list that compared U.S. cities for COVID-19 response in the first two quarters of 2020. Sixty five cities across the country, all with populations over 300,000, were selected. Through this analysis, City78 identified various trends across the cities then formulated recommendations based on their performance.

Ranking methodology⁵

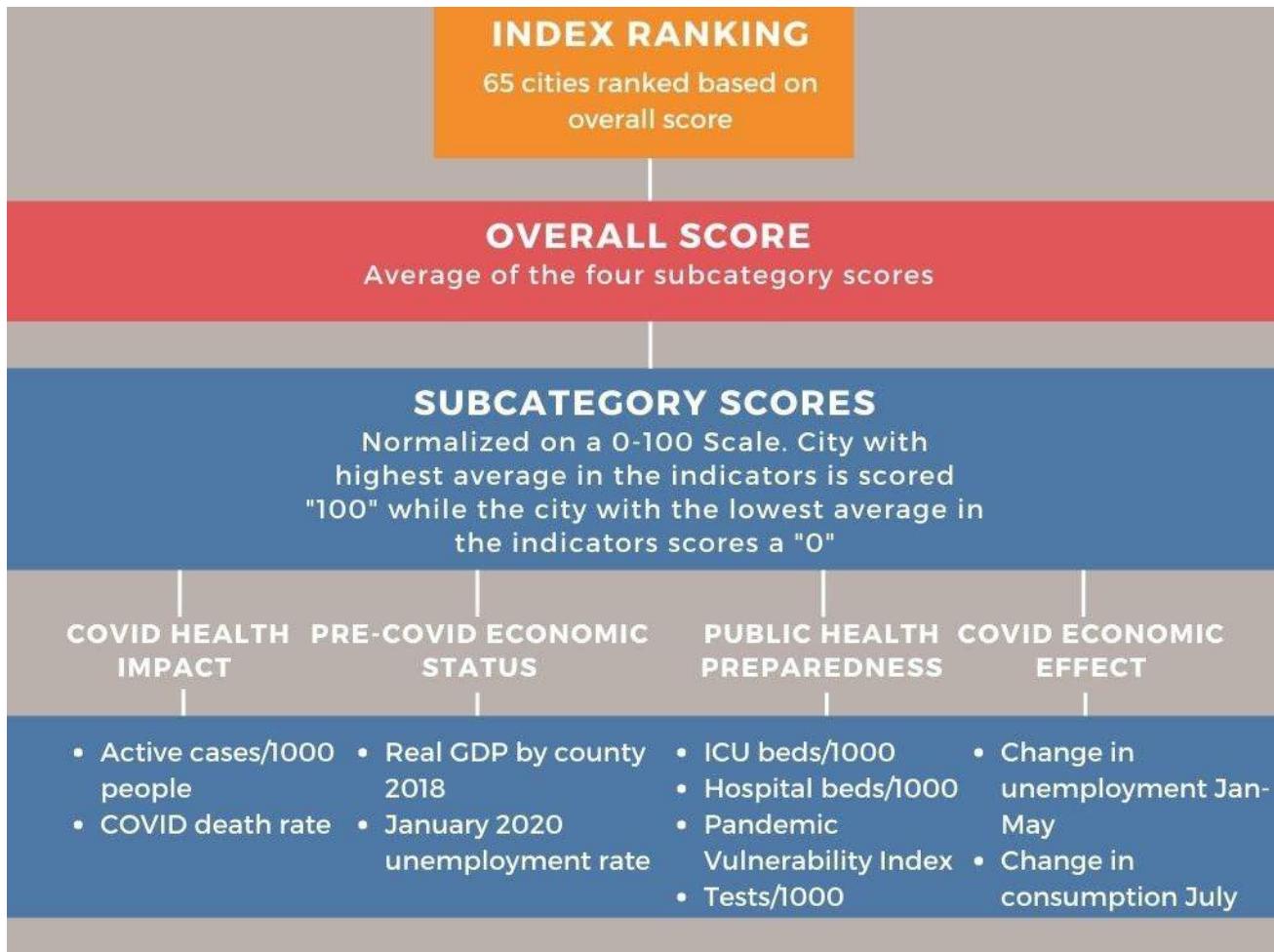
In order to gauge the performance and resiliency of cities in terms of preparedness and response to the pandemic, a COVID-19 impact index was developed using key economic and public health indicators. This index was used to score each city in the following four major categories:

- **COVID-19 health impact:** Active cases per 1,000 people; COVID-19 death rate
- **Pre-COVID-19 economic status:** 2018 GDP by county; pre-pandemic unemployment rate (January 2020)
- **Public health preparedness:** Availability of ICU and hospital beds per 1,000 people; Pandemic Vulnerability Index rating⁶; number of COVID-19 tests per 1,000 people
- **COVID-19 economic effect:** change in unemployment from January to May 2020; change in consumption

A score of 100 for an indicator implies that the city performed the best out of all cities in that indicator, whereas a score of 0 indicates that the city performed the worst out of all cities in that indicator. While some cities may have performed better than others in various categories, the overall city score was derived from a combination of all the represented indicators.

⁵Each indicator was normalized on a 0-100 scale using the equation: $\text{normalized_indicator} = (x - \text{Min}(x)) / (\text{Max}(x) - \text{Min}(x))$ — where x is the raw quantitative value of the indicator, i.e., unemployment rate. The normalized indicators were then averaged for each subcategory in order to calculate a subcategory score. For example, the Pre-COVID Economic Status subcategory was calculated by adding the GDP normalized indicator and the January unemployment rate normalized indicator and dividing by two. This process was repeated for each subcategory. All data was collected from the [Bureau of Labor Statistics](#), [Johns Hopkins Coronavirus Resource Center](#), and [University of Maryland COVID-19 Impact Analysis Platform](#).

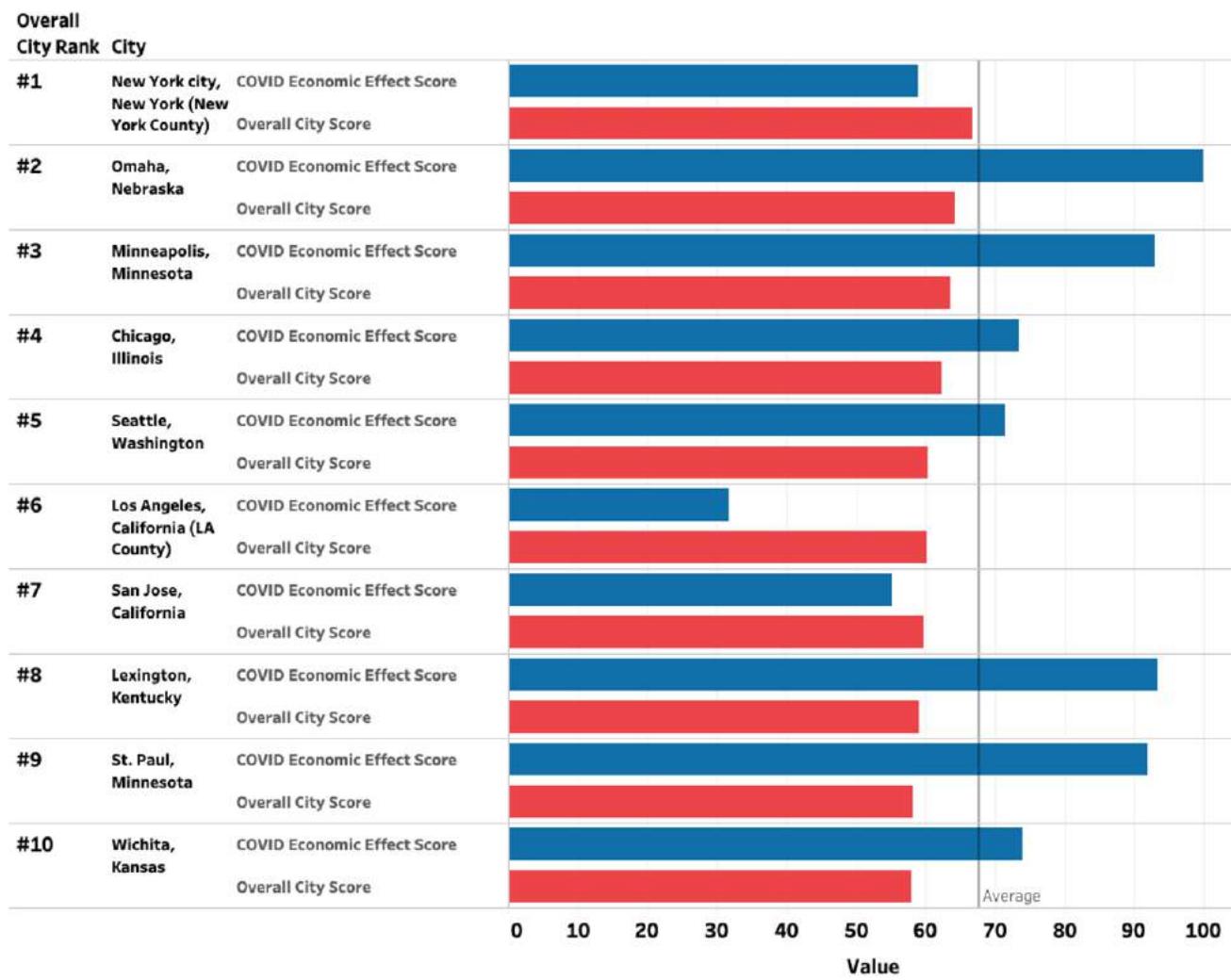
⁶The Pandemic Vulnerability Index is an index created by the National Institute of Environmental Health Sciences that measures county-level public health vulnerability to COVID-19 outbreaks



The Pre-COVID Economic Status subcategory is a composite indicator representing the real GDP of a city (by county) for 2018 and the city's January 2020 unemployment rate, which represents a measure of pre-COVID-19 employment for each city. The COVID Economic Effect subcategory is an aggregate score of the change in unemployment for each city between January and May 2020, and the change in consumption in each city for July 2020. The Public Health Preparedness subcategory is made up of indicators accounting for the number of ICU beds per 1,000 people, the number of tests per 1,000 people, as well as the National Institutes of Health's Pandemic Vulnerability Index rating. The COVID Health Impact subcategory is an aggregate score of active COVID-19 cases per 1,000 people and the COVID-19 death rate in each city.

Top 10 of the 65 ranked U.S. cities—here showing comparisons between Overall City Score and COVID Economic Effect Score. New York ranks first overall according to its Overall City Score of 66.8. Omaha ranked near the top largely due to a strong COVID Economic Effect Score of 100.

National Rankings



Trends

a. Most prosperous metropolitan areas were hit harder economically than smaller cities early in the pandemic.

Large metropolitan areas saw higher spikes in unemployment and decreases in consumption than smaller cities during the first two quarters of 2020. Los Angeles county saw a spike in unemployment of 16 percentage points between January and May, and a 15 percent decrease in consumption as of July 5th. Miami and Houston saw 24 percent and 15 percent decreases in consumption, respectively, indicating that those large metropolitan areas hit hardest by the virus early on also experienced greater economic decline.

Meanwhile, smaller cities that initially fell outside COVID-19 hot zones were comparatively unfazed early on by the economic downturn. For example, Omaha, Nebraska, saw only a 2.9 percentage point increase in unemployment, from a rate of 3.4 percent to 6.3 percent, in the first two quarters of 2020 (though this still reflects a near doubling of the unemployment rate). Additionally, Omaha only saw a 1 percent decrease in consumption. Omaha wasn't the only smaller metropolitan area to weather the storm relatively well early on: of the top 10 ranked cities based on post-COVID-19 economic performance, all had populations of under one million.

These initial findings seem justified, as these smaller cities 1) had fewer cases of COVID-19 early on, and thus faced less severe economic shutdowns, and 2) have economies that rely on industries that, at least initially, proved to be more resilient to the economic effects of the coronavirus. For example, the five industries most likely to be impacted by COVID-19 according to the ratings service Moody's are mining/oil and gas, transportation, employment services, travel arrangements, and leisure and hospitality (Muro et al. 2020). The city of Omaha's most robust industries are trade, transportation and utilities, professional and business services, and government, which in total make up roughly 47 percent of all jobs in the city (U.S. Bureau of Labor Statistics Midwest 2020). Hospitality and leisure only make up 8.4 percent. Comparatively, in Miami, which saw a 10 point increase in unemployment in the first two quarters of 2020, leisure and hospitality make up 12.4 percent of all jobs (U.S. Bureau of Labor Statistics Southeast 2020). This comparison leads to a deeper analysis of the cities worst affected by the economic impacts of COVID-19, those that rely heavily on tourism.

b. Tourism-heavy cities have suffered the most economically.

The tourism industry is projected to be one of the industries most affected by the coronavirus. The number of trips taken per week in the United States decreased from 1.2 billion at the beginning of March to 930 million in mid-July (Department of Transportation 2020). This decrease in travel within the U.S. has greatly impacted tourism-heavy cities like Las Vegas, Nevada. Las Vegas saw a 25 point

spike in unemployment between January and May 2020. Hospitality and leisure, which made up 27 percent of the city's jobs in January, saw a 43 percent contraction in May (U.S. Bureau of Labor Statistics Economy at a Glance 2020). Much of the city's economy relies on the casino industry, which means that the economic ramifications of the pandemic have expanded beyond hospitality, leading to a 19 percent decrease in consumption as of July 5th. Other tourism-heavy cities have also suffered. Tourism in the state of Florida, for instance, fell 10.7 percent in the first quarter of 2020, and many Florida cities are paying the price (News Service of Florida 2020). Jacksonville and Tampa saw 16 percent and 17 percent decreases in consumption, respectively, in the first two quarters of 2020, with further declines in the latter half of the year in the face of ever-rising coronavirus rates.

c. Sun Belt cities have suffered as they reconcile the tradeoffs between prioritizing the economy over public health.

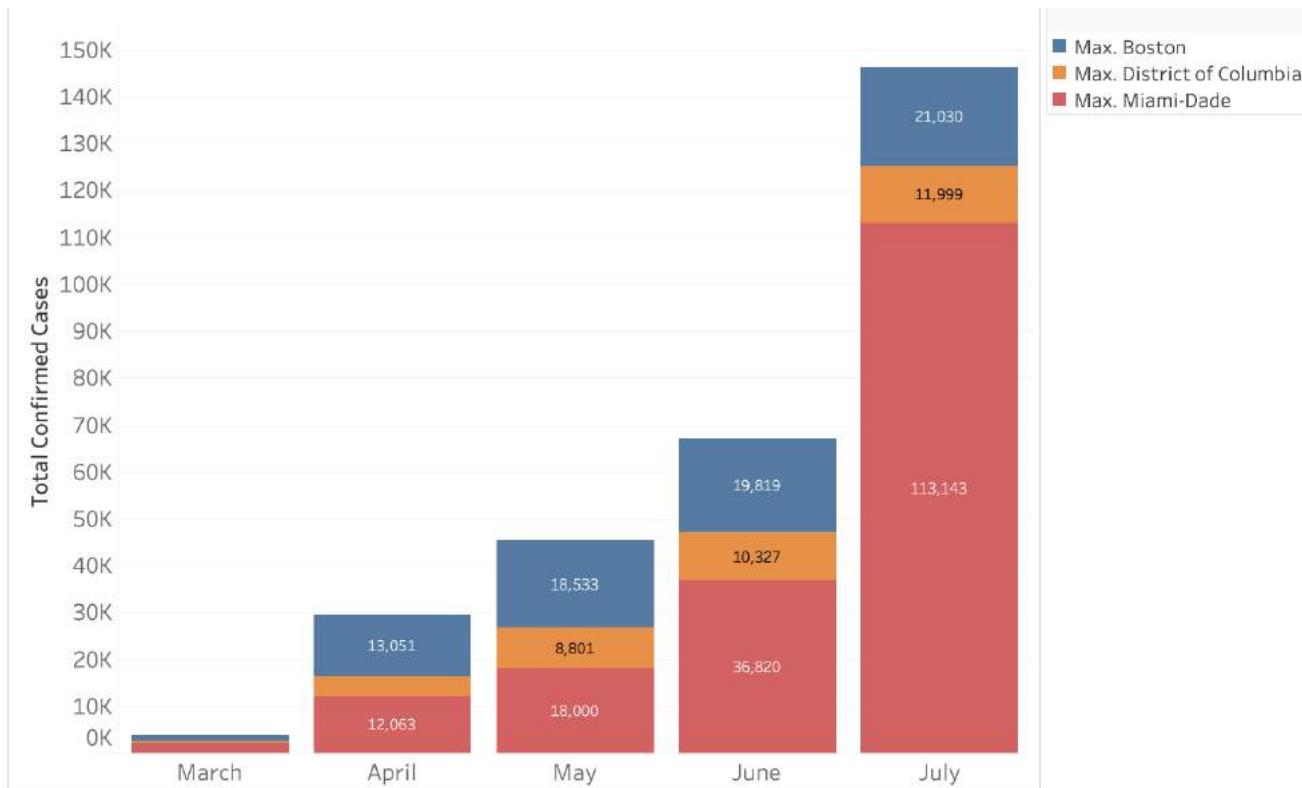
Sun Belt cities in Arizona, Florida, and Texas were hit hard by surges in COVID-19 cases after hastily reopening in the second quarter of 2020, in an effort to spur economic activity that had mostly halted due to lockdowns put in place at the beginning of the crisis. Of the 65 cities included in our national city rankings, two cities in Arizona, Phoenix and Tucson, rank 59th and 64th overall, respectively. Cities in Florida and Texas rank similarly poorly. Tucson and Phoenix both scored a 0 for their COVID-19 health outcomes due to incredibly high rates of active cases in July, averaging around 10.16 active cases per 1,000 people. By early August, that number had risen to 11.58 active cases per 1,000 people. The second highest rate of active cases within cities surveyed occurred in Miami, with 6.46 cases per 1,000 people; by August, that number had spiked to 13.99 active cases per 1,000 people.

This surge in active cases in the Sun Belt came as many states hastened their reopening against benchmarks and guidance provided by the White House Coronavirus Task Force and the CDC. These rushed reopenings were coupled with a full-steam-ahead attitude in which, in the words of Florida governor Ron DeSantis, states were "not going back" on reopening (Coyle and Cooper 2020). While some Sun Belt cities appeared to weather the storm of economic downturn better than their northern neighbors during the first half of the year, this was certainly not the case across the region as a whole. Tucson and Phoenix recorded only 3.9 and 4.3 percentage point increases, respectively, in unemployment from January to May; however, unemployment in August stood at 15 percent for both cities. This unemployment figure is still lower than many early-hit northern cities such as Boston, Massachusetts, and Queens in New York City, which both had unemployment rates around 22 percent in August despite having moved into the recovery phase of the pandemic. Alternatively, Miami recorded a 9.8 percentage point increase in unemployment between January and May, and El Paso, Texas, recorded a 10.5 percentage point increase. Though based on this data, it would appear that unemployment rates in the Sun Belt on the whole are lower than those in the Northeast and Midwest.

d. Cities with strict reopening plans have fared better than those without.

It is unsurprising that cities that have been proactive about their COVID-19 responses have fared better than those that have been too hasty to reopen. Take, for example, Boston and Washington, D.C. Both Massachusetts and D.C. have taken cautious measures to reopen their cities, timing phased reopenings with consistent decreases in coronavirus rates (DeCosta-Klipa 2020). Massachusetts's plan includes six key public health indicators, including testing capacity and contact tracing, which must be showing positive trends in order for the state to move to the next phase (Commonwealth of Massachusetts 2020). Similarly, Washington, D.C., doubled down on its efforts to combat a potential increase in cases by mandating on July 22 that masks would be required in all public places, even outdoors (Office of the Mayor 2020). Both Boston and Washington, D.C., ranked highly on the public health preparedness score, with Washington ranking first and Boston ranking 13th.

Conversely, Miami, which ranked 39th in its public health preparedness score, was mired in new cases in late summer, as Florida pressed on with its reopening plans despite the surges. The state ordered public schools to open in person in the fall despite recording some of the highest infection rates in the country (Balingit 2020). Meanwhile, testing wait times in Miami in August due to shortages were as long as seven to 10 days (Sesin 2020).



Recommendations

a. For large cities to recover post-COVID-19, they must prioritize low infection rates while at the same time striving to maintain their place identity.

New York City was the hardest hit city in the U.S. in the beginning of the pandemic. With a death rate of 3.92 percent in Manhattan alone, it seemed unlikely that the Big Apple would ever recover from such a large blow. The city of crowded trading floors, packed subways, and cramped theaters accounted for 13 percent of the nation's entertainment, arts, and recreation in 2018 and welcomed 66 million tourists in 2019. New York's ability to draw people in has been a central factor in its success for many years; however, this past strength is now its greatest weakness. The city's reopening has largely recognized this liability. Of the cities that have reopened in the wake of the first wave of coronavirus cases, New York did not see the post-opening spike in cases that was characteristic of many large cities that reopened. As of July 15, the seven-day average of new cases in New York City was 317, down from an average of 5,426 in April (Pereira 2020).

New York's successful reopening by mid-summer can be attributed to a coordinated statewide reopening plan in which localities have to reach certain key benchmarks, such as sustained decreases in cases. For this reason, despite being in the last phase of opening in July, indoor events in malls and cultural centers within New York City remained closed (Governor's Press Office, New York State 2020). Critics of New York State's reopening might have claimed that these benchmarks were overcautious. However, cities like Miami that reopened without benchmarks saw staggering spikes in cases over the summer. As of July, Miami had a daily average incidence rate of 5,283 cases per 100,000 people (Florida Department of Health 2020). For comparison, New York City's two-week average incidence rate at the same time hovered around 50 to 100 cases per 100,000 people.

This recent history shows us that in order to effectively contain a deadly and highly contagious virus like COVID-19, cities must commit to reopening slowly and with great emphasis on social distancing. But how can cities maintain social distancing longer term when many, like New York, rely on large gatherings as the foundation of their economies? New York ranked number one on our COVID-19 national city rankings, implying that the city is well equipped to recover from the pandemic. This is largely due to the city's willingness to embrace a culture of social distancing after experiencing the devastation of the first wave of the virus. The city's robust economy pre-COVID-19 also cannot be overlooked. However, in order to truly recover successfully, New York — and all cities — must reconcile this new culture of distance with the past drivers of prosperity, many of which may seem incompatible with a near-term post-COVID-19 urban landscape.

So what does embracing a culture of distance look like while maintaining a city's sense of place? In an article published by the Brookings Institution early in the pandemic, authors Richard Florida and Steven Pedigo proposed a number of ways in which a city can adapt to the realities of a post-COVID-19

environment while at the same time maintaining its place identity and economy. Notable among their recommendations were pandemic-proofing large civic assets, “pedestrianizing” infrastructure, and protecting the creative economy. What this all comes down to is supporting the physical components and activities of a city’s place identity while adapting them to survive a pandemic-proofed world. For cities such as New York, the vibrant activities of the city like attending shows, sporting events, and dining out are major players in the city’s place identity and thus its economy. In order to make sure these activities persist, cities must modify activities and events by taking steps to first ensure these activities are safe.

b. Cities must combat de-urbanization with incentives for potential city dwellers.

Following the outbreak of COVID-19 and the transition to virtual work, many companies and employees realized that work previously taking place in an office setting can alternatively take place at home. For this reason, some fear a surge of de-urbanization, as workers who once might have flocked to large cities for jobs now have greater opportunities to work remotely from anywhere. For example, an opinion piece published by the Wharton School at the University of Pennsylvania predicts mass-scale de-urbanization as city dwellers begin to fear the high-density environments of subways, theaters, restaurants, elevators, etc. (Garrett 2020). Rightly so, the article makes the point that “de-urbanization would harm economic growth because cities generate enormous scale economies and have proved to be remarkably effective incubators of creativity and innovation.” Despite these fears, however, history proves that urbanization is largely “disruption-proof” (Molavi 2020). From cholera in the 19th century, to world wars in the 20th, cities have faced highly disruptive forces yet continue to grow. In fact, cities are often the first to adopt innovative technologies to overcome these disruptions — cholera epidemics in European cities in the 19th century, for instance, led to wide-scale adoption of sanitation systems.

While the global trend of urbanization will likely persist, it is still imperative that cities make moves to disincentivize potential trends toward de-urbanization. This could come in the form of incentives offered by city governments to attract new city dwellers. One such initiative, Tulsa Remote in Tulsa, Oklahoma, provides remote workers a grant of \$10,000 to relocate to the city while also helping them build community connections through resources such as coworking space. Many U.S. cities have instituted similar remote relocation initiatives, including Savannah, Georgia, and Topeka, Kansas (Bacchi 2020).

Perhaps more importantly, cities must work to retain current residents and uphold their quality of life such that they are not forced to move away largely due to economic circumstances. Unemployment within the service sector has greatly affected lower-income communities within urban areas. In Washington, D.C., there is a high correlation between neighborhoods where workers in industries most vulnerable to COVID-19 live and those neighborhoods in which individuals make less than \$40,000 a year (Su 2020). Cities like Washington, D.C., have been proactive in providing direct cash

transfers to at-risk citizens, but cash transfers and unemployment insurance are merely bandaids, not long-term solutions.

In order to support at-risk city dwellers working in highly affected service, leisure, and hospitality industries, cities should focus on up-skilling unemployed workers for the jobs of tomorrow. This could consist of investment by the city into virtual apprenticeship programs for in-demand jobs in sectors such as information technology, or incentive-based programs in which individuals who qualify for unemployment insurance could receive supplemental payments on top of their weekly unemployment insurance payments if they enroll in a virtual learning program provided by the city (Lerman 2020).

c. Cities must prioritize economic equity for citizens in order to avoid the class/racial divergence in COVID-19 health outcomes.

COVID-19 has disproportionately affected Black and Latinx populations in the United States across all age groups. Among individuals aged 35 to 44, Black Americans are 10 times more likely to die from COVID-19 than White Americans, and Latinx Americans are eight times more likely to die (Ford et al. 2020). There are myriad factors that have led to this disparity in health outcomes. Black residents are at a higher risk of comorbidities such as hypertension, cardiovascular disease, and diabetes due in part to the living conditions present in many Black communities. Located in poorer areas, many Black communities do not have access to healthy food options, have high housing density, and have access to fewer employment opportunities that are conducive to working from home. In the words of Northwestern University cardiologist Clyde Yancy, "the aggregate of a higher burden of at-risk comorbidities, the pernicious effects of adverse social determinants of health, and the absence of privilege that does not allow a reprieve from work without dire consequences for a person's sustenance, does not allow safe practices, and does not even allow for 6-foot distancing" (Yancy 2020).

As the majority of Black and Latinx Americans live in urban areas, it is imperative that cities prioritize economic equity for these populations in order to combat the disastrous health outcomes they face. In the short term, cities can provide support to low-income city dwellers facing structural inequities through temporary stopgaps. These can include rent relief, as most low-income families do not own a home, food distribution centers in hard-hit communities, and inclusive assistance programs that do not exclude households based on factors such as citizenship (Turner 2020). In the long run, cities must focus on dismantling the structural inequities that allowed for COVID-19 health disparities in the first place. Responses should include proactive city planning — for instance, measures that ensure food deserts no longer exist in low-income areas, efforts to reevaluate draconian policies that preclude many Black and Latinx Americans from home ownership, and protections for providing a living wage to essential workers, of which Black and Latinx Americans make up a large portion.

Global Rankings

Similar to the U.S. national rankings, City78 selected and compared 51 large cities across the globe based on data availability and geographic diversity to build a COVID-19 Global City Ranking index for the first and second quarters of 2020. Cities were ranked based on their pre-COVID-19 economic performance, the health impact of COVID-19 (through June), and their projected economic performance for 2020.⁷

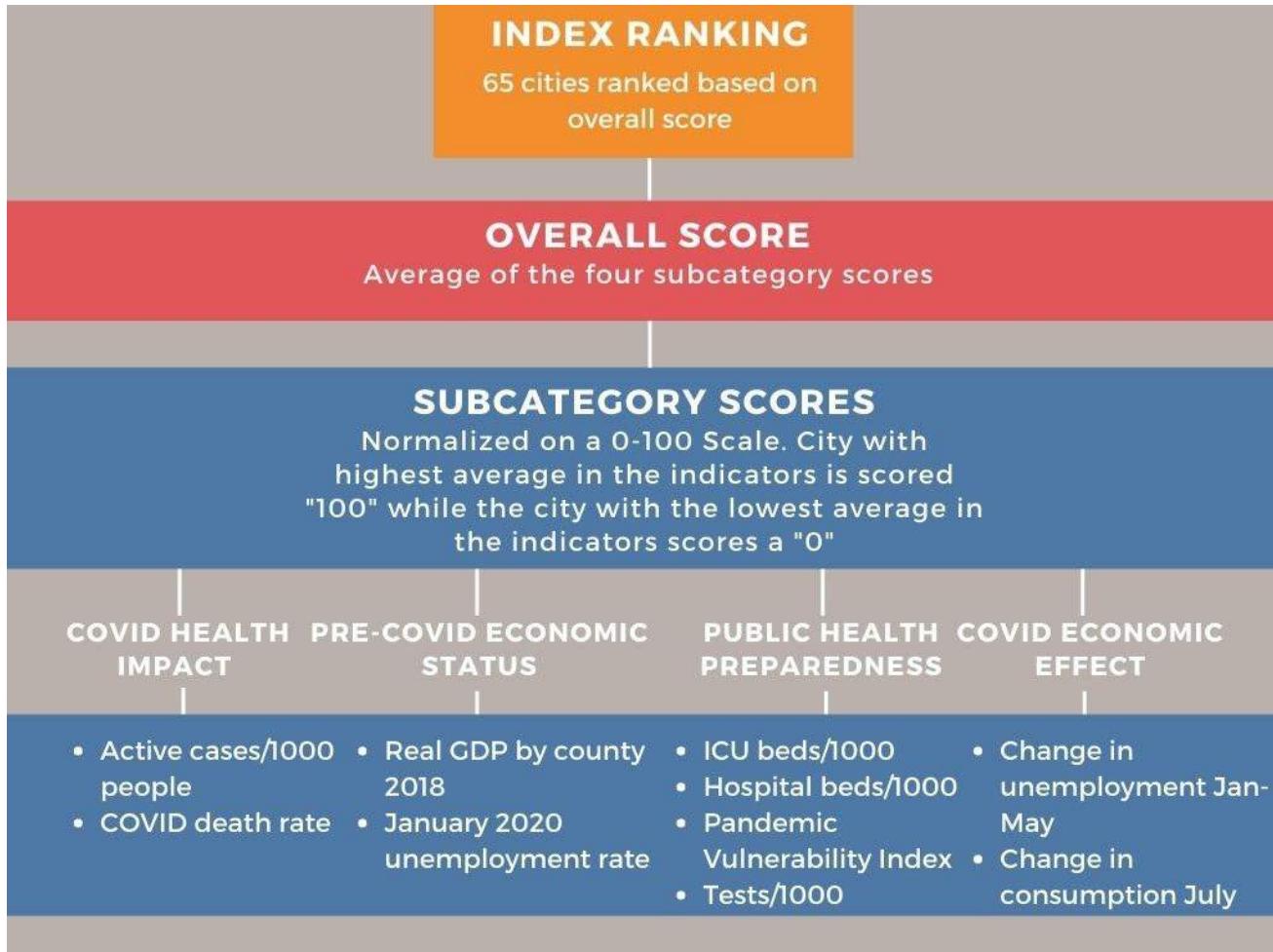
Ranking methodology^{8,9}

In order to rank the 51 selected global cities, City78 built a COVID-19 impact index, which scored each city on a scale of 0 to 100, with 100 being the best score and 0 being the worst score. The index includes three categories with quantitative indicators, such as active cases per 1,000 people, that were normalized on the 0 to 100 scale across each indicator such that the indicators could be averaged into three subcategory scores. A score of 100 within an indicator implies that the city performed the best out of all cities in that indicator, whereas a score of 0 indicates that the city performed the worst out of all cities in that indicator. Data was sourced from the Johns Hopkins Coronavirus Resource Center, the Brookings 2018 Global Metro Monitor, the World Bank, the International Monetary Fund, and the public health ministries of countries included in the index.

⁷For additional analysis and visualizations, refer to City78's interactive "[Global City Rankings and Place Identity Story Map](#)".

⁸Each indicator was normalized on a 0-100 scale using the equation: $\text{normalized_indicator} = (x - \text{Min}(x)) / (\text{Max}(x) - \text{Min}(x))$ — where x is the raw quantitative value of the indicator, i.e., unemployment rate. The normalized indicators were then averaged for each subcategory in order to calculate a subcategory score. For example, the Pre-COVID Economic Status subcategory was calculated by adding the GDP growth rate normalized indicator, the unemployment growth rate normalized indicator, and the GDP PPP normalized indicator and dividing by three. This process was repeated for each subcategory.

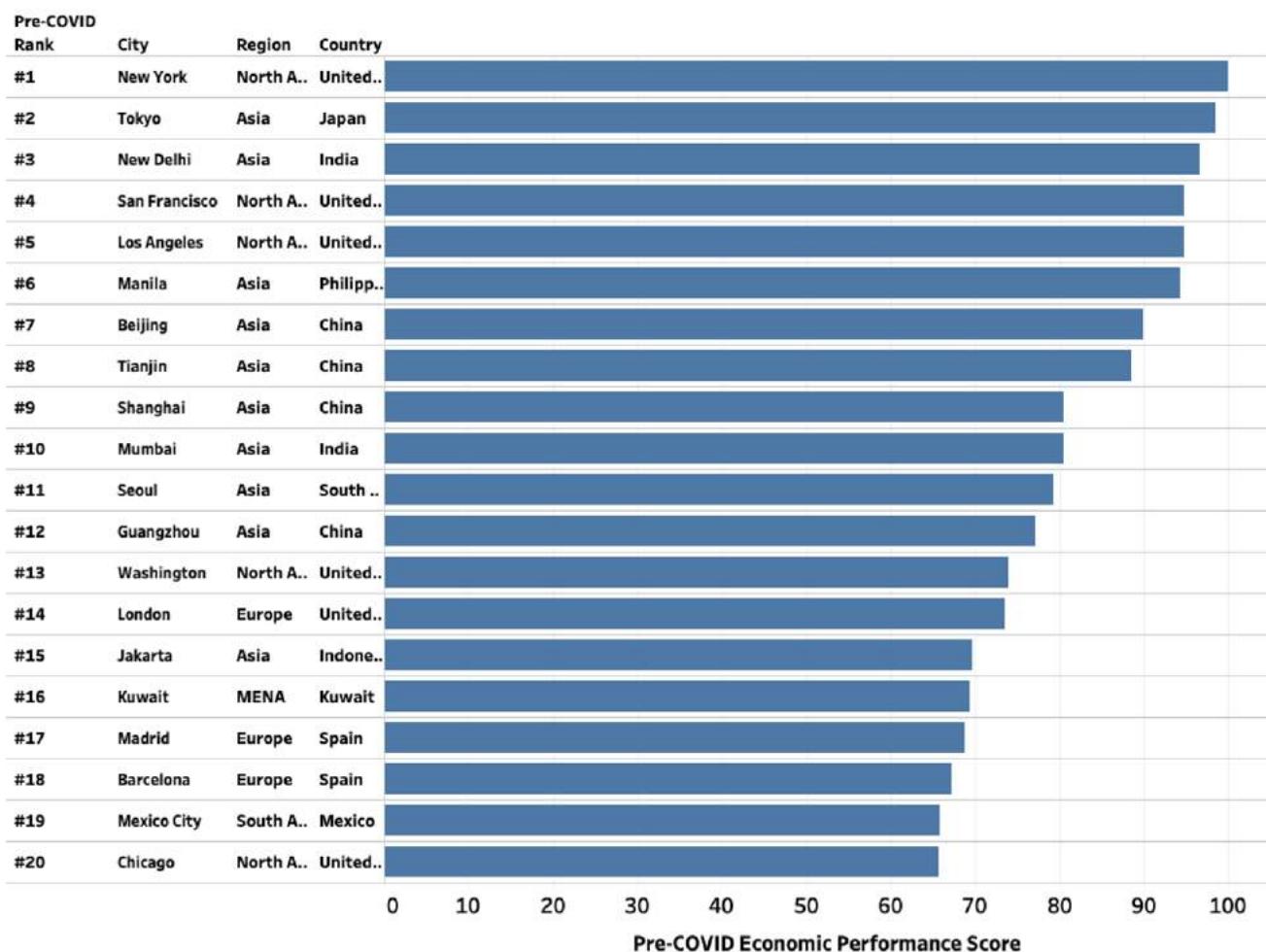
⁹Data limitations: Due to the nature of data collection varying from country to country, there were a limited number of aggregated sources of data across the global cities represented in the index. For this reason, much of the data regarding COVID-19 health impacts had to be individually sourced from the public health ministries of the countries each city was located in, when data from the Johns Hopkins COVID-19 dashboard did not suffice. Due to this lack of aggregated data sources across countries, we were unable to include as many indicators as there were in the National City Rankings, simply because the data was not accessible for some countries. Additionally, the 2020 GDP forecast, which acts as a proxy for each city's expected economic performance moving forward, is at the country level rather than the city level. This metric ignores the intranational differences between metropolitan economies; however, due to data limitations, we deemed it sufficient in suggesting important distinctions between the economic performance of cities in different countries.



The Pre-COVID Economic Status subcategory is a composite indicator representing the gross domestic product at purchasing power parity (GDP PPP) of a city for 2018, the city's 2018 employment growth rate, and its 2018 GDP growth rate. The COVID Health Effects subcategory is a composite indicator representing the number of COVID-19 cases per 1,000 individuals in a city and the number of COVID-19-related deaths per 1,000 individuals in a city. Lastly, the 2020 GDP Forecast is not a composite indicator but rather represents the projected 2020 GDP growth rate by country for each city. This indicator was used to forecast the future economic performance of cities in light of COVID-19 economic shocks.

Top 20 of the 51 ranked global cities, based on the Pre-Covid Economic Performance indicator. Asian cities account for 11 of the top 20.

Pre-Covid Economic Performance



Trends

a. Asian cities have far outperformed Western cities in their COVID-19 response.

In our global rankings, the top 11 cities in overall score are located in Asia, with the top four cities of Beijing, Tianjin, Shanghai, and Guangzhou all located in China. These high scores are largely based on high economic growth before the outbreak of COVID-19 that is projected to persist through the pandemic, especially when compared against the economic slowdown of many other cities. Tianjin had the highest GDP growth rate of 8 percent. Mumbai and New Delhi, in India, also saw high GDP growth rates for 2018, with 7 percent each. The only non-Asian city in the top 10 was San Francisco, with a GDP growth rate of 4 percent. With COVID-19 as the great equalizer across cities, however, Asian cities still prevailed in both health and economic outcomes. Asian cities were among the first to flatten the curve of coronavirus cases and have continued to maintain low infection rates in the months following the initial outbreak.

Asian cities have also consistently seen the lowest death rates compared to European and U.S. cities (though it is worth noting that some of the death counts have been questioned as to their validity). Of the 20 cities with the lowest death rates per 1,000 people, 15 of the 20 cities were located in Asia. Of the remaining five cities, only two were located in North America or Europe (Berlin and San Francisco). In terms of cases per 1,000 people, 13 out of the 15 best performing cities were located in Asia. In contrast, nine of the 20 worst performing cities in terms of cases per 1,000 people were located in Europe or North America, and 11 of the 20 worst performing cities in terms of deaths per 1,000 people were also located in North America and Europe.

Much of this comparative success in Asian cities can be attributed to the early and effective strategies of many Asian countries. These strategies, which included early adoption of social distancing, mask wearing, and contact tracing, were informed in part by previous experience with epidemics. For example, having ratcheted up public health precautions after run-ins with the Middle Eastern Respiratory Syndrome (MERS) and South Asian Respiratory Syndrome (SARS) in the 2000s, South Korea and Taiwan worked to integrate medical histories and locations of individuals in order to track and predict coronavirus cases. The adoption of these strategies was also met with far less backlash in Asian countries, where mask wearing was already commonplace during public health crises. In cities like Hong Kong, mask wearing is seen as a civic duty, and those who do not wear masks during public health crises are shunned (Friedman 2020).

b. South American cities that were already performing poorly economically before the COVID-19 outbreak are now struggling even more.

Many cities in South America were facing economic stagnation before the outbreak of COVID-19. Brazilian cities in particular have faced steep contractions. Sao Paulo recorded an employment growth

rate of -2 percent and a GDP contraction rate of -6 percent. Rio de Janeiro similarly saw a -3 percent GDP growth rate and -1 percent employment growth rate in 2018. Brazil's leadership has made a concerted effort to prioritize economic freedoms despite the warnings of public health officials, but this does not appear to have boosted economic growth. In fact, Brazil's GDP is projected to contract by 8 percent in 2020.

Brazil is not alone in its poor economic performance. Buenos Aires, Argentina, also recorded GDP contraction of 1 percent in 2018, and Lima, Peru, saw a -2 percent employment growth rate in 2018. In fact, seven out of the 15 lowest scoring countries for Pre-COVID Economic Performance were located in South America. Mexico City and Monterrey, Mexico, were the only two South American cities not in the bottom 20 for Pre-COVID Economic Performance.

This poor performance has been deeply exacerbated by the COVID-19 crisis. In many South American countries, especially in Brazil, COVID-19 numbers have grown at a pace only seen elsewhere in the United States. Santiago, Chile, and Sao Paulo, Brazil, hold the first and second highest spots in the rankings for number of cases per 1,000 people, with Santiago recording 34 per 1,000 and Sao Paulo recording 30 per 1,000. Additionally, Brasilia, Rio de Janeiro, Lima, and Buenos Aires all fall within the top 10 spots for cases per 1,000 people. In terms of deaths per 1,000 people, Rio de Janeiro places third, with 1.8 deaths per 1,000 people. Sao Paulo and Santiago also fall within the top 10. This abysmal COVID-19 health outlook has resulted in five of the nine South American cities indexed falling in the lowest 10 rankings for the COVID-19 Health Impact Score.

These precipitous health outcomes have had negative consequences for the projected GDP for many South American nations as well. While many cities were struggling before the pandemic to maintain positive GDP growth, COVID-19 has acted as the nail in the coffin for many South American economies. The projected GDP growth rate for all South American cities indexed fell under -4 percent, with Lima leading the projected contractions with a -12 percent expected growth rate. However, many South American countries' expected GDP growth rates comparatively outperform most European expected growth rates. That being said, all South American cities surveyed, with the exception of Bogota, Colombia, and Santiago, fell in the bottom 20 cities for projected GDP growth.

c. The U.S. and Europe face a much larger and unprecedented economic slowdown compared to Asia.

The early inability of European cities to contain large COVID-19 outbreaks has hamstrung economic growth prospects for many cities and has created public health emergencies unseen in Asian cities. Italian and Spanish cities have been particularly hard hit, based on early outbreaks that quickly grew beyond the capacity of public health systems in early April. In the U.S. throughout 2020, the lack of coordinated COVID-19 response at the federal level led to the country recording the largest number of COVID-19 cases and deaths in the entire world. This resulted in a yo-yo approach in which cities reopened and then shuttered again as cases rose. Compared to cities in Asia and Oceania, which had

reopened completely as early as June due to proactive measures, the uncoordinated U.S. approach under the Trump administration arguably threatened cities across the country with long-term economic stagnation.

The disparities in health outcomes outlined above have translated into vastly different predictions for GDP growth between Asian countries and the U.S. and Europe. With the exception of China, whose GDP is expected to grow by 1 percent in 2020 per World Bank projections, and Indonesia, whose GDP is expected to remain constant, all other countries in which indexed cities are located are expected to observe negative GDP growth rates. The United States' GDP is expected to contract by 6.1 percent overall in 2020. The projection is even worse for European countries: Italy and Spain are expecting a 12.8 percent contraction, the UK a 10.2 percent contraction, and Germany a 7.8 percent contraction. The European nation with the mildest expected contraction is Russia, which expects a reported 6 percent contraction.

It is important to note that while much of this disparity is explained by differing COVID-19 impacts across the world, it is also explained by the fact that the United States and Europe saw far lower growth numbers than Asia before the crisis. With the exception of San Francisco, all U.S. cities saw a GDP growth rate of less than 4 percent in 2018. And with the exception of Barcelona, the same is true for Europe. This is paralleled, although to a lesser extent, in employment growth rates. Of the 20 cities that saw the highest employment growth rates, six were located in Asia, four in North America, four in Europe, two in the Middle East and North Africa, and two in Oceania.

Recommendations for Western cities

a. Embrace the functional city.

The coronavirus pandemic has presented new problems and highlighted old pain points in city living. In the aftermath of the COVID-19 outbreak, cities will be faced with the issue of how they can ensure opportunities and equity for all citizens in an efficient manner. According to the World Bank, a functional city is a city "that delivers high-quality public services for all people, in both rich and poor neighborhoods; that works hard to create economic opportunities for residents and businesses; that prioritizes community participation and inclusion for all; and that makes policies and decisions that create a stimulating and enjoyable life for its residents" (Wahba and Vapaavuori 2020).

As discussed in the cited World Bank blog post, an example of a functional city is Helsinki, which (including its broader metropolitan area) has a population of 1.5 million and makes up 40 percent of the country's GDP. Helsinki's city model is grounded in creating opportunity for all, and as such has some of the best schools in the world. Because of the city's emphasis on functionality and openness, there is a high degree of trust between the city and its citizens, allowing for better responses in times of crisis. Helsinki's three pillars of city development are to develop a *smart, inclusive, and sustainable* city. These pillars are being leveraged in their COVID-19 response: "smart" in allowing for efficient

delivery of services through digital innovation, “inclusive” in that community participation is at the cornerstone of city decision making/budgets, and “sustainable” in allowing for the city to approach carbon neutrality by 2035 while at the same time increasing mobility.

Like Helsinki, cities must embrace the concept of the functional city by enfranchising citizens in the decision making process in order to rebuild trust and make an effort to build a city's inclusive functionality. This can include coalescing city communities around neighborhood models in which vulnerable populations are supported by a cohesive small-scale community within a larger city environment. Such situations have already taken place naturally in cities like Baltimore in the United States. Described as a city of neighborhoods, volunteers in many neighborhoods in Baltimore have stepped up to care for elderly neighbors in order to fill gaps left by state and federal efforts (Miller and Cohn 2020). These efforts have been echoed in other cities across the United States, where neighborhood response teams (Dvorak 2020) and community kitchens (Holmes 2020) have popped up. Cities must become actively involved in such efforts in order to support the inclusivity of city structures, especially when navigating stages of economic recovery.

b. Embrace reverse innovation.

Reverse innovation is when “triad” countries (i.e., countries in North America, Europe, and Japan) borrow from often less-developed non-triad countries. With regard to COVID-19, reverse innovation is necessary for triad countries, especially those in North America and Europe, who have not had experience battling a pandemic in recent years. On the other hand, countries in East Asia and Africa have recently battled epidemics such as MERS, SARS, and Ebola, giving these countries an advantage in preparedness over their developed neighbors. Western cities must embrace reverse innovation in order to effectively combat COVID-19 and other pandemics in the long run.

For example, innovations adopted from South Korea quickly helped the United States increase its testing capabilities. COVID-19 testing in South Korea effectively took on the challenge of quickly testing large groups of individuals in highly populated areas without putting health workers at risk. By March 19, 2020, the country had 85 drive-through testing sites, which became a model for the rest of the world. Results were sent to individuals via SMS within three days. For reference, the U.S. had only one drive-through test site for every 400,000 Americans as of June 2020.¹⁰

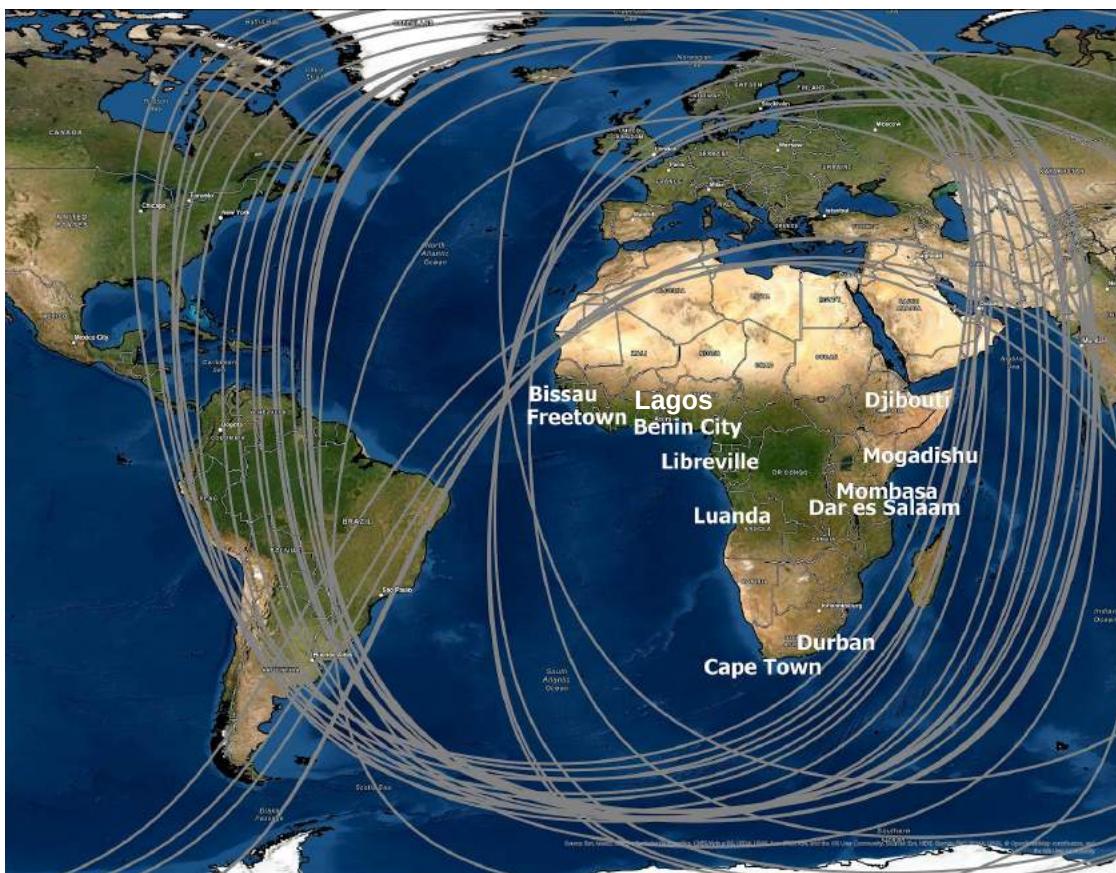
In dense urban areas, it is impossible to set up drive-through test centers; thus, walk-in test sites are the norm. However, these walk-in sites put health workers at risk and often take longer than drive-through testing, as medical workers require heightened PPE and sanitation standards. In Korea’s Yangji Hospital, testing booths were developed with rubber gloves inserted through the walls so that medical workers do not have to directly interact with patients. Massachusetts General Hospital

¹⁰ Location of Drive-Thru COVID19 Testing Sites across America: <https://covid19.sokat.ai>. Data obtained from the Johns Hopkins University Coronavirus Resource Center.

adopted this idea through its Springboard Studio, resulting in a reduction in the use of PPE by 96 percent and a reduction in patient testing times by 46 seconds.

Similar reverse innovation has been adopted from South Africa's contact tracing response to Ebola and South Korea's methods of information dissemination to its citizens during public health crises. The United States and European cities must continue partnerships such as that between Korea's Yangji Hospital and Massachusetts General Hospital in order to leverage knowledge sharing between cities and to encourage new innovation and process improvements across the board. In doing so, pandemic-combatting technologies will be more quickly disseminated across the globe, and city-wide responses will benefit from adopted innovations—now and for future health crises.

In addition to embracing reverse innovation, and as the West begins to reduce its dependence on China for industrial production, cities and countries in Sub-Saharan Africa that have performed beyond expectations in responding to the COVID-19 pandemic should be considered as both short-term and long-term replacements for investments in industrial production.



Potential shipping routes of major sub-Saharan littoral cities: 4,000 nautical miles or 13 days shipment time to other major cities and ports. (Source: City78)

c. Incorporate big data into smart-city solutions without trending toward authoritarian measures.

The success of many East Asian cities with regard to their coronavirus response has been due in part to their quick adoption of big data in order to conduct contact tracing. The TraceTogether app in Singapore is highly encouraged by Singapore's no-nonsense government and traces potential COVID-19 contact through the bluetooth signals that interact between individuals' phones (Government of Singapore 2020). The StayHomeSafe app in Hong Kong uses geofencing and wristbands to make sure quarantined individuals stay home and fines them \$3,200 for breaking quarantine (The Government of the Hong Kong Administrative Region 2020). In Korea, private developers created the Corona 100M app, which "collects data from public government sources that alert users of any diagnosed COVID-19 patient within a 100-meter radius along with the patient's diagnosis date, nationality, age, gender, and prior locations" (Watson and Jeong 2020).

While these efforts have proven to be incredibly successful in East Asia, Western democracies have been far more hesitant to adopt the use of such apps. For example, a Cambridge University flu contact tracing app developed in 2011 was only downloaded by 1 percent of residents (Knight 2020). This likely points to a greater emphasis placed on privacy and a skepticism toward information disclosure that is more prevalent in European and North American nations than it is in Asian countries. In fact, in Europe and North America, there are many policies that preclude companies from collecting data in the ways that are fairly commonplace in Asia. In Europe, the General Data Protection Regulation (GDPR) requires anyone seeking to process someone's data to obtain consent (Chandran 2020). Mass tracking of people's movements and contacts using smartphone location data violates this consent requirement.

And the Western fear of data usage is not without merit. Many of the strategies implemented by China in combating COVID-19, while successful, have been highly invasive. China repurposed a preexisting surveillance systems to track COVID-19 cases so that, so the argument goes, most people could return to normal life; citizens have been tracked by Chinese firms SenseTime and Megvii using facial recognition technology and AI temperature detection software to identify individuals not wearing masks and those with high temperatures, with 99 percent accuracy. Additionally, in a government-corporation collaboration, Alibaba has been sharing information about population movements with the government (Davidson 2020). Alibaba app AliPay and WeChat have been leveraged to keep individuals complicit with quarantines by using an algorithm to establish them as a COVID-19 risk and then assigning green (travel freely), yellow (one week quarantine), and red (two week quarantine) statuses, which are reported to the police.

While leveraging big data would be incredibly useful in improving contact tracing for Western cities, it is important to do so in ways that maintain public trust and uphold privacy standards. As such, opt-in contact tracing apps may be incredibly useful at the city level. In fact, such apps are already in

development in some states in the United States. The state of Virginia developed the app Covidwise (Wolff 2020), and Washington, D.C., rolled out an exposure notification app that uses a system developed by Apple and Google to alert individuals when their phone's bluetooth signals have come into contact with the bluetooth signals of an infected individual; the app is strictly opt-in and could potentially act as a framework for other cities in the U.S. and Europe.

WORLD

THE WORLD IS
TEMPORARILY CLOSED

WORLD IS
TEMPORARILY CLOSED



LOOKING AHEAD POST-COVID-19

Resilient cities of the future

As the world begins to prepare for post-COVID-19 economic recovery, cities have an important role to play in accelerating favorable outcomes. Such outcomes must strengthen structures that aim to sustain economic activity while safeguarding public health. As defined by the World Health Organization, "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (UN WHO Interim Commission 1948). As such, a near-perfect recovery must ensure a return to a work/life and school/play balance characterized by transitions between locations that are designated and designed for such activities.

Although there is both a social and an economic value in the mixing of uses, it is yet to be determined if there is a corresponding value in turning a single use into an all-purpose use — one where a location is appropriated to support the trio functions of live, work, and play. While technology and internet-powered virtual processes afford us the ability to fulfill certain requirements of daily life remotely, utility should not be mistaken for quality — in this case, the quality of life of city residents. The information and arguments presented in this paper caution against a total adoption of virtual processes, especially due to the possible risk this posture poses to productivity, innovation, knowledge sharing, and agglomeration economies.

As massive investments are proposed to shore up the economy and speed up recovery, achieving resilient economic systems must be the prime focus. These are systems that adapt to disruptions and are able to absorb shock and ensure service delivery even during major obstructive events. For example, best practices learned from the grocery store supply chain during the early months of the COVID-19 pandemic should be considered as a new industry standard, while local production, or at least production of essentials in closer proximity, should become priority.

A return to space & place

To achieve efficient and reliable economies, two important components are apparent: the maintenance of public health and the sustenance of knowledge-generating and problem-solving clusters. In the context of the COVID-19 pandemic, both have been particularly challenging, as we have seen firsthand how maintaining public health requires keeping people physically apart, while economic clustering requires the ability to congregate. To solve this quandary, a more nuanced situation-based understanding of the difference between density and overcrowding needs to be at the forefront of efforts to develop solutions for economic recovery.

Conclusion

The events of the COVID-19 pandemic now more than ever highlight the important role of resilient city structures and infrastructure in mitigating the negative outcomes of external shocks, both natural and man-made. The largely inept and slow response of many city structures in managing the pandemic is a clear sign that there remains much work to be done in achieving resilient cities of the future — cities that are powered by smart systems created to enhance quality of life rather than for any one economic outcome or for displays of superior technological ability or military might.

In achieving resilient cities of the future, a fundamental criterion is the creation of systems that further align public health structures with city management, planning, design, and smart city structures. This approach allows for a degree of flexibility to be built into city systems and infrastructure, enhancing economic resilience by ensuring continuity of service regardless of the current challenge. Of course in terms of a pandemic, this takes the form of effective containment strategies through policy actions, effective early warning systems, and leading-edge and flexible city infrastructure. As we enter the mass vaccination phase of COVID-19, this now means rapid vaccine distribution and inoculation.

According to President Biden “We must shape the rules that will govern the advance of technology and the norms of behavior in cyberspace, artificial intelligence, biotechnology so that they are used to lift people up, not used to pin them down.”

We at City78 believe the same approach should be adopted in accelerating economic recovery for post COVID-19 cities.





APPENDIX

This appendix provides the full breakdown of the City78 national and global ranking analysis, which shows city rankings based on both pre-COVID-19 and post-COVID-19 economic performance benchmarks. These rankings are based on data gathered as of August 2020 and are subject to change and updates. The rankings presented in the pages below are broken down into the following categories:

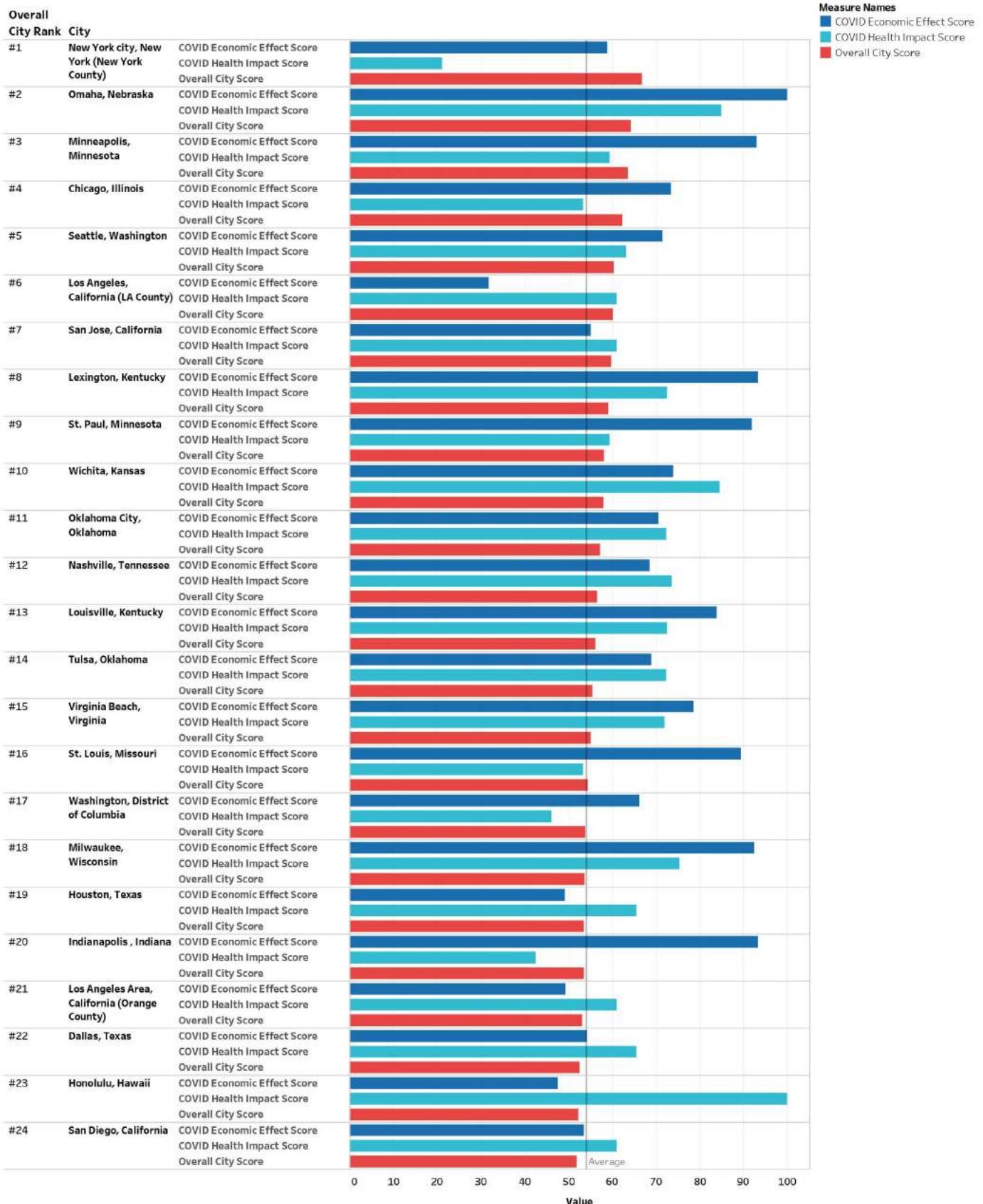
U.S. National Rankings:

- Overall City Rankings
- COVID-19 Health Preparedness & Health Impact
- COVID-19 Economic Effect & Pre-COVID Economic Status

International Rankings

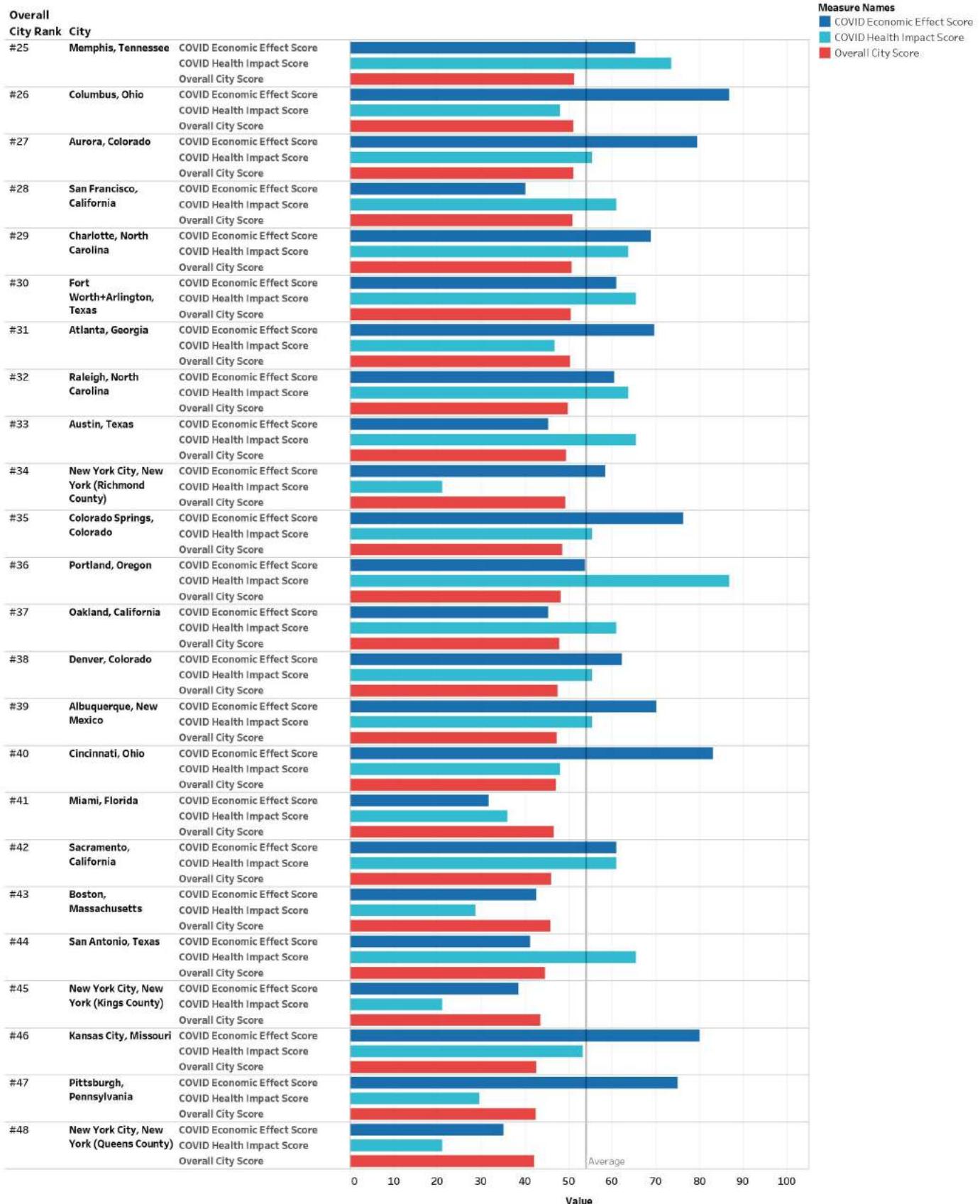
- Overall City Rankings
- COVID-19 Impact Score & Projected 2020 GDP Score
- Pre-COVID Economic Performance

National Rankings



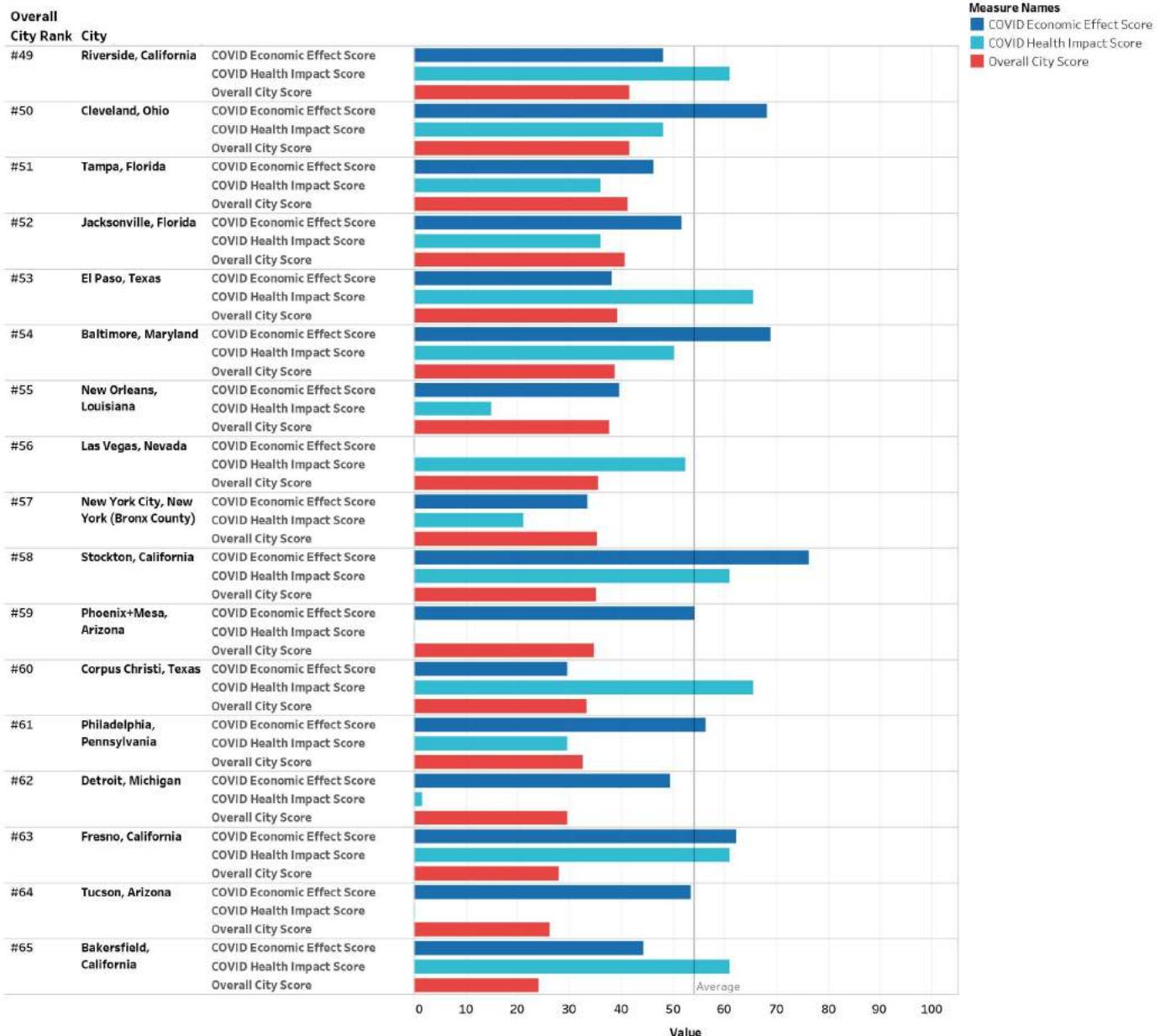
COVID Economic Effect Score, COVID Health Impact Score and Overall City Score for each sum of Overall City Rank broken down by City. Color shows details about COVID Economic Effect Score, COVID Health Impact Score and Overall City Score.

National Rankings



COVID Economic Effect Score, COVID Health Impact Score and Overall City Score for each sum of Overall City Rank broken down by City. Color shows details about COVID Economic Effect Score, COVID Health Impact Score and Overall City Score.

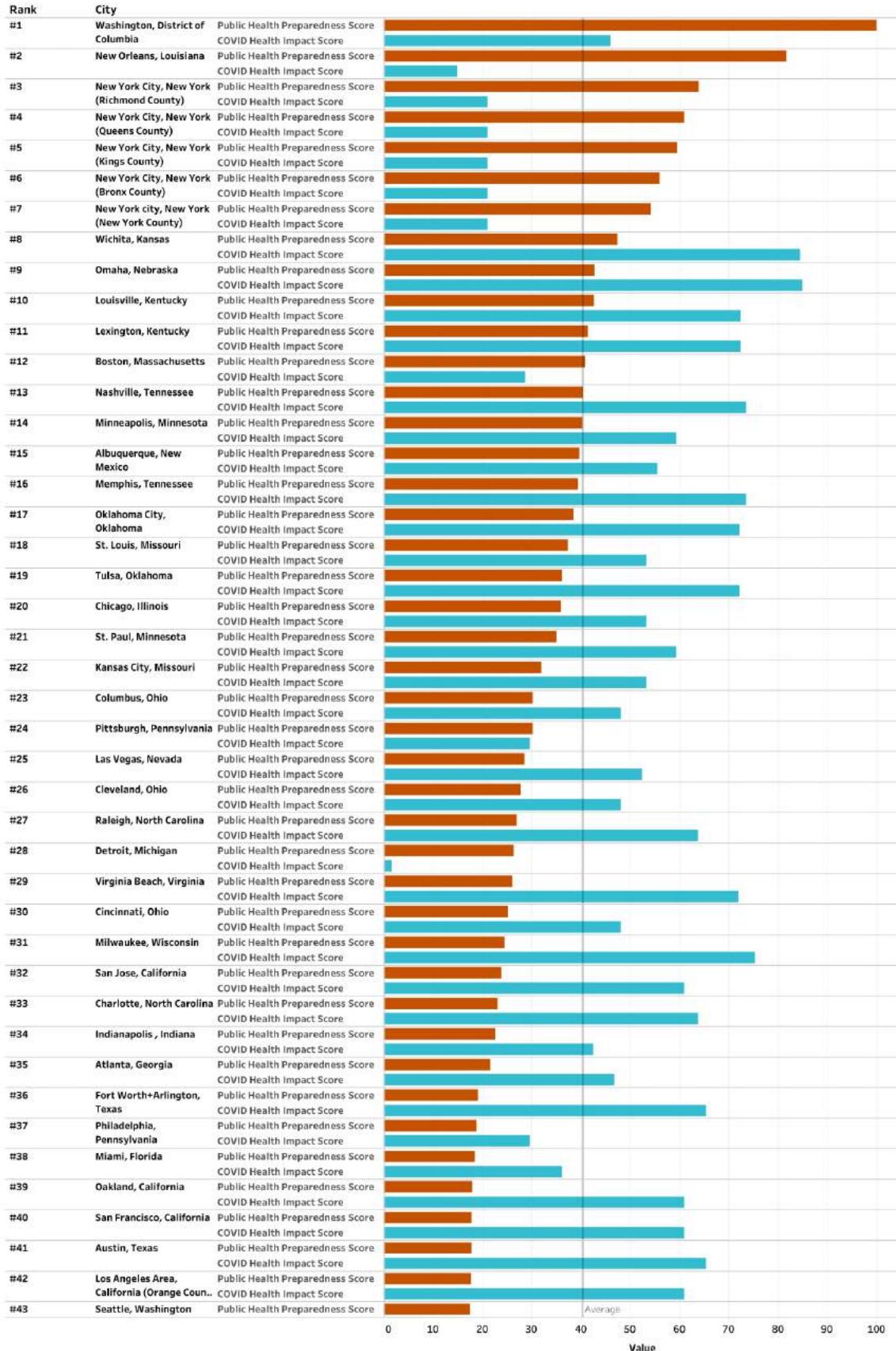
National Rankings



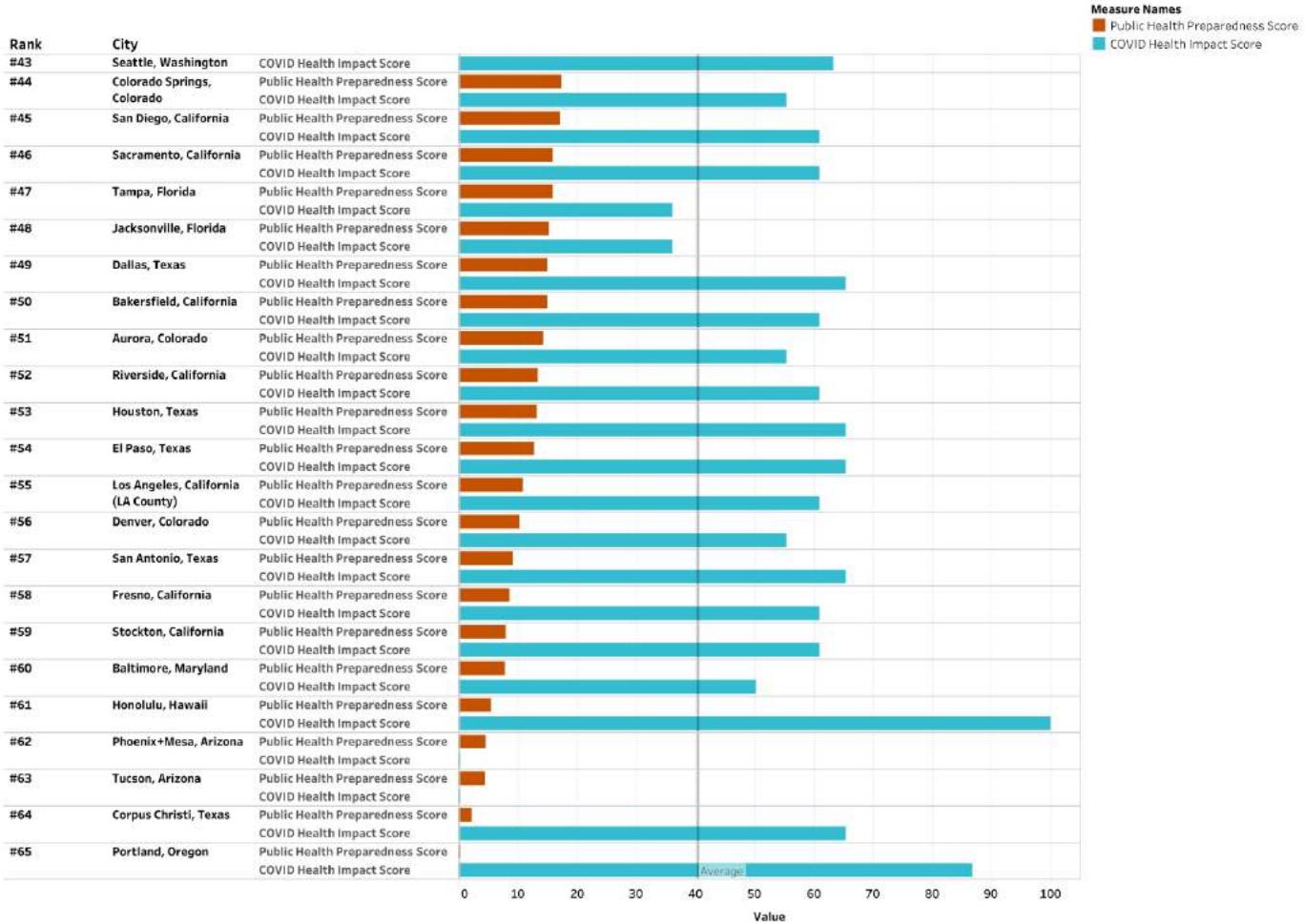
COVID Economic Effect Score, COVID Health Impact Score and Overall City Score for each sum of Overall City Rank broken down by City. Color shows details about COVID Economic Effect Score, COVID Health Impact Score and Overall City Score.

COVID-19 Health Preparedness & Health Impact

Measure Names
█ Public Health Preparedness Score
█ COVID Health Impact Score

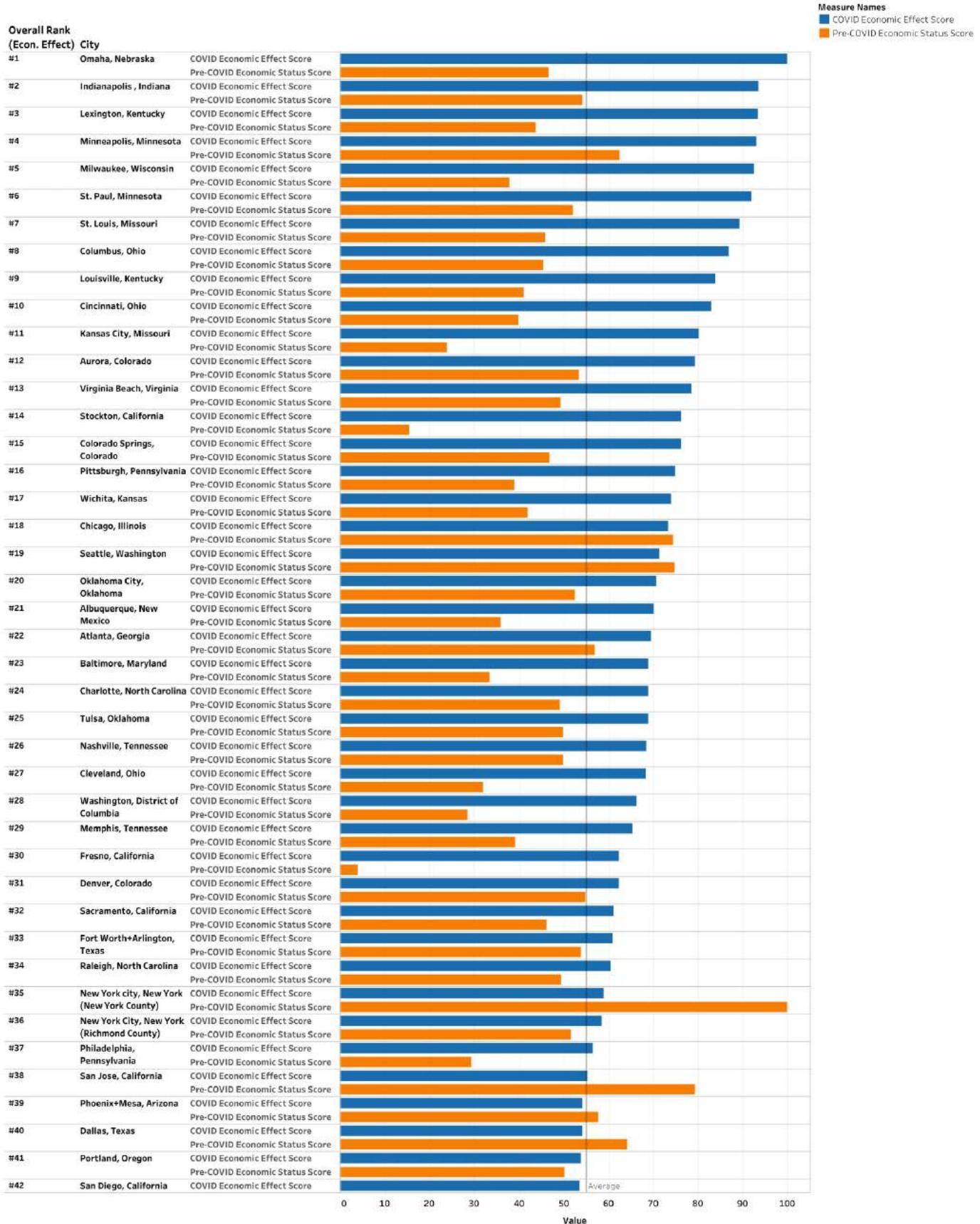


COVID-19 Health Preparedness & Health Impact



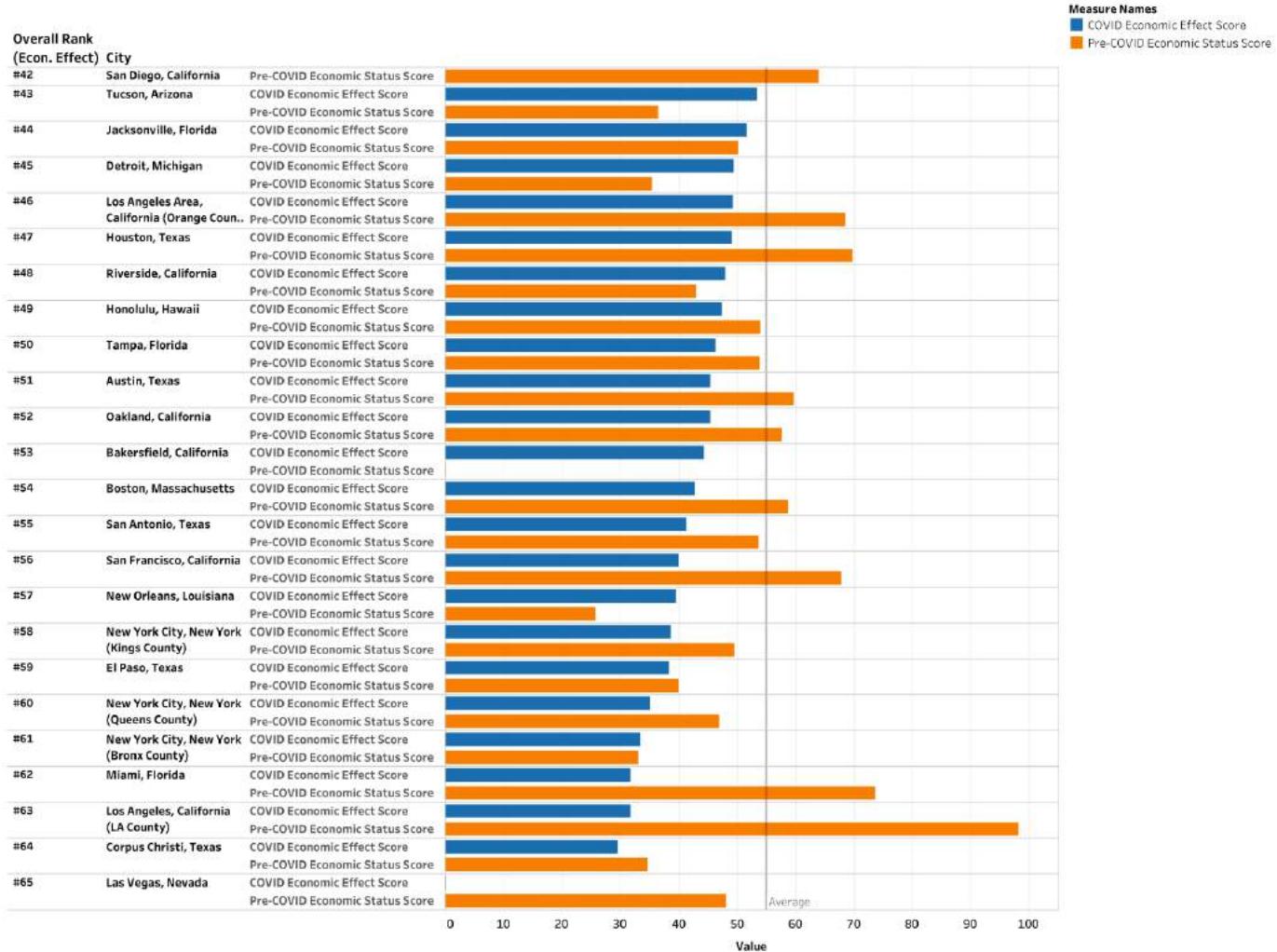
Public Health Preparedness Score and COVID Health Impact Score for each sum of Rank broken down by City. Colors show details about Public Health Preparedness Score and COVID Health Impact Score.

COVID-19 Economic Effect & Pre-COVID Economic Status



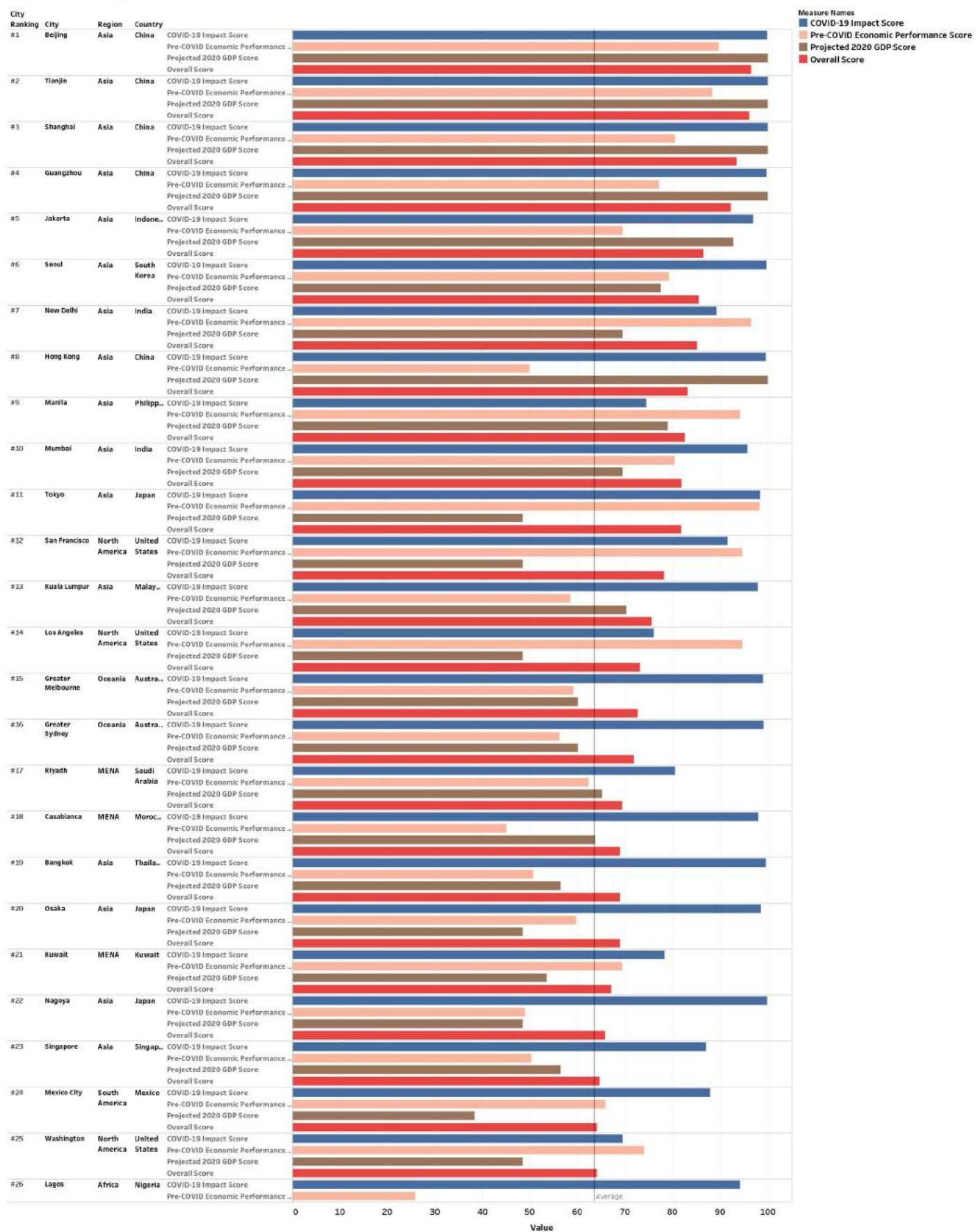
COVID Economic Effect Score and Pre-COVID Economic Status Score for each sum of Overall Rank (Econ. Effect) broken down by City. Color shows details about COVID Economic Effect Score and Pre-COVID Economic Status Score.

COVID-19 Economic Effect & Pre-COVID Economic Status



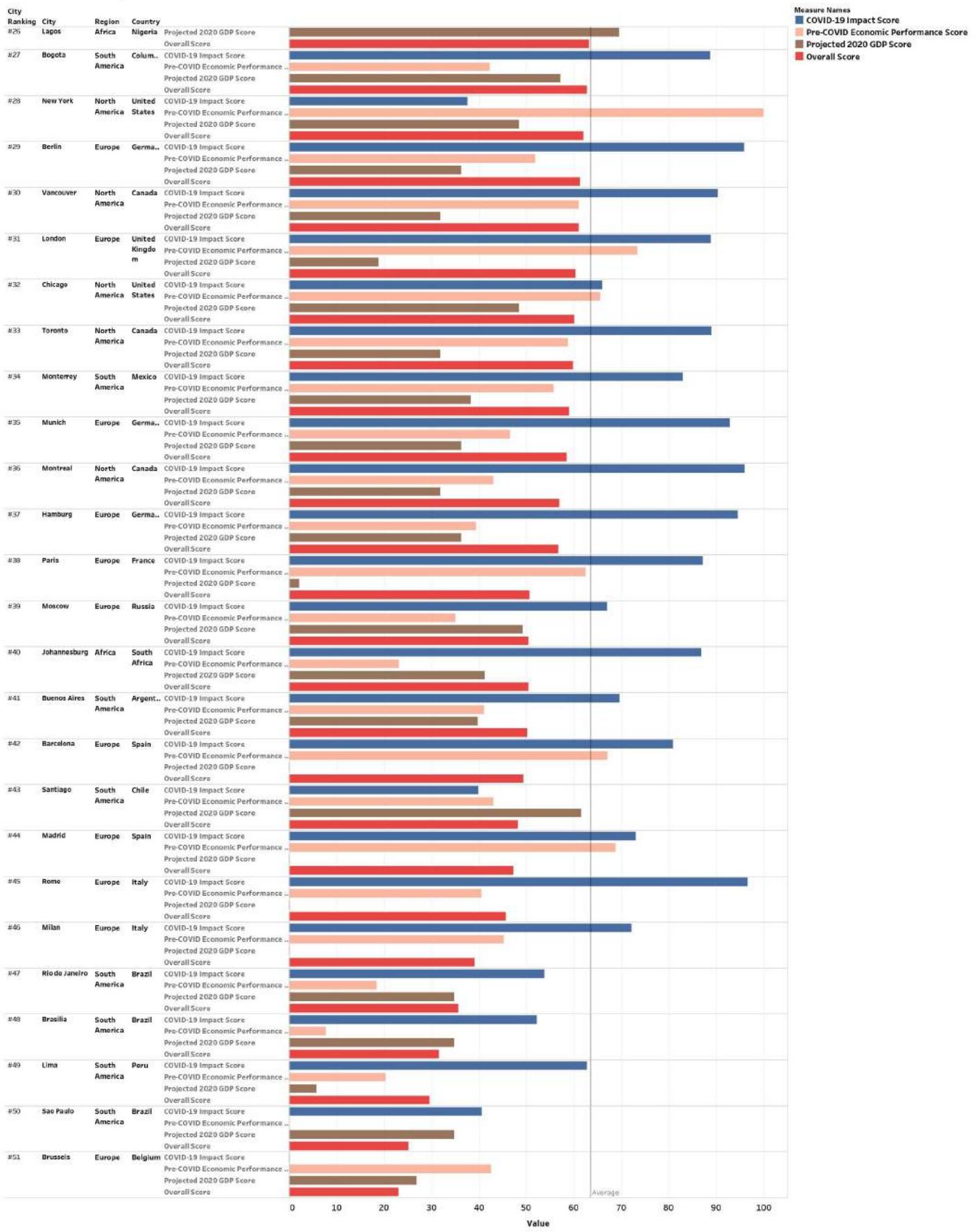
COVID Economic Effect Score and Pre-COVID Economic Status Score for each sum of Overall Rank (Econ. Effect) broken down by City. Color shows details about COVID Economic Effect Score and Pre-COVID Economic Status Score.

International Rankings



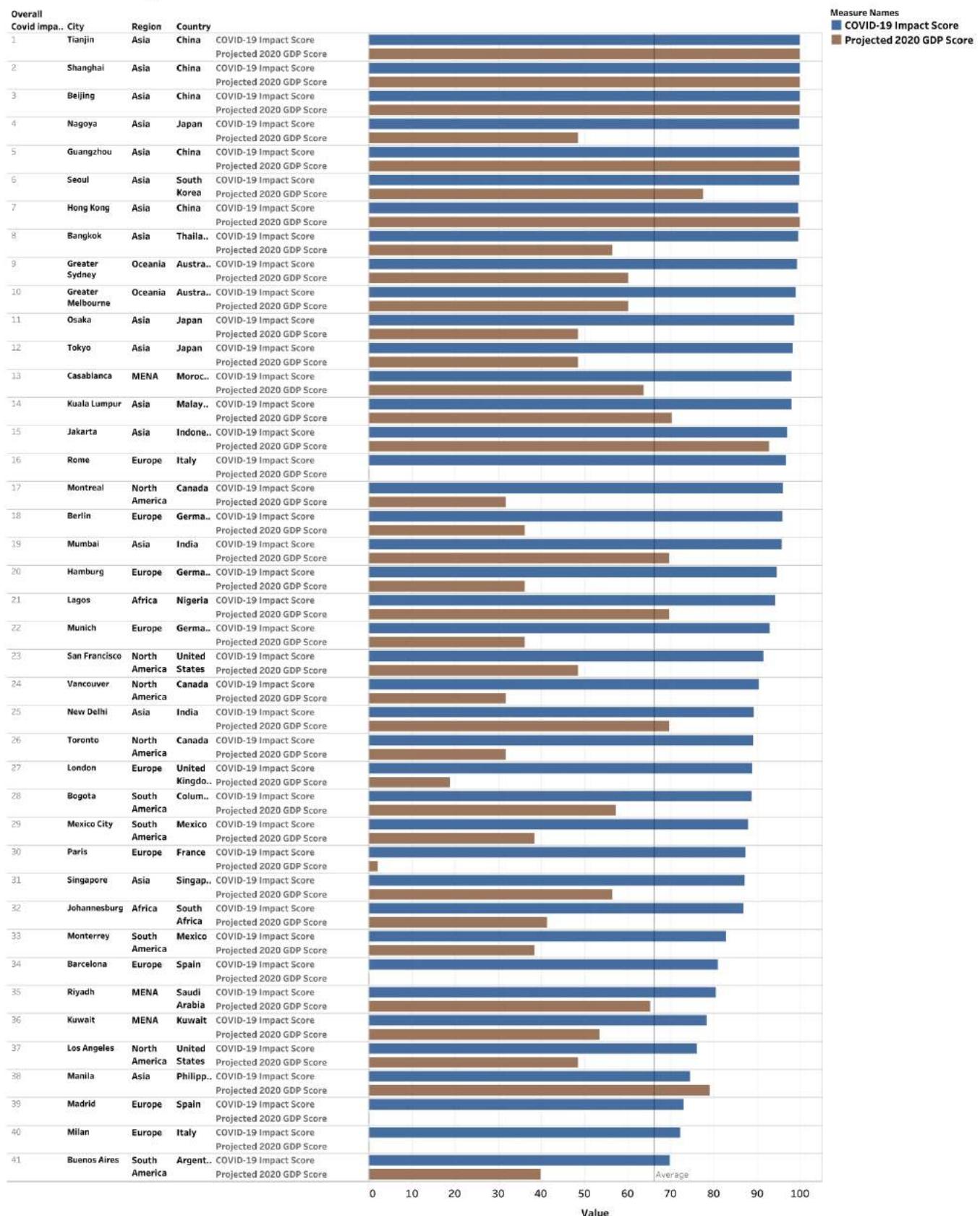
COVID-19 Impact Score, Pre-COVID Economic Performance Score, Projected 2020 GDP Score and Overall Score for each sum of City Ranking broken down by City, Region and Country. Color shows details about COVID-19 Impact Score, Pre-COVID Economic Performance Score, Projected 2020 GDP Score and Overall Score.

International Rankings



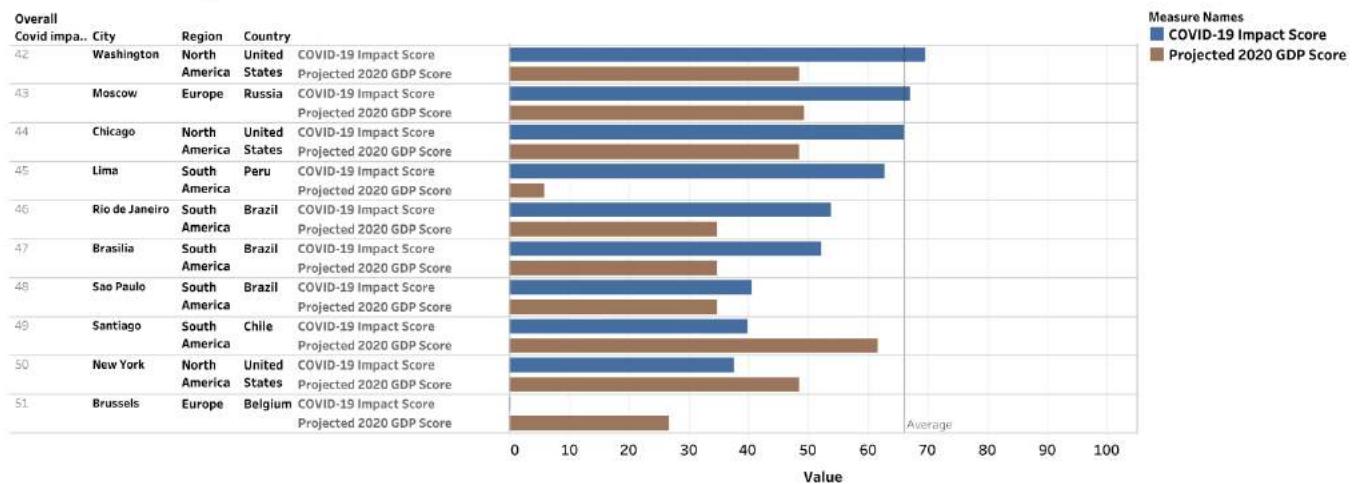
COVID-19 Impact Score, Pre-COVID Economic Performance Score, Projected 2020 GDP Score and Overall Score for each sum of City ranking broken down by City, Region and Country. Color shows details about COVID-19 Impact Score, Pre-COVID Economic Performance Score, Projected 2020 GDP Score and Overall Score.

International Rankings



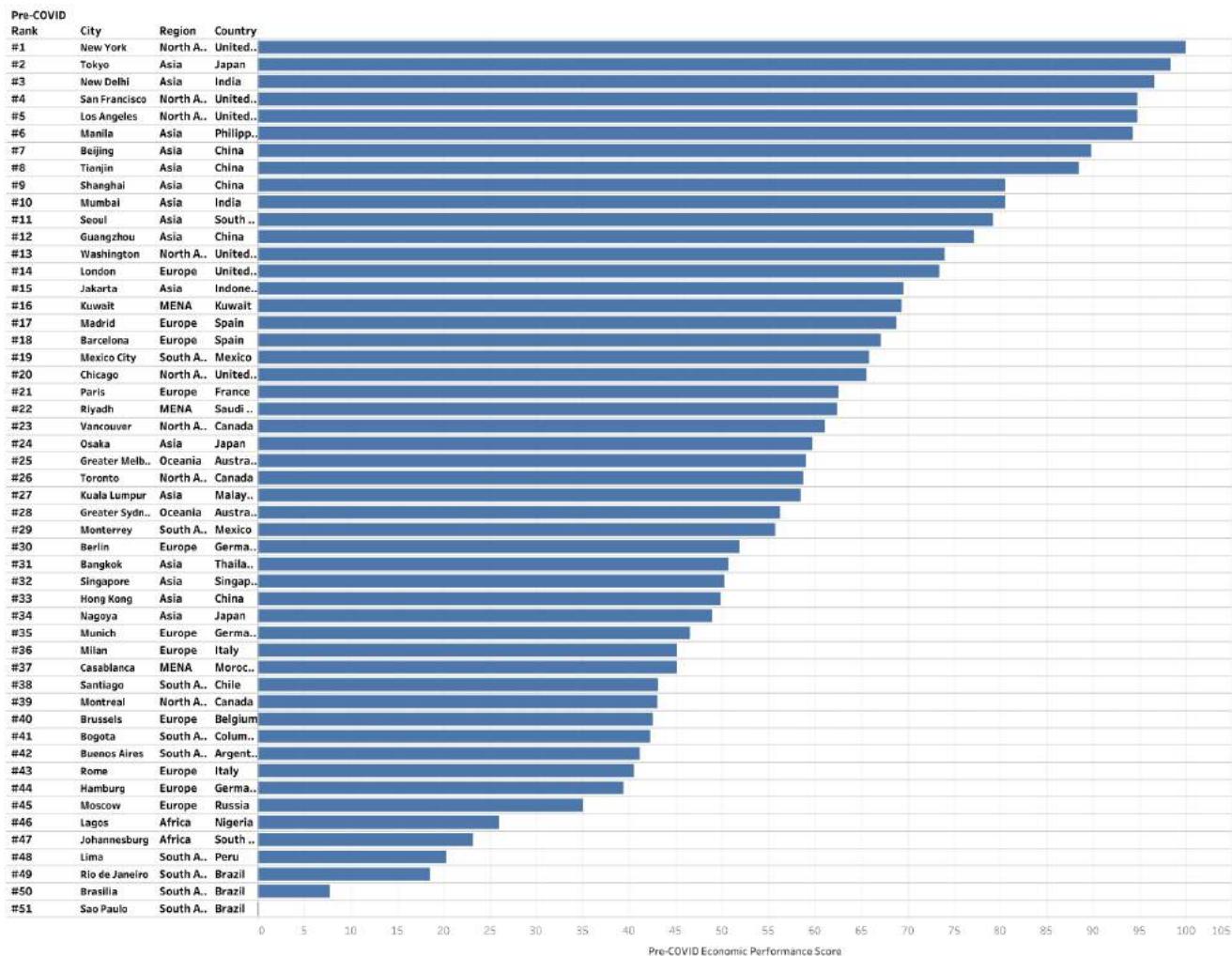
COVID-19 Impact Score and Projected 2020 GDP Score for each sum of Overall Covid Impact score broken down by City, Region and Country. Color shows details about COVID-19 Impact Score and Projected 2020 GDP Score.

International Rankings



COVID-19 Impact Score and Projected 2020 GDP Score for each sum of Overall Covid impact score broken down by City, Region and Country. Color shows details about COVID-19 Impact Score and Projected 2020 GDP Score.

Pre-Covid Economic Performance



Sum of Pre-COVID Economic Performance Score for each sum of Pre-COVID Rank broken down by City, Region and Country.

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