

Memorandum 2

Meeting Date: March 8, 2019

MEETING 2 SUMMARY

The second Futures Working Group meeting kicked off with a recap of the first meeting, which defined exploratory scenario planning using emerging and future trends and forces to develop alternative future scenarios. These trends and forces are seen as likely to happen (good or bad), but are not normative in the sense what we would want them to happen. The first meeting resulted in 41 forces nominated as the most important and relevant by the break out groups. DVRPC staff condensed these into a working list of 15 forces. The goal of this second meeting is to end with a maximum of 20 forces to be included in a voting exercise. At the end of the first Futures Working Group meeting, participants voted on the nominated list forces they would like to know more about. The top three working list forces (determined by carrying through votes from nominated forces as they were combined into the working list) for more information were then identified as: socioeconomic inequality, the Digital Revolution, and international upheaval and (im)migration.

Knowledge Presentations

Socioeconomic Inequality, *Tayyib Smith, Little Giant Creative*

- The architecture of inequality is built off unequal access to capital, homeownership, and education. We live in a society with a myth of meritocracy.
- Capital:
 - Poor minorities lack a funding mechanism to improve their houses. Lack of access to capital makes selling to a more capitalized person the only opportunity.
- Homeownership:
 - The 20th century economy employed exclusionary tools, such as redlining, that kept minorities out of many communities. Development of the suburbs left space for minorities in urban areas.
 - Now, with increasing interest in urban living, minorities are being pushed out, and there is nowhere for them to go.
- Education:
 - Of those who are between 16 and 24 years old in North Philadelphia, somewhere between 25 and 29 percent aren't employed or in school.
 - Mostly-black schools in Philadelphia spend ~\$9k/student, versus \$23k/student in Lower Merion
- If the current trends in inequality continue, then there will be complete cultural erasure. Already, many areas that 20 or 30 years ago were largely African American spaces have been overtaken.
- We need to find ways to benefit from increased urban investment without displacing existing residents.

The Digital Revolution, *Nihit Jain, IBI Group*

- A convergence of digital technologies has resulted in many people tracking 1:1 interactions via phones, coined as the Age of Surveillance Capitalism.
- We've entered the CLIOS (Complex, Large-scale, Interconnected, Open Systems) Systems Era.
 - Infrastructure Era -> Systems Era -> CLIOS Systems Era.
 - A change in one system affects the next.
 - E.g. Inequality is both a symptom and a cause.

- Moved from physical to virtual, with technology as a common force on all systems.
 - Case Study: Transit fare collection systems.
 - Physical token -> information stored on physical media -> information stored centrally -> information inferred? (future).
 - Inferential payment scheme is good for vendors (e.g. SEPTA, who may capitalize off data), but is solving what problem?
- Bias in how information is collected and presented, e.g. known inequalities in facial recognition.
- Unknowns: winners and losers, inequality, effects of underlying complexity, design bias.
- Potential to be left behind, digital literacy and education, strength of some sectors, potential to leapfrog early adopters elsewhere.
- What happens if people try to take ownership of their own data?

International Upheaval and (Im)Migration, *Lauren Hansen-Flaschen, Visit Philly*

- Globalization of economy
 - Global value chain disruption, local impacts can have worldwide effects.
- Threats to Global Economy.
 - Food insecurity.
 - Civil unrest.
 - Vulnerable infrastructure.
 - Interdependence of financial systems.
 - Environmental.
 - Technological.
- Growth of global tourism.
 - Can't be easily outsourced.
- Global Immigration.
 - Rapid growth in foreign-born residents since 1975 (+15%).
 - U.S. has largest numbers of migrants.
 - Migrant population becoming younger.
 - Refugee crisis: international responsibility sharing has collapsed.
 - Immigration to U.S. has declined, in part due to federal policy.
 - Philadelphia immigrant population has grown 69% from 2000 to 2016 (15% total); has driven population growth and entrepreneurship.
- Global factors influencing international travel to U.S.
 - Trade war with China.
 - Inflation.
 - Strength of the U.S. dollar.
- Dovetailing of forces.
 - What is the effect of migration to Philadelphia on regional poverty rate?
 - Relationship to Climate Change? Intergovernmental issues impact response.

Group Discussion, Research Statement

The Group refined and finalized the research statement that is guiding the exploratory scenario planning effort. General comments and discussion on the research statement:

- What does 'test uncertainty' mean?
 - Essentially it is how well we can guess the outcome of a force. Do we think it is reasonably predictable to go one way or another? Or do we think there are a number of different ways it could turn out.
- Should demographics be explicitly mentioned?
- Add infrastructure as a specific impact
- How do we deal with uncertainty in all 15 forces? We'll focus on those with the greatest uncertainty.
- How to isolate causes and effects? Hard to do, climate change is causing a lot of effects, but is primarily being caused by the burning of fossil fuels.
- Risk of oversimplifying complexity of these systems and their interdependence

- How to insert 'black swan' events? These may have major impacts on the region, but are much more difficult to predict. They may be incorporated into scenario causal chains.
- Add 'characterize [and test] uncertainty' to the research statement.
- Capture youth voices and other underrepresented groups in the planning process.
- Can capture complexity through narrative and storytelling rather than traditional quantitative methods.
- Missing focus on education; public health (in Vision).

This feedback was incorporated into the final research statement:

Characterize and test uncertainty from societal, technological, economic, environmental, and political trends and forces in Greater Philadelphia between the present and the year 2050, which may:

- *Pose new opportunities and risks to the region, and to various socioeconomic groups within it;*
- *Affect predictability in the region's demographics, economy, land use, infrastructure, and travel patterns; and*
- *Impact the region's ability to achieve its vision, to:*
 - *Preserve the environment,*
 - *Build livable communities,*
 - *Expand the economy,*
 - *Advance equity and foster diversity, and*
 - *Create an integrated, multimodal transportation network.*

Group Discussion, Finalizing the Voting List Forces

Discussion started from working list. Recommendations and suggestions as follows:

- Combine MaaS and Transportation Technology Deployment under different name?
 - Also delivery on demand?
 - Both forces could still happen independently.
 - Outcomes are related.
 - Generally about how goods/people move through the city.
 - Radical change in transportation/mobility."
 - "Radical" implies strong change and maybe underestimates uncertainty. "Fundamental" may be better.
 - Fundamental change in mobility, particularly in terms of trip frequency and distance. (General group consensus on this as the new combined 'Mobility as a Service' and 'Transportation Technology Deployment').
- Don't try to guess exactly which change will occur.
- Some forces are causal and should be combined with their effects.
 - Many forces might have a relationship to climate change.
 - Causal loop diagramming processes might be helpful in understanding scenarios.
- "Updating Infrastructure."
 - Is dependent on mobility change.
 - Should be reinventing (General group consensus); more in terms of how it is paid for or financed.
- Sharing, or change in individual's willingness to share seems like a potential force.
 - Tied to political dysfunction.
 - Is sharing seen as growing the pie, or giving up a slice of it so others can have more? If it's the latter, is this captured in socioeconomic inequality?
 - Seen more as people's willingness to share the same space, such as transit.
 - What about retreat from the public sphere vs. reinvestment in it?
 - How willing are people to share outside their self-defined tribe? Will we get to a point where people will see their tribe as global, or at least national?
- Have the specific scenarios been identified yet?
- Be ready to adapt to how we're wrong.
- Missing focus on changes to Eds and Meds industry, ripe for disruption.
 - Online education.
 - Single-payer healthcare.

- Merge low-density divestment and shifting demographics? (General group consensus).
- Shifting demographics combined with social/political dysfunction?
 - Separate disintegration of social cohesion? Related to sharing?
- Missing focus on food supply.
 - Related to climate change, but also other issues like unforeseen pests.
- Merge digital revolution and workforce automation (General group consensus).
- Modify 'Global Economy' to also address Greater Philadelphia's role in the megaregional economy
 - NEC .
 - Amazon and others desire to be in the megaregion.
- Waste management and disposal/sanitation.
 - China no longer taking our recyclable materials.
- Public health crisis.
 - Mosquito and tick borne diseases migrating to the region due to climate change.
 - Heat islands.
 - Equity.
- Reword description of socioeconomic inequality.
 - Inequality intersectional with others, and include built-in biases.
- What about energy? It's largely missing from these forces. Increasing use of cost competitive solar and wind, improving battery storage technologies, and microgrids could lead to a clean energy revolution.

Voting List Forces

The group discussion in the second meeting ended up with the following revised list of 18 voting forces.

1. **Clean Energy** - Increased consumer willingness to be off the grid and reduced cost of solar, wind, and other forms of renewable energy, along with battery storage technologies and microgrids create a revolution in energy production and distribution.
2. **Climate Change** – More severe storms and storm surges, more heavy rainfall in some areas and droughts in others, higher temperatures and more temperature extremes, and increased sea levels cause major disruptions throughout the world.
 - Resiliency will require green infrastructure and fact-based evidence to combat environmental degradation, while both fighting the impacts and adapting to them.
 - Population shifts to more desirable regions and areas within them (higher ground, less need to consume energy). This further bifurcates the haves and have-nots—especially for the communities that lack the financial resources to rebuild, and leads to very uneven health outcomes. Migration from most affected areas includes the coasts and Central America.
 - Risks include negative impacts to infrastructure (roads, bridges, rail lines, PHL); vulnerable populations become more vulnerable; property damage/loss from extreme weather; adverse human health impacts, including higher mortality from heat waves; resource wars; and there has already been a significant decline in biodiversity, including insect populations—the foundation of ecosystems, which will ripple up through the food chain and be exacerbated by climate change and habitat loss.
 - Opportunities may emerge from increased population and economic growth from climate refugees entering region; and potential for job expansion around a 'green new deal' or similar legislation; radical shift away from fossil fuels with massive investments in wind, solar, battery technology, and conservation.
 - Rapid growth in clean energy technologies risks labor force displacement and creates need for workforce retraining programs.
 - Outcomes could be worse with continuing availability of cheap fossil fuels, cars, and sprawling development patterns; which would increase driving, air pollution, greenhouse gas emissions, and congestion.
3. **Delivery On Demand / End of Bricks & Mortar Retail** – An intensification of current trends toward shrinking retail square footage and increased package delivery.
 - This may shift land use demand with a need to repurpose retail space, put more small trucks on the region's roads, and impact the local economy.
4. **The Digital Revolution** – The universal computer language of ones and zeros brings about a convergence of digital technologies such as the Internet of Things (IoT), big data, artificial intelligence, robotics, 3D printing, and

others. Automation replaces many of the functions traditionally done by humans, providing exciting opportunities to change the nature of work, our lifestyles, education, healthcare, and how we get around.

- Technology may help people live longer, create new modes of transportation, work and shop more from home, enable cloning, require more (cyber) security, and increase complexity.
 - Technology may level opportunities and access to them; or it may lead to more unequal access, changing job markets, and less demand for labor.
 - Digital technologies and real-time communications continue to decrease all costs—including transaction costs—growing the freelance, gig and shared economies while also building momentum for a cashless society. This strengthens the creative class and businesses that cater to it (such as coworking space); but may increase economic polarization, reduce the size of the middle class, increase gentrification, and push low-skill or low-income people out of the city.
 - As data and information become more and more the basis of the economy, universities and colleges may become more important economic development players, or they could be completely disrupted by new forms of learning.
 - Increased access to information can lead to a more informed and connected populace. However, more people may be left behind if technology is used to restrict equitable growth.
 - Digital technologies enable remote actions, and flatten the effects (and costs) of distance.
 - Robotics, artificial intelligence, and other technologies change the nature of work.
 - Due to automation, individuals have less work available to perform; but society needs less labor to provide the goods and services that comprise the modern economy. Informal institutions will become more important as a result, and a universal basic income may be inevitable.
 - This may result in loss of jobs, dissolution of social safety net, new labor and skill demands; and change household location decisions, commuting patterns, educational needs, and the type and quality of jobs available.
 - Greater Philadelphia's workforce may fall behind, and lose economic vitality due to skill mismatches.
 - Digital technologies may simultaneously link us together with like-minded people from around the world, while further isolating us from our neighbors. This may increase the effects of the 'filter bubble,' where we increasingly see only information that confirms our viewpoints (and little information that challenges our views). Since each person receives personalized info, everyone has their own version of reality.
 - Alternatively, a major technology failure may increase desire for non-technological solutions and competencies.
5. **Disintegration of Social Cohesion** – Lower trust in government, social, and religious institutions, along with people moving more frequently and having shorter-term jobs, limits the ability to form close relationships with neighbors and colleagues, increases divorce rates, reduces participation in civic and social activities, and increases addiction rates.
6. **Disruption of Meds and Eds** – The region's economy is thrown into turmoil as these key industries digitize—moving more of their activities online—reducing the importance of place in higher education and healthcare.
- Move to single-payer health insurance could also have major implications for healthcare delivery. The Affordable Care Act has led to major consolidation of hospitals to achieve economies of scale, while decentralizing outpatient care.
7. **Fundamental Change in Mobility** – Travel frequency, trip lengths, and willingness to share space greatly change due to shared mobility services, automated vehicles (AVs), electric vehicles (EVs), connected vehicles (CVs), and the Hyperloop.
- Advances in computing and artificial intelligence are being applied to and tested in automobiles. They are likely to initially be used in public vehicles.
 - This impacts goods movement, homeownership, and development patterns.
 - Development of lightweight, high power, high-storage batteries.
 - Reduced air travel, longer commute distances, reduces in freight congestion.
 - Use technology to manage all movements and link trip planning to single personal transportation account, which also pays for tolls, fares, parking, and shared mobility services.
 - Makes it easier to move in a multimodal fashion and integrate all personal and freight delivery data into planning tools that administer investments, manage curb space, and enhance traffic flow.

- All modes may see an increase in use, but competition could alternatively drive down transit ridership and personal vehicle ownership.
 - Public space becomes more "activated" but more chaotic.
 - With venture capital backing, there may be increasing private market control over the transportation network. Will this lead to disinvestment by the public sector in infrastructure as infrastructure becomes increasingly hard to fund without major reworking of taxes? Will private firms fill the void with control over both transportation services and the infrastructure they use (moving from Mobility-as-a-Service to Transportation-as-a-Service)?
8. **Greater Philadelphia in the Global Economy** – Greater Philadelphia and the Northeast Corridor megaregion expand global value chain connections within international markets—thanks to an increasing global middle class—attracting and growing new exporting industries.
- What will be our niche markets? How do we serve and engage locals? What are the effects on real estate?
 - Global Value Chains (GVCs) are the result of companies increasingly locating productive activities in many countries around the world due to lower trade and investment barriers, decreasing transportation costs, and advances in information and communication technologies (ICT).
 - The growing global middle class creates potential economic opportunities.
 - The region's location in the NEC corridor megaregion is a strength, so long as the rest of the megaregion's economy continues to grow.
9. **Housing Shortage** – The region's (and nation's) housing supply hasn't kept up with growing demographic and household diversity. New housing models are needed, along with an increased supply of co-generational, infill, and affordable units.
- Population growth in the city of Philadelphia is limited by lack of quality housing, zoning that overly restricts density, and the high cost of new construction.
10. **Income Redistribution** – Worsening inequality, exasperated by technology and capital replacement of labor, leads to an increasing redistribution of income through tax policies, universal basic incomes, and other mechanisms.
11. **International Upheaval and (Im)Migration** – Refugee crises, uprisings, food shortages, rising authoritarianism, civil unrest, terrorism, and climate change increase population movement and risks to supply chain and trade disruption.
- Immigration makes a large part of regional population growth, but the amount and composition is highly dependent on national policy and global economic trends.
 - It is less clear whether international migration rates will substantially increase or decrease, and how skilled they will be.
 - Climate change will result in significant internal migration, which Greater Philadelphia may be a prime receiving area for.
 - Further risks for disease migration, cyberwarfare, and non-state threats.
 - The emergence of global value chains, international interconnections, increasing specialization, and concentrated production areas increase the risk of local events creating global disruptions.
 - Failure of a single link can result in cascading system failures. As a result, national economies are now subject to systemic risk from breakdowns to the entire system. These potential risks include: epidemics and pandemics; resource and food shortages and price volatility; geopolitical disruptions; infrastructure failure (and potentially cascading failures given that so many infrastructure systems are interdependent with each other); interconnected financial systems that can quickly fan the flames of a crisis; lean global supply chains lack redundancies and can quickly break down, causing problems downstream; natural disasters and extreme weather, and disruptions to information and communications networks.
12. **Public Health Crisis** – Failure to treat chronic illnesses at their root causes, climate change impacts, declining effectiveness of antibiotics, and other health concerns means that today's younger generations will face more health problems and live shorter lives on average than previous generations.
- These problems are exacerbated by a warming climate that spreads mosquito and tick-borne diseases and their carriers into the region, increases the urban island heat effect, and unearths some of history's long frozen viruses.

- Potentially major equity implications, as low-income communities are often the first impacted or bear the greatest risks.
13. **Reinventing Infrastructure and its Financing** – New technologies will require major investments in updating infrastructure. The public sector will need to step up and provide new sustainable ways to fund infrastructure state-of-good repair, technological, and other needs. Or else the private market may step in.
- Will we be left with crumbling infrastructure? Addressing infrastructure challenges will be difficult without reworking funding mechanisms in ways that increase revenue.
 - Or will the private market fill the void, even though it could present a whole host of problems, and may not benefit the public.
 - Failure to upgrade infrastructure leads to constant gridlock, and secondarily impacts commuting patterns, and locational and home ownership decisions.
 - Mobility-as-a-service and other transportation technologies may reduce private vehicle ownership and demand for parking, while increasing demand for use of the curb. Need to consider potential reuse for parking facilities.
 - Greater Philadelphia is particularly dependent on uncertain state and federal transportation infrastructure funds, and lacks a local funding source to improve transit and make necessary capital investments.
 - Increasing concern about health impacts from water quality.
14. **Shifting Demographics and Locational Preferences** – Aging population, gentrification and displacement, immigration, decreasing birth rates, and other sociodemographic factors will lead to major changes in the region. As the maintenance bill comes due for decades of low-density suburban infrastructure maintenance, economic and demographic forces combine to increase demand for compact, walkable communities.
- Aging population, gentrification and displacement, immigration, and other sociodemographic factors also lead to regional locational preference shifts.
 - Impacts healthcare costs, employment, social interaction, co- or multi-generational living, population growth and fertility rates (for instance: baby boomers and Japan's negative birthrate), economics of aging population (the 'silver economy'), and unseen health factors (such as birth defects from lead).
 - Stagnant wages and increasing personal debt are causing more families to live in multigenerational households.
 - Individuals living in poverty may increasingly be pushed into the suburbs.
 - More population churn due to fast-changing economic activities. People continue to 'self-sort' their communities by race, class, and political affiliation.
 - People live longer lives, stretching their retirement savings, and impacting stock market valuations as aging individuals exit long-term equity holdings.
 - With no appetite for raising taxes to pay for higher per-capita exurban infrastructure costs, demand for auto-dependent suburbs may decline—causing an additional push factor as tax revenues decline leading to service cuts.
 - Aging baby-boomers may be stranded in car-dependent places after they can no longer drive.
 - Fewer nuclear families reduce the demand for low-density, single-family homes.
15. **Social and Political Dysfunction** – Increasing polarization leads to an inability to advance legislative agendas. This creates more funding risks for soft and hard infrastructure, and reduces the ability to solve big problems.
- Widening gaps among groups based on political ideology leading to distrust of government, with more nationalistic anti-immigration, anti-diversity, and anti-urban views.
 - Desire for political change—and concern for the environment— may promote more dialogue between disparate groups, and encourage more women and minorities to run for political office, diversifying governments at all levels.
 - The region must find ways to re-integrate individuals and areas, who have long been long been left behind due to the decline of manufacturing, back into the economy.
 - Homelessness is increasing in the city and region due to the opioid crises. Individuals who are homeless have a difficult time finding housing, connecting to social services, and making life improvements. Crime is increasingly concentrated, and routinely pops up in new areas.
16. **Socioeconomic Inequality** – Continuing and growing income and wealth disparities propel disparities within and between cities and regions. The wealth gap can lead to physical hyper segregation and inequitable access to jobs, healthcare, education, and other common goods.

- Statistics corroborate the feeling that there is growing inequality between the rich and the poor, and a shrinking middle class.
 - Disparities in wealth exacerbate other social divisions along lines of race, gender, and citizenship status, feeding into political ideologies of racism, ethnonationalism and anti-immigrant movements, as well as counter-movements.
 - There is also a disparity in the equitable distribution of fresh, nutritious food.
 - Nationally and globally, the wealthy shape public policy and consumer markets to their benefit, which increases distrust and social unrest.
 - In Greater Philadelphia, there is a shrinking middle class, a shortage of affordable housing, gentrification and displacement, a lack of intergenerational wealth and access to capital for people of color, and unequal levels of job opportunity and training.
 - May lead to a grassroots and community focused push to invest in distressed urban areas; and redistribute income through a universal basic income and a more progressive tax system.
 - At the same time, inequality between regions is increasing as economic ‘superstar’ regions extract wealth from those that are less successful in the digital information age.
 - Identity politics, such as race/ethnicity, nationalism, and gender/sexuality, are the subject of a growing tension, but this different than the socioeconomic issue.
 - Intersectional inequalities describe the interaction between socioeconomic inequality and other social hierarchies, for example women generally having less wealth than men, minorities having less wealth than whites, newly arriving immigrants having less wealth than long-term citizens.
17. **Technocracy** – Massive quantities of information, real time responsive systems, big data analytical models, artificial intelligence, and winner-take-all economics due to network effects concentrate the power in very large organizations (businesses or states).
- Laws, rules, and norms are changed in ways that benefit data owners; resulting in more digital divisiveness and inequality; and opportunities to expand communication, accessibility, and public outreach.
 - Cities become more efficient through deployment of artificial intelligence combined with real-time data collection; these systems sense, change, and guide flows through urban space.
 - Risks may include a loss of privacy, discriminatory and biased algorithms, and increasing control and power over citizens’ lives.
18. **Waste Management** – China’s refusal to take on any more recyclable materials has led to a crisis of disposing of and reusing a steadily increasing material flows. More waste collection needs impacts traffic flow and increased demand for curb space.

The third meeting will be held on **Thursday, April 11, 2019** and will focus on scenario implications. Table 1 details the changes in the forces from the working list to the voting list. Beyond these changes, many individual indicators had their definitions revised to improve clarity and comprehensibility. Thanks again to all the Futures Working Group members who provided guidance to revising these forces.

Table 1. Voting List Revisions to Working List Forces (Meeting 1 Outcome)

| Voting List Force(s) | Action |
|--|---|
| Clean Energy | Added new. |
| Digital Revolution | Now incorporates Workforce Automation. |
| Disintegration of Social Cohesion | Added new. |
| Disruption of Meds and Eds | Added new. |
| Fundamental Change in Mobility | Combined from Mobility-as-a-Service and Transportation Technology Deployment. |
| Income Redistribution | Added new. |
| Public Health Crisis | Added new. |
| Reinventing Infrastructure and its Financing | Renamed and revised Updating Infrastructure. |
| Shifting Demographics and Location Preferences | Combined from Shifting Demographics and Low-Density Divestment. |
| Waste Management | Added new. |