

Communities of Tomorrow: Where Will the Future Come to Live?

by futurist Richard Worzel, C.F.A

The futurist community has a saying: Someone always benefits from change. To which I add: Make sure it's your community.

This is my central message, so as I move through the various topics of my presentation, ask yourself: How can **my community** benefit from the changes to come?

The alternative is to let the future happen to you, probably producing results you don't like. For example, cab drivers in the age of Uber and Lyft ride-sharing are outraged about this development – but that won't help to prevent it.

You can argue that the changes coming are wrong, unfair, or should be prohibited, but that's like arguing the tide shouldn't be allowed to come in, or that whale oil producers should be protected from the emergence of electric light. Perhaps you are right – but the future doesn't care.

The real question is: Are you going to make the future work for you, or will you be steamrolled by it?

With that said, let's focus on the major forces that are driving change within your communities.

Technology: Smart Computers

Smart computers (which include, but isn't limited to, Artificial Intelligence) are going to produce changes at least as dramatic as the introduction of the Internet.

Let me start by defining some terms, and illustrating some of the technologies that are emerging.

Artificial Intelligence (AI) allows computers to mimic or improve on what humans do in specifically defined areas. There are lots of different definitions of what AI is. I read one article that claimed there were 33 types of AI, which does not help in trying to understand what it is. So let me offer a definition: AI is a computer system that is adaptive, and can solve problems, including problems that humans haven't, or can't, solve.

There are three critical things to know about AI.

First, AI is the Swiss Army knife of technology. It can be used in many, many applications, including ones you might not expect. It's not restricted to robots, or blue-collar work.

Second, AI is not a shrink-wrapped product. It is difficult to establish. It requires lots of clean, relevant, and timely data. Those who plan to use it must have incisive analytic capabilities to allow the AI to identify the patterns or things they are seeking. And finally, the users must have a clear definition of what their objective are. If you don't know what you are seeking, it's going to be hard for an AI to achieve it for you.

And third, once established, the effects of AI cascade very quickly. For instance, once a front-line function is automated, the supporting jobs often disappear very quickly.

So, AI is a very powerful tool, but it's not a magic wand, and you shouldn't approach it as such.

But AI is not the only way computers will be useful. **Evolutionary algorithms** are techniques to solve problems involving mammoth amounts of multi-variate data. Hence, it might be used to come up with a dynamic traffic management system in a major urban centre, with new solutions emerging all the time as traffic patterns shift, rather than relying on a static traffic controller based only on historic patterns.

Fog computing is the step beyond Cloud computing. Fog computing performs computations at the edge, where data originates, and can produce dramatic increases in computing power over more traditional

forms. It can also cope with the massive, new datasets that are emerging, as in genetic research, or the metadata produced by the Internet of Things (IoT).

A couple of examples where Fog computing might be used include:

- Turning a traffic jam into a networked computer that develops an optimal route for every vehicle, clearing the traffic jam in the shortest possible time.
- Turning a farmer's field into a computer that monitors the health and enables optimal yields for every single plant.

My point is that there are lots of technological developments you need to be watching that can both help and harm municipalities and their residents. If you ignore them, you will probably be side-swiped by them, or by the ripples produced by them. If you make use of them, they can improve city management, and the quality of life for your residents. Let me give you an example.

Self-driving Cars and Autonomous Vehicles

Self-driving cars (also called Autonomous Vehicles, or AVs) demonstrate how technology can deliver both positives and negatives, often in unexpected ways.

Companies like Uber & major trucking firms are anxious to reduce labour costs, which is a major driving force behind AVs. To technology companies like Google and Apple, AVs represent a major

new market to invade and disrupt. And, as a result, the car manufacturers are desperate to get into AVs in order to save their businesses. As a result, the pressure for AVs to appear on the roads is likely to mean they will appear sooner than we expect.

AVs have the potential, over time, to dramatically reduce traffic, cut down on collisions, reduce gridlock, and free up land that is currently locked up in parking. Uber-like AVs could pretty well eliminate the need for private cars in cities, which, in itself, would dramatically reduce traffic. And it's been estimated that as much as one-third of land in a city is devoted to parking. Much of this land could be repurposed for parks or downtown buildings or housing, reducing these costs. So, self-driving cars promise fewer collisions, fewer deaths and injuries, less traffic, reduced gridlock, and more land freed up for other purposes. What's not to like?

Well, first, I have doubts about these rosy projections for self-driving cars. I do think AVs will help with traffic, and will soon be better drivers than humans, reducing traffic collisions, but I don't think it's going to happen overnight, and I do think there will be unexpected problems. Remember that reality is messy. Computers generally do best in predictable environments, and human drivers aren't especially predictable, so I believe there will be, pardon me, roadblocks on the way to fully autonomous vehicles being accepted onto the highways.

Meanwhile, I've seen very little written about the potential costs of AVs. For instance, fewer collisions mean less work and fewer jobs for fire, police, and EMT workers. Less parking means lower city revenues from parking, and fewer parking tickets, all of which will hurt municipal coffers. Fewer cars on the roads mean fewer road repairs, which means less work for road repair crews. And fewer cars on the road also mean fewer cars get built, which reduces jobs in the world's largest manufacturing industry.

Automation Will Affect the Workforce

Another aspect of technology is that automation is revolutionizing the workplace. Robots, smart computers, and automation are eliminating jobs in many different parts of the economy.

A much-cited 2013 study done by Oxford University academics Carl Frey and Michael Osborne said that "According to our estimates, about **47 percent of total U.S. employment is at risk.**" [The emphasis is mine.]

In essence, any job that involves repeating the same pattern of behaviours, whether it's every day, week, month, or year, is in danger of being automated.

Examples of places where automation will replace humans include the clichéd example of the ultimate in bottom-end jobs: the burger flipper. Momentum Machine's Burger Bot can produce 3,600 burgers

an hour (with human help in loading the necessary ingredients), and uses less space than a human cook.

At the other end of the culinary spectrum, Moley Robotics has developed an automated kitchen that can prepare a wide range of upscale meals by mimicking the actions of a human chef.

ROSS AI, among others, has developed a computer system to perform legal research, and prepare legal briefs, replacing hundreds or thousands of paralegals, and entry-level lawyers. ROSS is not an acronym; the founders thought it had a warm, fuzzy ring to it. And ROSS makes use of IBM's Watson AI system.

Watson is being used in a wide range of applications, including to assist oncologists in tricky diagnoses. The combination of a human expert, backed by a properly trained computer AI, produces results that are better than either on their own.

The accounting and tax preparation and management professions are being revolutionized by computer systems that perform the routine aspects of their work.

All told, it looks as if Osbourne and Frey may be right: it looks like lots and lots of people will be put out of work by automation.

Yet, I think these prophets of doom are missing some very important aspects of the automation revolution.

First, as I said earlier, reality is messy, and computers aren't very good at messy. Think, for example, of how long photocopiers have been around – and yet, every office has someone whom everyone calls on when the copier is jammed.

Second, computers aren't generally inventive (there are exceptions, especially with certain kinds of evolutionary algorithms in tightly defined areas). Humans can come up with new solutions to old problems that would not occur to a computer.

And third, humans are flexible whereas computers are tied to specific tasks. You wouldn't expect a chess-playing computer, for instance, to offer suggestions on how to diagnose cancer, or cook burgers, or drive a car.

As a result, I think that while automation will penetrate virtually all aspects of the working world, the result may be more emphasis on “cobots” rather than “robots”. A cobot is a cooperative robot: it does the finicky, boring, repetitive things, or things that involve shifting through vast quantities of complex data, and leaves the, messy, inventive, real-world things to humans.

The result is better than either a human or a robot working on their own. And that's what I think we should be working towards: cooperation between humans and computers or robots.

And you should be looking at how automation can improve municipal services, but also think about using a hybrid model of human-computer cooperation can make your employees more productive – as well as creating more interesting and fulfilling work environments.

However, automation is inevitably going to have a strongly negative effect on the workforce as well. Workers will be replaced in repetitious jobs, and if they can't find work that involves human strengths and skills, they may never work again. This means that retraining of displaced workers is taking on an urgent, new importance.

Meanwhile, even if a only relatively small number of jobs are completely eliminated, the result is like a game of musical chairs: everyone still in the game is anxious about their future, with the result that they're afraid to ask for better wages or promotions. This is, in my view, one of the major reasons why wages have largely been stagnant for the past 20 years and more.

The gravitational pull of big cities.

The movement from rural areas into cities has been happening for centuries, and, with minor deviations, continues unabated. This has

been happening all over the world, with the result that some observers estimate that something like 75% of global population will live in cities by 2050. This is causing problems both for major cities, and smaller centres.

Major urban centres are suffering from too many people. Immigrants disproportionately settle in the major urban centres, which creates its own problems.

For instance, Toronto, which is my home town, is growing at a rate of about 100,000 people per year, largely because of immigration, and the Toronto region is projected to grow from 7.2 million to 9.5 million people by 2041, only 23 years from now. As a result, Toronto is rapidly outgrowing its infrastructure, and the cost of housing is soaring beyond the reach of workers in their 20s, 30s, and even 40s. The people needed by the businesses focused in Toronto may not be able to afford to live there.

And this means such areas need to think strategically about how to plan and fund growth. Too often, large cities are scared to raise taxes. This makes sense, since urban revenue often comes largely from property taxes, which are not an efficient source of revenue for large cities. As a result, investments in unseen areas, like maintenance and infrastructure, are often postponed until a crisis occurs.

Meanwhile, rural and ex-urban areas are suffering as well. There are municipalities that are disappearing because of declining populations. In the U.S., there are towns and small cities that are giving up their charters because they can't support the few citizens they have left. And this trend towards major centres creates resentment.

I recently read a letter to the editor of the Globe & Mail [national newspaper] in which the writer, from northern Ontario, complained about how Toronto had all the electoral ridings, and so got all the goodies. And yet, if you look at the number of voters per riding, a voter in a rural riding has more clout than one in an urban riding, with the result that smaller centres actually get a disproportionate amount of money for their population concentrations – even though they see, and resent, these big pots of money going to the major cities.

Both sides are right, and that's a problem.

So, if this centuries-long trend is continuing – and it is – smaller centres need to think strategically: What can we offer to get people to stay here, or attract them to move here? How do we use ju-jitsu to buck the trend? How do we benefit from this change? Complaining won't do it. As it happens, there are some futurist tools that can be helpful. I'll talk about them towards the end of my presentation.

Demographics: Who We Are, Who We Will Be

Boomers – The boomers are finally retiring. They are now harvesting their family homes for retirement cash, but their migration patterns vary according to the individuals.

All of them are seeking pleasant lifestyles. They want to be near their children and, especially, their grandchildren. They want to fulfill their bucket lists – if they can afford it.

Later they will need major medical facilities & support, which, ironically means they will need to move back towards major urban centres – but may not be able then to afford to live there.

The waiting lists for support services, such as supported living centres and nursing homes, is going to explode. If you're a smaller centre within striking distance of a significant city, and you want to find a service or industry that has a future for your community, this might be it.

We are also seeing a split among boomers: some are heading for smaller towns to enjoy small town lifestyles. Most of these will be near where their children & grandchildren are, or within striking distance of a major city or major airport. In fact, the futurist community typically draws a circle around a major airport that represents about a 1 ½ hour drive as being the most desirable areas.

Other boomers are staying in cities, buying a condo or smaller, easier-to-maintain house, close to downtown, near restaurants, cultural, and sporting events in order to take advantage of big city amenities. This is creating trends and counter-trends that do not represent a simple, easy-to-follow pattern.

Millennials – Millennials are in the midst of their working lives. They need to be near urban centres for work, but, as I said before, many are having trouble affording housing. They have had more difficulty finding worthwhile work than earlier generations, partly due to automation & the boomers' reluctance to retire. They are having trouble affording housing because of the price inflation caused first by boomers, and then by immigration.

If your community can find a way to provide access to home financing and affordable housing, that can be a powerful way to attract people to your community.

Millennials are starting family formation later than their parents, typically in their 30s rather than their 20s. Their children will need schools, hockey arenas, busing, pediatric care, parks, and so on. Millennials want good lives, and are not as attached to the status of their working lives: they work to live, unlike the boomers, many of whose lives are defined by their work.

Generation Z – GenZ are often children of the Millennials and the grandchildren of the boomers. It's early to characterize this group because they are largely children, but comments that are being made about them include that they are more button-down, more serious-minded, than their parents, and are, in fact, more like their grandparents. They are more accepting of diversity, not only in terms of colour, dress, and religion, but also sexual identification and orientation. They are even more technologically adept than Millennials.

The changing nature of sexuality & sexual identity – I recently saw a sign in the men's room at Ryerson University in Toronto. "This washroom is open to anyone who identifies as male. We respect your right to choose how you are identified".

Sexual identity is no longer binary, and transgender issues will emerge in your community. What you decide to do about these issues is up to you, but don't be caught by surprise because these changes are coming.

Big Issue Help for Your Citizens

Those who plan to take full advantage of the future need to think beyond traditional municipal services.

Where do your citizens spend their time? A lot of it is online, so why shouldn't you be providing roads and security for that part of their

lives lived in cyberspace, just as you do with other forms of infrastructure? And that may make it easier for you to provide other, more traditional, municipal services like licensing, voting, taxes, and so on.

Chattanooga, in Tennessee, extended existing municipal infrastructure by using the right-of-way for the city's electric power grid to lay fiber optic cable for its residents, producing "The Gig" Internet service. The Gig offers a GBaud of speed at competitive prices, far better than the commercial offerings provided by telecoms in the city. And, of course, they are being sued by the telecoms as a result.

But it has also brought businesses & venture capital investors to the city. One commentator called Chattanooga an "Internet boom town" because of the businesses it has attracted, and the professionals who have stayed or relocated there because of the high speed Internet availability.

As an extension of that, you keep your streets safe, why not help keep people's online lives safe? You could, for instance, buy a municipal anti-virus subscription for everyone on your tax rolls. Or you could provide a cyber and ransomware help, perhaps in conjunction with regional or national service. Think outside the box – don't get stuck in the services you provided in the 20th Century. That ended 18 years ago.

Climate Change: Here It Comes, Like It or Not!

You may choose to believe that winter won't come this year, but that won't change the actual fact that it will come anyway. Choosing not to believe in climate change amounts to the same thing: the effects will happen whether they have your permission or not. Choosing to disbelieve in climate change at this point is essentially like pulling the covers over your head and saying "Make it didn't happen!"

Miami and other coastal cities in Florida are dealing with flooding on a regular basis, whenever there's an especially high (king) tide, or storm surge. Miami's having to spend almost \$500 million on flood control as a result of having their streets and the ground floors of their homes and office buildings flooded with salt water on a regular basis.

Extreme weather events will become more common everywhere. This includes blizzards, heavy rains, flooding, thunderstorms, hail, wind storms, tornadoes, power outages. Houston, for instance, has had three "once every 500 year" floods in the past 3 years. India's 2016 heat wave produced record temperatures in the 50s Celsius.

It's not just that extreme weather events are happening; they always have. It's that the events are more extreme, and are happening more frequently. This will affect agriculture, what your farmers can grow, and where.

And remember: Mother Nature's bills *always* get paid. You can't escape it.

Infrastructure

Climate change and extreme weather events will require more robust infrastructure, able to withstand stronger winds, flooding, heavier weather events, more extreme temperatures. Which brings me to the subject of infrastructure investing.

We have persistently underinvested in infrastructure. We have accepted the supposedly conservative myth that all taxation is bad and wrong. This is dangerous, particularly when it comes to infrastructure. It means we are selfishly using up the investments made by our parents & grandparents for our benefit, and leaving bigger debts for our children & grandchildren. That is no kind of conservatism that I recognize!

So, don't ask politicians for funds to maintain infrastructure. Instead, present them with a cost-benefit analysis that says, "If we do make this investment, it will cost us \$X. If we don't, it will cost us \$2X."

Meanwhile, don't blindly invest in obsolete infrastructure. There may well be newer, better answers available.

One of the highest profile example might be **MTaaS**: Mass Transit as a Service, using Uber-type vehicles instead of, or in conjunction with, rapid transit systems. This may become much more widespread once we have fully autonomous vehicles available, and Uber & others are pushing hard for this.

One example is Innisfil, Ontario (Pop: 36,500), which is using Uber in place of RT:

“Over 3,400 users have completed more than 26,700 Innisfil Transit trips to connect with the commuter rail station, get to work, go out with friends, or visit their doctor...Over 1,300 drivers have made money by helping to move their community. The Town estimates it is saving more than \$8 million per year based on what an equivalent door-to-door bus system across all of Innisfil could cost.”¹

Larger urban centres typically use ride-sharing services to funnel riders from less densely populated areas to the mainline transit lines, reducing costs of serving less populated areas, and increasing the efficiency of more heavily traveled routes. There are lots of examples of this, including places like Atlanta, Arlington, the Tampa Bay area, and Denver, among many others.

¹ <https://www.newswire.ca/news-releases/innisfil-and-uber-announce-expansion-of-canadas-first-ridesharing-transit-partnership-676932213.html>

Of course, using ride-sharing raises political hackles: left wing politicians hate supporting profit-making companies anything, whether it makes sense for the city or not, and transit unions will go through the same kinds of protests as cab drivers protesting the advent of Uber. So, there are no cost-free choices, only ones that make more or less sense.

Security may be better managed with watchful, smart computers than expensive walls or fences. It can warn intruders that they are being recorded, shine a spotlight on them when they appear in places they shouldn't, and call police if it seems warranted. Smart computers don't get bored, or tired, or miss things, and can call a human for confirmation when something unusual happens that they don't know how to handle.

Smart materials monitor infrastructure stress in roads, bridges, water pipes, and so on, and allow for targeted maintenance. Stress points in bridges, roads can be monitored several times a second, rather than once or twice a year.

AI can be used to **optimize traffic flow, design storm water systems, or investigate water leakages from your (antiquated) fresh water systems**. Evolutionary algorithms are also candidates for some of these tasks.

You might want to investigate using wetlands for waste water processing, and water catchment areas to purify drinking water: “A study in 2012 that focused on 479 green infrastructure projects across the United States, found that 44% of green infrastructure projects reduced costs ... The most notable cost savings were due to reduced stormwater runoff and decreased heating and cooling costs.”²

My point is that there are often better infrastructure investments than just reusing archaic designs. Look forward, not back.

Preparing for an Uncertain Future – A Futurist Toolkit

You can use any or all of the tools I’m about to describe, and they will improve your ability to prepare for the uncertainties ahead. You don’t have to do all of them. And it may be that some of these would be best done regionally, provincially, or nationally, say by CAMA for instance.

Environmental scanning is one of the things that may be best done by a larger group, beyond just your municipality. Yogi Berra once said: “You can see an awful lot just by looking”, to which I would add: You can miss an awful lot by not looking.

² https://en.wikipedia.org/wiki/Green_infrastructure

You need to watch the horizon to see what's coming, and then think about how you should prepare and respond. CAMA could be a clearing house for ideas and information about the future on several issues like health care, broadband Internet access, infrastructure investments, technological applications of importance to cities & their residents.

Scenario planning. The problem with thinking about The Future is just that: There isn't just one possible future; there are trillions of possible futures, some more probable than others.

Scenario planning is a means of preparing for a range of probable futures rather than trying to come up with a perfect prediction of the One True Future. It also allows you to produce more robust contingency plans to ensure you get the future you want.

Wild Card analysis. A Wild Card is a low probability event or scenario which, if it happens, has dramatic consequences, such as the terrorist attacks of 9/11. It means unscrewing the inscrutable, or being able to expect the Spanish Inquisition (with apologies to Monty Python).

But asking "What could dramatically affect us that we are not presently thinking about?" can help you prepare for future uncertainties. For instance, Royal Dutch Shell anticipated the

collapse of the Soviet Union by using Wild Card analysis, and made a killing in oil futures.

The Desired Future & Backcasting. The Desired Future is the future you **really** want to have happen. Then, once you've defined what you want, Backcasting is a way of placing yourself into that future, and walking backwards into the present. It allows you to identify the steps you will need to take, as well as opportunities and roadblocks along the way that you might otherwise miss.

Cooperation. By working with your constituents and your suppliers, telling them what your plans are, and learning what theirs are, you can anticipate what you need to do, and get a much better idea of when you will need to do it. It's a way of moving your entire supply chain into the future, and making it more responsive.

Innovation has become kind of a motherhood issue: everyone swears they are dedicated to being innovative. The problem is that most organizations actually *don't want* to innovate because innovation requires you to:

- Do things you're not good at, which can make you look foolish (which people don't like).
- Think differently than you have in the past – you need to be able to have a fresh take on things you've thought about thousands of times, or else you won't come up with new ideas.

- And there's a personal risk as well: You have to be willing to fail, or else you can't innovate. Being attached to a bold, new idea that fails can stunt or terminate your career, so people tend to shy away from them, even when it's exactly what you need.

There are ways around these problems that can help you convert your municipality into an Innovation Organization. This will not only lead to more effective results and cost savings, but it will also produce a more interesting, more worthwhile place to work, helping you attract the talent your municipality needs for the future. I'm offering attendees a series of electronic handbooks for Scenario Planning, Wild Card analysis (as part of scenario planning), The Desired Future, and Innovation.

And if you would like to know more about anything I've said, or ask questions about any of these tools, or others that I've mentioned, then please don't hesitate to contact me. My email and phone number are available on my website.

What should you do next?

If you get home without a plan to take action on the things you've learned at this conference, then you've wasted your time. By the time you get back to your desk, the Perpetual Emergency will overwhelm you all over again. If you don't have a plan at least roughed out to change what your municipality is doing, or how you're going to

prepare for the future by then, you will have lost all the benefits of coming here. You would have received more benefit by staying home and having a nice, warm shower.

Alan Kay, one of today's great technological visionaries said that "The best way to predict the future is to invent it." And that's what I would urge you to do: Invent the future you want for your community, for yourself, your nation, and humanity as a whole.

And I wish you good luck, and God speed. Thank you!

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