



Innovation Toolkit:

A COMMUNITY RESOURCE
FOR DATA AND
TECHNOLOGY PROJECTS

Acknowledgements of Indigenous Lands and Treaties Across Canada

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Preface

Many Canadian communities are starting to include smart technology in their planning. As smart technology becomes more accessible and affordable, and with digital literacy levels rising across Canada, more community members are ready to participate in smart community projects.¹ Recent events, such as the COVID-19 pandemic, have made it abundantly clear that data and technology are a type of infrastructure and investing in them is both necessary and possible for municipalities of all sizes.

In this innovation toolkit, we will draw on the experiences and lessons learned by three communities that participated in the *Smart Cities Challenge*. This toolkit shares their stories of planning and implementation so communities across Canada can better support their own journeys with data and technology projects.

Smart Cities Challenge was a competition that opened to all municipalities, local or regional governments, and Indigenous communities (First Nations, Inuit, and Métis) across Canada. This Challenge empowered communities across the country to address local issues their residents face through new partnerships, using a smart cities approach.

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1. McKinsey Global Institute, *Smart Cities: Digital Solutions for a More Livable Future*, 2018

HOW TO USE THIS TOOLKIT

This toolkit is designed for municipal governments who are exploring how their communities can engage with data and technology projects. This is for government teams that are in the early exploratory phase. If you are part of these teams, you may have started thinking about the potential of embedding more technology into your projects, and want to learn more about what new, innovative approaches have worked for other communities.

In this toolkit, we will:

- Share the basics about what a smart community is, and the types of technology commonly used in smart community projects.
- Learn from the experiences of three Canadian communities that applied smart community innovation, with a focus on how they defined their challenge (or problem area), how they scaled their project's impact and the types of partnerships they leveraged.
- Then, offer **three tools** that can help you and your community begin to chart your own path, initiate your own data/technology project, and set the groundwork for your team to begin exploring real solutions.

The tools we will offer:

1. **The Challenge Statement Process Map** will help drive further analysis of the problem you are facing and the assumptions you have, revealing new insights into what your community needs are and clarity about common goals.
2. **Partnerships for Impact Checklist** will help you take a step back and assess whether the partnerships under consideration for your project are aligned with your community's values. It will also push you and your team to take stock of who is sitting around the table, and what perspectives might be missing.
3. **The Scaling Impact Task Flow** exercise asks you and your team to think deeply about how your project will impact residents, and the enablers and barriers that exist in your community that might affect your ability to implement your project at scale.

We have designed this toolkit to be flexible and with the understanding that communities from across Canada come to this work with different needs and at different starting points. You can use the tools interchangeably and independently but should use them in a way that best makes sense for your team. Feel free to adapt and adjust them as you see fit!

SMART COMMUNITIES OVERVIEW

Starting Out: Building Smart Communities from the Ground Up

There are a range of smart city and smart community definitions available, but a universal definition does not exist yet. Generally, it's accepted that smart communities use data and connected technology approaches, like **sensors and connected devices** that enable data collection, to improve the well-being of their residents. Improved lines of communication between governments and residents are considered to be an important aspect of smart communities.

At the Community Solutions Network, we suggest that smart communities are resilient, inclusive and collaboratively-built. Past approaches to smart community development have focused on the potential of technology alone to solve significant issues. Today, this approach is being re-evaluated and integrates important social factors and civic engagement. Smart technology is now seen more as the means for the community to achieve a set of goals. We know that taking a smart communities approach has many benefits beyond increased connectivity and technological innovation. Smart communities also discover new opportunities for social innovation and ways to improve service delivery, increase efficiencies, and develop more economic development opportunities. Perhaps most importantly, it is clear that when community well-being is kept at the centre, the quality of life for community members improves.²

Setting Context

Canada experienced a burst of smart community innovation when the **Smart Cities Challenge** was launched in 2017. As you will see, the issues that Challenge participants set out to address are relatable across Canada. Their solutions can be replicated and scaled to meet the needs of communities of all sizes.

In this section, you will find:

- An overview of the different types of smart technology leveraged by many communities that participated in the Smart Cities Challenge
- Case studies of three smart community projects and how they defined their community's "challenge" (or problem) and scaling strategies

In the **tools section**, you can find advice and lessons learned about each project to help you better understand the opportunities for each tool.

Sensors and connected devices are devices that can be used to measure changes in their surrounding environment. They generate and collect data, often operating together with other types of smart technology.

2. *The Ethical Smart City Playbook*, 29

3. *Mrinalini Ingram for TechRepublic, Smart cities: A cheat sheet*

Types of Smart Community Technologies



Broadband

Broadband is high-speed internet access that's always on and faster than the traditional dial-up access. It enables the connectivity that other smart city technologies and devices need to communicate and share data.



Information and Communication Technology (ICT)

Information and Communication Technology (ICT) solutions are communication channels between governments and the residents they serve. They are often technology platforms that provide services to, and collect data from, residents.



Big Data

Big Data describes the large, complex data sets produced by human interaction with digital devices and technology, and the advanced data analytics methods that are used to help us interpret them.



Geographic Information Systems (GIS)

Geographic Information Systems (GIS) is a suite of data collection and analysis tools that enable smart communities to visualize layers of information using maps and 3D modelling.



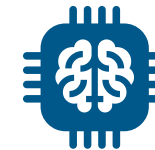
Blockchain Technology

Blockchain Technology can be used in smart cities through secure, direct buyer-to-seller smart contracts, enabling smart contracts to execute automatically when the terms of the agreement have been met.



Internet of Things (IoT)

Internet of Things (IoT) is the network of physical objects, sensors, or things that are connected to other devices and systems over the Internet.⁴ They can exchange data with each other, making them "smarter" than they would be alone.



Artificial Intelligence (AI)

Artificial Intelligence (AI) mimics human intelligence in programmed machines,⁵ and it enables smart communities to analyze and make sense of large amounts of data. AI can identify patterns in data and react accordingly, in support of better resource management.

4, 5. <https://futurecitiescanada.ca/stories/smart-cities-glossary/>

Case Study 1: Designing for Belonging (Fredericton & St. Mary's First Nation)

Defining the Problem

In their Smart Cities Challenge application, community leaders in the City of Fredericton and St. Mary's First Nation in New Brunswick, wanted to create a challenge statement grounded in designing for belonging. They were interested in engaging community members that were more likely to be under-engaged: those who are most marginalized, excluded and vulnerable. In 2017, Fredericton invested in extensive community engagement that prioritized input from residents, city staff, non-profit partners, aging adults, unhoused residents and residents experiencing poverty, and frontline workers at homeless-serving agencies. Their outreach efforts revealed that these different groups have unique needs, but overall, they wanted the city to leverage data to provide more targeted services.

Read [*Fredericton and St. Mary's First Nation's challenge proposal here.*](#)



Smart Solutions

- The Digital Fredericton transformation initiative utilizes **modern IT infrastructure and a robust municipal website** to advance and streamline how the city of Fredericton operates, and offer residents 24/7 access to municipal services online.
- The Digital Community Hub utilizes **big data analytics, Geographic Information System (GIS) technology and an online dashboard and hub** to provide residents with unified access to community resources and services, where they can track Fredericton's progress against smart city indicators and contribute their perspectives and expertise on community issues. Service providers can also use the hub to identify provision gaps.
- Connected Community Initiatives utilize **sensors** to enable the Doorable app to support accessibility in Fredericton; **data collection and measurement** to support the Non-Profit Data Collaboration; and a **shared digital platform** to support caseworkers and their unhoused clients as part of the Road Home Digital Platform and Enablement.

Dashboard is a type of user interface often used to visualize data.

Case Study 2: Designing the first Circular Food Economy (Guelph and Wellington County)

Defining the Problem

Communities across Canada struggle with linear food production and consumption systems that prioritize “take, make, and dispose” over efficiency, regeneration and community health and well-being. The City of Guelph and neighbouring Wellington County (located in southern Ontario) are using their smart community project to make a compelling proposition for a brighter, more sustainable future for Canada that starts with changing the way we approach food and the environment. For Guelph-Wellington, a **circular food economy** represents universal access to nutritious food, with no food waste – where food waste and materials are “re-valued” and continue to cycle through the system. Key to their vision is the role of food experts and entrepreneurs that drive innovation by advancing food challenges and solutions. Guelph-Wellington’s smart community project is driven by initiatives *Our Food Future* and the *Circular Opportunity Innovation Launchpad (COIL)*, in collaboration with community partners, including food-system businesses, non-profit organizations, researchers and farmers, among others.

Read [*Guelph-Wellington's challenge proposal*](#) here.

Smart Solutions

- Use **big data analytics, open data portal technology and Geographic Information System (GIS) technology and spatial data analytics** to track aspects like local food production; access to nutritional food sources; and local programs focused on food education and health.
- Use **an online platform and online learning delivery tools** to support new business collaborations, partnerships, jobs and innovations generated from new, food challenge-dedicated collision spaces.
- Use **blockchain technology, business diagnostics and analytics technology and RFID sensors** to track the journey of diverted organic food waste, and the economic impacts of revalued waste.

Circular food economy represents a shift in the way that agricultural systems function, and the lifecycle of our food. It mimics natural systems of regeneration so that food waste is fed back in to the cycle, typically as fertilizer.

Open data portal is a place where any person, business, government or organization can access, use and share data.

Spatial data analytics involves using a specialized set of data analytics tools and algorithms to analyze spatial data and uncover hidden patterns and improve predictive modeling.

RFID stands for radio-frequency identification and is a technology that uses radio waves to passively identify a tagged object.

Scale this Solution

Guelph-Wellington wanted to offer an accessible roadmap to other communities that isn't prescriptive. Their roadmap functions more like a menu of distinct projects that other communities can pick up and run with, depending on their resources and priorities. Their projects are replicable by design, with each focusing on defining problems and needs, rather than describing solutions. This was done in part to set the groundwork for a better technology procurement process. Their "problem-based" challenge approach was developed to encourage *innovation in procurement*.

Guelph and Wellington County are currently implementing their project. Here, we have simplified their 6-year project plan to offer an overview of what planning and implementation looks like.

Asset and behaviour mapping is the general process of identifying and providing information about a community's assets, or the status, condition, behaviour, knowledge, or skills that a person, group, or entity possesses, which serves as a support, resource, or source of strength to one's self and others in the community.

Digital currency platform is software that enables people to trade digital currency, or currency that's only available in digital or electronic form, and accessible using computers or mobile phones.

Goal 1: Increase access to affordable, nutritious, local food by 50%

- **Asset and behaviour mapping** will identify local food assets and behaviours related to food purchases and consumption. After identifying access gaps, a Circular Food Security and Health Action Plan will be developed.

Goal 2: Create 50 new circular businesses and collaborations

- Establish a Circular Food Economy Innovation Hub (CFE iHub) as a circular economy innovation engine for the region.
- Establish the Harve\$t Impact Fund to support institutional and venture capital opportunities.
- A new food economy skills and training program will support and expand existing sustainable food education programs in elementary and high schools, and post-secondary institutions.

Goal 3: Increase circular economic revenues by 50%

- A suite of business tools and services will be developed to help public organizations and businesses reinvent their processes and business models to increase sustainability and apply circular principles.
- The "Reimagine Food" Awareness Campaign will educate residents about the importance of revaluing waste.
- Develop and pilot a **digital currency platform** that leverages locally-generated carbon credits, using blockchain technology. The carbon-credit-backed social currency will be used by residents locally.
- Track the life cycle of food and food waste by tracking household waste in rural areas and urban centres, using RFID and GPS technology, with the goal of creating a circular loop rather than a linear system.

Case Study 3: Designing for Life Promotion (Nunavut Communities)

Defining the Problem

While suicide impacts people of all ages and backgrounds in Canada, Inuit people living in Nunavut experience one of the highest suicide rates in the world. In their proposal, the Katinnganiq **Makerspace** Network (which represents the Nunavut Association of Municipalities and their three partner organizations) adopted a life promotion program (rather than a suicide prevention program) that integrates Indigenous values and prioritizes the development of protective factors and positive influences for youth. They focused on youth intervention, instead of developing a program for adults, because positive early life events can pave the road for future health and well-being.⁶

Read [the Katinnganiq Makerspace Network's challenge proposal here](#).

Makerspaces are physical spaces that put the modes of fabrication and training into the hands of community members by offering virtually any kinds of tools and training, from crafting and woodworking to digital design and fabrication, like 3D printing.

Internet Exchange Points (IXPs) are technical infrastructure where networks come together to connect and exchange Internet traffic. They can help create shorter, more direct routes for Internet traffic, which lead to faster internet speeds, increased security, and cost-savings.

Smart Solutions

- 25 community makerspaces across Nunavut utilize **computers, printers, tablets, cameras, speakers and A/V equipment, robotics, sewing machines, crafting and carving tools** (among others) and ***the te(a)ch curriculum*** (an Inuit cultural and language-focused, digital literacy program) to support youth in life promotion activities, including: culturally-responsive skills training, digital engagement and digital literacy development and peer network-building and knowledge-sharing.
- Community makerspaces utilize **Internet Exchange Points (IXPs)**, which will interconnect existing satellite networks and route local internet traffic to *peering networks*, leading to faster internet speeds, increased security, and cost-savings.
- Community makerspaces will be connected and supported using **the Katinnganiq Makerspace Network digital platform**, providing makerspace teachers and users with capacity-building resources, data tracking and storage and other relevant tools.

6. Affleck et al., Suicide amongst the Inuit of Nunavut: An Exploration of Life Trajectories, 2020

Scale this Solution

What distinguishes the Katinnganiq Makerspace Network's initiative from other makerspaces is that the idea to build makerspaces didn't necessarily originate "on the ground" among residents. The four core partner organizations that constitute the Network proposed makerspaces as an avenue towards youth empowerment and well-being. It was clear that the way they defined their makerspaces had to be grounded in Inuit values and principles. Another key ingredient in successfully scaling this project is community ownership. While the Network provides resources to the hamlets for capacity-building, project coordination for the individual makerspaces happens at the local (hamlet) level. Each makerspace project begins with hamlets signing a community project charter that focuses on local staff managing program delivery.

The Katinnganiq Makerspace Network is currently implementing their project. Here, we have simplified their 6-year project plan to offer an overview of what planning and implementation looks like.

Phase 1: Starting up: formalizing the Network's structure and makerspace deployment

- In year 1, the Network established a physical office space in Iqaluit, incorporated as a non-profit and established formal operational systems. They developed a readiness and community capacity assessment framework to help identify which hamlets were ready to establish their makerspaces and guide deployment.
- The Network supports hamlets with locating and securing physical space for their makerspaces, as well as staff recruitment and training.
- A data privacy system was designed in consultation with the hamlet communities and the Privacy Commissioner of Nunavut.

Phase 2: The Network's content and platform development

- As makerspaces are being established, the Network will support the installation of community data centres that run IXPs.
- The te(a)ch k-12 curriculum (co-created by Pinnguaq, Qaujigiartiit Health Research Centre and Embrace Life Council, among other partners) was made available to the public. They initiated work on developing elder-led and adult learning curriculums (in addition).
- Staff began drafting requirements for the Katinnganiq Makerspace Network's Digital platform.

Phase 3: Youth program and activity delivery








This phase (2019-2024) covers the implementation of the Network's programs and activities, including: te(a)ch extra-curricular learning, traditional language/culture revitalization programs, creative arts, and other training.

Phase 4: Performance measurement, reporting and sustainability

In this phase, the Network began to set the groundwork for their future beyond the Smart Cities Challenge by developing performance evaluation and review frameworks, and a sustained fundraising plan.

Smart Communities Tech Overview Grid

This grid shows a visual summary of the types of smart community technologies each community used in their projects.

Smart Community Technologies							
	 Broadband	 Information and Communication Technology (ICT)	 Big Data	 Geographic Information Systems (GIS)	 Internet of Things (IoT)	 Artificial Intelligence (AI)	 Blockchain Technology
Case Study							
City of Fredericton & St. Mary's First Nation	●	●	●		●	●	
City of Guelph and Wellington County	●	●	●	●	●	●	●
Nunavut Communities		●			●	●	

TOOL 1

Tool 1: Challenge Statement Process Map



A challenge statement should identify what problem you want to solve, who is affected by it, and who will benefit from your solution. It should also define a performance metric that will guide you as you begin to identify possible solutions, and later implement your project. Remember to shift your focus to what your smart community project needs to achieve, not how. Writing challenge statements helps us dig deeper into community needs and goals, and good challenge statements set the groundwork for better, more thoughtful solutions.

How to Use This Tool

This **Process Map** will help you think about your community's challenge statement and what problem you are trying to solve. It should be brief and to the point, and include: your problem, who is impacted, and the metrics you can use to measure success. This tool will help you challenge your assumptions about the problem, dig deep into its origins, and guide you through iterating your challenge statement.

Examples of Challenge Statements

Fredericton and St. Mary's First Nation

Fredericton and St. Mary's First Nation are collaborating to create an accessible, welcoming, supportive community, starting with youth, newcomers, older adults, and persons with mobility-related disabilities; recognizing what is important to individuals and connecting them to what matters most, empowering residents with personalized digital tools, data & technology that enable them to create an exceptional quality of life.

Guelph and Wellington County

Guelph-Wellington will become Canada's first technology-enabled Circular Food Economy, reimagining an inclusive food-secure ecosystem that increases access to affordable, nutritious food by 50%, where "waste" becomes a resource, 50 new circular businesses and collaborations are created, and circular economic revenues are increased by 50%: 50x50x50 by 2025.

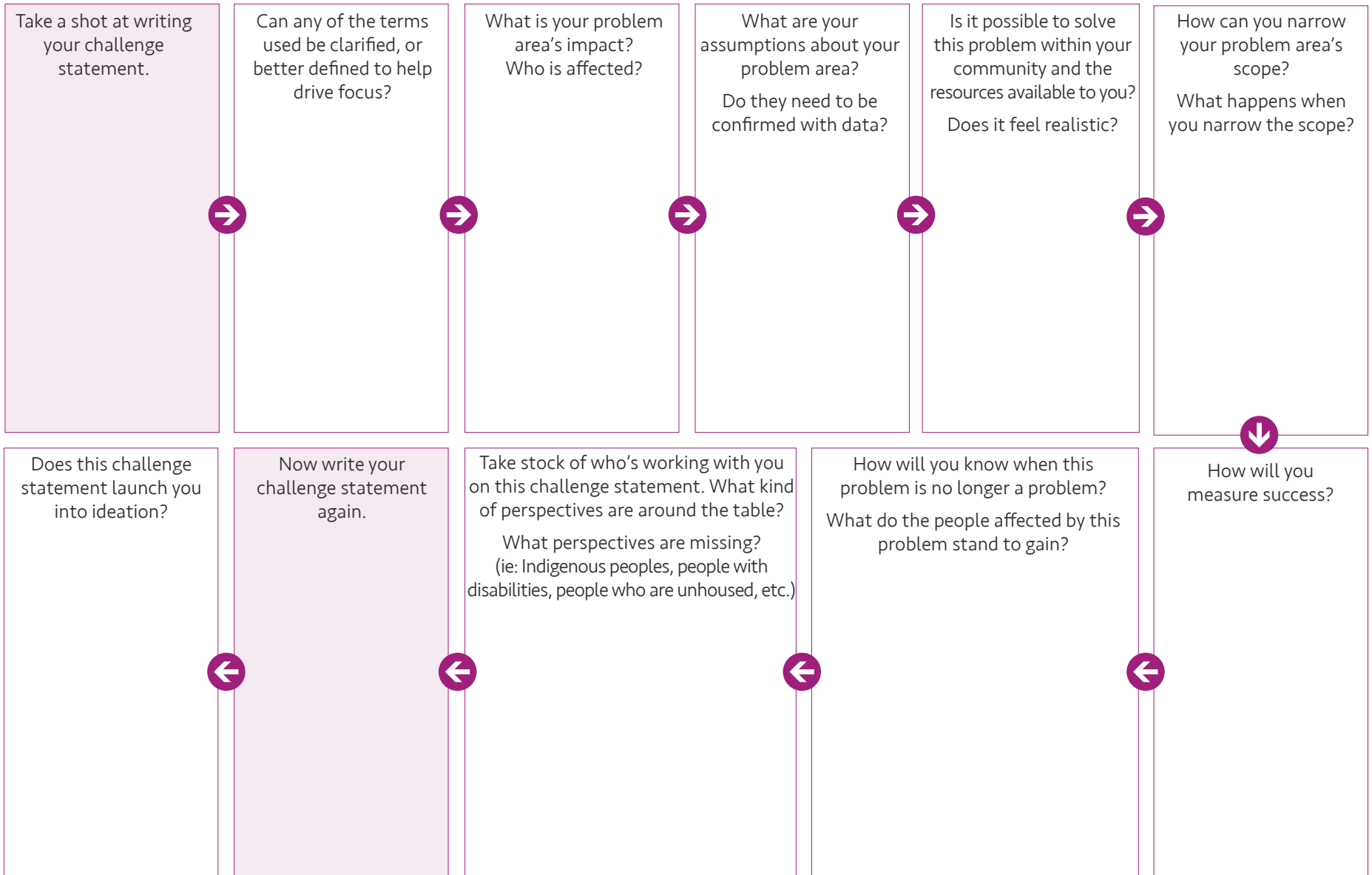
Nunavut Communities/Katinnaniq Makerspace Network

Our communities will implement protective and preventative measures to reduce the risk of suicide in Nunavut, which is ten times the national average, and increase the amount and accessibility of peer support networks, educational resources and creative outlets that promote positive Mental Health to all Nunavummiut.

Challenge Statement Process Map



Get started by making a first draft of your challenge statement. Then, go through each step answering the questions and reflecting on your problem. In the end, you can re-write your statement after your reflection.



Additional Resources:

- [ESC Definition Tool](#)
- [IDEO Framing Design Challenge Tool](#)

Smart Communities: Key Learnings and Community Insights



Take a Chance on Innovation

Fredericton took a chance on user-centred design when they were developing their smart city proposal. They decided to take the opportunity to pilot government innovation and apply a design thinking approach from start to finish.

- Fredericton's Smart City Project Manager Laurie Guthrie was already interested in user-centered design. She took cues from Denmark's public sector service design initiatives, and also pursued more training and courses on the subject.
- They consulted with a user-centred design PhD student, who supported their survey design, and other engagement activities, like focus groups and a card sorting exercise.

Identifying and Engaging Your Stakeholders

Fredericton spent time identifying who their community stakeholders were before they started the outreach to support their challenge area definition. They determined categories of stakeholders to engage, like seniors, citizens at large, and youth aged K-12. These categories influenced which community organizations they partnered with to support the deployment of a survey that asked residents about their most pressing needs.

- Fredericton engaged a variety of partners to help distribute their survey, from innovation and civic tech networks to church groups.
- They developed a version of their survey using **gamification** to encourage youth engagement.

Meeting Community Members Where They Are

The Nunavut Association of Municipalities (NAM) approached their partner organizations with a challenge area that was already clearly defined. Suicide prevention had been identified as a priority by the Government of Nunavut in 2017.⁷ Partner organization Pinnguaq had already been providing STEAM education experiences to Nunavummiut youth since 2012. Pinnguaq and the Qaujigiartiit Health Research Centre came into the project with a strong working relationship, as the two organizations had co-delivered the te(a)ch curriculum since 2015. NAM wanted to see how a tech approach could innovate suicide prevention strategies. The next step would be getting Nunavut's 25 hamlets on board.

- Partner organizations Pinnguaq, the Qaujigiartiit Health Research Centre and Embrace Life Council began outreach with a presentation to Nunavummiut mayors at NAM's annual meeting. Interpreters were present, and they hosted an open discussion afterwards where the mayors could voice their concerns.
- Pinnguaq wanted to fly out to several municipalities to discuss the project in-person, but poor weather conditions disrupted their plans. They did outreach by phone instead, and were able to speak with 22 out of 25 communities.

Gamification is the application of typical elements of game playing (e.g. point scoring, competition with others, rules of play) to other areas of activity to encourage engagement with a product or service.

7. *Inuusivut Anninaqtuq Action Plan 2017-2022*

TOOL 2

Tool 2: Partnerships for Impact Checklist



Defining the right partnerships will be key to your project's success. Projects that seek change at the systems level, like many smart community projects, often rely on impact partnerships to achieve their goals. Impact partnerships foster cross-sector collaboration, with the aim of cross-sector impact, generating new ideas and solutions with measurable impact. They often involve partnerships between corporations, government, community members and social innovators.

Impact partnerships are especially effective for projects that involve a higher level of uncertainty, and require more direction on how to drive change in the problem area.¹¹ Read more about Nesta's approach to impact partnerships [here](#).

How to Use This Tool

This **Checklist** can help you identify partners who are aligned with your community's values. Developing new relationships, or finding new ways to leverage the relationships you already have, can be an exciting process. It's important to take a step back and make sure that goals and expectations are aligned, and that all the necessary perspectives are represented.

	Partnership Sectors					
	Municipalities and Municipal Services	Schools and Educational Institutions	Non-profit Organizations & Foundations	Public Sector	Private Sector	Industry Associations
Case Study						
City of Fredericton & St. Mary's First Nation	●	●	●	●	●	●
City of Guelph and Wellington County	●	●	●	●		●
Nunavut Communities	●		●			

11. Nesta, Impact partnerships <https://www.nesta.org.uk/feature/innovation-methods/impact-partnerships/#:~:text=Impact%20partnerships%20are%20a%20specific,taking%20stock%2C%20adapting%20and%20learning.>

Partnerships for Impact Checklist



Use this tool to reflect on key questions to consider when thinking about your project's partnerships. Try to answer the questions that make sense to you and take notes as you go.

Questions to Reflect on Partnerships	Notes
What groups or individuals within our sector or wider community have the deepest understanding around the specific needs of our residents?	
Can we clearly define and outline our vision and expectations to a prospective partner?	
Are there existing relationships or stakeholders that we can build on that may be able to fill knowledge and expertise gaps that exist in our project?	
Will this partnership be able to adapt to the changes and pivots that are common in innovation-driven projects?	
Will this partnership be sustainable and benefit us not only now, but into the future as our project evolves?	
Does this partnership bring a unique and dynamic perspective that can challenge any existing assumptions about our problem area?	
Are we able to clearly define the core values of our prospective partners?	
What are the roles and responsibilities in the partnership including non-negotiables?	
Are we able to communicate how this partnership will be mutually beneficial?	
What level of collaboration are we looking for?	
Would our project benefit more from formal partnership agreements, or are informal agreements adequate?	

Additional Resources: [*ESC Systems Mapping Tool*](#)

Smart Communities: Key Learnings and Community Insights



Partnerships can take many different forms, but using a multi-sector approach can significantly increase the impact and sustainability of your project. Each of the projects explored throughout this toolkit has a different number of partners from various sectors, as shown in the grid below. It is important to remember that besides from the number of partners you engage, partnerships need to be meaningful to your specific goals and align with your community's values on a broader scale.

Partnerships Built on Trust

In Nunavut, it was important to identify partners that were already doing great work in the community. These partners needed to have a track record that community members could trust, and evidence-based solutions. The Nunavut Association of Municipalities (NAM) also strategically identified partners that worked across different industries or silos. This partnership development strategy doubles as a strategy to scale impact and innovation. It takes a systems-based approach, by engaging partners with different skill sets who can address a systemic problem from different areas.

- While the three partners recruited by NAM are all non-profit organizations, they deal with vastly different issues. Embrace Life Council is a suicide prevention organization based in Iqaluit. They provide education, research and statistical analysis, training, and a coordinated holistic approach to suicide prevention activities.
- Pinnguaq Association promotes STEAM education in rural and remote communities using different learning approaches and applications. Pinnguaq's expertise centred around advising on technology and curriculum development.

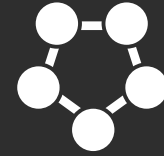
Good partnerships start at the right problem

Another unique aspect of Guelph and Wellington County's circular food economy project is that it addresses an existing system that the municipalities have limited control over: the agricultural sector. Guelph and Wellington County have interaction points within the food system, particularly waste management, but they knew that change needed to start at the beginning, with food production, and continue down the line.

- The municipalities leveraged existing relationships with partners across sectors, including food security and social justice organizations, academia, think tanks, business (restaurants and grocery stores) and the agri-food sector.
- A foundational piece of these partnerships was how they related to the problem area. Because complete buy-in was critical to achieve impact, Guelph-Wellington had to ensure that the challenge they chose reflected an intersection between the work, goals and values of these distinct sectors. Eventually, they found that creating a circular food economy offered a large enough framework, or table, where all their partners could find a seat.

TOOL 3

Tool 3: Scaling Impact Task Flow



One aspect of scaling involves technology. For example, procuring technology that's adaptive and inter-operable, which means the technology system selected is able to connect and communicate with other systems from other manufacturers. Another consideration is the technology's availability. It is ideal to use technology that isn't proprietary to a single manufacturer because it can lead to sourcing issues later on (and become a barrier for other communities trying to implement similar projects).

An important aspect of scalability is changing behaviours, and how a new approach is integrated into the existing community.⁸ While smart community projects represent exciting opportunities for change and integrating new ideas and new ways of living, it's important to think about how they can connect with current ways of living. Your community can shift the way it operates while still maintaining the existing structures it relies on.⁹

Projects that honour existing culture and behaviours, and reflect a community's aspirations and efforts towards growth, are more easily implemented at scale.

In this light, it's critical to explore and define your community's cultural context before embarking on a data and technology project. Cultural context is a critical component that affects how ideas are transferred, and whether they are understood by and resonate with community members. It can play a highly supportive role or become a roadblock to scaling your project.¹⁰

How to Use This Tool

Use this **Task Flow** exercise to help identify the enablers and barriers to scaling your project and its impact. This is a helpful thought mapping exercise to try independently, and it can get even more interesting when your team gets involved. Through this exercise, you can also start to point out the potential phases involved in scaling your project, and how phasing might be leveraged to enhance impact.

8. Fred Dust and Ilya Prokopoff, *Designing Systems at Scale*, 54.

9. IDEO, *Defining Values to Set the Stage for Future Growth*.

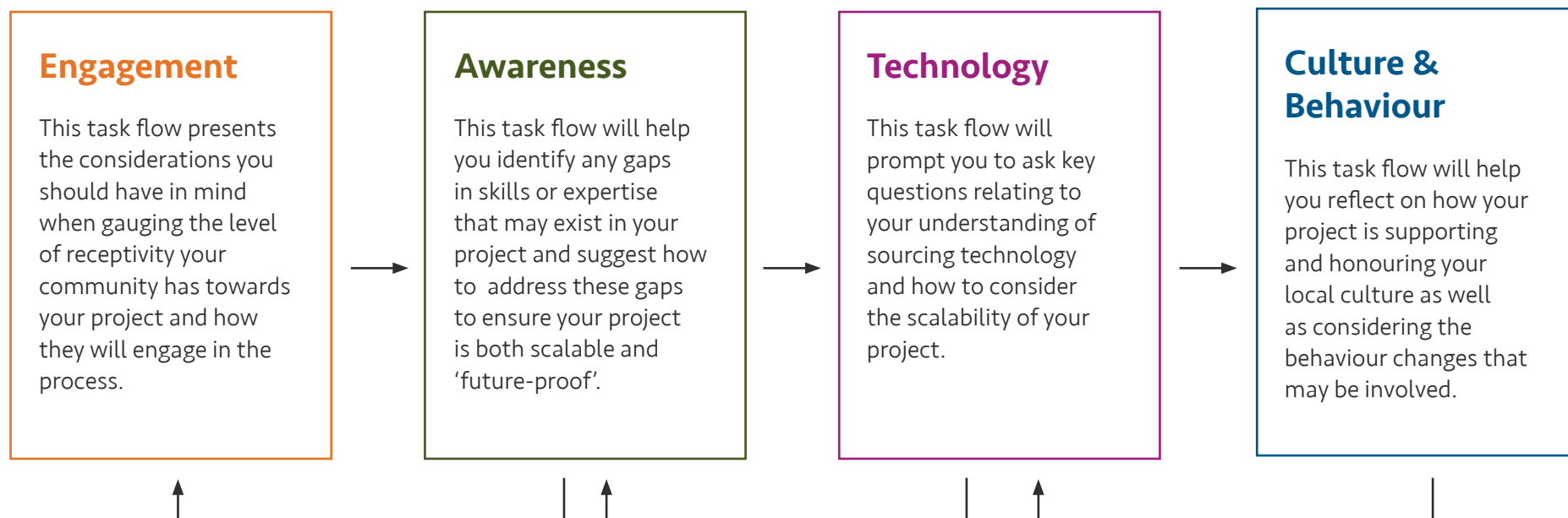
10. Dees & Anderson, *Scaling Social Impact: strategies for spreading social innovations*, *Stanford Social Innovation Review*, 2004.

Scaling Impact Task Flow

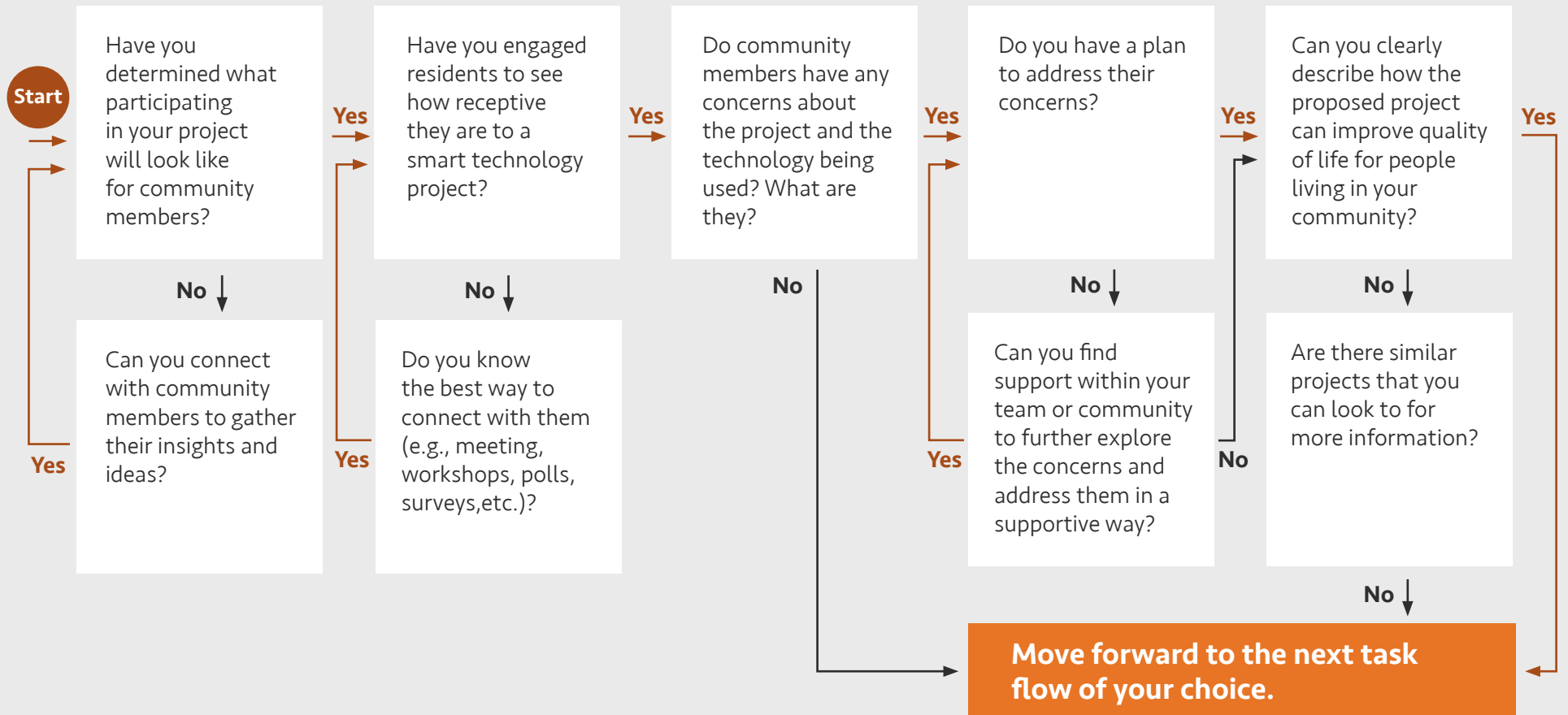


This tool is divided into four key project areas that can help guide your team in considering your project from different perspectives, including those who are already involved and those who will be need to be involved in order to increase impact. This tool will also help give a clear picture of how your project will work with and for your community.

To use this tool, it is important to understand that there is no correct order in which to work through each area, you can start anywhere and even go back if you need to. These task flows can be used independently and even at different stages in the project. Go through each of the task flows in whichever process best suits your project, then reflect on each question from your context and use the space provided to take notes when necessary.

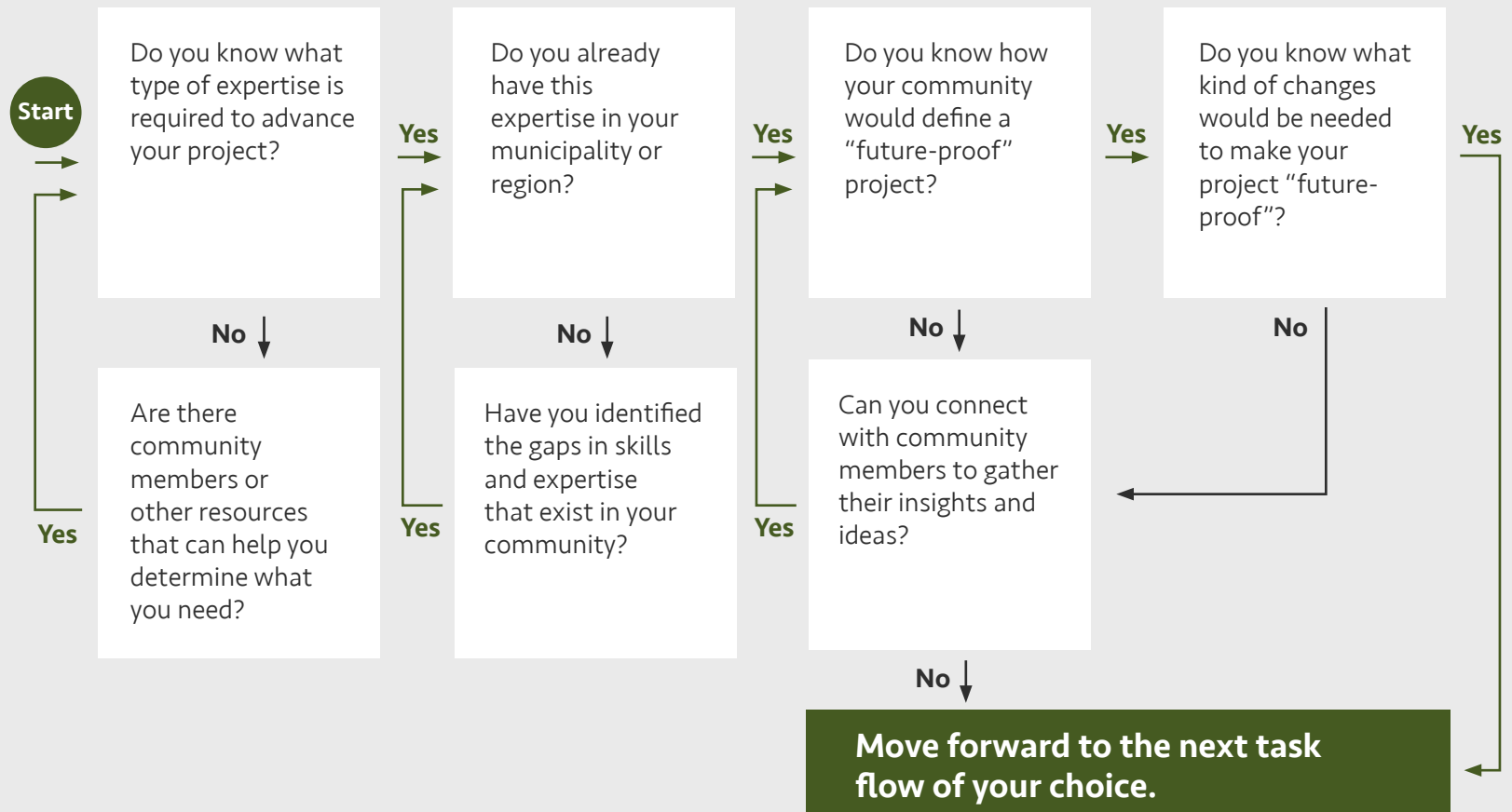


Scaling Task Flow: Engagement

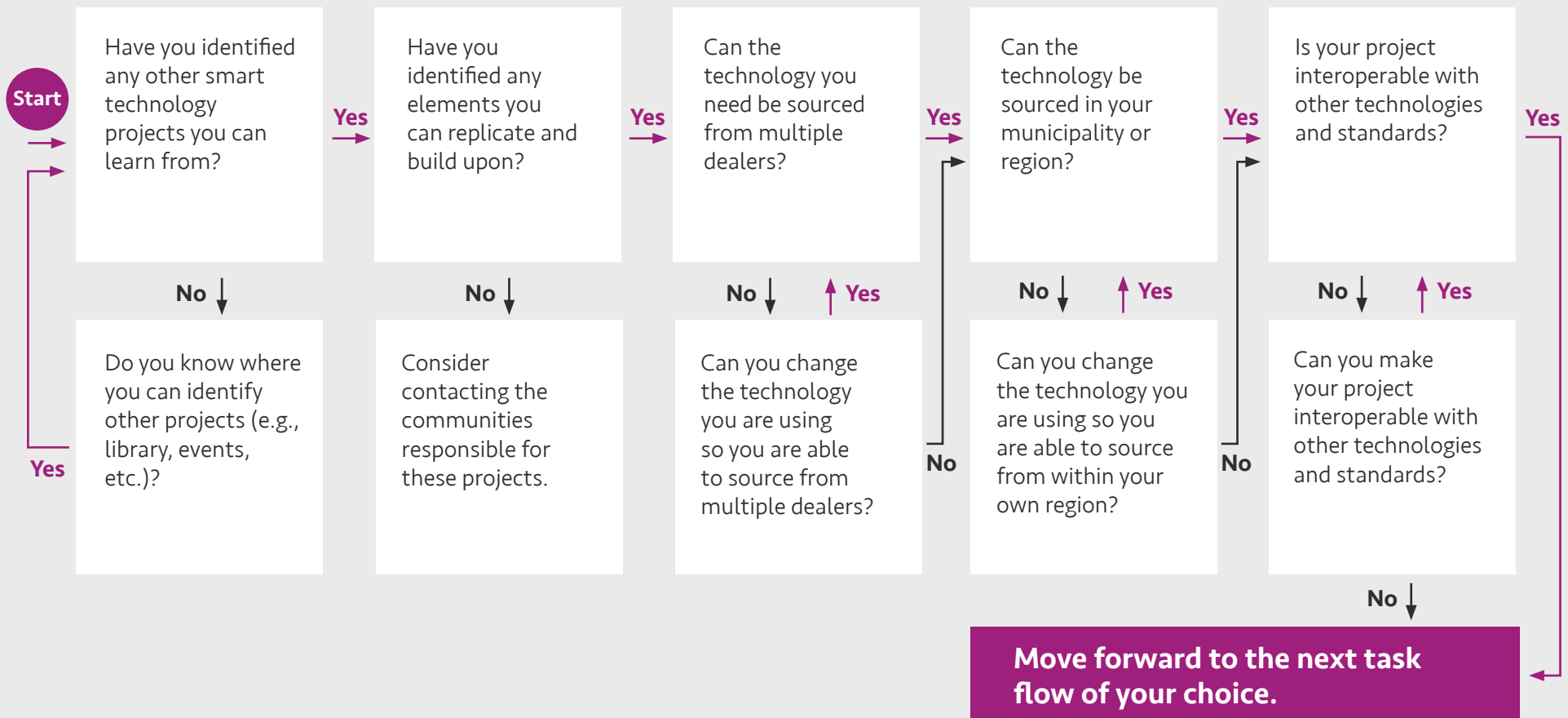


Notes

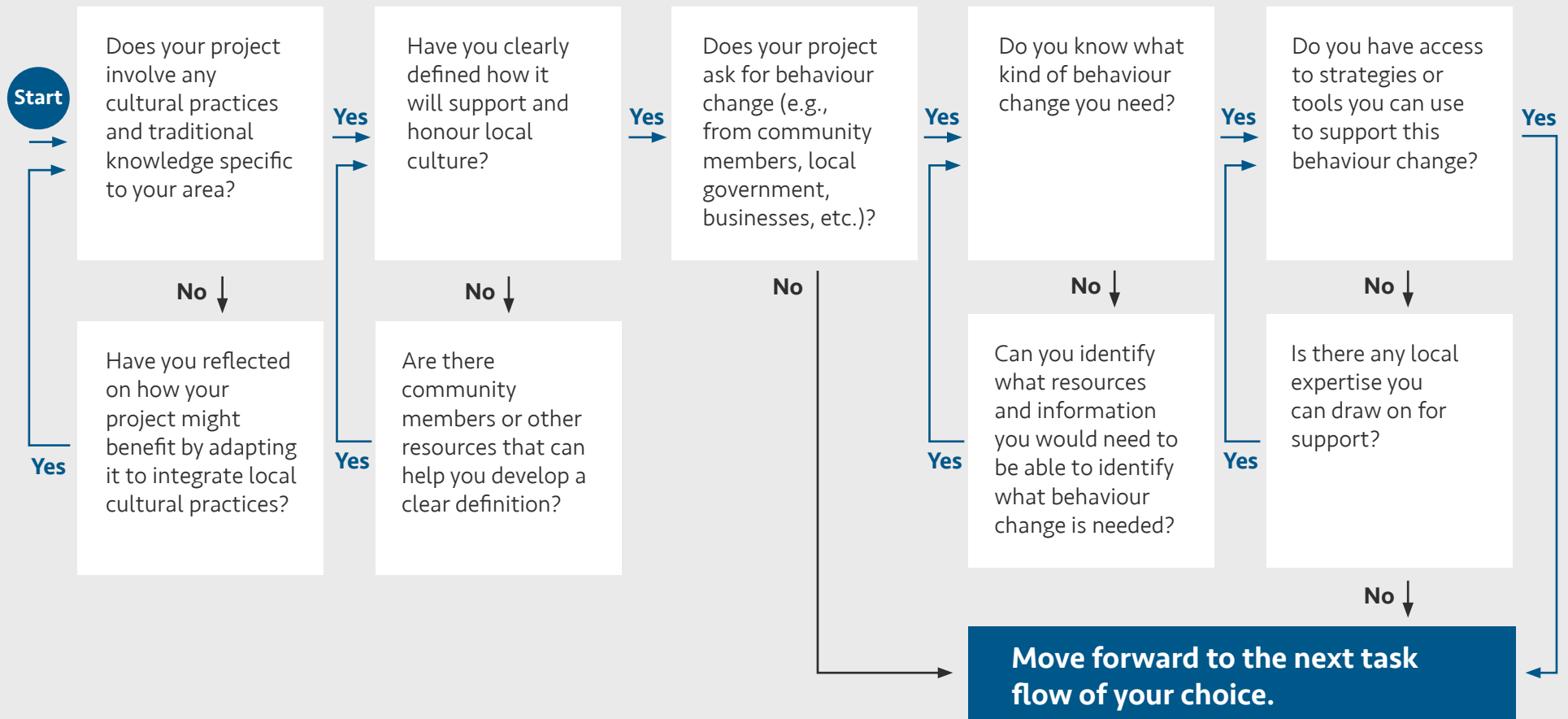
Scaling Task Flow: Awareness



Scaling Task Flow: Technology



Scaling Task Flow: Culture & Behaviour



Smart Communities: Key Learnings and Community Insights



Taking time to iterate

The Katinnganiq Makerspace Network identified time as a key piece of their success. The Smart Cities Challenge proposal development process took place over two years. The Network noted that having enough time to test and iterate their project and assumptions was really critical to confirming that their project was taking the right approach.

- Over time, the group shifted their focus from suicide prevention to life promotion. During the first year, partners learned more about the problem area from the Embrace Life Council, and the mental health advisory committee they had assembled to support the project.
- The first iteration of the project relied on installing **mesh networks** to improve connectivity. After piloting a mesh network, it quickly became clear that the approach wouldn't work in the time frame they had. The next iteration saw the adoption of Internet Exchange Points (IXPs), which do effectively support the project. Pinnguaq firmly believes that having the time to test and pilot aspects of the project allowed them to explore their options and choose the best tech solution.

Mesh networks are a type of internet networking that offers more reliable connections. They create connections between all devices in the network, and information is passed from one device (or node) to the next until it reaches its destination.

Data Privacy: Anticipating Needs and Support

Fredericton and Nunavut both faced challenges when developing the data privacy frameworks for their projects. While both teams had some in-house knowledge of data privacy, they had clear takeaways:

- Find the building blocks for your data privacy framework early. Look to other foundational frameworks, like Privacy by Design.
- Open up the lines of communication with your provincial privacy commissioner as soon as you can. It's important to start consulting early to ensure that your commissioner's availability will match up with your project's timeline.

Look for Solutions that Match Local Culture

The makerspaces proposed by the KMN were a great match to the local culture in Nunavut. A strong maker culture already existed in Nunavut because Nunavummiut have been dealing with restrictions on what products they can access for generations, and have become highly innovative in response. Tech-enabled makerspaces felt like a natural evolution.

Final Thoughts

The ideas and experiences of Canadian smart community projects explored throughout this toolkit can be a valuable source of information, and they can potentially enable better understanding of the types of smart technology available and how they might be applied in your region. Remember: while technology might be the means by which you accomplish your community's goals, it isn't the solution itself.

You and your team will now have a deeper understanding of how a smart community project can benefit your community and be leveraged to address its biggest challenges. By digging deep into your problem area, you should have made great progress towards a precise, well-defined challenge statement. This will allow you to clearly communicate to residents and potential partners about what needs to change, and who will benefit. This challenge statement will be the foundation and driving force behind your project!

With this new knowledge and these helpful tools in hand, you can now make steps toward building meaningful engagement strategies with your community, exploring how to scale your impact, and developing positive and productive partnerships. All of this will help you kick start your community's journey on the road to innovation.



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Resources

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Glossary

Asset and behaviour mapping is the general process of identifying and providing information about a community's assets, or the status, condition, behaviour, knowledge, or skills that a person, group, or entity possesses, which serves as a support, resource, or source of strength to one's self and others in the community.

Circular food economy represents a shift in the way that agricultural systems function, and the lifecycle of our food. It mimics natural systems of regeneration so that food waste is fed back in to the cycle, typically as fertilizer.

Dashboard is a type of user interface often used to visualize data.

Digital currency platform is software that enables people to trade digital currency, or currency that's only available in digital or electronic form, and accessible using computers or mobile phones.

Gamification is the application of typical elements of game playing (e.g. point scoring, competition with others, rules of play) to other areas of activity to encourage engagement with a product or service.

Internet Exchange Points (IXPs) are technical infrastructure where networks come together to connect and exchange Internet traffic. They can help create shorter, more direct routes for Internet traffic, which lead to faster internet speeds, increased security, and cost-savings.

Makerspaces are physical spaces that put the modes of fabrication and training into the hands of community members by offering virtually any kinds of tools and training, from crafting and woodworking to digital design and fabrication, like 3D printing.

Mesh networks are a type of internet networking that offers more reliable connections. They create connections between all devices in the network, and information is passed from one device (or node) to the next until it reaches its destination.

Open data portal is a place where any person, business, government or organization can access, use and share data.

RFID stands for radio-frequency identification and is a technology that uses radio waves to passively identify a tagged object.

Sensors and connected devices are devices that can be used to measure changes in their surrounding environment. They generate and collect data, often operating together with other types of smart technology.

Smart Cities Challenge is a competition that was opened to all municipalities, local or regional governments, and Indigenous communities (First Nations, Inuit, and Métis) across Canada. This Challenge empowered communities across the country to address local issues their residents face through new partnerships, using a smart cities approach.

Spatial data analytics involves using a specialized set of data analytics tools and algorithms to analyze spatial data and uncover hidden patterns and improve predictive modeling.