Making the North, Together

Envisioning makerspaces as systems conveners in the social economy

by Nam Hoang

Submitted to OCAD University in partial fulfillment of the requirements for the degree of Master of Design in Strategic Foresight & Innovation.

Toronto, Ontario, Canada, 2023

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Abstract

This major research project (MRP) applies systems and foresight tools to the realm of makerspaces and their social impact – **it seeks to understand the role of a makerspace in convening community and facilitating self-organization from the grassroots level.** It asks how the democratization of making, and of the tools and technologies involved, plays a role fostering the inherent creativity and niche innovations of a community. Hypothesizing that makerspaces, have the potential to reach across different spectrums of socio-economic class and identity, how might they act as leaders within a system, engines for convening grassroots power? Where social systems have become entrenched, in what ways might makerspaces exert pressure on existing regimes?

These questions are applied in an action case following a participatory action research methodology, sponsored by a not-for-profit makerspace in Yellowknife, Canada, called MakerspaceYK (MSYK). Following the acquisition of a new space and resources, the sponsor sought a generative re-framing of its strategic purpose, especially in relation to the systemic issues faced by the community it serves. The organization's perspective on its role within the wider system was explored strategic foresight tools, and interviews were conducted with other local non-profit and social impact organizations to establish the systemic landscape. The research findings were consolidated and synthesized into a Theory for Systemic Change and Action, with the aim of understanding potential impact and latent systemic leverage.

Ultimately, the study finds that makerspaces espouse the unique quality of being able to scale to purpose, reaching across the system as an intermediary, coordinator, and resource orchestrator among regime-level, niche-level, and community level actors. Due to this quality, makerspaces are well positioned to become systems conveners – fostering dialogue, spaces for learning, and cooperation across social boundaries.

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To my family – After three years you're still unsure what a foresee systemic school teaches someone, yet you trust that I will choose the right direction in life.

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Overview

The **Background** section provides an introduction to what makerspaces are and their socio-economic impact. It briefly covers the historical and contemporary context of the Northwest Territories, and introduces the concept of the 'social economy' and its co-evolution alongside state and industry goals – a lens that will be important to understanding the landscape of non-profit and social impact organizations in the North. MakerspaceYK, the sponsor, is then introduced, covering its operations, values, and need for new strategic vision.

Next, the **Research Design and Methodology** section describes the orientation of the study, establishing systemic design and knowledge co-creation as analytical lenses. The purpose and scope of the engagement are then established, before a full description of the research design and the participatory tools used are given.

Summary Findings compiles and summarizes both workshop and interview data into themes, while **Forming a Theory of Change** reconstitutes the data into a visual Theory of Systemic Change and Action (TOSCA). Using this framework, we theorize how the actions brainstormed by MSYK create leverage and systemic impact. This section provides a direct response to the research question as laid out in the abstract.

Implications & Recommendations extrapolates the implications that MSYK's image of the future might have on actors in the system. Recommendations are made for how actors at the regime, niche, and individual levels might play a role in convening more equitable and directly democratic systems of governance and changemaking.

The Appendix will contain simplified versions of each of the completed tools, as well as feedback given by participants on the approach and foresight tools used.

Research-Practitioner Background

This study employs a participatory action research methodology (Reason & Bradbury, 2005; Fals-Borda, 2006; Grimwood, 2022), in which the researcher and study participants work together to co-create knowledge. Participants become co-researchers, and the researcher, along with their potential biases and perspectives, becomes inextricably linked to the findings; I find it important, then, to provide a brief introduction to who I am and to provide my positionality.

My name is Nam Hoang. At the time of writing I am a Masters candidate in Strategic Foresight and Innovation, with a previous background in architecture and urbanism. My thinking and analytical lens was shaped by spatial practice in the Lefebvrian sense – that space is a social

product, we create it in our image and it molds us in return. Power, domination, and hegemony are expressed within and concealed by space, and so our resistance to it can be found in pockets and niches, streets and alleyways.

Where the theory hit the pavement was in starting my very own community makerspace called Makeshift Collective in 2014, a modest studio above a restaurant in Chinatown, Toronto. 'Founded' years before as a student advocacy group within our architecture school, we used this new space (in reality, an apartment where I and three others lived) to continue our experimentations and long conversations about the radical possibilities and failures of architecture in a post-2008 world. Over time, the two-storey space would house a fully functional but less-than-legal woodshop, photo studio, sewing studio, a bar and dance floor, and multiple small businesses in a space not larger than 800 square feet. Over six years, artists, photographers, designers, and craftspeople would come and go through the space. It was a formative experience for the two-dozen or so members of the collective; we learned in a very tactile sense the messiness and joy of striving for collective empowerment, of what was needed to convene people, to build and share resources, and to re-imagine our futures together.

Richard Sennett (2020) writes how the contemporary 'planner's pen' (read: the associated systems and structures) seeks to preempt and regulate the way our cities develop. Professional placemaking has become a 'brittle' process, overdetermined and unable to hold the creative tension or reconcile the myriad shifting narratives that give our cities life. Blending spatial and systemic design gives us a lens and praxis through which to (un)make the city around us, to reimagine its social forms and its spatial expressions as antifragile (Taleb, 2016) – if critical spatial practice were to embrace disorder and experimentation, and convene many hands and visions in forming the future, we could reclaim our cities as a commons to be collectively shared and managed (Stavrides, 2016; Harvey, 2019). A dissonant process, maybe, but one that aspires to being more open, democratic, and tactile too. I believe grassroots makerspaces to be a microcosm of that social form, a niche defying the pre-empting of planning by giving communities the time, space, and resources to experiment and build bonds through learning and making. For me, this research paper is a return to makerspaces, now through the added lens of systemic design. I aim to further explore how these creative enclaves surface opportunity in spaces messy and unbound, and how the hands of a community gives life to the places we live.

An MSYK member works in Shopspace. Photo: MSYK

Background

Makerspaces

Empowering the individual maker

Makerspaces[1] are broadly defined as 'making' environments where participants work individually or collectively to (co-)create knowledge and physical or digital products (Mersand, 2020). As sites for the production of art, science, and engineering, they blendw digital and physical processes, technologies, and skills – this type of cross-pollination makes them fertile ground for technological or social innovation. 'Tools' available in makerspaces

[1] Makerspaces are referred to throughout the literature as Hackspaces, Fablabs, industrial, academic makerspaces etc. The term 'makerspaces' will act as an umbrella referring to all typologies in this paper, unless a distinction is required.

can vary wildly, from traditional woodshops, metalworking, and craftwork, to digital fabrication (e.g. CNC, laser cutting, 3D printing), coding, computer engineering, and more. The contemporary maker- and fab-lab movement in the West is centered around the relocalization of production, technological innovation, community autonomy, ecological responsibility, and open source-style 'commoning' (Bollier, 2021). The movement espouses the principle that democratizing the individual's ability to build and modify the things around them will create emergent and far-reaching transformations on how society engages with and acts through technology (Nascimento, 2014).

Makerspaces grew from a variety of grassroots and self-sufficiency movements, with roots in DIY culture, hacker subculture, and the maker movement (Schrock 2014, Ensign & Leupold 2018, Mersand 2020), lending them a social lean alongside their fabrication capabilities. Unlike contemporary industrial/innovation clusters, makerspaces tend to be more open, convenient, and low-cost (Mersand 2020, Shi & Chen, 2022) and are often described as 'third spaces' (Oldenburg, 1997) – spaces for informal gathering and bonding. These diverse origins give rise to a wide range of makerspace typologies, reflected in the tools and technologies available within a space, its mission and purpose, even down to its membership and fees structure. No two makerspaces are the same; the space is a function of member and community needs. However, common principles and values across maker discourse are oriented towards self-expression, bottom-up community building, open creativity, and learning skills in social environments.

Ultimately, the maker movement, through no small amount of maker manifestos and proclamations, holds that any user, consumer, or citizen should be able to produce, copy, and improve technology on their own – it seeks to empower the individual to act independently from technological experts and specialists. Hands-on experience alters the individual's relationship and knowledge with technology, "opening up the many black boxes of our technologically complex world" (Nascimento, 2014, para. 4). This is particularly urgent in the face of increasing influence and infiltration from technology in public and private spheres of everyday life.

The economic and innovation perspective on makerspaces

In the past decade, both interest and the number of single entity makerspaces has been rising significantly on a global scale (Peek & Lou, 2016). Ensign & Leupold (2018) identify over 150 makerspaces in Canada alone, not including the large typology of educational makerspaces based in post-secondary institutions or libraries. The Fab-Lab movement, the high-tech cousins of makerspaces dedicated to international collaboration and scalable production through digital means, counts 1,750 Fab Labs registered in their global database (Fab Foundation, 2023). In China, almost 7000 makerspaces have been opened to support national goals of mass, accessible entrepreneurship (Shi & Chen, 2022).

Human-centered innovation research also emphasizes the democratizing potential of Makerspaces: they widen access and lower the barrier for the design and manufacturing of new products in local settings, incubate/accelerate startups and small businesses, and are hubs for knowledge sharing and entrepreneurial activities. In this way, makerspaces turn everyday consumers into producers of technology and innovation (Mersand, 2020). Shi & Chen (2022) posit that makerspaces act as both resource orchestrators and platform supporters. Resource orchestration is defined as convening actors at many levels (e.g. community, industry, academic, state) to gather, co-create, integrate, and codify knowledge. Makerspaces then become a platform for other actors to build upon, providing foundational knowledge (e.g. incubation/accelerator programs), technological and equipment support, entrepreneurship advice, and the convening of investment interest.

Tinkering and making emphasize open-ended and improvisational problem solving; this pairs well with the rich mixture of high and low tech tools provided by makerspaces to facilitate process- and product-oriented practices that break traditional disciplinary boundaries. The development of tools/skills transliteracy, as well as innovative problem-solving processes is seen as one of the main human capital benefits of makerspaces (Ensign & Leupold, 2018). Sheridan et. al (2014) in their case studies of a variety of makerspaces describe the impact of this interdisciplinary approach well:

"Sewing occurs alongside electronics; computer programming occurs in the same space as woodworking, welding, electronic music, and bike repair. This blending of traditional and digital skills, arts and engineering creates a learning environment… [leading to] innovative combinations, juxtapositions, and uses of disciplinary knowledge and skill." (Sheridan et al., 2014, p.526)

A young workshop participant watches a computer controlled (CNC) router carve into his workpiece. Photo: MSYK.

Social dimension of makerspaces

The creative act of making, especially in a community setting, encourages a dimension of 'social scaffolding' – learners observe each other, are inspired by, and help each other (Bevan, 2014; Nascimento 2014; Taylor, 2016; Mersand 2020). This dovetails neatly with studio and arts-based pedagogies, where peer-teaching leads participants to dig more deeply in projects, take ownership, and self-regulate their own learning (Sweeny, 2017; Mersand 2020). Beyond direct learning opportunities like classes or workshops, participants in makerspaces become mentors and leaders within their communities, extending the impact of such spaces into the realm of social cohesion and identity formation. This set of relations is inherently spatial, and makerspaces rely on physical space to be a social infrastructure, encouraging informal interaction, peer-to-peer learning, open-access to tools, community-building and solidarity (Schrock, 2014; Mazzilli-Daechsel, 2019; Mersand 2020; Bollier, 2021).

Recognizing that technologies are created through complex social, economic, and cultural interactions, the notion of 'critical making' posits an increased need for participatory design processes and general literacy surrounding technological and social innovation (DiSalvo, 2009; Ratto 2011, as cited in Schrock, 2014). Mazzilli-Daechsel (2019) situates makerspaces within Simondon's critique of our increasingly alienated relationship to technology: despite its limitations, the maker movement does represent a potential pathway to increasing critical thinking and cultivating more active participation in the invention and governance of new technologies. Makerspaces do this not just by providing education and access to tools, but also through opportunities to contribute to an organization and transform a space – they have the necessary tools to reintegrate material production with a dimension of social critique.

Meanwhile, commoning[2] advocate David Bollier (2021) positions makerspaces as drivers of commons-based peer production, a concept first coined by Yochai Benkler. In a nutshell, the maker movement encourages the open sharing and free-use of inputs and outputs (e.g. designs, production processes, files, code etc.) on a scale only made possible by the internet. It promised a form of global networked creativity, emergent innovation, and decentralized but cooperative action.

Situating the 'maker movement' in the territorial context

While the literature generally paints makerspaces as democratizing and equity-driving forces in economic, community, and academic spaces, they have also been criticized for widening the digital divide or being overly dominated by specific, privileged groups (Nascimento, 2014; Mersand, 2020). Though referred to as a maker 'movement', makerspaces and their

[2] As described by Bollier himself: "...commons can arise anywhere. Whenever a community decides it wants to treat a certain resource – land, fish, software code, urban spaces – as shared wealth, the seeds of commoning begin to germinate." (Bollier, 2021, p. 6) In this sense, commoning is a verb generally describing bottom-up initiatives that steward common resources, prioritizing the needs of local people and ecology over market exchange, capital accumulation, and extractive practices. These initiatives opt for forms of direct democracy and participatory structures over a reliance on state power.

networks have also been critiqued for their lack of political agenda or coordinated/large-scale mobilization (Taylor et al., 2016; Mazzilli-Daechsel, 2019) even as such an agenda may affect the accessibility of a space. As the maker movement matures, the divergence of its spaces, goals, and impact becomes difficult to reconcile. Even within this short introduction, I have covered both the scrappy, informal, community-based hackspace, as well as the high-end state sponsored innovation lab.

It is important, then, to situate the words 'maker culture' and 'innovation' in the political and economic context of Yellowknife and territorial life at-large. The North faces many challenges: high costs-of-living, economic volatility, geographic isolation, slow-moving bureaucracies, a host of social pathologies, the ever-present specter of colonialism – not to mention that the region experiences disproportionate effects of climate change. Northern peoples have needed to address many of these problems on their own for decades, a form of inherent community 'innovation', resiliency, and social learning. To northerners, 'DIY' and 'maker culture' might describe recreational activities as much as it does the necessity to build their own solutions outside of dominant structures and systems.

Architect Josh Armstrong (2012) in his thesis writes about the 'Shacklands', an informal development in Iqaluit that he argues "provide sites for the imagination of a culturally considered built future" (p. 3). These 'low-road' structures and shacks, built by locals, have an inherent quality of social criticism, experimenting in ways that respond to their needs in spite of colonial, spatial, and cultural impositions. Armstrong posits that the structures of the 'Shacklands' are an expression of agency from those who self-build them, their "hopes and dreams" as one of his interviewees expresses (Armstrong, 2012, p.115). These informal building typologies extend to Yellowknife as well. Margaret Burt (2020) explores the community-built houseboats and 'shacks' of Old Town, learning from the inherent innovation of occupants to inform more sustainable housing typologies for the region. These homes have many properties of much 'higher brow' architecture: they are off-grid, mobile, circular in their material use, and even feature social considerations such as generational expansion.

'Maker culture' is not enough to create systemic change if not coupled with a wider critique of systemic impediments. Yet, as seen in the 'Shacklands' and Yellowknife's Old Town, self-building provides a pathway to increased agency and a cultural reflexivity baked into the end product. Though these two examples are of a spatial nature, the following sections will explore social forms of cultural reflexivity and community innovation, and the systemic issues that northern organizations are responding to.

Houseboats line the edge of Yellowknife Bay. Photo: MSYK

Regional Context

A short introduction to the Northwest Territories

45,000 people live in the NWT, roughly half of whom are Indigenous (NWT Bureau of Statistics, 2023). 20,000 residents live in Yellowknife, where MSYK is based. The present-day economy of the territories is driven primarily by resource extraction, mining in particular, led mostly by large corporations based outside of the region. This dependence on natural resource extraction has set the region deep within the boom/bust cycle of industry economies, with significant socio-economic fluctuations as a result: labour shortages and migration swing concurrently with resource development activity, the workforce of the region heavily relies on fly-in/fly-out seasonal labour, and outside of industry there is a low diversity of enterprises that operate in the North (CanNor, 2019). Resource dependence has created a "wage-earner" culture as opposed to a "stakeholder" culture (Southcott, 2015, p.11). While on the whole, territorial economies have been forecasted to grow, the NWT's economy will decline over the next few years as mines begin to close. The Government of the Northwest Territories (GNWT) has been advancing economic diversification, business innovation, and

infrastructure projects over the past decade in response (CanNor, 2019). The public sector is the largest employer outside of the natural resource sector, and has the largest workforce that stays in the territory year-round; a quarter of the workforce in the territory works for the GNWT (Williams, 2023), a number still growing due to the pandemic (Hudson & Minogue, 2023)

A distinct element of the territorial economies as compared to the southern provinces is the significant share of Indigenous businesses and the roles that they play. Northern cooperatives have played a huge role in preserving Indigenous values and culture through the twentieth century, and as land claims are settled, Aboriginal Economic Development Corporations are established as social enterprises pursuing opportunity and investment on behalf of their constituents and communities.

Despite long term goals for the opposite, Northerners still rely heavily on goods being shipped, trucked, or flown into their communities. This is especially difficult for more remote settlements. The North is disproportionately affected by climate change – the Arctic is warming three times faster than the global average affecting construction, logistics, transportation, and basic needs like food and energy. The cost of living is significantly higher in the territories than in most other parts of Canada (CanNor, 2019). As a result, the 'mixed' and traditional economies of hunting, fishing and gathering, and communal labour still plays a large role for Northerners alongside the wage economy.

The following sections will cover (all too briefly) the historical context of the NWT, exploring how colonial/industrial logics and a predatory welfare system set the stage for myriad issues and challenges faced by the region today. We will then examine Northerns' grassroots response to these challenges through the lens of the 'social economy' – an important piece of context to understand the organizational ecosystem surrounding MakerspaceYK.

Ice sculptures carved on the frozen surface of Great Slake Lake. Despite challenges, Yellowknife the arts and culture scenes are active. Photo: Nam Hoang

A night view of downtown Yellowknife. Photo: Nam Hoang

Historical context and the continued effects of colonialism

Participation in (and the imposition of) a wage economy in the territories that is recognizable to southern Canadians is relatively new. In contrast to narratives of northern frontiersmanship, the wage economy and natural resource development of the northern economy is the product of close cooperation between state and industry (Southcott & Walker, 2015). It is necessary to understand that the recent history of the territory emerges "through colonial aspirations for resource riches and sovereignty," the actions of a paternalistic state and social engineering (Christensen, 2013, p.7). Each territory's history has been "profoundly shaped by colonialism and by Indigenous peoples' self-organization to reverse it" (Abele, 2015, p.82).

Northern First Nations and Inuit people would first meet Southern interests through the fur trade and whaling. The federal government did not initially extend the treaty system northward as they saw little potential for development in the region, unlike in the southern provinces where treaties were hastily negotiated to continue settlement (Coates, 1984). Though the forced assimilation of Indigenous peoples in the South was in full effect, Northern federal authorities encouraged self-sufficiency and protection (and segregation) from white society. As Coates writes, "the imperatives of federal legislation were not applied with unwavering conviction" by local administrators and Indian agents, who tended to allot residential reserves and regulate game in a way to "encourage the social and economic segregation of native and white, and hence preserve the 'native way'" (Coates, 1984, p. 194). The Yukon gold rush at the end of the nineteenth century would bring with it a wave of migrants, and while Southern interests and Northern inhabitants would become more and more entangled, the government would not change their stance. Cultural imperialism through the church still had a presence in the North; it was in fact the Anglican church that proposed a treaty claim on behalf of Indigenous communities from 1907 to 1910, requesting clergy-administered residential schools alongside game preserves and

community projects. Federal authorities would reject this, and "from 1894 to 1950, there was little commitment to assimilation, except as a far distant goal unlikely to be accomplished" (Coates, 1984, p. 183).

The laissez-faire attitude of the federal government would be reversed following World War 2, as Cold War tensions and national priorities precipitated changes to industrial, defense, and social policy (Southcott, 2011). The state would lead massive highway, railway, and infrastructure-building activities in the North in the 1950s and 1960s and also expand military infrastructure; for example the 63 radar stations of the Distant Early Warning Line across the far North. Ottawa would also open the door to new lead and zinc mining developments, and oil and gas exploration in the 60s in the Mackenzie Delta. This increased state and industrial activity would draw in Indigenous people from their communities for economic opportunities far greater than what was available before, disrupting Indigenous subsistence-based sharing economies and eventually leaving in its wake multiple climate disasters lying dormant (Pfeiff, 2016).

This new phase of state intervention would mark the creation of "the bureaucrat's north" (Coates 1985, p. 191) bringing with it a renewed effort of industrial planning and social engineering. The 1960s saw Canada complete its emergence as a welfare state, cementing publicly-funded social assistance with the Canada Pension Plan, unemployment assistance, and support for single parents. Federal authorities decided to bring social programs in the North in line with these regimes: compulsory education (i.e. the Sixties Scoop), regulation and land management regimes, and increasingly larger waves of migration and spatial reorganization. The urban centers of the North would develop economies around providing these state supports; centralizing the provision of these services would result in many rural and nomadic communities relocating to cities. Introduction of new technologies like guns and snowmobiles changed Indigenous ways of hunting and living off the land. Education programs ripped children away from their families, breaking cultural transmission for generations to come. Social housing had the side effect of introducing rent regimes, sedentarism, and altered consumption patterns. Resource industries would lead to wealth accumulation in these urban centers, fuelling uneven development and an urban-rural divide in the present. Though employment opportunities became more readily available, the combination of the wage economy, cash dependence, and government aid programs would thoroughly dislocate Indigenous space, time, livelihood, and culture (Southcott, 2015; Abele 2015; Christensen, 2013).

These social welfare programs were meant to equalize the material conditions of Indigenous peoples in the North. In exchange for changing their ways of life, Indigenous communities would be offered welfare benefits and programs, effectively assimilating Indigenous peoples while upholding dominant state-driven ideological frameworks (Christensen, 2013). This pattern is a type of welfare colonialism, a term first conceptualized by Robert Paine in 1977 to describe the colonial state making

decisions on behalf of the colonized – acting in the name of the colonized, but serving the administrative, political and economic ends of the state (Paine, 1977). Not by any means a unique approach to the North, First Nations activist and political leader Arthur Manuel writes how dependency on social programs was a deliberate means for the state to dispossess First Nations of their land across all of Canada (Manuel & Derrickson, 2015; 2017). Welfare was introduced to keep First Nations "corralled on [their] reserves" (Manuel & Derrickson, 2015, p.68), to pacify and entrap Indigenous people into colonial laws and systems, to assimilate and break social kinship, traditional economies, and connection to the land.

Photo: Luke Moore on Unsplash

Contemporary state response

Much of contemporary Northern life, then, is driven by welfare colonialism, the hangover of state intervention and social engineering, as well as the continuing boom/bust cycles of resource extraction. Boom developments occur much too rapidly to be beneficial or sustainable in the long term, with substantial research associating it with a wide range of social pathologies including violence, drug and alcohol addiction, and high-risk social behaviors (Goldenburg et al. 2010; Ruddell 2011; Shandro et al. 2011, as cited in Parlee, 2015). Outside of more recently established Beneficiary Organizations, no other major sources of locally accumulated northern investment capital exists, with local federal and territorial authorities operating primarily through federal transfer payments (Abele, 2015). The natural resource sector also offers much higher wages than most other employers in the region, creating a skill and brain drain effect (Parlee, 2015). Rapid in-migration of temporary workers puts pressure on limited infrastructure and services, and the volatile costs of living puts significant strain on long-time residents; affordable housing and homelessness in its many forms is one of the greatest insecurities in the North (Christensen, 2013). The still present need to import labour affects social norms and structures, and fostering an environment of dedicated local activism and stakeholder culture is difficult (Southcott, 2015).

Recognizing that policy crafted in Ottawa, with little consultation from Northerners, has been "shortsighted and ineffective" (Kikkert & Lackenbauer, 2019), the federal government has

been undergoing a process of devolution over the past two decades. Devolution first began in the Yukon in 2003, with the NWT following suit in 2014, giving territorial governments powers more similar to Southern provinces: healthcare, education, and land management (Sabin, 2017; Executive and Indigenous Affairs, n.d.). Notably, powers relating to the development, management, and collection of royalties from natural resources are also being expanded – with an emphasis on co-development with local and Indigenous governments. The "change from a colonial relationship to regional empowerment has not come easily" (Southcott, 2015, p.3); while the process is being watched closely for its contribution to policy co-development with Northern residents, it has also been criticized for shifting responsibility for decades of over-dependence and exploitation to local authorities in ambiguous ways, straining already low capacity (Southcott, 2015; Abele, 2015, Sabin 2017). Nonetheless, the policy goals of the GNWT and the preeminent federal player in CanNor (the Canadian Northern Economic Development Agency) are important considerations to the development of MSYK. Two themes stand out: economic diversification and the creation of regional innovation ecosystems.

Limited economic diversification and an "over-dependence on the public service and the resource development sectors" (CanNor, 2023, p.13) has resulted in a fragile economic environment; one of CanNor's major goals revolves around investing in key sectors that could also address the challenges Northerners face. Over the years, CanNor has suggested developing tourism (and its related products), local food production to reduce reliance on imports, value added services in the mineral supply and processing chain, and cold climate technologies (CanNor 2019; 2023). Investments in the knowledge economy and in research and development will add to the economic complexity of the natural resource industries. Examples might be the planned will be the expansion of Aurora College into a polytechnic university, or investing in skills programs to decrease dependency on outside labour. Federal plans also note the importance of increasing capacity within Indigenous groups to participate in economic opportunities, which would require supporting core development functions within those communities (e.g. planning, research, liaison, advocacy, coordination, and monitoring).

Atracting investors to build new industries will require the "cultivation of [a] resilient Northern innovation and entrepreneurship ecosystem" (CanNor, 2023, p.5). CanNor's IDEANorth program, for example, invests in foundational and small-scale economic infrastructure and local capacity building in service of fostering an innovation economy in the territories. In the short-term, this means direct financial support for scaling small/medium size businesses in the aforementioned 'key sectors' will be provided by the federal government. In the long-term, what CanNor calls "small-scale economic infrastructure" refers to the development of community spaces that network disparate groups, enhance collaboration, and fosters the necessary expertise to start new businesses – a regional innovation ecosystem that will include incubators, accelerators, and access to capital (CanNor, 2019).

The social economy: a response from the grassroots

While understanding the contemporary state response to regional challenges is important, community-based organizations have been "mitigating and managing the socio-economic effects of boom-bust economic environments" for decades (Parlee, 2015, p.53). To understand the organizations responding to local issues, both formal and informal, we can use the lens of 'social economy'.

The social economy refers to community-based voluntary, non-profit, and cooperative organizations that are an alternative to state sponsored services or for-profit activities (Southcott, 2015) – a 'third sector' rejecting profit-based capitalist relations and state-based bureaucracy in favour of more associational relationships such as mutual aid, self-help, or solidarity groups. Generally, these organizations operate on participatory and cooperative principles, and are an important driver for social cohesion and healthy community relationships, "part of a stakeholder economy, whose enterprises are created by and for those with common needs and accountable to those they serve" (Southcott, 2015, p.6).

Formal social economy groups have a deep history in Canada, especially in the Prairies and Quebec (where they are specially codified in law) and in the territories in the form of Northern and Indigenous cooperative enterprises. Abele (2015), however, reminds us that these groups exist in both formal and informal realms, that "the familial, local and regional organizations and affiliations that constitute northern community life... have been sufficient to maintain social integrity in many places, even in the face of decades of damaging external interventions and undemocratic governance" (p. 74).

As the need to mobilize around social problems, devolution, and community governance arises, social economy groups are on the forefront of building the social capital necessary to be flexible and responsive to quickly changing situations (especially in relation to government), provide existing structures for relational forms for empowerment, and be innovative in addressing the community's challenges.

Southcott & Walker (2015) in their research provide an interesting window into the landscape of social economy organizations in the North: the territories had a significantly higher proportion of organizations per population than the national average, yet the lowest proportion of charities. Social economy organizations represent a significant part of local economies, accounting for 7.5 percent of total GDP within the territories, and 20 percent of total employment at time of survey. One third of organizations at that time indicated that their membership was growing. Examples of social economy groups in the North are plentiful: shelters for those experiencing homelessness or family violence (e.g. YWCA, Coalition Against Family Violence), food banks and food-sharing networks, arts and crafts cooperatives, community wellness programs (e.g. family planning, maternal health, breakfast programs, cultural skills camps, drug and alcohol abuse counseling) and more (Parlee, 2015).

The work social economy organizations do is highly diverse, supporting major Northern industries through invisible work; child care, elder care, subsistence harvesting, and community programs is what makes it possible for members of the community to participate in wage-based economies. Parlee cites Vail and Clinton (2011) who suggested that lack of child care services in Nunavut and economic development are negatively correlated – without the proper social infrastructure in place, individuals are disincentivized to work in wage-based economies. Beyond merely mitigating the effects of social pathologies, social economy groups contribute to local development through community monitoring, environmental assessment, and the normalization of Traditional Knowledge within these operations. Northern cooperative enterprises by nature form and maintain institutions of self-government, and educate members in financial management, leadership, and collective decision-making (Abele, 2011; Southcott, 2011). Though social economy groups do so much to support industry, a vicious cycle occurs during boom periods, when the demand for these organizations rises but volunteerism and availability of labour decline.

Outside of organizations, everyday life in the territories holds many examples of the social economy and the social trust fostered by relational activities. The 'mixed economy' is seen as an alternative to the wage economy, and consists of households held together in a network of kin and exchange relationships; cash, goods, and services are all traded with each other (Abele, 2015). Goods such as food or plant/animal products are produced by on-the-land activities (e.g. hunting, fishing, trapping), services and domestic care, and knowledge exchange. These 'bush activities' are not typical of work seen in the wage economy, but are nonetheless physically arduous and require high levels of experience living on the land. Much of this knowledge of course originates from Indigenous people and Traditional Knowledge, and consequently the mixed economy is an important channel to transmit intergenerational values, language, and place-based knowledge. Where the mixed economy is strongly established, households do not need to rely on a single source or wage for their livelihood and are more resilient in the face of social pressures brought about by boom-bust cycles.

Locals march in the first ever pride parade in downtown Yellowknife. Photo: MSYK

A co-evolution led by the social economy

Contemporary life in the territories is formed by national and global industrial interests, a history of colonial oppression, and the continued impacts of natural resource overdependence. While the state has recognized the need for transferring policy-making power to local authorities, the process itself is “wicked” in nature (Rittel & Weber, 1973) and requires the disentangling of centuries of colonial interference.

The lens of the social economy helps us understand that, despite the abundance of macro-level theories around structural inequities and economic dependence in the North, the reality must take into account Northern communities as “powerful actors (willing and unwilling) in the success and sustainability of resources development activity” (Parlee, 2015, p.62). Local social economies foster strong social networks, trust, and stability, lowering economic risk and facilitating the dissemination of knowledge (Casey & Christ, 2005). The organizations and activities within the social economy should be seen as both an active and passive redressing of political power, a source of community-led innovation and mutual aid. Sustainable and equitable devolution will require new political structures be formed, relying on social economy organizations to lead a healthy co-evolution between the communities they serve, the state, and industrial interests.

Artspace at MSYK is used for a variety of community programming, including musical performances. Photo: MSYK

MakerspaceYK

History of MSYK

One such social economy organization is the subject of this research project: MakerspaceYK (or MSYK) is a makerspace based out of Yellowknife, NWT, and is one of the few physical spaces within the city supporting community arts. The following section will introduce the history of MSYK, provide an overview of their goals, values and operations since opening the space, and describe the context surrounding the professional engagement of the student practitioner.

MSYK began as a modest attempt by a group of friends in 2019 to build a community workshop and studio space for their creative projects. Finding few viable and affordable options for space within the city of Yellowknife, the group got creative about what spaces might work for them: they pooled their resources to acquire a small school bus in hopes of activating and transforming empty spaces within the city into work space. The 'Tool Bus' would be used to transport members, tools, and space to program across the city. At this time, a board was formed by the founding members to govern the use of the Tool Bus.To see what was possible with the Tool Bus, MSYK would launch a 'Summer of Skills' in the summer of 2019, featuring weekly workshops for the community in hopes of gaining momentum and building a portfolio that might lead to funding a permanent location. Through these workshops, the

mission of the organization began to take form, going beyond the need for a simple co-working space to ideas of social infrastructure and community capacity building.

With new experience under their belt and a vision for their permanent space, the organization was able to secure multi-year funding from the GNWT (through Industry, Tourism, Investment or ITI) and CanNor's IDEANorth program – to advance the NWT knowledge economy and provide Northerners more opportunities to further their education and skills. To meet this mandate, the new MSYK space was planned to have a traditional woodworking space ('Shopspace') as well as a 'Hackspace' with innovative digital fabrication and prototyping capabilities. An existing pub outside of downtown was rented in November of 2020 and renovations would begin, though the pandemic would pose significant logistical challenges and delays.

Despite these difficulties, throughout 2020 and 2021 the team would continue to bring together artists, makers, and residents in community-focused projects, such as murals or community gardens. Connecting with artists, residents, and youth in the community helped the MSYK team deepen their understanding of the need for 'Artspace' – a concept developed alongside community partners to support the need for "maintaining an arts presence in the space that does not depend on an economic component" and reduce barriers for different members of the community in accessing MSYK. Economic diversification, in MSYK's eyes, would only be reached through increased accessibility and empowerment of local communities; Artspace would run programming and partnerships that nurture these relationships through workshops, events, and gatherings. Funding was secured by the board and a team of local artists via the Arctic Inspiration Prize for the third and final piece of MSYK.

The space was originally slated to open in Spring of 2021, but labour shortages, high construction costs, pandemic-related challenges, and contractor delays would push this date back. A silver lining would come in the form of MSYK's landlord putting the space up for sale, and by securing additional funding through the Canada Cultural Spaces Fund the organization was able to purchase the unit outright, decreasing yearly costs and increasing flexibility for replanning and renovating the space. The purchase of the building would finalize in March of 2023, with their three year strategic plan ending soon after in April. Throughout 2022 three new staff would join the organization, including a new executive director.

The origins of MSYK: the Toolbus. Photo: MSYK.

The side entrance to MSYK. Photo: MSYK

Day-to-day operations

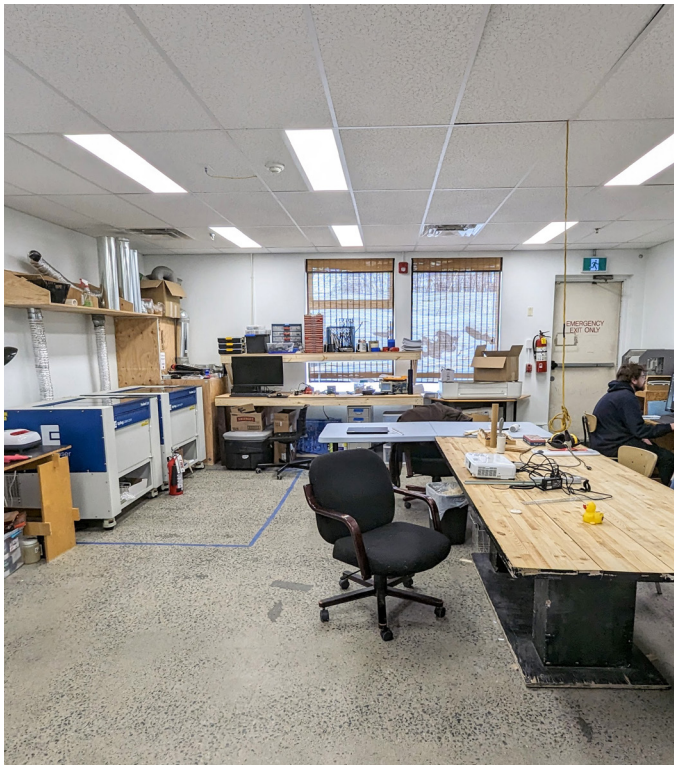
MSYK offers membership-based usage of their three different spaces: Shopspace is a traditional woodworking space, Hackspace is a digital fabrication lab, and Artspace hosts events, traditional crafts, and arts workshops. The organization is a registered non-profit, with three total staff members and nine board members; board members until more recently played the active role of 'working board'. Shopspace and Hackspace have an assigned staff member who works as a technician and workshop facilitator when necessary. An executive director leads the organization, managing both internal day-to-day operations as well as cultivating external relationships with other groups or organizations.

Shopspace, where the majority of the traditional woodworking and fabrication tools are housed. Photo: MSYK

Workshops, events, and drop-in hours/rates are meant to encourage community members to purchase monthly memberships. Classes and workshops are either hosted by a staff member or put on collaboratively with other organizations. These collaborative efforts are usually funded by project grants. Examples include hosting a youth-focused STEAM workshop series or a business incubation program. Community-run events are common: Artspace has hosted traditional beading circles, repair cafes, artist crit nights, and even community organizing events for groups like Yellowknife's new tenant board. Shopspace and Hackspace offer classes introducing members to different tools in the woodshop, or teaching computer programs for digital fabrication.

MSYK's Values and Goals

MSYK's mission begins with "making skill-building accessible" to all. Their vision in creating a makerspace is to empower "individuals to gain confidence, build practical skills and grow creatively so that [they] can build stronger, more resilient, and vibrant communities together." MSYK believes building resilient communities starts with supporting the inherently innovative residents of the territory and providing them the tools, skills, and resources to exercise their agency. MSYK also identifies building partnerships and aligning goals with other social economy organizations within Yellowknife as a priority — the range of collaborators is wide, from youth-focused service providers, arts organizations, education initiatives, and identi-



Hackspace, where digital fabrication tools such as 3d printers and lasercutters are housed. Photo: MSYK

ty-based community groups (e.g. francophone, BIPOC, LGBTQ+ groups).

MSYK aims to be a hub of trans-disciplinary learning, collaboration, and innovation. The North is a unique context for social innovation, rich in both scientific and traditional forms of knowledge but with limited opportunities and platforms for the collection, co-production, and dissemination of knowledge and knowledge capital. In their own words, the opportunity to come together, share skills, and co-develop competencies – without leaving the territory – is a crucial gap in the sector which can be filled by a place like MSYK.

In support of government goals of economic diversification, MSYK increases access to small-scale manufacturing and prototyping, and provides a space to scale and develop business ideas in an urban hub. With Yellowknife being so geographically isolated, it is not viable for individuals to acquire and maintain these resources on an individual basis. As part of supporting the knowledge economy, MSYK could act as a convening force for sharing entrepreneurial experience, fostering networks, and gathering investment capital. As the hackspace at MSYK develops, the organization will be able to offer training and programming for digital skills. Alongside more traditional trades and construction training, the organization would support the expansion of the skilled labour pool in the territory.

Artspace is multi-functional and is the first space you enter when coming to MSYK. It hosts programming and events. Photo: MSYK

Artspace acts as a direct conduit to local communities in Yellowknife, particularly effective in convening those interested in traditional crafts, community arts, and youth-focused organizations. Throughout their years of programming, MSYK has learned how valuable Artspace might be in providing an open, accessible, and safe environment for community members to meet each other and organize. The territory has also not capitalized the arts as a local economic driver, lacking a publicly-funded art gallery, limited studio spaces, and no retailers to supply artists and craftspeople with materials. MSYK hopes to address some of these gaps through Artspace, reducing barriers to participation and development of the arts, as well as creating opportunities for artists to showcase and perform in Yellowknife.

Moving forward with a strategic vision

MakerspaceYK has reached major milestones: purchasing and renovating their new facilities, completing a multi-year funding agreement, and opening their space for public membership (as of the publication of this document). This moment presents a new opportunity to reflect, re-prioritize, and re-align direction as the organization moves into its next stage of development. Bringing on new staff/board members, building new partnerships, and major decisions about the space all required dedicated time and space for dialogue and re-framing the possibilities of the future.

While the organization had worked with consultants in the past to write their mission, vision and values statements, MSYK was in need of a deeper co-creative approach to bring in ideas from new staff and board members. I was contracted to provide strategic foresight services, and we decided together on a participatory action research approach. The client also expressed a need for higher level concepts to translate into actionable knowledge that staff and members of the board could follow through on. With more experience under their belts partnering with grassroots groups and social economy organizations in Yellowknife, MSYK also wanted to understand internally how the new space could create impact and change for the community surrounding them. The group sought new energy after a year and a half of hard work renovating the new space, a refresh in the form of an image of the future.

A workshop package from a youth in STEAM workshop in collaboration with a few social economy organizations. Photo: MSYK

The research methods and approach needed to provide a safe and collaborative environment to envision the future, while informing an action-oriented theory of change. The theory of change also needed to reflect MSYK's expansion of resources, and how that might impact the ecosystem of social economy organizations around it. The next section will outline a research orientation that is participatory in nature, define the systems and foresight tools that were used, and frame the scope and purpose of the engagement.

A member makes a Christmas ornament during a workshop in Shopspace.
Photo: MSYK

The community uses Artspace as a meeting place. Photo: MSYK

The side patio of MSYK is periodically used by 'Bikespace,' a volunteer community bike repair group. Photo: MSYK.

Research in progress. Photo: MSYK

Research Design & Methodology

Research Orientation

Participatory Action Research

This study employs a participatory action research approach (Reason & Bradbury, 2005; Fals-Borda, 2006; Grimwood, 2022), producing an action case study (Braa & Vidgen, 1999). Participatory action research (PAR) has roots in a diversity of fields and traditions, and is therefore regarded as more of an orientation to inquiry than a stringent framework of methods, data collection, and analysis. PAR puts an emphasis on researchers being facilitators, working co-creatively with research participants to bring new critical understandings of their social context, so they might work towards their desired and deliberative change. Research is

done with and by participants, rather than on or for them; ultimately the social transformation that is relevant to the research is determined by them. Traditional methods and structures for conceiving 'expert' knowledge are questioned: partnerships with community members become the foundation for identifying relevant social issues, designing studies, interpreting data, and taking action.

Across the many PAR-inspired research methods, a common set of values and features generally hold true. PAR holds that sharing power, ownership of data, and using knowledge production processes that are reciprocal can transform the conventional and oppressive researcher–subject relationship. Centering local voices, cultures, and wisdom in knowledge production empowers these communities, democratizes knowledge, and supports the capacity of marginalized groups to demand action and make change. PAR, by definition, affects the researchers themselves as well. Grimwood (2022) describes the concept of 'engaged acclimatization' – by immersing themselves in the material, political, and cultural perspectives of participants, researchers begin to develop embodied knowledge and a culturally reflexive intuition that informs research objectives, design, and procedures.

In the case of this study, the PAR process began even before I landed in Yellowknife. Many hours of background research and calls with MSYK occurred before tools and techniques were decided upon, and I sat in on staff and board meetings to observe to help understand what methods might be most effective. My own experience running a makerspace for six years was invaluable in understanding the perspectives of both staff and board members, and provided me with a sensitivity to the challenges they faced that helped me gain their trust.

Despite all of this, I still harbored feelings that I might be seen as an outsider, unable to connect to my co-researchers or understand the context that community members lived in. However, when I landed in the city I was welcomed warmly. I made it a point to spend as much time as I could in the city: I was invited to

Table 1
Description of Research Orientation

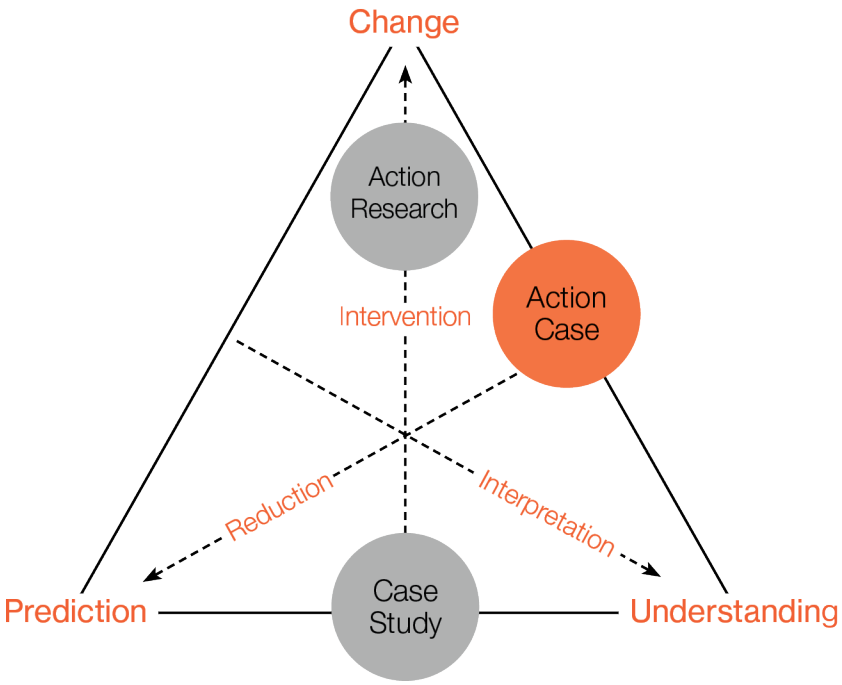
Research Question	What role does an urban makerspace play in convening communities and facilitating social impact within the Northern territorial context? What design methods or tools might be effective in supporting the role a makerspace might play?
Epistemology	Change (action-oriented), interpretivist.
Methodology	Participatory action research, action case study, co-creative.
Space	Design for social innovation, foresight, systemic design.
Techniques	Mixed methods: - Semi-structured interviews - Participatory futures workshops (e.g. Three Horizons) - Systemic design tools for analysis (e.g. Theory of Systemic Change and Action.

dinner at locals' homes, danced at a local festival, caught a play, took a sauna on the frozen lake, walked the entire perimeter of the city, and experienced day-to-day life in the winter of Yellowknife. I spent my two weeks everyday in the MSYK space, observing passively, speaking informally with members and staff, and participating in community-run events. Though two weeks is an admittedly short timeframe for 'engaged acclimatization', I met much of the community that MSYK believes it serves, and surely informed my intuition in facilitating the participatory workshops.

Action Case

As an action case, this study views the 'organization' (i.e. MSYK) as a rich setting to investigative and interpret in-context social relationships, organizational management, and latent potentials for socio-technical change. The action case is differentiated from a regular case study in that it is seeking to make a change in the organization it is studying, although the scale of that change, the number of required participants, and level of intervention are not as substantive as it might be for a dedicated action research study (see Figure 1). As is further elaborated in this section (see 'Purpose of the Engagement), what MSYK and I hope to gain in this limited action case are images of the future concerning the role makerspaces play in social infrastructure. This pertains to MSYK as an organization in its rich context, but also in a more generalizable sense that could be applied in other contexts in the

Figure 1
'Action case' in relation to regular case studies and action research. Adapted from Braa & Vidgen, 1999.



territory or in Canada at-large to support community-centered economic development and grassroots-led change. The tools introduced in this section, too, will be dialogically assessed with MSYK to understand their fit-to-purpose and evaluate their potential use in further systems convening.

Knowledge co-creation

In both PAR and an action case, the researcher/practitioner is directly involved with 'subjects' as co-researchers: the researcher/practitioner contributes to change by applying new concepts or frameworks, while the co-researchers contribute their lived experience and deep contextual understanding of their social setting. Practitioners and researchers within the fields of social innovation and sustainability transitions have advocated for models of knowledge co-creation over the past few decades, especially in the face of urgent contemporary challenges in sustainability transitions or socio-technical innovation (Mach et al., 2020; Jones & Van Ael, 2022; Holscher et al. 2023). Linking actors within a socio-political context through knowledge co-production (e.g. researchers, policy makers, community members) is a means of "changing how decisions are made by changing who is present in the knowledge-production processes" (Mach et al., 2020, p. 32). Participants who have 'skin in the game' also have a "duty of care [to] advocate for system changes that would be acceptable to others" (Jones & Van Ael, 2022, p.20). Although scholarship is still being developed around its true effectiveness and potential, knowledge co-creation can increase the rate of information uptake and enhance the capabilities of actors to take action on that knowledge (Jagannathan et al. 2020).

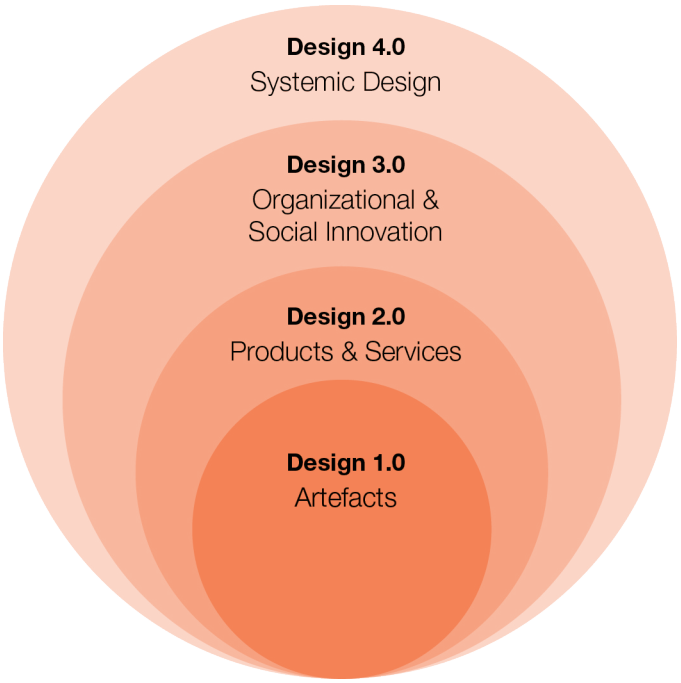
Systemic design as an analytical lens

As covered in the background section, the challenges facing Northerners are complex, with stakeholders across many spectrums, holding sometimes contradictory goals, across multiple intersecting systems. For both research and analysis, we need commensurate tools – systemic design "advances a holistic design practice that integrates all design, research, and method skills for complex contexts... a next generation practice developed by the necessity for significantly better social systems, complex services, and to lead systems change" (Jones & Van Ael, 2022, p. 3). Developed to inform human-centered design practices in complex sociotechnical systems, systemic design has applications in strategic planning, urban design, healthcare, public policy, and digital innovation. Systemic design breaks down complex social systems to understand nested and interdependent parts, seeking to intervene in the relationships between systems and understand their emergent interactions.

Systemic design presupposes that the world is perpetually changing, requiring a design approach that is provisional and open to redesign as opposed to seeking stability and finality (Ryan, 2014). It should be intended for situations "characterized by complexity, uniqueness, value conflict, and ambiguity over objectives. Systemic design can engage with value conflicts between stakeholders to develop broader, shared frames of reference and new ways of seeing existing challenges" (Ryan, 2014, p.4). To this end, design thinking tools have been adapted to systemic practice, developing visual storytelling and participatory diagramming exercises to collaboratively capture, model, and communicate systems to/with stakeholders. Their structured formats allow for easy reuse, remixing, and re-dissemination of knowledge.

In a framework describing four levels of design, Jones & Van Patter (2013) write how the design of products, artifacts, or individual services (Design 1.0 and 2.0) have defined 'bounds' – established or knowable levels of quality, aesthetic value, usability, economic value, output, end-users etc. that surround them. The outputs of these levels of design follow a process of 'strangemaking' in that successful outputs are made to be distinctive from each other (e.g. branding, identity design). The design of organizational processes or social systems (Design 3.0 and 4.0), however, operates at a community or civic level involving a wide range of stakeholders; these systems tend to be 'unbounded', 'fuzzy', or 'messy', meaning that they have many unknown upstream effects, feedback loops, and emergent properties. Design 3.0 and 4.0 demands processes of 'sensemaking' – a collaborative attempt by practitioners and stakeholders to make sense of the systems around them, elicit open dialogue and mutual understanding, and reach collective agreement on appropriate action for mutual benefit. The tools of systemic design, then, are participatory and co-creative by nature because of their need to cross boundaries within social systems, socialize knowledge among those stakeholders responsible for implementation, and collectively re-imagine what restricts and bounds individual groups' visions for the future.

Figure 2
Boundaries between the four domains of design, adapted from Jones & Van Ael, 2022, p.8.



Research Frame and Boundary

Purpose of the engagement

Though systemic design requires co-creation with stakeholders, not all stakeholders within a system need or should be involved at every level of an engagement – the purpose of the engagement decides who should attend and collaborate in a co-creative process (Jones & Van Ael, 2022). The purpose of this action case with MSYK is twofold:

1. First, participatory tools will aid in capturing the perspective of different stakeholders within the organization in re-framing the role their makerspace plays within the wider social system, and generate many images of the future for MYSK. This data will be synthesized into a visual Theory of Systemic Action and Change (TOSCA).
2. Second, the experience as a whole would serve to introduce systemic design and instill a futuring mindset within the group – a value-added 'change' aspect of the action case.

We used this co-creative process to inform a new strategic plan for MSYK, taking into account its new resources and partnerships. This approach also provided a means to socialize actionable knowledge in creating systemic impact in Yellowknife and in the Territory beyond. The process and frameworks were introduced to the organization as a first step, a collection of ideas, tools, and images that would need to be reiterated upon both inside and outside of the organization.

Engagement style and scope

Jones (2018) puts forward a systemic design engagement model, consisting of four cyclical contexts of co-creative learning and development (see figure 3) each requiring different participants and facilitation styles. This action case I will be facilitating in the 'Lab' style and context, which is focused primarily on working with internal members of the organization in an

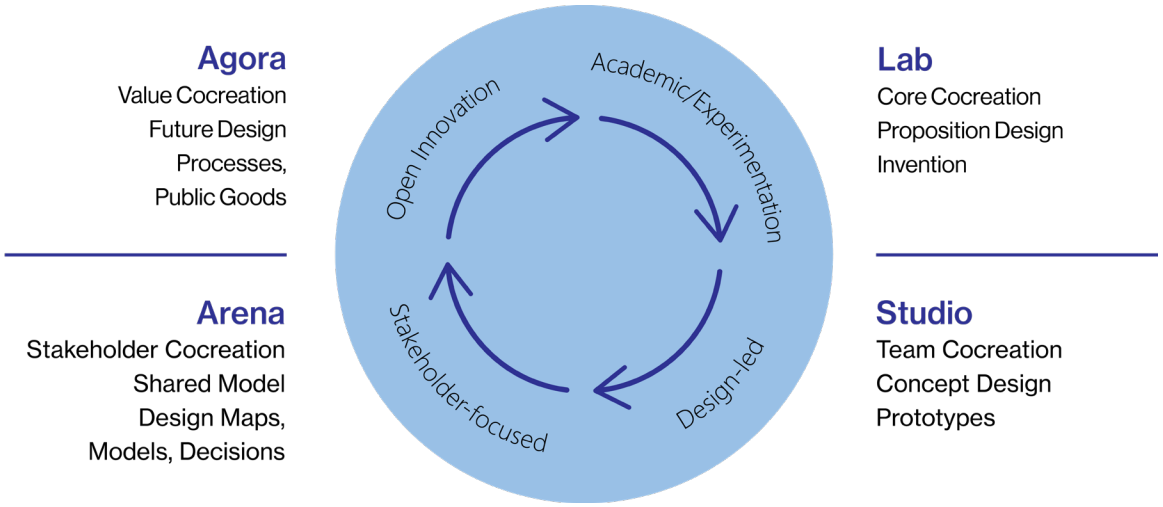


Figure 3
Systemic design engagement model adapted from Jones (2018).

experimental fashion. The scope of the 'Lab' engagement will be to:

1. Frame the boundaries of both the organization and the current system that surrounds it.
2. Collaboratively envision the future system, and imagine how the organization is embedded within it.
3. Explore the role that MSYK plays in intervening in the current system, and how it might foster the 'future' system.
4. Socializing design and strategic foresight tools within the organization. Encourage systems leadership beyond this single engagement, and the use of these tools in further stakeholder collaboration across the system.

The PAR orientation and co-learning aspects of the engagement reinforce the need for a 'Lab' context. A protected environment was decided upon so that members of the organization could experiment and learn systems and foresight tools, to later further iterate upon their work by including the wider community. I can be much more attentive to each participant's perspective in a smaller group. Each participant possesses and recognizes others' 'skin-in-the-game' in such a small group, which will help us be responsive and agile in prototyping system models and understandings of the system. PAR encourages a more emergent approach to data collection, and the 'Lab' context is appropriate in case I am required to change a tool's parameters or goals on the fly.

Research Design

The research engagement was designed in three sequential phases, each with its own tools and methods. Table 2 provides an overview of each tool or method used, and the section following briefly describes systems and foresight tools used that may not be common knowledge to all readers.

Table 2
Research engagement broken down in three phases, each with its own tools and methods.

Tool/Method	Participants	Purpose
Discovery Phase		
Review of archival data	Practitioner only.	Review of previous strategic plans and workshops that MSYK has conducted, process of familiarization with the organization.
Literature review	Practitioner only.	Background research to get acclimated to Northern context before workshop facilitation, especially surrounding social economy groups in the North.
Semi-structured interviews	6 organizations total. Participants included individuals, community groups, or organizations that have held events or collaborated directly with MSYK in the past two years. MSYK provided guidance in identifying, vetting, and screening interviewees for the practitioner.	Further familiarization with Northern context. Open discovery and problem framing to inform participatory workshops: data is directly useful to participants, and aids practitioner in facilitation.
Visioning Phase		
Organizational Lifelines	MSYK board members (8).	Establish a timeline of the organization and honor work that has already been done before moving forward into future visioning. Not all board members joined at the same time, this exercise was meant to acknowledge the plurality surrounding MSYK's past and present.
Three Horizons (3H)	MSYK Team (3 staff, 8 board members).	Collectively envision aspects of desired futures. Describe elements of the current system. Ideate on how to foster a transition between current and future systems.
Backcasting	MSYK Team (3 staff, 8 board members).	Staff and board collectively and directly link action to elements of the desired future. Open dialogue around the evolution of roles, responsibilities, measures, and outcomes.
MSYK Feedback on Foresight Tools	Practitioner, MSYK Team.	Both staff and board members gave open feedback (individually and as a group) on the effectiveness of the foresight tools used. This feedback can be found in Appendix A
Synthesis Phase		
Theory of Systemic Change and Action (TOSCA)	Practitioner-led, MSYK feedback.	Compiles data from Visioning phase into a visual artifact and mental model that can be quickly referred to at any time (i.e. to iterate, add new information etc.)

Discovery Phase

The Discovery phase consisted of reviewing previous strategic plans or feedback workshops that MSYK conducted in the past three years. Once the practitioner arrived in Yellowknife, they were able to observe MSYK operations day-to-day. Most importantly, semi-structured interviews were held with six different social economy organizations of varying size, operations, and mission. Members of these organizations were asked about how they had worked with MSYK in the past, about the challenges they face in their own day-to-day operations, relationships they may maintain within the greater system, and the impact they would like to create/see around them. Open discovery aided the practitioner in problem framing leading up to the participatory workshops, and provided valuable on-the-ground insights into the social system surrounding MSYK. Examples of structured discussion points are below:

- What is the group/organization trying to achieve? Who forms the group or organization? Who is the group/organization's target audience?
- Does the group/organization with other organizations in Yellowknife or beyond? How do these partnerships contribute to both organizations' goals? How might these partnerships evolve in the future?
- What kinds of collaborations do you currently have with MSYK? If your group has used their space, what has that enabled? What might the new resources of the space be able to provide to you and your organization?

List of interviewees

Six interviews were conducted, chosen by MSYK for their diversity in size, purpose, audience, and amount of collaboration with MSYK. To preserve their privacy, they have been coded below by what their organization/group does rather than by name. A short description and their associated code (used later in Summary Findings) is below:

Traditional Arts circle (TA) started as a casual gathering of community members to practice traditional beading, but as it became more formal (e.g. set times, reading Dene laws before beginning, bringing in elders) its purpose was to have a physical place to connect with each other, as well as the relational nature of crafting and the land. It is a place to laugh, connect to something bigger, and nurture your mental health.

Repair Advocacy community group (RA) like MSYK, is all about empowering the community through skills sharing. Transit can be tough in Yellowknife, and bikes are a big part of the solution. With only a few bike stores in town geared towards new consumer bikes, RA provides a space to fix and re-use old bikes, and share tools and skills to maintain them.

Youth Advocacy NPO (YA) by connecting with organizations like MSYK, is following a 'collective impact' strategy to address barriers that youth face, especially in issues of homelessness and within the education system.

Music Festival NPO (MF) is a major live music festival with a long history in Yellowknife, attracting national and international talent to the city.

Fine Arts community group (FA) uses MSYK for monthly critique nights, and advocates for space in the city for professional artists to show their work. Having gallery spaces to show your work is essential to the professionalization of the arts, sharing ideas and critique, and is even a requirement for arts council funding.

Youth Education community group (YE) believes in building a community centered around STEAM that reaches and retains BIPOC and queer youth, believing that youth don't have enough communities that empower and encourage them.

Visioning Phase

Next came participatory workshops with MSYK staff and board. Three total sessions were hosted, using three separate tools: Organizational Lifelines, Three Horizons (3H), and a custom-designed Backcasting exercise. At a high level, Organizational Lifelines and 3H were used in a generative fashion, opening up the field of possibility and ideating on possible futures, while the Backcasting exercise zeroed in on priority-setting and intermediate actions to pursue these possibilities.

Organizational Lifelines

As the eight board members of MSYK had all joined the organization at different times, each had experienced different peaks, challenges, and responsibilities in serving the organization. A fairly large group with differing conceptions

Organizational Lifelines in progress, using sticky notes on a table in Artspace. Photo: Nam Hoang

of the organization's narrative could lead to creative tensions: a shared vision of the future may be hard to arrive at if participants are not all starting from an agreed upon foundation. A tool called Organizational Lifelines (Burke et al., 2002) was used to surface and mitigate these tensions.

On a timeline from the start of the organization to the present, participants use sticky notes to write up key moments in its development. Discussion flows as gaps between key moments are filled, common interpretations and differing perspectives are fleshed out by the practitioner. Participants then put themselves on the timeline, naming when they became involved and how their roles might have changed over time. The practitioner prompts participants to reflect on forces and trends that impacted the organization (and its people) over time: recent events, overarching trends and patterns that may make up the culture of the organization or influence its future. The end-goal is to acknowledge a potential plurality of experiences within the organization, but align on major drivers of change before entering future visioning.

Three Horizons (3H)

Three Horizons (Sharpe et al., 2016) was developed as a framework for co-creating a vision of the future with a group or an organization. Three overlapping curves, or 'horizons' of time, represent possible trajectories and actions in relation to their strategic fit: each curve is overtaken by the next signaling the decline of one horizon as the next overtakes it. Horizon one

Three Horizons in progress, with board members split into two working groups. Photo: Nam Hoang

(H1) represents how 'business-as-usual' in our dominant system is losing strategic fit. Horizon three (H3) is our vision of an ideal future, to be thought of as a successor system to H1. Finally, H2 is where we ideate the 'turbulent transition' and the innovation required to bridge the gap between 'business- as-usual' and our 'ideal future'. Crucially, pockets within the framework make space for elements of the future that already exist in the present that might inspire us (H3 in H1), and elements of the current system that we might sustain into the future (H1 in H3). The framework offers a structured method for acknowledging the growth and challenges of the present, identifying elements that require change and innovation, and a way to explore the tensions and dilemmas in moving from H1 to H3. While 3H is normally used for much longer timelines (i.e. 20-30 years), a shorter timeline of 5 years was decided upon considering the size and relatively early stage of the organization, engagement scope, and to ensure that future visioning remained tangible and action-oriented.

3H was used to give form to the many ideas already brewing among MSYK staff and board: the visual element helped to show how these many images co-exist and might be formed into a roadmap. The primary goal was to be highly generative of the future, and to make it more tangible for the group. As important, though, was instilling a mindset within the group to recognize systemic patterns and understand the role that MSYK plays in shifting them.

Backcasting

Finally, a backcasting exercise was requested by the organization to help prioritize the much nearer future. On a much shorter timeline than 3H split into lanes (e.g. Business Model, Organizational Policies, Program & Partnership Development), the practitioner summarized and pre-populated selected elements of H2. These sticky notes acted as milestones and goals, and participants worked backward or forward with special attention to how each lane would influence the next. Obstacles, enabling factors, and tensions were called out along the way. Finally, the group worked together to summarize the larger timeline into major narratives: what changes need to happen in the short term, what developments bring about new evolutions, and how might MSYK be deeper embedded in the systems surrounding it in the near future?

Workshop Feedback

Though not strictly a visioning tool, the MSYK team was asked for their feedback on the design, facilitation style, and perceived effectiveness of each of the foresight tools used. I spoke with individual staff and board members informally, but also made time after the end of each participatory workshop to ask participants for their feedback. The feedback can be found in Appendix A, supplemented by my own thoughts in using each of the tools in-context.

Synthesis Phase

Theory of Systemic Change and Action
Both the Discovery and Visioning phases have generated a wealth of findings, a tool to synthesize the data is needed. Often, a "theory of change" becomes the mental model a social impact organization uses to collectively align on its purpose, boiling down actions, values, and understandings into a graphic, statement, or logic model. A Theory of Systemic Change and Action (TOSCA) takes the theory of change to the systemic level, a "more complex graphic [able] to accommodate the variety of possibilities, and to reveal leverage points and loops in the system model as change occurs" (Jones & Van Ael, 2022, p. 174). The TOSCA, though capturing a complex system, is read and prepared as a narrative: data and findings from the interviews and participatory workshops will be transduced into action-outcome chains to more simply describe how MSYK sees its role in systems change.

The TOSCA tool will take into account the same timeline as 3H, five years into the future. At the beginning of the timeframe organizational activities are listed in a column, while at the end a 'strategic impact' and desired system change is placed. From here, a backcasting process traces the necessary outcomes, actions, and preconditions within each activity row. Special attention is paid to understand the non-linear influence and feedback loops between these activities and outcomes. As action-outcome chains are generated, they should be simplified to short phrases, as the ultimate goal of the TOSCA is to be able to capture the narrative of systemic change by reading each activity 'pathway' left to right. The draft TOSCA will be prepared by the practitioner alone; as the TOSCA is not being used in a generative fashion a single practitioner (with

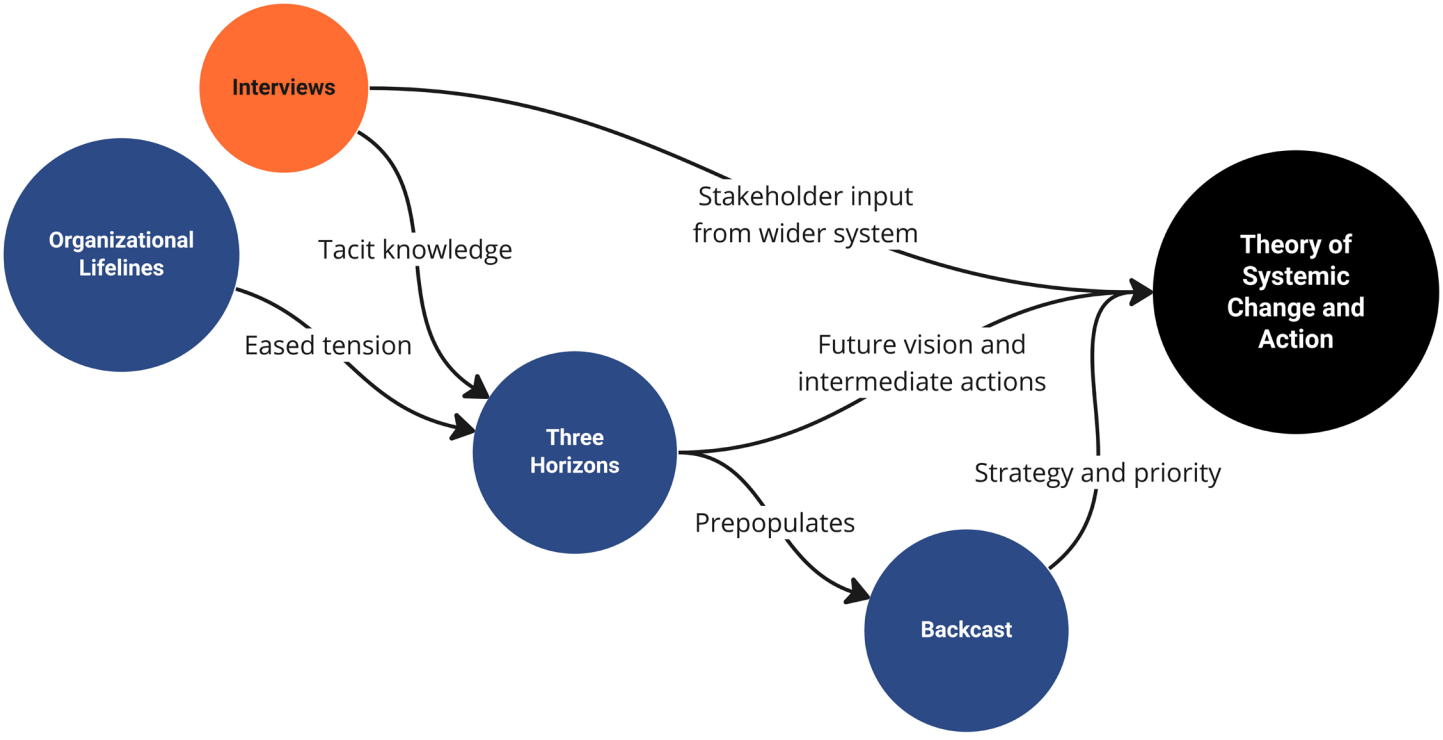
asynchronous feedback from a few staff/board members volunteering their time) can better compile, assess, and synthesize workshop data.

This micro-level TOSCA's purpose is to capture MSYK's individual perspective on necessary systemic change, and to link those beliefs to actions that the organization might take. Although it cannot be an accurate representation of the wider system without more contribution from other organizations or communities, the visual artifact will be both useful internally as a record, and externally as a talking point in wider systems convening and leadership.

Synergy between research activities

The tools and research activities chosen interact in a few key ways (figure 4). The Discovery phase provides a wealth of background information and tacit knowledge useful in facilitating the Visioning phase. Interviews provided contextual knowledge for prompting participants or probing further on specific points. Organizational Lifelines helped ease creative tensions and align a large group before conducting 3H. The second and third horizons of 3H provided the pre-populated points for Backcast, making them immediately recognizable and easy to work from for participants. Finally, the majority of the data synthesized for the TOSCA comes directly from 3H and interviews.

Figure 4
Synergy between tools and research activities.



Summary Findings

This section will explore the summary findings of the participatory workshops conducted, supplemented by relevant highlights from interviews. Each tool has been digitized, and can be found in the Appendix B or in this Miro board. Findings from all participatory sessions have been combined into brief summaries elicited from clustered sticky notes, with interview findings providing context from actors within the system. Interview data is attributed to each participant organization by code (see Research Design, Discovery Phase).

Taking inspiration from the 3H structure, findings will be presented in an H1-H3-H2 narrative. Present Tensions highlights H1 concerns: organizational challenges and the systemic issues surrounding MSYK. Visions of Future

Photo: Kwan Fung on Unsplash

Autonomy paints a picture of an ideal future in five years, centered around the autonomy of users, staff, and community empowerment. Finally, Actions that Build Momentum speaks to H2 ideas of intermediate actions, prioritization, and 'infrastructure' that pay off in the future. The ideas in this section become the foundation for the Theory of Change, and findings have been abridged to what is relevant for use in the TOSCA.

Present Tensions (H1)

Unclear direction leads to reactivity and the feeling that every opportunity must be taken on, past the capacity of staff and board. Yet, in a sense, this is the most resources MSYK has had – how do we move forward while making the most of what we have in an intentional way?

Reactivity and setting the course

Sitting down to complete H1, the board recognized 'reactivity' as a major issue creating confusion about the direction of the organization. The group cited tension in setting a specific course for revenue generation, worrying about being boxed into a specific model but also feeling tense about potential conflict with MSYK's original values (e.g. 'does a fee for services model follow our values of empowering community?'). Without a solid plan to refer to, the group expressed the feeling of constantly putting out fires instead of proactively setting a direction.

In the same vein, staff have been feeling stretched thin from trying to serve everyone's needs: varying members, partners, clients, and even the needs of the space (e.g. maintenance and setup). This is particularly frustrating since, without clear direction, the payoff for their effort can feel minimal. Clearer direction would lead to the prioritization of certain opportunities or challenges over others, since currently every opportunity or challenge that comes through feels too important to drop.

Part of the problem is also the lack of stable

operational funding; a major source of revenue for MSYK is program funding, but programming was sucking up precious staff resources leaving them unable to complete other priorities like setting up space systems or fostering a membership – both considered core operations by the board. Many opportunities for collaborative programming were coming to board members, but staff capacity was too low to take these opportunities on.

Space and user systems

Systems are still being established within the space: storage systems, onboarding, wayfinding, or the process for starting a project or collaboration within the space etc. This creates friction when users or potential partners want to use the space. Staff feel that creating these user systems will be key for users to interact with the space effectively without staff, and minimize the load on the maintenance of the space. However, setting up these systems requires staff time, again returning to the fact that staff is stretched thin across too many revenue streams, projects, and priorities.

Regional systemic issues

Myriad social issues keep the capacity of the region to make change low, with burnout occurring often within the community and among NPOs and service providers. Organizations, especially certain governmental departments, work in silos – the resulting environment can be both actively and passively anti-collaborative. It was heavily stressed that the "business-as-usual" practices of certain institutional actors (unnamed here) were straining capacity across the entire region and delaying the meaningful change social economy groups were trying to create.

The sentiment of feeling stretched thin organizationally and creatively is felt among interviewees (FA; YE). Everyone runs on volunteer power, and burnout is prevalent. YE expresses that organizations experience 'low institutional memory' – work between organizations is sometimes repeated due to non-coordination, and relationships, protocols, and initiatives are lost when individuals burn out.

Progress Made at MSYK

On a more positive note, in both the Organizational Lifelines exercise as well as the 'H3 in H1' section of the Three Horizons, the board took stock of the resources available to the organization. They acknowledged that MSYK, in owning the building, tools, and having staff, was presently at its peak in resources, and that the organization was finally in a place to provide tangible assets for public use in a consistent manner. The group reflected too on the continuous development of new partnerships throughout the organization's short life, and the recognition of anecdotal evidence that MSYK is becoming a known community resource. The board themselves acknowledged in the Lifelines exercise that this was the youngest, most-progressive, and well-connected board to date, with representation across academia, community development, construction, community arts, and local politics.

Visions of Future Autonomy (H3)

A space that inspires and enables member autonomy, and is fertile ground for new projects, relationships, and self-organization. MSYK is a trusted community convener and intermediary, working at different scales and connecting different contexts, organizations, and communities to create systemic impact.

Imagining the MSYK of the future

The board's imagining of the future was focused on connecting and convening Northern organizations and communities to address larger systemic issues. When asked what 'convening community' might look like in five years, board members suggested annual forums for creative organizations in the North to share learning and resources, with MSYK themselves becoming a source of knowledge for others looking to create impact with their own makerspaces. Could MSYK become an intermediary, trusted by the grassroots with the experience to navigate the systems of government or philanthropic funders? In working alongside these actors, programming in the future could be geared towards systemic issues in the region: housing, skill building, breaking silos in communities and entrenched institutions.

Staff, when asked what types of programming MSYK would be delivering in the future, imagined programs that could address capacity issues for specific groups in their orbit: artist residencies, internships for youth, hackathons, and build challenges that involve and serve the immediate needs of the community. Staff see future programming as an iterative process of dialogical exchange with different groups and communities, each an opportunity to deepen relationships with Yellowknifers and the challenges they face, and connect resources to their innate knowledge and capacities.

Supporting staff and user autonomy

Everything in the space has a home with clear instructions; this means tools but also objects that help users interact with the space like chairs, tables, and personal storage. No 'friction' occurs when members want to start a new project or partners want to run an event. These space systems also extend to building trust with users and members of the space. New staff are being hired to handle partnerships, business development etc., while users are beginning to train each other informally. This lightens the load on current staff members, who now have less of a 'diverse' load, but are able to deepen their respective responsibilities.

"Third Space"

The people who come to MSYK make meaningful connections with others, coming to Makerspace even if they don't have a project to complete. Staff would hear users saying: "I come to MSYK because that's where my friends are," or would share what they are building at MSYK outside of the space in their day-to-day lives. Community members would get together to do community build projects, using MSYK resources. Members, especially those who had learned new skills at MSYK, are now able to teach newer members different skills. MSYK feels comfortable as a 'third

space', and users and members alike respect the space.

Adapting the model

As more autonomy is built within the space, staff dreamt of a transition to a model that formalizes the community-run nature of the space. For example, a multi-stakeholder co-operative with different classes of membership might better reflect the deep investment members and users are putting into the space. Adapting the business model has some synergy too with restructuring revenue streams: the board floated ideas of starting a social enterprise arm, or changing staffing and business model to receive more diverse economic development and arts funding.

Institutional Memory

Protocols would be in place to spread key knowledge between old and new members of the staff and the board. This would increase organizational resilience and provide more latitude to staff and board members to change their roles over time. These protocols could also be in place to spread knowledge about the space and organization to committed volunteers or close partners, extending their ability to take initiative within the space.

Actions that Build Momentum (H2)

With the vision of user and community autonomy in mind, a clearer image of intermediate actions and overall strategy begins to emerge. Physical and digital infrastructures, clear strategic directions that govern staff and board roles, empowering volunteers, and working with a network of collaborators lays the groundwork for H3's vision.

Priority Setting

With all of the ideas on the table from H1 and H3, both board and staff separately came to the same conclusion: the next immediate priority should be developing an active membership and encouraging members to take initiative in the space. In the short term, improving the space for increased membership was the approach judged most congruent to MSYK's values of serving the community. Following membership-building would be network expansion through shared programming, and the diversification of revenue streams through events and partnerships.

Physical and Digital Infrastructures

Staff brainstormed systems that would allow them to be more hands-off with users, while empowering users to use the space more efficiently. In the physical space, signage, wayfinding tools, and instructions for tools could provide just-in-time supports. Modularity for the space would be key to meeting the needs of many different types of stakeholders, users, and partners: moveable partition walls and storage systems. Digital systems could

complement physical infrastructure: helping staff communicate possibilities of the space to partners using a 3d model, reference systems that not only catalogs MSYK's tools, but also user-lent ones, booking systems, and digital feedback at different touch points. The common thread among 'infrastructures' brainstormed was increasing the autonomy of members, and deepening collaborative relationships within the space.

Data protocols and standardized workshop tools would also benefit staff and board in making decisions about members and potential users. Encouraging the shared use and improvement of this common set of data among partners and collaborators, inside and outside of the space, would be a great step towards creating shared databases. The same approach could be taken for workshop tools such as templates, pre-made slides, and teach-the-teacher workshops.

Building a Culture of Volunteerism

Even in its short time operating, MSYK has attracted volunteers of many backgrounds, whether within the space or during outside events. To lower rates of burnout, build a healthy culture of volunteerism in the space, and effectively make use of willing volunteers, a clear plan and strategy for them needs to be developed. Actions might consist of 'persona' building for volunteers based on those who have already contributed. Understanding the profile of a volunteer and having a clear vision of how they might improve the space (physically or socially) gives staff the confidence to assign clear tasks to willing volunteers. Member-run initiatives would be the end goal for volunteers: markets, events, and member-run workshops came up as potential ideas. Staff would develop training materials, admin and tech support, and provide communications and outreach support to members.

MSYK as a Social Infrastructure

While physical and digital infrastructures are the first immediate step within the team's control, the much less tangible idea of 'social infrastructure' will be key in developing a culture of volunteerism and changemaking at MSYK. We can gain a much more grounded perspective of what 'social infrastructure' might mean through partner organizations' interviews.

Multiple interviewees (RA, RA, FA, YE) expressed that they felt MSYK was a good 'neutral' ground, in that it felt inclusive with no stigmas associated with the space. RA and FA both expressed that these values aligned with the arts more generally – anyone can participate in art and anyone can come to MSYK. YE feels the space is welcoming, and doesn't replicate institutional silos (i.e. in STEAM industries). They believe that MSYK being such a 'multi-faceted' place means you can experience all sorts of communities and identities. This 'neutral' ground is also a place where groups can come and reach niches they wouldn't otherwise.

The affordability of such a space affects its openness and accessibility. RA believes there is a big community appetite for spaces where folks can convene without paying money. This type of open format dovetails well with DIY

and co-op culture. With very few bike shops in Yellowknife serving a particular clientele, this kind of bike focused space would be unique in serving other demographics (e.g. lower income). As a partner organization, FA reports that they pay half at MSYK versus anywhere else in the city; this, along with MSYK's values, is a big attraction to them.

MF stresses the importance of proximity between community organizations, and the importance of relying on each other to make things work. They don't believe independent projects take off quite as well, especially in garnering community support. Specifically, they call out the importance of the relationships between leaders within these organizations. It is a 'social thing', friends and leaders are building this community together. MF reflects on a recent artist-in-residence project completed with MSYK, citing that those relationships are still going strong with musicians and community members still in contact.

Finally, YA offers another tangible example of social infrastructure. YA imagines the 'community as a classroom' as an alternative to colonial education systems, out of which many racialized and Indigenous youth fall. Different service providers and organizations could pool their resources to provide alternative education services, based on whatever the constellation of organizations could offer. Alongside this, a directory and mapping of services offered could be offered to the community.

For MSYK, then, being a social infrastructure consists of connecting different niches, offering them resources, and providing space to convene them. 'Holding space' means being open and accessible, affordable, and fostering a culture of cooperation and learning. It was agreed in both workshops and interviews that cooperative action addressing community challenges helps MSYK be seen as a social infrastructure. Convening extends beyond just the 'members' of each community or organization, and MSYK should work to bring together other leaders to address common challenges.

Evolving programming to have a networked impact

The notion of social infrastructure can also drive the approach to programming in the near future. Interview data supports this idea of coordinated programming having a larger impact. Precisely because systemic challenges are so great, many organizations expressed that each should own a niche and work in a networked fashion (RA, YE, MF, YE). Even as a much larger organization, MF depends on trusted partners to help them deliver on programming since funders are expecting a lot from them. The festival acts as a bridge between many organizations, creating many opportunities and intersections for programming (e.g. MSYK's artist residency program created in collaboration with MF). Examples of this 'bridging' role exist in other collaborations with MSYK as well: YE in their recent youth workshop adapted a curriculum from Pinnguaq (a Nunavut based makerspace and education initiative), used MSYK's resources and space, brought in faculty from Aurora College for their expertise and professional relationships, and relied on YA and other Indigenous organizations for outreach.

YA, for their part, follows a 'collective impact' framework, and believes in leveraging existing programs and organizations before making new ones. To them, creating impact in the region should be as much an exercise in innovation as it is orienting and coordinating what already exists. YA mentions, too, that community organizations should endeavor to combine their resources when possible. YA offers a tangible example of this: what if multiple community organizations shared a 'program coordinator' between them? This coordinator could leverage the many niches, competencies, and resources to gather more grant funding and split them among these organizations. They would also contribute to cross-pollination between organizations, maximizing impact because of their awareness of the community's overall resource pool and orientation of needs. This role would also build up 'institutional memory', passing it along to new coordinators or organizations.

Evolving board roles

Speaking about new revenue streams and potential structures revealed many unknowns, from re-examining membership pricing models to potential business strategies involving companies and organizations around the Territory. The board began reflecting on their own roles and responsibilities, believing that new roles for the board could be created to spearhead information gathering and action in specific areas. A Director of Policy might develop data collection protocols to best serve users of the space, while a Director of Business Strategy might do outreach with different corporate entities to garner sponsorships or partnerships.

The board talked about both potential projects and projects already underway as examples: engaging with Northwestel on a digital literacy project, working with Aurora College on a trades skill training project, or putting on technology workshops in other communities. An Engagement Director might expand MSYK's network, setting the stage for the H3 idea of networking different makerspaces in all three Territories.

Conclusion

The participatory workshops helped both staff and board members align on current challenges, surfaced many visions for the future, and deliberated on potential actions that might lead to those outcomes. In the present, MSYK is caught in the same vicious cycle as most social economy organizations in the north: chasing program funding is sapping the organization's ability to develop core operations around membership or developing systems to improve the space. Unclear priority on revenue streams is keeping the organization reactive, fueling the need to chase every opportunity and stretching staff thin in the process.

In contrast, the vision of the future identified 'autonomy' – for users, staff, and collaborators – as an important guiding light. This vision of autonomy coalesced around both the individual's experience as well as a collective infrastructure: everything from reducing friction within everyday use of the space to MSYK's capacity to connect different niches, communities, and organizations into a supportive and coordinated network. To address the challenges and needs of the community, organizations

within this network would act together, sharing resources, information, and capabilities to create appropriate programs and supports for their respective communities. MSYK, as a popular ‘third space’ in Yellowknife, will have built up social trust and a robust network, but also the material resources to be a ‘social infrastructure’. This means that MSYK not only offers services to the community, but also acts as a resource for locals to organize and spearhead positive social change. Alongside this reputation in the grassroots, the MSYK team emphasized their relationships too with institutional actors, highlighting the organization’s close alignment to many federal, territorial, and municipal goals and the possibility to act as an intermediary to the grassroots.

Many transitional actions were brainstormed: new roles for staff and board, new systems in place at MSYK, new partnerships that would benefit the role of community convener that MSYK would play in the future, and more. These H2 ideas will be explored in more depth in the Theory of Systemic Change and Action, modeling how these actions will create systemic impact and leverage.

Dancers prepare for a festival performance. Yellowknife's museum, the Prince of Wales Northern Heritage Center, is in the background. Photo: MSYK

Photo: Luke Moore on Unsplash

Forming a Theory of Change

Theory of Systemic Change and Action

Reading the TOSCA

This section compiles and synthesizes interview and participatory workshop data (3H and Backcast) into a Theory of Systemic Change and Action (TOSCA) – the TOSCA in turn responds directly to the research question asked by this report:

> ***What role does an urban makerspace play in convening communities and facilitating social impact within the Northern territorial context?***

The TOSCA will become a visual artifact and mental model that MSYK can refer to at any time, representing their collective alignment on action, values, and the systemic impact they are seeking. As covered in more detail in the Research Design section, the TOSCA looks five years into the future and focuses on the specific actions that MSYK might take to become a systems convener and community leader. This section of the report summarizes the TOSCA and should be read alongside the visual tool, which can be found within the Appendix C or in this Miro board. Five major activities form rows on the left side of the tool:

- People and Business Model speaks to changes in staffing, in terms of staff roles and number of staff, as well as changes in business model for MSYK.
- Physical and Digital Infrastructure explores the impacts of changing systems that govern use of the space, as well as the available tools and resources.
- Community and Membership speaks to the impact of building a dedicated base of members (i.e. paying memberships as well as volunteers)
- Programming covers the workshops, classes, and projects (e.g. grant-funded) and the protocols and structures that support them.
- System Leadership, unlike community and membership, speaks to the latent change potential in networking social economy organizations in the territory.

Over the five year timeline we will read, from left to right, outputs from immediate action, outcomes (1 year), sustaining purposes (2-3 years), and impacts (4-5 years) all leading to a strategic impact capturing the theory of change at the end of the timeline.

Outputs

Immediate action can be gleaned from the participatory Backcasting exercise: MSYK over the next year will set building a stable membership as the priority for both staff and board, who will have different areas of responsibilities to fulfill.

Staff will begin improving space systems so that new users can use the space with less friction. As mentioned in some of the staff H2 insights, this means improving storage for both users and close partners renting the space on a regular basis, creating digital onboarding and booking tools, and wayfinding so new members can familiarize themselves with the space. Staff will focus on developing sequential workshops, providing clear learner pathways so that current and potential members can easily expand their knowledge and use of the space (i.e., to further extend their paid memberships). These actions culminate in a member drive, pushing hard to widen the base of members and the reach of MSYK over the next year, renewing the momentum from completing the space.

Board members will redefine their roles and split into action committees to support outreach and program delivery. While staff define learner pathways through workshops, board members will support by developing protocols for data collection, matrices for program delivery, and direction for marketing. Using their learnings from this research process, a different action committee will begin a systems convening process – this means inviting other social economy organizations to assess common needs and resources. Through community asset mapping, and participatory systemic

design and foresight tools, this committee will establish a common frame of reference for the challenges and opportunity spaces within the grassroots.

Outcomes

As membership increases, staff will work on developing supports that foster a community "third space". This could mean more social events within the space, incentivizing or supporting member-run events and workshops, increasing accessibility (e.g. physical or skill barrier, time and availability of the space), and generally improving the space so that members experience little friction when wanting to use or run something within the space.

In their surveys of maker communities, Kwon & Lee (2017) found that while many individuals are initially driven by intrinsic motivations (e.g. improving or learning a skill), certain extrinsic motivations (e.g. financial or social benefits) may be more effective in inducing sustained maker activities. Staff can work on facilitating paid opportunities for members, such as small contracts or honorariums or grant funding for member-run workshops. A sense of community, and the feeling of contributing to social good both play critical roles in encouraging members in a makerspace to participate within the space (Kwon & Lee, 2017).

A second feedback loop presents itself between Programming and System Leadership. As the board continues its systems convening operations, shared resources and information flows should be established. Like we found in interview and workshop data, examples of this might be sharing a program director among several social economy organizations, developing common maps and data sets, increasing collective 'institutional memory' through recording and sharing information, and more. Building this networked capacity could be done through partnering with other organizations to receive project grant-funding, something MSYK is already doing. This time around, having aligned with a wider variety of organizations before finding the necessary grants, and then having common information flows to feed exit data to, will allow the network to be more strategic in selecting and distributing potential grant opportunities – project grants become a continuous improvement process rather than one-off collaborations.

Sustaining purposes

Fostering a 'third space' within MSYK builds up a culture of volunteerism; these volunteers and members hold a 'stakeholder' mindset and have the skill, resources, and knowledge to act. Staff will work to expand on available tools, resources, and potentially even space to support new programs and projects within MSYK. As volunteers and members begin to lead more programming, events, and workshops, this allows staff to evolve their role from teaching and supervising, to taking leadership. Staff will work towards initiating new strategic and community-focused projects that address local problems: examples that arose in 3H were waste diversion and repair cafes, hackathons, artist residencies, programs for youth, and community build challenges.

Meanwhile in System Leadership, MSYK

will expand their systems convening to now include more elements of the established regime and surrounding institutions. Through their increased programming and grassroots convening work, MSYK and its partners begin to demonstrate early signs of their potential networked impact. These early success stories should be used to gather investment capital and convene entrepreneurial experience from industry, different levels of government and their ministries, as well as national social economy organizations and foundations.

Impacts

Staff, volunteers, and members gain more resources and experience as they complete more community-focused projects over the next few years. These ad-hoc projects serve as prototypes; staff begin formalizing certain elements and structures to form inter-organizational action committees from the project teams. These larger committees could include volunteers and members as well as partner organizations, and could be organized around specific systemic issues and challenges. The committees, in turn, prefigure co-operative models for systemic change around these challenges, test grounds for different interventions and forms of organizing.

The impact created by MSYK and its network demonstrate that there is a thriving alternative to tackling challenges in the North, based on a foundation of social economy organizations deeply embedded in community needs and demands. These grassroots networks exert pressure on "business-as-usual" practices, and begin to shift elements of the current system that are still resistant to change. The network is not a monolith, with varying and even contradictory goals and values, but shared infrastructures (i.e. data, projects, shared human/material resources) make it effective to be agile in directing its efforts, and holistic in its demands for systemic change. MSYK, after years of working with both community and institutional actors, becomes a trusted intermediary at both scales.

Strategic impact

The ultimate goal of the network is to displace extractive, business-as-usual practices, with new, locally focussed development based on cooperative principles. The North already has a larger share per capita of social economy organizations than anywhere else in Canada (Southcott & Walker, 2015), the change comes in co-creating shared resources and information flows between them to foster political power and pressure, and to deploy interventions and limited resources in a more efficient fashion. As a network, social economy organizations can demonstrate that they are a viable alternative to the boom-bust economies of the past – a more participatory pathway to economic diversification, leveraging community-led innovation to address Northern challenges.

Leverage analysis of the TOSCA

What is Systemic Leverage?

In reading the complete TOSCA, we might begin to think that the diagram is a long to-do list and that planning for systemic change is linear, when it is anything but. Generalizing the action-outcome chains into narratives of change helps us zoom out and glean further insight from the relationships and systemic feedbacks being created at the macro level. Splitting the TOSCA in half by activities, two major narratives arise: **'Building the Alternative'** concerning Programming and Systems Leadership, and **'Reaching Hearts, Minds, and Hands'** concerning People, Infrastructure, and Community/Membership. We can use these two stories to explore how the actions and outcomes within the TOSCA build effective leverage within the system.

First, we should define what 'leverage' within a system might be. In her oft-cited article Leverage Points: Where to Intervene in a System, Donella Meadows (1999) puts forward twelve points to intervene within a system – each point is increasingly (with twelve being the lowest) more effective in shifting the system than the one before it, possessing higher 'leverage'. She conceptualized them as "small shifts in one thing [that produces] big changes in everything" (Meadows, 1991, p. 1) that are often lying in plain sight, and even more often being pushed in the wrong direction. 'Shallower' points are relatively easier to implement than 'deeper' ones, but do not have the systemic leverage to shift an entire system of interest. Deeper points affect all the points above it, but are also increasingly difficult to enact as entrenched systems put up commensurate resistance. All twelve points are nested hierarchically and tightly interacting, meaning that a small change at a high leverage point could have cascading effects within the system. While Meadows herself characterizes the list as a work-in-progress, cautioning that it is dangerous to generalize about complex systems, the points nonetheless present a great heuristic with which to discuss where to intervene in the system and identify feedback loops.

Abson et al. (2017) attempts to distill these twelve points into four broad groupings, into aggregate system characteristics (see Figure 5). Parameters speaks to the mechanistic components typically used by policy to make change, while Feedbacks seeks to understand the interactive dynamics within delays and feedback loops. Design relates to the structure of information flows, rules, and capacities to self-organize within the system. Finally, Abson et al. characterize Intent as the orientation of a system, an emergent direction "arising from the multiple, potentially conflicting, sets of worldviews, goals, and purposive behaviors within a given system of interest" (Abson et al., 2017, p. 2). In simpler terms, what the system is doing is not necessarily aligned to the goals of the actors within it, and its 'intent' emerges from the actions and behaviors of actors and actants within it. Abson et al. posit, then, that 'shallower' interventions might still have an effect on the emergent Intent of a system, even though generally the 'deeper' characteristics constrain what is possible at 'shallower' levels.

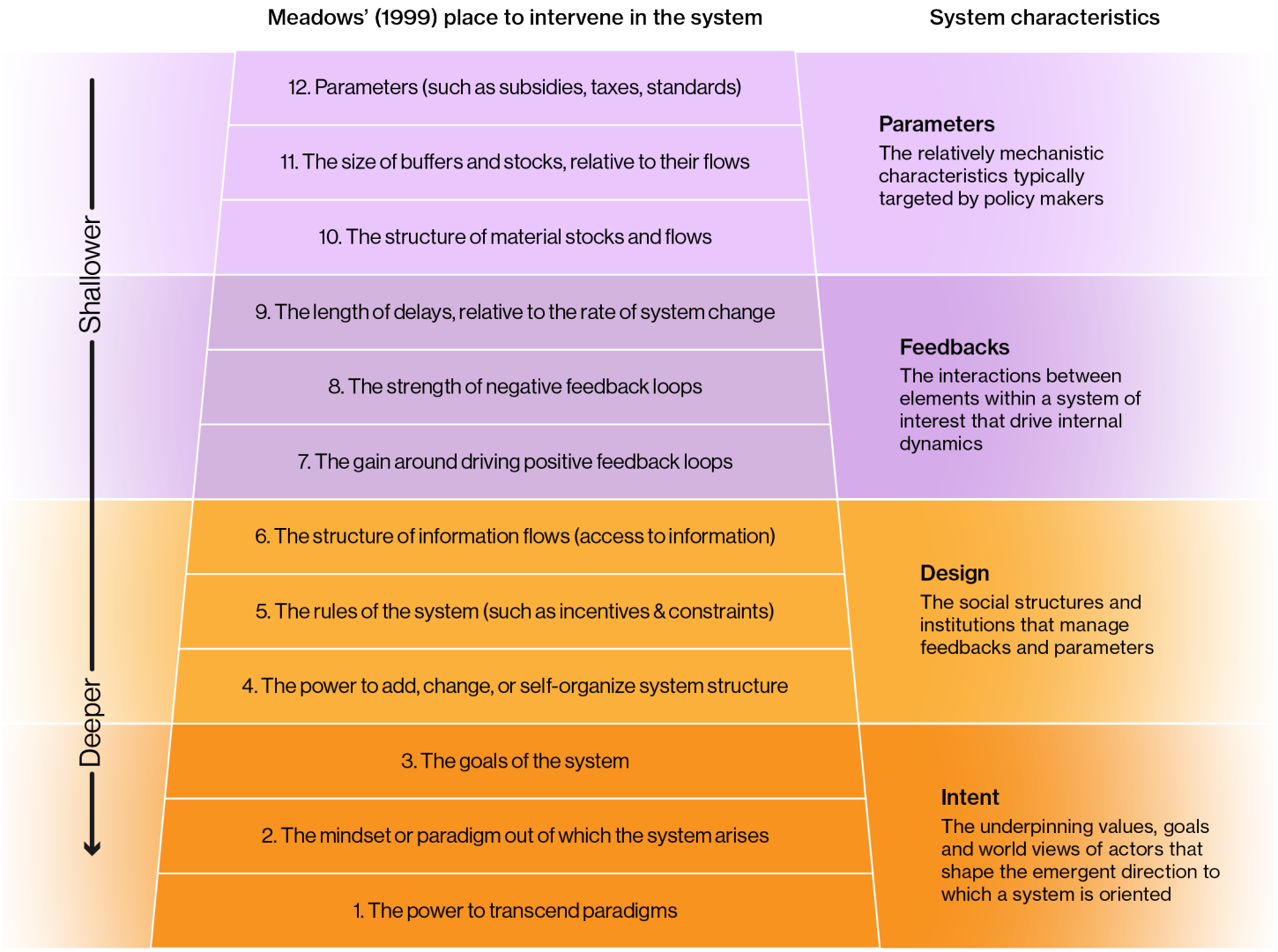
‘Building the Alternative’

Structure of Information Flows (6)

The first change narrative centers on interactions between Programming and Systems Leadership: gradually building the relationships, shared resources, and goal alignment that coordinates social economy organizations within MSYK’s circle. Convening the system in the short term is more surgical; care needs to be taken when taking on new shared projects precisely because resources like time and labour are so scarce. In the long term, however, capacity-building projects and shared infrastructure will fuel and inform new interventions, adding emergent properties to the overall system and a decentralized capability to act on common challenges.

The Structure of Information Flows (6) is a good place to start; as Meadows theorizes “adding or restoring information can be a

Figure 5
Leverage points and system characteristics, adapted from Abson et al. (2017)



powerful intervention, usually much easier and cheaper than rebuilding physical infrastructure" (Meadows, 1999, p.13). Gathering data and delivering actionable knowledge to actors within the system could change behavior or program goals, possibly creating entirely new feedback loops. Take as examples the idea of community asset mapping, or of sharing a program director and grant writer between multiple organizations – both outputs share information to passively or actively redirect resources and potential action, increasing the efficiency of the system at a lower overall cost to all stakeholders.

Restructuring information flows addresses lower levels of leverage as well. System malfunctions and inefficiencies often occur because of missing information or the (9) Length of Delays in feedback. Sharing data, and having a common reference for data points across the system, tells us what is working and what is not, driving positive feedback loops (7). In both interviews and the 3H, participants reported that social economy organizations often knowingly or unknowingly compete for the same resources (i.e. grant funding, skilled and knowledgeable labor). Mapping, monitoring, and keeping shared data up to date could correct for undue competition for these resources or encourage sharing and redistribution amongst the organizations in the system (Negative Feedback Loops (8)).

(5) The rules of the system

The Rules of the System (5) are changing, signaled by both territorial and federal governments' economic diversification policies and the devolution of decision-making power. In years 3 and 4 of the TOSCA, a critical mass of projects, programming, and networked organizations is increasingly exerting pressure on elements of the system that are still resistant to this change. Having restructured information flows and built common resources, MSYK's network works at the wider institutional level to accumulate influence and open up a closed system.

In Sustaining Purposes, MSYK begins to convene resources from institutions within the territory, but also from outside the NWT. Building networks and convening power that includes outside influence might help MSYK and its network maneuver around certain 'rules' and institutions that are entrenched within the territory. The network will work in a methodical and opportunistic way to lobby for change, working with or against parts of the regime as needed and supported by restructured information flows.

(4) The power to add, change, evolve or self-organize system structure

Towards the end of the TOSCA, MSYK is becoming a leader within the system. Trusted by both grassroots and institutional actors, they have accrued the social capital to organize and take action on systemic issues. The network is moving beyond simply lobbying for change, gaining the Power to Self-Organize the System (4).

Meadows theorizes that system self-organization, seemingly wondrous and sublime

within nature, is simply the result of patterns and algorithmic rules applied to evolutionary raw material, followed by (billions of years of) experimentation and evolutionary selection. The same elements of 'raw material' stocks, coordinating 'patterns' and a process for 'evolutionary selection' are present in social and technological systems self-organization. At this late stage of the TOSCA, the network's power to self-organize and take action emerges from:

- 'Raw material' – the accumulated people power, inherent innovation, material resources, and capabilities of organizations within the network. 'What' is needed to act.
- 'Patterns' – cooperative structures, decision-making bodies, relationships, and social capital accrued within the network that allows action separate from and unencumbered by the regime. 'Who' is acting, and 'how'?
- 'Evolution' – the information flows that tell the network 'where' to act, guiding their experiments. The impact assessments and accountability structures that course-correct and facilitate evolutionary selection.

The confluence of these elements proves the viability of MSYK's network as an alternative to the status quo. The knowledge and power to act, the cooperative structures to act of its own accord, and the ability to self-correct and experiment means the network is able to provide for its constituents where the regime of extractive practices and actors cannot. Displacing entrenched extractive systems will require sustained pressure and resources; the decentralized nature of self-organization provides this where a single organization or initiative cannot. By recombining resources, structures, and information in myriad forms, the network can respond quickly to both resistance from the regime, and the varied needs of its stakeholders – an alternative 'DNA' of emergent innovation and experimentation that is always learning and adapting. Meadows puts it best:

> ***Insistence on a single culture shuts down learning. Cuts back resilience. Any system, biological, economic, or social that becomes so encrusted that it cannot self-evolve, a system that systemically scorns experimentation and wipes out the raw material of innovation, is doomed over the long term on this highly variable planet. (Meadows, 1999, p. 18)***

'Reaching Hearts, Minds, and Hands'

(2) Mindset or paradigm of the system

The second narrative of change encompasses the shifts in people and infrastructure that MSYK makes over the course of the TOSCA to foster an accessible and engaged community. 'Reaching Hearts, Minds, and Hands' is about the tactile and social act of making; on an individual level, the creative act of making empowers us, equipping us with skills and confidence to make change in the environment around us. Scale the impact of that creative act up to the community level to find our highest and most necessary point of leverage, changing the Mindset or Paradigm of the System (2).

System goals, feedbacks, rules, and parameters all emerge from that slippery thing called 'values' – no shifts in mindset or worldview means the system will still conform to the previous system goal. Shifting shared social

agreements and norms about what is possible in the system is certainly not simple, but as Meadows (1999, p. 18) puts it: “there’s nothing physical or expensive or even slow in the process of paradigm change. In a single individual it can happen in a millisecond.” This is where I believe makerspaces have an advantage – the act of making starts with the individual, and makerspaces foster that inherent creativity.

While seemingly more ephemeral than the gradual buildup of networks and resources occurring in ‘Building the Alternative’, I believe this change narrative to be much closer to the competencies that MSYK already possesses. As an organization, it has always been focused on building up individuals through teaching practical skills, encouraging entrepreneurship, and building a welcoming and inclusive space for all members of the community. We can revisit the TOSCA to see how these values scale up to the community level through staff action, proper resourcing, and offering opportunities and projects as tangible demonstrations of change.

The actions in Outputs are very much focused on meeting individuals where they are and reducing friction in the space. The goal is to give community members a reason to be in the space: provide clear learning pathways, create tangible goals for learners, and direct staff to work with individuals directly in understanding why they want to be in the space and what they want to create. Improved space systems help members imagine running events or leading programming, breathing social well-being and life into the space. The member drive in Outcomes will increase engagement, creating social scaffolding as learnings and experience begin to flow between members. Again, while some members might enter the space due to intrinsic motivations to learn, sustained activity will be motivated by a sense of community, financial opportunities, and opportunities to address social issues (Kwon & Lee, 2017).

While early on MSYK will rely on staff (and partner programming) to affect the mindset of individual members, it will be the membership itself that fosters a healthy culture within the space. Mazzilli-Daechsel (2019) in their ethnographic study of makerspaces writes that the founders tended to monopolize decision-making in early phases of development due to their investment within the space. They continue:

“Problems start to arise, however, when a makerspace’s political structure fails to evolve as its membership grows. New members are effectively cut out of the space’s political life and decisions are made undemocratically. Such makerspaces reintroduce into their decision making processes the very hierarchies and asymmetrical power relations that are frowned upon in the activity of making itself. Members are free to do what they want in a makerspace, but they are not allowed to affect the conditions under which they make.” (Mazzilli-Daechsel, 2019, p. 9)

This is why, as a Sustaining Purpose, members should be given the latitude to help manage the space, as well as roles and responsibilities that give them meaningful input into the direction of the space. This is in line with both staff and

board's visions of the future: that MSYK might join the ranks of northern co-operatives advocating for social change in the territories.

Finally, as this culture of volunteerism develops, one-off community projects will develop into action committees – it is these skilled groups of members and volunteers who will show at a wider scale, that interventions led by social economy organizations are a viable pathway to systems change. MSYK, having the material resources and network to support these types of social impact projects, is an avenue for Yellowknifers at-large to see and be the change they want in their community.

Table 3
Summary of TOSCA change narratives.

	"Building the Alternative"	"Reaching Hearts, Minds & Hands"
Key activity areas	- Programming - Systems Leadership	- People and Business Model - Physical and Digital Infrastructure - Community and Membership
Primary system level affected	- Regime (institutions, government, industry) - Niche (social economy organizations)	- Individuals (members, users, community)
Leverage affected	- (6) The structure of information flows - (5) The rules of the system - (4) The self-organization of the system	- (3) The goals of the system - (2) The mindset or paradigm out of which the system arises
Example actions	- Initiate systems convening with social economy organizations - Develop networked capacity, e.g. shared Program Director, asset mapping - Exert pressure as a network on elements of the system that are resistant to change - Convene, orchestrate, redistribute resources from the regime-level	- Improve experience of space, and autonomy of members - Foster a 'third space' - Spearhead community projects to convene volunteers and build culture of changemaking

Addressing the Research Question

Makerspaces as system conveners

Healthy systems convening is led by intermediaries

So the inciting question remains: what is the role of a makerspace in convening community and facilitating self-organization from the grassroots level? The change narratives envisioned by the TOSCA reveal that, while MSYK is certainly at home in the grassroots, it operates at the intersection of many actors within the system.

> ***Through co-investigation with/via MSYK, I contend that makerspaces have the unique ability to scale to purpose, reaching across the system as an intermediary, resource orchestrator, and convening force between many levels of actors. In demanding democratic forms of negotiation, I argue that an interconnected system of grounded, genuine relational forms can emerge.***

Photo: Priscilla Du Preez on Unsplash

Makerspaces make the great systems conveners precisely because they stand interconnected between all levels of actors, benefiting from and offering something to everyone. Their close ties to each level makes them accountable to all. MSYK, in particular, has close ties to many communities and niches of social economy organizations across the territory, but also to regime-level economic development organizations like CanNor, ITI, and the city of Yellowknife. In contrast to this intermediary-led approach, we could explore the establishment of a network of Fab Labs led by the regime as a political project.

A regime-led implementation of a makerspace network

In 2011, Xavier Trias became mayor of Barcelona, campaigning on a smart city platform. Trias' government worked with technology giants to transform Barcelona into a city-wide laboratory for innovation. Part of that strategy was the establishment of a network of Ateneus de Fabrcacios (AdF), or fab labs, in some of the city's poorest neighborhoods to promote local production, teach digital skills to residents, and create urban laboratories seeking more sustainable cities. The first AdFs were criticized for failing to consider or connect with the needs of residents (Diaz et al., 2021) and in 2015 the incoming mayor Ada Colau's administration would redirect these spaces towards digital inclusiveness.

Today, five total AdFs have been established. At first glance, it seems like MSYK's dream: each AdF space is managed by a non-profit organization selected by public tender, with both the NPO and the city contributing resources, tools, staff, and financial support. The AdFs operate on a social currency basis: users may use the space and its tools for free in exchange for volunteering their time, training users, organizing events, or even making donations of materials, objects, or project documents. This is meant to promote the values espoused by the maker culture – free access, reciprocity, open sharing, and social learning. The users of the AdFs differ greatly in socio-economic background to private makerspaces (Diaz et al., 2021), and each has a place-specific mandate to address citizen participation and issues within its part of the city. However, this does not tell the whole story.

Diaz et al. (2021) in interviewing users of AdFs, report that the vast majority of individual users feel empowered by the fab lab, achieving high degrees of technical skill. However, the network of AdFs fail to empower on the collective

and political dimension; this is due to their original use as a political tool and their implementation via the regime's mechanisms. The Ateneus have "failed to free [themselves] from the system of public tenders that condemn the opening, management, and development of these places", lacking meaningful community involvement in framing what fab labs can provide for local residents (Diaz et al., 2021, p. 8). The authors conclude that AdFs might overcome these challenges with increased cooperation with activist, community, or private makerspaces.

By no means a failure, the network of AdFs still proves that the context and actors involved in creating a makerspace matters deeply. MSYK arose first from the needs of the community, as a mobile ToolBus meeting individual makers where they were. Consequently, it is accountable to community members' needs and the social economy organizations it partners with. Barcelona's story serves as a reminder that convening the system requires careful mediation and meaningful contribution from actors at all levels of the system.

Towards a model for makerspace-led systems convening

Diaz et al. (2021) articulate a model of three levels of empowerment, vis-a-vis individual users of makerspaces (Table 4); via a makerspace, users can feel empowerment on the individual, collective (niche), and political (regime) levels. I would build on this model, focusing instead on the systemic interactions between each level and shifting the perspective to that of makerspaces. Figure 6 conceptualizes how makerspaces act as an intermediary between each level of systemic actor, while also possessing skin-in-the-game with each of them.

Regime level

To regime-level institutions, such as government, foundations, and industry, makerspaces act as an intermediary between state/industry goals and community trust. Social economy organizations like MSYK hold social capital, and regime-level actors can work through

Table 4
Model of makerspace empowerment (Diaz et al., 2021)

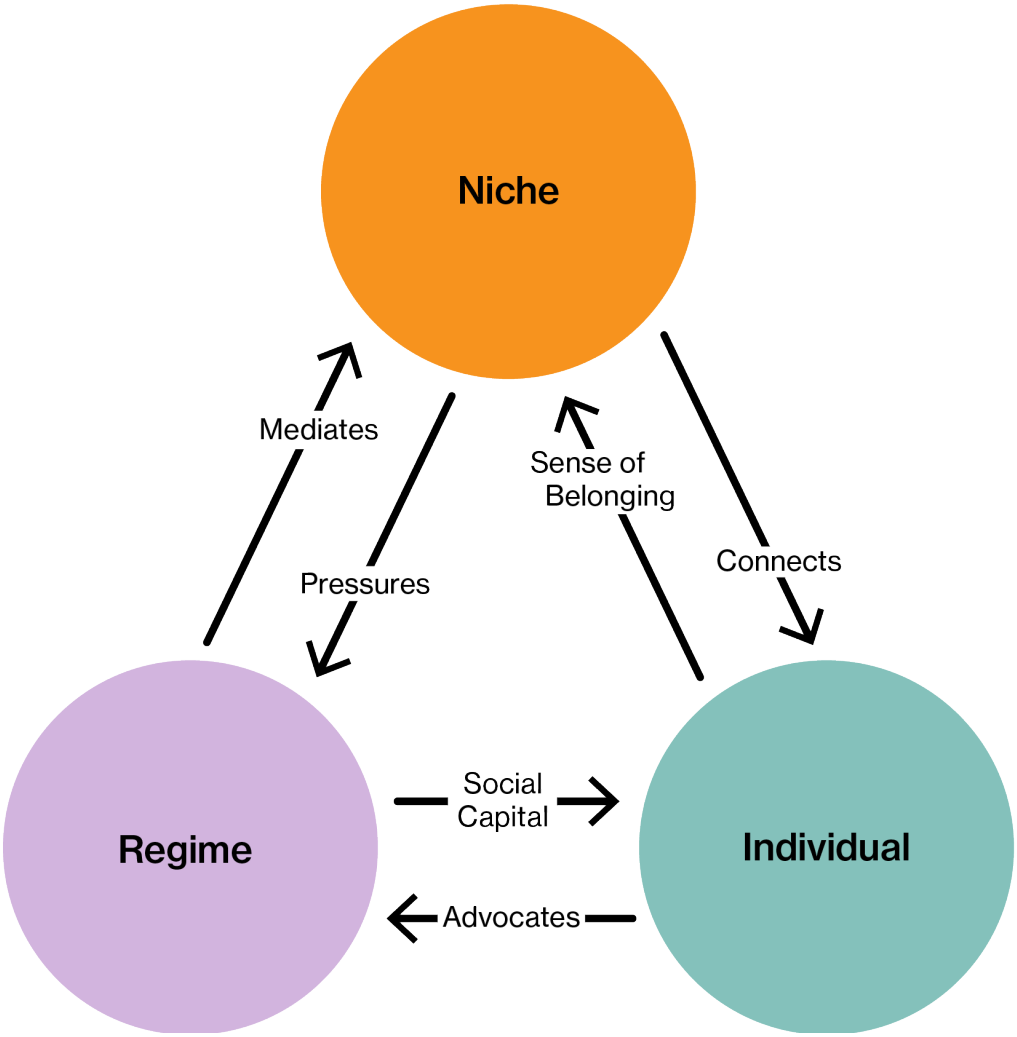
Level	User Empowerment
Political	- Political recognition of the activities carried out in makerspaces - Ability for users to be involved in the political decisions of certain issues - Presence of a strong identity and common imaginary
Collective	- Linking and forming a community of involved individuals - Implementing relevant projects to satisfy a local need - The feeling of belonging - The constitution of a wealth of information and knowledge held in common with other users
Individual	- Accessibilty to the space, its non-material resources, and its means of fabrication - Strengthening self-confidence and awareness of teh capacity to act - The development of technical and cognitive skills - The ability to generate new information and knowledge.

them to reach individual community members more reliably. The regime cannot accomplish its goals of economic diversification and devolution alone, it needs to rely on organizations that holds community trusts. Intermediary organizations like MSYK can help mediate within their network of social economy organizations coordinating and orchestrating the (re) distribution of resources, and know best what organizations to call and what avenues to use to reach specific communities.

Niche level

As we have discussed, makerspaces have the ability to convene a network of social economy organizations. They provide space to organize, as well as tools and skilled people to take action and pressure the regime and create collective impact. MSYK is the crossroads for so many individual niches, with partner organizations programming and coming through the space constantly. Making these niches visible and providing opportunities for individual com-

Figure 6
Model for makerspace-led systems convening. Actions within arrows are what makerspaces do on behalf of that actor.



munity members to find them ultimately brings a critical mass of people into social economy groups.

Individual level

Finally, at the individual level, makerspaces cultivate autonomy, creativity, and a sense of inclusion through social learning and the joy of making – a much needed 'third space' in cities that are increasingly unaffordable and inaccessible. In being a connector and maker of niches, they help individuals find community and a sense of belonging. As we saw in the TOSCA, makerspaces also have the potential to be an avenue to scale individual members' social impact through community build challenges or action committees.

Conclusion

Through this study, we can conclude that self-organization is a function of not just the grassroots, but of interactions between multiple levels of the system. Makerspaces, MSYK in particular, can scale to purpose and act as an intermediary between many actors within the system. In weaving deeper connections between each level of the system, genuine, accountable, and relational social forms are created.

It may sound idyllic, but envisioning this type of future helps us plan for the present. The final section of this paper will bring us closer to ground, extrapolating implications from this foresight exercise to inform recommendations on improving systems convening capacity across all system levels.

Photo: MSYK

Photo: MSYK

Implications & Recommendations

‘Making’ the Collaborative Future, Together

Closing arguments

Organizations within the social economy in the NWT are on the front line of myriad structural inequities. Economic volatility induced by natural resource pressures, and cultural erasure via an ongoing colonial hangover drive issues of poverty, unemployment, family breakdown, addiction, violence, poor mental health, displacement, and both physical and “ontological” (Christensen, 2013) homelessness. The common thread is an erosion of local community autonomy and the exclusion of northern perspectives in the problems that affect them. Decision-making power, for at least a century,

is found in distant boardrooms and legislatures. Government has signaled a change by initiating the devolution of powers but this process too has been criticized for only shifting responsibility and blame, undermining the authority of local governing bodies and the efforts of organizations.

And so, within this northern territorial context, this study sought to understand the role that makerspaces play today and into the future. Through a participatory foresight process with MSYK, images of the future were co-created, capturing hopeful but grounded possibilities for addressing systemic challenges. The TOSCA helped us understand that makerspaces have the unique ability to scale to purpose, acting as an intermediary to convene and orchestrate resources between the regime, niche, and community levels. The ultimate goal, dreamed up by MSYK, is to displace extractive, business-as-usual practices, with an alternative system of locally focussed development that espouses cooperative principles and directly democratic structures.

To conclude, this report will explore the implications of this study across the levels of the regime, niche, and for individual makerspaces. I propose a set of recommendations for actors within each level to improve their capacities to convene the system and support intermediary organizations (like makerspaces) within the social economy. Although I argue that intermediary organizations aid in convening the system, a healthy result only emerges if all actors begin to act as systems conveners, together. I conclude the report by discussing further steps for MSYK themselves, recommending systemic design and foresight tools that might be useful in further systems convening.

Shift Regime-level focus to a social infrastructure-first approach

Literature, our workshops, and interviews, all point towards social infrastructure prefiguring and ultimately supporting economic growth. Social economy organizations have borne the weight of addressing the issues stemming from national priorities and industrial activity for decades, and regime-level actors need to recognize their collective experience and support their capacity to take action. Interviewee YA puts it best: collective impact in the region is more than just 'innovation', it is about orienting and coordinating what already exists. The social economy in the NWT encompasses so many niches and stakeholders – from long-standing organizations, decades-long informal practices, to scrappy resistance efforts. Networked and coordinated, they could present a healthy pathway to devolution, addressing northern challenges in a culturally reflexive manner. Working with social economy groups, versus industry groups alone, maintains closer and more directly democratic relationships to the communities that governments should be serving.

Based on the findings of this report, I suggest the following priorities at the regime level to support systems convening:

1. Re-assess current support and granting programs collaboratively with social economy organizations. Government

and foundations should hold listening and co-design sessions that evaluate the design and implementation of these programs with their needs in mind.

i. Co-assess the effectiveness of programs (e.g. IDEANorth) and whether the funding mechanisms, timelines, reach, and eligible expenditures (e.g. core expenses, operational funding) should be expanded or redefined.

ii. Identify key social economy organizations already existing and provide direct support for their stabilization or scaling efforts (e.g. through targeted EOI or direct contact).

iii. Co-create streams of funding that incentivize social infrastructure, not just economic growth. Identify the socio-economic gaps that stop individuals from applying to government or foundation programs.

2. Incentivize the networking and coordination of social economy organizations. Support initiatives that promote the sharing of data, physical/human resources, and cooperation between social economy organizations. Expect these networks to begin acting autonomously after a certain period of time.

3. Identify and invest in intermediary organizations like makerspaces. This organizational archetype should be considered 'basic science', adding emergent value in orders of magnitude beyond their own operations. They increase overall capacity and capability to act within the network.

4. In parallel with territorial plans to foster new Northern industries convene expertise and investment capital to the North. In creating these new industries of tourism, climate change mitigation, green building, raw minerals processing etc., also build meaningful partnerships and engagement with social economy networks to ensure they develop with democratic input.

Foster networked impact in the Niche

The better part of this report is focused on the niche-level, encompassing the convening and networking of social economy organizations. This section will lean heavily on the "Building the Alternative" change narrative of the TOSCA to make recommendations to social economy organizations seeking a more collaborative and effective network:

1. Restructuring information flows between social economy groups. As the TOSCA suggests:

   i. Map and actively share assets and resources. For example, sharing a space, data, or role (e.g. program director, grant writer) that is in high demand from other social economy groups. Be cautious to not repeat work that has already been done, but build on what has come before.

   ii. Be open to sharing data on the success or failure of programs or ac-

tions undertaken.

iii. Map the goals, stakeholders, and reach of social economy groups. Be aware of when others are competing for the same resources, and make efforts to redistribute or collaborate when possible.

2. Becoming a Systems Convener. As Etienne and Beverly Wenger-Trayner (2021) write in their book Systems Convening: A crucial form of leadership for the 21st century, work to take a 'landscape view' of the system to spread capacity across it. Create learning spaces that engage people and organizations across socio-political boundaries and foster the social capital to work across different worlds.

   i. Take on projects, opportunities, and infrastructure that can spread capacity across the system. Makerspaces embody this by providing space, tools, and educational resources across the system, reaching a wide spectrum of potential users. Many of the examples in restructuring information flows also apply.

   ii. Approaching systems convening with the mindset that there is a plurality of 'political' goals at play. While perspectives may not always be aligned, a map of organizational goals and resources will help groups of organizations be decentralized in taking action or creating programs.

   iii. Systems convening begets systems convening. Be open, dynamic, relational and emergent in the process of becoming a system leader. Teach others tools and guide them to resources to help them take a systemic view.

3. Collaborating with the regime opportunistically, acting as intermediaries whenever it benefits your stakeholders. For example, a small coalition of social economy groups (including MSYK) are working with state funding to provide mutual aid in the form of gas money to evacuees of the late August wildfires. Becoming a reliable intermediary, while holding strong to cooperative principles, fosters trust with both the regime and people living in Yellowknife and the NWT and increases convening capacity.

What can other makerspaces learn from MSYK's example?

Though this study centers a very unique context, I believe many of the learnings can be generalized to makerspaces across Canada, and beyond to the maker movement at-large. The recommendations in this section are directed at both makerspaces and MSYK themselves, as guiding principles on operating the space as systems conveners.

Mazzilli-Daechsel (2019) provides an engaging critique of a maturing maker movement: he believes that the movement falls short on its promise of creating technology-literate publics

able to affect social change. In either its current form or within the aspirations captured by the foresight tools, MSYK addresses these critiques in meaningful ways that might provide insight for other makerspaces. Table 5 identifies four major critiques of interest and provides a comparative analysis to both MSYK's current form and image of itself in the future. This is by no means a refuting of Mazzilli-Daechsel's critiques, but rather an invitation to examine his points in a different light.

In addition, find below a list of recommendations that I believe makerspaces should keep in mind in becoming systems conveners at the individual and community level:

1. Foster a 'third space', always work to increase accessibility. Examples might be putting the price of membership on a sliding scale, creating clear learning pathways for makers to upgrade their skills, and always reassessing the reach of membership (who is not in the room?)
2. Create channels and avenues for individuals to scale up their impact. Makers might come at first via the intrinsic motivation to learn and make, but others will come (and stay) for the financial and social change potentials in the makerspace (Kwon & Lee, 2017). Create and connect the membership to opportunities in e.g. development grants, honoraria, community build challenges, or sponsored hackathons.
3. Plan to reform your management structure to reflect your membership's goals and commitment. This could mean anything from forming action committees to reincorporation as a form of co-operative.
4. Express the values of your organization (and membership) through the building of your network, mutual aid, place-based programming addressing local needs, and culturally reflexive programming. Always look to convene the system, and spread impact amongst it.

Table 5

Comparative analysis of Mazzilli-Daechsel's (2019) critique of makerspaces with MSYK

Critique	Comparative Analysis with MSYK
Makerspaces and the maker movement are easily co-opted or hampered by capitalist economic structures and logics.	MSYK recognized early on that, to survive and address its core goals, it would need to work in partnership with other social economy groups. Resources (human or capital) are so low that there is little choice but to collaborate. That said, MSYK has since fostered a reputation for resourcing other social groups and movements, lending material support not just to the close partners in this study but also to organizations such as the first tenant's association of Yellowknife, or hosting Indigenous speakers from across the territory. It navigates hostile structures by spreading resources to the social economy groups actively addressing them, and by adding overall capacity and capabilities to actors within the niche. To resist co-option by dominant structures, makerspaces need to work relationally. This not only uplifts other actors in the niche, but also keeps the makerspace itself accountable to grounded and genuine groups seeking social change.
Makerspaces do not appeal to people who have limited technological competences, falling short of their mission in democratizing tools and technologies.	In less than a year, Artspace has hosted traditional beading circles, hide tanning days, STEM workshops for Indigenous youth, repair cafes, and more. These forms of programming reflect both a cultural reflexivity and sensitivity to locals' needs. Makerspaces need to identify and offer culturally reflexive and place-based programming, effectively expanding the definition of 'technology' and the relevance of the space to a wider range of community members.
Over time, users may begin to feel a sense of ownership or responsibility over a physical space, but makerspaces do not shift their management structures to reflect this.	The rates of volunteer burnout cannot be understated within the northern context. Despite this, throughout the study we found many members who already wanted more responsibilities within the space. This led MSYK to plan early for incorporating supports and structures for volunteers (e.g. persona maps, teach-the-teacher workshops). Restructuring is not out of the question, with a co-operative model being present in each three horizons tool. Makerspaces need to plan early to incorporate structures that are rewarding to volunteers, especially to keep the 'third space' healthy.
The movement, in limiting its political engagement to the implicit impact of social spaces and learning, eschews the overt political mobilizations that might result in a radical reconfiguration of our relationship to technology.	This point of critique is an interesting one for MSYK. In multiple interviews, MSYK was viewed as "neutral", politically agnostic, and free of stigma (FA, BS, TA, YS) making it an attractive place to host community workshops and gatherings. Perhaps these perspectives are biased, yet each organization is quite diverse in their member composition, target audience, goals, and activities. Moreover, as we covered, MSYK has hosted explicitly 'political' groups in the past. Whether or not it is intentional, the organization is both trusted to be a safe space, as well as politically neutral. Taylor et al. (2016) writes in their case studies that many makerspaces feel that having an overtly 'political' lean can push potential members away, resulting in spaces that are antithetical to being a 'third space'. Even if not espousing explicit political views, makerspaces can do much to support organizing and mobilization efforts. Creating social infrastructure, institutional memory, spaces to convene, intervening in space, even providing physical tools – this is not politically neutral activity (Nascimento, 2014). While this might be a tough tightrope to walk, makerspaces seem positioned to work relationally to convene and support the actions of other social economy groups, while still being perceived as 'neutral' creative refuges. If anything, this represents a grounded, place-based approach helps makerspaces resist absorption by generic concepts of social justice: they must appeal to wider audiences to remain accessible, while also remaining accountable to the social economy organizations pushing for change alongside them.

Continuing an Agenda for Systems Convening

Next steps for MSYK

This study was framed by listening and envisioning exercises, but there is still much more to do in the hard work of systems convening. We can frame next steps around the TOSCA prototype, using it to flesh out further details and insights to guide future actions. A good place to start would be:

- Developing a series of business- or flourishing business canvasses (Upward & Jones, 2015) based on the action-outcome chains and key activities of the TOSCA. Conceptualize business cases for different revenue streams, elaborating on potential socio-economic and ecological impact of certain actions.
- Developing key performance indicators to make certain outcomes in the TOSCA more tangible. For example, speculating on how many members might be necessary after the member drive (outcomes) to maintain a healthy culture in the space (sustaining purposes) or to run action committees (impacts) would create insightful dialogue for the organization.
- Further fact finding and information gathering via interviews or surveys of members, individuals in the community, or with other social economy organizations. The business cases and KPIs make good heuristics to guide fact finding.
- Circulate and create dialogue around the TOSCA with other social economy organizations.

Tools for Systems Convening

Another important source of data that could improve the modeling of the TOSCA would be further systems convening. Using the tools that they learned in this engagement, MSYK could work with other social economy organizations on asset mapping, envisioning the future, and backcasting models. The systemic design handbook 'Design Journeys through Complex Systems' (Jones & Van Ael, 2022) provides a wealth of tools that can be reconfigured to MSYK's context, as well as frameworks and guidance for planning the size and purpose of an engagement (see Figure 3: Systemic design engagement model, page 37). In acting as an intermediary, MSYK will need to widen its co-creative context to include a wider range

Photo: USGS on Unsplash

of stakeholders and organizations, and come to the table with easy-to-understand tools that facilitate both listening and planning.

In Appendix D, I propose a series of tools for MSYK to explore: the tools could be used in this order, or be picked and chosen to fit in a specific context. Each engagement should be treated as an iteration within a research cycle, and the choice of tool and convening context can guide dialogue within the organization as to what comes next. As decided in Backcasting, systems convening could be led by the executive director, or by an action group of board members tasked with outreach. This team of systems conveners should consider displaying their work in a semi-permanent place in the MSYK space, semi-accessible just out of sight to system stakeholders who use the space on a regular basis; this might allow for more spontaneous feedback.

Conclusion

Makerspaces and the maker movement promised the democratization of new technologies, and the use of mass interconnectivity to share files, processes, and code openly. The movement painted an image of global networked creativity, emergent innovation, and decentralized but coordinated actions – the call spawned makerspaces, Fab Labs, and hackerspaces across the world. However, as the maker movement continues to mature, its perceived potential to create lasting systemic change seems to be waning. It is time we reassess the role that makerspaces play within these systems, and the kind of leverage that they are able to create and apply.

Through a process of collaborative investigation and envisioning the future, this study posits that makerspaces have the ability to act as intermediaries between actors across the system, scaling to purpose to meet the goals of a wide variety of system stakeholders. As an intersection for the needs of so many actors and organizations, makerspaces are well positioned to be systems conveners: they weave deeper connections between each level of the system, creating alternative institutions that are more collaborative, directly democratic, relational, and grounded.

In observing MSYK and the northern context, I learned that culturally reflexive programming and directly addressing the needs of local communities generated forms of place-specific 'innovation' – redefining what that term might mean for the maker movement. MSYK, for their part, began to understand their role in creating the social infrastructure that prefigures more equitable economic diversification. As systems conveners, they would work closely with other social economy organizations in the North to address the social challenges and pathologies that affect their communities. Regime-level actors need to learn from this approach as well, and should shift their priorities to supporting initiatives in the social economy over organizations espousing extractive 'business-as-usual' values. As the world experiences myriad challenges, makerspaces become front line research labs in driving community-first approaches to innovation and problem solving.

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Appendix

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B: Abridged workshop tools 87

C: Theory of systemic change and action 92

D: Tools for future systems convening 94

Appendix A

Reflection and Workshop Feedback

The beginning of this report posited two research questions. The first is fairly directly responded to in the findings and synthesis sections. Gleaning insight for the secondary question, understanding the effectiveness of participatory futures tools in co-creating actionable knowledge, is a bit more subtle. The coordinating and generative potential of these tools are less assessed by the resulting content itself, and more woven into how these ideas were formed. Discussions with staff and board post-workshop, however, do provide some understanding of their perceived effectiveness from a participant's perspective – these insights, as well as some commentary from the practitioner, have been summarized in this section to supplement the secondary research question.

Three Horizons

The MSYK group has had previous experience with consulting and strategic planning workshops. These workshops had an interactive format (read: not a 'participatory' approach as described in this report). Multiple participants noted that, without a coordinating foresight element, the 'values statements' and mission/vision work they completed felt disconnected to any actions that were brainstormed. Three Horizons in particular provided a context with which to connect and situate actions in relation to values.

The visual aspect of 3H helped participants bounce ideas off of what had already been posted, keeping the group generative and loose. They also found it helpful that the facilitator would group and theme large groups of sticky notes as the 3H progressed. One participant remarked that having major themes called out made them feel more secure in posting more granular ideas. Themes held major questions and tensions in participants' minds, but also externalized them as an influence rather than something requiring an immediate response or solution. This helped in managing scale, and participants reported feeling like they did not get too hyper-focused on any single objective or point.

The practitioner notes that, since staff and board members had separate 3H sessions, each session felt different to facilitate. Staff, being only three, had a fairly strong idea of what needed to happen in the space, moving from idea to idea fairly quickly and commenting that the 3H visualized many of the problems they talked about day to day. The board, ironically enough, did get stuck on certain granular actions but specifically on certain aspects of

day-to-day operations that they did not have insight on. It took some facilitating to keep them focused on their own networks, competencies, and responsibilities.

While separating the two groups seems counterintuitive to knowledge co-production, it did have the added benefit of generating a more diverse set of findings to be synthesized into the TOSCA. This could be a consideration when designing research. The two groups did come back together in the Backcast, where ideas were hashed out as a whole, generating again a different and useful dataset to be recontextualized.

Organizational Lifelines

The practitioner chose to use Organizational Lifelines with the board since that participant group was much larger. Participants in the exercise noted that it was more helpful than they realized it might be: both newer and older board members gained awareness around certain struggles, challenges, and opportunities along the timeline and built empathy with each other. Some issues were reframed for the group by setting it into a visual timeline. For example, over the four year lifeline the same issue of staff capacity popped up multiple times, and the board was able to understand how certain issues continue to plague the organization and speak to its effects and causes later in 3H. Multiple participants noted that completing Organizational Lifelines before jumping into 3H made the latter much smoother, noting that they felt they were on the same page about the challenges the organization had faced.

Backcasting Exercise

In the same way, 3H provided alignment on how certain values were connected to potential futures before heading into the Backcasting exercises. In a conversation between participants, it was theorized that starting with the Backcast would have been too granular, and would have slowed the process down. 3H helped to build a shared frame of reference for potential challenges and futures, avoiding unnecessary debates during the very granular brainstorming of Backcasting.

The Backcasting template was set up with multiple categories of sticky notes. Actions could be enabling, obstacles, or milestones. Another sticky note was also made to call out ‘tensions’ that might need to be resolved. Some participants noted that this made the exercise bloated; they felt that they were ready to converge on clear actions and this many layers slowed that down. Other participants appreciated the ‘tension’ sticky note in particular for reasons similar to the large ‘theme’ sticky notes in 3H; it gave them insight into the influence or preconditions of certain actions.

Participants agreed that Backcast established an ambitious but realistic roadmap for a single year, generating not just actions but different stories that also encapsulated responsibilities, metrics, and future impacts. Participants began using these stories as major themes and heuristics to refer to a whole category of actions. Although the Backcast only covered a single year, the way that the group was forced to prioritize certain actions, and the ‘stories’ generated from the exercise, gave ample insight for the practitioner to create the TOSCA.

Appendix B

Staff 3H

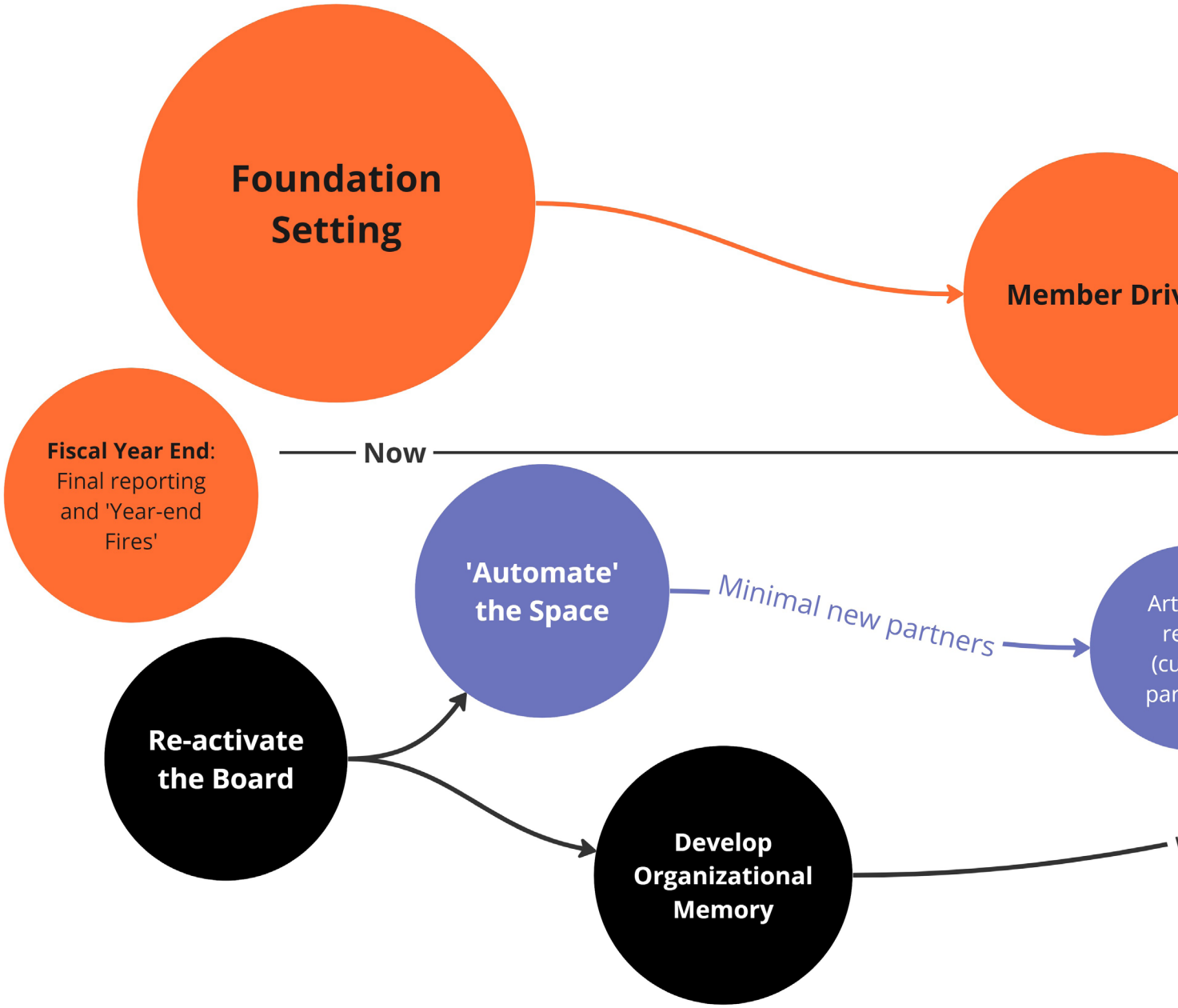
CURRENT SYSTEM CONCERNS	INTERMEDIATE INTERVENTION (TEMPORARY)	VISION (IDEAL FUTURE)
- Staff hitting limit due to serving too many interests or directions. - Space logistics and management systems still poor - Slow membership uptake, unsure of what to offer - Funding/revenue is inconsistent - User systems aren't designed to help them be autonomous	- First, set a vision for clear priorities on how to grow and help use staff resources efficiently - Vetting matrix for projects - Improve space systems: wayfinding, online booking, etc. - Train volunteers to help with spaces. Create clear roles. - Champion user autonomy, create systems to help users be able to use the space without constant help. - Programming evolutions: residencies, hackathons, intensives	- Staff autonomy and self-direction. More making less typing. - Social infrastructure at MSYK. Discussion and learning between members, community build projects, formal programs w/ partners. - User autonomy: members run workshops and skill sharing - Space systems: online inventory and booking, tools have a home, collaboration between the spaces. - Access: 24/7, trust members
POCKETS OF THE FUTURE IN THE PRESENT	**ELEMENTS OF THE CURRENT SYSTEM WE CAN REUSE**	**ELEMENTS OF THE CURRENT SYSTEM WE NEED TO SUSTAIN**
- Great vibe: Calgary Central Library, Ptarmicon Crew, coffee shops - Inspiration from social purpose: CSI Toronto, Solid State (BC), Dene Nahjo Craft Sale, Toolbox Initiative, resource.coop - Inspiration from systems in place: Nuuk, Makerlabs Vancouver (membership system and website), Guild of Arts and Crafts (been operating forever).		- Inclusive vibe: BBQs - Sense of wonder: things on display, people rolling up to ask "what is this?" - Team projects, e.g. waste diversion - Fun community events: Live shows, music, comedy.
● CURRENT REGIME ● NICHE INITIATIVES ● TRANSITION INTERVENTIONS		TIME HORIZON:

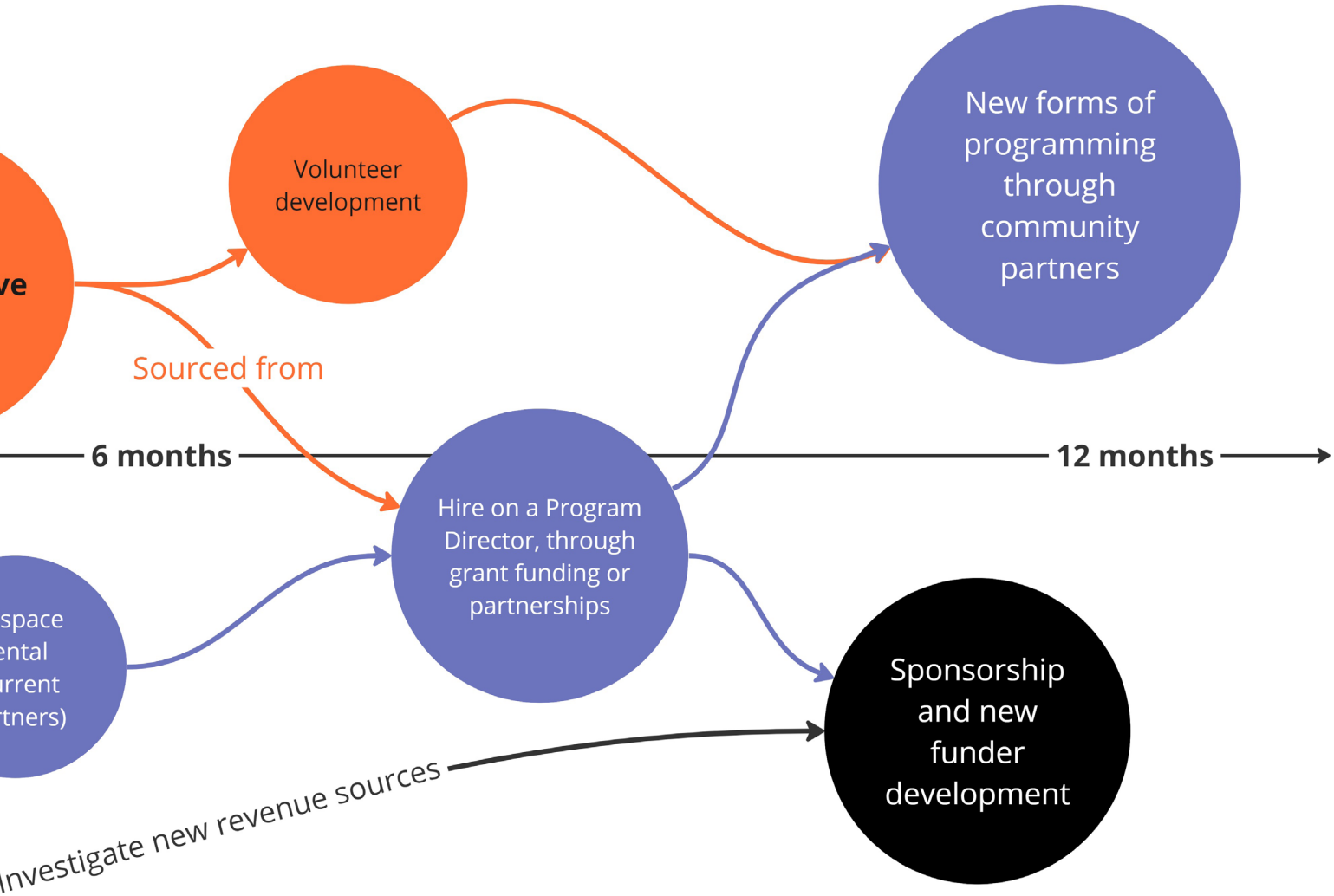
Board 3H

CURRENT SYSTEM CONCERNS	INTERMEDIATE INTERVENTION (TEMPORARY)	VISION (IDEAL FUTURE)
- Anti-collaborative organizational environment - Economic struggles and regional systemic issues: food insecurity, lack of housing, cost of living too high, supply chain shortages - Low organizational capacity. Too reactive, always chasing program funding. Hard to pull out of crisis mode because not enough capacity.	- Role of board: delegation of new roles? e.g. Director of Policy, Business Strategy, or Engagement - Prioritize revenue streams: start with memberships, then go to programming with partner orgs. Consider events, rentals, fee-for-services. - Expand network + revenue sources: e.g. talk to other communities in the territory, big companies like Northwestel - Improve data collection	- MSYK is a convening force. Partners and volunteers have clear roles and wants wh;enengaging with MSYK. Feel they can take initaitve in the space. Programming ideas: annual forums, artist-in-residency. - Community support: third space. Engaged users. Robust vounteer base. - New income ideas: hire new role to bring in more grants, do networking. Social enterprise arm? - Change structure: e.g. cooperative.
POCKETS OF THE FUTURE IN THE PRESENT	ELEMENTS OF THE CURRENT SYSTEM WE CAN REUSE	ELEMENTS OF THE CURRENT SYSTEM WE NEED TO SUSTAIN
- Great vibe: Calgary Central Library, Ptarmicon Crew, coffee shops - Inspiration from social purpose: CSI Toronto, Solid State (BC), Dene Nahjo Craft Sale, Toolbox Initiative, resource.coop - Inspiration from systems in place: Nuuk, Makerlabs Vancouver (membership system and website), Guild of Arts and Crafts (been operating forever).		
● CURRENT REGIME ● NICHE INITIATIVES ● TRANSITION INTERVENTIONS		TIME HORIZON:

Appendix B contd.

Abridged Backcast




ve
Volunteer development
New forms of programming through community partners
Sourced from
6 months
12 months
Hire on a Program Director, through grant funding or partnerships
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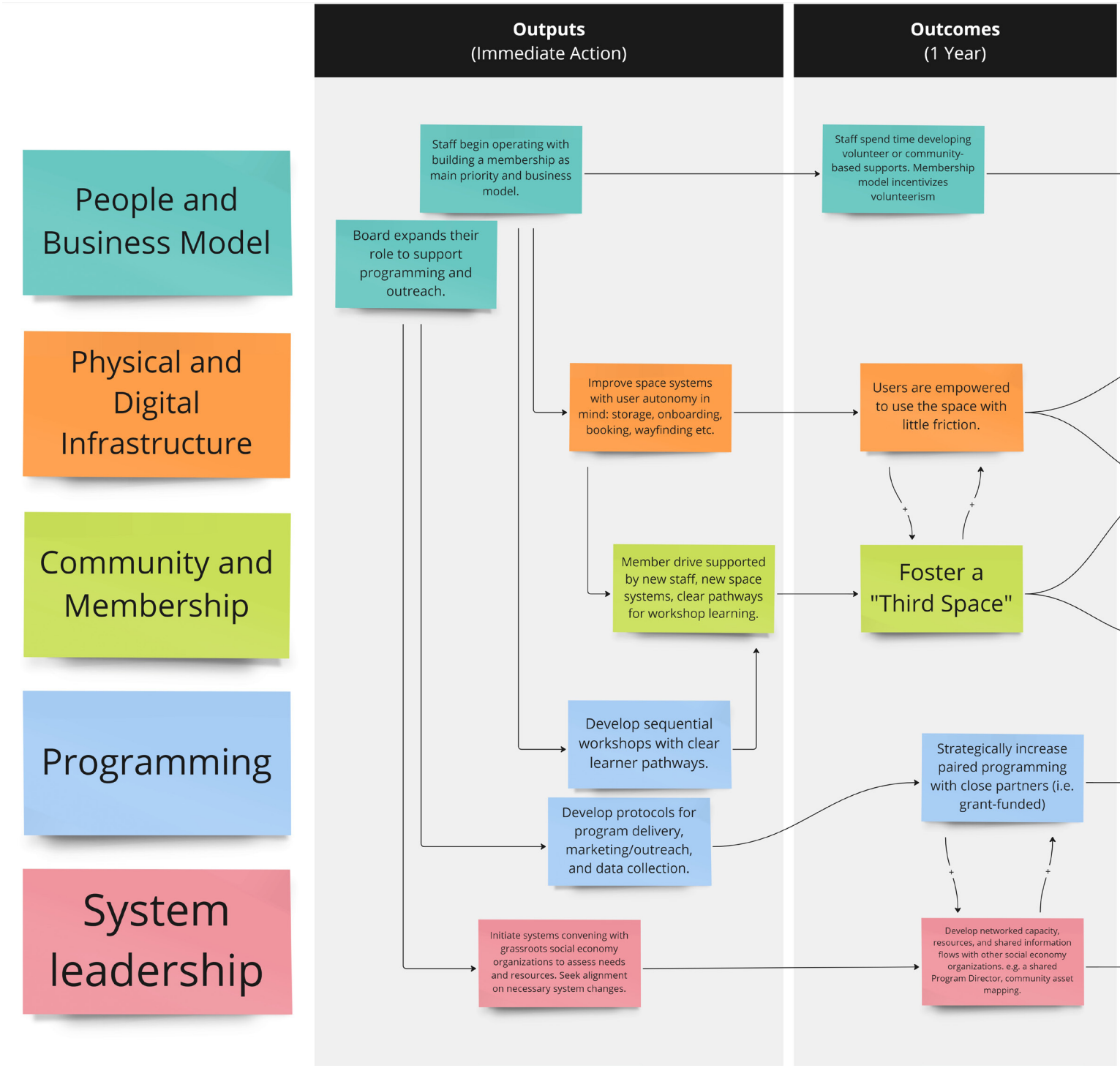
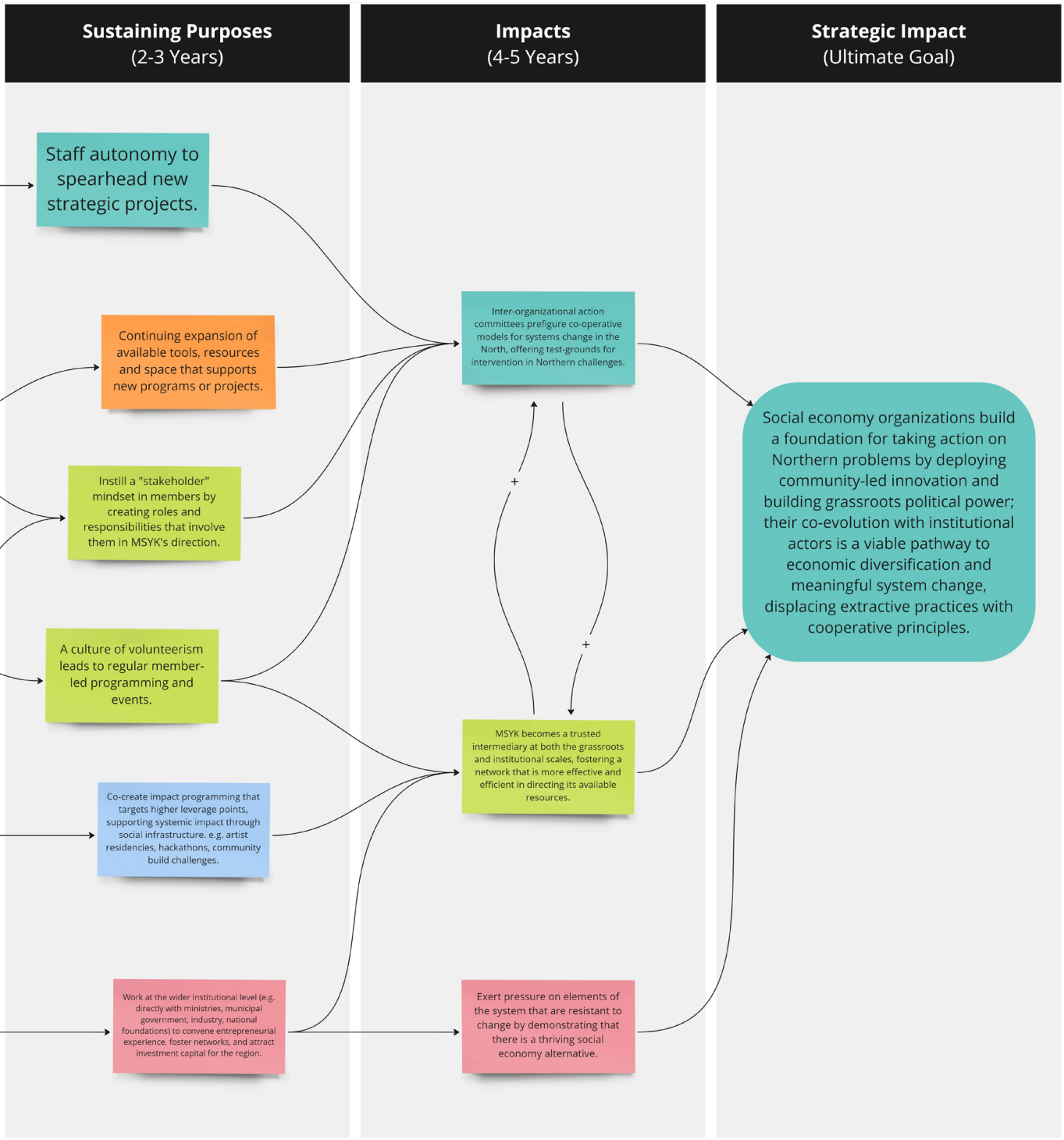
rtners)
Sponsorship and new funder development
Investigate new revenue sources

Appendix C

Theory of Change and Systemic Action




Sustaining Purposes
(2-3 Years)
Impacts
(4-5 Years)
Strategic Impact
(Ultimate Goal)
Staff autonomy to spearhead new strategic projects.
Continuing expansion of available tools, resources and space that supports new programs or projects.
Instill a "stakeholder" mindset in members by creating roles and responsibilities that involve them in MSYK's direction.
A culture of volunteerism leads to regular member-led programming and events.
Co-create impact programming that targets higher leverage points, supporting systemic impact through social infrastructure. e.g. artist residencies, hackathons, community build challenges.
Work at the wider institutional level (e.g. directly with ministries, municipal government, industry, national foundations) to convene entrepreneurial experience, foster networks, and attract investment capital for the region.
Inter-organizational action committees prefigure co-operative models for systems change in the North, offering test-grounds for intervention in Northern challenges.
+
+
MSYK becomes a trusted intermediary at both the grassroots and institutional scales, fostering a network that is more effective and efficient in directing its available resources.
Exert pressure on elements of the system that are resistant to change by demonstrating that there is a thriving social economy alternative.
Social economy organizations build a foundation for taking action on Northern problems by deploying community-led innovation and building grassroots political power; their co-evolution with institutional actors is a viable pathway to economic diversification and meaningful system change, displacing extractive practices with cooperative principles.

Appendix D

Suggested Tools for Further Systems Convening

Tool	Convening Context	Purpose
Framing the System		
Actors Map (p.50)	Studio	An Actors Map is a simple way to get started in a co-creative convening context. It identifies key participants (organizations, individuals, human and non-human actants) and maps their relationships to each other. It also acts as an input to future tools, and as a way to guide the selection of future participants to convene. In a Studio context, invite members from 3-5 other social economy organizations and organize them into breakout groups. Consider mixing the members of each organization within breakout groups to cross-pollinate perspectives. Map alliances, conflict, and influence between different actors and actants, then compare the maps of each breakout group to surface new insights. Do all social economy groups see the system the same way? Do certain organizations have more of a window into certain relationships or communities than others? A Studio context is more than appropriate at the early stage of framing the system. The Actor's map is more about surfacing data to be used as inputs in next steps than it is about generating actionable knowledge at this time in the process. That said, attention should be paid to what organizations are invited to the Studio context: ensure a variety of communities and niches, and therefore different values, goals and perspectives, are represented.
Rich Context (p.54)	Studio or Arena	Rich Context is used in a co-creative way to define connections between long term trends, the current practices of regime level institutions and policy, and any emerging innovations from the niche that respond to these trends or practices. The tool maintains that the way the niche responds are aligned to necessary systems changes. Rich Context can deepen the insight gained from the first mapping of relationships in the Actors Map. I suggest a Studio context for the first usage of this tool, involving a few members of the MSYK team and leadership from 3-5 other social economy organizations. Consider re-convening participants from the Actors map, or continuing in the same session. The smaller context gives the team some time to learn and experiment with the tool, as it is a bit more advanced. Together, the group would align on the common systemic challenges that they face and identify different niche methods and perspectives in addressing them. Opportunities to collaborate directly and indirectly could be surfaced and should be noted for the future. In further iterations of this research cycle, the MSYK team could convene this tool with a wider range of stakeholders and organizations, even including members of the general public or institutional actors. In this Arena context, MSYK would act solely as facilitators, perhaps getting support from other social economy organizations to facilitate or to help convene participants. An Arena context is defined by convening a 'requisite variety of an entire social system [guaranteeing] that some stakeholder positions, power, and interests will be at odds' (Jones & Van Ael, 2022). Facilitators should be aware and have a plan in place for working out differences productively. Use the Actors map to help guide decisions on what actors to invite to the table to achieve representative variety. In both Studio and Arena convening styles, the output of Rich Context aligns participants on the challenges the community faces in the form of long-term trends and entrenched power structures. It centers community-led innovation and resilience as the solution. The data collected helps the MSYK team/network identify where to direct attention, listening, and resources to niche innovations. For participants, they should walk away from the convening event with new understandings, reframing what they thought they knew about the system.

Understanding the System		
Story Loops (p.108) and System Archetypes (p.114).	Lab	Rich Context provides the foundation for mapping system dynamics visually. In a Lab setting, use Story Loops to capture the complexity of system interdependencies and feedback loops from Rich Context in a visual and communicable way. Consider setting up the system dynamics map somewhere semi-permanent in the MSYK space so that it can be easily revisited by staff and board members – the generation of insights over time is important in the Lab context. As more and more Story Loops are generated, System Archetypes can help the Lab team identify recurring patterns throughout the mapping. Though they can be technical, the Archetypes makes it simple to communicate the core issue(s) of the system being examined. Fixes that Fail, or Shifting the Burden are examples of common stories in system dynamics, so re-conceptualizing groups of Story Loops helps to frame them well. This mapping of system dynamics will inevitably lead to further questions, requiring continued fact finding missions (e.g. interviews, further convening) among system stakeholders. Although I suggest the Lab context to develop the mapping, consider sharing the findings from time to time with users of the space, partner organizations, etc. to gather more feedback for accurate modeling. The map becomes a living record of research and feedback about the system. For MSYK or an extended systems convening team, this analysis process will facilitate deeper sensemaking and improve their ability to communicate systemic issues to stakeholders.
Envisioning the System		
Three Horizons (p.128)	Studio or Arena	As we covered throughout this study, Three Horizons is an intuitive framework for envisioning and defining images of the future, identifying values-driven outcomes and potential interventions. It is useful to frame a long-term vision, but also as a planning roadmap. Just as with Rich Context, I would suggest the use of 3H in both the Studio and Arena contexts. Convening the Studio context might mean inviting closer organizations to the table, completing 3H just as was done in this study to surface different images of the future to compare and contrast. An Arena context will again open the tool to a wider stakeholders, but including both regime- and individual-level actors would create much more varied images of the future. At this stage of the systems convening process, we have captured a deeper understanding of the goals of the system (i.e. emergent from the actors and actions within). 3H is meant to invite system stakeholders to dream of changing those goals, to surface avenues for change or interventions, and identify potential collaborators for everyone at the convening event. This type of codesign workshop can be formative for participants, leading to tangible decisions about the future and network expansion.
Fostering the Transition		
		Organizations or individuals who have come along for the journey are now more informed and invested in the change they would like to see in the system. Next comes the nitty-gritty, road-mapping and defining the actions and programs that will bring about a preferred future. Three different tools come to mind, chosen for their variety of convening contexts and for their focus on planning and action. Continued on next page

Fostering the Transition (continued)		
Outcome Map (p.166)	Lab	The system reframing and envisioning processes should identify avenues for collaboration between organizations that attended. Should any of these organizations (MSYK included) want to better define a collaboration (e.g. shared program, infrastructure, intervention etc.) they might consider using an Outcome Map. This tool takes inputs from the envisioning phase (e.g. an H2 data point) and builds out the activities, outcomes, and preconditions necessary to reach that point in the future. Used in a Lab context between two or more organizations, it is useful for visualizing how each organization contributes capabilities and resources to move towards a strategic outcome, while also making space to discuss what systemic impacts are ultimately created into the future. The Lab context is used here for focused, deep, multi session/day work between organizations, concerning their specific competencies and capabilities. Working groups from previous tools might be reconvened.
Transition by Design (p.204)	Lab or Studio	The Transition by Design tool envisions the growth and diffusion of an innovation or intervention, from protected parts of the niche, to more macro adoption or buy-in at the wider regime level. New interventions or changes can often be subsumed or co-opted by an existing system (i.e. norms, practices, institutions) before it can find iterative success. Transition by Design conceptualizes how the innovation or intervention interacts with the system at each level, and how it might transform to ensure wider adoption and the displacement of 'business-as-usual' practices that no longer work for everyone. In my opinion, Transition by Design provides a more holistic approach to scaling up an intervention than an Outcome Map, but provides less resolution in the granular actions that collaborating organizations might need to take. The tool nonetheless provides insight into how the system might react (positively or negatively) to interventions in its goals. Convene this tool in either a Lab or Studio context, decided by requisite variety for the change program being planned or whether a working group already exists. The larger the perceived impact might be, the wider variety of participants might be invited to ensure insight from different communities, institutions, and perspectives. The tool will take multiple sessions to complete.
Collaboration Model (p.208)	Studio or Arena	The final suggested tool is the Collaboration Model, a canvas style tool that provides a framework for designing a collaboration or project for system change. Unlike the other two tools, the initiative or innovation has not yet been chosen. If previous framing or envisioning workshops have not produced clear collaborative avenues between participants (including MSYK), the systems convening team might consider using this tool as a generative brainstorming and sketching process of potential collaborations. The "DNA" and "Purpose" sections of the tool are normally agreed upon before the start of the co-design session – these parts of the canvas should be filled with data points from 3H that point towards a more collaborative future. The rest of the canvas then guides participants in designing enduring collaborations or coalitions with each other. Convene this tool in either the Studio or Arena context. For the Studio context, reconvene previous working group members who have not decided on an intervention point for the previous tools, and may want more time co-investigating. The Arena context might be used for something akin to systems-based 'speed dating': convening actors from across the system and rapid prototyping many models of potential collaborations returns insight on the types of shared capacities, activities, preconditions, and value that might be generated.

Thank you for your time and energy. You made it!

If you have any comments or feedback, you can reach me at nam@wemakeshift.com