Digital Economy Ecosystem Assessment Report:

Northeast Kingdom, Vermont

June 2021

Contents

Acknowledgements

In close partnership with communities, the Rural Innovation Initiative and the Center on Rural Innovation (CORI) conduct assessments of digital economy ecosystems as part of a collaborative and iterative process to identify regional strengths and assets, challenges and opportunities, and actionable strategies for scalable growth and development.

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01) Introduction: The path toward scalable growth

What we know: Understanding your community

The Northeast Kingdom exhibits many of the key ingredients to catalyze and grow a dynamic digital economy ecosystem. The Northeast Kingdom demonstrates strengths across many key drivers and key metrics, including a strong presence of small and young firms and a solid base of remote workers in the region, an existing strong entrepreneurial culture to leverage, and invested cross-section of local institutions prioritizing this effort. In addition, the community shows early signs of an emerging tech start-up scene and entrepreneurship support system.

County Summary	
FIPS	50005
County	Caledonia
State	Vermont
ACP Typology	Rural Middle America
Urban/Rural Type	Non CBSA
Population	30,234
Pop. Density	46.6 per sq mile
Employment	14,815
Med. Income	$50,563

As a result of our multifaceted assessment process that includes the Northeast Kingdom's self assessment, the data-driven Digital Economy Ecosystem Report (DEER), and extensive community interviews and engagements with key stakeholders, the following key themes emerge:

- **Strengths and assets:**
    - Strong foundation for entrepreneurship programming through NVU and Do North Coworking Space
    - Local start-ups in the area with potential and desire to scale (ex. White Out Solutions, Northview Weather)
    - Robust web-based business activity and adequate access to technology and devices compared to peer rural communities. There is a high share of local businesses pointing to local entrepreneurial culture.
    - The Northeast Kingdom has had higher shares of remote workers (7.2%) compared to RIN communities (4.8%), VT(6.8%), and US (5.1%) (*Source: 2019 American Community Survey, US Census Bureau)*. This indicates the presence of individuals that could be brought together via tech meetups and other culture building events to kickstart the community's self-identity as a tech hub.
    - Recent industry and sector trends show some shifts towards tech-adjacent business activities. From 2013-2018, HQ/corporate operations increased more than 150% and Profesional, Scientific, and Technical Services increased more than 10%. High-growth in these sectors could have spillover effects in the broader economy to support businesses and high-tech talent pools

- **Challenges and opportunities:**
    - Number of tech and tech-enabled jobs is low compared to the rest of the state and RIN peer groups: 4% in the NEK vs. 10% across VT.
    - Support for scalable entrepreneurship needs to increase in order to boost the number of tech jobs in the ecosystem. A recent search for software jobs in Caledonia County yielded only 10 opportunities within a 25 mile radius. Scaling existing start-ups and providing the support needed to launch new ones can create more digital employment opportunities in the region.
    - More CS graduates & increased training opportunities can kickstart existing strengths in small business entrepreneurship, number of remote workers, and number of web ventures. Currently the Northeast Kingdom is in the 40th percentile in Computer Science (CS) graduates. Due to the low numbers of local CS graduates in the area, it will be important to increase opportunities for digital skilling, especially given the older population, to create new and alternative pathways for wider segments of the population to gain tech skills.
    - Access to broadband lags other RIN communities, as well as access to digital devices. Anecdotally through our interviews it was made clear that the importance of digital tools and basic understanding of the opportunities they provide is something that must be disseminated more broadly across the Northeast Kingdom community in order to get wide buy-in for Digital Economy Ecosystem building efforts.

Where we can go: Growing your digital ecosystem

As The Northeast Kingdom continues its planning, resourcing, and strategy-setting process to grow and optimize a digital economy, both short- and mid-term potential areas of focus and prioritization have emerged:

- **Enabling non-traditional paths in the talent pipeline.** Given the identified gaps and low efficiency in conventional educational attainment rates and the existing talent pipeline, more rapid, job-focused training programs could be implemented. Leveraging community colleges and existing training centers as a base, highly targeted career and industry specific certificate and skilling programs could more quickly build out the flow of talent into the community.

- **Build up entrepreneurship supports**. NVU and the Do North coworking space along with local leaders have started building the necessary infrastructure to support a scalable tech economy. Highlight the successes already present in the community in order to draw both attention and talent to the ecosystem. Widen the top of your funnel through culture building events to develop more tech talent and foster a culture of innovation amongst the broader Northeast Kingdom community.

- **Shore up digital workforce & pair with start-ups.** Individual communities have started engaging K-12 youth in tech, but there needs to be a strategic effort around

collaboration or creation of a pipeline to ensure these individuals stay engaged as they get older and pursue careers in tech. There could be room for a regional leader to roll out standardized programming that helps curate this pipeline and engages youth from across the Northeast Kingdom. Leverage your strong traditional entrepreneurship programs and spaces to create tech startup-specific programming that is welcoming of the diverse aspects of your community.

This report will:

- Outline the approach and key activities of the assessment process
- Provide an overview of community context and economic baseline and foundations
- Present key insights and data indicators organized by CORI's Direct Drivers
- Summarize conclusions and next steps

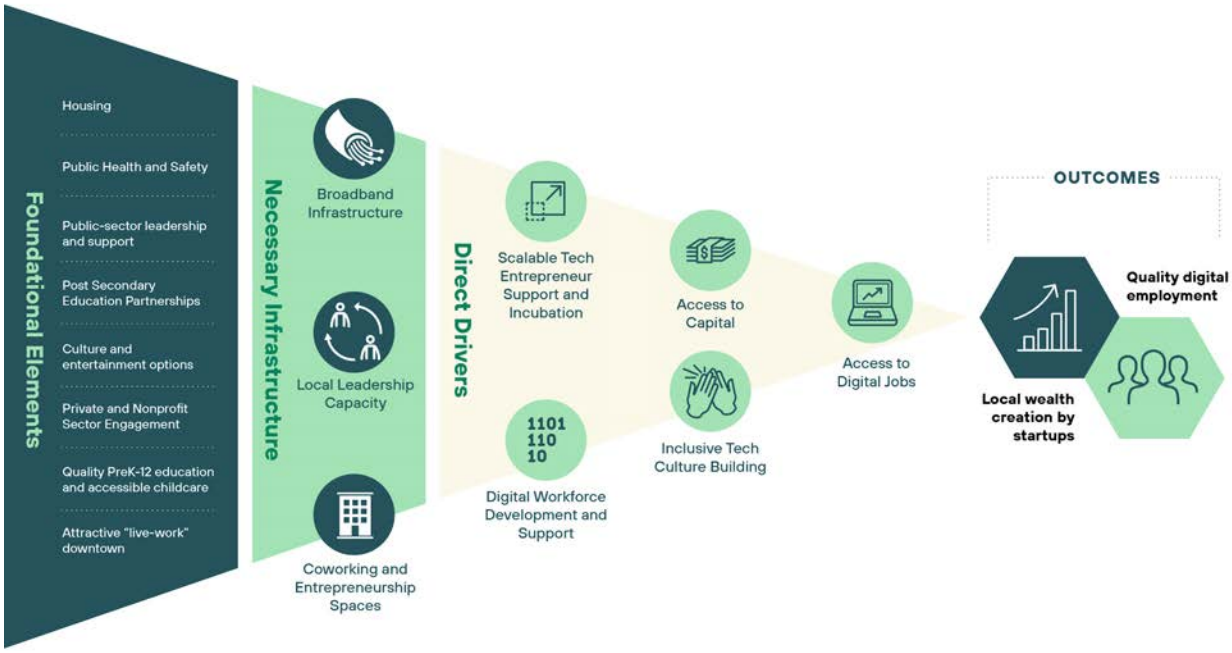
02) Assessing the Northeast Kingdom's current position and potential

Community Assessment Activities

Community Self-Assessment	Digital Economy Ecosystem Report (DEER)	Review of Current Economic Strategies/Reports	Community Interviews
• Benchmarking digital economy ecosystem survey • Self-assessment and scoring for each aspect of DEE model, including identification of assets, gaps, and opportunities	• Analysis of digital economy data indicators related to digital employment and entrepreneurship		• interviews with community stakeholders about challenges and opportunities for local tech entrepreneurs and the digital workforce

The Digital Economy Ecosystem (DEE) Model

A cornerstone of the community assessment process is understanding a region's current state and position and its growth potential through the lens of the CORI Digital Economy Ecosystem Model. The Model is grounded in the underlying principle that healthy digital ecosystems offer promising and accelerated paths to broad based economic growth, the creation of high quality and durable jobs, higher productivity, and local wealth creation.



The Model includes the following components:

- **Foundational Elements:** The key structural elements of the built environment within a community, such as housing, community density, cultural and social amenities, an attractive "live-work" downtown, etc. that enable a digital economy ecosystem to

thrive. While the configurations of these elements are unique and will vary by community, gaps or weaknesses should be thoughtfully considered and addressed to set these base conditions that can foster diverse and thriving digital ecosystems.

- **Necessary Infrastructure:** Including broadband, coworking and entrepreneurship spaces, and local leadership capacity and other imperatives for communities that will support workers, small and start-up businesses, and residents. Gaps or weaknesses in the infrastructure assets communities will stunt local wealth creation and quality digital employment.

- **Direct Drivers:** Key enablers for communities to successfully compete in the digital economy that build local capacity and provide access to digital jobs, capital, and workforce development and support.

Pillars of a Digital Economy Ecosystem Building Journey

CORI organizes the key components and process steps of ecosystem building into 7 pillars and benchmarks to track progress through the phases of technical assistance from community assessment, strategy development and execution, and beyond.

These 7 pillars are:

1. **Leadership Organizations.** The relevant conveners and connectors in the community to define and clarify roles, drive the workstreams related to the journey, and devise the execution path for the digital economy ecosystem strategy.

2. **Steering Committee.** Identified by members of the leadership organizations, a committee or advisory group of cross-sector partners and stakeholders to collaborate through the participation planning process.

3. **Evidence-based Decision Making.** The process for collecting and analyzing data to understand the current state of the community, identify priorities and areas of focus, guide decision-making, and inform program development and resource allocation.

4. **Resources.** The essential human and financial resources required to ensure that strategies and plans progress towards execution and on-the-ground impact.

5. **Digital Economy Ecosystem (DEE) Programs.** The tailored set of programs and initiatives designed to address community gaps and needs and achieve strategic goals.

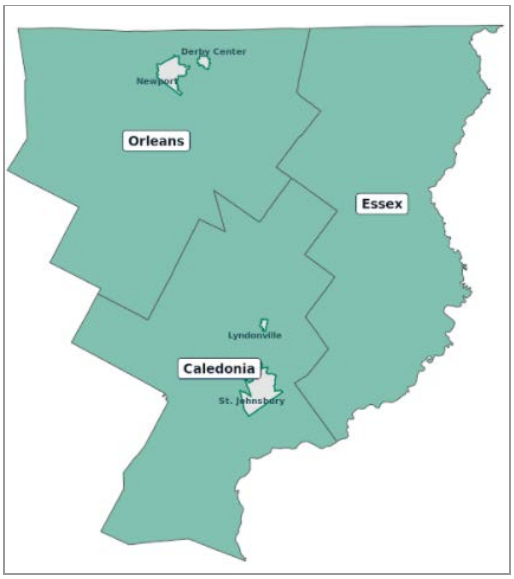
6. **Infrastructure & Facilities.** As gaps and opportunities are identified, the planning and execution on the creation of the physical spaces and other aspects of the built environment that will support the digital economy ecosystem and innovation hub.

7. **Shared community vision.** The articulation of the shared priorities and goals for the digital economy ecosystem and coordinating and expressing the community's commitment towards building a tech economy and an inclusive tech culture.

03) The Northeast Kingdom in context

Community overview

Located in the Northeast most corner of the state of Vermont and bordering New Hampshire and Canada, the Northeast Kingdom is comprised of three counties, Caledonia, Essex, and Orleans. The regional economy's largest economic sectors are the public sector, health care, and retail, followed closely with a specialization in manufacturing.



Anchor communities, St. Johnsbury and Lyndon, the focus of this report, have many of the foundational elements in place to begin building out their digital economy ecosystems. Attractive live-work downtowns with cafes, breweries, and entertainment paired with the local presence of Northern Vermont University make for a vibrant community atmosphere.

However, some challenges remain. Key among them is a lower incidence of broadband use and access region-wide, as well as disparate access to technological devices, which may disadvantage startups and established firms in the area. An abundance of funding opportunities for broadband network development over the next 12-24 months however may help alleviate these challenges.

Benchmarking against peer communities across the US

Given the unique economic and social character, scale, and geographic variability of rural places and communities, it is important to assess strengths, challenges, and overall digital economy readiness against peer communities. These are communities of similar composition, located in non-metro and rural areas, and generally share aspirations and goals to build-out their digital economy ecosystems. To draw out the most appropriate and useful insights, we conduct our qualitative and qualitative analyses and compare against CORI's twenty-one Rural Innovation Network (RIN) communities. These are communities that have journeyed through the Rural Innovation Initiative (RII) assessment, strategy, and technical assistance paths and have demonstrated a commitment to catalyze and grow their digital economy ecosystems.

Benchmarking against RIN communities

Rural Innovation Network (RIN) community members joined the network after demonstrating an ongoing commitment to the development of their digital economy ecosystems through the Rural Innovation Initiative.

- Ada, Oklahoma
- Cape Girardeau, Missouri
- Cedar City, Utah
- Durango, Colorado
- Emporia, Kansas
- Independence, Oregon
- Marquette, Michigan
- North Iowa region, Iowa
- Pikesville, Kentucky
- Pine Bluff, Arkansas
- Platteville, Wisconsin
- Portsmouth, Ohio
- Red Wing, Minnesota
- Shenandoah Valley, Virginia
- Springfield, Vermont
- Taos, New Mexico
- Traverse City, Michigan
- Waterville, Maine
- Wilson, North Carolina

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Economic baseline/foundations

This section outlines our topline takeaways regarding Franklin County's economic foundations for building a Digital Economy Ecosystem from your comprehensive Digital Economy Ecosystem Data Report here.

Report focus

	Northeast Kingdom	VT	US
Population change, 2010-2019	-2.3%	-0.3%	6.3%
Total employment, change, 2018-2019	1.5%	0.0%	1.6%
GDP, 2018 (per capita)	$38K	$53K	$63K
Poverty rate, 2019	13.3%	10.2%	10.5%

Source: State & County Quickfacts, US Census Bureau, 2019, BEA

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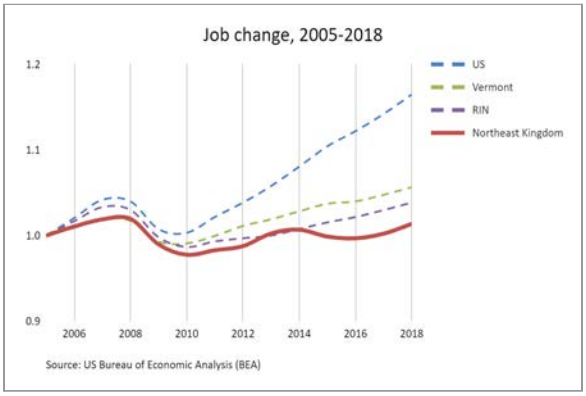
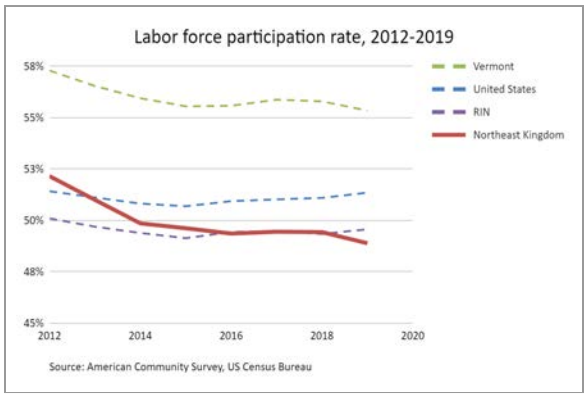
- Population, employment, and workforce vitality and productivity

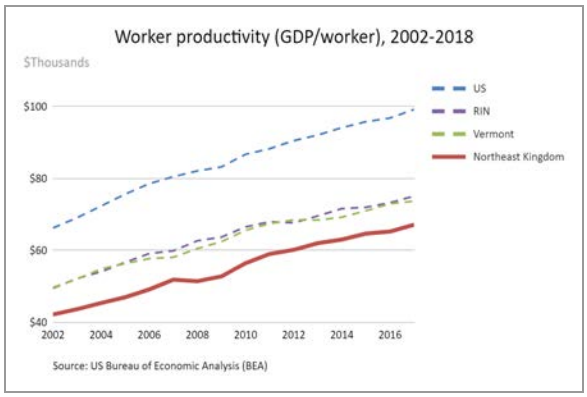
    - **The Northeast Kingdom has experienced sustained job and population loss.** For more than a decade since the 2008 financial crisis, the counties that make up the NEK haven't recovered as robustly as Vermont or CORI's Rural Innovation Network (RIN) communities. From 2010-2019, the NEK's population contracted by more than 2%. In terms of jobs, while the NEK once kept pace with similar rural communities in the US, it began to lose ground in 2014. The most recent job numbers, however, do indicate an uptick in total employment of 1.5% in 2019.



    - **Workers participate at similar levels to other rural communities, but are more disengaged than VT overall.** Labor force participation, defined as those employed part- or full-time or unemployed and actively looking for work, is a key indicator of the industry to skills matching in a region and the health of the dynamics of labor supply and demand. While labor force participation has generally trended downward nationally, the NEK's rate of 50% is on par with other rural communities, but is lower than VT's rate of 55%. As this may be an indicator of a more pronounced skills mitmach across the region, it does present an opportunity to invest in and leverage targeted training and re- and up-skilling programs for workers across their career lifecycle, beyond traditional secondary and post secondary education.

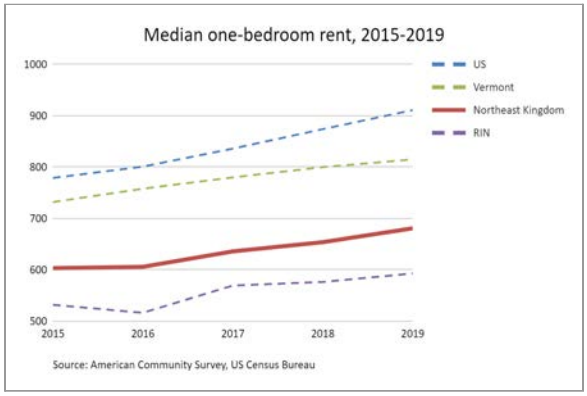


- **Worker productivity is rising, but still lags similar rural communities and Vermont.** Worker productivity has risen in the NEK from $42K/per worker in 2002 to $69K/per worker in 2018, tracking upward growth trends in other rural communities and in Vermont. High rates of worker productivity are an indicator of the presence of high quality, wealth creating, and durable jobs. But other rural communities and Vermont have higher productivity overall.



- Housing costs and affordability

  - **Lower real-estate and housing costs in the NEK are a competitive advantage in attracting workers from higher cost locations in Vermont.** Especially as companies and workers have evolved engendering more remote- and home-based work opportunities, lower cost locations with the ability to support these workers are increasingly competitive. In the NEK, median 1- bedroom rent of $681 is 18% lower than VT and 29% lower than the US. Not only could this attract workers from other parts of Vermont, but younger untethered workers and families seeking for lower housing costs from across the region.



- Broadband infrastructure

  - **Broadband availability lags many comparable rural communities across the US.** Benchmarking broadband availability and usage against similar rural communities shows that NEK counties lag on both measures. In Caledonia County for example, only 77% of the population has access to basic broadband. Compared to the US average of 90% or more.

- Perspectives from the community

    - “The economic story of the North, well our theory is, we never hit the real real lows, and we never hit the real real highs. We kind of chug along, you know there's an up in the economy, we might see an uptick, if there's a downtick in the economy, we might see a bit of a downtick, but we've been fairly steady as a business” — Florence Chamberlin, local tech business owner

    - “...Very little has changed, so people were used to having that conversation and hearing people talk about change and not seeing anything...And so I think there, whatever is done if you want buy-in then you really have to show people that it can be successful and give them tangible examples of that type of success and what that means to them.” — Evan Carlson, Co-founder of Do North Coworking

04) Focus on the five Direct Drivers

Based on CORI's experience working with rural communities across the US, in addition to the foundational and infrastructure elements, our model features five direct drivers that are at the core of building sustainable and thriving digital economy ecosystems to drive long term job growth, wealth, and prosperity.

The keys to local wealth creation and increasing high paying, high-quality, and "durable" tech jobs through the digital economy are the following five drivers:

- **Scalable Tech Entrepreneur Support and Incubation:** Fostering a dynamic and innovative environment and community for start-up founders and aspiring entrepreneurs to connect and collaborate with local peers, established leaders from the business community, and access to labs, project shops, and other work spaces.

- **Digital Workforce Development and Support**: Providing learning and development opportunities from local students and workers from across the career spectrum. This driver focuses on establishing and maintaining both traditional and non-traditional learning paths to provide the local digital economy with skilled and talented labor pools.

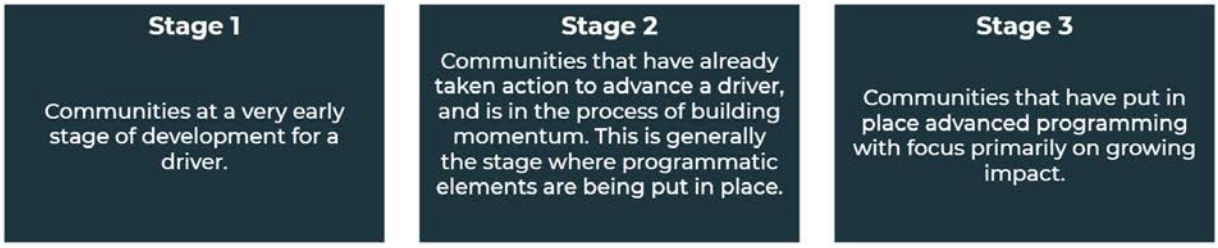
- **Access to Capital:** Creating an environment where burgeoung entrepreneurs and start-ups have exposure and access to seed, angel, or more traditional funding mechanisms. This driver focuses on the funding necessary to ramp up operations, hire, and scale.

- **Inclusive Tech Culture Building:**
  Building a strong, inclusive tech culture and community through programming that encourages people from diverse backgrounds to participate in the digital economy. This driver focuses on ensuring that communities are strengthened through broad based involvement across racial, gender, socio-demographic, and other groups.

- **Access to Digital Jobs:** Giving workers the necessary skills and technology tools to expand career opportunities from both a sector and geographic perspective. This driver allows access to higher-paying, tech-focused opportunities, be they to support local companies and ecosystems as well companies that may be located elsewhere.

The three stages of development for direct drivers

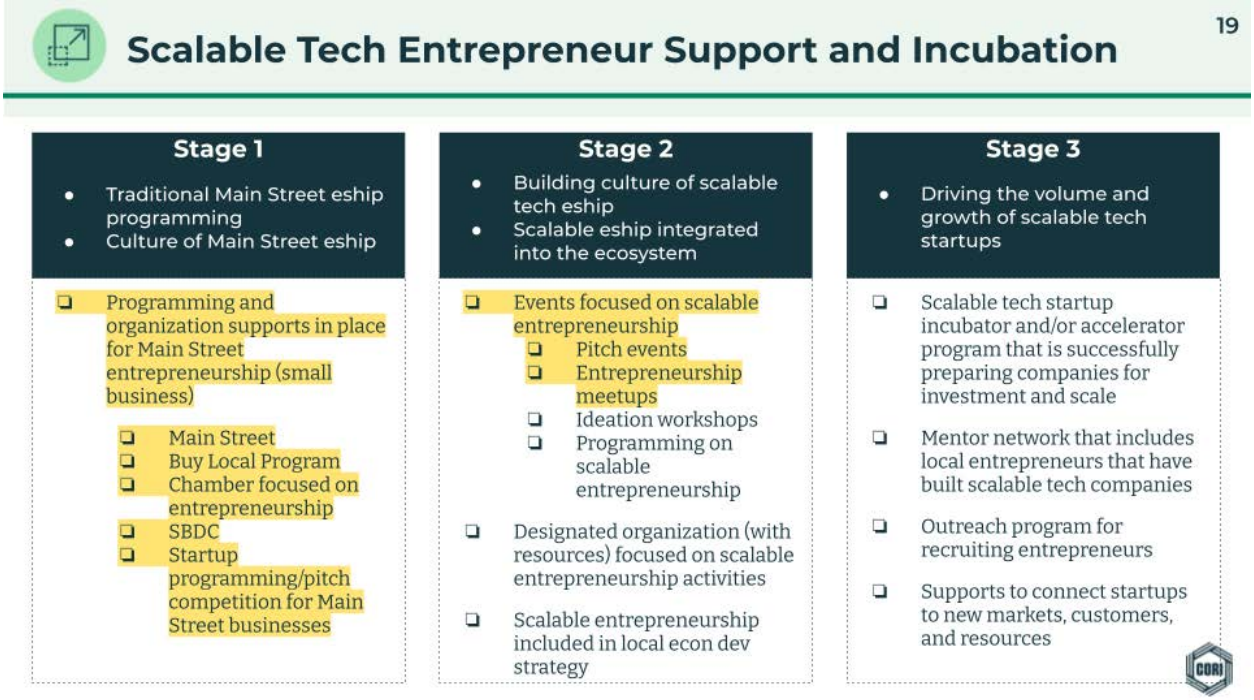
To assess digital economy readiness and potential, the current state of and the environment for each driver is examined. There are different categories or stages of driver maturity and representative programs for each of these 3 stages of development. The programs outlined are potential options that your community can consider to progress from one stage to another. Communities can vary across the spectrum of stages for each unique driver.



For each Direct Driver, your core team provided an initial score based on your self-assessment. Based upon our completed analysis, we have provided you with an updated score and rationale below per driver.

1) Scalable Tech Entrepreneurship Support and Incubation

- Driver stage scoring
    - Community's self-assessment score: 2
    - CORI's score: 1.5
        - Note: All programs highlighted in yellow in the image below were confirmed as present in your community to demonstrate our rationale for your community's score.



- Key findings and learnings

  The Do North co-working space is a key strength in the region, providing access to reliable high-speed internet access, a place for entrepreneurs to exchange ideas, and as a venue for events and networking. This is a vital resource to maintain and can be used as a foundation upon which to build more robust scalable entrepreneurship programming, such as mentoring, community outreach, and an accelerator program. As discussed during the presentation, Do North does not have to be *the* place for these activities, but the function that Do North currently plays in the ecosystem is vital. Giving these activities a home anchor, either through Do North or elsewhere, will also facilitate tracking and strategic planning for scalable entrepreneurship by the region's economic development apparatus.

- *Gaps & Challenges to Address*

    - Lack of an organized database of entrepreneurial mentors (they are here) and accelerator/incubator program(s).
    - The community lacks a real accelerator program.
    - Limitations:
        - Access to angel investors
        - Access to venture capital/seed funding
        - Access to workers with digital skills
        - Access to startup training (e.g., lean startup training)
        - Access to broadband
        - Access to mentors
    - Lack of tech culture and awareness that these types of business can be successful here.
    - Despite having a strong foundation for an incubator program, the Do North co-working space does not have a designated incubator membership track.
        - No regular digital skilling offerings, no mentorship programming, no business support for start-ups.
    - Turn-out and support for these entrepreneurship events has been variable, certain events have benefitted from built-in support of external partners and enjoyed great turnout, but for other events where turnout was expected to be high there was still difficulty drawing audiences.
    - Engagement in these events by the local CS students has been low, a challenge that faculty and Do North leadership haven't had the bandwidth to try to untangle.
    - Do North's success relied heavily on the awesome leadership of Evan Carlson who is stepping down, so ensuring continuity of vision and leadership will be very important to keep up the momentum that Do North has built.
    - Not a clear pipeline for new talent to come through - local schools don't produce a lot of graduates with these interests, and when they do these graduates still do not always stay in the region, St.Johnsbury academy graduates for example.
    - Unclear scalable entrepreneurship/business support mechanism, although there is an SBDC through the college.

- *Potential Solutions to Explore*

    - Position a central downtown location (e.g. Do North) as the designated

organization focused on scalable tech to create a one-stop shop
    - Create a local program focused specifically on scalable tech entrepreneur support and incubation
    - Build off momentum of previous entrepreneurship/tech network such as the "Future of Forestry" hackathon, the Road Pitch event, and other Tech meetups
- Leverage your county & Core Team partners and coworking/makerspace locations to build a clear, accessible journey for NEK residents to follow, starting with:
    - Tech ideation workshops targeting diverse target audiences (e.g. artists, recovery community, seniors etc.)
    - Startup weekends and/or incubator programs tied to pitch events.
- Before launching a full incubator or accelerator program, dedicate staff resources to promising startups to provide custom wraparound support and serve as connectors to the ecosystem (e.g. mentors, legal services, accounting, space).
- Wrap-around supports for local entrepreneurs:
    - Establish a mentor network, work them into the programming of the Incubator
    - Build in supports to connect startups to new markets, customers, and resources
    - Supports for navigating the funding and investment processes
- Leverage local partners to create a well-branded outreach program in order to strengthen the pipeline of tech entrepreneurs into the ecosystem.
- Outreach program should extend to not just the existing tech and tech-adjacent professional population, but to other local groups too such as seniors, agricultural workers, or others in order to ensure equity of access and diversity of membership in entrepreneurship and skilling programs.

- *Assets & Partners to Engage*

    - NVU and Do North
    - Evan Carlson and Jay Shafer as local entrepreneurs with tech start-ups already established
    - The local NVDA and VT SBDC Office to keep track of the entrepreneurs that are in the area, and also to track potential mentors and resources specifically for scalable entrepreneurship and business services
    - The Foundry's makerspace as another onramp for entrepreneurship programming

        - NEK Entrepreneurship Week. This event presents another opportunity to get the word out about scalable tech and provide a platform for some of the storytelling and outreach around the possibilities that scalable tech could provide as a career pathway in the region. There are many successful startups and small businesses in the area whose stories can intersect with the Digital Economy Ecosystem journey, and highlighting the wins at public events like this will help bring visibility to these intersections.
        - Directly engage the strong small business community present in the region to explore tech ideas and explore scalable solutions to some of their own business pain points. This will leverage the county's high shares of:
            - NEK workers (28%) employed by small, owner operator businesses. Our Rural Innovation Network counties stand at ~20% (US Bureau of Economic Analysis).
            - Employment in firms of 50 or fewer employees (44% vs 39% in VT), evidencing a healthy network of small businesses and entrepreneurs.

- Perspectives from the community

    - "If it wasn't for the startup community in Burlington, I wouldn't be where I am today. There's no question about that. We went through the launch Vermont accelerator cohort like three years ago, and we went, we won second place, and we met some really good people, so I'm pretty well networked and connected. Vermont's a small place right. So, if all I had was the kingdom, I wouldn't be where I am, because it would just be kind of, you know, staring in my belly button, trying to figure out what I'm doing." — Jay Shafer, entrepreneur/founder of Northview Weather & professor at NVU in Atmospheric Sciences

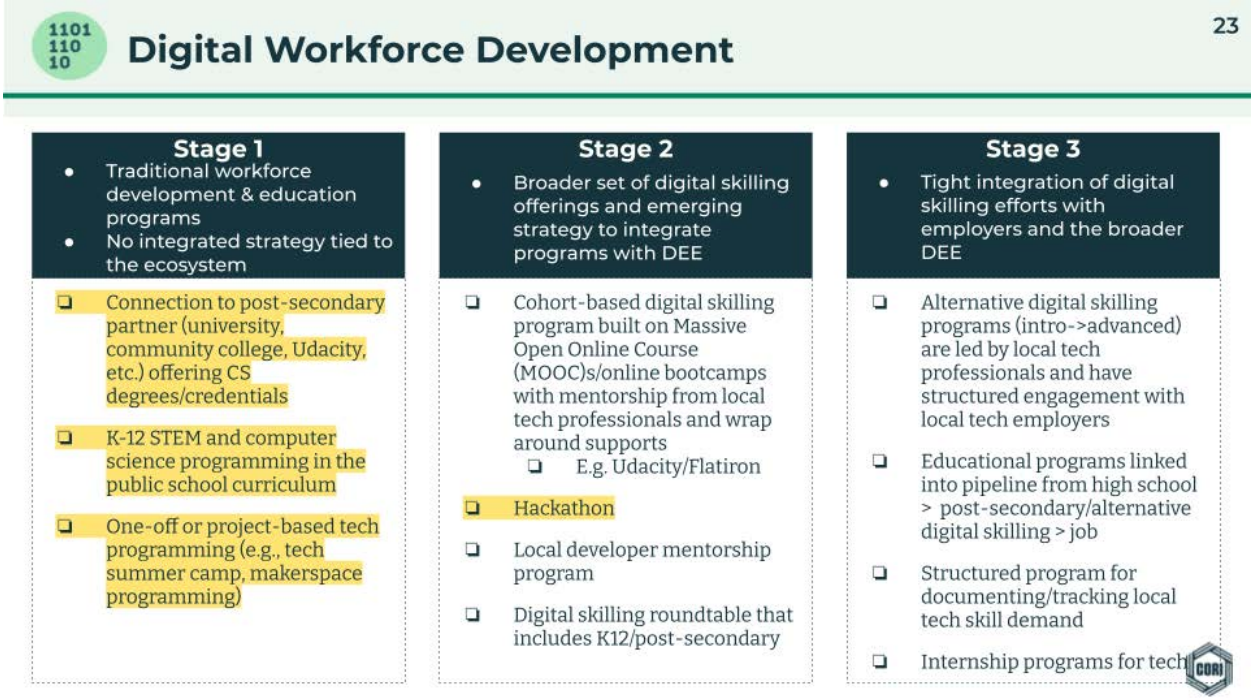
    - "The co-working space, they've done a little bit of things along those lines, like a hackathon, and I think we've had a meetup or two, and are heading in that direction... I think the social component and that isolation piece for me that's one of the hardest things I feel pressure on. Like I feel all alone trying to solve these things and I have mentors and people I can call on but it takes a little more effort than having people that are kind of around you or in your backyard." — Jay Shafer, entrepreneur/founder of Northview Weather & professor at NVU in Atmospheric Sciences

    - "I knew that space was in a good place when a company there could hire me with a real salary ... That was helpful ... The other thing, too, is that, you know, I

strongly believe that we need to have businesses that scale in our region. And if my job with this company is to really help scale it, then I can also be helping the overall mission of the co-working space in the region by scaling this business successfully." — Evan Carlson,

2) Digital Workforce Development and Support

- Driver stage scoring
    - Community's self-assessment score: 2
    - CORI's score: 1
        - Note: All programs highlighted in yellow in the image below were confirmed as present in your community to demonstrate our rationale for your community's score.



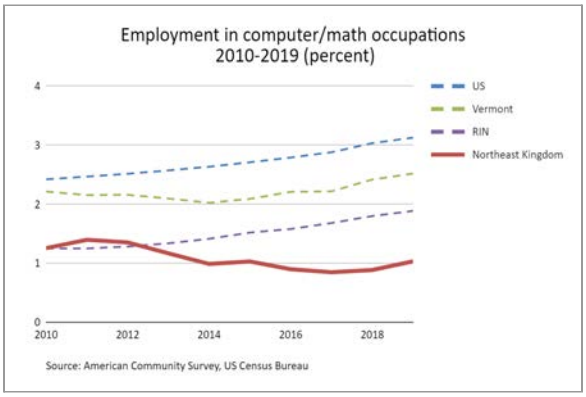
- Key findings and learnings

  There are some very strong local educational opportunities through both NVU and St. Johnsbury Academy and Lyndon Institute, however despite these resources there is not a clear pipeline from K-12 through higher education to local career opportunities in tech. The region could benefit from a clear strategic vision aimed at ensuring broad and equitable access to a range of skills training in both technical fields and entrepreneurship. Having alternative educational offerings like coding bootcamps, summer camps, or extracurricular activities would provide multiple inroads for young people in the community to get involved and interested in digital economy careers, additionally these could be used to diversify membership and event participation through proactive/ targeted community outreach. St. Johnsbury and Lyndon Institute both already offer online career training programs in computer science, which could be leveraged and paired with a mentorship program to connect

students with professional networking opportunities, career guidance, connections to the entrepreneurial ecosystem more broadly.

- *Gaps & Challenges to Address*

  - There are currently low levels of existing digital employment and growth in tech or tech adjacent sectors that could support a digital economy.
  - Levels of employment in computer and math occupations have declined. As recently as 2011, the NEK had shares of employment in computer and math occupations that exceeded that of similar rural community peers. By 2019, however, this strength had eroded so that other rural communities across the US had double the share of workers in these occupations compared to the NEK.



  - Lack of digital skilling for adults not enrolled in higher education, and even for those who are enrolled, courses are not always offered at NEK locations (St. Johnsbury and Newport) or with enough frequency to allow for consistent enrollment or access.
    - There are CS skills taught in various different programs across NVU, but there isn't necessarily a unifying vision across the school when it comes to digital skills. Instead there's the CS dept (with only one full-time faculty member to oversee 28 courses) and then one-off skills taught in other departments (like in atmospheric sciences, or in the art dept), which means that the tracks are largely siloed off from one another.
  - Not enough high school programs that provide digital skills training or adequately prepare students for this career path. No clear pipeline. From interviews we conducted, it seems like the impression of tech coming out of the K-12 system is heavily skewed towards IT, and less development or coding as career paths.
    - No clear connections between the local schools, higher ed, and then employers. Also unclear who the local employers are/would be in this area
    - There don't seem to be strong STEM or CS programs in the public k-12 system
  - No formal mentorship programs currently exist, either for students or

for entrepreneurs.
        - Currently no resource exists to track tech and/or employer needs related to tech, or to document the demand or supply of these types of talent in the area.

- *Potential Solutions to Explore*
    - To better serve the community and provide alternatives to Bachelor's degrees or having to go back to school, seek to expand non-traditional learning programs and pathways such as highly targeted certificate and skill training programs for technical, math, and computer science occupations.
        - In order to more effectively engage community members, these programs should be tied to employers and/or make the career pathways very clear. Develop Internship programs to connect individuals coming out of school or training programs with the job pipeline as soon as possible
        - Incorporate mentorship programs into this effort to strengthen it, since visibility of tech/entrepreneurship careers seems to be a need in the region
        - Connect to alumni networks — currently there is no tech-based network, but this could be created
    - Provide a local presence of a national digital skilling partner that provides tuition assistance (e.g. Flatiron) that includes peer support and other wrap around services such as follow-on job search support.
        - For adult learners participating in skilling programs, engage local tech workers to create a developer mentor program that pairs adult students with established tech workers. These relationships can encourage program completion and open doors to more local and remote job opportunities upon completion of the program.
    - Host discussions about digital skills, tech career pathways, access to jobs etc. with people involved in workforce development, such as SBDC advisors, case managers, career counselors and staff from the local adult learning center. Use these conversations to promote more understanding of what DEE entails and what kinds of career pathways are possible.
    - Increase one-off or project-based tech programming (e.g., tech summer camp, makerspace programming), especially as a way to engage younger residents and pique their interest early.

- *Assets & Partners to Engage*
    - Northern Vermont University - Lyndon (NVU)

- Community College of Vermont (CCV)
- Vermont Career & Technical Education (CTE) Centers
- Vermont Training Program funding
- For K-12 Schools:
    - Programming/computer science
    - Mechatronics lab - North Country Career Center
    - Makerspace- The Foundry @ Lyndon Institute (IL) is metal fabrication and woodworking focused)
    - Computer & Network Technology (program @ North Country Career Center)
    - Computer Programming & Game Design (program @ North Country Career Center)
    - Web Development (class @ Lyndon Institute class)
    - Computer Science (several courses @ St. Johnsbury Academy)
- Despite very busy schedules, Bradley Beth and Shawn Tester were great community advocates for building out onramps for K-12 and college student populations. Both serve on local school boards or committees. Bradley in particular is an amazing community resource in terms of his knowledge, especially when it comes to scalable curriculum development for highschoolers and college students, however being the only full-time CS faculty responsible for 28 courses his limited time and bandwidth do pose a challenge.
- St. Johnsbury Academy and Lyndon Institute, given their robust offerings and facilities in addition to their adult education CS offerings they should definitely be leveraged (funding incentives exist for these from CEDs alignment - would be helpful for this information to also live with the SBDC advisors if it doesn't already).
    - They both also offer STEM/robotics tracks and programs, which could potentially contribute to the local talent pipeline if students are engaged and given the opportunity/reason to stay local or come back after college.
    - These schools also present alumni and parent network opportunities that could contain mentors or potential investors with ties to the NEK
- It appears that Hazen Union HS received funding in 2018 to help with the job pipeline and entrepreneurship education. They're a little far off in Hardwick, but casting a wide net for prospective students and to promote regional events would be a good way to increase visibility.

- Perspectives from the community

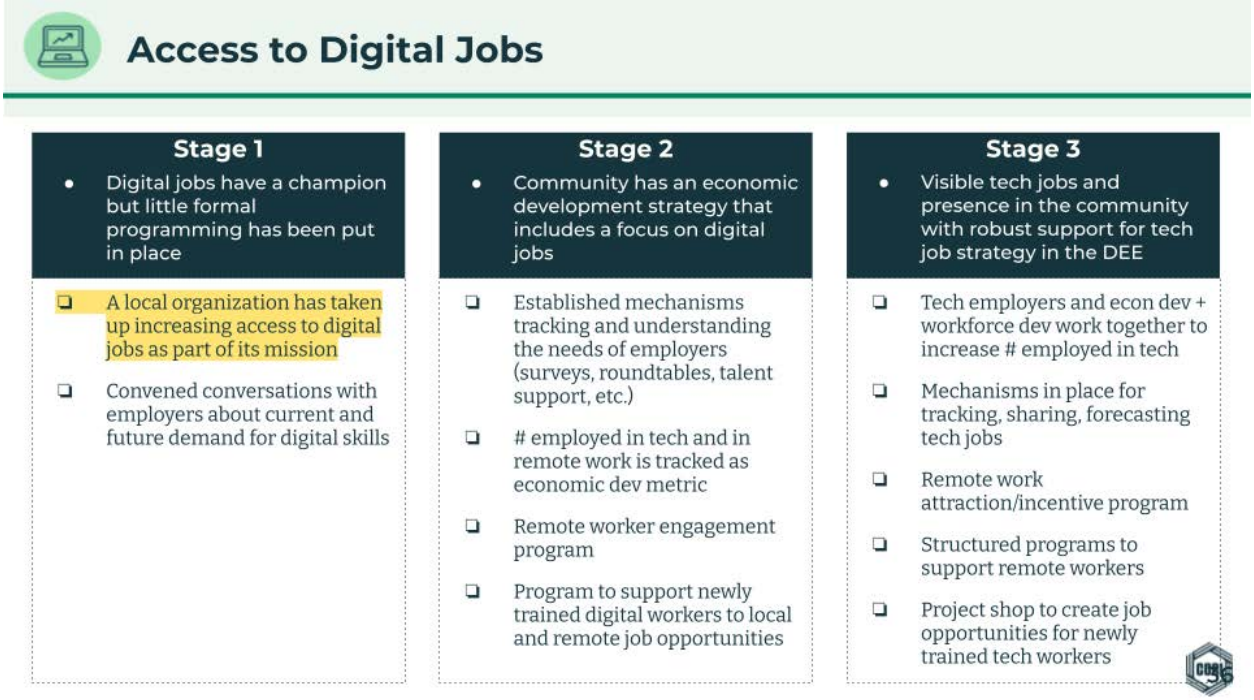
- “Honestly, if I could pick one target, it would be. The high schools in the area. It's kind of unreasonable to expect students to even have any idea what this discipline or field entails. Given the lack of exposure they get until they're, you know, they're 18 years old they step out of high school, they've never had any kind of experience with software development or engineering or anything...Using devices isn't enough, because it's just an appliance to students growing up these days. It's like using the refrigerator doesn't make you want to dig deeper into the refrigeration technology, it's the same thing with using phones and laptops, it's not enough. But I think that's a misconception that a lot of people have. It's: "well students, they've grown up in a digital world so they're interested in this.” And they're just not” — Bradley Beth, CS Professor at NVU

- “And, and I think your digital economy concept can fit really well in the sense that, you know, you may not need to have a bachelor's degree to go be a code jockey..And as you layer in that broadband, you know you can let those kids have their careers here, while leveraging those skills. So, that to me is the single most important thing we can do is explore how we support our high schools to develop much more robust programs to get kids out of high school with either certificates or, or some kind of an Associate's level degree, and let them start contributing meaningfully to their careers.” — Shawn Tester, Board member of the NEK Collaborative and CEO of the regional hospital

- “Very few people (are participating). Majority of the businesses that people that show up for any of the programming that we do are much more of the solopreneur, Mom and Pop type things that they want to start, have had very, very few digital technology people come to our door and actually tried to take advantage of anything we offer, and some of that is our own positioning and our own, you know, lack of ability to actually get the word out, affected by, and also there's not enough people in this region that are actually well versed enough in to be able to actually do this type of work” — Evan Carlson, Co-founder of Do North Coworking

3) Access to Digital Jobs

- Driver stage scoring
    - Community's self-assessment score: 1
    - CORI's score: 1
        - Note: All programs highlighted in yellow in the image below were confirmed as present in your community to demonstrate our rationale for your community's score.



- Key findings and learnings

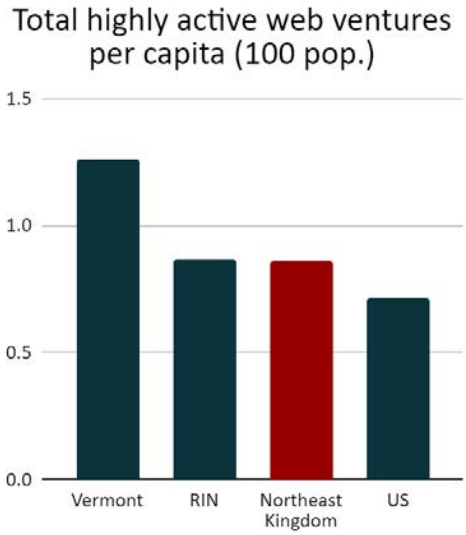
    - *Gaps & Challenges to Address*
        - Large shares of the population have limited or no access to the technology and other tools needed to actively pursue and engage in remote work. 16% of NEK residents had no access to a digital device such as a laptop in 2019, as compared to 10% in Vermont as a whole.
        - A number of tech employers in the area are small in scale, employing only 1-3 tech workers each. Despite the presence of some larger manufacturing employers in the region, there is no clear tracking mechanism for either the types of skilled labor needed by employers in the area, nor is there tracking of the tech talent or digital workforce beyond informal networks. There is a need to identify who in the area

could take on this role as a bridge between employers and the workforce, and who in the area could take on remote worker incentive programming.
        - Lack of local tech businesses with employment capacity, e.g. website development companies that employ only 1 or 2 people.
    - Broadband availability and usage is inconsistent across the community which limits access to remote work and to technology and professional jobs that require higher bandwidth (e.g. software coders, CAD, etc.)

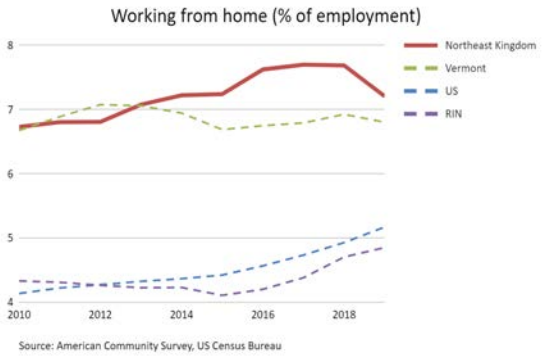
- *Potential Solutions to Explore*
    - Track existing tech workers and job opportunities in the region, and engage in conversations with employers about current and future demand for digital skills. Then, use this information to establish a mechanism for tracking, forecasting, and disseminating these needs.
        - Identify what organization locally or regionally could make this a focus of their work
    - To understand current demand and number of remote and/or tech workers in the area, this organization or collaborative could:
        - Establish a mechanism for tracking and understanding tech demand from local employers via surveys, roundtables, etc..
        - Track # employed in tech and remote work as part of your local economic development metric, while building a list of known tech and remote workers as supports to begin fostering a tech community.
        - Consider a remote worker engagement program and marketing campaign that would draw people to the area.
        - Build a program to link newly trained digital workers to remote and local job opportunities and internships.
    - Create a resource hub that either directly helps or connects tech workers to career coaching and local or remote digital jobs. This hub should serve as a one-stop shop for local professionals and potential newcomers to the community to learn about tech opportunities in the region.
    - Fostering startups through entrepreneurship helps to help grow the number of jobs in the ecosystem, connecting newly skilled tech workers with startups through internship programs or permanent employment.

- *Assets & Partners to Engage*

- The volume of activity in web-based ventures and businesses matches or exceeds that of other rural communities and the US. Entrepreneurs and companies operating in digital tech economies depend on the web to access customers and suppliers and for their own business collaboration and operations. Across the three NEK counties, the levels of registration of more highly trafficked, business websites are higher than that of the US and comparable rural communities. For the NEK digital economy, this translates into broader access to both local and non-local markets as well as the opportunity for entrepreneurs and other smaller web businesses to establish their operations



- There is an established presence of small businesses and owners and home-based and remote workers. Compared to Vermont, other rural communities, and the US, the NEK has relatively higher shares of small businesses, the self-employed, as well as a strong base of home-based workers. A large part of the economy are small businesses as 44% of workers work in companies of 50 employees or less. Small businesses are often home-grown and are more likely to be entrepreneurs and founders of start-ups. In addition, the self-employed and those working in proprietorships account for 28% of employment, 4% more than Vermont and 7% more than comparable rural communities. There is also a solid foundation of remote workers as more than 7% of total employment is fully home-based, above the 5% share for both rural communities and the US. This indicates a workforce that is comfortable and skilled with that style of work and can utilize the technology and tools that enable it.

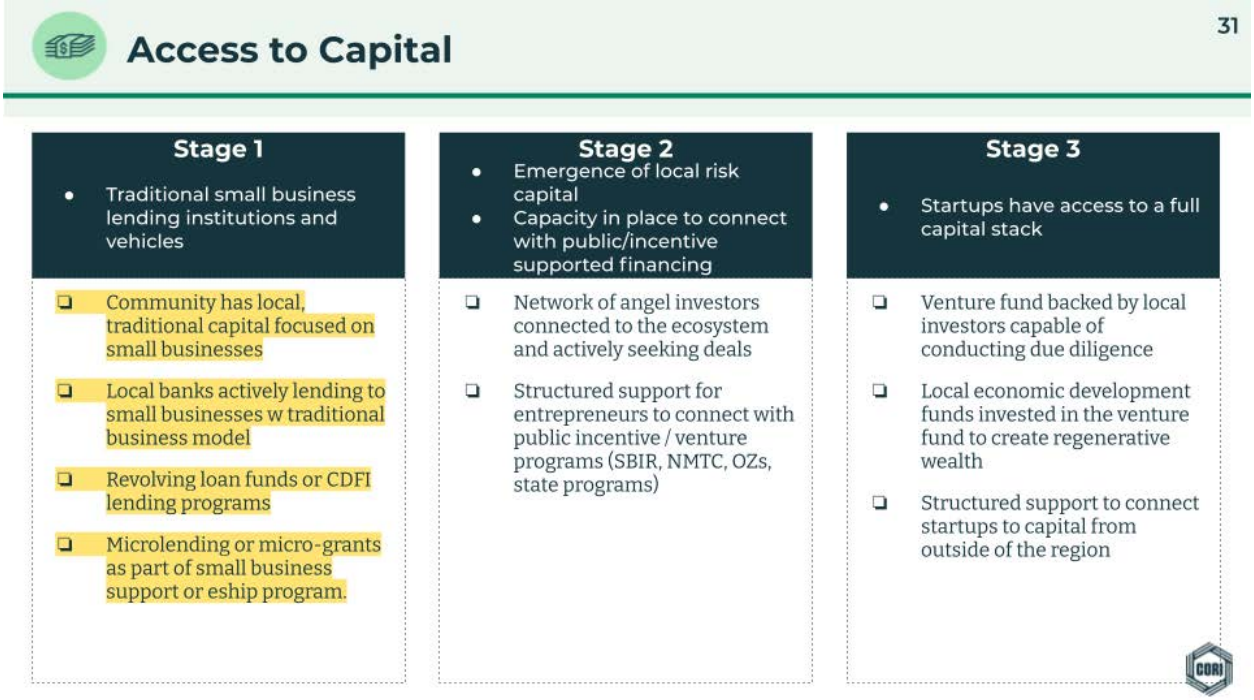


        - Conduct outreach to HR and staffing offices of local advanced manufacturing companies (NSA Industries, Precision Composites, Weidmann, etc.) to understand their qualification needs and their demand for tech workers locally
        - Engage small local web development businesses such as Flek, Inc and Northeast Kingdom Online
        - Engage the NVDA and their economic development partners, including the local Chamber of Commerce and NEK Collaborative. Any of these groups could serve as the tracking entity for these Digital Jobs metrics, but all of them should be well acquainted with any resource hub that emerges from this initiative so that they can all act as front doors for community members who could benefit from these resources.
            - The NEK Strong resource hub could be leveraged as either a temporary or long-term home for these resources

- Perspectives from the community
    - "So, I pay it forward, I mean every entrepreneur that I know likes to talk about what they do and the problems that they've solved so, like, I'd love to help open up the possibilities for others" — Jay Shafer, Entrepreneur and Founder of Northview Weather & professor at NVU in Atmospheric Sciences
    - "Well here's the, here's the thing I think people don't understand the value of technology I think a lot of businesses may be owned by people that just are still in denial that it makes a difference, and also the cost involved, that a lot of these sorts of mom and pop businesses are single sole proprietorships that are trying to do everything" — Florence Chamberlin, local tech business owner
    - "...we send our best and brightest off to college in Boston or New York or, you know, wherever. And then guess what happens, they don't come back. Right? You know, it's really scary that what we thought was best intentions has actually contributed to the demographic challenges we have in this area. So, if we can find a path to giving some of those best and brightest opportunities right here in Northeast Kingdom, we'll keep them, and we'll help grow our economy by making them contribute here" — Shawn Tester, Board member of the NEK Collaborative and CEO of the regional hospital

4) Access to Capital

- Driver stage scoring
    - Community's self-assessment score: 1
    - CORI's score: 1
        - Note: All programs highlighted in yellow in the image below were confirmed as present in your community to demonstrate our rationale for your community's score.



- Key findings and learnings

  The local network of founders and entrepreneurs and investors is disconnected and does not have robust platforms to meet, collaborate and explore financing opportunities. The co-working space provides an excellent opportunity for entrepreneurs to gather and exchange ideas, and there has been great entrepreneurship programming in terms of events, but the business development supports for scalable entrepreneurship remain unclear in the community. As those are built out, it will be important to engage capital funders and build a platform or mechanism to connect these entrepreneurs with potential investors.

- *Gaps & Challenges to Address*
  - Households with income in excess of $100K+ that are potential individual and angel investors lag adjacent counties, VT and the US (American Community Survey, US Census Bureau, 2019).
  - Minimal early stage micro-grants or non-dilutive funds to encourage ideation and risk taking. Could be an opportunity for activities such as pitch events or crowdfunding campaigns that help ideas in the very earliest stages get off the ground.
  - Deal flow not yet present to rally local investors around. No known early stage tech startups have received equity investments in the last three years in the County.
  - Utilizing SBIR or STTR programs at the university — as noted in your self-assessment, these programs could exist if there were more capacity, but since it takes 1-2 months to write each of these grants and the school is primarily teaching focused, accessing these resources has been a challenge.
  - Funding raised from tech entrepreneurs in the community has currently been mainly self funded and/or bootstrapped through customer revenue.

- *Potential Solutions to Explore*
  - Building out open and accessible digital platforms as virtual meeting places for entrepreneurs seeking funding to connect with capital funders.
  - Launch a tech-focused pitch event in the NEK that offers companies the chance to compete for non-dilutive, pre-seed funding. For reference a Rural Innovation Network community, Cape Girardeau, MO has created a version of this with their annual First $50k pitch event. While the award doesn't need to be that large to start with, local banks, major employers, potential angels, or even state programs could help fund a First $10k event.
  - Build institutional support that helps entrepreneurs navigate the fundraising process. Connect with other angel groups and VC's in the state once entrepreneurs are at a stage in which they are ready to pitch.
    - With a process that differs significantly from traditional banking processes it will be important to have a regional "go-to" resource that can help startup founders determine when they are ready for funding, build their pitch decks, hone their presentation deliveries, and navigate the deal negotiation process. Consider building a pathway to these supports into your entrepreneur and business support systems.

        - Begin building ties and working relationships with existing state-wide angel networks and venture capitalists, so that when startups accelerate their growth in the Northeast Kingdom you have existing resources they can approach to secure larger amounts of funding that may not be available locally (ex. $350k+ investments).
        - Leverage the fact that two other Vermont communities have gone through this process before, Randolph and Windham County, who might have already identified statewide angel groups.

    - *Assets & Partners to Engage*

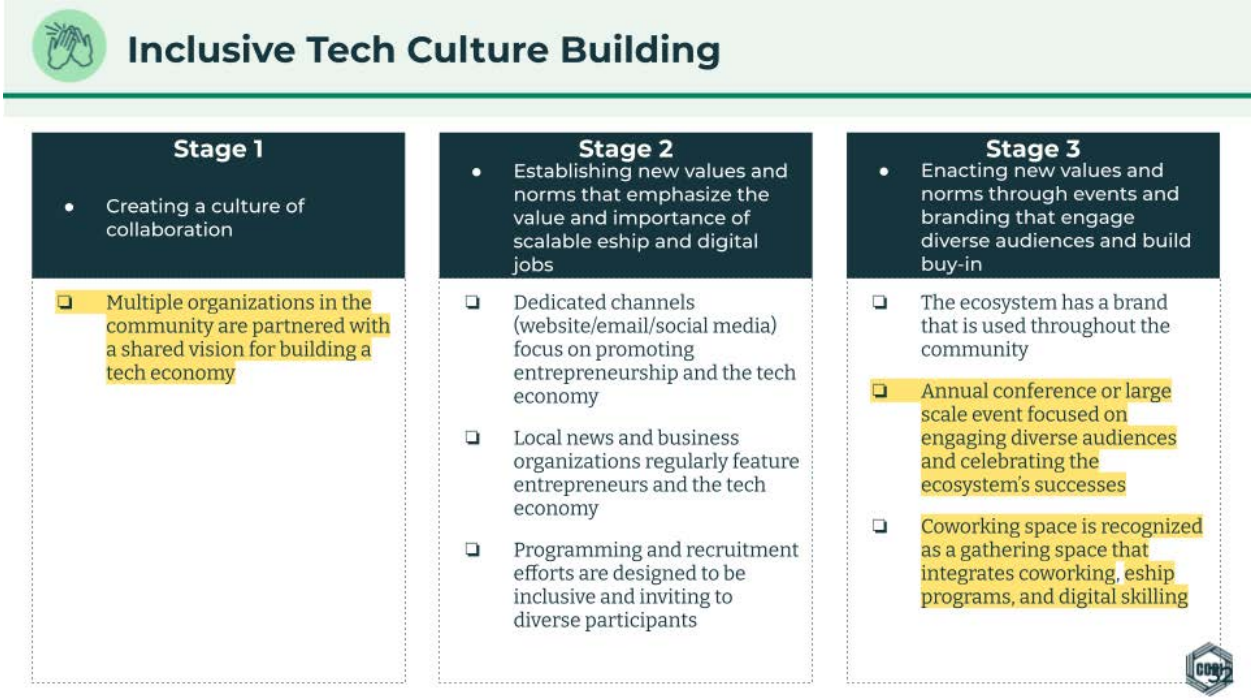
        - There are state-wide organizations that provide opportunities for startups from around the state to pitch their ideas both for direct investment for equity and for non-dilutive funding through annual pitch competitions. A few early groups to consider could be: VCET or FreshTracks.
        - Local businesses leverage EDA resources to increase use of and experience with digital marketing practices, and to hire local web developers.
        - USDA Rural Business Development Grant (RBDG) Program.
        - Opportunity Zones in St. Johnsbury, Lyndon, and Newport City
        - REAP Zone - NEK.
        - Local revolving loan funds - NVDA, NCIC, Community Capital of VT.
        - Some state-wide entities are able to provide more traditional loan funding to startups and entrepreneurs when they can show their company will support job growth or retention. Additionally, increasing access to capital for entrepreneurs through small business counseling services, capital coaches through the SBDC, and business support programs are all useful stepping stones. It is also worth noting that cultivating business growth is outlined as a priority area and is Goal 2 in the 2016-2020 CEDS.

- Perspectives from the community
    - “So I feel like that's one of my advantages. I know a lot of people in my network and I could pull in more talent if I had funding to do that, so I'm actually not as concerned about the hiring and the abilities to do that.” — Jay Shafer, entrepreneur + NVU professor in Atmospheric Sciences
    - “We are a college town, despite the fact you'd walk through the village center and you'd never know it. We have a large access to people that have quite a bit of capital coming through for outdoor recreation purposes. But there's not much just kind of keeping people in the village ...” — Evan Carlson, Co-founder of Do North Coworking

- “I happened to reach out to the CEO of the credit union and we were able to have lunch with him and ultimately, he said he would be happy to help contribute in a big way to the co-working space as he wanted to show his commitment to the community, and so they gave us $125,000 overage for five years. And that was the funding, ultimately allowed us to be able to access a large EPA grant that funded salaries for three years as well as the USDA Rural Business development grants to cover operating costs for the first year, and the USDA Community Facilities grant that could take care of the FF&E kind of furniture, fixtures, etc.” — Evan Carlson, Co-founder of Do North Coworking

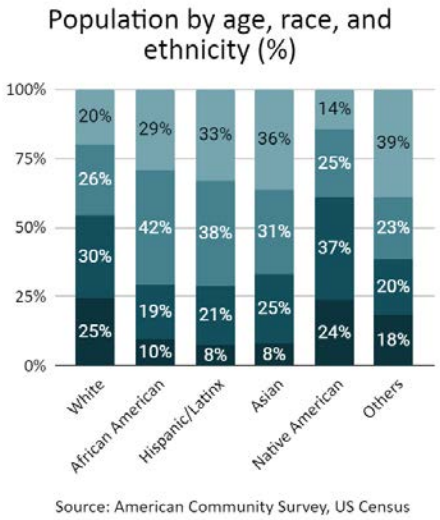
5) Inclusive Tech Culture Building

- Driver stage scoring
    - Community's self-assessment score: 2
    - CORI's score 1
        - Note: All programs highlighted in yellow in the image below were confirmed as present in your community to demonstrate our rationale for your community's score.



- Key findings and learnings

    - Multiple groups in the Northeast Kingdom are making progress toward creating and supporting a regional tech economy, and there is a clear emphasis on diversity, equity and inclusion through a variety of adjacent efforts in the region. However, a more solidly defined vision for the region and clear alignment on what parts each organization will play would enhance efforts, reduce redundancies, and create a cohesive regional story towards your own



inclusive tech brand. This shared story can then be promoted to local residents, small business owners, potential entrepreneurs, remote and tech workers. Additionally, there is room to drive targeted initiatives that engage traditionally underserved populations in the Northeast Kingdom to encourage their participation in a digital economy, including communities of color, individuals living at or below the poverty line, and others.

- There is potential opportunity to engage large shares of younger, prime working age people of color. While the population isn't particularly diverse in absolute terms, non-white populations are young with larger shares in prime working age cohorts of 20-44 and 45-64. This presents an available and possibly underutilized labor pool and an opportunity to activate new and more untapped parts of the population and workforce. Identifying, engaging, and ensuring training of these populations would also work to offset the overall older and aging total population.

- *Gaps & Challenges to Address*

    - Interviews suggest that a significant cultural shift is required for the average Northeast Kingdom resident to have awareness that tech careers or founding a startup could be "for them", that is not a threat to community traditions, and that there is a viable pathway they could follow to be a part of the burgeoning tech culture.
        - Tech workforce development and access to jobs are not currently highlighted or widely promoted in the region.
        - Examples of successful startups do not yet represent diversity within the region.
    - While there is a core group of people working to build a tech culture generally, diverse voices and perspectives could be more actively engaged. There is a lack of inclusive tech culture building activities and outreach targeting NVU students as well as underserved populations that may not have awareness of tech opportunities in the community, or may not yet see themselves belonging in this space.
    - There is currently no established mechanism for tracking the diversity of participants for NEK events more broadly.

- *Potential Solutions to Explore*

    - Start building your shared community vision now. Bring partners together with a case for change and a call to action for how to collaborate. Think broadly and beyond who you typically might engage in tech and entrepreneurship.

- Begin to build a brand. Leverage all other ecosystem building activities and programs that reach diverse facets of your community to share your story widely, including NEK Entrepreneurship Week, NEK Womxn Lead Network, the Racial Equity Sector Convenings and more.
    - Build relationships with local media to tell your story early and often.
- Design early pipeline awareness, inspiration, and educational events for those new to tech by meeting them where they are - leveraging local cultural traditions/events/industries.
    - Host inspirational and educational events for NVU students and faculty in tech-adjacent programs that connect tech with their area of expertise to act as onramps to the ecosystem.
    - Promote tech cultural belonging for seniors, BIPOC, women, current tech and remote workers.
- Create a "front door" for your regional tech culture at Do North, or an alternative, and other satellite locations.
- Find ways to pair tech experts with entrepreneurs to solve local problems with tech and explore scalability.
- Host a conference to support local tech/entrepreneurial community that ties into the NEK Entrepreneurship Week

- *Assets & Partners to Engage*

    - Vermont Womenpreneurs (statewide)
    - NVU:
        - Has a focused effort to support black, indigenous, or other BIPOC see here that could be leveraged
        - Offers a wide array of tech-adjacent curriculums that can act as onramps to ecosystem. You could bring together different NVU departments that incorporate tech skills
    - Flipped VT and NEK Collaborative sponsored and delivered a BIPOC business Digital Marketing grant (for technical assistance) that could be a good model for future events.
    - Leverage local events and tie in tech:
        - NEK Womxn Lead Network - Yearly cohorts of women in leadership region-wide gather quarterly to share success, get support and broaden their networks @ NEK Collaborative.
        - Racial Equity Sector Convenings - Ongoing sector-specific conversations to facilitate collaboration and shared learning region-wide @ NEK Collaborative.
    - Do North programming and collaborations such as meetups.
    - The Foundry MakersSpace in Lyndon

        - NEKC's Womxn Lead Network and Racial Equity Sector convenings groups and/or leads
        - Catamount Arts - tap into this community and network to engage new audiences

- <u>Perspectives from the community</u>

    - "The co-working space has been phenomenal. The timing of that couldn't have been better with kind of giving us a home. And, number one, but also just a place where we feel like there's a culture of innovation, there's one other startup that's there. And I think continuing to support that is absolutely necessary. Right and NVU is managing that space right now. And there's definitely some change there. Evans is going to be leaving, and the other person that they just hired part time is actually going to be transitioning too. So like that's kind of one of the rocks that needs to stay there, and you guys probably know that but I just have to say it." — Jay Shafer, entrepreneur + NVU professor in Atmospheric Sciences

    - "...when you have people riding $10,000 bikes pass people that you know, can afford to, you know, pay their basic bills on a regular basis in these communities, I think it's something that craves attention, and especially when people are moving here that have that same you know now are working remotely, are living in this community it further displaces the existing groups but I think that there has to be this inclusive process for, you know, looking at these industries that exist that people are going to get behind and that people believe in on both sides of the spectrum" — Evan Carlson, entrepreneur, former director of Do North co-working space

05) Conclusions and next steps

Based upon our findings, we conclude that The Northeast Kingdom region has a number of core elements to draw upon to build a thriving rural digital economy ecosystem. The Northern Vermont Economic Development District Strategy and local leadership are aligned with this focus. However, without intentional focus and resources, this potential could remain unrealized. The workforce pipeline must be addressed to ensure that there are digital workers at a range of skill sets for local employers to draw from, and entrepreneurship programs must be expanded to include the needed support to produce more scalable tech startups and tech jobs. There are also some elements of the Northern Vermont Economic Development District Strategy that clearly align with a DEE vision and could be leveraged to obtain funding required to implement your strategy (see Appendix).

At this stage, we can confidently recommend that The Northeast Kingdom community has the core capacity and assets needed to develop and successfully implement a DEE strategy. Your community has met all of the required benchmarks for the assessment to proceed along the journey to the strategy development stage.

We look forward to working with you to develop your Digital Economy Ecosystem strategy in the next phase of our Technical Assistance. A strategy development overview packet has been provided to you to guide you through this next stage of the process.

06) Appendix

Interviewees

Name	Title	Organization	Location of Org
Jay Shafer			
Bradley Beth	Assistant Professor, Math & Computer Science	Northern Vermont University	Lyndon
Shawn Tester	CEO	Northeast Vermont Regional Hospital	St. Johnsbury
Florence Chamberlin	Business Manager | Creative | Photographer	FLEK	St. Johnsbury
Evan Carlson	Entrepreneur in Residence and Co-Founder	Do North Coworking	Lyndon

Identified Areas of Alignment with Regional Strategy & Planning Documents

From the 2016-2020 Northern Vermont Economic Development District Comprehensive Economic Development Strategy:

- "To Cultivate, attract, nurture, and grow businesses and enhance economic competitiveness in the Northern Vermont region include:
    - Support the development of innovation-based industry clusters that create high-wage jobs
    - Help communities implement economic development strategies that grow existing, locally-owned businesses and attract new companies
    - Support the formation and growth of export-oriented businesses
    - Support business attraction and retention efforts of local and regional economic development entities
    - Support programs that encourage people of all ages to consider becoming entrepreneurs
    - Encourage and support the development of entrepreneurship education
    - Identify resources that entrepreneurs and small businesses need to start and grow and help facilitate access to these tools
    - Support efforts to improve access to capital for entrepreneurs
    - Support efforts to improve awareness of, and access to, regional Small Business Development Centers" (19)

- “To develop a competitive skilled workforce in order to encourage businesses to start, locate, and expand in the Northern Vermont region include:
    - Conduct collaborative planning activities with regional partners to promote alignment of economic and workforce development goals, including emphasis on postsecondary education and skills training to support high-growth, high-wage jobs, including skilled trades
    - Encourage and identify industry-led certification training programs to train existing and future workers for a more competitive economic environment
    - Pursue funding opportunities with workforce partners to expand the availability of training programs for targeted industries and occupations
    - Make labor market information accessible to school districts/higher education institutions so students can make informed choices about career options
    - Partner with local colleges within the region to increase production of knowledge-based workers in science and technology sectors
    - Partner with local industry, Workforce Solutions Career and Technical Education Centers and Community Colleges in the region to identify and provide a skilled-trade workforce
    - Establish strategic partnerships, which include a combination of social services, community and faith-based organizations, and educational providers to ensure a successful support system is developed.” (21).

Other Sources/Resources

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