John Glenn College of Public Affairs

Ohio's Broadband and 5G Sector Partnership: a systems approach to bridging workforce gaps

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PURPOSE & MOTIVATION

Many Ohioans still lack internet access, limiting their use of online services, telehealth, work from home, distance education, and many other vital resources. The resulting digital divide further disadvantages some of our most vulnerable citizens. The motivation of this work is to assess the impact of Ohio's Broadband & 5G (BB&5G) Sector Partnership and its regional Nodes on strengthening the workforce needed to expand this critical infrastructure. A causal loop diagram provides insights into the underlying dynamics of this complex system and will serve as the foundation for building a stock and flow model. Novel Sector Partnership program level data, as well as state administrative data, will be deployed to simulate the effectiveness of this initiative on improving the telecom sector workforce development system.

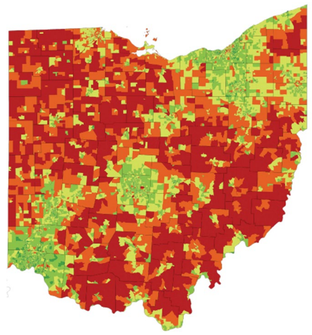

Figure 1. Map of Ohio's Broadband Availability Gaps

The Sector Partnership's purpose is to bring government, education, and industry together in a collaborative effort to meet this workforce demand.[1] Key stakeholders included state agencies, telecommunication companies, industry associations, non-profit organizations, career-technical education providers, and public and private colleges and universities across the state. The Sector Partnership (SP) is focused on three primary pillars of work:

Dynamic hypothesis: The BB&5G Sector Partnership positively impacts the state's objective – to reduce the workforce gap, thereby reducing the internet access gap.

BUILDING UP THE SYSTEM

State and federal grant funding supported the creation of the Sector Partnership, with additional sustaining funding expected from NTIA's Broadband Equity Access and Deployment program. The governance framework is shown in Figure 2, below. At the top is the statewide Sector Partnership, the governing body responsible for overall initiative leadership. The Sector Partnership Management Team oversees day-to-day implementation efforts at both the regional and statewide levels. The Regional Nodes implement initiatives on a regional scale including increasing career awareness, implementing education and training programs, and ensuring programs are available at low- or no-cost for participants.

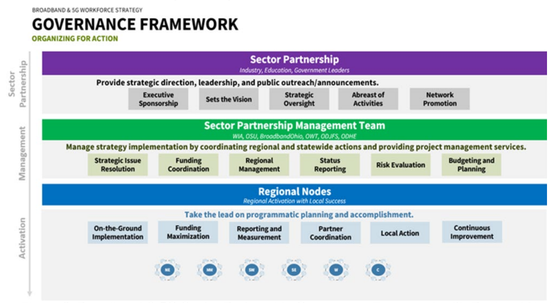

Figure 2. Broadband & 5G Sector Partnership Governance Framework with Regional Nodes

WORKFORCE GAP ANALYSIS

A quantitative workforce gap analysis has been completed to better understand how the current workforce development system is meeting sector employer demand at the region level. The following maps display these results – showing the change in gap ratios by region from 2020 to 2021. Labor market analyses, including employment rates within the telecom sector and skillshed analysis considering declining and increasing employment dynamics have also been completed.

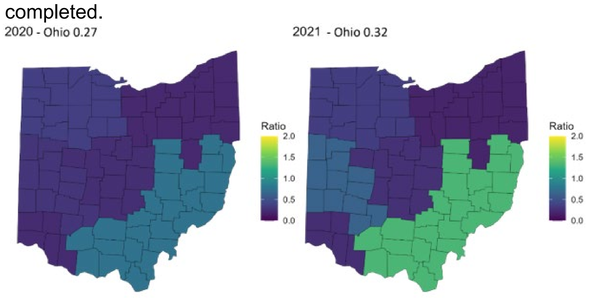

Figure 3. Ohio's Graduates to Postings Saturation Ratio, 2020-2021

CAUSAL LOOP DIAGRAM

Causal loop diagrams seek to capture the feedback structure of systems and represent the dynamic hypotheses about the causes of dynamics.[2] The CLD in Figure 4 represents Ohio's efforts to expand its BB&5G infrastructure using telecom provider incentives. The dynamics of the Sector Partnership initiative's influences on the overall workforce system are shown and capture the underlying hypothesis about the cause of these dynamics. Key variables are considered and the causal links between them. Their (+) or (-) polarity indicates how the dependent variables changes when the independent variables change.[3] Loop identifiers show overall reinforcing or balancing feedback within the system. In this workforce system, as with most systems, equilibrium is not attainable. The system is characterized by goal seeking behavior given the desire to have the workforce demand met by the supply at any given time, and no gap in internet access for Ohioans.

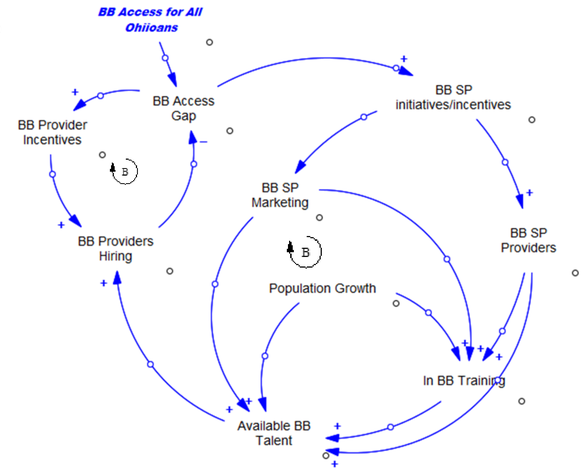

Figure 4. CLD of Broadband & 5G Sector Partnership Workforce Strategy Impact on Internet Access

BB ACCESS FEEDBACK LOOPS

1. BB Provider Incentives, BB Providers Hiring
2. BB SP initiatives/incentives, BB SP Providers, Available Talent, BB Providers Hiring
3. BB SP initiatives/incentives, BB SP Marketing, Available BB Talent, BB Providers Hiring
4. BB SP initiatives/incentives, BB SP Providers, In BB Training, BB Providers Hiring
5. BB SP initiatives/incentives, BB SP Marketing, In BB Training, Available BB Talent, BB Providers Hiring

INSIGHTS

Development of the CLD accomplished the primary motivation – to better understand the underlying dynamics within the growing BB&5G Sector Partnership system and the overall impact of this initiative on the state's goal of ensuring all Ohioans are served by this critical infrastructure. The CLD confirms that scaling this network of education, training, and employment support service providers will improve the current system and reduce the existing gap between telecom workforce demand and supply.

NEXT STEPS

- ❑ Engage key stakeholders in developing a SD model
- ❑ Deploy novel participant data, state's administrative data, and other relevant data sources to validate model
- ❑ Simulate workforce policy scenarios to maximize impact
- ❑ Develop user friendly interface for various stakeholder groups

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2 Sterman, J. (2000). *Business dynamics: Systems thinking and modeling for a complex world.* Boston, MA: Irwin McGraw-Hill.
3 Hayward, J., Roach, P.A. (2024). *Notes and insights, A comparison of loop dominance methods: measures and meaning.* System Dynamics Review 40, e1757.
4 Barbrook-Johnson, P., Penn, A.S. (2022). *Causal Loop Diagrams.* In: Systems Mapping. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-031-01919-7_4

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