The Economic Development Role of Community Colleges: Motivations and Results

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NCATC 2024 Conference: Human Skills Amplified by Automation and AI

Agenda

- NSF ATE-funded research project background
- NSF ATE grantee interview and survey findings
- Regional case studies – initial findings

Hidden Innovation Infrastructure Project

What is the Role of Technician Education in Economic Development?

https://sites.rutgers.edu/eerc-hii/

Research Objectives

- Uncover how NSF ATE's development of the technician workforce through innovation in community college technician education programs contributes to economic development

  National Analysis of ATE and Community College Technician Education

- Develop a better conception of how community college education contributes to economic development in terms of skill development and support of the innovation ecosystem

  Regional Case Studies of Community College Education in Manufacturing

- Develop measures of how skill development contributes to firm-level innovation and productivity and regional economic development

What is economic development?

- All the activities that seek to promote economic activity in a region, state, or country

  … to improve economic well-being and quality of life for communities

Community College Economic Development Activities

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Education and Training

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Business Support

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Regional Engagement

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Community College Economic Development Results

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Skilled and Inclusive Workforce

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Skilled and Inclusive Workforce

Productive, Innovative, and Inclusive Firms

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Community College Economic Development Results

Skilled and Inclusive Workforce

Productive, Innovative, and Inclusive Firms

Productive, Innovative, and Inclusive Regional Ecosystem

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Community College Economic Development Activities

Education and Training
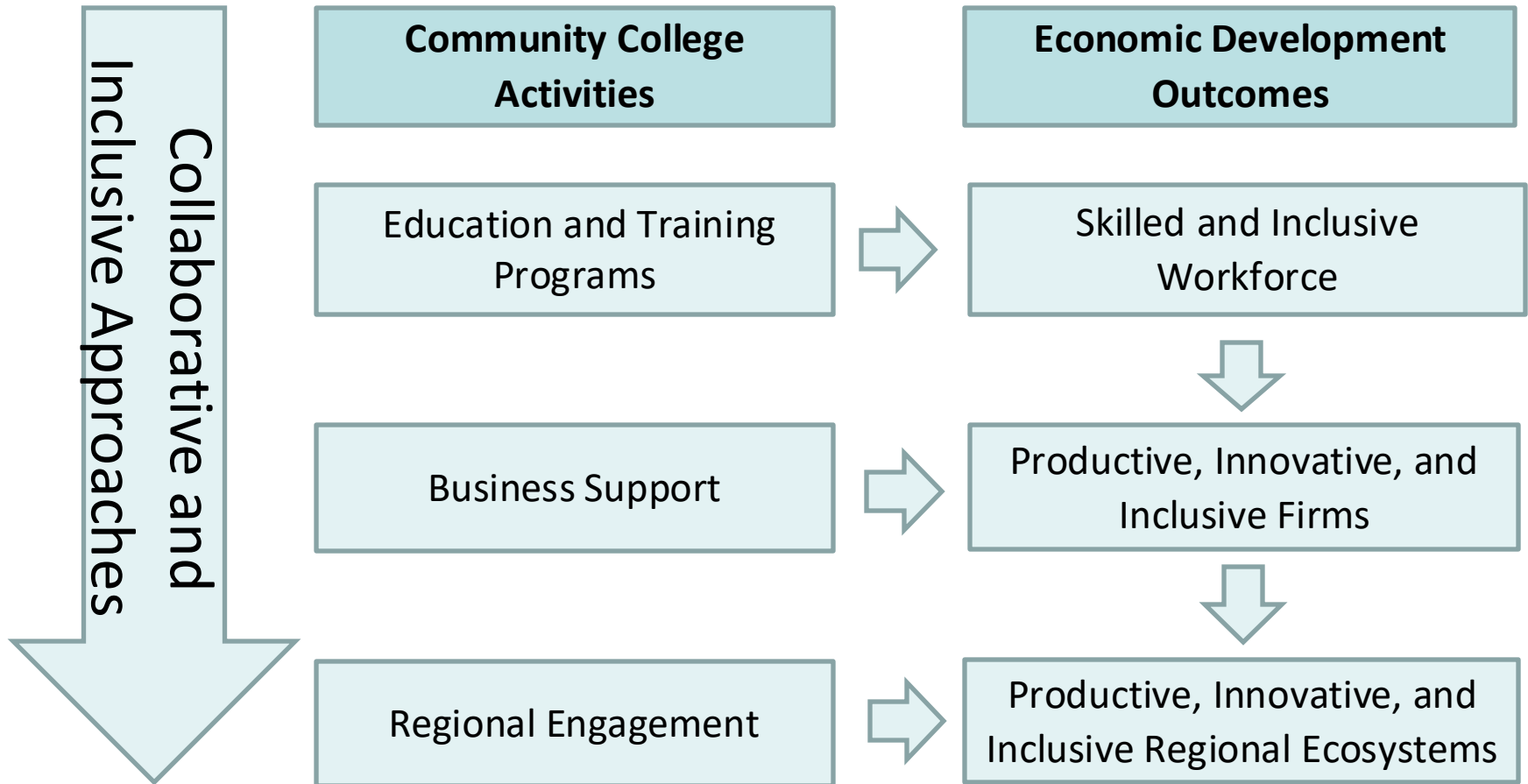
Business Support

Regional Engagement

Partnerships and Innovation

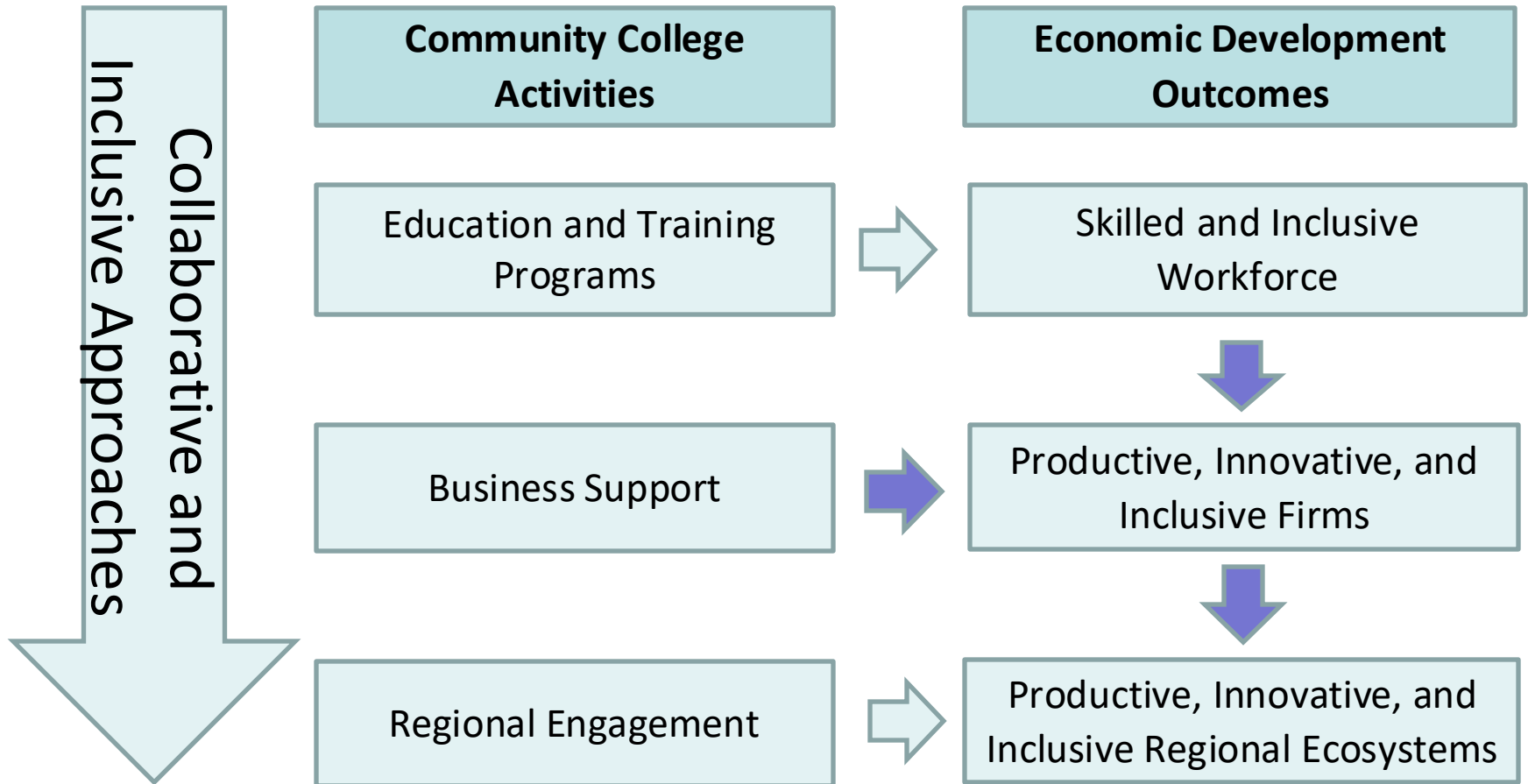# Community College Economic Development Results

Skilled and Inclusive Workforce

Productive, Innovative, and Inclusive Firms

Productive, Innovative, and Inclusive Regional Ecosystem

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Community Colleges & Economic Development

Community Colleges & Economic Development

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NSF ATE Grantee Interviews

– Focused on "workforce development"

  • ATE centers have "economic development" goals

– Collaborations with business and industry; some also with higher education, K12, public organizations, and industry associations

– Grantees are leaders and participants in regional partnerships

NSF ATE EvaluATE Survey – HII Supplement

- Half of ATE-funded projects had an explicit economic development goal

  - Advanced manufacturing
  - Bio and chemical technology
  - Ag and environment
  - Engineering
  - Info/securities
  - General advanced technologies

NSF ATE EvaluATE Survey – HII Supplement

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Community Colleges & Economic Development

*Community college technician education contributes to economic development when there is an <u>intentional link</u> between program activities and **community/regional economic needs**. This happens through <u>partnerships</u> with organizations in the community and activities that are connected to economic development goals designed **to promote economic growth and prosperity** regionally and nationally.*

Economic Development Goals

"The curriculum and training program initiatives are directly informed by the needs of industry."

*"Local industry suffers from an acute shortage of trained technicians, and this is impacting plans for further expansion and growth of these companies. The goal of this project is to help **close this regional 'skills gap'**."*

Economic Development Goals

*"To **build a biotechnology network** of opportunity including partners such as local high schools, universities, and businesses..."*

*"... to **position small-scale farmers... to be able to compete in the local and regional marketplace**, while also promoting environmental sustainability and contributing to the overall workforce development of the community."*

Economic Development Goals

*"Creating job opportunities for underrepresented minorities in an emerging STEM field which will lead to **the upward social mobility of the local community**."*

*"To **engage more female and minority students** in the field of cyber security in the rural communities."*

Does anyone here have a goal to affect the economic development of their region?

NSF ATE EvaluATE Survey – HII Supplement

- More than half of ATE-funded project PIs seek to align with industry

  offer in-demand, industry-aligned courses and credentials (60%); host regular industry advisory/partner meetings (60%)

NSF ATE EvaluATE Survey – HII Supplement

- Fewer than half have deeper industry engagement in their project

  convene regional stakeholders (33%); offer earn-and-learn or WBL programs (25%); customized training (22%); attract/retain businesses (15%); provide facilities (8%); entrepreneurship (7%)

Education and Training: ATE Project vs. Institution

Education and Training Activity	% ATE project	% College
Offer industry-aligned courses and credentials in in-demand fields	62	82
Host regular industry advisory partner meetings to inform college offerings	60	78
Offer "learn and earn" or formal work-based learning opportunities	25	54
Offer customized training for local and regional employers	22	71
Offer entrepreneurship training	7	55
Other ways of engaging in education and training	12	17

Business Outreach: ATE Project vs. Institution

| Business Outreach Activity	% ATE project	% College
Conduct research and development in partnership with universities	15	39
Provide facilities for use by local employers	8	47
Offer small business assistance	3	39
Offer small business incubation or commercialization	1	32
Other ways of engaging in business outreach	6	10

Regional Outreach: ATE Project vs. Institution

Regional Outreach Activity	% ATE project	% College
Convene regional stakeholders around industry needs	33	52
Assist in efforts to attract employers to the region or expand existing employers	15	44
Conduct economic scans	7	39
Participate in regional economic planning or policymaking	7	48
Other ways of engaging in regional outreach	4	5
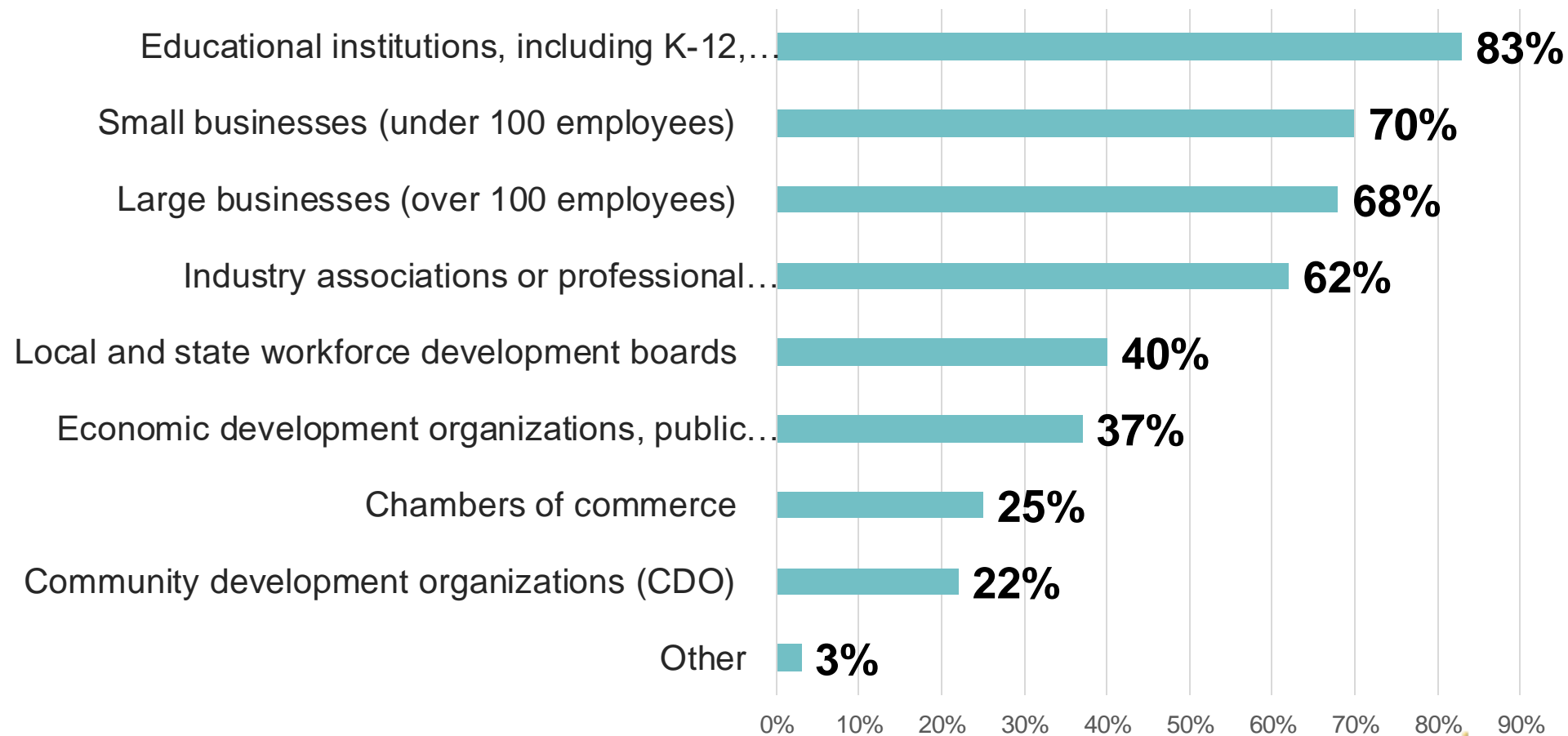
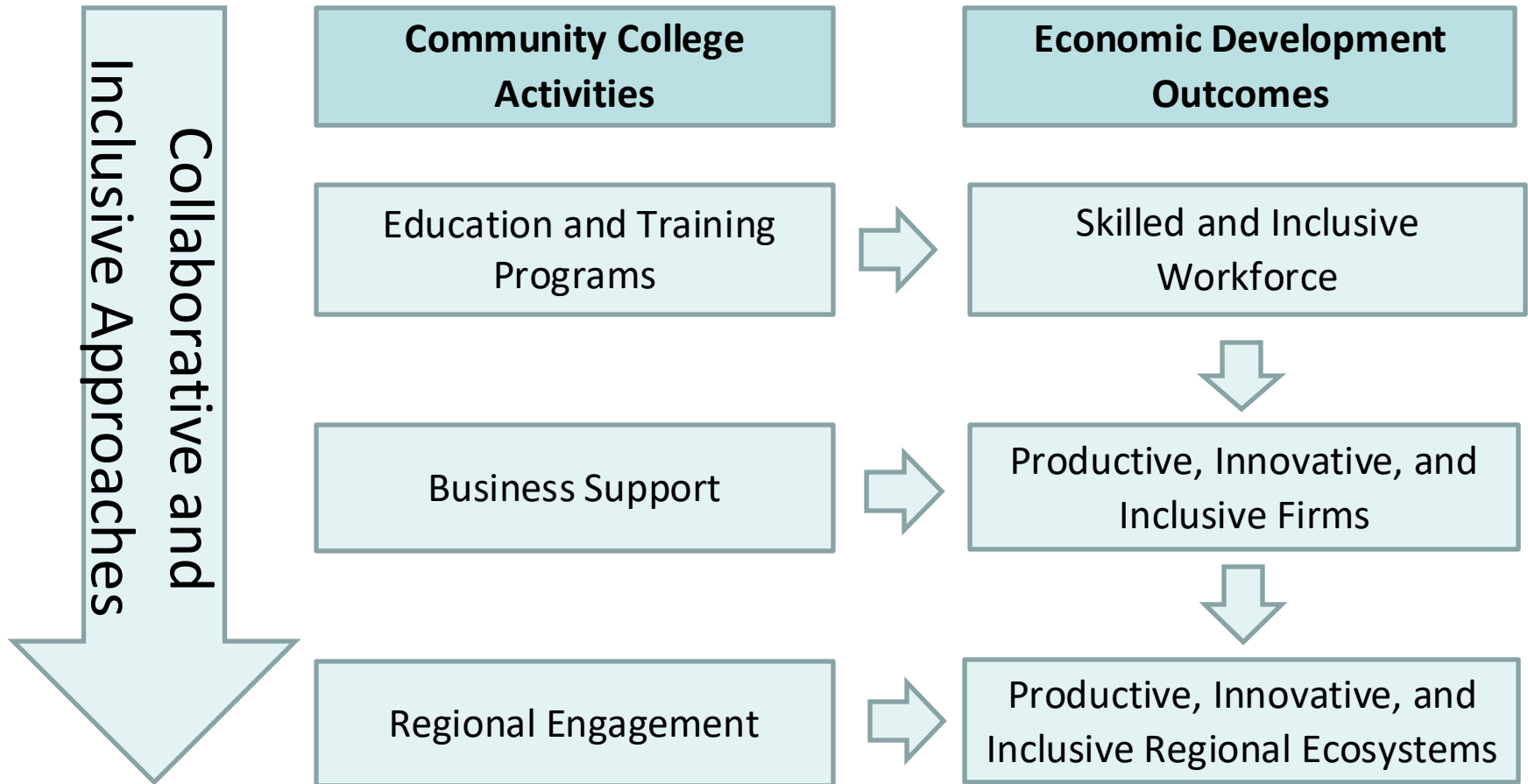What is an "economic development" goal, activity, strategy, or outcome?

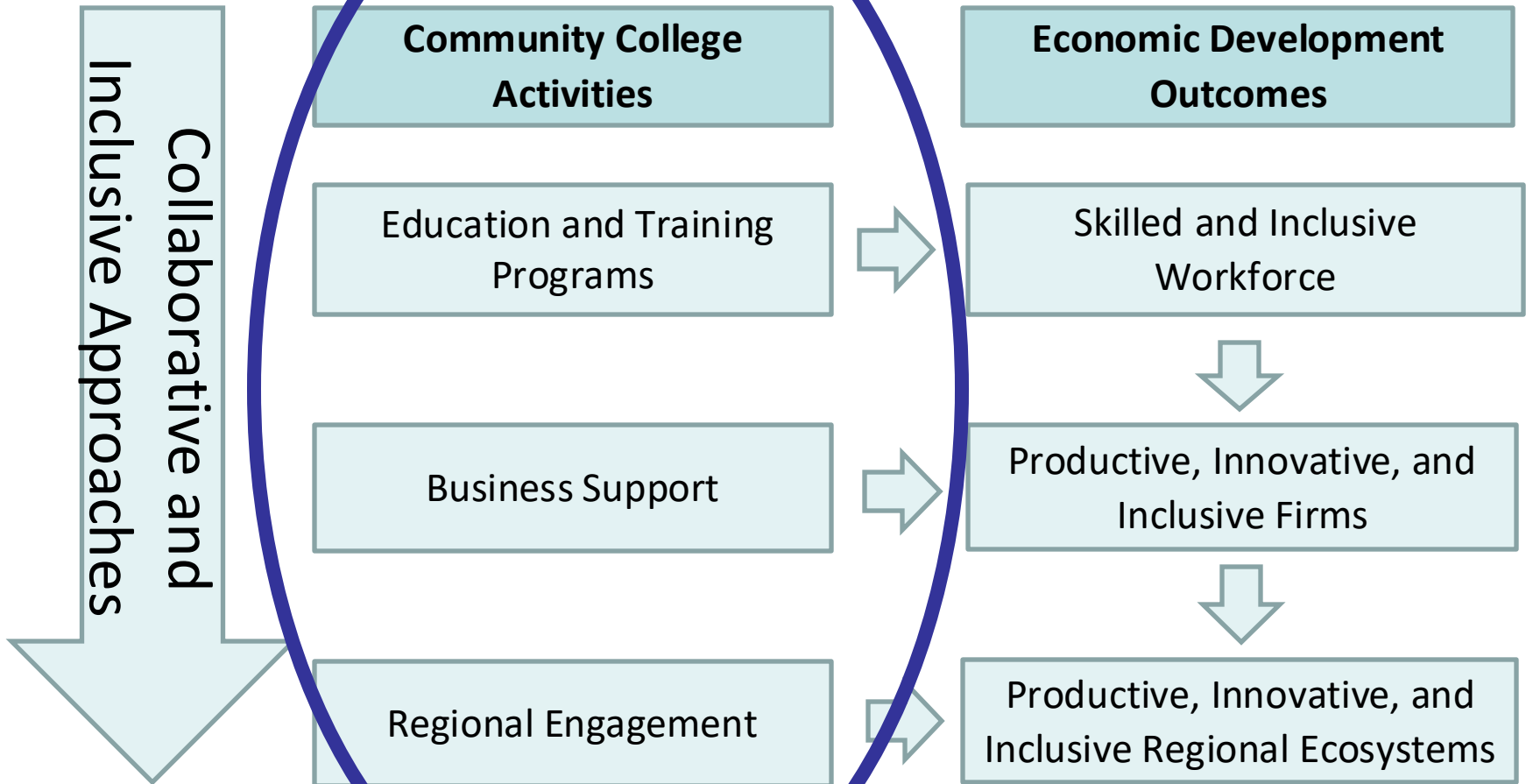How do we get to more productive, innovative, and inclusive regional ecosystems?

Is anyone measuring ED impact? Business ROI? Would it be useful to do so?

Community Colleges & Economic Development

Collaborative and Inclusive Approaches

Community College Activities	Economic Development Outcomes
Education and Training Programs	Skilled and Inclusive Workforce
Business Support	Productive, Innovative, and Inclusive Firms
Regional Engagement	Productive, Innovative, and Inclusive Regional Ecosystems

Community Colleges & Economic Development

College staff perspectives

Community College Activities	Economic Development Outcomes
Education and Training Programs	Skilled and Inclusive Workforce
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Collaborative and Inclusive Approaches

Community College Staff Perspectives

Interview themes – activities and expected results
- Education and Training Programs
- Business Support
- Regional Engagement

Analysis themes – actors and strategies
- Leading/initiating
- Collaborating/sustaining
- Entrepreneurial/creating new lines of work
- Innovation, productivity, inclusion outcomes

Community College Staff Perspectives

Interview themes – activities and expected results
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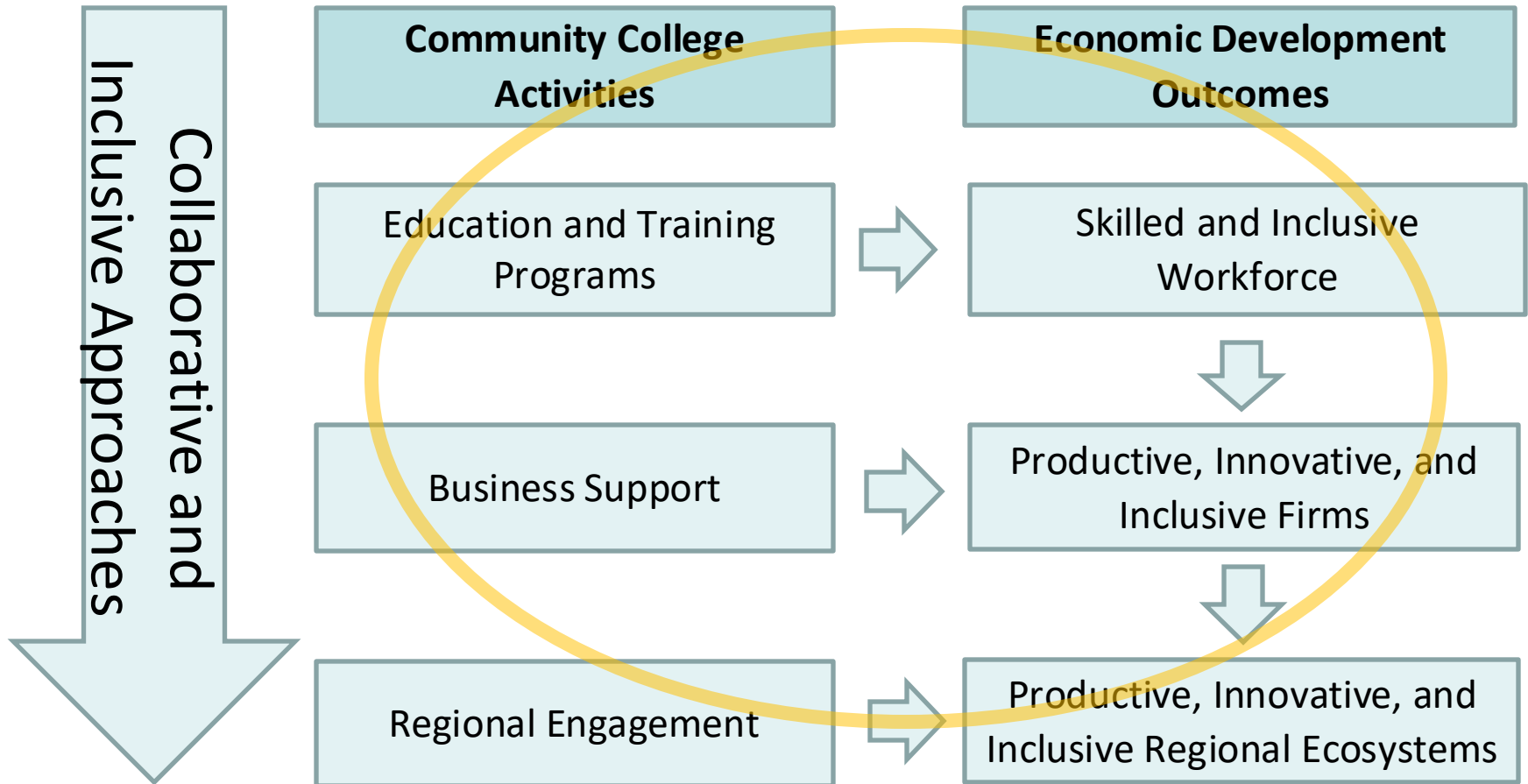**Analysis themes – actors and strategies**
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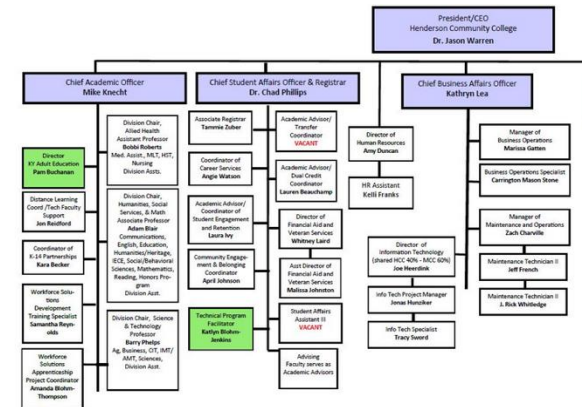
Interviews and analysis by individual actor role and strategy / school strategies and roles

Community Colleges & Economic Development

The Companies

State	Industries	Interviewees	Relevant Training Programs
A	Defense Construction Insulation	Plant supt.; Production supt.; Workforce training manager; Engineering team lead	AAS and certificates in AIT; CNC; Automation
	Semiconductors Aerospace Metal	HR rep; Regional manager; Workforce stability leader; University relations manager; Strategic hiring manager	AAS, certificates, and bootcamps in AIT; Welding; Robotics
	Electricity Natural Gas	Customer service manager/Adjunct; Construction manager; Maintenance team leader; Intern and apprenticeship coordinator	Unregistered Apprenticeships in Maintenance; Power Systems Technology; AIT
B	Healthcare products Metal	Site head; Senior HR; Senior engineer	Associate degree/certificates in Electromechanical Automation; Electronic Engineering Tech; Mechanical Engineering Tec
	Metal/Electronics Semiconductor prototypes	Senior Manager; Managing Director; Student	Credentials (BS, AAS, and Certificates) in MEMS; Automation Engineering
	Steel/Metal Electricity products	Corporate trainer; Weld tech; VP of operations; Lean manager	Associates with embedded certificates and co-ops/OJT/apprenticeships in Manufacturing Engineering Technology; Industrial Technology
C	Aerospace Defense Boats	CEO; VP of HR; Engineer; Manufacturing tech; Project control analyst; GM; Owner; Maintenance support; HR manager	AS and multiple certificates in FAME sponsored Computer Tech; Engineering Tech
	Machining Metal	Director of manufacturing support; Director of Ops. support	AS and certificates in Advanced Manufacturing; Welding; Maintenance and Fabrication

The Companies - Industries

| Defense |
| Construction |
| Insulation |
| Semiconductors |
| Aerospace |
| Metal |

| Aerospace |
| Defense |
| Boats |
| Machining |
| Metal |

| Electricity |
| Natural Gas |
| Healthcare products |
| Metal |

| Metal/Electronics |
| Semiconductor prototypes |
| Steel/Metal |
| Electricity products |

The Companies – Training Programs

AAS and certificates in AIT; CNC; Automation
AAS, certificates, and bootcamps in AIT; Welding; Robotics

AS and multiple certificates in FAME sponsored Computer Tech; Engineering Tech
AS and certificates in Advanced Manufacturing; Welding; Maintenance and Fabrication

Credentials (BS, AAS, and Certificates) in MEMS; Automation Engineering
Associates with embedded certificates and co-ops/OJT/apprenticeships in Manufacturing Engineering Technology; Industrial Technology

Unregistered Apprenticeships in Maintenance; Power Systems Technology; AIT
Associate degree/certificates in Electromechanical Automation; Electronic Engineering Tech; Mechanical Engineering Tec

The Companies – HII Analysis

- The development of technicians and technician talent/skills in terms of:
  - *Sourcing* (e.g., training, preparing, recruitment)
  - *Deploying* (e.g., job role, skill application, productivity, contribution to innovation/technology, retention)

- The employer perspective on community colleges' contribution to **manufacturing firms (micro)** and to **manufacturing industry (macro)**
  - The impact of centering the workplace in education
  - How technicians are sourced
  - How technician skills are deployed
  - How facilities, equipment, and academic programs are utilized

The Companies – Do they value the college?

Gas service provider: *So they're teaching these kids how to work, the robotics are teaching them how to work in these manufacturing plants. But they're going out and just getting jobs right away…And obviously, that's good for the economy, for … getting and retaining employees. Because the school you train them to do what you want to do.*

There's retention there, because all those guys will retire right now.

The Companies – Do they value the college?

The community college builds exactly what the company needs…We pretty much say this is what we want to do, and they make it work as a partner

So we essentially tell them this is what we need and they go, okay here you go

What this custom weld class has done very well is taking our needs and making it the most relevant that it can make it, if we're taking their time off the production floor

The Companies – Do they value the college?

if you take these 5 classes, you'll get a certificate in logistics…If you take these 24, you get your associates. I mean, quick and does a really good job. And it's really nice for someone who college has never been an option for them

Those who have been going through a program are definitely a higher-level employee when you hire them in

The Companies – Do they value the college?

Adjunct instructor from industry:

The classroom is a chance for me to kind of see who's got mechanical aptitude. If they don't, are they able to listen and follow procedures and learn how to do it? Because like I said, I rate my students at the end of the semester, whether I think they would be a good fit for the company.

The Companies – Do they value the college?

So he'll [instructor] publish what his current curriculum is. He'll say, here's the changes I've made recently, here's where we've adjusted these things. And then when we've got 30, or 50 people on the call, he'll say, Okay, I'm opening it up for suggestions. So, what do you see that is good? What do you see that's missing in the curriculum? And you'll get, people that are, let me give you a suggestion. … so you can have that dialogue among the manufacturers

The Companies – HII Findings

- Companies are atomistic

- Companies initiate and lead, with support from colleges

- Companies train employees; colleges give them a good head start

- A variety of relationship styles:

  - Arms-length demand-response

  - Iterative, collaborative, and stable over time

  - Iterative, developing more robust tech + training over time

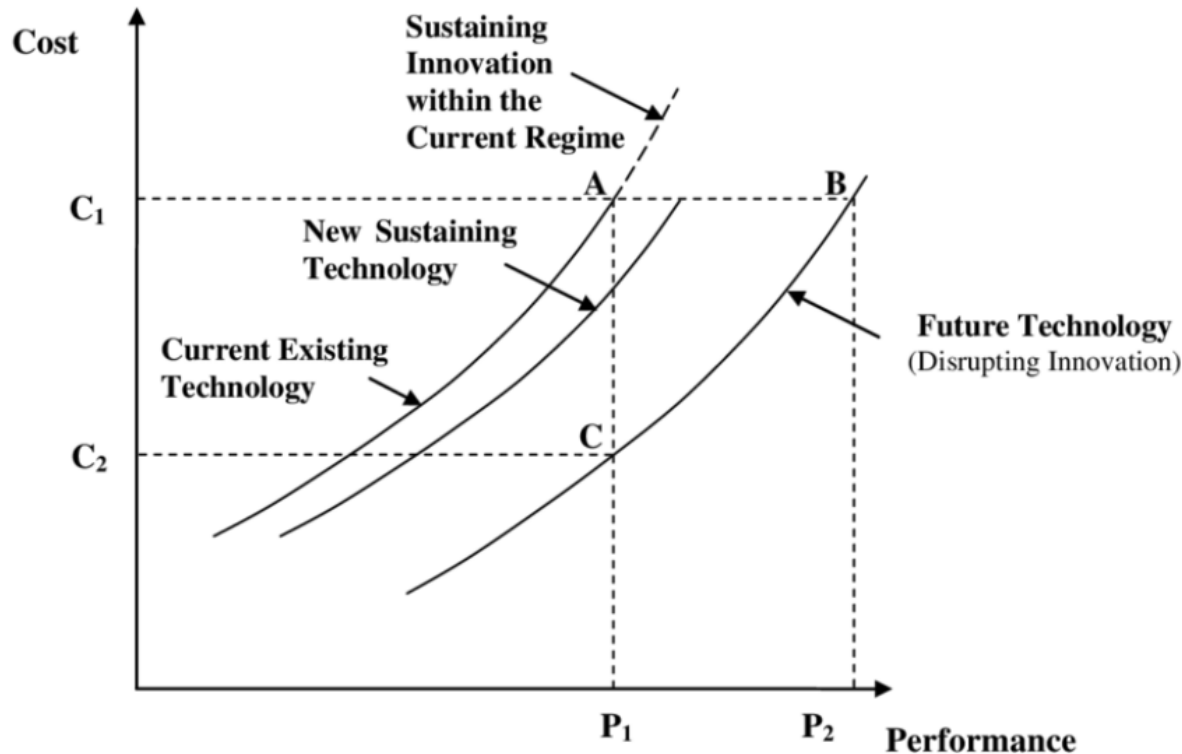 - Structured earn/learn programming enables robust multi-employer engagement, especially for innovating/initiating companies

Company (client) Findings

- Firms express a commitment to the public good and don't estimate their own ROI from training

- Innovation and productivity gains are unclear to the firm
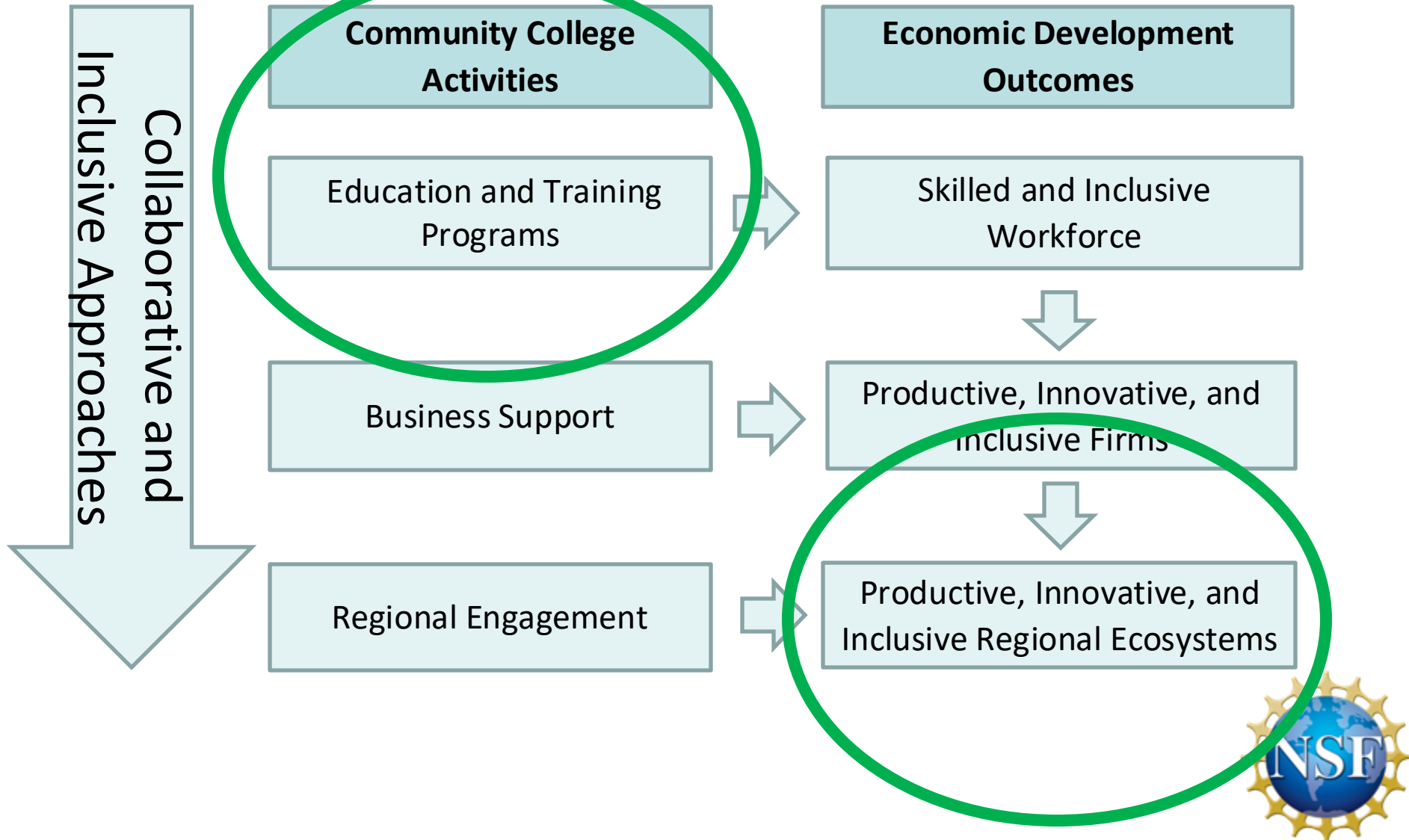
- Inclusivity goals are not articulated

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THE BENEFITS AND COSTS OF APPRENTICESHIP
Roadmap for Measurement

?

01   Determine the **TOTAL COSTS** of apprenticeship and the costs of alternative hiring methods.

Determine the measureable
BENEFITS of apprenticeship.   02

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Partner Perspectives

– Colleges fill an important niche in their economic regions, primarily are seen as responsive service providers, responding to requests from employers

– Unclear where community college responsibility for training ends and employer responsibility for training begins

Insights and implications: education/training, business services

Who does most of the work – is it 80/20 or 20/80 (schools/employer)?

→perspective of the customer is 20/80

Which employers have the privilege of collaborating with the college?

→some employers are better partners, some colleges can be selective

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Insights and implications: education/training, business services

Who does the work of strategic engagement at the college?

→President, Dean, Program Developer, Instructor…

Who gets results?

→What results are valued – inclusion, innovation, productivity…? Retention, expansion, entrepreneurship? Individual firm or industry success?
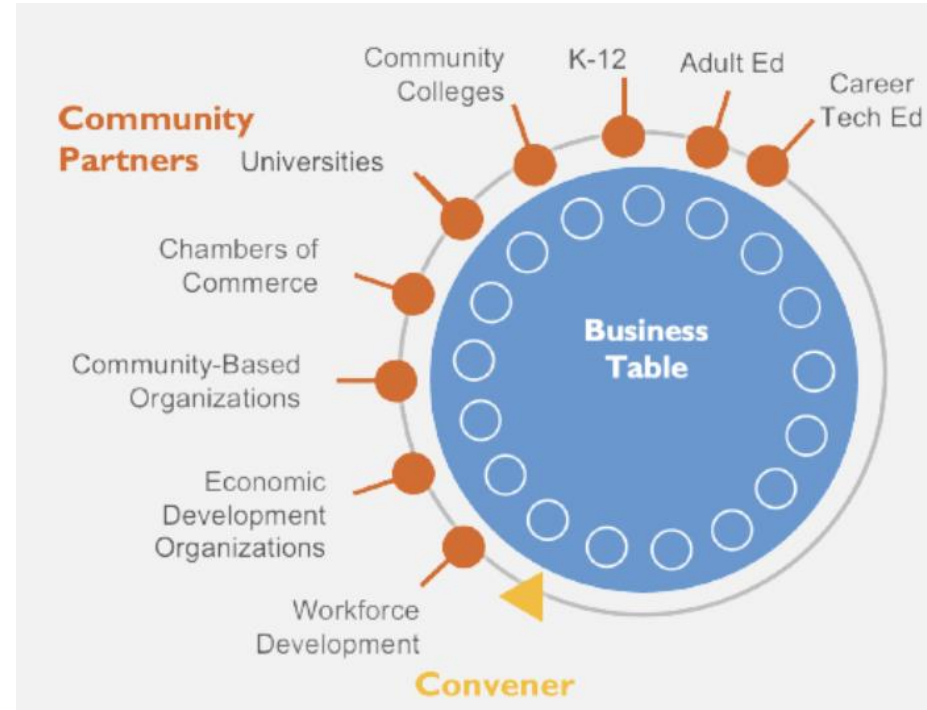
On what timeline?

→What is the role for shorter, faster programs?

→What timeline for relationships and building trust?

Insights and implications: regional engagement
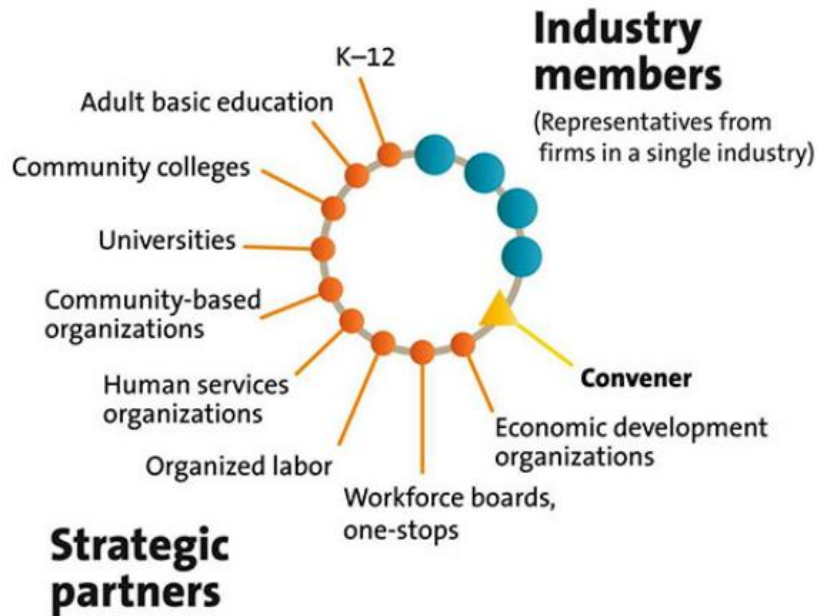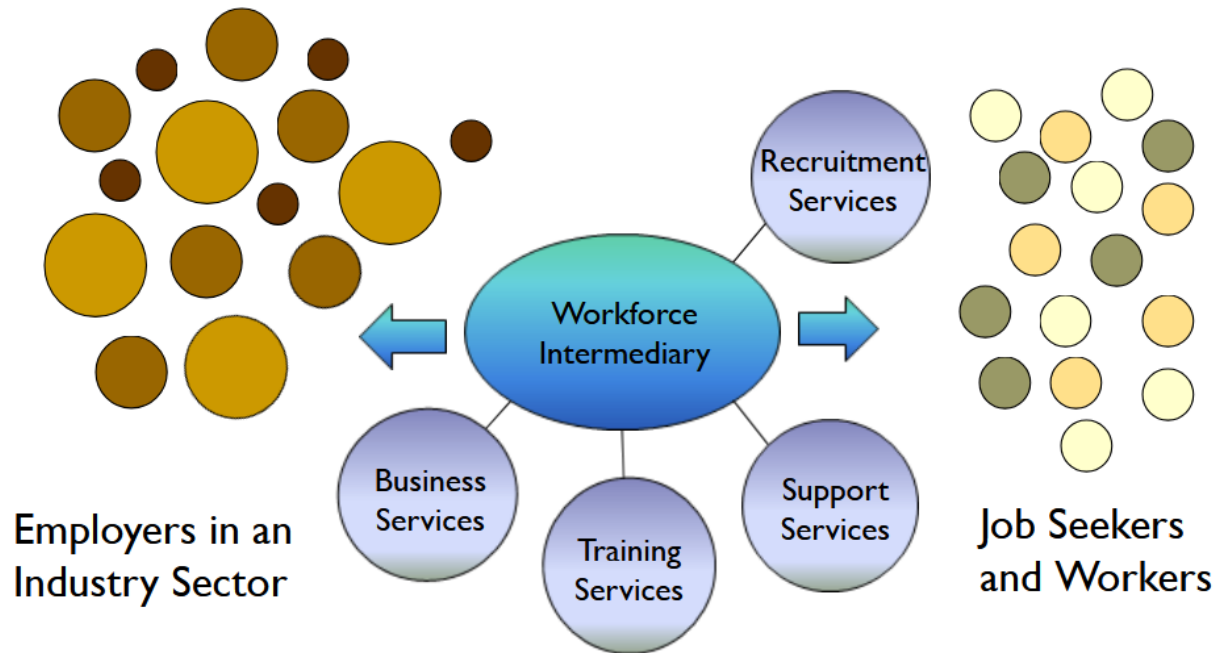
How does this work?

Sector partnerships
Next Gen Sector Partnerships

Insights and implications: regional engagement
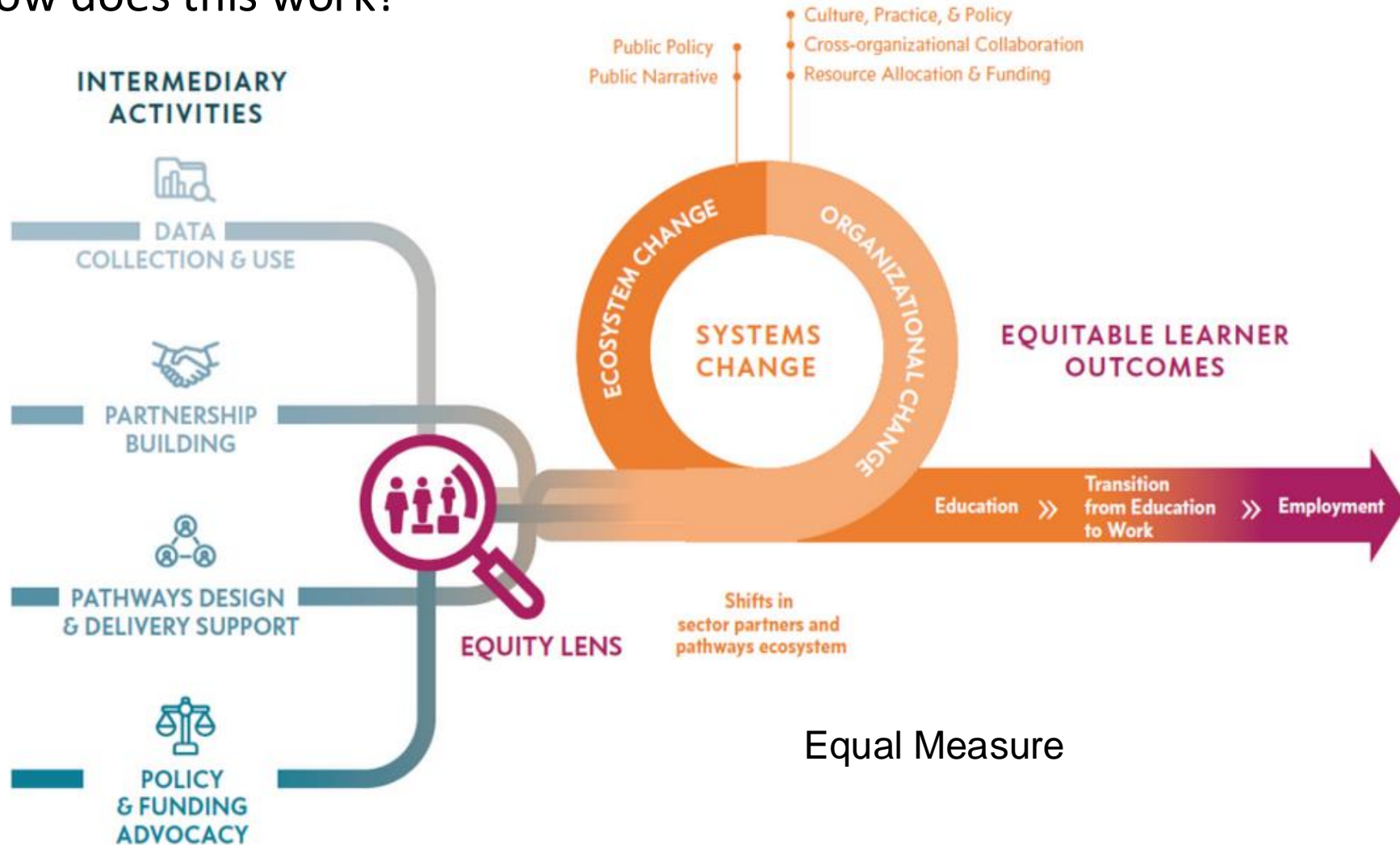
How does this work?

Employers in an Industry Sector

Business Services

Workforce Intermediary

Recruitment Services

Training Services

Support Services

Job Seekers and Workers
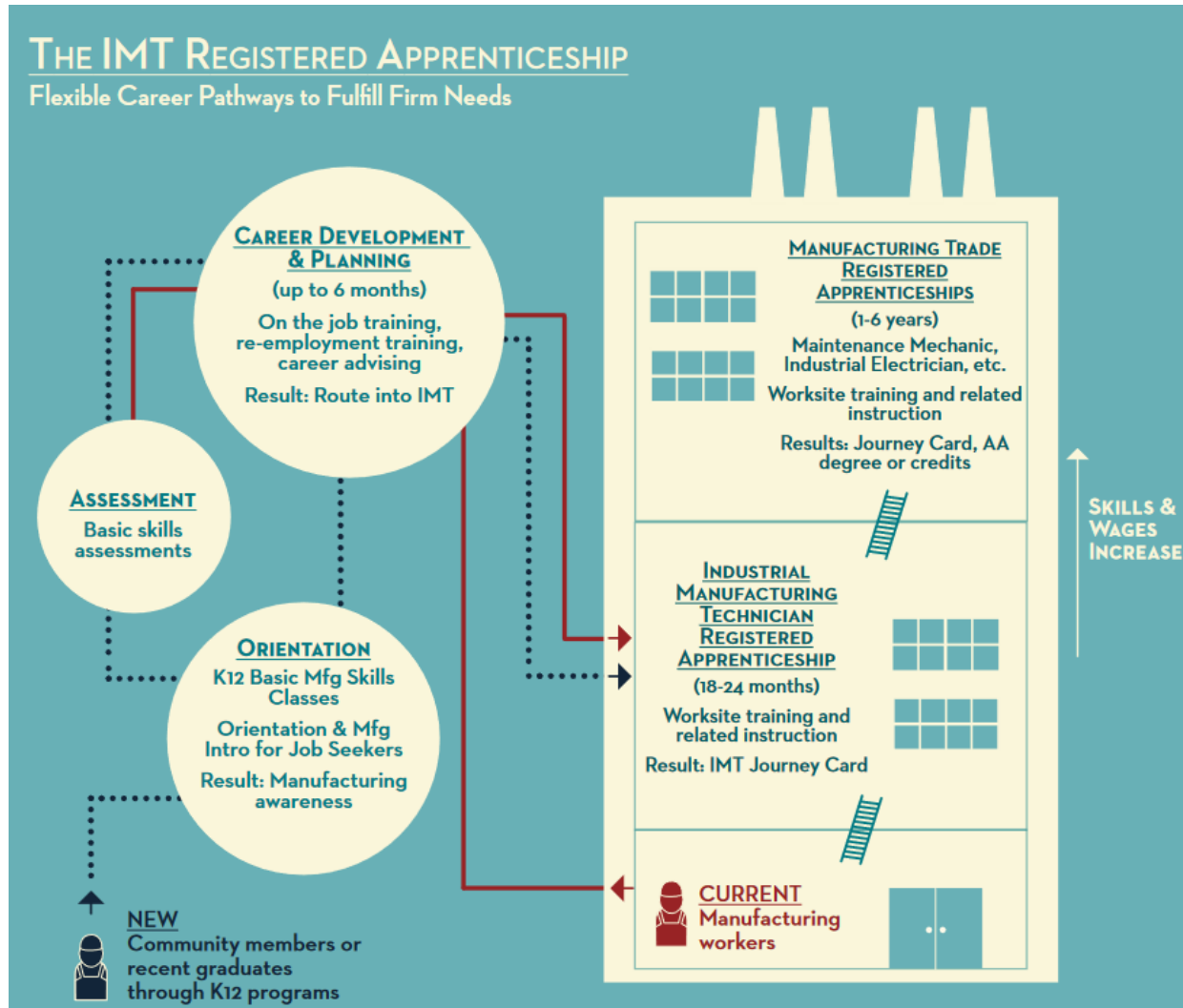
National Network for Sector Partnerships

Insights and implications: regional engagement

How does this work?

Equal Measure

Insights and implications: regional engagement

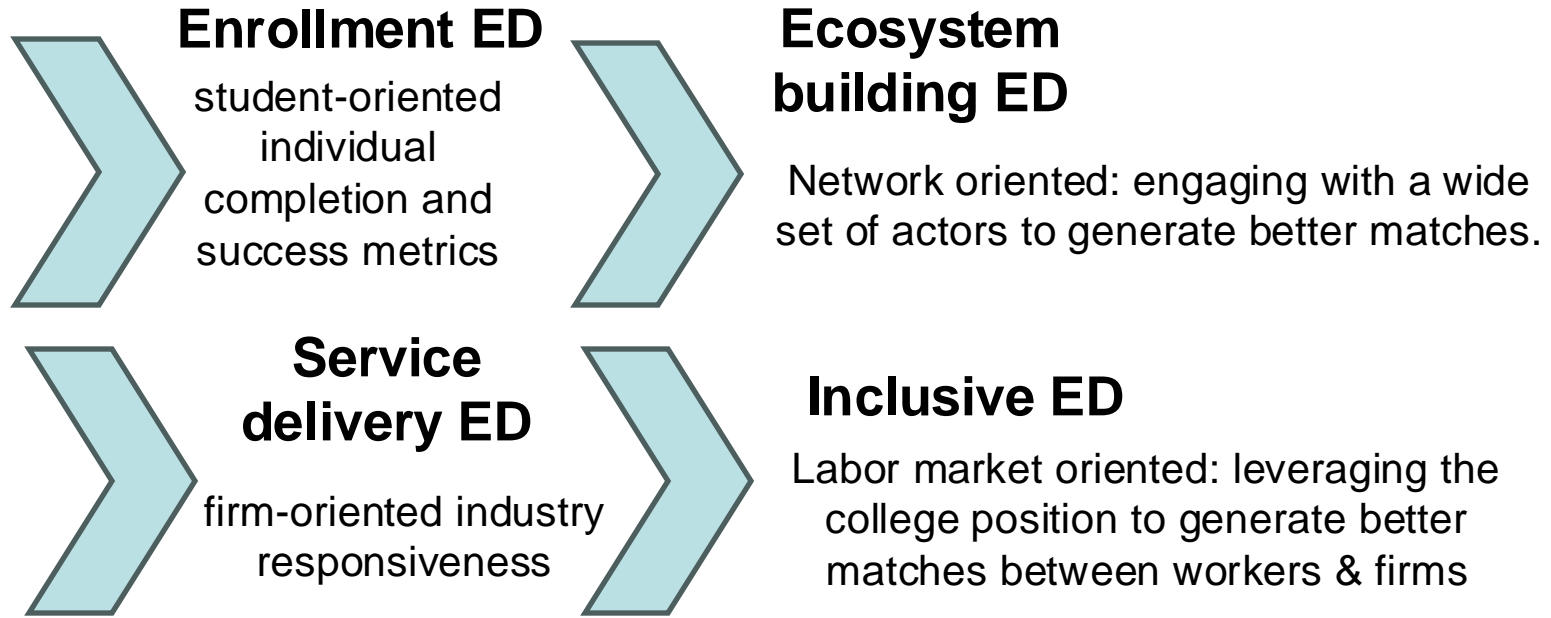How does this work?

COWS

Insights and implications: regional engagement

*A **deeper dive:*** colleges engage in strategic action, along a continuum…

- Colleges have articulated strategies and intentions
- Several examples of colleges leveraging their training power to produce better results for the region
- Forum for advancing strategies different in each region

Insights and implications: regional engagement

Enrollment ED
student-oriented individual completion and success metrics

Ecosystem building ED
Network oriented: engaging with a wide set of actors to generate better matches.

Service delivery ED
firm-oriented industry responsiveness

Inclusive ED
Labor market oriented: leveraging the college position to generate better matches between workers & firms

A Continuum of ED approaches

Ideas about economic development	*Firms as drivers of wages over time (e.g., growth accounting framework)*	*Education/skills of workers as driver of wages over time (human capital theory)*	*Worker power as driver of wages over time (declining worker power thesis)*

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Rejecting colleges as "order takers"

"

…like a restaurant order to the college, and it's our responsibility to fulfill that.

Well, we absolutely, frankly, reject that model, because it doesn't really work in our community. We are small enough as a metro area, where we've really developed a collaborative ecosystem

"

RUTGERS

"

Renegotiating role with employers

We have enough credibility and outcomes that we're able to now be a little bit more frank with employers … you have to be investing in your workforce as well.

…You may want to talk to so and so, even though you're a competitor, to see how it's working out.

And so we're now in a little bit of a better position where we can start advising business and industry on how to approach workforce development.

"

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Rejecting assumption of a low-wage economy

" We were a "low wage community"…we're the call center community…

But we could actually really be a technology hub, if we put all of our resources together, because our people they have just as much of a right to get that high quality job as anybody who lives in [a metropolitan area] or elsewhere. And we are always going to be a low wage community if we don't break that cycle somehow. "

Insights and implications: regional engagement

How does this work?

Discussion Break

Which of the initial findings resonate with you and which would you like to learn more about?

Collaborators and Publications

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Data Tools on technician grads and technician occupational trends:

https://sites.rutgers.edu/eerc-hii/data-tools/

EERC Publications
https://go.rutgers.edu/HIIpublications

Project website:
https://sites.rutgers.edu/eerc-hii/

Read More EERC Research on Economic Development

Illuminating Economic Development in Community Colleges: Lessons from NSF ATE Grants
June 2023, Michelle Van Noy and Radha Biswas

Lessons in Community Colleges Economic Development from the NSF ATE
June 2023, Michelle Van Noy, Radha Biswas, Marilyn Barger, and Debra Bragg

https://go.rutgers.edu/HIIpublications

Learn more about our data tools on technician graduates and technician occupational trends:

https://sites.rutgers.edu/eerc-hii/data-tools/

Visit our project website:
https://sites.rutgers.edu/eerc-hii/

ATE Project Engagement in Business Outreach Activities