March 16, 2023

Eric Smith
Director, Office of Innovation and Entrepreneurship
Economic Development Administration
Herbert C. Hoover Building
1401 Constitution Ave. NW
Washington, DC 20230

RE: Request for Information on Implementation of the Regional Technology and Innovation Hub Program: 88 FR 9427; 2023-03022

Dear Mr. Smith:

The Federation of American Scientists (FAS) is a catalytic, non-partisan, and nonprofit organization committed to using science and technology to benefit humanity through policy agenda-setting and delivering on the promise of equitable and impactful policy. FAS believes that society benefits from a federal government that harnesses science, technology, and innovation to meet ambitious policy goals and deliver impact to the public. I am writing today in my capacity as Director of Regional Entrepreneurship at FAS, to provide information on how to structure a Tech Hubs program that will accelerate regions across the U.S. into globally competitive leaders in industries of the future.

Tech hubs will help strengthen the region and U.S. economic and national security, but most importantly, they should provide opportunities for inclusive community planning around a central vision of the economic future a given place aims to pursue. Planning that is inclusive and seeks buy-in from the start from a wide range of stakeholders will create lasting durable coalitions, and is indispensable to creating a successful tech hub. Persistent and sticky coalitions
are not the sole determinant of a potential tech hubs’ success, but given the breadth of innovation ecosystem stakeholders which must be convened and consulted by any such effort, we believe strong coalitions and broad engagement to be the primary early indicator.

Specifically, my comments today will provide information on: 1) a model for understanding innovation ecosystems and their success or failure; 2) the characteristics of a Tech Hub; 3) program design recommendations; and 4) brief thoughts on leveraging resources and support across the pool of applicants. First, we introduce a model for understanding and assessment of Tech Hubs coalitions and offer preliminary thoughts on how this model might inform the evaluation of innovation ecosystems’ growth and development. Our recommendations for tech hub characteristics focus on outlining the ways that program eligibility and selection criteria might be designed to assess the capacity of each of the identified stakeholder groups in a given area. Our recommendations for program design focus on promoting activities that make up the “connective tissue” between each of those groups. Finally, our recommendations for other funding and resources highlight ways to crowd in further support for these activities within potential tech hubs.

Section 1: A Model for Understanding and Assessment of Innovation Ecosystems
Framing comments: Responses to Questions 1, 16, and 21
I will explain my recommendations in the context of a specific model of innovation ecosystems. This model, which I have adapted from whitepapers written by MIT entrepreneurship researchers Fiona Murray and Phil Budden, is built on two key academic concepts, and is reinforced through my many years of practice as an entrepreneur, ecosystem builder, and philanthropic funder of inclusive entrepreneurial ecosystems.

When it comes to judging the potential for success in developing innovation ecosystems, the model below is a tool that can be used to summarize the two key criteria that should be used to describe success: 1) breadth of engagement, and 2) evidence of trust and alignment across the ecosystem. Innovation ecosystems must engage and align these six key stakeholder groups:

- Entrepreneurs - Those who have started and are working to start new companies, including informal entrepreneurs, sole proprietors, small businesses, tech startups, university researchers considering or pursuing tech transfer, deep tech startups, manufacturing firms, service firms, and the non-profit organizations that convene them and represent their voices.
- Government - Public entities of all levels and branches, including, local, state, and federal government agencies and officials, as well as pseudo-governmental organizations and public-private partnerships (including some economic development organizations).

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- Corporations - Large and established companies in a region that are relevant in their capacity as major employers, large-scale purchasers, pilot customers, sponsors of research and potential strategic investors and acquirers of technology and innovation-driven companies. Corporations might also act in the classical definition of cluster development, providing fractional access to advanced equipment or capabilities that the scale of their capex facilitates, to improve access to such facilities for smaller or newer companies with fewer assets to fund such investments.

- Workforce Development - The programs and capabilities in a community that produce a base of employees with the specific skills and competencies to support both growing and established companies, including K-12 systems and districts, educators, non-degree credential programs, professional training programs or job pipelines, skills-based development communities and meetups, regional workforce partnerships, community colleges, and colleges and universities of all kinds.

- Capital - Providers of private capital that supports the creation of commercial value in exchange for a return on investment, including venture capital, angel investors, angel networks, traditional private equity investors, limited partners or institutional investors, as well as community banks, CDFIs, CDCs, other non-bank loan funds, fintechs, and providers of alternative financing such as factoring or revenue/royalty-based financing.

- Research Institutions - Organizations which conduct the basic and applied research from which deep tech businesses might be formed and begin the process of commercializing that research, including research universities and affiliated centers and institutes, research and teaching hospitals, private research institutions (such as the Stowers Institute or Danforth Plant Science Center), national labs, FFRDCs, and Focused Research Organizations.

Figure 1
In the context of regional, place-based innovation clusters (including tech hubs), this stakeholder model is a tool that can help a burgeoning coalition both assess the quality and capacity of their ecosystem in relation to a specific technology area or provide a guide to prompt broad convening activities. From the standpoint of a government funder of innovation ecosystems, this model can be used as a foundation for conducting due diligence on the breadth and engagement of emerging coalitions. It can also be used to help articulate the shortcomings of a given community’s engagements, to highlight ecosystem strengths and weaknesses, and to design support and communities of practice that convene stakeholder groups across communities.

Innovation ecosystems are complex, adaptive systems. They are complex because they are composed of not just six people or six organizations, but six systems with their own challenges, focuses, and dysfunctions. They are adaptive because these six systems work in ways that are interconnected and create reinforcing or balancing feedback loops—that is to say that a small change in the actions of one stakeholder can resonate within their own system, and throughout the larger ecosystem to create much larger effects that compound over time, or in a different context, that same small change can produce no effect at all on outcomes. Adaptive systems are difficult to model and predict, and sometimes even difficult to describe. This is precisely why the evaluation of innovation ecosystem efforts is difficult to standardize and outcomes are nearly impossible to predict.

**As the Tech Hubs program defines and prepares to measure its success in developing innovation ecosystems, it should be focused on capturing the specific ways in which innovation ecosystems and the capacities of the stakeholders within them are changing over time.** It should be less focused on measuring economic development outputs and outcomes as an indication of success or failure during the grant period. It should not ask applicants to predict the long-term economic outcomes that their work will produce nor should it ask them to report on economic outcomes relative to a prediction. This is a fruitless forecasting exercise that not even the finest economists can reliably produce. While economic outcomes should be collected as one kind of descriptive data to help measure the impact that Tech Hubs might have, the team should be careful not to frame these as critical measures of success—instead, success should be judged in terms of expanded engagement, and expanded stakeholder innovation capacity.

Concerted efforts to change the conditions of a given innovation ecosystem must be grounded in a collective impact approach if they hope to succeed. Collective impact models require the ongoing convening and building of trust among ecosystem stakeholders. This relational foundation allows collective impact efforts to align a broad group of stakeholders around a shared vision, priorities, plan for execution, and metrics for impact. This process of identification, convening, trust-building and alignment is slow. That is why efforts to build innovation ecosystems (such as those funded by the Tech Hubs program) must operate on a much longer and more sustained timeline than any one grant application to be successful.
The selection criteria for the Tech Hubs program should be grounded in an understanding that progress happens at the speed of trust—not at the speed of federal grant application periods. Communities that have a long track record of convening broadly and working to build trust and alignment among stakeholders are best positioned for success in building entrepreneurial ecosystems. Activities like previous programmatic partnerships, ongoing coalition meetings, existing shared governance structures, or efforts to collect shared impact data are examples of activities that might indicate ongoing collective impact efforts, and therefore, indicate high levels of trust among coalition partners.

Section 2: Characteristics of a Tech Hub

Responses to Questions 1 (a, b, c, d) and 16

As discussed above, the initial and qualifying criteria for a Tech Hubs should be that any application represents the work of multiple organizations in an existing coalition—not just one. The program should assess breadth or require engagement across the stakeholder model as a foundational indicator.

Answers to the questions “what city is best for X industry?” (and vice versa) or “what are defining features of a successful Tech Hub?” must be grounded in a methodology that extends beyond traditional asset mapping or the lagging indicators traditionally used to describe economic development (such as location quotient or industry employment). We argue that a stakeholder asset capacity analysis which includes comparative insights and is broken down by industry offers the most accurate assessment of a given region’s potential and metrics for success. Analysis should primarily focus on the capacity of stakeholders in those places, as the example metrics provided below:

- Entrepreneurs - What is the specific nature of firm formation, startup success, and small business growth potential in the proposed industry cluster, and what makes the entrepreneurs of this region particularly well-suited to build the cluster at hand?
  - Penetration of entrepreneur support programs: percentage of firms in a metro area served by entrepreneur support organizations.
  - Presence or past success of particularly novel or successful entrepreneur support programs with significant potential to develop startups or small businesses relevant to the cluster and its supply chains.
  - Industry specific value growth: aggregate valuation growth of startups by industry, via Crunchbase or Pitchbook.
  - Measurements that indicate the specific, industry-relevant capacity of small businesses: such as a high concentration of a specific, relevant type of manufacturing firm or service provider, relative to other places. For example,
Kansas City’s large concentration of contract research organizations and small-run process manufacturing firms have the potential to support a biologics cluster.

- **Industry specific entrepreneurship efficiency index**: e.g. breakdowns of data like the Startup Cartography project, which indicate which new firms are most likely to develop IP and experience venture-backable growth in the future.

- **Government - How aligned are governments in the region around pursuit of this cluster idea?** What is the nature of the resources that they provide to sustainably develop this ecosystem and stakeholders within it?
  - Active capital pools supported by other state and federal programs: E.g. SBA loans, SSBCI, state-funded ventures, and any specialized programs designed to help startups or small businesses in this cluster access capital.
  - Sustained presence of innovation-aligned incentives relevant to the proposed cluster such as angel investment tax credits or CDFI tax credits in the region.
  - Ongoing/sustaining funding commitments to support cluster activities or stakeholders activities relevant to it, such as sustained funding for entrepreneurship support organizations or funding for a public-private partnership.
  - Regional economic planning alignment or the degree to which diffusion of industry-specific focus into local economic development plans like CEDS or “Topeka 2040” plans has occurred.
  - Evidence of ongoing, traditional economic development activities designed to support the growth of the cluster, such as business or talent attraction efforts designed to support the growth of the proposed cluster.

- **Corporations - How are major employers and established businesses in the region relevant to efforts to build this cluster?** What connections exist to relevant corporate partners outside the region that can help advance this cluster’s development?
  - Corporate health assessment: including relative size/market share/profitability of publicly traded companies in the region compared to others in similar industries.
  - Strategic investment activity: including indicators of strategic investments and acquisitions in the industry made by local corporates or non-local companies with significant local ties, sufficient to indicate a pipeline of opportunities
  - Innovation value assessment including the total value of all patents and goodwill of publicly available financial statements, as an indicator of corporate willingness to pursue strategic acquisition activity, or presence of a corporate culture that values innovation.
  - Ongoing, locally-targeted engagement efforts relevant to the cluster, such as commitments to purchase goods or services from local small business vendors, pilot/first customer programs, or corporate accelerators with a track record of serving local companies.

- **Workforce development**
○ **Percentage of PhD graduates by discipline** aligned with specific industry focus, and the degree to which they stay in the region or flow elsewhere.

○ **Presence, speed to launch, or unique ability to create new classes and degree programs** within regional universities and community colleges of all types.

○ **Presence and seats in non-degree certificates and training programs** relevant to the cluster industry or specific skills needed.

○ **Indicators of ongoing industry-workforce engagement** relevant to the industry, or a specific, demonstrated ability to create nimble, responsive workforce training programs.

○ **Ongoing engagement efforts with established organizations** like Workforce Innovation and Opportunity Act (WIOA) partners and/or workforce partnerships to provide specific and targeted support to businesses relevant to the cluster.

* Risk Capital
  ○ **Industry-specific venture capital attraction**: reporting on startup rounds raised over time and corresponding increases in aggregate startup valuation categorized by industry.

  ○ **External vs. local venture funding ratio**: descriptive measures of how much startup funding comes from local vs. non-local sources, as a means of understanding the dynamics of a local venture capital and angel investment ecosystem.

  ○ **Volume of alternative financing deals**: measures to indicate debt/alternative financing needs are met.

  ○ **Volume of debt financing relative to need**: active capital pools deployed in the form of small business and microloans relative to estimated aggregate demand for capital.

  ○ **Access to existing capital products**: estimates of the volume of federally-funded, managed, or guaranteed capital products across programs and agencies, like SBA 504 and 7a loans, SSBCI funds, and USDA loans, controlled for population.

* Research Institutions
  ○ **Research classification**: text analysis and classification of abstracts of peer-reviewed publications at regional research institutions to help understand the volume and nature of research happening at institutions in the region.

  ○ **Research quality**: the number of citations pieces of research have secured from other papers published in peer-reviewed journals, which can be helpful in the aggregate (to answer the question, what is the best research we are producing?) or at the individual level (to understand which research institutions or even labs are producing the highest-quality, most relevant research).

  ○ **Tech transfer flows**: understanding the percentage of university tech transfer licenses granted to companies less than 5 years old vs larger or more established companies.
Finally, all categories measuring people should be regularly disaggregated on the basis of race and ethnicity, gender, and nativity. This is critically important because ensuring that innovation ecosystems are inclusive and produce equitable outcomes requires that we understand exactly who is and isn’t being served, as well as how those dynamics change over time.

The list above provides examples that are illustrative of what it looks like to analyze the capacity of assets in a stakeholder ecosystem, though they are not exhaustive. While it is probably unreasonable to assume that many cities are already thinking along these lines, the Tech Hubs assessment criteria and application question should be designed, in addition to providing descriptive information about proposed activities, to help draw out the insights above so that reviewers and program managers can judge a) whether communities understand what assets they have and the strengths and gaps in their capacity, and b) how well activities proposed align with opportunities to strengthen those assets and more broadly engage with un- or under-represented stakeholders.

Responses to Questions 12, 13, 14, and 15
Most of the value of a proposed Tech Hub will come from innovation (in product or process) that drives new firm or product creation. As such, to the extent that it is allowed by legislative intent, Tech Hubs should prioritize the growth of nascent innovation ecosystems that are well-positioned to drive outsized growth, especially in areas or industries that are aligned with national competitiveness priorities but are not already supported by purpose-built federal programs and incentives.

For instance, semiconductor manufacturing capabilities are an area of critical national importance, but they are already receiving funding and support from purpose built programs within the CHIPS and Science Act that will result in clusters around existing and soon to be built infrastructure. In contrast, the current administration has issued an executive order for a whole-of-government approach to advancing the bioeconomy, but no purpose-built cluster funding initiatives for the bioeconomy have been funded. In this regard, the Tech Hubs program should look more like an evolution of the Build Back Better Regional Challenge program than a follow-on investment in funded cities.

As one of few federal cluster development programs with a long-term authorization, the Tech Hubs program should prioritize criteria that allow it to be flexible, filling gaps in federal funding for innovation ecosystem development activities and adjusting to accommodate the creation and sunset of one-time industry-specific programs, purpose-built to seed innovation ecosystem development in specific sectors. Tech Hubs staff should look for community proposals that articulate the gaps in their ecosystem outreach, assets, or stakeholder connections and fund applications that articulate those gaps, whether or not federal funding is already at the
table. They should not just pursue the leverage of other government funding by doubling down on clusters funded by other agency and federal programs as a path to “agency collaboration.”

That being said, funding from other federal programs relevant to innovation ecosystem building can indicate some of the underlying conditions important to Tech Hub success—namely, the presence of ongoing coalition activity. They can also be useful as a means of “auditing” the stakeholder analysis and gaps articulated by applicants. For instance, if a community articulates a need to improve SBIR attainment as a gap in their research institutions’ capacity, Tech Hubs reviewers and staff could ask whether that state is an EPSCOR state or has an existing SBA FAST award, and then assess whether or not the recipient of that FAST award seems to be a meaningful partner in the coalitions’ application. Lack of that group’s involvement in the coalition without explanation could indicate that the coalition is struggling to fully engage research institutions in their work. That might serve as a point of focus if that application is funded.

Similarly, applicants who have been Build Back Better Regional Challenge semi finalists or have received Engines Type 1 funding might be more likely to have ongoing, rich coalition efforts. Below are federal programs that might offer particularly good opportunities for to better understand communities’ ongoing work in this regard:

- Small Business Administration: Small Business Innovation Research Program (SBIR), Regional Innovation Clusters, Growth Accelerator Fund Competition
- NSF: Regional Innovation Engines, EPIIC, EPSCOR
- Treasury: State Small Business Credit Initiative
- NIST: Manufacturing Extension Partnership, Manufacturing USA Institutes
- Department of Energy: Clean Energy Demonstrations on Current and Former Mine Land, Regional Direct Air Capture Hubs, Regional Clean Hydrogen Hubs, Office of Clean Energy Demonstrations
- Department of Defense: Defense Manufacturing Community Support Program
- Misc: Southern Crescent Regional Commission

Responses to Question 2, 4 and 11
Determining how the size and timing of investments can best accelerate a future Tech Hub’s evolution or that proposed Tech Hub’s relative global competitiveness is a difficult question for two reasons. First, the national competitiveness indicators and priorities outlined in the CHIPS and Science Act have not yet been produced. Second, the specific supports needed for critical technologies differ dramatically by industry. Some efforts, like those to build AI or cybersecurity capabilities are primarily workforce-driven, requiring little capital expenditures for companies and access to a few critical facilities like supercomputers, whereas industries like next-gen energy storage or the bioeconomy require significant new expenditures by most new companies to compete. Assuming that the eventual priorities will be broadly distributed across industries,
we recommend that the team focus more on judging the presence of regional alignment with national competitiveness plans.

We advise the Tech Hubs program staff to pay particular attention to the results of the NSF TIP Directorate’s pilot program for a National Network for Critical Technology Assessment (NNCTA) led by Dr. Erica Fuchs at Carnegie Mellon University as an early indicator of some of the capabilities that will be relevant to future discussions of national competitiveness. The NNCTA is convening dozens of academics to create analytical tools and dashboards to help government decision makers determine how best to invest limited resources to bolster critical technology capabilities. The NNCTA conducted a demonstration of their performers’ capabilities on March 15th, 2023. EDA should look to offer feedback for the tools and work with NNCTA and the NSF to better refine this analytical capacity. Doing so would help those responsible for standing up the Tech Hubs program make decisions with globally informed and industry specific analytics.

Section 3: Program design and structure
Response to Question 6
Tech Hubs will be best positioned to execute on three key aspects of innovation ecosystem building:

1. Broadening of stakeholder engagement in developing innovation ecosystems
2. Providing catalyzing funding (matched by local funders) for the development of new innovation assets
3. Strengthening the “connective tissue” between stakeholders in innovation ecosystems (the dotted lines in Fig. 1).

As it designs applications and funding opportunities, Tech Hubs should consider asking coalitions to put each proposed project in one of these three categories, as a means of better understanding the nature and purpose of proposed activities.

When it comes to funding outreach and broad engagement, Tech Hubs should fund the kind of work that it is most difficult to fund and therefore to do–convening and outreach. Tech Hubs should recognize that this work is foundational to the development of inclusive innovation ecosystems and fully fund these capabilities, not requiring matching funds. It might fund dedicated personnel, regular convening activities of stakeholders or other interest groups, and public communication and engagement campaigns, including large-scale events. Tech Hubs might also fund capabilities that allow Tech Hubs coalitions to sponsor the activities of groups in the community or facilitate partnership-building and collaboration. Finally, Tech Hubs might use

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2 Read the proposal here:
this as a justification to support major investments in space or facilities that allow for convening, regular meeting, or engagement with the community at-large.

When it comes to providing catalyzing funding for the development of new innovation assets, Tech Hubs funding should be structured as a first-mover. New innovation assets needed to support ecosystem growth might include the construction of new labs or facilities, the creation of new governance structures, or the expansion of a local university’s ability to conduct targeted research. These are all expensive undertakings and to ensure that they are sustainable community assets, local support for their development and maintenance is critical. Still, communities that do not have ready access to capital have traditionally struggled to provide the up-front match required in other EDA programs. Instead, Tech Hubs should not require a match, but should instead structure outputs and outcomes in the grant related to raising leveraged funding over time. This will allow the Tech Hubs capital to be truly catalytic in its impact, and allow teams time to build support for their work more broadly among funders.

Finally, when Tech Hubs funding supports programmatic interventions, it should emphasize evidence-based activities that strengthen the connective tissue between each of these stakeholder groups. The best proposals for a Tech Hub will clearly identify the programmatic activities that will best improve stakeholder connectivity and will articulate novel ideas for entrepreneurship support, plans to scale and adapt proven program models to serve new geographic areas, and perhaps even plan to revive old efforts for which sustained funding has not been available. In addition, good applications should build feedback loops into their program models, ensuring that the communities being served continuously inform program changes. Poorly constructed applications will propose reinventing the wheel by doing things like reinventing basic entrepreneur support curriculum, duplicating programs already active in the community, or failing to articulate how their activities, if they are similar, will reach new audiences.

Example: A novel, programmatic intervention to connect workforce development, entrepreneurs and corporations

If potential tech hubs want to ensure they have a workforce properly trained to contribute to their growing ecosystem, and incentivized to stay in the geographic area of the hub, they need to start with education in mind. One example of a novel partnership that the EDA should look towards in critical industries is the NeoCity partnership that won a Build Back Better Regional Challenge award in Osceola County, Florida. NeoCity features a 500-acre technology district with a semiconductor fab that provides semiconductor and microelectronic R&D and production capabilities to industry and government. The technology district also hosts NeoCity Academy, a

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3 For a description of their projects see: [https://www.eda.gov/sites/default/files/2022-09/Building_Central_Florida_Semiconductor_Cluster_for_Broad-Based_2022-09_Building_Central_Florida_Semiconductor_Cluster_for_Broad-Based_2022-09_Building_Central_Florida_Semiconductor_Cluster_for_Broad-Based.pdf](https://www.eda.gov/sites/default/files/2022-09/Building_Central_Florida_Semiconductor_Cluster_for_Broad-Based.pdf)
STEM high school located next to the tech center/fab. NeoCity Academy recently graduated its first class of 99 students.\(^4\)

Many of these students interned with the NeoCity semiconductor fab and learned about the processes involved. Additional state funding is creating a pathway for other county residents to develop skills and certifications in robotics, clean room processes, and wafer fabrication at nearby Valencia College through 20-week training classes. This is critical as one of the main bottlenecks in the semiconductor workforce is the availability of workers with clean room experience. Few students or workers across the country get access to hands-on education inside a clean room or on a wafer production line. This model can be replicated across other industries besides semiconductors. Advanced manufacturing of other goods, biomanufacturing, advanced battery technologies, and materials technologies hubs all should make use of such a place-based, education-focused model that can resolve key bottlenecks around given technologies.

**Example: Adaptation of an existing, proven programmatic model to connect research institutions, entrepreneurs, and capital.**

If potential tech hubs want to encourage women and people of color to start businesses based on innovation, they must first recognize that programs that exist today are not meeting the needs of those communities. However, they might look for analog programs that identify people with the skills to be successful in managing businesses that have little exposure to entrepreneurship, and seek existing program models along a similar theme: programs that train non-entrepreneurs to become entrepreneurs.

This is exactly what UNeTech, a novel tech transfer organization based in Omaha, NE did when they adapted the NSF iCorps model to create their “Opportunity Corps” program\(^5\). UNeTech is a part of UNeMed, a joint venture which houses the tech transfer offices of the University of Nebraska-Omaha, an urban-serving research university, and the University of Nebraska Medical Center. The program was created to see if the iCorps program’s success in helping scientists with no entrepreneurial background make the founder leap, could do the same for women and people of color who were not professors or graduate students, but had a STEM background. This program has now served dozens of entrepreneurs, and has spawned the creation of almost 10 businesses in just two cohorts. Due to the program’s collaboration with InvestNebraska, a state-run venture fund, many of the participating entrepreneurs have gone on to secure seed rounds.

**Response to Questions 20 and 22**


\(^5\) For a description of the project, see: [https://www.unetech.org/opportunity-corps/](https://www.unetech.org/opportunity-corps/)
Finally, as the Tech Hubs program is designed, **there are two characteristics of past EDA programs that we advise should be abandoned: requiring matching funds, and partial funding of applications.** The matching funds requirement is inequitable and penalizes organizations led by people of color, which raise less philanthropic and corporate funding than white-led organizations, as well as coalitions in rural areas. Removing the matching funds requirement does not necessarily mean that leverage can’t be measured, just that it is not a qualifying criteria for an application. Coalitions should be asked to measure and report on leveraged funding, including non-traditional and pro-bono support, as they measure the impact of their work.

Additionally, Tech Hubs should not plan to partially fund community applications under any circumstances. Given the importance of trust-building in a collective impact model like ecosystem building, care is often taken by applicant coalitions to ensure that organizations across the community are represented in their plans. This can help ensure the coalition’s long-term success as a wide group of organizations feel a sense of ownership over the group’s plan. They are also often carefully negotiated and politically calculated agreements, calibrated to “preserve the peace” among coalition partners. Application reviewers cannot possibly understand the community-level impact of choosing to fund some parts of an application and tossing out others. As a result, knowing that those decisions can have far-reaching ramifications, Tech Hubs should make funding decisions about applications as a whole, not excise specific projects within submitted applications.

**Section 4: The question you didn’t ask–leveraging outside support across the portfolio of Tech Hubs awardees**

Tech Hubs is the latest in a string of government investments that are making a strong statement that cluster development and innovation ecosystems are the future of economic development. As a result, many corporate and philanthropic partners are paying attention to the investments made by the federal government, with a desire to engage across the full portfolio of awardees. Aligned with their Regional Innovation Engines program, the NSF TIP directorate recognized this change and has taken steps to create support capacity, in the form of the “Engines Builder Platform” that is designed to leverage these emerging opportunities across the full network of awardees. Certainly, Tech Hubs could learn from this example. Better yet, it could seek collaboration with NSF and its Builder Platform to provide access to the same supports for participants in the Tech Hubs program.

As someone who has spent my entire career doing, studying, and funding ecosystem building work, I hope that my extensive comments today show evidence of my passion for this work, and the need for greater standards and frameworks to describe it. What I lack in brevity, I hope to

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make up for in pragmatic and useful insight. Thank you for the opportunity to provide comments and recommendations to inform this program, and FAS stands ready to assist the EDA in any way possible as it brings this program to life.

Sincerely,

Melissa Roberts Chapman
Director, Ecosystems and Entrepreneurship
Federation of American Scientists