

**Summary and Analysis of *Request for  
Information to Make Access to the Innovation  
Ecosystem More Inclusive and Equitable***

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## Executive Summary

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The National Science and Technology Council (NSTC) Lab-to-Market (L2M) Subcommittee is an interagency community convened by the White House Office of Science and Technology Policy (OSTP) to strengthen the Nation's ability to transition federally funded innovations from the laboratory to the commercial or government marketplace. Maximizing the real-world impact of research and development (R&D) to improve lives has been a long-standing priority of the U.S. Government across multiple Administrations. OSTP published a *Request for Information to Make Access to the Innovation Ecosystem More Inclusive and Equitable*<sup>1</sup> (Inclusive Innovation RFI) in the Federal Register, soliciting comments between the dates of June 3 and July 5, 2022 with the aim of gathering input from the public to identify and better understand:

1. Barriers that prevent innovators from underrepresented groups or underserved communities from participating in the U.S. innovation ecosystem;
2. Examples of government programs or other initiatives that have seen success in supporting innovators from underrepresented backgrounds; and
3. Recommendations to meet the specific needs of innovators from underrepresented backgrounds and underserved communities to increase their participation in the innovation ecosystem.

OSTP asked the Science and Technology Policy Institute (STPI) to prepare a report summarizing and analyzing the submitted responses. All statements and opinions reported in this document are based on submitted comments, which were accepted at face value; claims made in submissions were not fact-checked or otherwise verified. **Inclusion of comments or recommendations derived from Inclusive Innovation RFI submissions in this report does not indicate endorsement by STPI or OSTP.**

The RFI received 44 submissions from a variety of perspectives: 32% were from consulting and investment firms; 25% were from academic and research institutions; 25% came from entrepreneurs or groups whose missions directly or indirectly include working to build and strengthen innovation ecosystems (including: professional associations/advocacy organizations, foundations/philanthropies, enterprises, ecosystem connectors, and community-based organizations); and the remainder were from private individuals or government (Federal, State, and local).

## Barriers Identified by RFI Respondents

Barriers to participation of innovators from underrepresented groups in innovation ecosystems identified by RFI respondents were of four overarching types:

1. **Barriers to Entry into Innovation Ecosystems.** Barriers to entry into innovation ecosystems stemmed from a lack of established networks for many first-time innovators, lack of necessary resources (including funding, time, and advice), and lack of diversity in sources of capital.
2. **Educational and Knowledge Barriers.** Educational and knowledge barriers include a lack of exposure to science, math, engineering, and entrepreneurial preparation at all levels of education, lack of support for both faculty and students to pursue innovation at universities, and a lack of entrepreneurial training among prospective innovators and inventors.
3. **Structural and Cultural Barriers.** Although programmatic, entry, and educational barriers affect all innovators, they are amplified for groups that have historically suffered from bias and discrimination (e.g., based on race, ethnic background, sex, disability, income, or gender identity). Individuals from marginalized groups can also feel discouraged from participating in innovation ecosystems when they do not have representation in spaces where research and entrepreneurship are pursued.
4. **Federal Programmatic Barriers.** Challenges accessing Federal innovation programs stem from lack of knowledge about the programs (including their existence), lack of effective Federal outreach to underrepresented communities, and difficulty preparing applications for Federal support to develop and market innovations.

## Exemplar Programs from RFI Respondents

Ninety-five programs that respondents perceive to have successfully engaged underrepresented populations and underserved communities were identified in the RFI submissions. Most focused on supporting entrepreneurship through training, resources, and building connections in innovation ecosystems (45%). The next most common type of program focused on supporting science and technology education (24%). About 33% of the programs mentioned by RFI respondents were provided or funded by the Federal Government, 25% were provided by commercial operators, and the remainder were provided through non-profit organizations, academic institutions, and investment firms. Although RFI respondents mentioned many types of underrepresented groups when discussing barriers, about 33% of the example solutions mentioned in RFI submissions did not specify any underrepresented group. Those who did indicate underrepresented groups only specified two: women and racial/ethnic minorities.

## **Critical Success Factors for Successful Programs**

Although respondents were asked to identify critical factors contributing to the success of programs advancing the participation of underrepresented groups in innovation ecosystems, the variety of different types of programs made the definition of success ambiguous. Nevertheless, responses submitted to the RFI reflected three common traits associated with successful programs: (1) partnering closely with the communities the programs aim to help, (2) evaluating the situation of the community being served and the impact of the programs, and (3) providing sustainable, reliable support for an enterprise from development to commercialization.

## **Recommendations Proposed by RFI Respondents**

Respondents included many recommendations to make innovation ecosystems more inclusive and equitable.

In the area of outreach and communication, RFI respondents recommended community-based partnerships and targeted outreach. A variety of media and marketing strategies were suggested with the priority on highlighting innovators from underrepresented groups who can serve as role models, mentors, and guides. RFI submitters also emphasized the importance of support for science and technology education at all levels and using the platform of the Federal Government to recognize and publicize successful programs, enterprises, and innovators.

To address data needed for evidence-based policies, RFI respondents recommended continued support for research on diversity and inclusion in the innovation space, coordinating data collection and collation across the Federal Government, surveying applicants and awardees of Federal programs, and making data on underrepresented groups applying to innovation programs accessible and usable.

Respondents felt that the Federal Government is in a position to help change cultural values. They recommended that Federal outreach be accessible to all people and reviews of applications to Federal programs be free of bias. The Federal Government is also in a position to influence the general attitude toward innovation by highlighting successes, signaling academic institutions to reward innovation, and helping innovators overcome risks perceived by private investment sources.

Respondents also see a role for the Federal Government in creating opportunities: federally sponsored events like summits to showcase successful innovators and Federal resources; prize competitions and hackathons to lower barriers to entry; information portals to make resources easier to find; and matchmaking to help innovators connect with investors, Federal lab researchers, and other participants in innovation ecosystems.

Lastly, RFI respondents recommended that Federal funding programs set aside allocations specifically to support innovators from underrepresented groups and to make the application process for Federal resources more straightforward.

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# 1. Introduction and Background

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The National Science and Technology Council (NSTC) Lab-to-Market (L2M) Subcommittee is an interagency community convened by the White House Office of Science and Technology Policy (OSTP) to strengthen the Nation’s ability to transition federally funded innovations from the laboratory to the commercial or government marketplace. Maximizing the real-world impact of research and development (R&D) to improve lives—regardless whether the research was done at a Federal lab, a university, or a private company—has been a long-standing priority of the U.S. Government across multiple Administrations.

Partnerships across the innovation ecosystem—connecting government agencies, universities, entrepreneur support organizations (ESOs), private enterprises, and sources of capital—are a critical means of improving the conditions for transitioning scientific discoveries from research labs to the wider world. Partnerships maximize the economic impact of science and technology, increase the growth of enterprises based on innovation, and help ensure that all Americans benefit from federally funded innovation, especially those who have been historically disadvantaged and marginalized.

The L2M Subcommittee is committed to improving inclusive and equitable access to Federal resources through broad engagement with the U.S. innovation ecosystem. Throughout 2022, the Subcommittee led a series of activities seeking to identify specific barriers for underserved entrepreneurs in accessing the Small Business Innovation Research and Small Business Technology Transfer (SBIR/STTR) programs, also known as America’s Seed Fund.<sup>1</sup> These activities include a Customer Discovery study<sup>2</sup> conducted by Dr. Grant Warner of Howard University and the Lab-to-Market IDEA (Ideas for Developing Equitable Access) Summit held on May 17, 2022.<sup>3</sup>

The third major information-gathering activity was the *Request for Information to Make Access to the Innovation Ecosystem More Inclusive and Equitable*<sup>4</sup> (the “Inclusive

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<sup>1</sup> SBIR/STTR – America’s Seed Fund: <https://www.sbir.gov/>

<sup>2</sup> SBIR Inclusion Study: <http://sbirinclusion.com/>

<sup>3</sup> Lab-to-Market IDEA Summit (Ideas for Developing Equitable Access): <https://bit.ly/L2M-IDEASummitPlaylist>

<sup>4</sup> Notice of Request for Information (RFI) to Make Access to the Innovation Ecosystem More Inclusive and Equitable, 87 Federal Register 33,786 (June 3, 2022). <https://www.federalregister.gov/documents/2022/06/03/2022-11844/request-for-information-to-make-access-to-the-innovation-ecosystem-more-inclusive-and-equitable>

Innovation RFI”) published by OSTP in the Federal Register and soliciting comments from June 3 through July 5, 2022. For the purposes of the RFI, an *innovation ecosystem*

describes the complex community of participants and resources needed to develop and commercialize technology. This ecosystem includes the people (e.g., students, faculty, industry researchers, investors) that make up the institutional entities (e.g., universities, businesses, funding agencies, venture capital firms, State and local economic development organizations, entrepreneur support organizations), material resources (e.g., funding, equipment, facilities), and the relationships among these interconnected actors. Innovation ecosystems may operate at different geographic levels (e.g., city, regional, national) and within multiple sectors (e.g., health, energy, agriculture).<sup>5</sup>

The RFI sought “information to improve inclusive and equitable access to Federal programs and resources by broadly engaging stakeholders in the U.S. innovation ecosystem.”<sup>6</sup> More specifically, the L2M Subcommittee requested input from the public to identify and better understand:

1. **Barriers** that prevent innovators from underrepresented groups or underserved communities from participating in the U.S. innovation ecosystem;
2. **Examples** of government programs or other initiatives that have seen success in supporting innovators from underrepresented backgrounds; and
3. **Recommendations** to meet the specific needs of innovators from underrepresented backgrounds and underserved communities to increase their participation in the innovation ecosystem.

OSTP asked the Science and Technology Policy Institute (STPI) to prepare this report summarizing and analyzing the responses submitted to the RFI. It provides a summary of the comments, opinions, and recommendations provided by RFI respondents organized to address the L2M Subcommittee’s three main topics of interest. All statements and opinions reported in this document are based on comments submitted to the Inclusive Innovation RFI. All RFI responses were accepted at face value; claims made in submissions were not fact-checked or otherwise verified. **Inclusion of comments or recommendations derived from Inclusive Innovation RFI submissions in this report does not indicate endorsement by STPI or OSTP.**

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<sup>5</sup> Ibid.

<sup>6</sup> Ibid.

## 2. Methods

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To achieve the aim of the RFI, the L2M Subcommittee posed a set of eight questions:<sup>7</sup>

1. In your experience, what are barriers to participation in the innovation ecosystem?
2. Do barriers exist that are unique to innovators from specific underrepresented backgrounds or underserved communities? If so, what are those barriers?
3. How can the Federal Government identify the specific barriers, problems, or issues faced by innovators and emerging entrepreneurs from underrepresented backgrounds or underserved communities as they seek to engage with Federal programs and services?
4. How can the Federal Government increase participation in the innovation ecosystem by innovators from backgrounds and communities underrepresented in the current ecosystem?
5. In your response, please provide your definition of “underrepresented” or “underserved.”
6. How can the Federal Government meet the specific needs (e.g., training, support, other) of innovators and emerging entrepreneurs from backgrounds and communities underrepresented in the innovation ecosystem by either improving existing government programs or initiatives, or by offering new government programs or initiatives?
7. Are there examples of programs that have seen success in supporting innovators from underrepresented backgrounds and underserved communities in the innovation ecosystem?
8. What are the critical success factors of these programs?

All RFI responses were submitted to OSTP, who shared only those regarded as responsive with STPI. The text of all responses was initially sorted and categorized based on its relevance to the questions posed in the RFI. However, respondents interpreted the questions in a variety of ways colored by their experiences and interests. To more effectively highlight the insights and perspectives of RFI respondents, the classification of

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<sup>7</sup> Ibid.

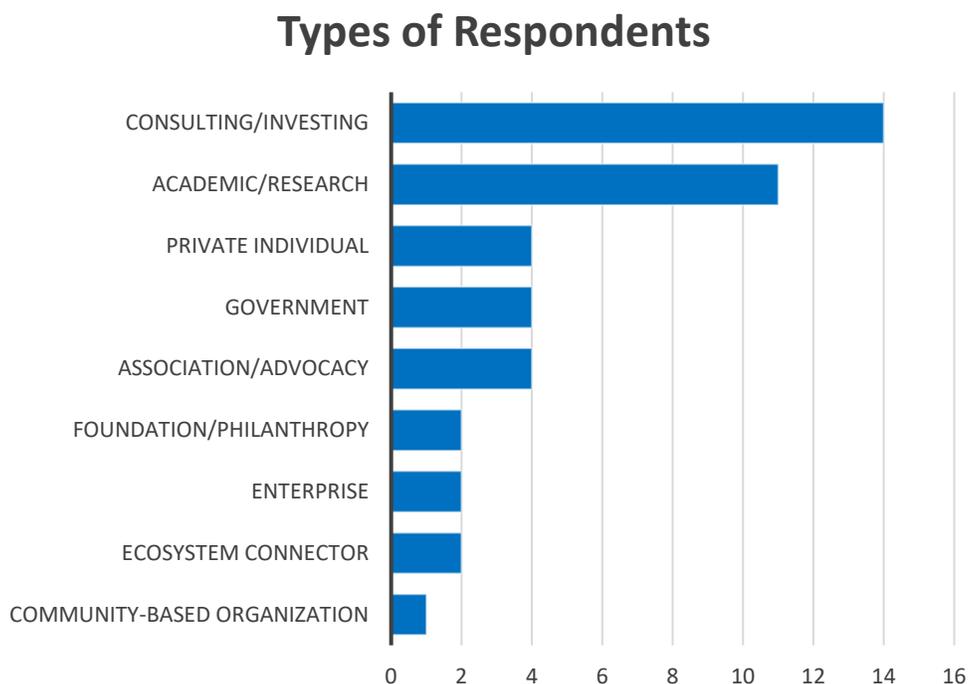
responses was simplified into three overarching categories, each corresponding to one of the three main topics of interest of the L2M Subcommittee:

1. **Barriers** faced by innovators from underrepresented groups;
2. **Examples** of programs providing solutions to overcome barriers faced by underrepresented innovators; and
3. **Recommendations** provided by respondents to advance equity and inclusion in innovation ecosystems.

In addition to summarizing and organizing the content of submissions, STPI sorted the respondents, barriers, and solutions into broader categories (described in additional detail in the appropriate sections) in order to explore for relationships among them. It is important to acknowledge that submissions represent the contributions of a self-selected pool of respondents and should not be taken as a strictly objective characterization of the U.S. innovation ecosystem as a whole. Nevertheless, the analyses and summary of RFI submissions provide useful insights into the people and institutions that make up the U.S. innovation ecosystem and indicate potentially fruitful directions for further investigation.

### 3. Characterizing the Pool of RFI Respondents

The Inclusive Innovation RFI received 44 submissions regarded as responsive. Submissions came from a wide range of perspectives (Figure 1), but were dominated by those from consulting and investing firms (32%) and from academic and research institutions (25%). Another 25% came from entrepreneurs or groups whose missions directly or indirectly include working to build and strengthen innovation ecosystems (associations/advocacy organizations, foundations/philanthropies, enterprises, ecosystem connectors, and community-based organizations). The remainder were submitted by private individuals and government representatives.



**Figure 1. Number of Submissions from Different Types of Respondents<sup>8</sup>**

<sup>8</sup> *Consulting/Investing*: entities providing funding or for-pay services to enterprises; *Academic/Research*: universities and non-profit research institutions; *Private Individual*: members of the public who do not represent any organization in an official capacity; *Government*: any Federal, State, Tribal, or local government entity; *Association/Advocacy*: entities representing particular economic or industry sectors as well as professional organizations; *Foundation/Philanthropy*: organizations that provide funding and other support to advance a specified mission; *Enterprise*: businesses pursuing innovation; *Ecosystem Connector*: organizations that promote economic development by providing support and other resources to entrepreneurs and investors; *Community-Based Organization*: entities working for the benefit of a local community. Assignment of respondents to each category was inferred based on the content of the submission.

## **4. Barriers Identified by RFI Respondents**

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### **A. Introduction**

Inclusive Innovation RFI respondents identified a wide variety of barriers facing entrepreneurs from underrepresented groups and underserved communities aiming to join innovation ecosystems. Based on the content of RFI submissions, STPI identified four broad types of barriers:

1. Barriers to Entry into Innovation Ecosystems,
2. Education and Knowledge Barriers,
3. Structural and Cultural Barriers, and
4. Federal Programmatic Barriers.

Within each of these categories, challenges identified by innovators were further sorted into more refined groupings. Specific challenges identified by respondents within each of these categories are described below.

### **B. Barriers to Entry into Innovation Ecosystems**

#### **1. Lack of Established Networks**

Many RFI respondents noted that entry into innovation requires a high level of social capital—i.e., knowing people with access to funding and knowledge. Respondents described social networks as an important means of finding role models, mentors, advisors, and guides who can help interpret a project solicitation, provide examples of successful applications for funding, and review a draft proposal or business plan.

A significant barrier for innovators from underrepresented groups identified by RFI respondents is their limited access to the social connections that are needed to fully participate in innovation ecosystems. Respondents noted that a lack of diversity among current innovators leaves those from underrepresented groups with fewer trusted, familiar connections to turn to for guidance, resulting in fewer pathways to start engaging with innovation ecosystems. RFI respondents felt that relationships with role models, mentors, and gatekeepers who “look like them” are an important factor contributing to success for innovators from underrepresented groups. The historic lack of awareness, support, and encouragement leads people from underrepresented and underserved communities to be less trusting, to have less confidence, to self-censor, and to feel excluded from innovation

ecosystems. RFI respondents also noted that cultural differences may impact how underrepresented innovators engage with colleagues and professionals in an innovation ecosystem, further exacerbating their sense of isolation. And importantly, RFI respondents noted that the lack of underrepresented innovators is self-perpetuating: without role models and mentors, fewer innovators from underrepresented groups (who themselves can serve as role models and mentors) choose to participate in innovation ecosystems.

## **2. Lack of Necessary Resources**

Pursuing innovation and launching an enterprise requires money and time, yet one of the most significant barriers facing many small entrepreneurs raised in RFI submissions is a lack of access to early-stage, non-dilutive, and “right-fit” investment capital. Innovators must have sufficient income or access to support to meet fundamental needs—RFI respondents mentioned child care, transportation, technology, mental health, housing, food—in order to put forth the effort required to launch and manage an enterprise. Lack of a stable income particularly prevents early-stage entrepreneurs (students and recent graduates) from pursuing startup ventures. In addition to limited access to necessary capital, RFI respondents reported that many minority and underrepresented entrepreneurs must overcome the disadvantages of an unskilled workforce, disconnected business support services, and lack of manufacturing facilities.

One of the most difficult challenges identified by RFI respondents is that obtaining the funds to launch a venture often requires having funds in hand. A lack of resources limits many small entrepreneurs because their inability to pay for one critical resource closes off access to other necessary resources. An example provided in one RFI submission results from the Leahy-Smith America Invents Act, which allows any person to claim to be an inventor and gives priority to people or entities that are “first to file” a patent claim. However, filing a patent claim requires money and the expertise of a patent attorney, which many small innovators cannot afford. Without a provisional patent in hand, investors are hesitant to support to an entrepreneur for the further development and commercialization of an invention. Another example taken from an RFI response concerns supplemental funds aimed at increasing diversity. These are typically granted on top of a primary grant *after* it has been awarded, but entrepreneurs from underrepresented populations often need support *before* they have won the main award to do exactly those things that are necessary to win it (e.g., invention, development, staffing). As noted by other RFI respondents, the issues faced by individual entrepreneurs also scale up to entire innovation ecosystems: nascent innovation ecosystems cannot help entrepreneurs until they build financial and structural infrastructure, but doing so requires a critical number of participants and connections.

A number of RFI respondents noted that the more limited personal networks of innovators from underrepresented groups close avenues for funding (e.g., friends and acquaintances, lending institutions, investors) available to larger and more established

entrepreneurs with strong personal networks. For example, the friends and family of innovators from underrepresented groups are typically less able to loan or invest capital than the friends and family of established entrepreneurs. RFI respondents also reported that debt-backed financing (i.e., loans) is notoriously difficult for women and minority entrepreneurs to access due to lack of collateral and gender bias. RFI respondents also noted that when venture capital is available, it often comes with a requirement exchanging cash for equity that is neither desired by nor engenders trust from the innovator.

### **3. Lack of Diversity in Sources of Capital and Other Resources**

Many RFI respondents noted that decision makers in venture capital firms tend to see potential more readily in people with whom they share cultural context and life experiences. However, the venture industry is overwhelmingly White and male at every level, which makes entrepreneurs from underrepresented groups less likely to win venture capital support. In addition, RFI respondents noted that sources of finance are often focused on a particular region, which can effectively exclude outsiders from underrepresented groups. This barrier is not limited to venture capital: RFI respondents noted that bias (conscious or unconscious) also affects the evaluation of innovators for accelerator programs, non-venture funding, and other opportunities.

## **C. Educational and Knowledge Barriers**

### **1. Lack of Fundamentals (Math, Science, Invention) at the K-12 Level**

Acknowledgment that disadvantaged communities and lower-income areas have historically been denied access to funding, equipment, instruction, curricula, and other necessary resources for science, technology, engineering, and math (STEM) education was a common theme in RFI submissions. Respondents felt that the resulting gaps in resources, personnel, and alumni support have hampered innovation at institutions serving these communities. Without a solid foundation in math and science as well as encouragement to develop a passion for science and technology, students will not gain the knowledge necessary to develop and advance innovations. RFI respondents emphasized the importance of fundamentals (mathematics and basic science rather than subjects like robotics and coding) as well as the need for early exposure to invention and entrepreneurship. Without a strong, early foundation in STEM education, children from historically marginalized and low-income communities can be put at a disadvantage that is difficult or impossible to overcome as they get older.

### **2. Lack of Support for Students and Faculty to Pursue Innovation at Universities**

Institutions of higher education have an important role in the innovation ecosystem through the students they train and the research they support. However, RFI respondents

reported that many colleges and universities do not offer students training or instruction on entrepreneurship or bringing innovations to market. An additional barrier raised in RFI submissions that is faced by students from minority and underrepresented groups is that they are often the first in their families to receive a college education. As a result, they are often expected to contribute to the financial well-being of their families upon graduation and therefore do not have time while in college to pursue entrepreneurial activity unless it counts toward their degree.

On the research side, only a handful of academic institutions were perceived by RFI respondents to provide a clear roadmap to help faculty entrepreneurs navigate the process of transitioning academic research to commercialization or to provide entrepreneurship training. Most universities were not thought to reward faculty efforts to move innovations from lab to market or provide sufficient funding and resources to technology transfer offices to help launch innovation-based enterprises.

### **3. Lack of Entrepreneurial Training**

A major barrier to participation in innovation ecosystems reported by numerous RFI respondents is that many potential innovators lack the knowledge needed to establish and manage a commercial enterprise. Commercializing an innovation requires legal, sales, and business skills that inventors focused on developing a technology often do not have and cannot readily afford. In addition, the knowledge needed to launch an enterprise is often not contextualized for people from particular geographic or demographic communities, diminishing their ability to enter innovation ecosystems. RFI respondents felt that the general lack of knowledge among potential innovators about how to commercialize their ideas gives large enterprises, which have greater expertise and resources, an advantage in bringing technology to market.

## **D. Structural and Cultural Barriers**

### **1. Systemic Bias and the Legacy of Historical Discrimination**

Respondents to the Inclusive Innovation RFI widely acknowledged that innovation ecosystems continue to suffer from a societal legacy of discrimination based on race, ethnic background, sex, disability, income, and gender identity. The systemic barriers that keep innovators from underrepresented groups and low socioeconomic status from access to quality education, work opportunities, economic mobility, and wealth-building act as a brake on prosperity.

One barrier keeping underrepresented groups from participation in innovation ecosystems that was mentioned in RFI submissions is the historical absence of women and people of color in technical fields. A consequence of this disparity identified by one RFI respondent is that funding from some government agencies results in fewer awards to

female innovators to commercialize their work because those agencies tend to focus on technology areas with disproportionately fewer women. In addition, according to one RFI respondent, approximately half of the gender gap in awarded patents can be attributed to the tendency for female inventors to abandon a patent claim after an initial denial.

RFI respondents noted that the culture and environment of the innovation space tends towards exclusivity that can result in micro-aggressions that discourage entrepreneurs from underrepresented groups. Although exclusion poses a clear barrier, RFI respondents noted that a lack of intentionally inclusive practices can also be damaging. An example described in one RFI submission was networking and professional development events that are held after hours or on weekends; these can result in exclusion of innovators without access to child care (predominantly women) or who must hold a second job to earn a living (economically disadvantaged people). Child and elder care responsibilities were identified in several RFI submissions as a substantial barrier to the full participation of women in innovation ecosystems.

RFI respondents noted that application reviewers can be affected by conscious and unconscious biases that affect the outcome of the awards process for women and other underrepresented groups. Traditional best practices employed to develop innovation ecosystems (i.e., supporting entrepreneurs with a demonstrated history of success) tend to favor male and White entrepreneurs, especially with respect to access to capital. In addition, significant capital often focuses on scaling an enterprise up, but several RFI respondents noted that doing so does not necessarily benefit underserved populations.

An additional source of systemic bias identified by RFI respondents is the impact of racial segregation, which has multiple negative effects that harm both the life opportunities of residents of segregated areas as well as the economic performance of entire metro areas. Innovation ecosystems are typically geographically confined, often to areas without minority populations, which limits their ability to connect with innovators from underserved groups. Innovators who live and work in areas with a dearth of investors, successful entrepreneurs, or technology incubators end up leaving their communities to be closer to sources of funding and management expertise according to several RFI submissions.

RFI respondents characterized underrepresented groups as suffering from both a wealth gap (characterized as a lack of access to wealth or wealthy individuals) and a credit gap (the lack of opportunities to secure loans or credit for businesses). For Black people, historical and ongoing structural racism has led to large disparities of employment, earnings, homeownership, and credit and banking services, contributing to extreme inequality in accessing favorable loan terms with banks and credit institutions. As noted in RFI submissions, Black business owners have lower loan approval rates—28% as opposed to 67% for White counterparts—and half of all Black business owners report experiencing a trust gap (i.e., feeling that they are treated unfairly by financial institutions). Overall, RFI

respondents felt that the ecosystem for Black-owned businesses remains thin, undercapitalized, and reliant on government and non-profit organizations rather than market investment.

RFI respondents also noted that not all underrepresented groups suffer from the same barriers. For example, Native American entrepreneurship opportunities are particularly hindered by limited broadband internet on Tribal lands compared to the U.S. average.

## **2. Cultural Differences and Inhibitions**

RFI respondents specifically identified the legacy of discrimination against people from underrepresented backgrounds and underserved communities as a barrier to participating innovation ecosystems. Underrepresented groups continue to confront affinity bias in hiring and project assignments, lack of awareness about communication style differences, unnecessary cultural norms within an organization that deter team members from fully contributing, and the threat of emotional or physical harm from micro-aggressions, harassment, and stereotyping. In the view of many RFI respondents, a historic lack of awareness, support, and encouragement has established a culture in which people from underrepresented and underserved communities do not trust and do not feel welcome entering the innovation ecosystem.

RFI respondents identified a number of ways that ongoing structural racism and cultural differences pose barriers to the participation of underrepresented groups in innovation ecosystems. Technology—inherently necessary for innovation—can be experienced differently by different demographic groups based on information processing style, technology self-efficacy (confidence with technology), and attitude toward technological risk. In workplaces that are not diverse, people from underrepresented groups can feel particularly exposed. For example, one RFI respondent felt that underrepresented people may perceive that pursuing innovation will appear to their supervisors as a distraction from their main work in a way that would not be noticed in the case of workers from a non-minority group. Lastly, it was noted in several RFI submissions that what is perceived as an innovation can differ significantly among people with different cultural backgrounds and assumptions. Innovations perceived as “grassroots” or “frugal” (i.e., not technologically sophisticated) are often overlooked by policymakers, academia, and industry in the United States, but can be the most important and valuable to marginalized and disadvantaged communities.

## **E. Federal Programmatic Barriers**

### **1. Lack of Knowledge about Federal Programs**

Several RFI respondents noted that identifying and navigating the array of funding resources and collaboration opportunities across the Federal Government poses a

substantial barrier to participating in innovation ecosystems. For many prospective innovators, doing anything with the Federal Government seems impossible because they do not know anyone who can help them navigate the process. Some RFI respondents felt that many entrepreneurs—particularly those who do not have previous experience with a government agency, the military, a university or Federal research lab, or a government contracting organization—are unaware of the various Federal programs available to them. In addition, many potential applicants do not understand how Federal programs work or how to apply, let alone what it takes to win an award. RFI respondents also reported that some agencies do not provide an easy means of asking clarifying questions or are unresponsive when queried and that information, programs, and services are not easily accessible. One factor contributing to innovators’ difficulty in identifying a Federal opportunity is that the language used to explain agency requirements and program objectives can be difficult for individuals unfamiliar with government opportunity announcements to understand.

In addition to confusion about agency missions, the rules and requirements can vary among programs, often in seemingly arbitrary and restrictive ways in the view of several RFI respondents. In addition, SBIR/STTR program funding opportunities can be narrow, which can discourage innovative submissions and favor applicants who have previously interacted with the funding agency. One RFI respondent reported a perception that program managers lack the time and resources to research new companies, leading them to be risk-averse. Another respondent commented that entrepreneurs are not highly incentivized to apply to Federal programs that lack a meaningful transition mechanism to help businesses find a path to bring their innovation to market and sell at scale beyond their initial Federal customer or partner.

## **2. Lack of Effective Agency Interaction with Underrepresented Communities**

Many RFI respondents felt that agencies lack understanding of program participants and should conduct research to better understand applicants and their motivations. RFI respondents reported that Federal program outreach suffers from a lack of understanding of the systemic, cultural, and digital barriers to participation facing marginalized and underrepresented communities. Federal programs often fail to partner with community-based organizations that understand the needs of a community, its culture and values, and the most effective mechanisms for communication and engagement. Federal programs and other ecosystem support organizations also often suffer from a lack of understanding of the distinct commercialization pathways for entrepreneurs and innovators from particular regions or demographic populations. In some cases, innovators may face barriers stemming from limited English proficiency, lack of access to technology or alternatives to online information, and the need to pay fees for simply accessing information. In other cases, RFI respondents reported that the digital platforms provided by programs do not effectively and

securely disseminate solicitations to all interested participants or allow online collaboration for responders and their team members to collectively prepare submissions.

According to several RFI respondents, members of underrepresented and underserved communities have historically had limited access to Federal labs and consequently the Federal lab innovation ecosystem. In addition, minority and women-owned businesses approaching Federal labs are often funneled to diversity supplier programs and do not have access to the lab leaders making decisions on purchasing products or services.

### 3. Program Applications Are Difficult and Time Consuming

Numerous RFI respondents reported that the SBIR/STTR application process is onerous, confusing, and time consuming. One submission framed the problem as a value proposition: a proposal that has a 10% chance to get \$100,000 of funding yields a net present value of \$10,000. Since preparation and submission may take 100 hours or more, the effort may not be justified, which dissuades many potential applicants. The odds of success can be improved for those with greater familiarity and expertise with the grant application process, but RFI respondents noted that this inherently favors larger companies over small enterprises or requires hiring expensive consultants, many of whom take a portion of a successful award. In addition to grant writers, RFI respondents reported that proposals require a list of qualified personnel to perform the contract—who can cost more than \$50,000 to retain; an expense of this magnitude excludes many individual innovators.

## F. Discussion

The most commonly identified barriers by respondents to the Inclusive Innovation RFI were barriers to entry (Figure 2)—i.e., lack of access to capital and networks necessary to successfully launch and grow an enterprise. Barriers to entry were closely followed by education/knowledge barriers and structural/cultural barriers, with Federal programmatic barriers being the least frequently cited in RFI submissions.

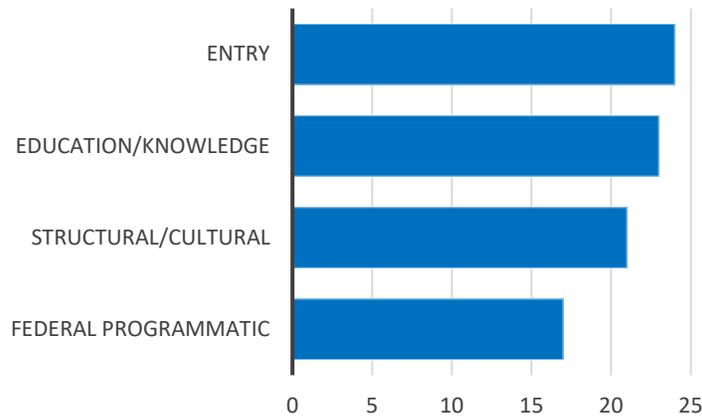
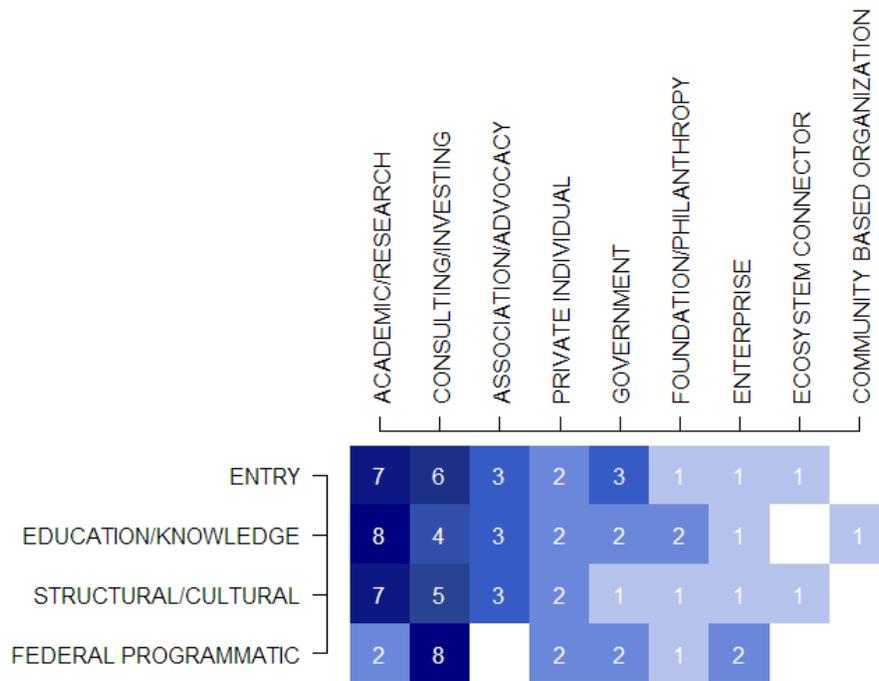


Figure 2. Number of Submissions Addressing Different Types of Barriers

The differences in the frequency with which different types of barriers were cited in submissions may reflect a difference in the interests of different types of respondents (Figure 3). In particular, respondents from the consulting/investing sector mentioned Federal programmatic barriers more frequently than any other group of respondents (8 of 17 total mentions of Federal programmatic barriers), who all largely focused on the other three types of barriers. Consulting/investing respondents also mentioned education/knowledge and structural/cultural barriers proportionately less frequently than other types of respondents, particularly those representing academic/research perspectives.



**Figure 3. Number of Submissions from Different Types of Respondents Addressing Different Types of Barriers**

Most RFI responses mentioned multiple barriers, often falling in different categories, which suggests a widespread sense that different types of innovation barriers are correlated with each other—for example, reduced access to high-quality educational opportunities results in more limited networks, which in turn reduce opportunities to obtain financing for an enterprise. The interdependence of barriers implies that they cannot be resolved in isolation from one another.

Although the original RFI posting specifically asked respondents to distinguish barriers to innovation and technology transfer as a whole from barriers faced by underrepresented groups, many respondents did not make a distinction between the two or identified the main barriers faced by all innovators as the ones primarily faced by underrepresented groups. This is not to imply that respondents felt that inclusion is not an

issue in the U.S. innovation ecosystem: that ongoing and legacy bias and discrimination magnify the barriers faced by innovators from underrepresented and marginalized populations was widely acknowledged in the RFI responses. However, the lack of distinction in barriers facing innovators from underrepresented groups versus innovators as a whole suggests that RFI respondents feel that an important way to improve opportunities in the U.S. innovation ecosystem is to strengthen the system for all entrepreneurs by making training, funding, and other resources more equitably accessible across the board.

## **5. Exemplar Programs from RFI Submissions**

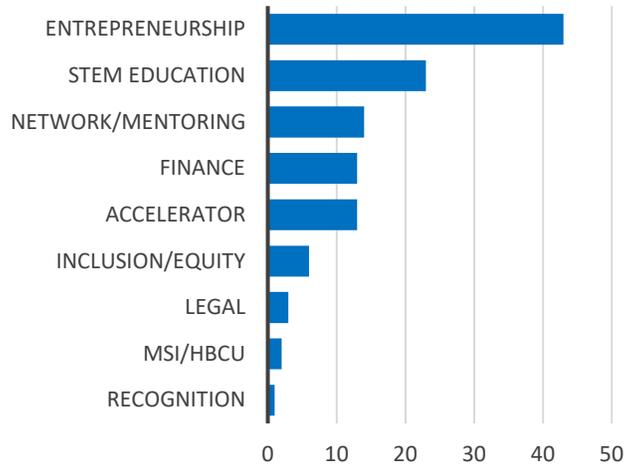
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### **A. Introduction**

In addition to barriers, RFI respondents were asked to provide examples of successful programs that advance the inclusion of entrepreneurs from underrepresented groups in innovation ecosystems. Although the RFI specified interest in Federal programs, responses included examples from a wide range of providers. Programs that (1) did not have a clear name or description or (2) did not have evidence of current or recent activity (e.g., websites with outdated information) were not included. Based on submitted information, programs were categorized according to the type of support or activity they provide, the type of organization overseeing the program, and the underrepresented group they target (if specified). All information was inferred from RFI submissions; no systematic or additional fact-checking or information gathering was performed.

### **B. Characterizing Programs Submitted to the RFI**

Ninety-five programs were identified in the RFI submissions (Appendix A), only one of which was mentioned by more than one submitter (the U.S. Patent and Trademark Office [USPTO] Law School Clinic Certification Program). Of these, the largest number focused on entrepreneurship support services (45%) and STEM education (24%) (Figure 4). Other innovation ecosystem services—networking/mentoring, finance, and accelerator—were each provided by a similar number of programs, together totaling 42%. Programs providing more than one form of support were included in every category to which they contributed.

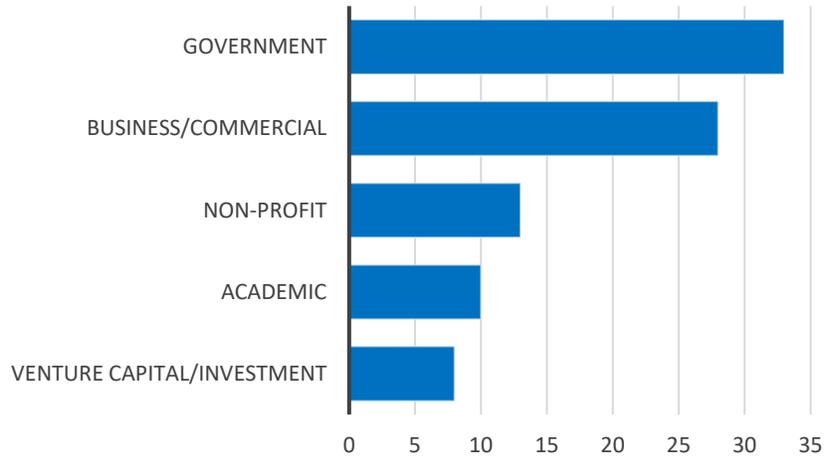


**Figure 4. Number of Programs Providing Different Forms of Support or Activities<sup>9</sup>**

In terms of the types of organizations associated with programs, the government offered the largest number (35%); these were mostly Federal but also included a handful of State programs (Figure 5). The second most common type of organization offering or associated with programs was businesses and commercial enterprises (29%). Programs mentioned in RFI submissions were also offered by non-profit groups (14%), academic institutions (11%), and venture capital/investment firms (8%).

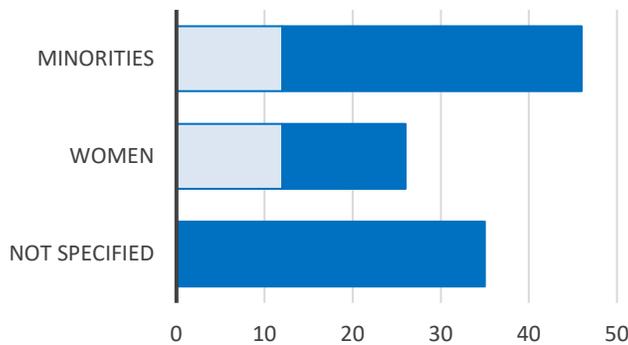
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<sup>9</sup> *Entrepreneurship*: programs providing non-financial resources for entrepreneurs, like training, facilities, equipment, and guidance; *STEM Education*: programs supporting STEM Education in an academic setting; *Network/Mentoring*: programs designed to help entrepreneurs foster relationships with role models, colleagues, and other members of an innovation ecosystem; *Finance*: programs providing funding to entrepreneurs and inventors; *Accelerator*: programs focusing on facilitating the transition of innovations from research to market; *Inclusion/Equity*: programs specifically focused on advancing the prospects and opportunities for people from underrepresented groups and ensuring they are treated equitably and fairly; *Legal*: programs providing legal assistance to entrepreneurs; *MSI/HBCU*: programs providing support to advance the missions of historically Black colleges and universities (HBCU) and minority-serving institutions (MSI); *Recognition*: programs highlighting successful innovators and/or entrepreneurs.



**Figure 5. Types of Organizations Offering or Associated with Programs**

Although all programs mentioned in RFI submissions implicitly addressed inclusion of underrepresented groups, just over one-third of program descriptions provided by respondents did not directly address what demographic groups they targeted or included (Figure 6). Of those that did, only two underrepresented groups were specifically mentioned: racial/ethnic minorities (nearly half of all programs) and women (just over a quarter of all programs). Twelve programs specifically mentioned serving both women and racial/ethnic minorities. It is noteworthy that although many submissions mentioned other types of underrepresented groups—for example, disabled people, indigenous people, and veterans—no programs specifically targeting those groups were identified.

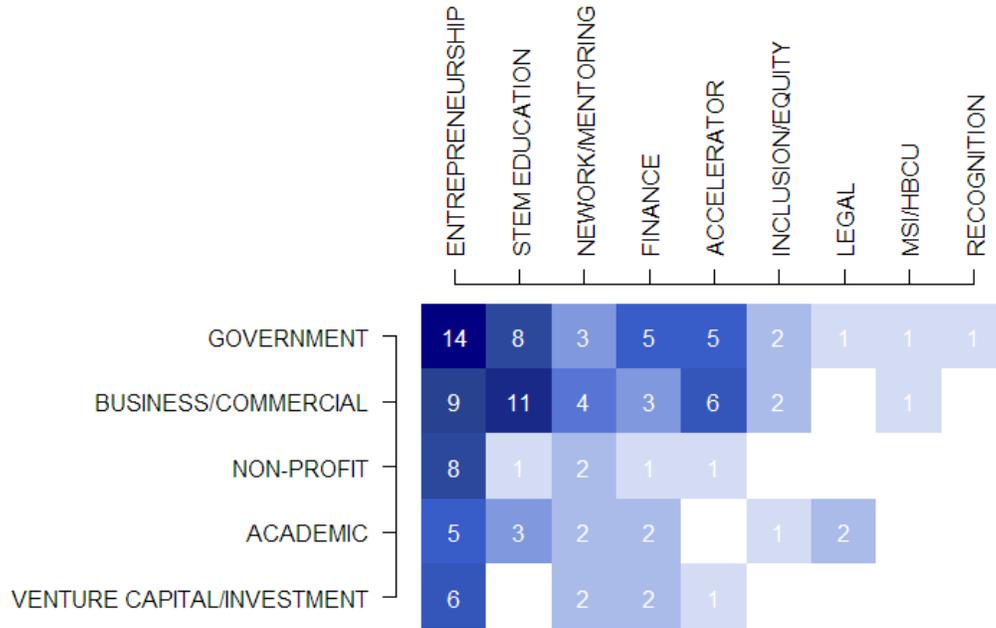


**Figure 6. Demographic Groups Targeted by Programs<sup>10</sup>**

<sup>10</sup> Light blue portions of bars indicate the number of programs that specifically target both minorities and women; these same 12 programs are included in the counts of both categories.

### C. Discussion

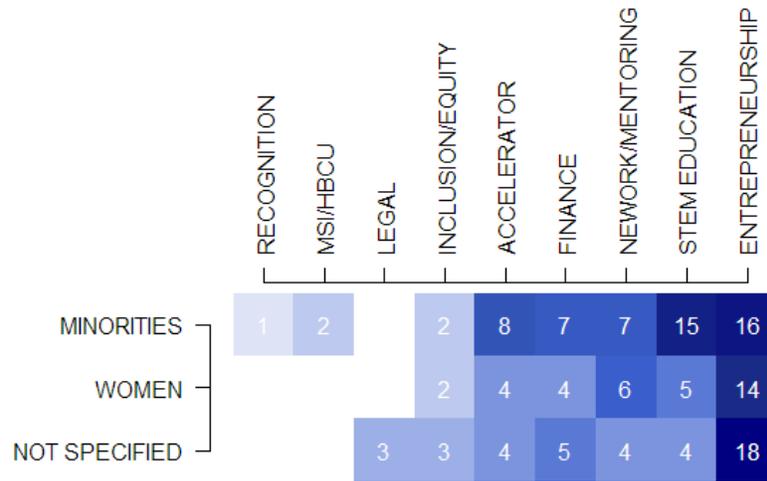
Sorting the number of programs by type of support provided and by the type of organization offering the program suggests that different types of providers address different needs (Figure 7). Government programs identified in RFI submissions tend to favor entrepreneurship support, finance, and accelerator services but appear to steer away from networking and mentoring. Businesses and commercial entities also serve as accelerators and have a particularly strong presence in STEM education. The programs mentioned in RFI submissions cannot be assumed to be representative of the U.S. innovation ecosystem as whole, both because the sample is small and because there is a self-selection bias in the pool of respondents; more rigorously collected data are needed to test whether suggested patterns are broadly characteristic of the U.S. innovation ecosystem. Nevertheless, these results suggest that innovation ecosystem services may be partitioned among different types of providers and that there may be opportunity to amplify their impact by connecting partners providing complementary service offerings.



**Figure 7. Interactions between Organization Types and Type of Support**

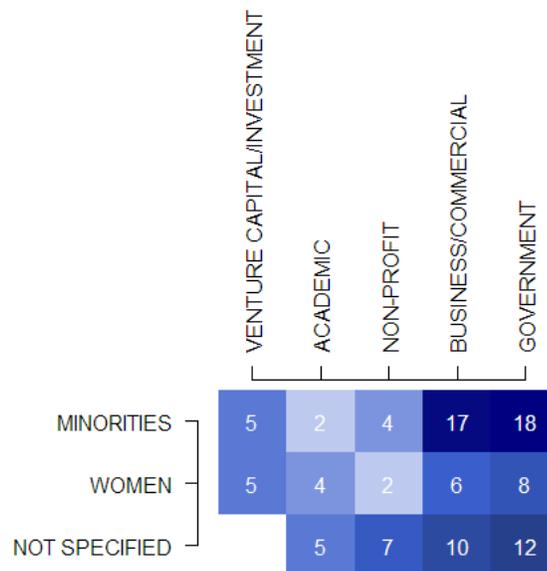
Despite the limited range of underserved demographics identified among RFI submissions, different types of programs appear to target different demographics (Figure 8). For example, despite a substantially larger number of programs aimed at supporting racial and ethnic minorities than those aimed at supporting women, each group has a similar number of programs offering entrepreneurship support (five programs providing entrepreneurship support specifically mentioned both groups and are counted in both categories in Figure 8). In contrast, STEM education and accelerator programs appear to

particularly target racial and ethnic minorities (only one STEM Education program and three accelerator programs specifically target both groups).



**Figure 8. Interactions between Program Types and Targeted Groups**

In contrast to program type, different types of organizations do not seem to differentiate between racial and ethnic minorities and women (Figure 9) relative to the overall profile of programs targeting the two groups (Figure 6). However, different types of organizations appear to have different degrees of specificity: non-profit organizations and academic institutions tend to offer programs that do not specify any target group, whereas venture capital and investment firms tend to specify women and/or minority innovators (two programs run by venture capital or investment firms specifically targeted both women and minorities and are counted under both groups in Figure 9).



**Figure 9. Interactions between Organization Types and Targeted Groups**

## **D. Critical Success Factors**

In addition to examples of programs that support innovators from underrepresented backgrounds and underserved communities, RFI respondents were asked to identify the factors critical to programs' success. The variety of different types of programs with distinctly different missions (e.g., entrepreneurship training, connecting networks, proposal preparation, investing capital) meant that the definition of success varied greatly. In addition, many respondents simply highlighted programs they felt were successful without articulating what they felt made the programs successful. Nevertheless, reviewing the RFI submissions suggests three factors that are consistently associated with perceptions of success, listed and discussed below.

### **1. Partnering with Targeted Populations**

Many respondents emphasized the importance of partnering with the geographic or demographic community a program is intended to serve. Working with local partners allows programs providing external resources (e.g., training, funding, networking connections) to identify the actual needs of a community and to customize messaging to communicate effectively. Collaborating with community leaders is also an important means of establishing trust and building the relationships that are the foundation for an enduring innovation ecosystem.

For example, one RFI respondent described how the University of California-Riverside has joined with the National Latina Businesswomen Association of the Inland Empire to offer a micro-MBA focused on business management targeting female entrepreneurs. This collaboration was created in response to a study that found that educational opportunities were what the community most desired. Another example of addressing the needs of a specific community is Celdara, which was described in an RFI submission as a program that provides funding and mentorship to innovators in academic settings, particularly women returning to academia after starting a family.

Targeted training can also focus on segments of the innovation ecosystem beyond just entrepreneurs. As an example, one RFI respondent noted the Black Venture Institute, which offers a virtual course hosted by the Berkeley Haas School of Business in partnership with Berkeley Executive Education that specifically aims to train Black angel and venture investors.

Networking and funding also benefit from direct engagement with community partners. For example, Invest in Women is an initiative run by venture firm Chloe Capital that hosts accelerator programs intended to increase visibility, forge connections with industry leaders, and make direct investment in technology ventures founded in disadvantaged communities. Each Invest in Women accelerator program is run in collaboration with one to two locally-based lead partners and conducts targeted outreach

and engagement activities to build trust, strengthen relationships, and inform programming.

## **2. Evaluation and Adjustment**

RFI respondents consistently mentioned the importance of evaluating the effectiveness of a program. However, metrics for evaluation varied among programs and were highly dependent on their aim and scale. Investment programs tended to report the number and diversity of ventures funded, training efforts tended to report the number of participants who completed the program, and diversity and inclusion programs to report the number of people from underrepresented groups they supported. In many cases, RFI respondents emphasized the importance of using evaluation tools and metrics to identify unmet needs in a particular community and adjust programming accordingly.

An example from one RFI submission of a Federal program that evaluates diversity, equity, and inclusion is the Homeland Security Startup Studio (HSSS), which brings together entrepreneurs, mentors, and inventors to deliver technology solutions for homeland security. Diversity, equity, and inclusion are measured by diversity within the companies formed in each HSSS cohort.

A non-government example is the Silicon Valley Innovation Program, which measures its success in reaching out to various underrepresented populations by tracking follow-on event participation, changes in the applicant pool for each of their topic calls, and ultimately whether companies stemming from the program are awarded funds.

## **3. Ensuring Sustainability**

Lastly, a number of RFI submitters noted that success is not accomplished just by reaching a particular milestone. Rather, a program's success requires endurance and should be considered an ongoing process of helping an underrepresented group or underserved population to advance over time. Participation in an innovation ecosystem is best viewed as a path starting with an idea or invention and ending with the establishment of a self-sustaining enterprise. It requires allowing innovators and entrepreneurs to accomplish all that is necessary to bring an innovation from lab to market, which may be unrealistic in a timeframe of 1–3 years (the typical duration of many programs). Rather, a critical factor for success is ensuring that an innovator can trust that the right kind of support will be available at each stage of an enterprise's growth rather than setting arbitrary deadlines.

## **6. Recommendations Proposed by RFI Respondents**

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RFI respondents made numerous and diverse recommendations to increase the inclusivity of the U.S. innovation ecosystem. Recommendations submitted to the Inclusive Innovation RFI were compiled and grouped into broad themes. Within each theme, general suggestions have been summarized narratively and more specific recommendations are listed individually. The recommendations included under one theme often also touch on other themes.

### **A. Outreach and Communication**

#### **1. Community-Based Partnerships**

Numerous RFI respondents noted the importance of engaging with and reaching out to communities and populations that are underrepresented and underserved in the innovation space. To build trusted relationships, programs must ensure that historically excluded communities have leadership in development, implementation, oversight, and accountability of programs. RFI respondents recommended that outreach and interaction with the greater innovation community be two-way, tailored to the community, and consistent over time. This can be done by providing funds and collaborating with trusted partners focused on increasing economic prosperity in underrepresented communities, including private-sector entities, community-based organizations, accelerators, incubators, schools, universities, foundations, States' economic development programs, regional and local governments, and chambers of commerce.

Community colleges, technical schools, vocational schools, colleges/universities, and high schools were identified as valuable resources to understand specific barriers facing a community or region, and one respondent proposed public libraries as hosts for entrepreneurial resource centers. Several respondents recommended direct interaction of SBIR/STTR program officers with individual innovators and businesses. To increase engagement and strengthen innovation and entrepreneurship within communities, one RFI respondent recommended that the Federal Government provide incentives in the form of cash or in-kind resources (e.g., free training) to participating individuals and organizations. Alternatively, resources could be used to incentivize States and cities to increase entrepreneurial output from underserved and underrepresented communities, thereby

keeping talent close to home rather than losing it to places with stronger, more established innovation cultures.

## **2. Targeted Outreach**

Many RFI respondents recommended targeting gatherings like trade events, conferences, and professional society meetings. These represent opportune occasions to hold focus groups to identify challenges facing various stakeholder communities. Workshops and roundtables at such venues would benefit from providing incentives to participate and return feedback. HBCUs and MSIs were identified as places to hold events (particularly events involving the technology transfer offices of Federal labs).

## **3. Media and Marketing**

Building awareness, providing program information, and supporting education and training require thoughtful, innovative marketing campaigns across the full spectrum of modern media. Federal programs' digital platforms should be easy to use for both requesting and submitting information. Information should be free of Federal jargon and clearly relevant and should focus on applicants rather than awardees. Multiple information channels and modalities should be used; RFI respondents recommended video vignettes (posted on TikTok and a dedicated YouTube channel), live virtual classrooms, Federal program office hours, and in-person classroom visits. In particular, virtual programming was recommended to reduce practical barriers—such as travel costs and time—to participate in Federal programs.

In addition to instructional information, RFI respondents described the importance of storytelling and ambassador models with a focus on tales of success, so that innovators from underrepresented groups can discover role models who share their experience. One RFI respondent noted that such efforts could tap the \$100 million allocated to improve customer experiences in the Federal Technology Modernization Fund,<sup>11</sup> announced June 16, 2022.

## **4. Recognizing Success**

RFI respondents opined that a powerful incentive to help mobilize the wider innovation ecosystem to increase diversity and inclusion is to recognize and publicize successes. Suggested approaches include showcasing successful entrepreneurs from underserved communities, offering incentives and recognition to large- and medium-size

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<sup>11</sup> The Technology Modernization Fund. “The Technology Modernization Fund: A New Funding Model for Federal Technology Modernization Projects.” Accessed August 22, 2022. <https://tmf.cio.gov/>

corporations for engaging underserved communities, and highlighting diversity in Federal awards, among community leaders, and within organizations.

## **5. Education and Training**

Numerous RFI respondents recommended supporting education and training, particularly focused on entrepreneurship and commercializing innovations. Specific suggestions included:

- Fund public and private programs that deliver STEM and entrepreneurship education, including programs that extend beyond university and community college campuses;
- Recognize and publicize model curricula and programs for schools and community organizations to adopt;
- Provide grants, scholarships, and fellowships for people from underrepresented backgrounds and underserved communities to further their education and business development;
- Sponsor Federal researchers and innovators to reach out to primary, secondary, and undergraduate institutions, emphasizing those serving underrepresented communities in order to showcase relevance while providing visible role models for students;
- Support programs that train applicants on how to prepare and submit a winning proposal to Federal programs;
- Mobilize Federal tutor teams to bring STEM and innovation education into elementary schools; and
- Conduct national studies on the efficacy of education programs focused on STEM and invention.

An area of particular focus for several RFI respondents was the need for education about intellectual property (IP). Some submitters recommended providing funds to support free IP workshops, legal clinics, and office hours. In addition, the USPTO and the Small Business Administration (SBA) should coordinate to provide IP education specifically designed to reach entrepreneurs from underrepresented groups.

## **B. Data on Diversity and Inclusion in Innovation**

### **1. Support Research on Diversity and Inclusion in Innovation**

Numerous RFI respondents raised the need for more and better information on the current state of diversity in the innovation sphere and recommended funding data collection

and research (both within and outside the Federal Government) to understand the barriers facing innovators from underrepresented groups. One respondent specifically recommended commissioning the National Academies of Sciences, Engineering, and Medicine to identify and make recommendations to address potential biases or barriers to participation in the SBIR/STTR application process.

## **2. Coordinate Data across the Federal Government**

Numerous RFI respondents identified the need to coordinate Federal data sources and collection efforts across agencies, including internal labor market analyses to identify bottlenecks or ceilings faced by innovators from underrepresented groups and demographic information related to research grants, patent applications, and granted patents.

## **3. Survey Applicants and Awardees of Federal Programs**

RFI respondents also consistently recommended surveying applicants and awardees as part of their interaction with Federal programs and services. One respondent specifically flagged the National Science Foundation's I-Corps<sup>12</sup> program as a model for conducting methodical, extensive, and intentional surveys and interviews. Another respondent advocated for the inclusion of entrepreneurship elements as part of the U.S. census.

## **4. Make Data Accessible and Usable**

A number of RFI respondents identified the importance of making data on diversity and inclusion in the innovation sphere available, accessible, and timely. Specific recommendations included developing modern digital platforms enabling public users to query what specific barriers, problems, or issues are faced by innovators and that can facilitate analysis and identification of best practices. Data should include geographic information system applications to identify regional disparities in entrepreneurial outcomes.

## **5. Specific Federal Actions around Data**

The RFI yielded a number of specific recommendations concerning data on diversity and inclusion in innovation to be undertaken by particular Federal entities:

- The Council for Economic Advisors should study and report on the inventor diversity gaps among women, people of color, and other underrepresented groups. The report should quantify the positive impact that greater access to

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<sup>12</sup> National Science Foundation. "About I-Corps." Accessed August 22, 2022. <https://beta.nsf.gov/funding/initiatives/i-corps/about-i-corps>

invention and patenting would have on individual income, wage gaps, national gross domestic product, and U.S. technological leadership.

- The Federal Reserve should study and report on the positive impact that expanding the number of inventors of color and patents granted to inventors of color would have on existing racial economic gaps and U.S. economic growth and recovery in the wake of the COVID-19 pandemic.
- The Office of Management and Budget should designate the USPTO as a data-sharing agency under the Confidential Information Protection and Statistical Efficiency Act.<sup>13</sup>
- Support the Individuals with Disabilities Education (IDEA) Act,<sup>14</sup> which would require the USPTO to gather demographic information on applicants (separate from patent applications in order to mitigate implicit bias in the patent examination process).
- Conduct a survey of diversity and inclusion maturity at Federal labs to be carried out by existing diversity and inclusion teams at Federal labs.

## **C. Changing Cultural Values**

Many of the most difficult challenges facing innovators from underrepresented groups are grounded in cultural and societal norms. Many RFI respondents identified how the Federal Government could begin to change cultural aspects of the innovation ecosystem that hold back innovators and entrepreneurs from underrepresented groups.

### **1. Changes in Federal Culture**

In order to lead a broad-based effort to expand the diversity and inclusion of innovation ecosystems, the Federal Government must set an example. An area that several respondents identified for change are the interfaces government programs present to prospective applicants. Broadly, Federal programs should employ human-centered, inclusive, participatory design in their public interfaces and remove biases and non-inclusive language from user-facing components of Federal technology products. In addition, equitable and effective service delivery would be advanced by responsibly engaging with communities to understand their experiences.

Besides ensuring that Federal program interfaces are inclusive, there is a need for the Federal Government to acknowledge and address the challenges that minority inventors have historically faced, specifically in the patenting process. In addition to acknowledging

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<sup>13</sup> Confidential Information Protection and Statistical Efficiency Act: <https://www.bls.gov/bls/cipsea.pdf>

<sup>14</sup> Individuals with Disabilities Education (IDEA) Act: <https://www.govinfo.gov/content/pkg/STATUTE-104/pdf/STATUTE-104-Pg1103.pdf#page=49>

past harms, it was recommended that the USPTO (1) reconsider the guidelines for eligibility for taking the USPTO bar exam to remove unnecessary barriers to entry into the field and (2) make financial support available for a pilot program to reduce fees and accelerate patent examinations and certifications for minority applicants (similar to the awards under the Patents for Humanity program).

A number of RFI respondents recommended including a requirement that all Federal grant applications include a Diversity and Inclusion Plan at the applicant's institution, including reporting of specified metrics. In addition, Federal programmatic offerings should undergo regular, in-depth reviews to assess their impact on diversity. One respondent advocated implementing a Diversity and Inclusion Maturity Model (e.g., the Korn Ferry Maturity Model) to measure and drive progress in the expansion of inclusion in Federal programs. Another respondent suggested establishing a committee that would receive continuous feedback from researchers studying innovation and entrepreneurship ecosystems and the effect of Federal initiatives.

To strengthen Federal transparency and accountability, one RFI submitter recommended establishing ombudsman positions in SBIR/STTR offices to receive and address complaints of bias.

## **2. Strengthening Federal Resources**

RFI submissions included a number of specific recommendations to provide support to innovators. To help people from underserved communities participate in innovation programs, RFI submitters recommended that the Federal Government expand the availability of critical support services (e.g., child care, transportation) and provide stipends and/or insurance coverage. Two RFI respondents recommended strengthening and expanding the USPTO's successful legal assistance programs to help innovators deal with IP issues (e.g., USPTO's Patent Pro Bono Program and the Law School Clinic Certification Program). Lastly, one respondent noted that the Americans with Disabilities Act (ADA) has provisions for a disabled person to be hired by a corporation or business but does not have a provision for equal access in government contracts. This is an oversight and the respondent recommended changing the ADA to allow impoverished disabled persons to have equal access to government contracts for employment.

## **3. Changes in Academic Culture**

In addition to changing aspects of Federal culture and carrying out actions to advance inclusion in innovation ecosystems, several RFI respondents encouraged using Federal leverage to push the culture of academia to be friendlier to entrepreneurship and innovation in general and particularly for people from underrepresented groups. Further, universities should be encouraged to train faculty in entrepreneurship, and those receiving Federal

funding should incorporate innovation and entrepreneurship into the criteria for tenure and promotion as a form of scholarship.

#### **4. Changes in Investment Culture**

Lastly, a number of RFI submitters made recommendations on how to change the culture of investment to advance the inclusion of underrepresented groups in innovation ecosystems. One suggestion was to encourage revenue-based financing, in which an enterprise pledges a percentage of topline revenues rather than giving up equity in order to obtain capital. Another suggestion was to support investment by providing anchor capital (i.e., a seed to build confidence for others to invest), to fund manager education and training, and to encourage community building with the aim of effecting systemic generational change in venture capital. In addition to capital itself, it was also recommended that the Federal Government collaborate with private industry and professional organizations to establish mentorship and coaching programs to educate stakeholders on the IP process.

#### **D. Creating Opportunities**

Numerous RFI respondents identified actions the Federal Government should take that would directly create or increase opportunities for innovators from underrepresented groups:

- Sponsor a Federal Innovation Summit to showcase Federal and contractor teams with successful innovation projects and to allow entrepreneurs to pitch ideas;
- Sponsor federally supported hackathons and competitions with prize money and scholarships in which teams must include a majority of students from underrepresented groups;
- Pair prize competitions (which have a low entry barrier) with accelerator programs to help participants develop their solutions;
- Expand the scope and number of Federal agency internships (e.g., National Institutes of Health, National Aeronautics and Space Administration) for underrepresented students;
- Provide funds for the hiring of expert mentors and advisors who can bring professional management guidance to ventures undertaken by new innovators;
- Provide funds to subsidize the cost of preparing and filing patent applications;
- Provide funds for cohort training programs, to be managed by State or municipal agencies, specifically designed to serve non-university inventors and small businesses;

- Provide a one-stop portal to a database of resources that allows entrepreneurs easy access to information on access to capital;
- Provide a readily accessible repository of easily understandable web-based content and tools that include step-by-step guidance to minority and underrepresented inventors throughout the patenting and product commercialization lifecycle;
- Provide a matchmaking service to help small and large businesses connect with each other to develop submissions for upcoming requests for proposals;
- Facilitate the creation of a network of mentors; and
- Establish a federally funded free incubator/accelerator.

## **E. Federal Funding Programs**

### **1. Funding Priorities and Set-Asides**

RFI submitters identified a number of priorities that should specifically be supported through Federal funding to increase inclusivity:

- Set aside funds for unsolicited proposals in addition to those submitted in response to a request for proposals;
- Set aside funds to provide on-ramps specifically for underrepresented groups;
- Set aside funds for first-time innovators (“First Chance Opportunities”);
- Provide grants to help enterprises scale up through business model iteration, product and service innovation, and geographic expansion;
- Create new Federal acquisition rules specifically for emerging technology (“Federal Acquisition Rules for Innovation”); and
- Ban applicants that use government innovation funding as a steady revenue stream rather than for launching a sustainable enterprise.

### **2. Federal Application Process**

Two of the most commonly cited barriers facing innovators from underrepresented groups concern (1) the difficulty of preparing an application to Federal grant programs and (2) bias in how applications are reviewed. To help innovators apply to programs, RFI respondents recommended streamlining the grant application process to include only truly essential requirements and providing greater pre-application assistance to first-time and underrepresented applicants.

RFI respondents addressed the importance of reducing bias and improving the review process by:

- Increasing the diversity of reviewer pools;
- Conducting blind reviews of the technical merit sections of applications;
- Tracking metrics of reviewer bias; and
- Training reviewers in effective evaluation and how to provide actionable feedback.

## Appendix A. Programs Identified in RFI Submissions

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<b>Program Name</b>	<b>Program Type</b>	<b>Setting or Type of Organization</b>
Accelerating Women and under-Represented Entrepreneurs (AWARE)	Entrepreneur Support	Academic
AI for Future Workforce	STEM Education	Business/Commercial
AllStar Innovations™	Entrepreneur Support	Business/Commercial
Amazon and Columbia University created the Summer Undergraduate Research Experience (SURE)	STEM Education	Business/Commercial
Amazon Future Engineer (including Alexa for Astronauts)	STEM Education	Business/Commercial
Amazon Robotics teamed up with Hampton University	STEM Education	Business/Commercial
Angel Capital Association	Entrepreneur Support, Finance	Business/Commercial
Association of University Technology Managers (AUTM)	Entrepreneur Support	Non-Profit
AWS GetIT	STEM Education	Business/Commercial
AWS re/Start	STEM Education	Business/Commercial
BE NYC Mentors	Entrepreneur Support	Government
Bioscience Inclusion Initiative	STEM Education, Entrepreneur Support	Business/Commercial
Bioscience Industry-Workforce Collaborative	STEM Education, Network/Mentorship	Business/Commercial
Black Venture Institute	Entrepreneur Support	Venture Capital/Investment
BRACE For Impact	Entrepreneur Support	Non-Profit
California Energy Commission (CEC)	STEM Education	Government
California Public Utilities Commission (CPUC)	STEM Education	Government
Cardozo/Google Patent Diversity Project	Inclusion/Accessibility, Finance	Business/Commercial
Code Next	STEM Education	Business/Commercial

<b>Program Name</b>	<b>Program Type</b>	<b>Setting or Type of Organization</b>
Collaboratory for Women Innovators	Network/Mentorship	Academic
Columbia Startup lab (CSL)	Finance	Academic
Communities of Practice (CoP)	STEM Education	Non-Profit
Cornell Tech Runway, The Runway Startup Postdoc Program	Entrepreneur Support, Network/Mentorship	Academic
DHS's Office of Partnership and Engagement's Social Impact Working Group	Inclusion/Accessibility	Government
Diversity VC	Finance	Venture Capital/Investment
DOE-wide DIVERSE-W Event Series	STEM Education, Entrepreneur Support	Government
DRIVEN	Accelerator	Business/Commercial
Edison Nation	Entrepreneur Support	Business/Commercial
FastForward	Finance, Entrepreneur Support	Business/Commercial
Federal Laboratory Consortium for Technology Transfer (FLC)	Entrepreneur Support	Government
FedTech	Accelerator	Venture Capital/Investment
Fordham Entrepreneurial Law Clinic (ELC)	Legal	Academic
FOR-M initiative	Entrepreneur Support	Non-Profit
GEM Consortium Inclusion in Innovation	STEM Education, Entrepreneur Support	Government
GenderMag	Inclusion/Accessibility	Unknown
Golden Seeds	Entrepreneur Support, Network/Mentorship	Venture Capital/Investment
ICF	Inclusion/Accessibility	Business/Commercial
I-Corps	Entrepreneur Support	Government
IdeaScale Challenge	Accelerator	Business/Commercial
IE National Latina Businesswomen Association of the Inland Empire	Entrepreneur Support, Inclusion/Accessibility	Non-Profit
Impact Seat	Accelerator	Business/Commercial
Innovation Crossroads	Entrepreneur Support	Government
International Business Innovation Association (INBIA)	Entrepreneur Support	Non-Profit

<b>Program Name</b>	<b>Program Type</b>	<b>Setting or Type of Organization</b>
International Business Innovation Association (INBIA)	Entrepreneur Support	Non-Profit
International Career Advancement Program (ICAP)	Network/Mentorship	Non-Profit
International Scientific Advisors (ISA)	N/A	Government
Invent Together	Inclusion/Accessibility	Business/Commercial
Invest In Women accelerator	Entrepreneur Support, Network/Mentorship	Venture Capital/Investment
iNvictus Office Center	Entrepreneur Support, Network/Mentorship	Business/Commercial
JROTC STEM	STEM Education	Business/Commercial
Launch Minnesota	Accelerator	Government
Law School Clinic Certification Program	Legal	Government
Mentor-Protégé	Network/Mentorship	Government
Meta	Accelerator, Network/Mentorship	Business/Commercial
Minority Business Development Agency (MBDA)	Inclusion/Accessibility, Finance	Government
Minority Serving Institutions and Community Consortium (MSICC)	STEM Education, Entrepreneur Support, MSI/HBCU	Government
Minority Serving Institutions Partnership Program (MSIPP)	STEM Education	Government
Missouri Louis Stokes Alliance for Minority Participation in STEM (MoLSAMP)	STEM Education, Entrepreneur Support	Academic
National Inventors Hall of Fame	Entrepreneur Support	Non-Profit
New York Fashion Tech Lab	Entrepreneur Support	Venture Capital/Investment
NSF Advance	STEM Education, Inclusion/Accessibility	Government
Pacific American Fund (PAF)	Accelerator, Inclusion/Accessibility	Government
Patent Pro Bono Program	Finance	Government
Patents for Humanity	Recognition	Government
Penn Law Entrepreneurship Legal Clinic	Legal	Academic

<b>Program Name</b>	<b>Program Type</b>	<b>Setting or Type of Organization</b>
Portfolio	Finance, Entrepreneur Support	Venture Capital/Investment
Quirky	Entrepreneur Support	Business/Commercial
REACH for Commercialization™	STEM Education, Entrepreneur Support	Academic
Revolution Capital	Entrepreneur Support	Venture Capital/Investment
Rutgers I-Corps Fellowship	Finance	Academic
SBA Growth Accelerator Fund Competition	Entrepreneur Support	Government
SBIR/STTR Phase 0 Assistance Program/Dawnbreaker program	Inclusion/Accessibility	Government
SBIR/STTR programs	Entrepreneur Support	Government
SCORE	Network/Mentorship	Non-Profit
Silicon Harlem	Accelerator	Business/Commercial
SLAC DEI Office	Inclusion/Accessibility	Academic
Small Business Administration (SBA)	Entrepreneur Support, Finance	Government
Small Business Innovation Research (SBIR) & Small Business Technology Transfer (STTR)	Entrepreneur Support	Government
Social Solutions International, Inc.	Accelerator, Inclusion/Accessibility	Business/Commercial
Tech Exchange	STEM Education, MSI/HBCU Support	Business/Commercial
Telebrands.com	Entrepreneur Support	Business/Commercial
The Federal and State Technology (FAST) Partnership Program	Entrepreneur Support, Finance	Government
The Institute for Women's Policy Research	Accelerator, Inclusion/Accessibility	Non-Profit
The Lemelson Foundation	Finance	Non-Profit
The National Cancer Institute, Small Business Innovation Research Development Center's (NCI SBIR) flagship Applicant Assistance Program (AAP)	Finance	Government
The S&T Homeland Security Startup Studio (HSSS)	Entrepreneur Support, Network/Mentorship	Government
The S&T Homeland Security Startup Studio (HSSS)	Accelerator, Entrepreneur Support	Government

<b>Program Name</b>	<b>Program Type</b>	<b>Setting or Type of Organization</b>
The S&T Silicon Valley Innovation Program	STEM Education, Accelerator	Government
The White House Initiative on Advancing Educational Equity, Excellence and Economic Opportunity through Historically Black Colleges and Universities	MSI/HBCU Support	Government
The White House Initiative on Asian Americans and Pacific Islanders (WHIAAPI)	Inclusion/Accessibility, Network/Mentorship	Government
United Inventors Association (UIA)	Entrepreneur Support	Non-Profit
Ureeka	Entrepreneur Support, Network/Mentorship	Business/Commercial
Washington State University in St. Louis and Osage University Partners	Entrepreneur Support, Network/Mentorship	Unknown
Women in Technology (WIT)	STEM Education, Entrepreneur Support	Academic
xTechSearch program	Accelerator, Inclusion/Accessibility	Government

## **Appendix B. National Science and Technology Council Lab-to-Market Subcommittee**

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Vanessa Chan (DOE)  
Mojdeh Bahar (NIST)  
Marcos Gonzalez Harsha (DOE)  
John Bittman (Executive Secretariat; NIST)

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## Appendix C. Abbreviations

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ADA	Americans with Disabilities Act
DOE	Department of Energy
EDA	U.S. Economic Development Administration
ESO	entrepreneur support organization
HBCU	historically Black college or university
HHS	Department of Health and Human Services
HSSS	Homeland Security Startup Studio
IDA	Institute for Defense Analyses
IP	intellectual property
L2M	Lab-to-Market
MBDA	Minority Business Development Administration
MSI	minority-serving institution
NCI	National Cancer Institute
NIA	National Institute on Aging
NIH	National Institutes of Health
NIST	National Institute of Standards and Technology
NNCO	National Nanotechnology Coordination Office
NOAA	National Oceanic and Atmospheric Administration
NSF	National Science Foundation
NSTC	National Science and Technology Council
OSTP	Office of Science and Technology Policy
R&D	research and development
RFI	Request for Information
SBA	Small Business Administration
SBIR	Small Business Innovation Research
STEM	science, technology, engineering, and math
STPI	Science and Technology Policy Institute
STTR	Small Business Technology Transfer
USN	U.S. Navy
USPTO	U.S. Patent and Trademark Office