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ECONOMIC DEVELOPMENT & TOURISM**
KA 'OIHANA HO'OMOHALA PĀ'OIHANA, 'IMI WAIWAI
A HO'OMĀKA'IKA'I

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August 21, 2023

The Honorable Ronald D. Kouchi,
President and Members
of the Senate
Thirty-Second State Legislature
State Capitol, Room 409
Honolulu, Hawaii 96813

The Honorable Scott K. Saiki,
Speaker and Members of the
House of Representatives
Thirty-Second State Legislature
State Capitol, Room 431
Honolulu, Hawaii 96813

Dear President Kouchi, Speaker Saiki, and Members of the Legislature:

For your information and consideration, I am transmitting a copy of the Department of Business, Economic Development, and Tourism's Report on Dual Use Technology Task Force, as required by Section Act 121, Session Laws of Hawaii 2021. In accordance with Section 93-16, Hawaii Revised Statutes, I am also informing you that the report may be viewed electronically at: <http://dbedt.hawaii.gov/overview/annual-reports-reports-to-the-legislature/>.

Sincerely,

for 

James Kunane Tokioka

Enclosure

c: Legislative Reference Bureau



Report title:

Dual-Use Task Force
Preliminary and Final Report

Pursuant to Section 93-16
Hawai'i Revised Statutes

Prepared by:

Hawai'i Dual-Use Task
Force



**Hawai'i's economic resiliency depends on the
successful catalyzation of its innovation sector**





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1 EXECUTIVE SUMMARY

This report is funded by the Hawai'i Department of Business, Economic Development & Tourism (DBEDT) as authorized by Act 121, Session Laws of Hawai'i (2021) as amended by the Governor's Emergency Proclamation Related to the State's COVID-19 Omicron Variant Response dated January 26, 2022.

Hawai'i's economic growth continues to lag the national average despite numerous attempts to stimulate and diversify its economy. Most of these attempts follow the classic model of a top-down initiative driven by state government, often associated with a combination of policy and funding focused on growing a particular sector. Most, if not all, of these initiatives have either fizzled out or become sources of frustration for state legislators that feel they are now obligated to continue to fund the programs year after year because the sector has become dependent upon the funding. *This is the antithesis of a successful government program which should become independent of government funding after a period of time has passed.*

Numerous events occurring nationally and regionally (within the Indo Pacific region) have created an opportunity for Hawai'i to leverage substantial sources of funding and to position itself as a world leader in innovation. Timing, intent, and strategic action must all align to turn this promise into a reality that irreparably and positively transforms Hawai'i's innovation sector into a sustainable engine with all the commensurate benefits for the communities of Hawai'i.

This report will provide a survey of the landscape within Hawai'i, the larger national and Pacific regional picture in order to set context and motivation. This report will proceed to provide three tangible mechanisms that should be authorized and supported by DBEDT and state legislators to translate strategy into action.

Key recommendations for tangible mechanisms:

- "Single flag." The innovation economy is inherently diverse but that does not mean it should be ad hoc. Ad hoc activities cannot leverage efforts and therefore cannot scale. Instead, the Hawai'i innovation ecosystem should be coordinated under a single "flag" tied to a set of shared vision, mission, values, and governance. The flag should also represent a large-scale, compelling "call-to-action" as a unifying rally call.
- "Build on existing investments." State legislators have regularly been funding innovation activities such as the HTDC SBIR matching grant program. These programs should continue, while at the same time, there should be a clear understanding that funding alone cannot build the innovation ecosystem. Synergistic, targeted programs are necessary.



- “Focus investments.” As the saying goes, don’t water down the poi. Well-meaning attempts to give a small amount of funding to everyone is ineffective, as it creates a downward spiral of mismatched expectations and inability to deliver results effectively. Achieving clarity on funding based on strategy and targeted outcomes is crucial.
- “Focus on business financial sustainability.” Even the most well-meaning economic development initiative can falter if the aspirations are so expansive that the effort is akin to “boiling the ocean.” Our suggestion is to focus on encouraging and supporting the businesses that follow a model for long-term financial self-sustainability without a reliance on government grants.
- “Drive accountability through metrics that matter.” Proper use of public funds should be measured through metrics that show a combination of impact (how did the recipient and community benefit) and accountability (is the recipient behaving in a manner consistent with long-term strategy and intentions).

2 INTRODUCTION

The “Innovation Framework Forward” report co-authored by Enterprise Honolulu and Paideia Enterprises in 2014 lays down an excellent analysis of Hawai'i’s long history of the ebbs and flows of major industries [1]. In particular, the report identifies the following systemic trends:

- Hawai'i’s economy is dictated by one or two dominant industries. Today, the top two industries are tourism and military spending (for clarity, the vast majority of military spending in Hawai'i is for military personnel, housing, and construction).
- The leading industry tends to grow, followed by a sharp drop-off often due to external forces.

Other insights from this report *which remain true in 2022 include:*

- There is no silver bullet. Isolated, non-integrated government initiatives such as individual policy changes, tax credits, etc. have not been effective in creating lasting and positive change. When these efforts fail, it creates an ironic catch-22: the “next big idea” is challenged to gain broad support, thereby creating an environment where the only new measures that gain legislative traction are narrowly supported by a small cluster of like-minded representatives, thereby perpetuating the cycle of stove-piped initiatives that have a low probability of success.
- The government and the community have unique roles to play. The national and local recurring pattern indicates a specific role government plays in successful economic transformation: invest in shared infrastructure and close gaps in available capital. Non-government partners such as non-profits and economic



development groups focus on strategy and programs. Business community focuses on what it does best: grow revenue, profits, and jobs.

- Avoid zero-sum games. The report elegantly points out the historical challenges Hawai'i has faced when economic development initiatives gave the appearance of favoring one industry, seemingly at the expense of another. Equally important is to balance the need to ensure strong community buy-in while not going so far towards "something for everyone" that the poi becomes watered down. *The strategic balance is struck when a small handful of strategic initiatives is fully funded, when these initiatives span numerous industries, and the outcome of the state funding is targeted at capturing out-sized markets outside of Hawai'i through the exporting of products and services.*

3 HISTORICAL PERSPECTIVE

3.1 Defining the desired outcomes

Against the backdrop of Hawai'i's recent (past 25 years) risk exposure to its dependency upon tourism, the primary desired outcome is clear: diversify Hawai'i's economy against the external (i.e., outside of our control) economic shock of a sudden drop-off in tourism.

It is the opinion of this report, however, that Hawai'i not simply seek to replace, or even augment, tourism, with another industry. The rationale for this is due to Hawai'i's recurring pattern: a single (or top two) dominant industry that sustains Hawai'i but then dramatically, and irreparably, drops off. Further, a careful analysis of the workforce composition for these industries indicates a point of commonality: the majority of the workers are blue collar / trades, typically with lower-than-average wages and educational level. When the inevitable economic downturn occurs, it is commonplace for this segment of the community to be hit disproportionately hard because they tend to have fewer long-term savings but more importantly because they are reliant upon their employer for training. Thus, if the entire industry is in a downturn, they are forced to consider employment outside of their industry that they are trained to work in. Moving into a new industry, especially one that an employee is not trained for, often reduces the probability of successfully securing employment, and even when successful, will often come with reduced pay because the level of qualifications cannot be matched due to the lack of training.

Therefore, we focus on innovation and impact as a refined set of desired outcomes which focuses the strategy to be more than simply growing or attracting a new industry sector.

Further, we focus on the choice of an ecosystem versus an industry definition or sector definition. Ecosystems have evolved as a strong candidate for successful economic transformation as illustrated by the following passage [2]:



First, ecosystems are not defined by traditional industry boundaries. Innovation and competition emerge from the periphery or outside the industry and grow through network effects and webs of complementary products that connect and entrench consumers. Second, ecosystems are not limited by factor endowments and their control, but are fostered by creating abundance, such as through data—the value of which multiplies with the number of nodes (Metcalfe’s Law). Third, ecosystems do not require geographical proximity. This is salient as it points to ecosystems as a strategy for growth, particularly in the context of the COVID-19 pandemic which has driven remote working and the diversification of supply chains.

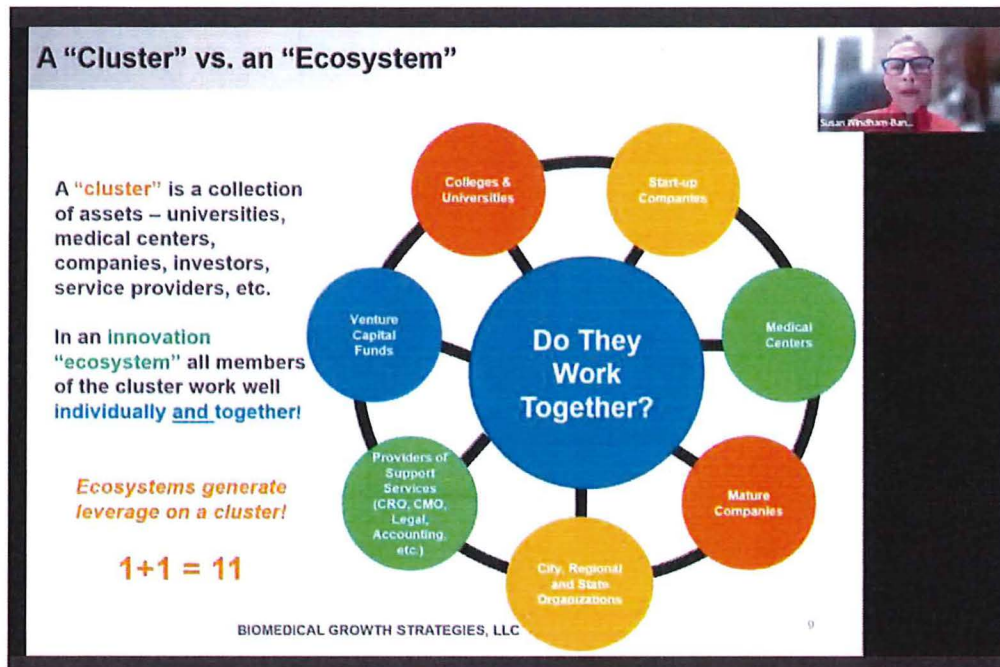


Figure 1: A cluster is a collection of assets. It becomes an ecosystem when these assets work individually and together

Why this matters for the Hawai'i Innovation Framework: it is not an if, but a when, that the next "industry" will decline, whereas a priority goal established within this report is the creation of economic growth that is sustainable and resilient against outside forces. Therefore, if Hawai'i can successfully grow an innovation ecosystem, the ecosystem exists within, but more importantly, across numerous industries. This will serve to create market-to-market bridges that do not exist today and also grow more than one sector at a time.

The Innovation Framework Forward report defines an innovation economy as an economic engine that monetizes the value of the definition of innovation.

Hawai'i Innovation Framework

This brings even further clarity and focus to a cohesive strategy because it implies that not all business models will necessarily apply to the definition of innovation. This is crucial, not for the purposes of excluding certain businesses, but rather to provide sufficient focus for the definition of metrics that matter. If performed correctly, simply because a business fails to meet the definition of innovation, does not mean that the business will not benefit from the government's support of a business that does meet the definition of innovative.

Innovation Defined

Innovation is the intersection of invention and insight, leading to the creation of social and economic value

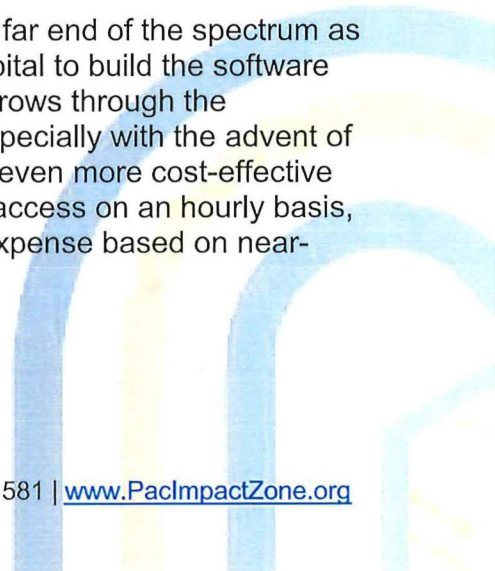
As an example, a thriving "innovation campus" full of startups focused on innovation and growth needs to be supported by traditional, "non-innovative" small businesses ranging from food service, custodial, and even "technology" small businesses such as IT and maintenance. These support businesses are agnostic to the specific industry

cluster that the innovation ecosystem is supporting.

Further, the output from Hawai'i innovative businesses should focus on export, regardless of whether the business delivers goods or services. Why? Without a focus on export outside of Hawai'i, it will inevitably lead to in-fighting because the Hawai'i customer base is finite, whereas exporting to the U.S. mainland and internationally is essentially a marketplace with unlimited upside.

Finally, regardless of the rate of growth, a traditional measure of an innovative business is one that is structured to scale. A scalable business means its revenue grows faster than its fixed costs needed to service growth. An example of a business that traditionally does not scale very well is consulting. A consulting business increases its income through billable hours which means in order to grow its income, it must hire additional employees (growing its human resource fixed cost). While this may be attractive in the eyes of a government office, it is not necessarily indicative of a long-term healthy business because once the business revenue declines, the most likely cost cutting measure is to reduce headcount.

By contrast, cloud-based software businesses are on the far end of the spectrum as highly scalable businesses. While the up-front human capital to build the software product can be tremendous, the "scale" of the business grows through the acquisition of additional servers, not more employees. Especially with the advent of a platform-as-a-service such as Amazon AWS, this is an even more cost-effective scalable business because the business "leases" server access on an hourly basis, thereby creating a nearly perfect alignment of business expense based on near-real-time customer demand.





3.2 Defense & dual-use in Hawai'i

A small, grass-roots group self-formed in 2008, called the “defense and dual-use group.” This group met monthly to discuss various business opportunities, and also pulled together to collectively present a united front for state legislative activities related to the “tech” sector and in particular research and development (R&D) activities.



Figure 2: Grass-roots dual-use network started in 2008 formed the basis for the “R&D tech sector” in Hawai'i

Many of these businesses came together under the single banner through the Hawai'i Technology Development Venture (HTDV) program funded by Senator Inouye through an Office of Naval Research contract. These businesses heavily focused on defense applications and a technology-centric approach to business. Some of the businesses successfully captured Small Business Innovative Research (SBIR) contracts, but by-and-large these businesses were technology development businesses. Most notably, once the earmark moratorium (an across-the-board freeze on any congressionally directed earmarks) eliminated the funding for the HTDV program, the majority of the businesses within the defense and dual-use grass-roots group were out of business.

While this group was relatively small, amounting to less than \$70M in gross annual revenue, it follows the recurring pattern described in section 2, namely Hawai'i sectors grow steadily then drop off suddenly, usually due to an external event, and rarely recover.

Today, in 2022, the defense and dual-use group remains a shadow of its peak in 2010, yet there is reason for hope especially when viewed through a new lens: through the research performed for the creation of this report, Pacific Impact Zone has identified at least five small businesses that are developing dual-use, innovative products and services in Hawai'i that were not part of the original grass-roots group. More importantly, over half of these businesses were in existence in 2010 yet quietly working on their products because their source of revenue did not come from HTDV but rather a mix of direct commercial and government customers. As an additional notable point, two of the businesses are on Maui, showing the need to create an expansive and inclusive model that intentionally and meaningfully incorporates all neighbor islands as well as O'ahu.

4 READING THE LANDSCAPE

4.1 Macro market trends

The term dual-use is decades old and historically refers to products and services that have “dual-use” applications spanning government and commercial sectors. Today, the use of the term dual-use typically means the same thing, but it is important to recognize that the intent behind dual-use warrants revisiting.

When dual-use was first conceived, the federal government represented the largest source of new technology research and development funding. Therefore, the concept of dual-use was to have the government fund advanced technology development, with the goal to then seek commercial dual-use applications for these technologies. This concept has led to many of the world's leading breakthrough technologies such as GPS, night vision technology, and autonomous robotic systems.

Today, however, the world economy is far more connected, venture capital financing is also globally networked, and the largest commercial technologies such as 5G inject trillions of dollars into the global economy. Therefore, it is widely recognized that the source of “first” funding for advanced technologies are now the commercial developers.

Dual Use in 2022

Federal markets recognize the need to attract “non traditional sources of innovation”, i.e., academics and commercial businesses that do not normally do business with the federal government

Today, the perspective of dual-use must evolve. *Today, it is more likely that technology advances will come from the commercial sector, and the government serves in the role of the buyer, not financier.*

Therefore, within Hawai'i, the dual-use sector needs to adapt with these global shifts. In order to successfully grow the dual-use sector, we have a responsibility

to attract commercial “non traditional federal contractors” to transition their solutions to solve federal government needs, while simultaneously fulfilling the original intent of dual-use, which is to diversify the economy through commercializing federally funded technology developments.

Becoming a dual-use government contractor can be an intimidating process, especially in the wake of the COVID-19 pandemic, where agencies have been changing priorities, shifting financial obligations, and delaying contracts. The federal



government has significantly shifted from a large-contractor-only focus to small businesses as sources of innovation. This requires that small businesses engage in the complex federal procurement ecosystem. The need for innovation in priority technology areas is timely and consequential for the continued economic stability of our Nation and competitiveness over our adversaries. For small businesses, knowing where to start, how to prepare and where to look for *appropriate* opportunities can be daunting. This report is designed as a guide for Hawai'i (HI) companies to navigate the federal innovation space, understand the players and entry points, and help derisk time and investment in diversifying business portfolios.

First, understanding sources of federal contracts and priority technology gaps are key to tracking and addressing growth areas in the defense market. Second, before starting to explore all the opportunities that are available, it is important to have a basic understanding of how federal contracting works: what types of solicitations are available to non-incumbent companies, and what types of contracting vehicles a small business will come across before it can align its proposals to the government clients' contracting strategies. This is a growing sector representing billions of dollars of funding, thousands of contractors, and hundreds of key organizations. Being prepared with a solid business foundation is required to participate in the federal contracting ecosystem. Third, knowing how to search for opportunities, supply chain needs, and teaming engagements is the most efficient approach to growing your market in the government sector.

This report is designed to increase the number of contracts awarded to HI companies by federal agencies, help companies understand the ecosystem, and successfully present their solutions to government clients. It is also designed to help government efficiently identify vendors to boost regional economic development, diversify innovative solutions for a competitive advantage and increase the number of non-traditional companies in federal procurement.

Understanding federal appropriations and technology gaps is essential in addressing growth areas in the defense and national security markets. Without this knowledge, a small business cannot be competitive and adaptive. Government recognizes that small businesses are competitive and agile, making them essential to the federal innovation ecosystem and invaluable sources of technology solutions. In late 2021, the U.S. House of Representatives supported this effort with significant Defense Spending targets for small businesses. In addition, the Department of Defense (DoD), Department of Homeland Security (DHS), Department of



Transportation (DoT), and other U.S. Federal agencies have long recognized the critical role small businesses play in innovation, investing significant resources in small business outreach and collaborative research. However, federal acquisition vehicles have only recently been created to expedite the otherwise notoriously slow federal procurement process. These *rapid contracting vehicles* have been created specifically to encourage small business contracting with the federal government.

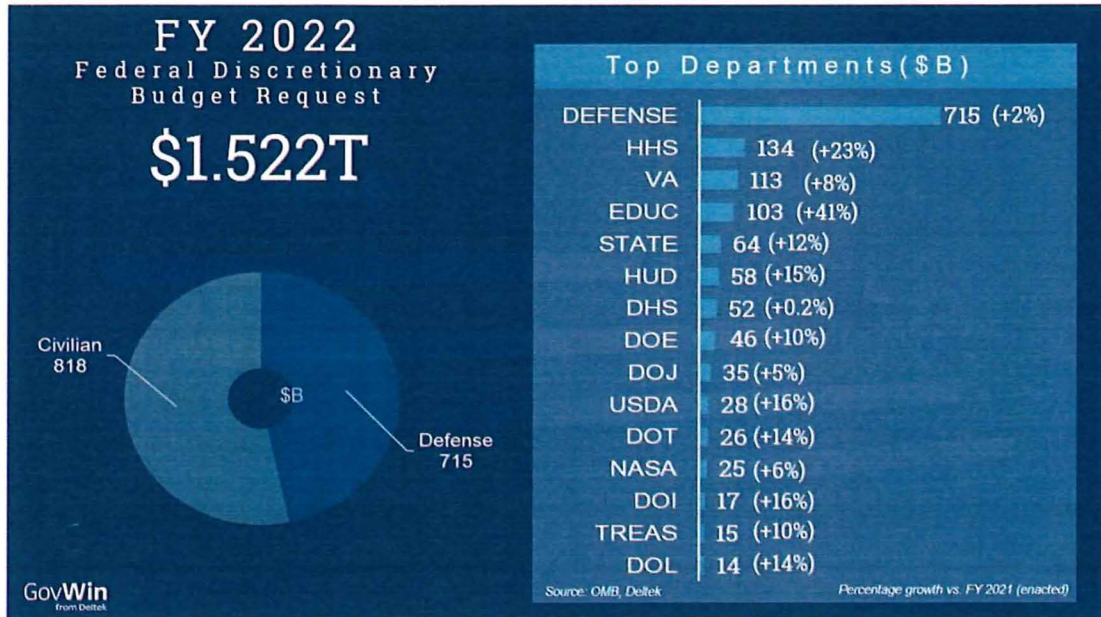


Figure 3: FY22 federal budget breakdown

The budget outlined by the Biden Administration illustrates an appetite for continued growth and continued spending in order to drive economic development in the face of COVID-19 and other events that have dramatically changed the procurement environment. Common questions asked by contractors are: how has the pandemic shaped the federal ecosystem, how are contractors changing their approach and strategies to federal contracting as a result, and what technology trends do vendors need to track? We know that government agencies have tightened their budgets, are adapting to competition for technical talent, and have been adapting to remote-work requirements. Therefore, innovators will need to demonstrate cost-savings and value to the government customer to help offset unique pandemic challenges. Even during “normal” pre-pandemic times, selling to the government was a complex process, especially for small businesses. “Cracking the Government Procurement Code” found that 93% of small businesses experience significant barriers to selling to government organizations, and 85% agree that the overall procurement process is difficult to participate in.”



Following are four critical trends that federal contractors and subcontractors should track for the upcoming fiscal year to prepare their business development and contracting strategies:

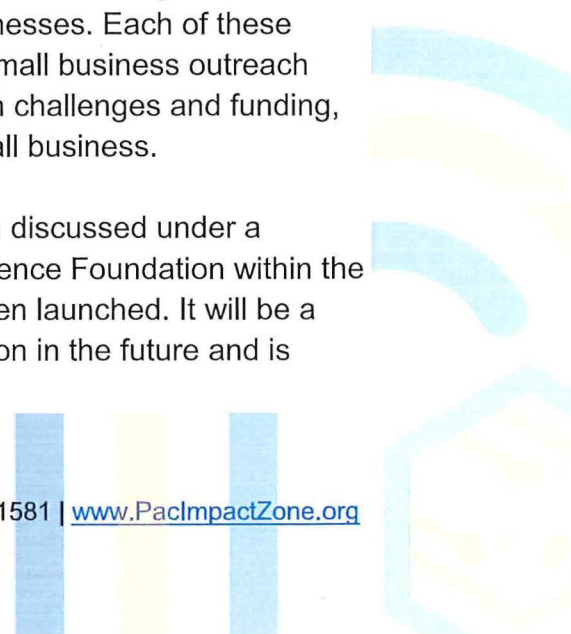
1. Be prepared for potential questioning from Congress on select budgetary proposals. This could mean delays in policy enactment impacting small business, and contracting actions.
2. There are many discretionary increases within civilian agencies. These offer opportunities for companies to provide program management and administrative support to those agencies.
3. DoD, in particular, will release a significantly-increased number of solicitations for advanced technologies, in particular, Internet of Things (IoT) and artificial intelligence (AI).
4. In addition, DoD will likely redirect resources from legacy systems to priority technologies, focusing on cybersecurity and cloud computing. Many of these contracts will likely be awarded via Other Transaction Authorities (OTAs) and Small Business Innovation Research (SBIR) opportunities.

Climate change will continue to be a major driver of market trends in both national security and economic stability. Energy storage, water, security (including cybersecurity to ensure safety), and critical infrastructure will also continue to grow in importance as seen in opportunities for small businesses offering novel solutions.

4.1.1 Agency Trends and Forecasts

The following is a brief overview of some of the most active federal agencies regarding recent additions to their outreach to small businesses. Each of these agencies have significantly shifted their acquisition and small business outreach programs to include rapid contracting vehicles, innovation challenges and funding, and collaborative research opportunities that engage small business.

While much of the federal budget for innovation has been discussed under a revitalized and greatly-expanded role for the National Science Foundation within the U.S. Department of Commerce, that effort has not yet been launched. It will be a significant source of contracting for services and innovation in the future and is important to track over time.





Hawai'i Innovation Framework

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In the meantime, trends across the following agencies are increasing in scope, with one program in particular that is expanding for both commercial and defense purposes: Space-Based technologies and related data visualization/analysis technologies. These are applied by industries as diverse as agriculture, energy, finance, defense, and disaster mitigation. International cooperation is expected to increase in this segment, providing additional markets for U.S. small businesses beyond the domestic dual-use market.

Agency	FY 2022 Theme	Trends	Notes
DoD	<ul style="list-style-type: none"> Breakthrough Technologies NextGen Defense Capabilities Space Technologies 	<ul style="list-style-type: none"> Remote and autonomous operating systems for across the Services Investment in sensor technology Investment in high-priority programs, platforms and systems Satellite communications, intelligence, surveillance and reconnaissance investments and Allied-Nation collaboration 	Increased focus on Multi-Domain Operations require technology solutions that can be shared across Services and Partner Nations.
DoT	<ul style="list-style-type: none"> Improved Decision Making Traffic Safety with increased autonomous vehicle use 	<ul style="list-style-type: none"> Unmanned aircraft systems Autonomous vehicle safety systems and mobility solutions Improved data analytics Improved decision making 	Safety-focused technologies and real-time synthesis of data streams are priorities across government agencies.
GSA	<ul style="list-style-type: none"> Cybersecurity improvements Tech Modernization 	<ul style="list-style-type: none"> Technology Modernization Fund (TMF) to strengthen cybersecurity and other DOD priorities Innovative contracting to support technology acquisition 	Providing highly agile and flexible contracting vehicles for DOD priority programs.
DHS	<ul style="list-style-type: none"> Strategic Sourcing Contract Vehicles or Qualified Product 	<ul style="list-style-type: none"> CBP modern border security tech 	Increased contracting opportunities through a number of newly established Strategic Sourcing vehicles



	Lists (QPL) in select fields	<ul style="list-style-type: none"> • CISA cybersecurity tools and services • COVID and Medical Services and Products • Cyber Response & Recovery Fund • R&D in climate resilience • Cybersecurity data analytics • Transportation security technologies 	for timely requests and lists of coming-soon or potential opportunities.
DOC	<ul style="list-style-type: none"> • Support domestic supply chain resiliency 	<ul style="list-style-type: none"> • Increased NIST funding • Science and tech research • Expanded opportunities for minority-owned businesses 	Increased funding for small to medium manufactures.

Table 1: Major spending trends across federal agencies

According to the FY2022 Biden Administration Budget, DoD spending will stay on par with previous years with only a 2% increase [3]. It is important to note that DoD plans on spending this budget increase on information technology products and services. The DoD is going through a significant IT transformation; shifting to cloud-based infrastructure. This allows for more remote capabilities and a strong foundation for deploying advanced innovative artificial intelligence capabilities.

Towards this focus, DoD will outsource network operations and 5G pilots that promise to deliver capabilities with little or no latency, while cyber-operations' contracts — both offensive and defensive — are growing as a whole. "DOD's move to a multi-domain operational construct will drive unprecedented integration across the joint force, paving the way for greater use of emerging technologies such as 5G and artificial intelligence," confirms Alex Rossino, principal research analyst for Deltek.

As DoD transitions resources from legacy systems to priority programs, future contracts will increase funding for emerging technologies. One area, DoD installation energy performance, may evidence increased investment in sensor technology and related capabilities as will other installation maintenance and management programs. Cybersecurity will continue to be among the highest of



federal priorities government-wide, with the Cybersecurity and Infrastructure Security Agency (CISA) expected to see a \$110M (+5.5%) budget increase from FY 2021 above the \$650 million provided in the American Rescue Plan.

Also of significance are DoD efforts to increase the amount of awards to companies that are led by women, people of color, and other underserved entrepreneurs.

4.1.2 International

Global trends will also impact the market for small business offerings, particularly the buildup in defense spending in the Indo-Pacific Region and in the NATO Region as U.S. adversaries increase provocative military actions in both areas. For HI companies in related sectors, there will be a significant increase in annual market growth for dual-use technologies outlined below in this report. For example, the UAV market in Asia Pacific is projected to grow at the highest CAGR of 18.5% during the period from 2021 to 2026. The growth of the market in this region is largely due to the increasing demand for UAV from China which will utilize drones primarily for its surveillance and India which utilizes drones primarily for commercial applications. For small businesses interested in entering international markets, a low-risk strategy is to supply major players operating in the global market. For UAV technology, for example, this strategy would entail targeting large international UAV providers such as include General Atomics (US), Northrop Grumman Corporation (US), EHang (China), Parrot (France), PrecisionHawk (US), Israel Aerospace Industries Ltd. (Israel), DJI Technology Co., Ltd. (China), AeroVironment, Inc. (US), and Lockheed Martin Corporation (US). These key players offer UAVs applicable for Defense & Government and Civil & Commercial sectors and have well-equipped and strong distribution networks across North America, Europe, Asia Pacific, and the Middle East, Latin America, and Africa. The UAV market was selected for this example because it is a dual-use technology that can easily be applied across commercial and military sectors as well as global markets.

It is important to note, however, that supplying US adversaries including China, North Korea, Iran, and other nations with technology-based equipment or services will preclude companies from being considered for opportunities supplying US defense and related sectors. The Global Trade Team and Global Trade Center at Portland Community College is the starting point for regional companies seeking accurate and customized information on each global market [4]. These programs source and curate current export requirements spanning lthe US Department of Commerce Bureau of Industry and Security (BIS) administers Export Controls and all U.S. laws, regulations and policies governing the export and reexport of



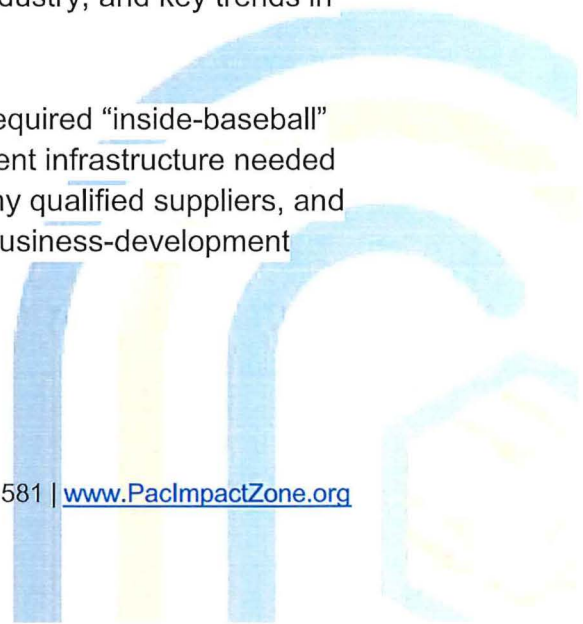
commodities, software, and technology falling under the jurisdiction of the Export Administration Regulations (EAR). Through its Office of Exporter Services, EA also provides information on BIS programs, conducts seminars on complying with the EAR, and provides guidance on licensing requirements and procedures.

4.1.3 Gap: The challenges of becoming a qualified, procurement-ready federal contractor

Many companies see these increases in the federal market for new technologies and services and are motivated to change their revenue models to include contractual work for the federal government. However, the federal market is difficult to penetrate and should be approached with resources and timelines that address unique barriers. On average, it can take a minimum of 18 months of planning, preparation, and persistence before a company is potentially awarded a government contract. Being procurement-ready requires a significant investment of time and resources, as well as informed market research to identify potential opportunities, reinvent outreach or marketing material, develop the targeted proposals, and finally implement a federal contract in compliance with federal contracting rules. Therefore, it is important to learn the government procurement process, understand the trends, and seek ways to efficiently align your offerings to the needs of the government. All these steps help to derisk your investment and maximize your federal-government business development efforts.

To focus on key barriers to entry, informed research is key. Much of the federal acquisition ecosystem is unclear to those new to the market. Information on government contracting opportunities, which ones are truly open to new companies, and how companies are evaluated is difficult to discover for specific requests from government for qualifications or responses. Added to this, the lack of transparency and ease of access to information that government has to the art of the possible, company capabilities, small-business teaming opportunities that can be incentivized by government, pricing and business models that drive industry, and key trends in innovation outside of government.

The complexity of government contracting vehicles and required “inside-baseball” knowledge as well as accounting and contract-management infrastructure needed to successfully secure contracts are disincentives for many qualified suppliers, and lead to failure to win contracts after investing significant business-development resources in proposals.



Hawai'i Innovation Framework

The Federal Government itself is constrained from conducting true market intelligence. Instead, it is required by policy to conduct superficial market research across known suppliers.

The result is a lack of new innovation from nontraditional suppliers despite an increase in rapid contracting vehicles, and continued alignment of contracts to traditional sources of solutions that are often offered at higher cost with less novel approaches than small business can provide.

In addition to time constraints facing government contracting professionals, another barrier for them to conduct market intelligence is their lack of access to real-time information searchable by topic and their lack of access to innovators in a collaborative and explorative environment matching the government end-user needs and environment.

The following section outlines the basic framework of federal contracting, the types of solicitations that are available, the types of contracts you may encounter, and the rules of engagement. The federal market is a living and changing ecosystem of programs and actors; a complex network of interconnected systems and performers. Our focus for this report is on *Federal Innovation Acquisition* and the opportunities that lie therein for the HI region and where federal contracting is housed. This is a significant market with billions of dollars, thousands of contractors, and hundreds of key players and resources to understand. And although it can be daunting knowing where to start, having a basic understanding and being prepared with a solid business foundation are the key components to play in the federal contracting game. First we start with understanding some of the key players in the federal ecosystem:

- Funders
- Contracting Offices
- Labs and Federally-Funded Research Organizations
- Aggregators of federal resources - AFWERX, SOFWERX, NavalX and Tech Bridges, for example
- Technical Evaluators
- Market Research Teams
- Rapid Contracting Vehicles including Other Transaction Authorities, Small Business Innovation Research Grants, Small Business Technology Transfer Grants, Commercial Service Offerings, and Indefinite Delivery Indefinite Quantity contracts





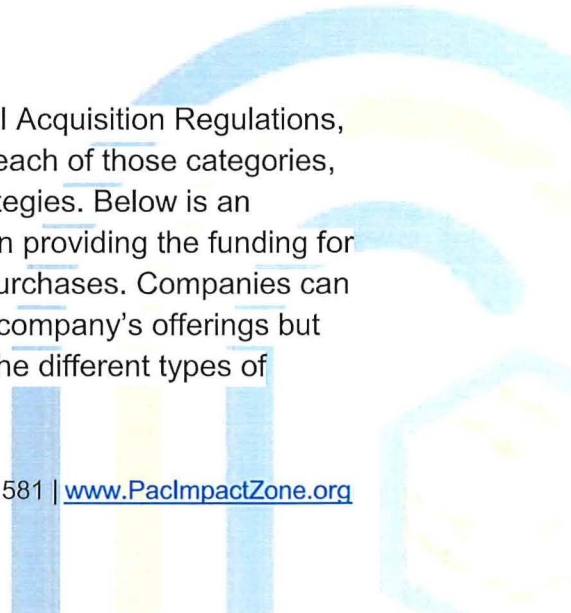
- Industry Outreach Programs/Innovation Support Hubs
- Connectors
- Nonprofit Research Entities

Although this list is not exhaustive, there is an easier way to think about all these players and that is in terms of *Major User Groups*. There are three main groups that we can categorize all the players in the *Federal Innovation Acquisition Ecosystem*: Government, Innovators, and Large Contractors (including contracting vehicles and managers). Government includes all the funding agencies, contracting offices, test and evaluation agencies and outreach or support hubs. Innovators, traditional and non-traditional, include technology, process and service solution providers, both full, partial or research solutions. And lastly, large contractors include primes (usually searching for smaller subs or teaming), OTA consortium managers, other contracting vehicles, and other consortia.

Each of these Major User Groups plays a unique role in the ecosystem, however, there are many barriers to entry and unclear rules of engagement for all players, which can seem discouraging when considering federal contracting as a line of revenue for your company. Lack of information is a huge barrier for not only small businesses but also the government. As noted, the government often lacks information on industry shifts and technology trends, or “the art of the possible” when developing their contracting requirements. Companies lack information on appropriate entry points and understanding the needs that those entry points represent is another barrier. Company resources and valuable time are often wasted thinking that a government contract is imminent when lines of funding, the actual contracting vehicle and officers, and contracting processes have not been engaged. This interconnected ecosystem is driven by specific funding sources and outreach programs, topic-specific budgets, limited entry points to funded opportunities, and subject matter experts who can assist small businesses to derisk time and investment.

4.1.4 Contracting Vehicles

There are two types of contracting categories, the Federal Acquisition Regulations, or FAR, and non-FAR contracts and agreements. Within each of those categories, there are multiple contracting solutions, vehicles and strategies. Below is an overview of these vehicles. Depending on the organization providing the funding for the solution, different options may be utilized for similar purchases. Companies can strategically scan for opportunities based not only on the company's offerings but also on the type and flexibility of the contracting vehicle, the different types of





requirements associated with each one, and the timing of funding and type of funding that each vehicle represents. For example, a Small Business Innovation Research Grant (SBIR) provides earlier-stage investment in a company's emergent solution that would be more appropriate to a company developing an early-technology readiness level solution where all the funds are directly related to the technology development. In contrast, an Other Transaction Authority (OTA) would be preferable for a small business that may have a solution that would benefit from being iteratively customized with the government client, resulting in products that could become programs of record in a relatively short time at a larger scale of production.



Figure 4: FAR and non-FAR contract types

The above [Contracting Cone](#) (an interactive online graphic created and provided by the [Defense Acquisition University](#)) outlines the full spectrum of available FAR and Non-FAR contract strategies. This tool provides a comprehensive overview of all contracting strategies, to help enable collaborative discussions within Industry and Government to select the right contracting strategy. Whether you are a government agency searching for the best spending path for your new budget or a small business navigating the federal ecosystem, having visibility into the different environments, their constraints, their benefits, and their desired outcomes can



ensure that you consider the full range of contract strategies and choose the one that best suits you. Below are further high-level descriptions of common contracting vehicles and their strengths and restrictions as seen by Industry.

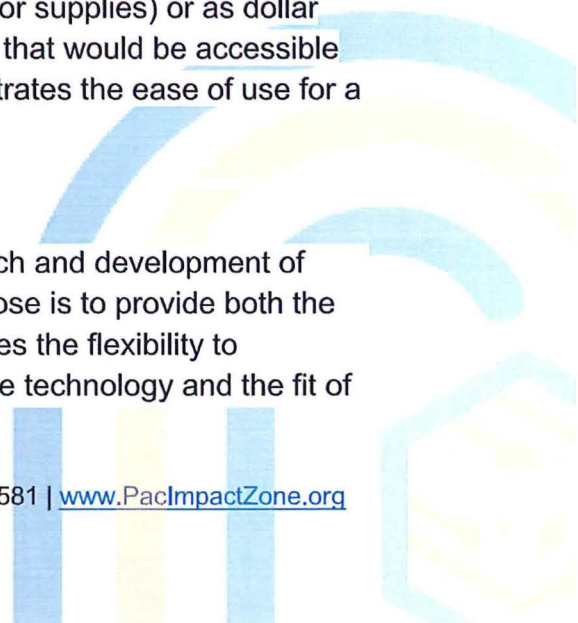
Indefinite Delivery Indefinite Quantity (IDIQ)/Multi-Agency Contracts (MACs)/Governmentwide Acquisition Contract (GWAC)

Indefinite delivery, indefinite quantity contracts provide for an indefinite quantity of services for a fixed time. They are used when a government agency cannot determine, above a specified minimum, the precise quantities of supplies or services that the government will require during the contract period. IDIQs help streamline the contract process and speed service delivery. Both the timeframe and the quantity of a product or service are negotiable and are determined as the product or service is tested, evaluated, deployed, and assessed. This gives both the government and the company the flexibility to increase production and extend timelines as needed to meet government needs and company capacity.

There are also “multiple award” IDIQs, meaning that multiple vendors are awarded the opportunity and are added to the contract through task orders. The benefit of this is to be able to expand the team of performers within a set contract, with the flexibility of increasing quantity and extending the timeline based on both the government client’s needs and the company’s ability to scale within set timeframes. For example, if an innovator’s prototyping project fits within the scope of an existing IDIQ contract of which the innovator is an awardee, the contracting officer can rapidly add a task order to the contract and award the new task order quickly. IDIQ contracts are most often used for service contracts and architect-engineering services. Awards are usually for base years and option years. The government places delivery orders (for supplies) or task orders (for services) against a basic contract for individual requirements. Minimum and maximum quantity limits are specified in the basic contract as either number of units (for supplies) or as dollar values (for services). One example of a multivendor IDIQ that would be accessible to HI companies is the GSA IDIQ called Oasis which illustrates the ease of use for a small business here on its [website](#).

Other Transaction Authorities (OTAs or OTs)

OTs are a vehicle specifically designed to support research and development of solutions including prototyping activities. Their main purpose is to provide both the government client and the company or teams of companies the flexibility to negotiate and renegotiate milestones as the efficacy of the technology and the fit of





the solution to the end-users become apparent through the demonstration milestones. OTs are designed for government clients to acquire prototypes to test in the field before purchasing in quantity. Prototype OTs provide a streamlined path to later award non-competitive follow-on contracts in the form of Production OTs or a FAR contract.

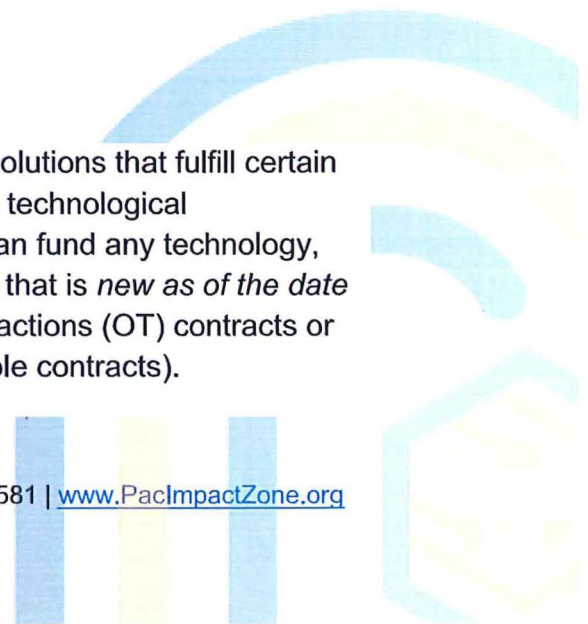
What is a "prototype project?" A prototype project can be a novel innovation that is being developed into an application for the first time, or an existing technology in any market that is being customized for the government-designated use and/or end-user for the first time, or can be two or more existing technologies that are being integrated for a new use that have never been used together before. Prototype projects commonly used by the defense market, for example, address a proof of concept, a model, reverse engineering to address obsolescence, a pilot deployment of technologies, a novel application of commercial technologies for defense purposes, an agile development activity, and/or the creation, design, development, demonstration of technical or operational utility, or combinations of the foregoing [5].

In order to be awarded an OT, one of the following must be true:

- At least one non-traditional defense contractor is included in proposal and provides significant innovation to the project, *or*
- All proposal participants are small or non-traditional defense contractors, *or*
- If no non-traditional company is part of the contracted team, then one third of the total cost must be provided by sources other than gov (if no non-traditional defense contractor participation) *or*
- An agency Senior Procurement Executive must determine that:
 - Innovative business arrangements not feasible or appropriate under a contract
 - Opportunity to expand defense supply base not practical or feasible under a contract

Commercial Solutions Opening (CSO)

CSO is a competitive program authorized to obtain new solutions that fulfill certain requirements to close capability gaps or provide potential technological advances/upgrades. In its most basic definition, a CSO can fund any technology, process, or method, including research and development that is *new as of the date of proposal submission*. CSO can either use Other Transactions (OT) contracts or FAR-based fixed-price contracts (but not cost-reimbursable contracts).





For the DoD, CSOs are used to acquire innovative commercial items, technologies, or services that directly fulfill requirements, close capability gaps, or provide potential technological advances. It is focused on non-traditional providers of technologies and services and are similar to Broad Agency Announcements (BAA) in that way, but CSOs allow for acquiring technology directly relevant to a specific program. In contrast, BAAs are restricted to basic and applied research and development not related to a specific system or hardware program. CSOs are authorized by Section 879 of the FY17 National Defense Authorization Act (NDAA).

The limitations of CSOs are that they can only be used on fixed-price or fixed-price incentive contracts; awards exceeding \$100 million require approval from USD Acquisition & Sustainment (A&S) or a military service acquisition executive, and there is an authority expiration date to track.

Small Business Innovation Research (SBIRs)/Small Business Technology Transfer (STTRs)

SBIRs and STTRs are competitive programs that encourage small business innovation and engagement with federal research and development, and acquisition. SBIRs are broken up into three phases (SBIR Phase I, SBIR Phase II, and SBIR Phase III) and are specifically designed to fund research and development with the potential for commercialization. Whereas STTRs are specifically designed to facilitate research and development collaboration between small businesses and U.S.-based nonprofit research institutions. Similar to SBIRs, STTRs have the potential for commercialization of innovative technological solutions. The goal of both of these programs is to encourage small businesses to develop technology that meets U.S. warfighter needs.

- Phase I explores the feasibility of a technology idea and tests the small business performance before moving to a potential Phase II. Contracts are no more than 6 months in duration and awards are normally less than \$150,000.
- Phase II awards are a continuation of research and development efforts from Phase I, however, they specifically evaluate the potential and viability of commercialization. Contracts are no more than 24 months and are less than \$1 million.
- Phase III completes the research and development efforts from SBIR/STTR Phase I/II and actually enables a small business to pursue commercialization. There are no limits on the number, duration, type, or dollar values of Phase III





award. Important to note, Phase I/II are funded by the SBIR/STTR program itself, whereas Phase III are funded directly by federal agencies. An agency can enter into a Phase III contract at any time and it can be competitive or noncompetitive, meaning that an agency has the right to award the contract directly to a company without any competition. SBIR Phase III simplifies the prototyping procurement timeline, with the purpose of transitioning companies from research and development to creating hardware or software products that ultimately benefit Government or Industry.

Procurement for Experimental Purposes (2373)

Commonly referred to as “2373”, this type of contracting vehicle allows the government to purchase products necessary for experimentation, technical evaluation, assessment of operational utility, or to maintain a residual operational capability. This vehicle is only authorized for the following nine areas:

- Ordnance
- Signal
- Chemical Activity
- Transportation
- Energy
- Medical
- Space-Flight
- Aeronautical Supplies
- Telecommunications

2373 can be competitive or non-competitive, an award or agreement and can be written using commercial terms.

These awards and agreements are authorized under Title 10 Section 2373 “Procurement of Experimental Purposed” as a rapid acquisition tool for fielding and testing new capabilities. Organizations must request delegations of authority to utilize 2373. Since FAR and DFARS do not apply to section 2373, projects can be streamlined. Section 2373 authority can also be combined with other authorities such as science and technology OTs (section 2371) or incentive prize competitions (section 2374a) to rapidly transition emerging technologies into fielded systems for realistic testing and evaluation. Purchases may be made inside or outside the US.

Cooperative Research and Development Agreement (CRADA)



CRADAs are agreements between federal lab(s) and a nonfederal party or parties. CRADAs authorize federal labs to enter into agreements with other federal agencies, state/local governments, industry, nonprofits, and universities. The goal of CRADAs is for inventions or intellectual property that are created in these funded labs to be licensed into commercialized products or processes. Under the CRADA agreement, the government can provide personnel, facilities, equipment or other resources with or without reimbursement. Under CRADAs, the federal government does not provide funding as it is a vehicle to utilize lab facilities, derisking technology development but not purchasing it.

Partnership Intermediary Agreement (PIA)

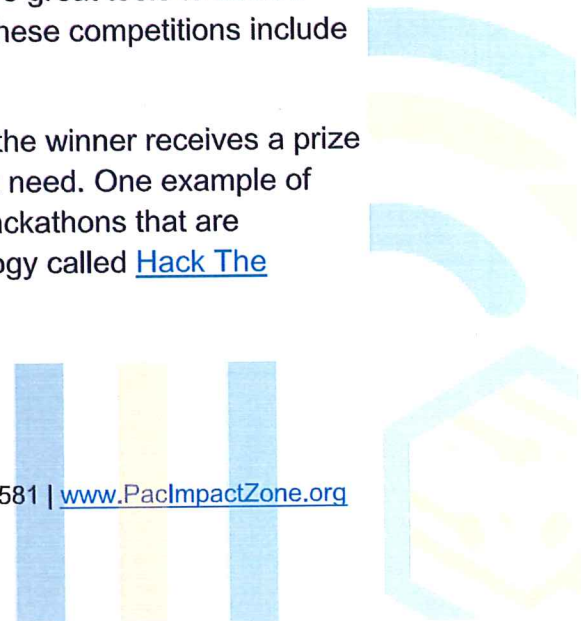
PIAs are agreements between the federal and state or local government agencies, or nonprofit entities that provide “intermediary services” such as between a federal organization and small businesses, educational institutions, and/or laboratories. A PIA can be a contract, agreement, or memorandum of understanding (MOU) with a nonprofit that engages academia and industry on behalf of the government. The goal of setting up a PIA is to accelerate tech transfer, licensing, and commercialization.

PIAs provide the government flexibility to engage an entity to conduct research, hold events, develop platforms and tools, and hold training and briefings, for example. They are normally tied to a timeframe of several years, allowing the government flexibility in establishing projects within the overall scope of services as needed. For companies as part of a nonprofit effort, this provides access to a government client by supporting a nonprofit with technologies and/or services.

Other FAR-based Strategies

There are many other strategies and vehicles in the federal ecosystem, such as challenges, prize competitions, hackathons, etc. These are great tools to secure innovation dollars and fund prototypes. Some examples these competitions include the following:

- Agencies will run tech/innovation competitions where the winner receives a prize for developing a viable solution to solve a government need. One example of this is the US Navy's recent and on-going series of Hackathons that are Challenge events with prizes for autonomous technology called [Hack The Machine](#).

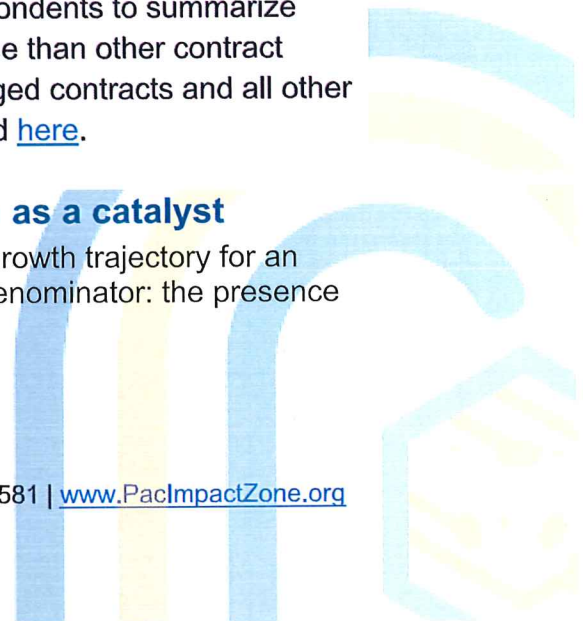




- Agencies can also enter into contractual relationships with contractors for task orders that include a technical need with a clear deadline and monetary value associated with it. These are referred to as milestone-based competitions, the most well-known being led by NASA. More information on a 2021 NASA milestone competition called NextSTEP N: Sustainable Human Landing System Studies and Risk Reduction can be found [here](#).
- *Rapid technology prototyping* is a competition model that involves agencies issuing several contracts for small prototypes to be built within a short period of time. A recent example of this is the US Navy's award of five-year contracts worth \$48.9 million combined to 12 companies to design, develop, test, deliver and install rapid prototype platforms associated with systems, support equipment, subsystems and related capabilities. More information can be found [here](#).
- *Challenge-based acquisition (ChBA)* model explores what is already available in the commercial market and agencies will only pay for a successful solution. To win this type of challenge a company is required to demonstrate their product's performance in real-world conditions. Many federal agencies use ChBAs, and a comprehensive overview across government can be found [here](#).
- The *staged contract* method can be utilized for short concept papers that allow agencies to identify potential vendors while helping those companies avoid the cost of developing a detailed proposal if they are not eligible. This method comprises a three-phase evaluation process of a short concept paper, an invitation-only full proposal, and 1-2 year pilot evaluation to follow. Staged contracts are used by government agencies for rapid and inexpensive assessments of existing or prototype private-sector technologies. Staged contracts allow the government to scan and scout industry for potential solutions. These concept papers are vehicles for respondents to summarize their solution with less investment of time and expertise than other contract proposals require. Comprehensive information on staged contracts and all other contracting vehicles that are listed above can be found [here](#).

4.2 **Common thread: research and innovation as a catalyst**

For regions that have successfully nurtured a sustained growth trajectory for an innovation sector, there appears to be a clear common denominator: the presence of a source of “raw” innovation through research [6].





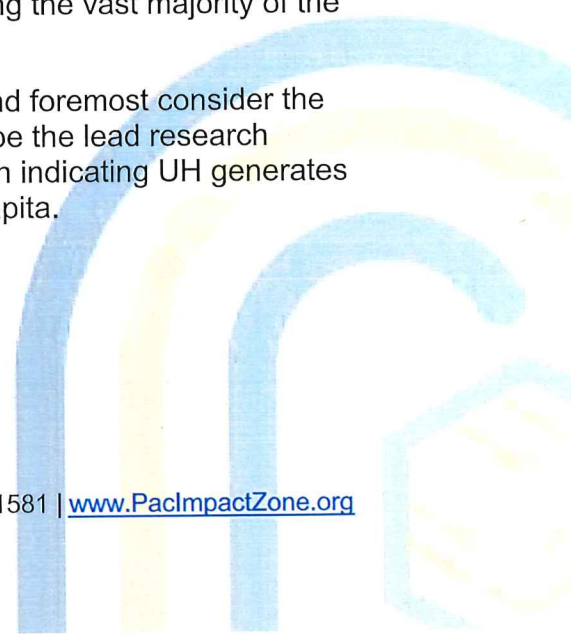
The default conclusion is this research group must be an anchor university as evidenced by locations such as Silicon Valley (Stanford University) and Boston (MIT). However, careful analysis indicates the following characteristics are the likely keys to success, versus a simplified view that only universities can meet this need:

- A minimum critical mass of research should be focused on “translational” research, i.e., research that is geared towards leaving the research environment and being translated into commercial practice.
- The nature of the research plays to regional assets and strengths. The assets tend to span physical, geographic, and human capital.
- The research body must be actively and consistently engaged with regional community partners. This comes in a variety of forms but often appears as funded partnerships (funding flows both ways, to and from the research body), large scale collaborations, and long-term community engagement such as workforce development outside of the research institution.

All told, while very difficult to directly measure, there is an apparent “we know it when we see it” cultural artifact: the lead research institution is a clear leader that believes in the power and benefit of innovation and imparts the energy, spirit, and passion, of collaboration and pushes innovation throughout the community.

Ironically, one of the big barriers that appears to impede the success of a lead research organization is the expectation of payoff. Most large research institutions have a technology transfer office who is chartered to seek out partners to “receive” licensable intellectual property created by the research institution. The typical arrangement is through a license agreement where the research institute is paid a royalty based on revenue generated by the receiving party (often a for profit business). Ironically, there appears to be a low correlation in the regional success of innovation sectors as a function of royalty revenue. Columbia University, regarded as a top ten generator of royalty revenue based on licensing, acknowledges that when measured on a pure ROI basis, only the very top programs in the country break even, and even then, it averages 15 years to reach break even and usually because of a single outsized “unicorn” business generating the vast majority of the value [7].

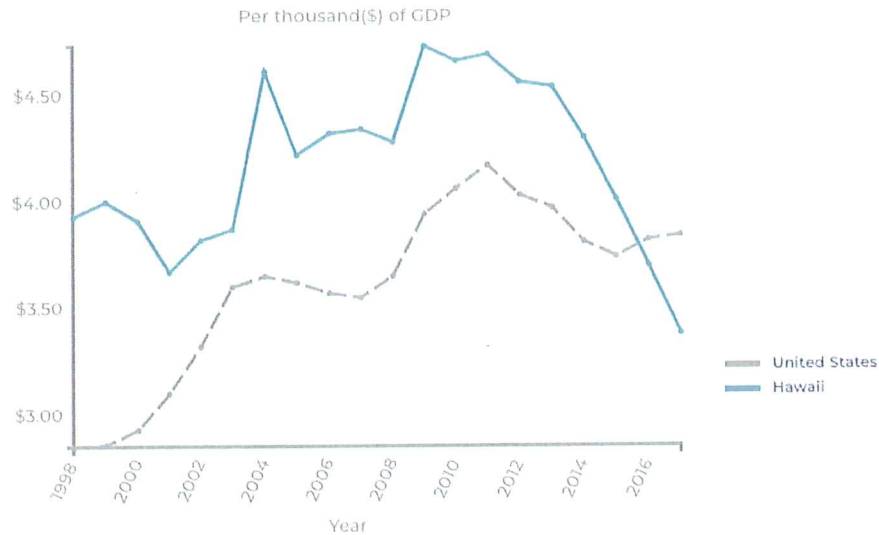
Looking specifically in the Hawai'i region, we must first and foremost consider the University of Hawai'i system as the leading candidate to be the lead research institution. This is further evidenced by the following graph indicating UH generates a higher-than-national-average of research activity per capita.





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References

<https://www.nsf.gov/statistics/state-indicators>

Figure 5: University of Hawai'i generates a higher average per capita research activity compared to the rest of the U.S. [8]

This indicates the potential UH has to be the right catalyst for innovation, yet when analyzed against the raw GDP performance for Hawai'i over the same time period, we see that there is a negligible correlation in economic growth. Regardless of whether research was growing or not, Hawai'i's GDP growth is mostly fixed, as evidenced in the figure below.



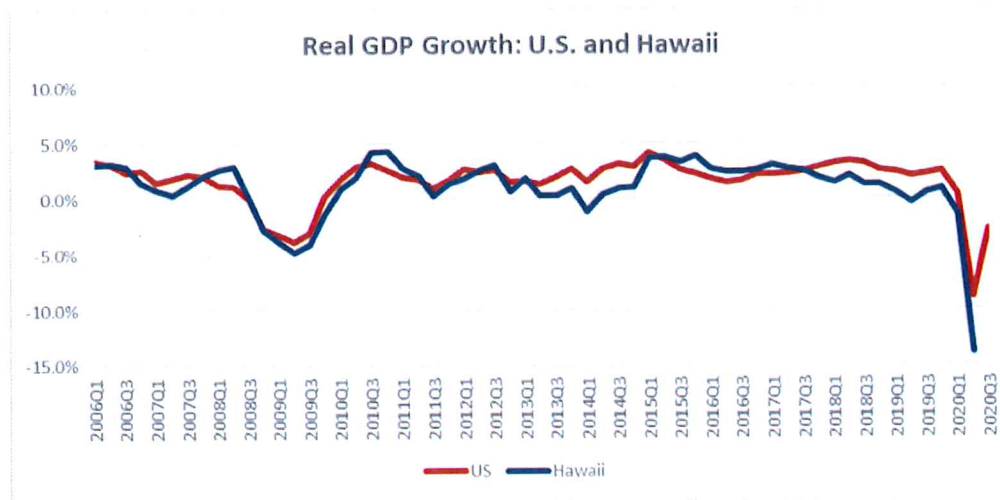


Figure 6: Hawai'i real GDP growth shows steady performance independent of funded research activity [9]

Does this imply that UH cannot be the lead research institution as the catalyst for innovation? *Absolutely not, as there are numerous factors outside of research activity that influence true GDP growth.* We opine, however, that this lack of correlation is due to the industries that dominate Hawai'i's GDP, namely tourism and military spending, which generally have little to do with innovation.

When looking at other successful, sustained regions of innovation, another influencing factor is the presence of strong "second-in-command" research groups in addition to a lead organization. Silicon Valley / San Francisco not only has Stanford but also the Stanford Linear Accelerator, UC Berkeley and Lawrence Livermore Research Laboratory.

Questions Hawai'i should focus on:

- How can we measure research funding deployment within the Hawai'i community? For every dollar of research funding brought to a research institute, how much of it stays local?
- For every dollar of research funded at a research institute, how much of it is successfully commercialized? Simply measuring licensing agreements is unlikely to be sufficient as many licensed technologies are returned to the originated group due to a lack of market traction.
- How is research leadership leveraged to influence innovation within the community?

Being able to understand the data that comes from the above questions can influence a future strategy for successfully integrating UH and other research



centers in Hawai'i to fully leverage the power of research as a regional catalyst. This is a crucial understanding because other economic development studies have clearly shown that research and innovation without a comparable investment in entrepreneurship fails to grow a regional economy [10].

4.3 Influx of federal funding

Over the next ten years there will be multiple large inflows of federal funding that can be leveraged to grow Hawai'i's innovation economy. These sources are enumerated below.

4.3.1 Pacific Deterrence Initiative (PDI)

The Secretary of Defense has directed over \$25B in funding to be allocated from FY22 through FY27, and possibly beyond, to focus efforts on building a strong and connected Indo Pacific region to “deter” provocative actions within this region [11]. It is widely recognized that the rise of near-peer actors in the region require an out-sized investment in advanced long-range capabilities, information operations, cyber, and communications.

More significantly, much of the PDI funding is estimated to be spent within Hawai'i, presenting an opportunity to approximate the funding that Senator Inouye was able to bring to Hawai'i during his tenure as the chair for Senate Defense Appropriations.

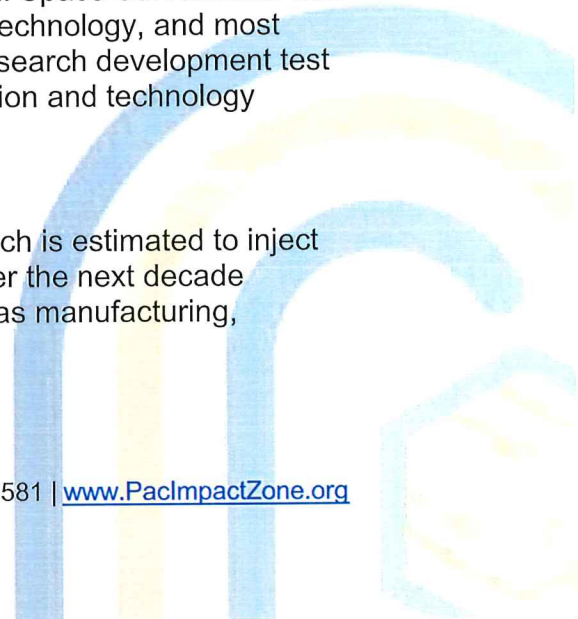
A closely related follow-on program activity is the Multi Domain Task Force (MDTF). Hawai'i was designated as the next location for an MDTF buildup and will amount to roughly an additional 200 full-time-equivalent staff members spread across active duty, civilian, and contractors [12]. More than the direct head-count increase is the “pull” function for what MDTF represents: a growing need for advanced technologies and innovations that power the vision behind MDTF. This is where Hawai'i can focus its revenue generation efforts.

4.3.2 Space Force

A similar order-of-magnitude funding injection will be coming to Hawai'i through the growth of Space Force. The FY23 funding allocation amounts to over \$20B, with an estimated \$2B coming directly to Hawai'i through the Maui Space Surveillance Site (MSSS) [13]. This encompasses a mix of personnel and technology, and most importantly, the bulk of the funding is allocated against research development test and evaluation (RDT&E) funding which prioritizes innovation and technology development.

4.3.3 CHIPS ACT

The CHIPS ACT was approved by Congress in 2022, which is estimated to inject tens of billions of dollars throughout the United States over the next decade primarily focused on reducing the dependency on overseas manufacturing, especially semiconductor manufacturing.





While none of the CHIPS ACT funding is directly “earmarked” for Hawai'i, but rather established electronic manufacturing regions such as Texas and Arizona, there is \$10B allocated for regional innovation development that will be administered by the Commerce Department. This is something that could be pursued for Hawai'i's innovation sector.

4.3.4 IRA (Inflation Reduction Act)

The recently passed Inflation Reduction Act authorizes over \$300B in climate change initiatives encompassing a wide range of activities from tax credits to infrastructure build-out to innovation. More notably, one of the strongest proponents of this bill was Hawai'i Senator Brian Schatz. Notably, \$10M is specifically allocated for Native Hawaiian investment to focus on climate change adaptation and resilience [14].

5 RECOMMENDATIONS

Against the backdrop of Hawai'i's history of innovation, the national and Indo Pacific regional landscape, and the multiple sources of substantial federal funds coming to Hawai'i, the state is set for the following three tangible next steps to proactively and rapidly build a strategy to grow Hawai'i's innovation sector into a sustainable (not reliant on state funds) and invaluable economic engine for Hawai'i's future.

5.1 All flags under a single banner

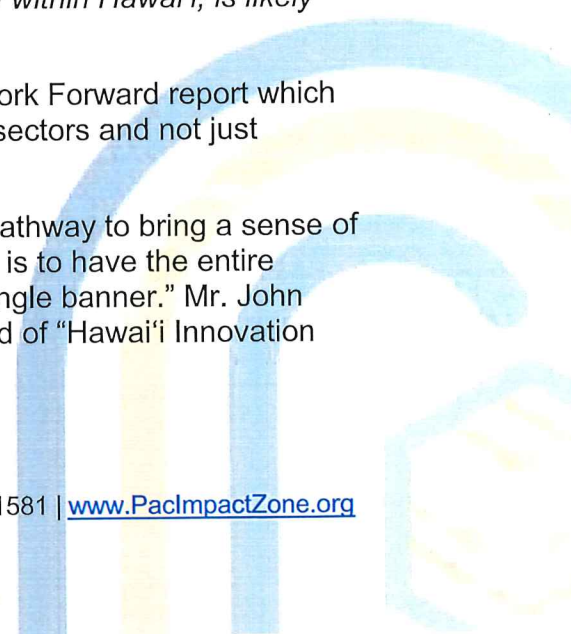
In 2020, DBEDT and the Chamber of Commerce of Hawai'i launched the “Hawai'i Defense Alliance” as a community-led subgroup under the Chamber of Commerce's Military Affairs Council.

This group was envisioned to be a coalition of the willing to focus on growing the defense sector in Hawai'i. Notably, one of the sub-committees under Market Resiliency was specifically chartered to grow the innovation sub-group within the defense and dual-use sector.

A notable outcome from the innovation sub-committee was the recognition that *innovation, when limited to the defense sector specifically within Hawai'i, is likely too small to warrant meaningful investment and effort.*

This conclusion is consistent with the Innovation Framework Forward report which opined that innovation should span numerous economic sectors and not just “technology.”

With these observations, this report suggests a specific pathway to bring a sense of unity, formality, and strength to Hawai'i Innovation, which is to have the entire innovation ecosystem brand and market itself under a “single banner.” Mr. John Greene of DBEDT has suggested the initial working brand of “Hawai'i Innovation Alliance.”





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Benefits of flying under a single banner include:

- Strength in numbers. The larger the community, the more impact, and therefore the increased desire to make appropriate investments.
- Funding leverage. A larger team that is practiced in collaborating for large grant and contracting opportunities can capture sources of funding that a single, smaller entity could not.
- Market recognition. Similar to the strength in numbers concept, but with a bias towards the stakeholders that this single banner supports, makes it an “easy button” for small businesses and entrepreneurs to understand how to effectively leverage services provided by this banner.

The Hawai'i Innovation Alliance (HIA) could serve as the unifying brand for service providers to the innovation ecosystem in Hawai'i. Through HIA, innovators will have a single source of support throughout the entire life cycle of their business.

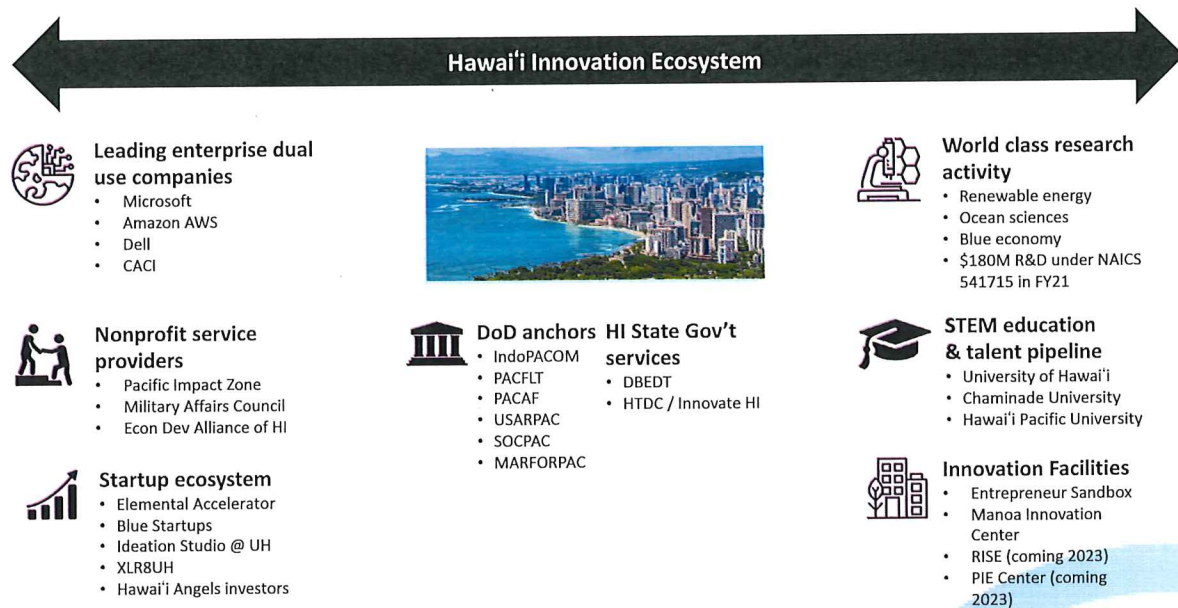


Figure 7: The Hawai'i Innovation Ecosystem is robust yet fragmented, making it difficult for innovators to fully utilize support services

Innovators that wish to commercialize their technology by starting their own business face a daunting array of challenges which often make it difficult to take their first step. Despite the numerous State, nonprofit, and for-profit services available to support entrepreneurs in Hawai'i, the support network is highly fragmented. For first time entrepreneurs, the unstructured, sometimes duplicated nature of services is confusing. This is compounded with the wide spectrum of “pain point” solutions



ranging from HR administration, to seeking sources of funding, to understanding legal implications. For many budding entrepreneurs, the task at hand is so confusing that they opt to not even start, thereby preventing a potential new profitable business from becoming a reality.

HIA would exist to solve this problem by offering a unified single source-of-support for innovative businesses in Hawai'i. Any government, nonprofit, or for-profit service providers that offer programs or services will be offered through the HIA website. Further, HIA employs a community of Innovation Sherpas that will serve as personal guides to any dual-use business that needs assistance connecting with HIA services.

By pairing each small business with a dedicated "Innovation Sherpa," the Sherpa builds a long-term relationship with the business, deepening their understanding of the opportunities and challenges unique to the business, enabling the Sherpa to better align support resources at the appropriate time.

Hawai'i Innovation Alliance (HIA)

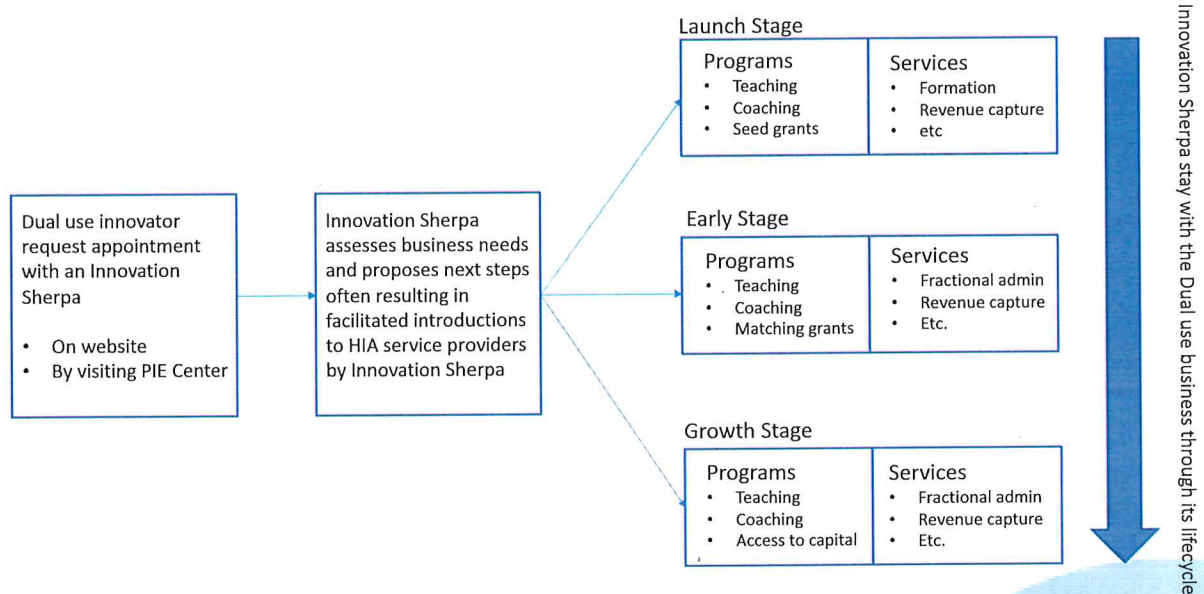


Figure 8: Hawai'i Innovation Alliance (HIA) overview

Each provider entity is free to offer services across one or more service pillars designated as [LAUNCH STAGE], [EARLY STAGE], and [GROWTH STAGE].

- LAUNCH STAGE businesses are either pre-formation or just at the beginning phases of their business. The typical challenges here are to acquire the first source(s) of revenue and early stage administrative burdens such as basic accounting.



- EARLY STAGE businesses have successfully acquired their first one or two research contracts such as an SBIR phase I, so the business typically faces new challenges such as contract, project, and human resource management.
- GROWTH STAGE businesses have often figured out how to repeatedly win research contracts but often find themselves “stuck” in a cycle of pursuing what they know how to do (win more SBIR) because they have payroll and other current day cash flow demands. This business often needs strategic advisement and playbooks for safely transitioning out of research and into commercialization.

5.2 Build on existing investments

Hawai'i already has numerous state and federal investments in place that should be amplified (and coordinated through the aforementioned HIA for maximum impact).

- Small Business Administration (SBA) regularly funds programs to grow the small business community in Hawai'i
- UH PACE currently provides programs focused on student entrepreneurs, and has expressed interest in expanding its programs to UH alumni as well
- HTDC manages many of the state's funded efforts to grow technology and innovation including
 - SBIR matching grant, phase I through III
 - SSBCI (new Dept of Treasury funding in 2022)

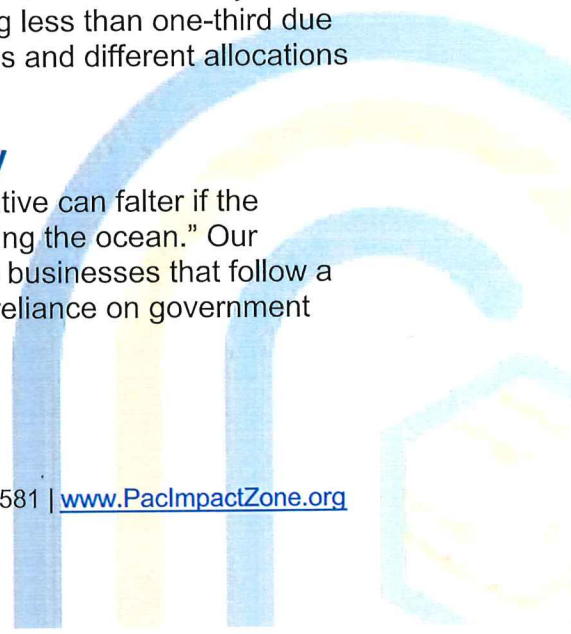
5.3 Focus investments

As the saying goes, don't water down the poi. Well-meaning attempts to give a small amount of funding to everyone is ineffective, as it creates a downward spiral of mismatched expectations and inability to deliver results effectively. Achieving clarity on funding based on strategy and targeted outcomes is crucial.

This also means that programs should be funded at the right level. If a program is estimated to truly require \$1M in funding, then funding it at \$500K is unlikely to deliver “half” of its intended value. It may end up delivering less than one-third due to practical and unavoidable challenges such as split focus and different allocations of personnel based on reduced funding levels.

5.4 Focus on business financial sustainability

Even the most well-meaning economic development initiative can falter if the aspirations are so expansive that the effort is akin to “boiling the ocean.” Our suggestion is to focus on encouraging and supporting the businesses that follow a model for long-term financial self-sustainability without a reliance on government grants.





This is crucial especially against the backdrop of the recent SBIR reauthorization. While most of the 11th-hour reauthorization can reasonably be boiled down to political theatrics, there remains a handful of clear messages from Congress. In particular, this report focuses on the often cited “SBIR mill” business model as one of the chief reasons that the SBIR program is actually not succeeding.

Proponents of the SBIR program point to typical economic development and political metrics such as blended top-line revenue, jobs created, and patents filed.

However, a deeper analysis of many SBIR companies reveals that these businesses derive a huge amount (often far more than 50%) of their total business revenue from phase I and phase II SBIR contracts. The opponents of SBIR point to these statistics, because phase I and II revenue is primarily research and development. Profitable commercial businesses invest (i.e. with their own funds) anywhere from 5% to 20% of their revenue in research and development, which is far off from many SBIR businesses.

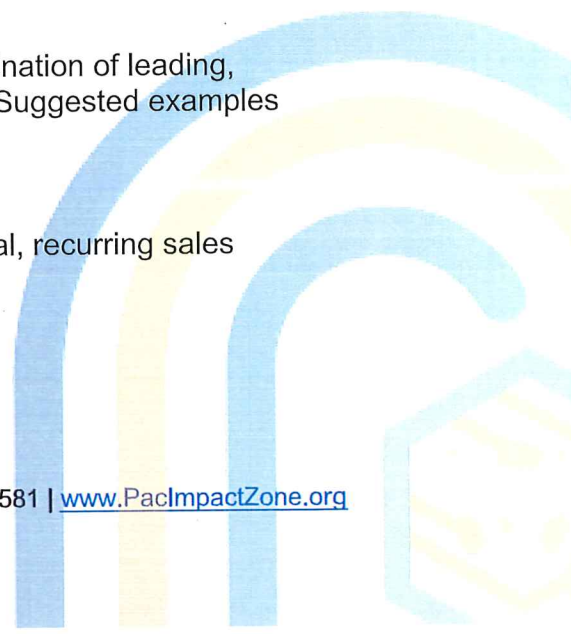
There are no known regions where innovation has translated into regional economic growth without the innovations being transformed into commercial product sales with the commensurate growth in corporate profits and revenue ramp.

Opponents of the SBIR program claim that these vastly different revenue models shows the ineffectiveness of the SBIR program as the program is supporting organizations which are not true commercial businesses but rather research labs structured as a for-profit entity.

Therefore, this report opines that the HIA and any associated innovation investments should focus on bona fide evidence that support recipients are generating true commercial success. Those businesses that are not should be discontinued from support. While this may seem “harsh,” this is the nature of capitalism: the market, as evidenced by commercial sales, picks the winners and losers, not the government. If the market is not responding to a business’ offerings, then the government should not be supporting it either, and instead focus its investments on those businesses that the market has rewarded. These businesses will, in turn, reward the local economy.

Further, the right metrics should be used that are a combination of leading, lagging, economic development, and capitalism minded. Suggested examples include:

- Revenue growth
 - Percentage of revenue derived from commercial, recurring sales
- Customer concentration
- Real wage growth of employed staff





- Employee retention rates

6 ADDENDUM: PACIFIC TECH 2022 CONFERENCE

PIZ was jointly funded by DBEDT and HTDC to provide strategic and tactical support to the newly rebranded Pacific Tech 2022 conference managed by HTDC.

In particular, PIZ provided the following:

- Sourcing of “insider baseball” speakers from government and industry. This was intended to push the re-brand of the event away from an SBIR centric event as well as away from SBIR program managers that were too high in the organization and therefore poorly equipped to speak in detail with small business attendees.
- Pre-event preparation to HI small businesses. PIZ suggested that Pacific Tech be used as a training forum for HI small businesses due to the low cost of Pacific Tech as well as the elimination of the need to travel. This is part of the larger theme for empowering Hawai'i small businesses to compete more effectively against national competitors.

In total, there were over 170 total attendees which exceeded HTDC's expectations. Roughly 50 were speakers, and of the 170 total attendees, an estimated 60 were from off-island.

Based on feedback PIZ gathered from the local community, we provide the following learning lessons:

- There is a strong appetite for more in-person events post-COVID. It is unclear how long this will last, but for as long as it does, Hawai'i should take advantage of this and increase the amount of in-person gatherings.
- Numerous attendees were impressed with the breadth and depth of the speakers relative to year's past. The quality of the speakers at the event was emphasized by multiple individuals. This is a crucial detail because the reputation of the event will be a draw to increase attendance in the outyears.
- The pre-event training was helpful but occurred late in the process. This was a conscious decision on our part to delay holding the training until the last minute so we had maximum attendees registered. In the future, if we can make the training asynchronous (not timed with a specific event) but rather a standalone series, the effectiveness of the training should increase.

The PIZ team is emphasizing the need for intentional follow-up for maximum value capture. Based on feedback received from HI businesses that attended the training,



roughly 25% have already followed up with prospects / partners / etc. they met with at the conference. We would like to see this number increase to over 50%.

Additional suggestions for future consideration:

- One of the benefits for Pacific Tech is its small size. Multiple attendees commented on the “quality over quantity” feel of Pacific Tech versus larger events such as the AFSCEA TechNet which occurred the following week and had over 3,000 attendees.
 - However, PIZ suggests that Pacific Tech should strive for an attendee base of 400 – 500. This is a meaningful number to attract off-island attendees so there are increased opportunities for networking to justify the time and cost to travel to Hawai'i.
 - Foot traffic flow is a factor. The TechNet conference was held at the Hilton Hawaiian Village which spanned three towers across the hotel. This, combined with the general business of the Hilton, caused some to comment that it was “stressful” to be at TechNet this year. In contrast, the Pacific Tech event was held in an isolated area of the Convention Center and was small enough in size that there was ample room to spread out while keeping “opportunistic” run-in probability high.

7 CONCLUSIONS

Hawai'i has consistently struggled to create a sustained and successful innovation economy. The reasons for this have been enumerated through this report, with a focus on the lack of grass-roots initiatives as well as underfunded and unfocused efforts.

Despite the setbacks, there remains sufficient residual assets to warrant a refreshed strategic approach to growing the innovation economy, especially bolstered by the billions of dollars of federal funding coming to Hawai'i over the next decade.

This report provides concrete and tangible suggested next steps based on lessons learned, contemporary techniques for leveraging changes in the federal marketplace, and through the identification of valuable and leverageable assets throughout the state.

Finally, a sense of urgency must come with any forward actions. The wave of funding is finite in time and it will take many quarters, and likely a few years, to fully energize the right components of the innovation economy, to pull together within the right timeframe to capture, anchor, and deploy the federal funds.



8 PERSONNEL INFORMATION

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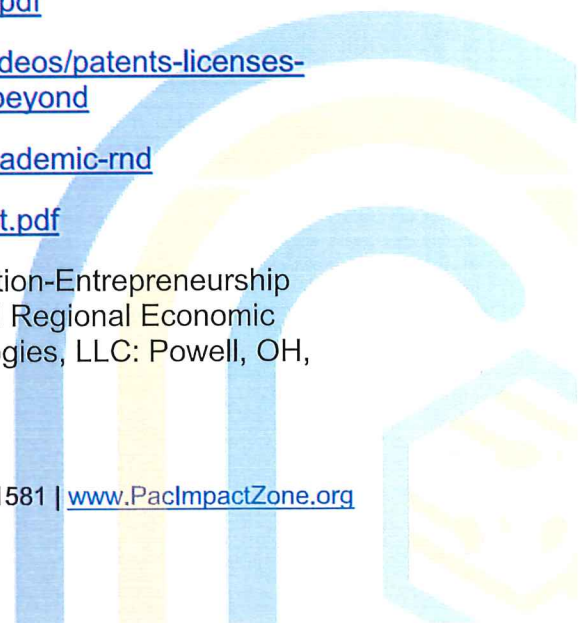
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