6 - Year Report

FOUNDATION FOR ARMENIAN SCIENCE & TECHNOLOGY

FAST
DISCOVERING THE FUTURE

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MESSAGE FROM THE CEO

Dear Reader,

As we mark our sixth anniversary of founding our Foundation, we take stock of our accomplishments to lay the groundwork for what lies ahead. We have developed concepts and implemented programs to build a cross-sectoral platform to enhance science's commercial potential in Armenia through competitive education, research, and technological innovation.

My core belief is that technology is the key to prosperity in the modern world. Innovation driven by science and technology will play a decisive role in national security, people's well-being, and states' international standing. As a result, it is a policy area of monumental strategic significance, affecting all aspects of governance, the economy, and society.

Countries that innovate quickly will set the course for future generations and drive the international agenda. To ensure security, economic sustainability, and participation in global value chains, Armenia must position itself as a global driver of progress and change. A world constantly changing and undergoing major shifts requires us to stay abreast of developments and adapt quickly.

The main objective is to build a strong, innovative Armenia backed by science and technology. Toward this goal, we are leveraging our global network, developing and mobilizing local talent, and attracting new investments to Armenia.

During the past six years, we have thoroughly explored Armenia's scientific and technological strengths by conducting extensive research. We have also identified where the country has the most significant innovation opportunity. As a result of these findings, we will focus on education in the coming years while putting considerable effort into scientific research and establishing platforms for commercialization.

On the road to innovation excellence, Armenia faces many systemic obstacles. Addressing these obstacles head-on is crucial to building the path to new opportunities. It is only when players in the political, administrative, scientific, and primarily commercial realms pull in the same direction that transformative change is triggered.

It is imperative to understand that Armenia is not merely a geographically and historically shaped territory. It is also about a conscious state of mind that is limitless in reach, creativity, and potential. Armenia's internal and global network offers enormous human capital with impressive innovation capacity.

Strategic endeavors and intelligent work can only justify high ambitions. In this sense, we view FAST and the culture it hopes to create in and around itself as a source of inspiration. I see it almost as if the world was a limitless ocean of possibilities, a sea full of opportunities open to Armenians who wish to contribute to national prosperity. There is no way to understate the impact this could have on the world if it were a common cause.

As an organization committed to transparency around our processes, this report seeks to shed light on how we intend to lay the foundations for Armenia to become a global leader in innovation. Moreover, it provides an overview of the impacts we have experienced and some of the challenges we have yet to overcome.

This is why I invite you to consider your role as part of a collective Armenian consciousness that, when mobilized collaboratively, will enable our nation to unleash its full potential as a global technology leader. There is no time to delay - the future is now!

Dr. Armen Orujyan
Founding CEO, FAST

ABOUT FAST

FAST is a platform created to reimagine and help redirect the future of Armenia toward scientific, educational, and entrepreneurial advancement. Its hallmark is a belief in the tremendous capacity and talent of the Armenian people inside and outside the country and a collaborative spirit for securing its sustainable development.

In the early 2000s, entrepreneurs Ruben Vardanyan, Noubar Afeyan, and many other associated partners conceived a network of initiatives to drive Armenia's advancement.

As a result, the IDeA Foundation, UWC Dilijan, Wings of Tatev, and many other initiatives were born. In 2016, Ruben Vardanyan and Noubar Afeyan joined forces with Artur Alaverdyan, the Luys Foundation, and the Ayb Foundation to create FAST.

FAST has become the entity to crystallize and implement an extraordinary vision focused on fostering the development of Science, Technology, and Innovation (STI) in Armenia. It acts as an initiating, connecting, and nurturing force to drive the necessary change.

FAST operates within three main pillars: Education, Research, and Commercialization. The logic behind this strategic and operational choice arises from FAST's holistic approach to its mission. While science remains the primary objective of the Foundation, comprehending and sustaining it necessitates competitive education. Advancing science calls for extensive research, and deriving broader benefits from it involves the process of commercialization. Hence, the three main pillars are keys to the organization's integral vision of creating educational opportunities, connecting science and financial networks, conducting pioneering research, and building a holistic ecosystem for Armenia's development.

FAST fosters cross-institutional and cross-sectoral synergies capable of multiplying impact by consolidating resources in Armenia and beyond. Along with promoting Armenia's resilience and global connections, this approach aims to stimulate long-term, self-sustaining national development.

OUR VISION: EN ROUTE TO INNOVATIVE ARMENIA

VISION OVERVIEW

In 2041, FAST envisions Armenia as a top 10 global innovator and a top 5 Data Science (DS) and Artificial Intelligence (AI) nation. Various programs and activities will create a holistic STI ecosystem to implement such an ambitious agenda. Additionally, FAST aims to help transform Armenia from one of the most technology-consuming nations to one of the most technology-creating.

Over six years, the Foundation has focused on developing pilot frameworks. Once implemented, these frameworks are intended to lead to spin-offs or scale-ups, with more extensive program planning to follow.

Three pillars underpin our development strategy and vision for the next 20 years.

EDUCATION

Driving a critical mass of students in Armenian educational institutions to benefit from AI and cutting-edge STEM curriculum, pioneering infrastructure, and real-time knowledge synthesis.

RESEARCH

Nurturing globally competitive research talent to generate breakthrough scientific discoveries and technological innovations through solid local and international collaborations.

COMMERCIALIZATION

Fostering a fertile and profitable venture-building environment to feed a diversified high and deep-tech industry, resulting in Armenia's presence on the global map as a hub for technology exports.

WHO WE ARE

THE FOUNDERS

FAST's vision of regenerating Armenia's science and technology innovation to reach its full potential has drawn local and international professionals worldwide.

The conviction that Armenia has the potential and right to shape its own history has united our founders and board members in pulling their efforts and resources to advance this vision. It is also a driving force for our organization's management and wider team – a fact reflected in the passion with which we do our work.

Noubar Afeyan, Ph.D.

Member of the Board

Co-Founder, FAST

Founder and CEO, Flagship Pioneering

Co-Founder and Chairman, Moderna Inc.

USA

Artur Alaverdian

Member of the Board

Co-Founder, FAST

Serial Entrepreneur, Venture Investor

Owner and Chairman, ProfHolod

Founder, SolarOn

Armenia

Ruben Vardanyan

Public Figure

"Ayb" Educational Foundation

"Luys" Cultural, Scientific, Educational Foundation

The importance of building a solid scientific, educational, and technological backbone in Armenia has never been as urgent as it is now. FAST was conceived six years ago to strengthen Armenia's innovation ecosystem, knowing the challenges we had to overcome. However, none of us could have anticipated the drastic changes within Armenia and worldwide.

While recent security developments in the world have given rise to uncertainty about the future, it is no time to slow down our collective efforts to focus on bolstering Armenia's scientific and technological foundations.

Over the last several years, FAST work has focused on advancing basic research by enabling research collaborations and mentorship, emphasizing life sciences and biotech, and helping develop STEM-related educational programs for Armenia's youth. FAST has catalyzed public-private partnerships, initiated programs to strengthen the development of human capital needed in Armenia, and brought a new systematic approach to entrepreneurship to Armenia.

FAST has also worked on establishing and strengthening global networks among Armenian scientists, engineers, and other domain experts to increase the profile of innovations from Armenia and their translational potential.

There is much more to be done with the combined strengths of private and public sectors, individuals, foundations, and organizations. Hence, I extend an open invitation to all interested in working with me and my colleagues to advance the state of science, technology, innovation, and education in Armenia.

Noubar Afeyan, Ph.D.
Co-Founder, FAST

Since its founding, FAST has played an important role in the development of science and technology in Armenia. By implementing a variety of programs and initiatives, pilot projects in three areas of activity - education, research, and commercialization, have the greatest impact on the scientific environment, involving a wide range of scientists, students, early-career researchers, and technology entrepreneurs.

During this time, we can note positive dynamics in the awareness of the importance of science and technology in the life and development of the country; for example, thanks to the consolidation of the scientific and business communities, it was possible to increase government funding for science in Armenia. The interest of Diaspora scientists and business representatives in science in Armenia is growing, and private funding for technology startups is increasing.

Today, when Armenia is faced with the most serious challenges - threats to sovereignty and territorial integrity, with the loss of Artsakh and increasing instability in the world, there is no other way for Armenia other than to rely on its own strengths, responding to this by increasing efforts in the development of science and technology in Armenia, turning the country into a technological leader, creating a knowledge-intensive, technologically advanced, competitive and industrial economy in the country, increasing the technological defense capability of the country.

Investments in science and technology in Armenia should be of paramount importance and considered an investment in the country's future.

Artur Alaverdyan
Co-founder, FAST

Armenia, throughout its existence, amassed a significant scientific and technological heritage. Unfortunately, much of this legacy was lost during the interwar period and the immense security and socio-economic challenges of the post-Soviet era in the 90s. Today, the myriad obstacles on the development path highlight our country's urgent need to rekindle essential areas of growth potential.

The events of the 2016 war starkly demonstrated the pressing requirement for an entity capable of catalyzing Armenia's STI development. In response, we established FAST in 2017 with an ambitious vision—to position Armenia among the world's top 10 innovative nations by 2041, particularly in DS and AI.

In the 21st century, advanced science and innovative technologies stand as pivotal elements for a nation's success. Reality urges us to move swiftly in this direction, prioritizing innovation and harnessing our human capital. While new technologies undeniably bring benefits, it is crucial to recognize their potential to pose threats when used irresponsibly and without proper control. Hence, development in this critical domain must be guided intelligently, with a clear understanding of risks and security.

In fields like science, where development cycles are often longer than in other areas, immediate results might only sometimes be apparent. However, the endeavors pursued today, thanks to FAST and its research-backed strategy to elevate Armenia's global status, are conducted at a high professional standard. I am confident that this will ultimately yield remarkable outcomes visible to all.

The need for institutions like FAST extends beyond Armenia's borders. I firmly believe that FAST is on the right trajectory and will be pivotal in nurturing Armenia's ecosystem. Yet, advancing technology and science alone cannot ensure a nation's prosperity. A balance across all elements—education, healthcare, culture, and more—is imperative. Noubar Afeyan, others, and I articulated this vision within the "Armenia 2020-2041" initiative launched over two decades ago.

Certainly, we encounter substantial challenges and intricate issues. To reinforce our vision and amplify our capabilities, leveraging the combined strengths of Armenia and its Diaspora is of paramount importance. The restoration of our nation's scientific and technological potential hinges on cooperation with the world and the synergistic convergence of our unique resources with global ones.

I hold the belief that we have laid a solid foundation for progress and are poised to conquer new summits.

Ruben Vardanyan
Co-Founder, FAST

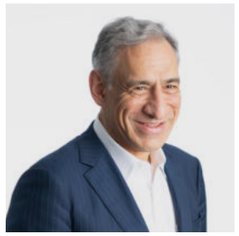
GOVERNANCE

FAST was founded on 20 June 2017. The Foundation's senior management comprises the Board of Trustees and the Chief Executive Officer. The Board of Trustees is the Foundation's highest management body. Additionally, The Foundation houses The Board of Advisors, a formal advisory body.

BOARD OF TRUSTEES

Members of our **Board of Trustees** are experts, innovators, leaders, and highly respected figures in the world of academia, science, business, and innovation.

They bring vast experience in developing successful ventures, leading thriving science-backed organizations and global companies, and lecturing at top academic institutions. They have all made distinguished contributions to social causes, supporting social ventures and Armenia-focused initiatives.



André Andonian

Chair of the Board

Chairman Emeritus North Asia, Special Advisor, McKinsey & Company

Chair of Asia Pacific, Flagship Pioneering

CEO, Andonian Advisory Pte.

Chair of the Board of Directors, Cognaize

Singapore

Noubar Afeyan, Ph.D.

Member of the Board

Co-Founder, FAST

Founder and CEO, Flagship Pioneering

Co-Founder and Chairman, Moderna Inc.

USA

Artur Alaverdian

Member of the Board

Co-Founder, FAST

Serial Entrepreneur, Venture Investor

Owner and Chairman, ProfHolod

Founder, SolarOn

Armenia

Ingrid Hengster, Ph.D.

Member of the Board

Managing Director Country CEO Germany

Global Chairman Investment Banking Barclays

Germany

FAST was created with the foresight of our founders Artur Alaverdyan, Noubar Afeyan, Ruben Vardanyan, and the Ayb Foundation. During this period, the world we live in has changed, and governments, companies, and institutions are grappling with the 4D disruptions: de-globalization, de-carbonization, disruptive technologies, and demographic shifts. We at FAST believe that science and technology can be a unifying force for good, bringing the international community together to address these challenges in addition to the specific challenges and opportunities Armenia as a country is facing.

Over six years of FAST, we are proud of what we have accomplished together on our mission of creating an ecosystem that drives scientific advancement and technological innovation in Armenia and beyond.

We have launched over 25 programs in 3 verticals: education, research, and commercialization of science, with the main focus on AI and Biotech. FAST has engaged over 11,000 beneficiaries through its programs, including directly supporting more than 1300 high school, undergraduate, and graduate students, more than 830 entrepreneurs with about 300 startups, and almost 250 researchers.

Our ADVANCE STEM Grant Program provides up to $125K annual grants to 9 internationally connected scientific teams in Armenia. Our science-based startups founded by FAST's commercialization initiatives have won the 2021 and 2022 Entrepreneurship World Cups in Armenia, and both of them have been invited to join Berkley's Skydeck Accelerator.

Through FAST's Advance Armenia Campaign, we have raised nearly $3 million since 2022 to advance Armenia's scientific and technological potential, primarily for helping us scale up our ADVANCE STEM Research Grant Program and the launch of Generation AI.

Annually, we organize the Global Innovation Forum (GIF) in Yerevan. In 2022, we celebrated the success of GIF: Life-Altering Technologies, held on October 5th and 6th. The forum was full of captivating presentations, vigorous debates, and policy discussions, with over 1,300 participants and 65 distinguished speakers from 20 countries.

Encouraged by our accomplishments to date, we are more than ever determined to move forward to a more sustainable and resilient future that builds on the strengths of Armenia in the second half of the 20th Century as a center for life science, industrial computing, software development, and semiconductor production. We aspire to help Armenia become a new regional hub of advanced technology and innovation due to its competitive human capital and well-educated population, the sector's share in GDP, and its constant growth in the number of local and international companies and total revenues. Our top 3 strategic priorities are to create a Global Armenian Science and Technology Network, build a National Adaptive Innovation Campus (AIC), and attract younger generations to science and its commercialization.

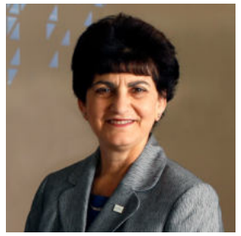
I would like to thank our CEO, Armen Orujyan, and our highly motivated and talented team at FAST for creating a broad and effective platform for collaboration that allows many people to contribute with their distinctive talent and leadership. We are privileged to have world-famous experts and professionals on our Board of Trustees and Board of Advisors. Our NextGen Council unites young scientists and tech entrepreneurs worldwide, and members of the Visionary Circle educate international community members on the importance of our mission. If you are driven by the dream of scientific and technological advancement in Armenia, I encourage you to join our journey and become part of the FAST network.

At FAST, we try to unite all forces to directly contribute and transform Armenia into a science-driven, innovative country by 2041. The great Brazilian Formula 1 driver Ayrton Senna once said, "You cannot overtake 15 cars in sunny weather... but you can when it is raining." We have such an opportunity for Armenia now."

André Andonyan
Chair, Board of Trustees

BOARD OF ADVISORS

The Board of Advisors is the primary guiding entity in constructing FAST's overall strategy and program mapping. It provides the Board of Trustees and FAST management with invaluable topical expertise and assists in decision-making. The Board of Advisors comprises academic, scientific, technological, and entrepreneurial community members. They are esteemed and highly-regarded figures in their respective fields, combining vast expertise and experience on a global scale. Their functions revolve around guiding as a Board and as members sitting as individuals on specialized FAST committees.



Mary Papazian, Ph.D.

Chair of the Board;
Executive Vice President, Association of Governing Boards of Universities and Colleges

Former President, San Jose State University,

USA

Garabed Antranikian, Ph.D.

Director, Center for Biobased Solutions Hamburg University of Technology

Germany

Armen Askijian

CTO and Head of Engineering Airbus U.S. Space & Defense, Inc.

USA

Hovhannes Avoyan

Founder and CEO, Picsart

Armenia

Lord Ara Darzi of Denham, OM KBE PC FRS

Co-Director, Institute of Global Health Innovation

Paul Hamlyn Chair of Surgery, Imperial College London

UK

James Chavin, Ph.D.

President, Teza Technologies

UK

Gabrielle Gauthey

CEO High Representative to the EU institutions SVP of European affairs, TotalEnergies

France

Avak Kahvejian, Ph.D.

General Partner,
Flagship Pioneering,

USA

Sarkis Kiramijyan, MD, FACC, FSCAI

Interventional Cardiologist, Director of Structural Heart Disease Program,

Adventist Health White Memorial Hospital,

USA

Ari Libarikian

Senior Partner,
McKinsey & Company,

USA

Serge Tchuruk

Consultant, Former Chairman, Alcatel-Lucent Enterprise,

France

Davíd Yang, Ph.D.

Founder and Board Director, ABBYY,

Co-founder, Yva.ai,

USA

In just six years, FAST has established itself as a catalyst for unleashing systemic change in Armenia's science and technology ecosystem. FAST is a game-changing platform that brings together important stakeholders – scientists, educators, policymakers, government officials, industry leaders, entrepreneurs, and experts and organizations throughout Armenia and the Diaspora – in a shared effort to develop innovative, sustainable, and competitive advances in science and technology in Armenia.

With a goal of Armenia becoming a global innovator nation by 2041, FAST has laid the foundations for impactful programs such as ADVANCE, ASCENT, STAN, and Unit 1991. It has launched large-scale programs such as Generation AI to bring innovative change in cutting-edge science, math, and AI education in Armenian high schools.

As chair of the FAST Advisory Board, I could not be more proud of the work of the entire FAST team and its meaningful collaborations with partners within Armenia and the Diaspora. With the Foundation in place, I am excited about the next few years as FAST continues to invest in the next generation of science and technology leaders who will play a central role in developing Armenia's science-based innovation ecosystem.

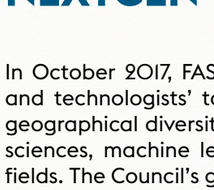
Never has FAST's work been more important, as science and technology are key pillars in securing Armenia's security and a prosperous future.

Mary Papazian, Ph.D
Chair, Board of Advisors

NEXTGEN COUNCIL

In October 2017, FAST created the **NextGen Council**, which brings together young and motivated scientists and technologists' talent, knowledge, and skills. The Council places a particular emphasis on gender and geographical diversity in the selection of its members' pool. Council members come from bioscience, medical sciences, machine learning (ML), quantum engineering, and technological, innovation, and entrepreneurial fields. The Council's geographical spread, which extends from Armenia to Eurasia to the Americas, also ensures that the worldviews and perspectives it can draw are comprehensive and diverse.

Throughout six years of its existence, FAST has demonstrated an unwavering commitment to returning Armenia to the league of science and technology-driven economies. Despite ongoing local and global struggles during this period, FAST has been exceptionally resilient and managed to deliver on some of its most ambitious initiatives — large research grants for academic labs, fellowships for PhDs and Postdocs, an annual innovation forum to bridge academia, industry, financial institutions, policymakers, consumers, other stakeholders, and more. These endeavors stem from a comprehensive ecosystem-building strategy developed by FAST's founders, management, and advisors. I am thrilled that our NextGen members played and continue to play a significant role in shaping and executing this strategy.



Erik Aznauryan, Ph.D.
NextGen Council's Inaugural Chair
Wyss Technology Development Fellow
Dr George Church lab
Wyss Institute for Biologically Inspired Engineering
Harvard University

Carla Abrahamian, Ph.D.

Postdoctoral Researcher at the German Heart Centre, Munich,

Germany

Lena Afeyan, Ph.D.

Head of Strategy and Corporate Development, Oxford-Harrington Rare Disease Therapeutics Accelerator,

UK

Hayk Aslanyan

Researcher, System Programming Laboratory

Armenia

Aramayis Dallakyan

Senior Statistician and Software Developer, StataCorp LLC,

USA

Mikael V. Garabedian, Ph.D.

American Cancer Society Postdoctoral Fellow, University of Pennsylvania,

USA

David Ghukasyan

Software Developer,

Armenia

Hovakim Grabski

Research Scientist, Russian-Armenian University,

Armenia

Hrayr Harutyunyan, Ph.D.

Research scientist, Google Research,

USA

Salpy Kanimian

Ph.D. student in Economics, Rice University, Houston,

USA

Théo Kaprélian

Ph.D. student in Medical Imaging, The National Institute of Applied Sciences of Lyon,

France

Arpine Kozmanyan

Software Engineer, Birthright Armenia,

Italy

Larisa Mazmanyan

Founder and Director of Strategy and Innovation, Brooklin Consulting,

Canada

Hmayag Partamian, Ph.D.

AI Researcher, Postdoctoral fellow, University of Texas at Arlington,

USA

Shushan Sargsian, Ph.D.

Recent Ph.D. Graduate from NYU School of Medicine, Director of Early Career Opportunities, Clear Direction Mentoring,

USA

OUR TEAM

The Foundation's management team ensures the implementation of our strategy. Their vast experience in our priority scientific disciplines is an essential driving force for our Foundation and its programs. Our management team also maximizes the diverse skill sets of our wider team members to achieve the best results and further develop their professional capabilities.

The management team at FAST consists of Suzanna Shamakhyan, the Vice President of Strategic Programming, and Marine Kachatryan, the Vice President of Operations. The Founding Chief Executive Officer, Armen Orujyan, leads the team.

The CEO leads and governs our management team, holding the highest responsibility for the executive branch and the Foundation's overall functioning. The CEO directs current activities, implements Board of Trustee decisions, represents FAST at the highest level, issues orders and instructions for proper Foundation activities, and liaises between the Board of Trustees, Board of Advisors, Next Gen Council, and the FAST team. He supervises day-to-day operations, leads FAST talent, and contributes to their growth and development.

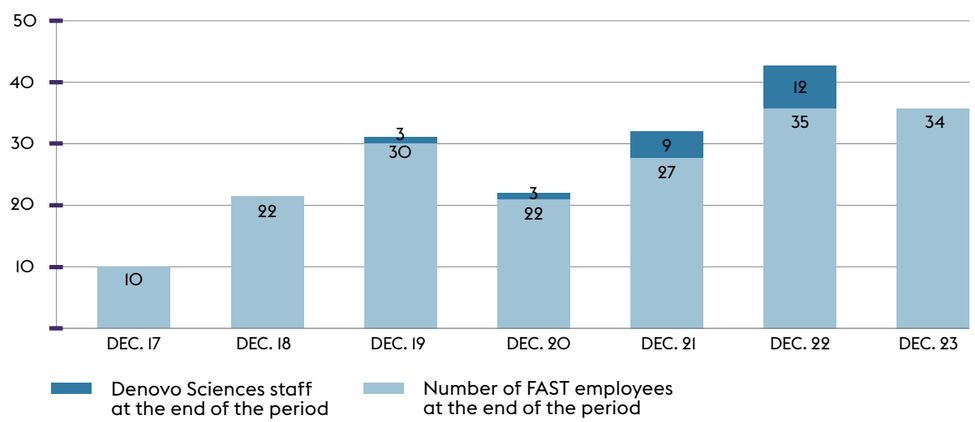
FAST's organizational structure is represented by three key units: strategic programming, global engagement, and finance and operations.

Our Vice Presidents lead individual units and are accordingly responsible for the activities of those units, coordinating our overall tactical work, operational tasks and objectives, and the outputs of units according to the overarching organizational strategy at the core of all unit activities. They also consolidate and integrate the Foundation's executive functions with its operational activities, implementing executive decisions through action plans.

FAST is focused on finding the best professionals in the field and supports the development of the new generation. We are an equal opportunity employer, making employment decisions without regard to race, religion, national or ethnic origin, sex, sexual orientation, gender identity or expression, age, disability, or other characteristics protected by law.

Since its inception, FAST has constantly evaluated the most efficient ways to organize internal workflows and ensure team productivity through the optimal distribution of roles. The deliberate and continuous reevaluation of its plans against a changing reality allows the Foundation to stay agile and follow its organizational objectives according to apparent and emergent needs.

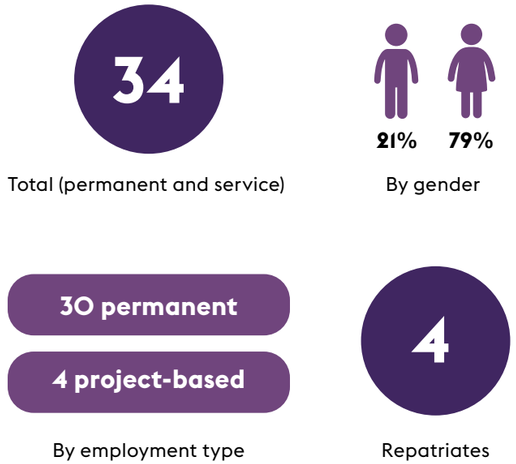
Graphic 1.1. Permanent staff dynamics during 2017-2023



Explore all the details about the Denovo Sciences program in the Spun-Off section.

As illustrated in the preceding graph, FAST has experienced rapid growth in its employee numbers, demonstrating positive dynamics in each interval. Over the past six years, our team has accomplished significant milestones that we take pride in sharing. We've created 35 high-quality permanent jobs, a testament to our dedication to sustainable employment. Beyond these roles, we have been actively involved and provided training to over 300 interns and volunteers through various FAST activities. As of December 2023, we now have 34 positions within the Foundation.
The only notable challenge in our staff occurred during the COVID-19 pandemic, driven by its substantial impact on program implementation and funding. This period transformed the working experience for all team members, requiring them to navigate the delicate balance of working from home and managing remote workflows.This situation highlighted the urgent need to prioritize employee well-being, development, and engagement.

Graphic 1.2. Staff directly employed as of December 2023



The working environment at FAST transforms as we move forward and grow as an organization. We encourage everyone at FAST to unleash their potential. At the same time, we believe that attractive working conditions are important. Team members are valued and respected and provided professional and personal growth opportunities.

Our team of bright young professionals has tremendous enthusiasm and works tirelessly and with the utmost dedication to our organization's mission. While each individual in our team has their own story, we are all united under the same vision of Innovative Armenia 2041.

From a certain point in my life, I started strongly believing in the power of the “think globally, act locally” approach. With its ambitious mission and a devoted team under visionary leadership, FAST helped me transform this approach into a professional mindset.

Every morning, I come to work with a global goal to build an innovative scientific ecosystem in Armenia, then sit at my desk to break that goal into bite-sized goals and take mini-steps towards each of them.

It has been more than five years for me at FAST, and sometimes it feels like ages because we have accomplished a lot, and I had a chance to grow a lot, sometimes, though it feels like I started yesterday because there is so much more yet to do. And that is so exciting.

Veronika Aghajanyan,
Lead of Research Advancement Programs

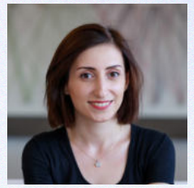
First and foremost, I want to share how I became a part of FAST and joined the team. I visited the FAST office to discuss a potential partnership and shared my thoughts and feelings about the wonderful, dynamic, and unique environment. To my surprise, I received a job opportunity offer to consider applying for the position of Stakeholder Coordinator.

It was a delightful turn of events, and I am thoroughly enjoying my time here at FAST.

FAST’s teamwork and mutual respect culture creates a sense of belonging and provides a platform for personal and professional growth. I am privileged to work alongside skilled professionals who inspire me daily and encourage me to challenge myself continually. I am grateful to be a part of the FAST team.

The organization’s culture, commitment to innovation, and dedication to making a positive impact make it an exceptional workplace. I thoroughly enjoy each day at FAST and eagerly look forward to continuing this fulfilling journey.

Lusine Madoyan
Stakeholder Coordinator, Generation AI program.



The Mission. The People. The Space. Being a part of this organization right from its inception has been an incredible journey for me. From the beginning, I had the opportunity to be involved in launching new programs, facing challenges head-on, and continuously learning and growing.

FAST provided a platform for me to expand my network, make a tangible impact, and forge countless new friendships. It was an honor to contribute to the organization’s mission through the power of events, and I am truly grateful for all of these experiences.

Even though I have moved on from my role, I still hold the team’s spirit close to my heart. I firmly believe in the bright future that FAST strives to achieve for our nation.

Anahit Nersisyan
Former Events and Programs Producer and Coordinator

Over the past 5.5 years, my journey with the foundation has been incredibly transformative. Starting as the Financial Controller and progressing to the VP of Operations, I have been privileged to witness the remarkable evolution of our organization. Reflecting on this experience, I am overwhelmed with gratitude for the opportunities bestowed upon me. Each step of my career has been a testament to the foundation’s commitment to growth and empowerment.

As the VP of Operations, my role extends beyond numbers, encompassing the essence of our collective vision. The mission we have undertaken for Armenia is not merely a cause—it is a calling. Being part of this journey, I have seen the impact we have made and felt it resonate within me.

The foundation’s mission aligns with my deepest convictions, and every achievement and milestone reflects our shared dedication to what is suitable for our country.

Marine Khachatryan
Vice President of Operations

When I first learned about FAST's vision, it deeply resonated with my belief in our nation's potential. With my background in global education and partnerships, 6 years ago, I joined FAST, ready to juggle this exciting challenge with my role as a mother of a newborn and a toddler.

My initial role as VP of Partnerships and Events allowed me to lead flagship projects like the Global Innovation Forum and the Neruzh diaspora startup program, and foster international ties across continents. Later, the complexities of 2020 inspired me to dive deeper into strategy and implementation, leading me to oversee Strategic Programming. This role has enabled me to shape our strategies in education, research, and innovation. The challenges we faced only fueled our determination, inspiring us to launch groundbreaking long-term projects such as the ADVANCE Research Grants in 2020 or the Generation AI program in 2023. The latter coincided with my son's first year in school, and symbolizes the transformation we envision for their generation.

At FAST, working with outstanding team and global experts has been profoundly enriching. This journey has reinforced my conviction that focused work and determined collaboration can transform Armenia into a thriving nation. My role at FAST transcends a career; it's an integral part of my life, weaving together my personal growth and professional endeavors, all committed to the progress of our society and nation.

Suzanna Shamakhyan
Vice President of Strategic Programming

ARMENIA'S CURRENT PROFILE

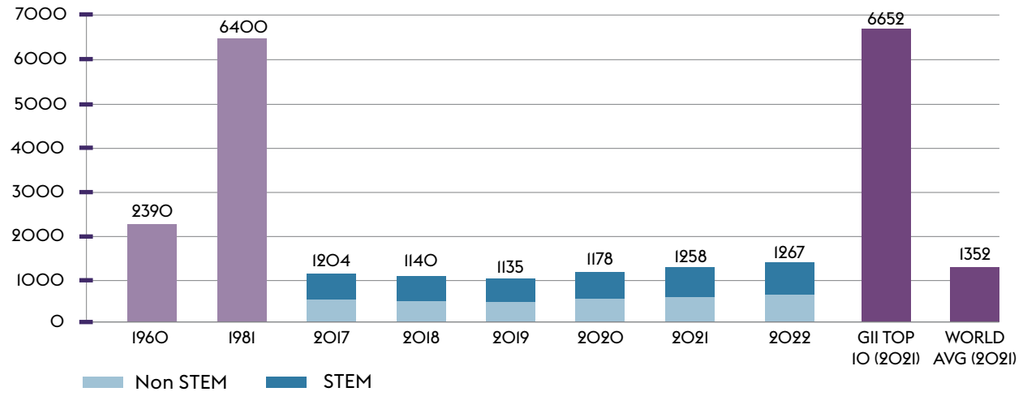
- The outlook of FAST for Armenia is shaped by precedents of other countries, like Israel, Singapore, and South Korea, which have made technological leapfrogging possible, as well as Armenia's own former status as a scientific and technological hub, which became a leading state after WWII within the Soviet Union and rose to prominence before the collapse of the Soviet Union.
- FAST has intensively studied other countries' experiences and the prevailing conditions in Armenia in developing and implementing its interventions.

STI POTENTIAL

We Imagine Armenia as a global leader in science-based solutions to challenges facing both the country and the world. Taking its first tentative steps towards this future, Armenia is demonstrating a commitment and collaboration that is not simply optimistic but also grounded in precedent.

- A handful of other countries with a comparable starting point of STI ranking, such as Israel, Singapore, and South Korea, have already made similarly ambitious leaps. Such precedents in "technological leapfrogging" are instructive for Armenia.
- Armenia was there before: it was among the vanguard of the world's discovery of digitalization (one of the first Soviet computer systems was designed here in 1959). The production of strategic microelectronic equipment used by the Soviet defense industry was also formerly Armenia's preserve. The country was once responsible for 30% of the Soviet Union's military electronics R&D and its main hub for software development, industrial computing, electronics, and the production of semiconductors. Among Soviet republics, Armenia ranked second only to Russia for its number of active researchers and scientists. As one of the most vibrant scientific communities in the later years of the Soviet Union, the country was home to 22,000 researchers working in 130 scientific institutions. Thus, it was once already a top technology hub for the Soviet bloc – a "Soviet Silicon Valley," as some have suggested.

Graphic 2.2. Number of researchers per million population



The last decade has shown clear signs of Armenia's STI growth potential, with several local companies securing investments to drive innovation in their respective fields, including Picsart, Krisp, CodeSignal, Sololearn, Renderforest, and SuperAnnotate AI. Over the last six years, it has also seen a growing number of accelerators, angel investors, and venture capitalists establishing a presence in Armenia.

The Information Communication and Technology (ICT) sector, in particular, has experienced considerable growth due to the increasing number of investments in the field. It has become one of the most significant sectors of the Armenian economy. The number of IT companies in 2022 exceeded 2,100. The sector's share in Armenia's $13,8 billion nominal GDP (2021) is 5%. The average annual growth in the number of ICT companies over the last ten years is about 26%. Similarly, the turnover of the high-tech sector has also risen from $144 million in 2016 to $853 million in 2022. Various factors contribute to this substantial increase, including a significant influx of foreign companies investing in the region, technological advancements fostering innovation, and favorable government policies encouraging industry growth.

Favorable conditions for nurturing Armenia's potential have also emerged at the structural level. This includes the passage of beneficial legislation that provides tax privileges for the Armenian IT and export sectors, the establishment of free economic zones, and customs-free trade within the Eurasian Economic Union. Armenia's eligibility for the European Union's HORIZON EUROPE programs and its mobility and other schemes also offer growth stimulus. Additionally, the Ministry of High-tech Industries provides grants, incubation, and acceleration programs for startups at various stages of development.

Meanwhile, in the education sector, progressive Armenian initiatives such as the TUMO Center for Creative Technologies (ranked number one among the World's Best Innovative Schools) and the Armath Engineering Laboratories educational program are helping cultivate Armenian youth equipped with the skills and knowledge to succeed in the modern digital age.

To summarize, the concept of Innovative Armenia is not new. It has, in fact, inadvertently become one of the country's greatest exports. Armenia's past achievements provide a natural baseline in the living memory of its scientific community. This suggests that, with the right stimulus, Armenia can potentially rebuild its profile as an international science and tech hub. It can reverse its current trajectory on STI and positively thrive, bringing science and technology innovation home once again. Whether it is successful will be a matter of resolve: as other countries seek to build their way up the innovation charts, Armenia will have little time to stand still.

STI HINDERINGS

Achieving greatness requires firmly grounding oneself in reality. To set the trajectory for Innovative Armenia 2041, FAST has invested significant effort into objectively assessing Armenia's current STI landscape. This involves multiple baseline assessments of STI and analyses of how other countries comparable to Armenia have achieved "technological leapfrogging."

Once a major technological and scientific contender, Armenia has experienced significant regression in the conditions that enabled its past achievements. Following the collapse of the Soviet Union, various objective and subjective factors contributed to this regression.

The prolonged war in Artsakh resulted in the continuous contraction of Armenia's GDP and many casualties, negatively impacting the country's economy, national priorities, and the STI ecosystem. In addition to Armenia's exacerbated geopolitical situation, other factors contributed to this negative development: the collapse of the holistic Soviet economy eliminated market opportunities for high-tech exports, institutional support diminished, and Research and Development (R&D) expenditures and funding inflow experienced significant contraction. The latter led to brain drain and the curtailment of major research projects.

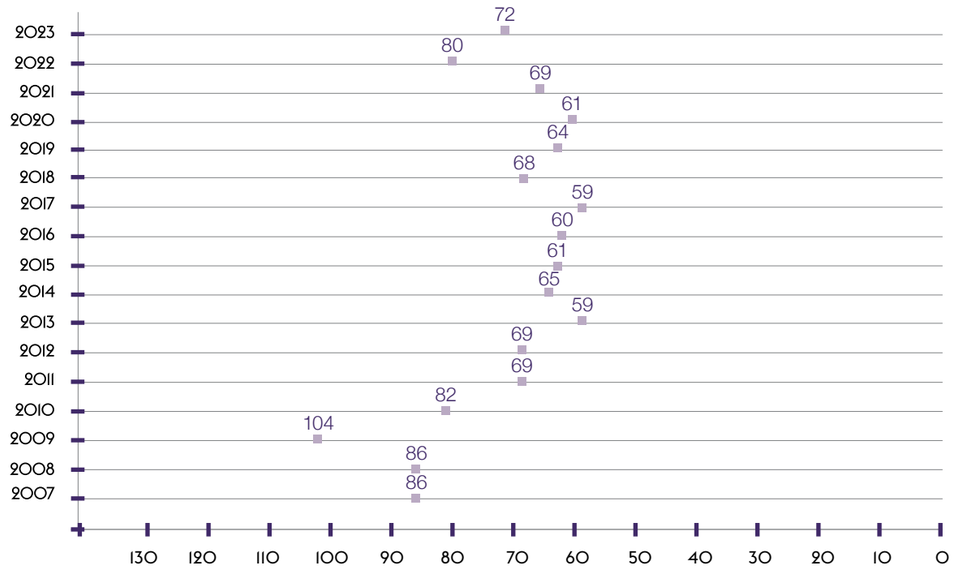
By contrast, competitor nations have successfully advanced their own STI ambitions, thus driving Armenia down global innovation rankings even further.

The Global Innovation Index (GII) began in 2007 and is an annual ranking of countries by their capacity for and success in innovation. It comprises two subindices - Innovation Input and Innovation Output.

These two indices capture both the elements of the national economy that enable innovative activity and the actual evidence of innovative output through seven input/output pillars. The GII is the only international index to rank countries from the innovation perspective. As such, it offers a unique and valuable tool for tailoring interventions to promote output growth, improved productivity, and job growth. It also provides detailed metrics that can be used to measure progress comparatively.

Armenia ranks 72nd among the 132 economies featured in the GII 2023.

Graphic 2.3. GII ranking, Armenia (2007-2023)



Armenia secured the 17th position among 33 upper-middle-income economies in the GII 2023. Displaying a commendable ability to translate investments into tangible outcomes, the country exhibited superior innovation results compared to its investments. Notably, its rank for innovation outputs rose to 62nd in 2023.

Despite fluctuations in Armenia's GII ranking over the past 15 years, there is an evident need for a consistent and comprehensive approach to fostering innovation. The 2023 GII performance highlights strengths and challenges, emphasizing the necessity for concerted efforts to elevate innovation for sustained long-term growth and competitiveness.

Nourishing Armenia's innovation ecosystem requires improving innovation performance, hindering indicators currently exhibiting weakness.

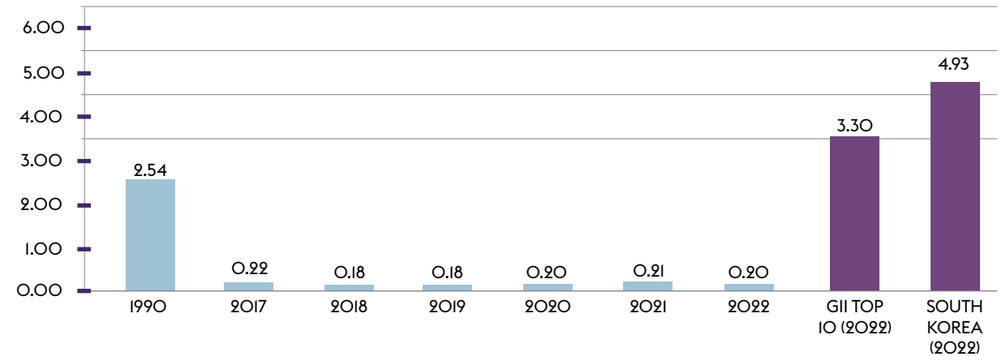
Some of the most pressing challenges facing Armenia's innovative development concern

- The development of the country's professional Human Capital
- The advancement of R&D and education.

R&D: Our correlational analysis of the leading objectively verifiable indicators in STI ecosystems displays that R&D expenditure is the core variable closely correlated with all other major STI indicators. It also acts as a good predictor of a country's innovativeness. According to a study that analyzed EU28 time series data for ten years, an increase in the share of R&D expenditure in GDP by 1% causes GDP growth of 2.2%.

Armenia's financial allocation in the R&D sector indicates significant and systemic challenges for fundamental and applied sciences. Since 2009, gross domestic expenditure on R&D as a percentage of GDP has averaged 0.23%. The OECD average is 2.67% (see the graphic below). While the above R&D spending figure excludes private corporate R&D expenditure, which Armenia does not accurately compile, estimates for the overall total remain modest.

Graphic 2.4. Armenia as a Science and Technology Hub Then and Now – R&D Expenditure (% of GDP)



Armenia's predominantly IT-centric tech sector engages in outsourced R&D, with a gradual emergence of domestic R&D initiatives among some companies; however, the prevalence of such activities is limited, resulting in a scarcity of science-based or deep-tech startups.

The country still needs mature science-intensive venture builders to accelerate the startup creation process and provide the required stimulus to foster innovative indigenous companies capable of achieving higher valuations than their outsource-oriented counterparts. Such venture builder-backed companies have a 60% likelihood of making returns compared to just a 5-20% likelihood among experienced capital-backed startups.

Education: Another primary variable of interest is education. The analysis of the World Bank's World Development Indicators database provides estimates of the bivariate relationship between government education expenditure and GDP across a large sample of countries.

Our team conducted calculations according to the World Development Indicators (WDI) 20-year retrospective data. The results reveal that for every equivalent of a dollar the government invests in education, there is, on average, a corresponding growth of 20 dollars in the GDP.

As of 2021, Armenia spends only 2.1% of its GDP on education – of this, only 8% on higher education. The OECD, by contrast, spends nearly twice as much, an average of 4% of GDP, on education, with 24% of that outlay going to higher education. This also affects student interest. 2021 saw a 12% drop in Armenia's overall STEM student numbers compared to 2011. Meanwhile, STEM Ph.D. student numbers have likewise seen an annual decline of 15-17% a year, with a further 7-9% decline in students graduating between 2011 and 2021. According to the Science Committee, in 2021, about 36% of all Armenian researchers were over retirement age, further compounding this regressive situation.

These factors indicate some of the significant human capital pipeline challenges and demonstrate the need to stimulate the cultivation of a new generation of STEM professionals and researchers and ensure accelerated growth to close the increasing gap.

Armenia's STEM pipeline deficits also risk further exacerbating challenges in the IT sector. Increased integration of STEM into IT through advances in high-tech engineering and AI is driving higher levels of codependency between the two once distinct sectors regarding innovation. ArmStat data highlights a notable imbalance between the current IT and other STEM professionals in Armenia's workforce, with more IT professionals than STEM.

However, while Armenia's IT sector has generated much attention since the early 2000s, particularly in the last ten years, even in ICT, maintaining a professional workforce remains a key challenge. Recent studies have once again highlighted a mismatch between the number of university graduates in the field and the availability of new jobs in the Armenian employment market. In addition, companies and students highlight a longstanding gap between industry needs and university education, inhibiting the production of a work-ready STEM-focused labor force.

Other related structural inhibitors:

The weak performance of Armenian universities in global rankings.

- Fewer employment opportunities and lower wages in the Armenian STEM sector beyond ICT.
- Significant disparities between research institute outputs despite similar levels of per capita funding.
- Only a small cluster of Armenian scientists publish, producing competitive research and engaging in international collaborative networks. A lack of state-of-the-art research infrastructure and lab facilities. Limited opportunities for networking and collaboration with world-class researchers and research centers.
- The weak performance of Armenian universities in global rankings. Fewer employment opportunities and lower wages in the Armenian STEM sector beyond ICT.

STRATEGIC ROADMAP

INITIATING AND PLANNING

The implementation of FAST's vision began gradually.

2017 - THE FOUNDATION

In 2017, we dedicated our efforts to meticulous planning and groundwork, involving thorough consultations, extensive research, and in-depth analysis.

We took a holistic approach to Armenia's STI ecosystem, strategically pinpointing crucial areas for intervention at FAST.

This process included theoretical planning and practical implementation, requiring us to conceptualize ideas, conduct on-the-ground tests, and tailor various tools and intervention tactics to match complex realities. Such endeavors demanded considerable time and dedication.

We have thoroughly researched Armenia's startup ecosystem's landscape, disruptive technologies, renewable energy, and agricultural challenges in Armenia. Our strategic approaches reflect a confident understanding of these sectors, positioning us to drive innovation and achieve sustainable success.

In a pivotal move in October 2017, FAST initiated the NextGen Council, a dynamic assembly of 18 young scientists and technologists spanning diverse fields. The objective was clear: to elevate scientific excellence in Armenia, emphasizing gender balance and a global perspective.

2018-2019 - THE FIRST SEEDS

The efforts and dedication between 2017 and 2018 bore fruit in two successful pilot initiatives, laying the foundation for impactful programs that continue to shape Armenia's development trajectory. In 2018, FAST launched crucial programs to foster innovation in Armenia, focusing on prompt and efficient measures.

The Adaptive Innovation Campus (AIC), a cornerstone of Armenia's technological future, was meticulously researched and planned, paving the way for FAST's strategic vision. In 2018, STAN, a bridge between investors and science-powered startups, ignited the Armenian tech scene. The Global Innovation Forum (GIF) launched that same year and became the annual gathering where academia, industry, and policymakers converged to shape the future of innovation.

Fueled by the urgency to modernize the Armenian army, 2019 witnessed the birth of Unit "1991". This bold initiative tackled the challenge of forging a new generation of tech-savvy soldiers: From February to June, a rigorous Data Science and AI training program transformed conscripts into skilled assets for intelligence, surveillance, and reconnaissance. This program became the bedrock of Unit "1991"'s education and R&D arm.

In 2019, ASCENT, a groundbreaking platform, emerged as a venture builder for deep tech ventures poised to propel Armenia's technology prowess on the global stage.

We launched a flurry of 13 new programs between 2018 and 2019. Eleven thrived, continuing into 2020, while one reached its completion and another found new life as part of a later initiative.

2020-2021 - BUILDING RESILIENCE AMID CHALLENGES

Even as the pandemic cast its shadow, 2019-2020 was a testament to our resilience. We nurtured nine programs and scaled up eight, adapting to budget constraints and pausing one when needed. This global crisis exposed vulnerabilities and amplified the need for technology in healthcare and crisis management. Meanwhile, organizations like ours faced resource challenges, and the Artsakh war added another layer of complexity to our efforts and the nation's well-being. But through it all, resilience emerged as a vital force, driving all people towards recovery.

In 2020, we introduced the ADVANCE Research Grants, a framework for research funding in the Armenian scientific ecosystem. Efforts continued to develop a comprehensive program package for our AIC, expanding the concept into an Innovation District (ID).

We launched the InVent venture-building program, utilizing ASCENT's ideas for startups addressing current needs. An AgriTech Accelerator, in collaboration with UNDP ImpactAim Venture Accelerator and Armenian National Agrarian University (ANAU), marked a significant milestone for FAST initiatives.

In 2020, we also developed the concept for our upcoming Reimagining Education program to craft an innovative and transformative approach to positively impact Armenia and the world.

In 2021, we introduced MITQ Incubation with Digitain and Revive Deep Tech Accelerator by UNDP ImpactAim, focusing on commercially viable projects for war veterans with disabilities.

2020-2021 marked a year of continued progress, with ongoing initiatives thriving and two exciting new programs taking flight.

We also witnessed the strategic transformation of one program into a separate entity, further expanding our reach. This momentum continued in the first half, with four additional programs being designed and readied for launch.

2022-2023 - GLOBAL IMPACT AND BUILDING TOMORROW

After forgoing GIF in both 2020 and 2021 due to the challenges posed by the Covid-19 pandemic and the conflict in Artsakh, GIF22 has made a comeback, centering around "Life-altering Technologies and AI."

In 2019, we launched AI Bootcamp for junior specialists, and in 2022, all efforts invested in the creation of an AI program in high schools since then were seamlessly refined into the Generation AI program—an inclusive education and career path for future AI researchers. We proudly launched the Generation AI pilot program in 2023.

The ADVANCE Research Grants have expanded significantly, growing from two projects to a portfolio of 10. This exciting growth mirrors the program's commitment to fostering innovative research across diverse disciplines. Although the Neuroscience Project concluded its cycle in 2023, we gained valuable insights. Through open and collaborative discussions among FAST, the Apkarian Foundation, and Yerevan State Medical University, we jointly adjusted the program's trajectory, ensuring optimal resource allocation for the remaining projects. We are thrilled to witness the continued success of the ADVANCE Research Grants and eagerly anticipate groundbreaking discoveries from its talented cohort of researchers.

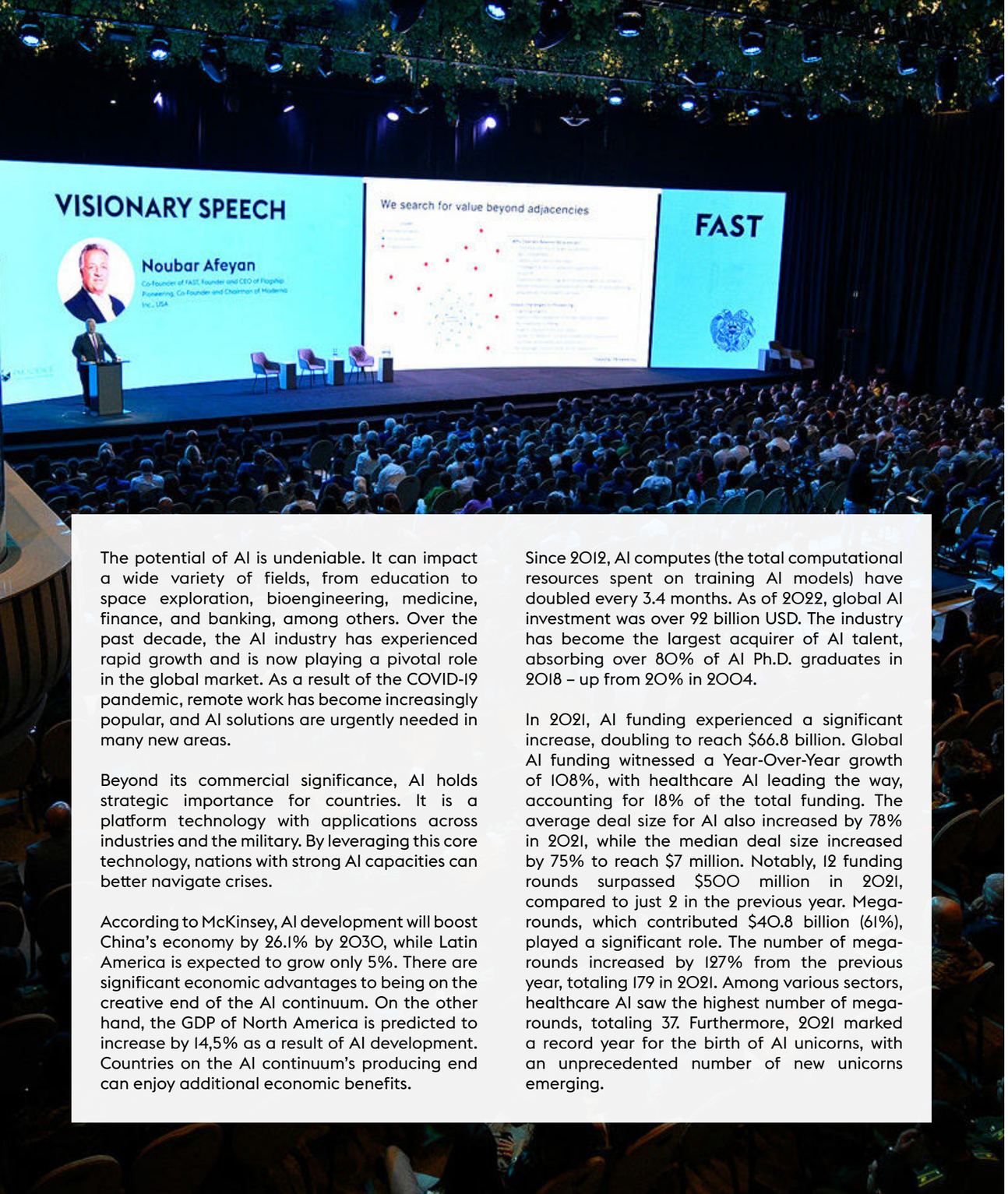
We launched our first fundraising event, the Advance Armenia Gala, in Los Angeles in 2022. Advance Armenia events took place in both Boston and Los Angeles in the spring of 2023. We eagerly anticipate upcoming events in 2024, reinforcing our commitment to fostering collective innovation and catalyzing positive change along with our Diaspora and others interested in Armenia's prosperity.

Two of our programs, Unit "1991" and STAN, successfully spun off during this period, signaling their growth and sustainability. Their newfound independence not only showcases their progress but also underscores the lasting impact of our initiatives.

In 2022, collaborative efforts with the Government of Armenia were set in motion to start construction on the B-On biotech prototyping lab at ANAU. The official inauguration of the B-On lab took place in November 2023.

Over the past six years, FAST's dedicated programming has yielded measurable results, strategically positioning Armenia for a prominent role in the global innovation landscape. The journey continues with a steadfast focus on advancing education, research, and sustainable growth.

UNLOCKING ARMENIA'S AI POTENTIAL



The potential of AI is undeniable. It can impact a wide variety of fields, from education to space exploration, bioengineering, medicine, finance, and banking, among others. Over the past decade, the AI industry has experienced rapid growth and is now playing a pivotal role in the global market. As a result of the COVID-19 pandemic, remote work has become increasingly popular, and AI solutions are urgently needed in many new areas.

Beyond its commercial significance, AI holds strategic importance for countries. It is a platform technology with applications across industries and the military. By leveraging this core technology, nations with strong AI capacities can better navigate crises.

According to McKinsey, AI development will boost China's economy by 26.1% by 2030, while Latin America is expected to grow only 5%. There are significant economic advantages to being on the creative end of the AI continuum. On the other hand, the GDP of North America is predicted to increase by 14,5% as a result of AI development. Countries on the AI continuum's producing end can enjoy additional economic benefits.

Since 2012, AI computes (the total computational resources spent on training AI models) have doubled every 3.4 months. As of 2022, global AI investment was over 92 billion USD. The industry has become the largest acquirer of AI talent, absorbing over 80% of AI Ph.D. graduates in 2018 – up from 20% in 2004.

In 2021, AI funding experienced a significant increase, doubling to reach $66.8 billion. Global AI funding witnessed a Year-Over-Year growth of 108%, with healthcare AI leading the way, accounting for 18% of the total funding. The average deal size for AI also increased by 78% in 2021, while the median deal size increased by 75% to reach $7 million. Notably, 12 funding rounds surpassed $500 million in 2021, compared to just 2 in the previous year. Mega-rounds, which contributed $40.8 billion (61%), played a significant role. The number of mega-rounds increased by 127% from the previous year, totaling 179 in 2021. Among various sectors, healthcare AI saw the highest number of mega-rounds, totaling 37. Furthermore, 2021 marked a record year for the birth of AI unicorns, with an unprecedented number of new unicorns emerging.

Armenia's strong foundation in mathematics and natural sciences positions it advantageously for AI development. While the country has made strides in high-tech exports, the infinite potential of AI offers a whole new scale of opportunity. However, to fully seize this potential, Armenia needs to invest in talent, research, and infrastructure.

Over the years, Armenia has recognized AI's strategic importance and embraced it as a priority for technological development. Various stakeholders in the STI ecosystem have actively engaged in advancing AI, acknowledging its potential to drive national progress.

In Armenia, AI advancement remains in the early stages overall. In 2017, EV Consulting found the Armenian ecosystem to have limited yet growing AI capacity. Later in the same year, FAST's research showed that if specific resources were invested in AI development, the country could quickly conquer a significant niche in the global market. This conclusion was supported by the World Bank three years later when the "Realizing Armenia's High-Tech Potential" report likewise concluded that with investment in tertiary research, Armenia's strong heritage in mathematics could position it as a global hub for pure AI research.

Before 2017, Armenia had already prioritized the advancement of AI, but little had been said publicly about its development. Since its inception, FAST has been instrumental in fostering a broader discourse around AI as a strategic direction for Armenia's technological development. A number of national events, including FAST's GIF since 2017, have also emphasized the importance of accelerating AI advances among Armenian leadership and government representatives.

Armenia's government, the armed forces, and the national communication apparatus have struggled with limited advanced technological resources since the start of the Artsakh war in 2020. AI has become a rethought national security target.
In order to rank in the top 20 of the Global AI Index (Tortoise), Armenia needs 50 times more AI talent than it does now. It is estimated that by 2028, we will need 10,000 more AI engineers, assuming about 200 specialists are available now. On average, 105 more papers need to be published annually to close the gap in research. We will need around 50 more research groups, each containing five AI scientists on average, based on Scopus statistics that indicate one group publishes two papers annually. There is also a big gap in the development to reach the top 20th country potential. We will need to produce three patents a year, reaching fifteen patents within five years in total.

FAST's key focus has been understanding how advanced technology, particularly AI, has shaped everyday life, academic research, and commercial opportunities since 2017. Our foundation has been a pioneer in making AI a priority for Armenia's development agenda and one of its biggest supporters. To date, FAST has designed and implemented 12 programs and initiatives directly contributing to the development of AI. These interventions have included work on establishing an AI pipeline producing globally competitive Armenian talent, as well as fostering the emergence of new Armenian AI-based tech solutions and scientific verticals.

Furthermore, FAST aims to enhance Armenia's commercialization potential through programs that nurture science-intensive venture-building aimed at developing AI solutions.

While Armenia seeks broad growth nationwide, we recognize the benefits of concentrating efforts on specialized areas to grow its STI ecosystem. As a result, FAST's strategic plan focuses on fostering advancements in AI and DS, two of the most promising fields for sustainable development.

Having invested substantial effort over six years, FAST remains committed to advancing Armenia's scientific and technological landscape. Among FAST's interventions are grants and training in education and research, science-intensive venture builders, knowledge exchange platforms, large-scale placement events for AI and DS, and strengthening international ties to increase intellectual and networking capacity.

We firmly believe in Armenia's potential to contribute significantly to the global AI value chain, becoming a vital player in shaping the future of this transformative technology.

PROGRAMS

OVERVIEW

Over six years of its activities, FAST programming has concentrated on exploring Armenia's scientific and technological potential and defining pipelines for further development of the STI ecosystem through education, research, and commercialization.

FAST generates and hosts innovative ideas that undergo rigorous research and testing phases to ensure they are viable and solution-based. We include steps such as ideation, development, pre-launch, and launch as part of our programming to ensure a successful initiative or program. In addition, some programs are piloted before being scaled up.

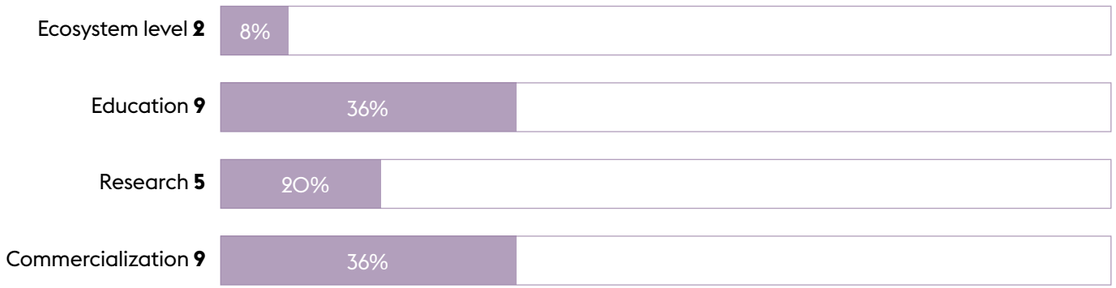
Our carefully developed scheme involves detailed impact measurement of each program to help understand the need for the program's continuation. Targeted work on identifying and overcoming problems helps to constantly improve our intervention tactics and make the correct and timely shifts, resulting in agility to reach our goals. When and where needed, we implement new programs while making a tactical point to support the growth of a missing segment within another program and aiming for a holistic approach to developing the desired STI ecosystem. This way, interdependencies between problems create essential connectedness between our programs. Each of our pipelines is solution-based and targeted towards a long-term impact and goals.

Over the years, we steadily continued bringing our primary vision to life. Since 2017, FAST has implemented 25 programs, including 9 in Education, 5 in Research, 9 in Commercialization, and 2 at the Ecosystem level (holistic 3-in-1).

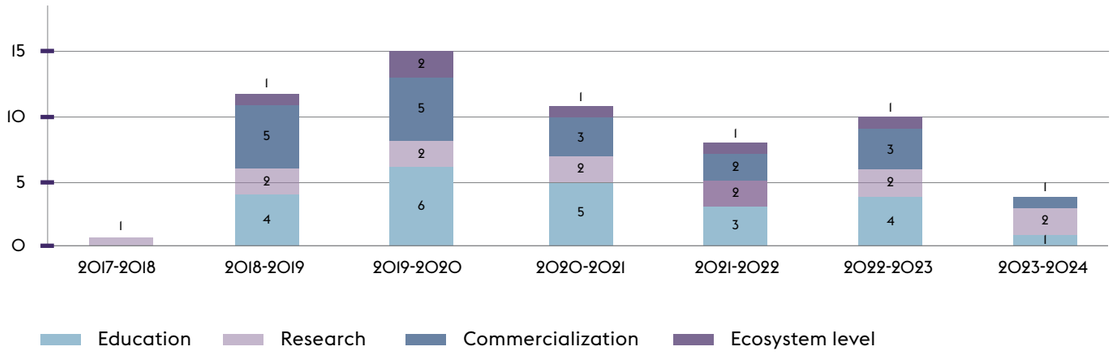
As of the end of December 2023, the foundation has engaged more than 2,800 direct beneficiaries through its programs, and about 8,500 individuals benefited from over 120 workshops, events, and network-building initiatives. The training hours conducted currently stand at nearly 3,500 hours.

From 2023 onward, FAST has focused on the spin-off and scale-up of its main programs while developing new ones.

Graphic 3.1 Total number of programs for the 2017-2024 financial period, by pillars



Graphic 3.2 Number of programs by pillars, by financial years



EDUCATION

Many of our programs place a strong emphasis on education, capacity building, and the enhancement of Armenia's intellectual capital. FAST recognizes the crucial role of skilled human resources – academic and industry experts and professionals – in advancing Armenian STI.

Our recent programming efforts prioritized education, especially in DS and AI, as some of the most crucial fields for fostering innovativeness and assisting national security. In 2019, we ran advanced mathematics and basic AI training for conscripts and soldiers serving in special detachments of the Armenian Armed Forces.

In collaboration with the Ministry of Defense (MoD), "Unit 1991" and its associated Education and Research program became an important learning ground that helped further develop national AI R&D. During 2023, the **"Unit 1991" Education and R&D** program was spun off to the MoD. In 2019, we launched a DS and **AI Bootcamp** for junior specialists. The same year, FAST also launched an **Apprenticeship** program. More than 600 students and 50 industry representatives were trained on AI through these programs, which piloted a new framework for on-the-job training.

FAST's educational programming also targets entrepreneurial knowledge and its enhancement to nurture and encourage future innovators. This is why we established entrepreneurial training programs for startups and budding entrepreneurs in the form of a Startup Studio program. In 2019, we also launched the **Aspiring Female Entrepreneurs Program (AFEP)** within the Creative Spark: Higher Education Enterprise Program in collaboration with the British Council and partners from Aston University.

In 2020, FAST also launched an **AgriTech Accelerator**, an acceleration program to support startups and entrepreneurs, in partnership with the UNDP ImpactAim Venture Accelerator and the ANAU, which the University successfully continued sustaining through new batches - an important milestone for FAST programs. In the last six years, we have trained more than 400 entrepreneurs.

In the Creative Spark initiative, some projects were enhanced and developed into new ones, such as SciNova, a program of academic courses on Research Design and Science Commercialization for Master's and Ph.D. students. More than 100 instructors have been trained through this program from 15 local higher education institutions, and bilingual courses have been published. In 2023-2024 academic year, more than 800 students will have access to the course through ten regional and Yerevan-based universities.

FAST's educational programs, as part of a larger ecosystemic vision, are further enhanced and scaled up into new projects to guarantee the sustainability of acquired results. Several such programs are currently under design and/or in the pre-launch stage, aiming to advance the educational system in Armenia at large and contribute to the country's overall strategic development and innovativeness.

In 2022, all efforts invested in the creation of an AI program in high schools since 2019 were seamlessly refined into the **Generation AI** program. The newly approved educational program creates an education and career pipeline for a future AI researcher and innovator, from the high school to the doctoral level. Designed in partnership with the Ministry of Education, Science, Culture, and Sports of the Republic of Armenia, as well as with active involvement of NGOs, academia, and industry professionals, Generation AI's integration into the public education system ensures future sustainability and be a step toward systemic changes in education with long-term benefit for Armenia's research and technological capacity.

We marked 2022-2023 with meticulous planning and preparation for the launch. We successfully initiated the curriculum development phase, laying the foundation for what promises to be a changemaker educational program. In September 2023, the High School pilot program was successfully launched in 16 schools from 7 regions in Armenia, including Yerevan. Almost 400 students in 10th grade are direct participants of the pilot program. Almost 50 teachers and instructors are involved in the training program.

FAST's education-targeted programs have provided domain-specific training for more than 2,500 individuals and knowledge transfer opportunities for an additional 1,600 participants from a wide variety of backgrounds. These training and events have enhanced capacity in core innovation subjects such as DS, AI, corporate innovation, and entrepreneurship.

RESEARCH

To support the production of globally competitive research output in Armenia, FAST has designed and launched a range of strategic programs to support the development of the local research community and bridge it with world-leading scientists.

In 2018, FAST established its **Fellowship** program to support talented students financially pursuing PhDs in STEM-related fields. We piloted another program to invite guest researchers to Armenia for mid-term visits, which ultimately led to the establishment of the **Travel Grant for Collaborative Research** program in 2019. These programs paved the way for building a comprehensive umbrella program incorporating the earlier piloted initiatives and developing new components that promised a significant impact. This way, in 2020, FAST introduced an unprecedented framework for research funding into the Armenian scientific ecosystem - the **ADVANCE Research Grants**.

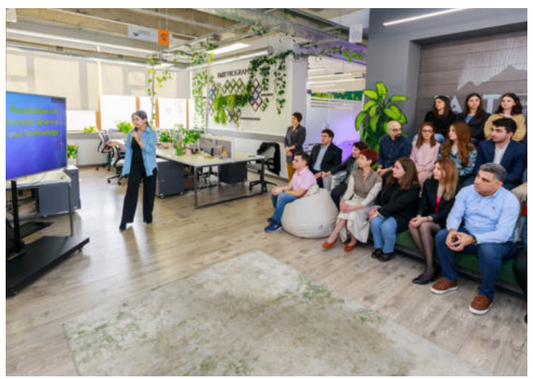
While the earlier initiatives were focused on specific challenges within the scientific ecosystem in the country, the new funding scheme is designed to tackle the fundamental challenges of the system comprehensively: research topics diversification, significant upgrading of the research supervision level, and rapid professional development for local researchers and competitive remuneration and capacity building. By scaling the ADVANCE program and launching new initiatives, we aim to create a robust, competitive scientific STEM environment in Armenia, particularly in AI and related fields.

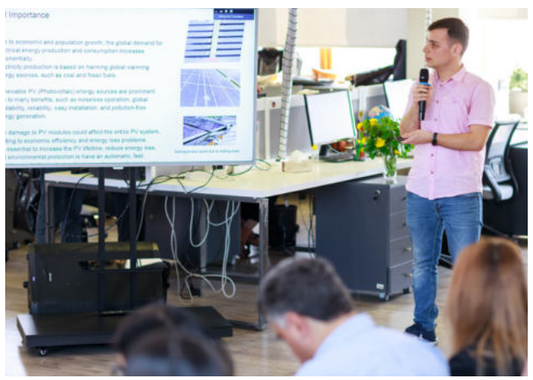
With the inaugural FAST fundraising event held in 2022, we were able to raise funds that exceeded our target, funding exceptional research within ADVANCE Research Grants.

The Science Committee funded the first grants based on a replica of ADVANCE's model in 2021, marking a significant milestone. Before launching the pilot grants, the framework and initial agreements with the Armenian Government had set out to ensure systemic change and long-term sustainability for the initiative. The government's adoption of the ADVANCE model marked a major milestone.

Our programming under the Research pillar funded over 120 local researchers, supported 33 international research collaboration projects, and hosted over 100 foreign researchers in Armenia. As a result of several programs, 25 visits to international labs have been conducted, and over 85 scientific papers have been published.

In order to realize our long-term vision of creating a sustainable STI ecosystem and catalyzing scalable change in Armenia, FAST initiated several years ago the research and planning of a large-scale ecosystem-level program, AIC, which is currently in the development stage.





COMMERCIALIZATION

It is imperative that Armenia develops a clear strategic path leading toward creating innovative scientific products not only for Armenia but for the world since it wishes to be competitive on a global scale. While incubators and accelerators are important approaches, they are still insufficient by themselves. FAST has focused on creating programs to help build science-intensive innovation in Armenia and ensure pre-seed funding for companies created through this pipeline, recognizing the critical need to boost scientific commercialization.

To better understand the local environment, FAST started with small-scale initiatives. One of our early test-run programs, the **Technology and Innovation Support Center (TISC)** launched a series of workshops on ensuring the growth of enterprises through the development of technology research results. Another small-scale initiative, the **Awards** program, was aimed at funding and supporting inspiring innovative technology-based teams.

This tool helped unite a vibrant group of Armenian innovative minds during the 2019 Space Apps Challenge Hackathon at FAST Creative Campus, where the top 5 teams were awarded. Another event within the framework of this program was the Seaside Startup Summit (SSS), a non-formal startup gathering offering a unique business platform for collaboration.

Since 2018, FAST has partnered with the **Sevan Startup Summit** for two consecutive years, providing startups with an opportunity to access funding by organizing pitches and meetings with **Science and Technology Angels Network (STAN)**, an angel investor program founded by FAST as Armenia's first angel group investing in early-stage science-intensive startups.

In 2018, FAST awarded the first prize at the Summit to the deep tech startup SuperAnnotate AI, marking the first funding the now globally growing startup received in Armenia.

Through its **Advance Solutions Center ASCENT**, FAST launched an anchor project - Armenia's first science-intensive venture builder focusing on life sciences and AI - in February 2018. A second venture-building program, **InVent**, was launched in early 2019.
Key new programs launched in 2021 were the **MITQ Incubation Program** in partnership with Digitain and the **Revive Deep Tech Accelerator Program**, designed by the UNDP ImpactAim Venture Accelerator. Revive aims to support selected startups in developing and deploying their products into successful commercially viable projects that help ease the lives of war veterans with disabilities.

As a result of all these initiatives, more than 300 startups have benefited from our programs over the last six years. Among them, 35 startups received direct funding, while 40 startup teams were created from scratch. Up to 130 startups received a 2-to-6-month mentorship and coaching program and access to coworking space at FAST's Creative Campus.

Moreover, in 2022, we successfully spun off ASCENT, and in 2023, STAN as distinct programs, an important milestone for FAST programs.

While there have been some notable developments through Armenia's push for the growth of the tech sector, simple access to competitive lab infrastructure remains a key challenge. FAST's initial strategy envisaged the establishment of several large lab facilities. A deeper understanding of existing local infrastructure and other capacity factors led us to shift the emphasis towards programming that will consolidate existing labs or build new ones by developing Armenia's human capital and funding opportunities in STEM. Inroads are currently being made to bring lab facility access closer to the nascent innovation generation.

To provide shared lab facilities and coworking space for the wider ecosystem, FAST began working on establishing the B-On Biotech prototyping laboratory in 2021. With B-On, biotech teams can bring their innovations to life and develop world-changing technologies in a wet laboratory. In addition, it will serve heavily for research and education purposes while the biotech startup ecosystem matures and expands. As of November 2023, it is open to first-resident startups.

COMPLETED PROGRAMS

STARTUP STUDIO

PILLAR: EDUCATION

TIMELINE: AUGUST 2018 - JANUARY 2019

CAPACITY: INTELLECTUAL FINANCIAL NETWORK

SDG TARGETS:

	4 QUALITY EDUCATION	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
PRIMARY	4.4.1	8.3.1	
SECONDARY	4.3.1	8.6.1	9.b.1

Problem

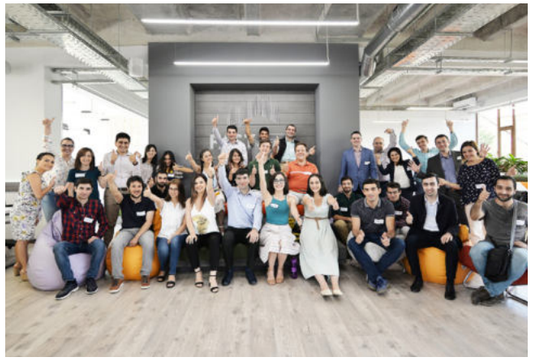
Armenian startup numbers have been rising for the last decade: The Enterprise Incubator Foundation (EIF) report on Armenia's ICT industry found 150 new companies created in 2018 alone, with an average of 116 companies created annually between 2000 and 2019. Many successful companies have been established by stimulating industry development and helping entrepreneurs build their ventures. However, by 2018, few accelerators supported science and technology-backed startups to enhance their knowledge in entrepreneurship or access mentorship, funding, or a vibrant environment.

Solution

FAST created a platform to support science and technology-backed startups through a coaching and mentorship program and to provide access to coworking spaces at FAST's Creative Campus. The 3-month program helped startups undertake the entrepreneurial journey with modules specifically designed to cover their needs.

The program consisted of business and technical sessions, teamwork, panel discussions, mentor engagements, motivational talks, and interactive games. It also involved the organization of demo days for pitches to investors.

The program offered a separate track for budding entrepreneurs to introduce and develop business culture themselves and provide fundamental knowledge and practical skills for creating their own ventures.



Results

Three batches of startup development sessions were organized. In total, 44 startups participated, benefiting from 12 learning modules, the mentorship program, and access to FAST's Creative Campus. One hundred sixty participants attended the two demo days for pitches.

With 16 coaches supporting, 28 startups pitched to STAN investors, with one successfully raising a pre-seed investment of 50,000 USD.

> FAST's Startup Studio opened a number of closed doors for our startup. Ongoing mentorship provided by the program helped us become more powerful, responsive to upcoming challenges, and, most importantly, believe that we would succeed.
>
> **Hayk Manukyan**
> CEO, Haylend, Armenia

FELLOWSHIP

PILLAR: RESEARCH

TIMELINE: SEPTEMBER 2018 - AUGUST 2019

CAPACITY: INTELLECTUAL FINANCIAL NETWORK

PARTNER: ARMENIAN STATE COMMITTEE OF SCIENCE

SDG TARGETS:

PRIMARY		9.5.2	17.6.1
SECONDARY	4.B.1	9.5.1	

Problem

A fundamental challenge for Armenian science is its aging research community and the need to develop a new generation of STEM researchers. The Science Committee estimated that over 40% of all researchers in 2018 were above the retirement age. Meanwhile, 2018 saw overall STEM student numbers down by 33% compared to 2010. PhD student numbers have also declined by 25-28% a year, with an average 15-17% annual reduction in PhD graduates. Poor financial remuneration remained a major obstacle for promising Armenian PhD students. This challenge forced many to work in the private sector, often in occupations unrelated to their studies, thus depriving them of full engagement in research.

Solution

To enable promising Ph.D. students to concentrate fully on their studies, FAST designed a fellowship program for Armenian citizens and candidates of Armenian descent wishing to conduct doctoral studies in STEM-related fields at leading Armenian universities.

In total, 40 fellowships were available annually, including five full fellowships worth 7,000 USD a year and 25 partial fellowships worth 3,500 USD a year. Ten full fellowships, each worth 7,000 USD annually, were also available to outstanding female candidates.

Results

Independent committees selected 19 Ph.D. students and provided financial and institutional support by FAST. Of these, seven grantees were women, and 12 were men specializing in physics, biochemistry, and computer sciences, among other fields. Upon receiving this financial support, six fellows enrolled in Ph.D. studies, and 13 were supported to continue their research and studies. The program participants published over 40 scientific papers in international journals within a year. They conducted 11 visits to international labs in Europe and the US, connecting them to the global scientific network needed to grow professionally. This program was coordinated with the Armenian State Committee on Science, which runs a similar initiative to incentivize doctoral study. Such coordination helped to prevent double financing by ensuring responsibility solely for postgraduates under its scheme.

> The huge impact of the Fellowship program on my career is difficult to overestimate, as thanks to it, I had the opportunity to focus on my research entirely. As a result, I published 13 research papers in high-ranking international scientific journals. The unique platform for networking and collaboration for young researchers created by FAST was a priceless contribution to the high quality of my research papers.'
>
> **Sargis Gasparyan**, Program Fellow
> Researcher, ICRANet-Yerevan Center, Armenia

APPRENTICESHIP

PILLAR: EDUCATION

TIMELINE: DECEMBER 2018 - MARCH 2020

CAPACITY: INTELLECTUAL FINANCIAL NETWORK

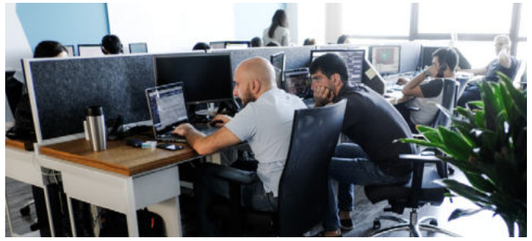
PARTNERS: EPAM SYSTEMS, DIGITAIN, SOFTCONSTRUCT, SFL CORPORATION LTD.

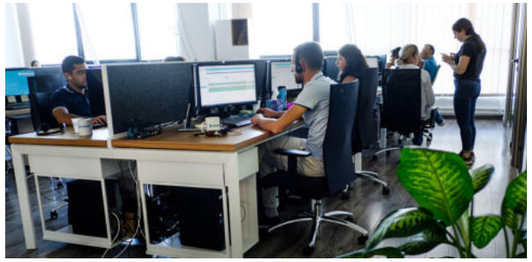
Problem

Armenia's rapidly developing ICT sector has generated a mismatch between supply and demand in the tech labor market, signaling a disconnect between education and industry. Therefore, many students, especially in STEM, abandon proper engagement with study to start working, often full-time. Headhunted young talent ends up being deprived of opportunities for fundamental education, which, in turn, hinders their long-term professional growth. At the same time, academic programs in Armenian higher education institutions remain highly theoretical and do not prepare students for a smooth transition into the labor market upon graduation. This creates the perception that theoretical knowledge is not helpful in a practical setting, negatively impacting students' motivation to engage in formal education. Many companies highlight a lack of skilled graduates, resulting in inefficient resource use due to the constant need for staff recruitment and development.

Solution

FAST established a new framework for on-the-job training with leading Armenian IT companies that can be combined with formal education. Participants are students who spend 10 hours a week with the host organization for up to one year. Supervisors in the hosting company set individual learning plans for their students and assess their performance according to the methodology developed within the program. The program aims to transform the industry into a knowledge generator and, in the long run, modify the university curriculum to consider industry needs.





SDG TARGETS:

PRIMARY		8.5.2, 8.6.1
SECONDARY	4.3.1, 4.4.1, 4.5.1	

Results

In the first batch, 42 students were selected to participate in the program from 2019 to 2020. They were involved in several different departments at one of the leading and largest IT companies in Armenia, such as SoftConstruct. After several months of training, many students had already been offered a job with a flexible schedule in the company that would not conflict with their studies.

In the second batch, 18 students were selected to participate with four leading IT companies – EPAM, Digitain, SoftConstruct, and SFL from 2020 to 2021. The team leads of each company were introduced to the program's academic component and trained on how to ensure the learning path for each student. This program underwent some changes due to the COVID-19 pandemic and was not continued.

Accumulated expertise was also shared with the Government of Armenia in December 2019 to integrate best practices into a unified nationwide process to reform the professional internship model implemented in universities.

ASPIRING FEMALE ENTREPRENEURS PROGRAM

PILLAR: EDUCATION

TIMELINE: JANUARY - JUNE 2019

CAPACITY: INTELLECTUAL FINANCIAL NETWORK

PARTNER: ASTON UNIVERSITY (UK)

DONOR/SUPPORTER: BRITISH COUNCIL

SDG TARGETS:

	4 QUALITY EDUCATION	5 GENDER EQUALITY	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
PRIMARY	4.4.1, 4.5.1		8.3.1	
SECONDARY	4.3.1	5.5.2	8.6.1	9.B.1

Problem

Although there needs to be more up-to-date data on the proportion of women entrepreneurs in leadership positions in Armenia, the country is no exception to the global rise of women entrepreneurs. However, in the regions where women are significantly less empowered to take an active role in the intellectual workforce, only some women go into science-driven entrepreneurship. Moreover, our experience in entrepreneurial programs has demonstrated that a scarcity of female scientists establishing innovative science-focused startups is another major issue.

Solution

As an organization seeking to empower women in science and entrepreneurship, a program for aspiring female entrepreneurs was designed to help women obtain the necessary tools for conceiving, developing, and launching a science and technology-backed startup. The program targeted participants from Armenia's regions using an online format.

The intensive two-month program aimed to instill and cultivate an entrepreneurial culture among participants by equipping them with fundamental knowledge and practical skills, laying the groundwork for these entrepreneurs to launch their ventures. It culminated in a demo day for graduates to pitch to a large audience of investors, entrepreneurs, technology leaders, and other related groups. The most promising startups gained an exceptional chance to enroll in the Startup Studio program.

Results

In total, 67 aspiring female entrepreneurs from all regions of Armenia participated. The program saw the creation of 19 startups, of which four were generating revenue by the end of the program. Some 16 coaches helped to support participating startups within the scope of 12 learning modules. One hundred ten participants attended the demo day and saw two teams receive 1,000 USD and 500 USD prizes. Aston University also organized two workshops on DS and enterprise and entrepreneurial education for field professionals and incubator managers.

This program was implemented jointly with Aston University (UK) within the Creative Spark: Higher Education Enterprise Programme framework funded by the British Council.

> AFEP was truly a booster for me as a founder. Before joining the program, I had no idea about how to establish and lead a startup. I also did not have much confidence in my decisions and steps. Thanks to the program, I successfully shaped my product and confidently started my startup journey. The program team was ready to encourage and support even my craziest ideas, which was a great motivation!
>
> **Adelina Oganezova**
> Co-Founder and Commercial Director, KANGAROO, Armenia

TRAVEL GRANT FOR COLLABORATIVE RESEARCH

PILLAR: RESEARCH

TIMELINE: FEBRUARY - DECEMBER 2019

CAPACITY: INTELLECTUAL FINANCIAL NETWORK

SDG TARGETS:

	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	17 PARTNERSHIPS FOR THE GOALS
PRIMARY	9.5.1, 9.5.2	17.6.1
SECONDARY	9.B.1	

Problem

The average Armenian GDP expenditure on R&D has been as little as 0.23% over the last decade – less than one-tenth of the OECD average. Limited and inefficiently distributed resources allocated for the development of science result in low research output. The Web of Sciences database suggests that between 2006 and 2018, of all STEM-related articles published by Armenian authors, over 40% received no citations. The citation average for Armenian authors was one-fourth that of scientific authors worldwide. Moreover, most papers that have been cited in other articles are published in co-authorship with foreign researchers (around 60%). Unfortunately, even established international collaborations have limited funding to facilitate mutual visits and joint research activities for Armenian scientists and their international partners, despite their potential to lead to publications in high-impact journals.

Solution

FAST created a travel grant scheme to foster collaborations between Armenian and international STEM researchers. The program was designed to allocate ten grants for Armenia-based researchers to visit their counterparts and for international researchers to visit Armenia. Grantees were expected to collaborate on joint scientific projects for a maximum period of three months to produce joint publications in high-impact journals. Maximum grants were 7,500 USD to cover the costs of international travel, accommodation, and daily expenses.

Results

Instead of the initially planned ten projects, the independent committee selected 22 researchers to participate in 21 international collaborative research projects in advanced materials, biotechnology, molecular biology, DS, genetics, neuroscience, and physics. Throughout 2019, 14 Armenia-based researchers visited partners in 7 countries at institutions such as Harvard University, University of Cambridge, École Normale Supérieure, and University of Tokyo. Eight international researchers from the US, UK, France, and Israel visited their partners in Armenia from Harvard Medical School, University of Nantes, University of Glasgow, and other prestigious institutions. Several collaborations have already resulted in 10 joint international publications.

> Thanks to the FAST Travel grant, I published two research papers in world-class scientific journals with an Armenian team of chemists. Our joint Franco-Armenian project allowed us to create a new class of anti-cancer agents and propose an alternative concept for the fight against aggressive cancers. At present, we are ready to undertake preclinical trials of our molecules.
>
> **Vehary Sakanyan**, Program Grantee
> Emerita Professor, University of Nantes, France

> The travel grant enhanced my work's progress and helped me succeed in the prestigious Horizon 2020 Marie Skłodowska Curie Individual Fellowship. Not only did I get a chance to learn from the specialists of my host institute – Instituto de Ciencias de la Vid y del Vino (ICVV) – in Spain, but now we plan to continue our collaboration together with Yerevan State University on a comparative study of Armenian and European grapevine genetic resources at the molecular, genomic and cellular levels.
>
> **Anna Nebish**, Program Grantee
> Lecturer and Researcher, Yerevan State University
> and Institute of Molecular Biology of the National Academy of Sciences, Armenia

AI BOOTCAMP

PILLAR: EDUCATION

TIMELINE: OCTOBER 2019 - DECEMBER 2021

CAPACITY: INTELLECTUAL FINANCIAL NETWORK

PARTNERS: RWANDAN GOVERNMENT
DENOVO SCIENCES
AYB FOUNDATION

DONORS/SUPPORTERS: CYNORA
INTELINAIR

Problem

A 2020 Catalyst tech survey found that nearly half of the companies experience a large or severe deficit in skilled workers, especially in narrower specializations. Over 50% of companies consider acquiring junior talent a reasonable to extreme severity challenge. This further highlights the need for education and training courses to bridge the gap between fundamental knowledge and its practical application in industry.

Armenia's dynamic IT sector expansion and the emerging AI market have added to the burgeoning rise in global demand for AI professionals. This has further strained the gap in current levels of supply and demand. FAST's programs to advance AI in Armenia require a stable supply of high-quality professional talent.

Solution

A 12-week intensive course on DS and AI was designed to aid participants in transitioning effectively to or developing a career in the field. The course included workshops and specialized modules on developing creative ideas, entrepreneurial innovation, generative algorithms, deep reinforcement learning, chemoinformatics, graph neural networks and time series, and hybrid algorithmic trading models. It provided high-quality skills and in-depth AI training while creating a talent pipeline for the Advanced Solutions Center (ASCENT) and other initiatives using top graduates. As an indirect outcome, it also helped partner companies to shape AI R&D centers and teams using capstone projects designed around practical industrial problems identified by these companies and ASCENT.

Impact indicators

ACTIVITY LEVEL	BATCH 1	BATCH 2	CHEMINFORMATICS BOOTCAMP
PARTICIPANTS TRAINED	28	19	10
OF WHICH INDUSTRY REPRESENTATIVES	20	9	4
OF WHICH STUDENTS	5	10	6
OF WHICH RESEARCHERS	3	0	0
OF WHICH FEMALES	10	11	7
SCHOLARSHIPS GRANTED	15	13	4
OF WHICH FULL	5	13	1
OF WHICH PARTIAL	10	0	3
TRAINING HOURS CONDUCTED	100	100	100

SDG TARGETS:

PRIMARY	4.4.1, 4.B.1
SECONDARY	4.3.1

Results

2019 saw 28 academic and industry participants receive advanced DS and AI training. FAST granted five full scholarships and ten partial funding. The course presented six capstone projects addressing industry problems in Armenia and abroad. The second AI Bootcamp started in October 2020 with 19 participants. Among them are 3 Rwandan participants, engaging within the framework of an MoU signed with the Rwandan Government in March 2020 to support knowledge and technology transfer to Rwanda. Two of the formal partners for this second AI Bootcamp are Cynora and IntelinAir.

Cynora provided scholarships to five students and co-supervised a capstone project alongside FAST. IntelinAir provided four scholarships. The third boot camp specialized in cheminformatics started in October 2021, intending to teach modern cheminformatics tools to students and researchers with a chemistry background. The cheminformatics boot camp involved 10 participants, including six students and four industry representatives. Four participants with top results on the entrance exam received scholarships. The project was conducted together with Denovo Sciences and Ayb Foundation.

> It is not a stretch to call my experience with the AI Bootcamp life-changing. It helped solidify my career choice and narrow my graduate school focus. Working on the final project under the supervision of one of our mentors made me realize that I really enjoy doing research, and this is exactly what I want to do in the future. Fast forward six months, I worked on something I'm passionate about while surrounded by intelligent and inspiring people.
>
> **Irina Tirosyan**, Program Participant, Armenia

> Participation in the AI Bootcamp played a crucial role in my career path selection. Before the Bootcamp, I only had abstract knowledge about AI. After the Bootcamp, I realized that I wanted to continue my career in DS – and thanks to the camp, I have already started.
>
> **Artak Kamalyan**, Program Participant, Armenia

AGRITECH ACCELERATOR

PILLAR: EDUCATION

TIMELINE: JANUARY 2020 - JULY 2021

CAPACITY: INTELLECTUAL | FINANCIAL | NETWORK

PARTNERS: ANAU
INTERNATIONAL CENTER FOR AGRIBUSINESS RESEARCH AND EDUCATION
NATION IN ACTION INITIATIVE
ARMENIAN NATIONAL INNOVATION SDG LAB
ADB VENTURES FACILITY

DONOR/SUPPORTER: UNITED NATIONS DEVELOPMENT PROGRAMME'S (UNDP) IMPACTAIM VENTURE ACCELERATOR

Problem

Armenia's Statistical Committee findings highlight agriculture as one of the largest contributors to the Armenian economy. Not only did agriculture bring in 14.9% of GDP in 2018, but its absolute value is constantly rising. Despite this, the sector faces numerous challenges locally and globally, including food insecurity, undernourishment, environmental impacts, and greenhouse gas emissions. The lack of innovative interventions hampers productivity and technological modernization. In 2020, the World Bank identified farmers adopting innovative technologies and practices as a "key driver" for increasing agricultural productivity and raising income.

Agriculture employed 20% of Armenia's workforce in 2019, with 80% living in rural areas. Weak links between entities and individuals working in agriculture and academia and a lack of entrepreneurial education and research in agriculture are barriers to starting and scaling up sustainable agri-businesses and developing the sector.

Solution

Working with UNDP ImpactAim Venture Accelerator and the ANAU, FAST has co-designed and implemented an acceleration program to support startups and entrepreneurs offering solutions to agricultural challenges in Armenia and beyond. The program aimed to create strong links among participants, academia, and industry stakeholders. The core program lasted 12 weeks and walked participants through a tailor-made entrepreneurial journey. It consisted of a series of sessions introducing entrepreneurship, the impact of frontier technologies on agriculture, and core startup development, followed by a prototyping stage.

SDG TARGETS:

	4 QUALITY EDUCATION	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	17 PARTNERSHIPS FOR THE GOALS
PRIMARY			9.5.1, 9.5.2, 9.B.1	17.6.1
SECONDARY	4.4.1, 4.5.1	8.5.2, 8.6.1		

Results

Sixty-two entrepreneurs and 15 startups from 12 countries were selected to participate in the program. A kick-off online webinar took place in June, followed by one month of onboarding sessions, including 8 group sessions, over 20 one-on-one sessions, and over 100 submitted deliverables.

After the program's first phase, the core startup development sessions started with 36 entrepreneurs and 10 startups. The entrepreneurs got an opportunity to recruit team members. At the core startup development stage, these teams participated in sessions to enhance different capacities, including finding product market fit, strategy building, and mastering the art of sales. At the final stage of the program, 21 teams pitched their ideas in a live online event. Based on the jury evaluation, four teams received grants (2 grants worth 5,000 EUR and two grants worth 3,000 USD).

Since completing the FAST and UNDP role in the program, ANAU has retained its sustainability and has successfully launched recurring batches of the program. By June of 2023, five batches had been organized, four of which had been completed.

> The ANAU is very pleased to partner with FAST in achieving our common goals of building the right agritech and biotech ecosystem for Armenia and turning new technologies into the driving force of the education system and the country in general. FAST has been instrumental for all its partners in timely soliciting needed resources and professional support where they are most expected while carrying out its mission of building a technological future for Armenia and elsewhere.
>
> **Vardan Urutyan**
> Rector, Armenian National Agrarian University, Armenia

INVENT

PILLAR: COMMERCIALIZATION

TIMELINE: JANUARY 2020 - AUGUST 2021

CAPACITY: INTELLECTUAL | FINANCIAL | NETWORK

PARTNERS: ASTON UNIVERSITY
MINISTRY OF ENVIRONMENT OF RA

DONOR/SUPPORTER: BRITISH COUNCIL

Problem

CB Insights, a global company maintaining a database with market intelligence and investor activity data, summed up the top reasons startups fail. According to them, 35% of startups report a failure due to "no market need," 20% of failures are due to competition, and 19% have a "flawed business model." The indicator of "no market need" being the highest spoke of a serious issue of the traditional startup life-cycle: A startup generates an idea, uses incubation and acceleration programs for its gradual refinement, and then flops due to no need.

At the same time, FAST's experience with entrepreneurial programs and its research on Armenia's venture industry highlighted that Armenia's existing entrepreneurial landscape lacked the capacity and scale to accommodate even the limited available funding offered by venture funds and angel networks. This problem was more acute for science-backed ventures, where only a few startups offered deep tech solutions, and venture funding was limited.

Solution

In 2020, FAST designed a pioneering venture-building program to utilize ASCENT's filtered ideas and challenges, collected from industry and government, to generate startup companies tailored to prevailing needs and opportunities. The InVent program ran for over 20 weeks and walked serial entrepreneurs, researchers, and industry professionals through the startup journey, From ideation and team formation to minimum viable product (MVP) development and fundraising. Throughout the program, FAST provided full institutional and financial support to the participants. The best teams received idea-stage investment and got a chance to raise 50,000-100,000 USD pre-seed stage investment from STAN.

Impact indicators

INDICATORS	BATCH 1	BATCH 2
ENTREPRENEURS RECRUITED	51	40
TEAMS FORMED	13	10
TRAINING HOURS CONDUCTED	44	56
TEAMS PITCHED FOR FUNDING	8	6
TEAMS GRANTED WITH FUNDING	4	3
FUNDING PROVIDED TO TEAMS	20,000 USD	15,000 USD
TEAMS RECOGNIZED AS COUNTRY FINALISTS	2	0

SDG TARGETS:

	4 QUALITY EDUCATION	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	17 PARTNERSHIPS FOR THE GOALS
PRIMARY		8.3.1	9.5.1, 9.5.2, 9.B.1	17.6.1
SECONDARY	4.4.1, 4.5.1	8.5.2, 8.6.1		

Results

Two tracks were formed during the first intake batch for this program: an AI track with 39 entrepreneurs and an Environmental track with 12 entrepreneurs. Around 30 startup development sessions and over 150 hours of one-on-one sessions were organized to ensure the establishment and growth of the startups. Over five months, 13 startup teams were created, of which eight pitched for prototype funding, and four secured 5,000 USD in investment each for developing a prototype. One of these four (Jarvis) was chosen by the Armenian Ministry of High-Tech Industry to participate in an entrepreneurial program organized by Draper University. At the same time, a further two (Joong and DigiEmotions) received conditional offers for a 10 million AMD grant. Another team, LoopEx, later renamed HopShop, won the "Digital Technology" category among Armenian participants during the Big Idea Challenge 2020, organized by the British Council. HopShop became the National Entrepreneurship World Cup 2022 winner in Armenia and participated in the 2022 UC Berkeley Skydeck International Accelerator batch. HopShop also received funding from STAN Angels.

The second batch of the program was launched in March 2021 and completed in August 2021. Ten teams were formed from 39 selected participants. As a result, three teams received 5,000 USD funding. One of the three winning teams also received a 40,000 USD investment from STAN and an additional 20 million AMD grant from the Armenian HTI Ministry next year.

> I am thrilled to be a small part of the amazing efforts and initiatives that FAST is engaged in to encourage and support entrepreneurship in Armenia. Promising talent and great startup education excite me for Armenia's future.
>
> **Marvin Liao**
> Former Partner, 500 Startups, United States

SCINOVA

PILLAR: EDUCATION

TIMELINE: NOVEMBER 2020 - SEPTEMBER 2022

CAPACITY: INTELLECTUAL FINANCIAL NETWORK

PARTNERS: ASTON UNIVERSITY (UK), JETPUB SCIENTIFIC COMMUNICATIONS (USA), ANAU ARMENIAN STATE UNIVERSITY OF ECONOMICS, INCLUDING GYUMRI BRANCH YEREVAN STATE UNIVERSITY, YEREVAN STATE MEDICAL UNIVERSITY INTERNATIONAL SCIENTIFIC - EDUCATIONAL CENTER OF NAS RA, NATIONAL POLYTECHNIC UNIVERSITY OF ARMENIA INCLUDING GYUMRI AND VANADZOR BRANCHES, RUSSIAN-ARMENIAN UNIVERSITY, FRENCH UNIVERSITY IN ARMENIA GAVAR STATE UNIVERSITY, SHIRAK STATE UNIVERSITY, VANADZOR STATE UNIVERSITY, GORIS STATE UNIVERSITY

DONOR/SUPPORTER: BRITISH COUNCIL

Problem

R&D outputs are a key sign of innovation performance, but their real-world benefits and innovation value are negated without commercialization. The commercialization of Armenian scientific output is currently at a nascent stage, requiring additional efforts and investment to enhance education on commercialization and support technology transfer.

To date, lessons learned from FAST programming have highlighted important challenges for ecosystem players that could be overcome through the provision of a curriculum around how to conduct quality scientific research and commercialize scientific output. Such a curriculum is crucial not only to ensure that research outcome translates to innovative output but also to recast the image of science among Armenian youth from something abstract and academic to something of practical relevance and tangible benefit.

Solution

In 2020, FAST designed a program to create two academic courses: Research Design and Science Commercialization. The courses introduced the basics of conducting quality research and creating commercial value from scientific inventions. Training for trainers and instructional resources (Curriculum and Instructor Manual) were made available to academic staff from all local academic institutions providing STEM education to postgraduate students.

IMPACT INDICATORS	2021	2022
CURRICULUM DEVELOPED	2	
INSTRUCTOR MANUALS DEVELOPED		2
STUDENTS TRAINED THROUGH THE PILOT	25	
ACADEMIC STAFF TRAINED	39	60
STEM-FOCUSED PARTNER UNIVERSITIES INVOLVED	5	15
STUDENTS BENEFITED FROM BC'S ENGLISH LANGUAGE TRAINING	50	
STUDENTS BENEFITED FROM INTELLECTUAL PROPERTY TRAINING	50	
TRAINING HOURS CONDUCTED	142	47

SDG TARGETS:

	4 QUALITY EDUCATION	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	17 PARTNERSHIPS FOR THE GOALS
PRIMARY	4.4.1			17.6.1
SECONDARY		8.6.1	9.B.1	17.17.1

Results

The first phase was launched in 2020. The curriculum for both courses has been developed in cooperation with experts and ongoing consultancy and validation from Aston University. A successful partnership was established with the ANAU to pilot the course for 25 Master's students during the Spring semester of the 2020-2021 academic year.

To support academic staff in successfully delivering the curriculum, training of trainers has been conducted for 39 academic staff from ANAU, Yerevan State University of Economics, Yerevan State University, Yerevan State Medical University, and International Scientific-Educational Center of National Academy of Sciences (NAS RA). As a result of Phase I, ANAU has fully integrated the courses into its Master's programs. Additionally, the International Scientific-Educational Center of NAS RA has integrated the course into two Master's programs, the Yerevan State Medical University and Yerevan State University of Economics, which have integrated some modules into existing courses.

A diagnostic tool was developed to evaluate the readiness of universities to engage in the commercialization of research. It aims to identify specific barriers to the industrial application of research outcomes currently experienced by Armenian researchers and apply suitable interventions to remove such barriers.

To ensure the continuity of the program and effective integration of the courses into STEM-focused graduate and postgraduate programs, a bilingual (English and Armenian) course manual on both Research Design and Science Commercialization courses has been developed in the first half of 2022. Prepared in cooperation with the American "JetPub Scientific Communications" LLC and Aston University's Editorial Board, the manuals are equipped with all the necessary methods, assignments, and materials for student-centered instruction. The second phase of the training for trainers program was organized for another 60 instructors from 15 local higher education institutions providing STEM education.

As a result of the second phase, the "Research Design" course was reshaped in 10 Yerevan-based and regional universities, becoming available to more than 800 students. Some universities are developing implementation programs for the "Science Commercialization" course with support from FAST.

This program was implemented jointly with Aston University (UK) within the Creative Spark: Higher Education Enterprise Programme framework funded by the British Council.

REVIVE DEEP TECH ACCELERATOR

PILLAR: COMMERCIALIZATION

TIMELINE: FEBRUARY - DECEMBER 2021

CAPACITY: INTELLECTUAL | FINANCIAL | NETWORK

SDG TARGETS:

	4 QUALITY EDUCATION	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	17 PARTNERSHIPS FOR THE GOALS
PRIMARY			9.5.1, 9.5.2, 9.B.1	17.6.1
SECONDARY	4.4.1, 4.5.1	8.5.2, 8.6.1		

Problem

The assistive technology industry is limited and specialized, primarily serving high-income markets. There needs to be more state funding, nationwide service delivery systems, user-centered R&D, quality and safety standards, and context-appropriate product design. Therefore, many low-to-middle-income countries do not possess assistive technology products. Yet the demand for such products/services is relatively high. For instance, research has shown that today, only 1 in 10 people in need have access to assistive technology due to high costs and a lack of awareness, availability, trained personnel, policy, and financing.

The exact reasons apply to Armenia as well. There needs to be more products and more startups in the local market.

Solution

In 2020, FAST, jointly with UNDP ImpactAim Venture Accelerator, designed the Revive Deep Tech Accelerator program to leverage a network of local and international growth stage companies working on assistive technologies. The goal of the Revive Deep Tech Accelerator was to support the selected startup to develop and deploy their products into successful commercially viable projects to help ease the lives of veterans with disabilities.

The program is part of the UNDP Revive Veteran Support Program, designed to transfer new skills and capacities, aiming to act as a helping hand for veterans launching their startups or expanding their existing businesses while accelerating their education and career.

IMPACT INDICATORS

CHALLENGES DEFINED	8
STARTUPS RECRUITED	12
COACHES AND MENTORS INVOLVED	15
TRAINING HOURS CONDUCTED	25
WINNING STARTUPS SELECTED TO DEPLOY PRODUCT SOLVING THE CHALLENGE	4
STARTUP MEMBERS TRAINED	22
WINNING STARTUP MEMBERS	10

Results

The acceleration program, initiated on September 23rd and concluding on December 3rd, 2021, saw the graduation of 10 startups from diverse countries, including Armenia, Tunisia, Iran, the USA, Estonia, and India.

The startups participated in 25+ hours of sessions and personalized meetings with around 15 speakers, coaches, and industry representatives. Four of the graduated startups (two local and two international) received small grants - 3 of the startups received $2K each, and the other one, AIP Tech - $7K. In the program's last phase, the selected startups had individual consultations with the key stakeholders in Armenia, including Government and industry representatives. As a result of the funding, AIP Tech applied to the European Patent (EP) Office and participated in the Arab Health Expo. The other startups spent the funding on the following activities: hiring consultants/experts, developing a mobile app, etc.

ARMENIA'S ENERGY INDEPENDENCE ROADMAP

PILLAR: RESEARCH

TIMELINE: FEBRUARY 2021 - DECEMBER 2023

CAPACITY: INTELLECTUAL FINANCIAL NETWORK

PARTNER: SOLARON SOLAR PANEL MANUFACTURER

DONOR/SUPPORTER: ARTUR ALAVERDYAN

SDG TARGETS:

PRIMARY		17.6.1
SECONDARY	12.A.1	

Problem

The disastrous consequences of the rapidly changing climate are becoming more concerning. In the past two centuries, The Earth's temperature has risen by an average of 0.85 °C, which may soon lead to catastrophic consequences for life across the globe.

Fossil fuels, such as coal, oil, and gas, are the largest contributors to deteriorating global climate change, accounting for around 90 percent of all carbon dioxide emissions. The most significant and impactful way to slow down the gradual and long-term global warming and energy crisis is to reduce atmospheric CO_2 by replacing fossil fuels with carbon-free renewable energies on the one hand and by increasing energy use efficiency and storage on the other. In the current discourse of fighting climate change, renewable energy is important in global sustainability.

Armenia's self-sustainable future is not an exception. This is why we initiated a program to address and participate in locally solving this global challenge, which may lead to further deployment of the solutions suggested by the roadmap.

Nearly 200 countries, including Armenia, have agreed that reaching carbon neutrality by the mid-21st century is essential to limit global warming to a threshold set by the Paris Agreement. Armenia's strategy towards striving for carbon neutrality is also connected to energy independence, as having no proven gas or oil natural resources, the country must cover the gaps of its own energy industry.

This makes the country highly dependent on external sources and vulnerable. Favorably, Armenia has the necessary conditions - abundant sunlight throughout the year, lots of mountains and rocky unpopulated areas, and hence the potential for using them to source energy from the sun. Given that energy is one of the critical economic fields that cannot be ignored while building an innovation ecosystem, Armenia's Energy Independence Roadmap was born.

Solution

In partnership with SolarOn, FAST established Armenia's Energy Independence Roadmap, aiming to draw the path to accelerate and advance this process economically.

The roadmap will be used to attract investment and make policy recommendations to the government. Aiming to propose precise scenarios with cost estimation and investment plans, the roadmap will deeply analyze the opportunities and obstacles related to scaling the share of various renewable energy sources, including solar, wind, hydro, and biomass. It will particularly investigate the feasibility of applying the existing technology solutions to the Armenian case and identify the necessity of further improvement to strengthen their efficiency. Upon completion, the roadmap will be presented to the stakeholders and interested groups for in-depth discussion and coordination of the next steps.

Results

From a pool of group and individual applicants, the independent international Committee formed by FAST chose a group of experts specializing in diverse aspects of energy-related issues. The group developed a concept paper approved by the Committee and became the ground for further research. For the past ten months, the group has been working on the development of several scenarios for Armenia's energy independence pathway and has finalized the draft of the roadmap.

IMPACT INDICATORS

ROADMAPS TO BE DEVELOPED	1
LOCAL EXPERTS ENGAGED	4
INTERNATIONAL EXPERTS ENGAGED	2

MITQ INCUBATION PROGRAM

PILLAR: COMMERCIALIZATION

TIMELINE: APRIL - AUGUST 2021

CAPACITY: INTELLECTUAL FINANCIAL NETWORK

PARTNER: DIGITAIN

Problem

One of the key characteristics of a robust innovation ecosystem is corporate innovation, which has yet to be cultivated in Armenia as a culture. FAST has long recognized the need to develop such a culture and has partnered with several international entities to bring their expertise to the local market. However, the absence of robust in-house venture-building and supporting programs in large corporations remains the major lacking component.

Solution

In its mission to develop the corporate innovation culture in Armenia, FAST partnered with Digitain, seeking in-house solutions for sourcing new talent and ideas on the local market and matching with their expertise to develop new technologies. The collaboration assumed the development of an incubation program offering full content support and mentorship that would focus on startups offering solutions in sectors such as FinTech, MilTech, AI, software as a service solution (SaaS), AR/VR, and EdTech during the first batch.

IMPACT INDICATORS

STARTUPS APPLIED	35
STARTUPS GRADUATED	8
SESSIONS HELD	24
STARTUPS FUNDED	4

SDG TARGETS:

	4 QUALITY EDUCATION	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	17 PARTNERSHIPS FOR THE GOALS
PRIMARY			9.5.1, 9.5.2, 9.B.1	17.6.1
SECONDARY	4.4.1, 4.5.1	8.5.2, 8.6.1		

Results

The MITQ incubation program was designed by FAST and holistically incorporated into the structure of Digitain. Eight promising teams, totaling 30 participants, were chosen to participate in the program. The teams participated in a 12-week program with sessions on customer development, team building, market research, pitching, MVP building, and other subjects.

At the end of the program, a Demo Day was held, during which the teams were introduced to the jury and STAN angel investors with an opportunity to pitch. As a result, ArmBionics won first place and received a grant from Digitain. Later, the team participated in FAST's Revive Deep Tech Accelerator program, which was implemented jointly with UNDP ImpactAim Ventures in 2021. Since then, ArmBionics closed a pre-seed round of investment. The startup completed designing a mechanical arm product, which is now ready for production, and started designing the second product - a myoelectric arm. The startup obtained ISO9001 and CIS voluntary certificates to scale internationally.

Another winning team, Axona Lab, has also further succeeded in receiving investment from STAN - a notable achievement for an early-stage startup. Axona Lab is a Neuromarketing company that uses applied Neuroscience and AI technology to boost marketing campaigns. Since receiving funding from the STAN, AxonaLab has validated its solution with several customers in Armenia and abroad. The team is transitioning into a software-a-service platform and expanding its operations to the UAE market.

In addition, two other teams received various grants.

SPUN-OFF PROGRAMS

SCIENCE AND TECHNOLOGY ANGELS NETWORK

PILLAR: COMMERCIALIZATION

TIMELINE: FEBRUARY 2018 - JULY 2023

CAPACITY: INTELLECTUAL FINANCIAL NETWORK

Introduction

Armenia inherited a robust high-tech ecosystem from the Soviet era, encompassing a technical educational system, software development talent, and international connections. These factors enabled the development of one of the most dynamic industries of independent Armenia, the Information and Communication Technologies sector, in the early 90s. Within ten years, the industry matured, and in the 2010s, several hundred software development companies already provided outsourcing services globally.

In the long run, however, Armenia's outsourcing potential could not compete with some larger countries, and the need to focus not only on outsourcing services but also investing in R&D and developing its products came forth. Due to a consolidated lobbying effort, with the support of the Armenian Government, the first incubation programs and the first venture capital firm - Granatus Ventures, were introduced in the early 2010s. These reforms gave birth to a steadily growing startup ecosystem with multiple success stories. A gap in the market remained for access to post-incubation early-stage funding to build prototypes and shift from idea to market. The funding sources for early-stage startups remained personal savings, support from friends and family, and a few business angels. That was not enough.
Given the lack of a dedicated platform for financing early-stage science and technology startups and the imperative to bolster initiatives emerging through FAST, the initial months of FAST's establishment saw the formulation of a pivotal strategic goal: the establishment of Armenia's inaugural angels' network focused on science and technology. This vision came to fruition in February 2018 with the official launch of the STAN. It has since played a crucial role in facilitating initial investments in numerous local startups. As of July 2023, STAN celebrated its 5th anniversary and transitioned into an independent initiative.

Problem

While the ICT sector had seen accelerating startup growth, there were only a few funding opportunities to support the early stages of startups, with no Angel groups and very little state aid. Raising foreign investment capital was also challenging at this time due to Armenia's low attractiveness for venture capital and private equity (Armenia ranked 86th of 125 nations on the Venture Capital and Private Equity Country Attractiveness Index in 2017, and in 2021 it was 90th in 125 nations).

Solution

In February 2018, FAST took the initiative to create a platform to unite prominent Armenian entrepreneurs who will invest in early-stage science-intensive startups and help them grow by contributing their entrepreneurial skills and capital. This platform, called STAN, became a key program and an important funding starter for Armenia. In February 2018, STAN was the only angel group in the country.

STAN offers individual investors access to pre-seed and seed-stage investment opportunities with a growing focus on AI as a platform technology. STAN also provides a platform through which idea-stage

funding can be provided to high-risk, high-return deep tech projects, as well as offers an opportunity for special impact investment in women-led idea-stage startups to leverage women's entrepreneurial potential in Armenia.

STAN introduces angel investors to the founders of promising Armenian science and technology-intensive startups. The network helps angel investors to contribute with their financial, network, and intellectual capacity. Angels invest and propel startup journeys, helping with their network and entrepreneurial knowledge. Each member of the network commits to invest 10,000 USD annually.

Such platforms are introduced globally as an important initial supporter in some of the future's biggest commercial success stories. They give early-stage startups that graduate from various incubation programs access to finances and entrepreneurial advice. Thus, they have proper ecosystem pillars to support their inception and further growth. At the same time, angels can become game-changers if they invest in the right initiative at the right time.

Results

Originally formed by 18 founding members, STAN has expanded to engage 48 Angels from various industries committing 1,450,000 USD, and the network is still growing. Thus far, it has made over 600,000 USD in investments in 14 startups with several deals in progress.

Along with providing access to risk capital, STAN also offers vast expertise that can be leveraged to support companies through strategic advice, mentorship, and connections to facilitate their further development. Furthermore, through STAN, angels meet each other and partner in investment deals, thus taking networking opportunities to the next level.
All the activities mentioned above introduce the best international practice of tech entrepreneurship taking off in Armenia, thanks to STAN.

Since the launch of this program, a positive change in state understanding of the importance of such initiatives has become apparent, and the industry has become more active in initiating similar projects and platforms. We are proud to see that that number has risen to 4 and will continue to grow.

From July 2023, STAN will operate independently as a separate legal entity under the status of a Foundation, which aims to nurture early-stage startups with angel funding. FAST maintains its involvement by serving on STAN's board of trustees. The success of STAN continues to grow with new angels joining the network, new pitching sessions, and a high level of investor interest in pitching startups. The recent 14th pitching session in October 2023 ended with three new deals of more than 150,000 USD in total and overall investors' interest in 10 over 11 pitched startups.

STAN has held a membership in the European Business Angels Network (EBAN) since 2018. EBAN is the pan-European representative for the early-stage investor community, gathering over 100 member organizations in more than 50 countries today. Established in 1999 by a group of pioneer angel networks in Europe with the collaboration of the European Commission and EURADA, EBAN represents a sector estimated to invest 11.4 billion Euros a year and play a vital role in Europe's future, notably in funding SMEs.

SUCCESS STORIES

doodooc

doodooc, another portfolio startup of STAN, shows a great example of success and achieving big results.

Throughout 2022 doodooc collaborated with Serj Tankian, who used doodooc platform to create music visualization for his newly released extended plan. The platform was also the official music visualizer of the FIFA World Cup 2022 in Qatar. In December, NVIDIA Inception program for startups accepted doodooc.com.

doodooc.com is a generative music visualization platform that empowers music creators to make highly customizable sound-reactive animations based on a deep analysis of their audio.

doodooc's team has developed an AI-based software that analyzes 11 layers of music, combined with a platform that consists of 300+ visualization templates. With the help of its platform, musicians can generate content directly linked to their art, reflecting all the basses, tones, and moods of their pieces. Due to the custom resolution feature, visuals rendered on doodooc.com can be customized to fit any screen size, making doodooc's animations a perfect fit for live performances.

Denovo Sciences

You can discover Denovo at the crossroads of biology, chemistry, physics, and AI. It is a deep tech company that creates novel therapeutics using state-of-the-art AI technologies.

During a workshop organized around creating and brainstorming innovative ideas, Denovo Sciences was born within Ascent's innovative venture-building program by a team of young scientists and tech professionals. Over 150 others later chose the idea, and the team started developing the prototype. Later, the team spun off into a startup company.

The startup received angel funding from STAN in 2020. The startup was among the top 25 finalists of the Entrepreneurship World Cup in 2021, selected from 100,000 applicants and 400 competing startups worldwide. In 2022, Denovo Sciences was accepted into Berkeley's Startup Acceleration program, which included funding and a 6-month acceleration program allowing the co-founders to network and pitch to investors in Silicon Valley to raise more funds for the next rounds.

IMPACT INDICATORS (BEFORE SPIN-OFF)

ANGELS INVOLVED	48
COUNTRIES REPRESENTED	8
ANGEL FUNDS COMMITTED	1,450,000 USD
PITCHING SESSIONS HELD	13
STARTUPS PITCHED	142
INVESTMENTS MADE	14
AMOUNT OF INVESTMENTS MADE	622,000 USD

SDG TARGETS:

PRIMARY			9.5.1, 9.5.2, 9.B.1	12.A.1	17.6.1
SECONDARY	4.4.1, 4.5.1	8.5.2, 8.6.1			

Founding a startup is no easy feat. There are many moving parts, and knowing where to start can be difficult. That is why we are so grateful to have had STAN by our side during our journey.

Besides the obvious financial incentive, STAN also gave us access to its amazing network of people. Our advisor, Vahag Karayan, was a huge asset, providing us with guidance and advice every step of the way.

STAN helped us get our name out there, featuring us in conferences and events such as GIF and STARMUS. This allowed us to showcase our product internationally and meet potential investors."

Karlen Madoyan, Ph.D.
Co-founder and CEO at doodooc

Today, there is sometimes the impression that you must go to the US, Europe, or other countries to succeed. I want to help create such an ecosystem in Armenia to put it on the map as a country where you go to become highly successful.

I believe that with tremendous IT talent and large Diaspora connections, Armenia has all the ingredients it needs to become such a destination.

Igor Khalatian, Co-Founder, Co-Chair, STAN
Founder and CEO of Iris Dating,
Ex-VP of Development at Oracle

FAST has managed to create a unique ecosystem for the development of science and technology in Armenia in a short time. The STAN business angel community is among its programs – a platform for supporting and developing startups.

I had a dream of creating the strongest and the most professional community of business angels to support talented and motivated entrepreneurs from Armenia and their startups in their development and international expansion.

We all understand how small the Armenian market is, and it is almost impossible to create a large and successful business exclusively by working in the local market. STAN is about smart money. Our key advantage is that STAN comprises several dozen successful entrepreneurs and professionals from Russia, Europe, and America.

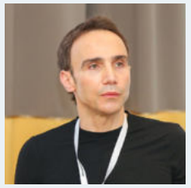
Our angels have expertise in most major markets in the world, and we cannot only finance a startup but also provide young entrepreneurs with advice on how to develop innovative projects that can make Armenia and our world a better place."

Ruben Arutyunyan, Co-Founder, Co-Chair, STAN
Founder and President, HENDERSON Fashion Group

As of December 2023, the current count of active members is 37.

STAN ACTIVE MEMBERS LIST

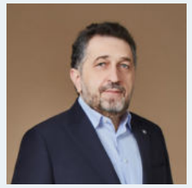
BOARD OF TRUSTEES



Igor Khalatian

Co-Founder,
Founding Angel,

Chair of the Board
of Trustees



Ruben Arutyunyan

Co-Founder,
Founding Angel,

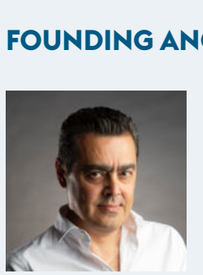
Member of the Board
of Trustees

Avetis Antaplyan
Angel, Member of the
Board of Trustees

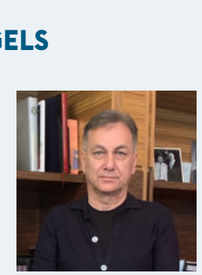
Alexandre Meterissian
Angel, Member of the
Board of Trustees

Suzanna Shamakhyan
Ex-Officio Member of
the Board of Trustees

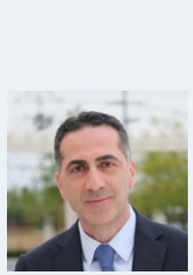
FOUNDING ANGELS



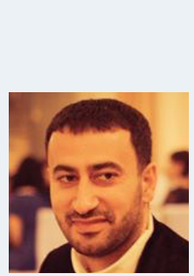
Artur Alaverdyan
Founding Angel



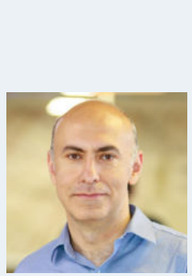
Igor Avanesyan
Founding Angel



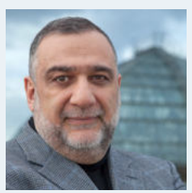
Armen Orujyan
Founding Angel



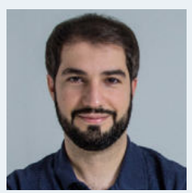
Arthur Tovmasyan
Founding Angel



Vahan Vardanian
Founding Angel

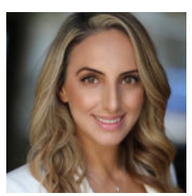


Ruben Vardanyan
Founding Angel



Ruben Vardanyan
(Joomag)
Founding Angel

ANGELS



Gayane Aghajanyan
Angel

Sargis Badalyan
Angel

Kevin Bartanian
Angel

Zarik Boghossian
Angel

Levon Budagyan
Angel

Rem Darbinyan
Angel

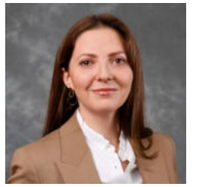
Artur Galstian
Angel

Sascha Gharibyan
Angel

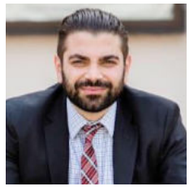
Art Ghazaryan
Angel

Hayk Harutyunyan
Angel

Vahag Karayan
Angel



Astghik Khachatryan
Angel



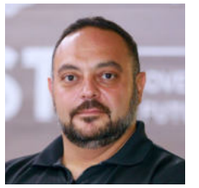
Armen Kiramijyan
Angel

Sassoon Kosian
Angel

Narine Kotikyan
Angel

Hayk Mamajanyan
Angel

Hovhannes Mardirossian
Angel

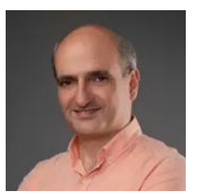


Gugo Martikyan
Angel

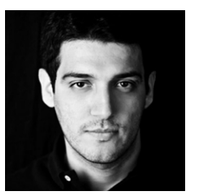
Armen Martirosyan
Angel

Armen Panossian
Angel

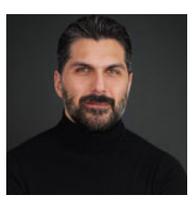
Stephan Reckie
Angel



Yervand Sarkissian
Angel



Gevork Sarkisyan
Angel



Hratch Sofoian
Angel

Vahram Sukyas
Angel

Sergey Yengoyan
Angel

AI/DS TRAINING PROGRAM FOR TIER C & "UNIT 1991" EDUCATION AND R&D

PILLAR: EDUCATION

TIMELINE: FEBRUARY 2019 - FEBRUARY 2023

CAPACITY: INTELLECTUAL FINANCIAL NETWORK

PARTNERS: MINISTRY OF DEFENSE
HI-TECH CYBERSECURITY CENTER
IMPROVIS AEROSPACE AND DEFENSE
AMERICAN UNIVERSITY IN ARMENIA

DONOR/SUPPORTER: SIS AND MASIS GATEWAY

Introduction

Since its independence, Armenia has had a crucial task of forming a strong army. Having inherited the experience of the Soviet past, the military industry needed modernization and reform. Especially over the past years, the vital need to withstand modern technological challenges became apparent to ensure our security.

Among the essential strategic elements of fortifying our army is establishing R&D for the military. The important first step was made when the Armenian MoD formed specialized scientific and technological detachments for conscript-performed R&D. This, in turn, required a consistent and large supply of trained talent to build the needed internal capacity through government strategies.

A sustainable learning curve starting from school is very important to train talent. AI and DS skills, needed in modern security affairs, become instrumental in ensuring efficient R&D and innovation.

Realizing the urgency, Unit "1991" was developed and established by the Ministry of Defence, with the unit's educational and R&D components to be established and managed by the FAST team.

The longer-term vision of this program is the full integration into the fiber of the state defense R&D development, with planned sustainability within the state structures.

Problem

Despite the demand for tech education, only a few conscripts, by the time they have graduated from high school, are qualified to serve in the army's specialized detachments, evidencing the need to create a special talent pipeline.

Additionally, the limited talent flow renders the implementation of serious R&D projects challenging since they require collaboration within and between scientific and engineering fields and, consequently, a large number of tech specialists.

SDG TARGETS:

	4 QUALITY EDUCATION	8 DECENT WORK AND ECONOMIC GROWTH	17 PARTNERSHIPS FOR THE GOALS
PRIMARY	4.4.1	8.B.1	
SECONDARY	4.3.1		17.17.1

Solution

In February-June 2019, the DS/AI training program was designed and deployed to equip participants with skills and knowledge on DS applications, which developed into Unit 1991's Education and R&D program. In September 2019, FAST, the MoD, and the Hi-Tech Cybersecurity Center signed an MoU that paved the way for creating Unit 1991. In August 2020, the MoD established Unit 1991 as the Armenian Armed Forces high-tech R&D detachment.

It is a comprehensive platform for monitoring and building talent flow capacity and deploying R&D projects that generate applicable solutions. The beneficiaries of the program are conscripts or female civilians who have a desire to deepen their math knowledge and advance their careers in the area of AI.
FAST designs and implements advanced educational courses on DS and AI for future conscripts and women, and Unit 1991 recruits and facilitates R&D projects. This offers advanced training to facilitate defense sector R&D while increasing the inflow of educated and experienced high-tech personnel into Armenia's civilian workforce upon completion of service.

The goal of the educational component of this program is to help satisfy the need for necessary talent prepared to tackle AI-based tasks and later capable of implementing R&D projects. The strategy involves a considerable boost and practice of advanced mathematics among high school graduates.

Results

In 2019, 15 soldiers were trained in DS and AI over six months, with opportunities to apply their new skills during and after their national service. In January 2020, 46 participants completed a competitive selection process to join the first pre-army training course of Unit 1991. Over six months, participants studied mathematics and programming for ML, classical ML methods, and deep learning and participated in an R&D idea generation workshop. Similar courses were organized in Gyumri and Agarak by FAST partners, Improvise, and participants of the "Soldiers as Lecturers" program.

Starting in July 2020, as most classes and courses shifted to online teaching due to the COVID-19 pandemic, the pre-army training courses expanded their induction beyond Yerevan to enroll 462 participants from 8 Armenian regions. They also included a 6% quota for female participation, offering women a unique opportunity to enter the Armenian defense sector through these detachments. In April 2020, an MoU with the American University in Armenia was signed to organize a joint Training of Trainers in Dilijan and Vanadzor to expand the regional inclusion of the program. The entire personnel for Unit 1991's AI Group, selected by an independent MoD examination committee, is composed exclusively of the alumni from various batches of the pre-army training organized by FAST.

FAST deployed four advanced in-army training courses during 2020-2022 and established two competitive AI labs to fully realize this project - Sis and Masis Gateway AI Labs, which support Unit 1991 R&D projects and cover the needs of pre-army courses. The labs are designed to provide up to 40 people with high-performance computing.

Commencing in February 2023, the "1991 Division" program is ongoing within the RA MoD.

After thoroughly reviewing the collaborative work undertaken in the preceding four years, FAST expresses its profound satisfaction with the outcomes.

The "1991 Division" program is now mature enough to run independently alongside the RA MoD. Our achievements and expertise demonstrate that the program works well. As we move forward, we trust that the MoD can continue to independently meet the program's goals.

IMPACT INDICATORS

ACTIVITY LEVEL	TIER C
SOLDIERS DIRECTLY BENEFITED	15
TRAINING HOURS CONDUCTED	120
PROJECT IDEAS GENERATED	25+

ACTIVITY LEVEL	UNIT 1991 BATCH 1	UNIT 1991 BATCH 2	UNIT 1991 BATCH 3	UNIT 1991 BATCH 4	UNIT 1991 BATCH 5	UNIT 1991 BATCH 6	TOTAL
APPLICATIONS RECEIVED	410	480	560	390	285	255	2380
FUTURE CONSCRIPTS TRAINED	71	65	101	105	95	96	533
OF WHICH FEMALES	0	5	4	10	5	6	30
OF WHICH FROM REGIONS	31	7	28	38	37	26	267
TRAINING HOURS CONDUCTED	480	220	220	220	220	220	1580
CAPSTONE PROJECTS ACCOMPLISHED	6	3	3	3	4	4	23

The courses I have been taking during my program are very comprehensive. The trainers are highly skilled, and teaching mathematics is done on a profound level, after which you start practicing it and eventually understand all the practicalities and their real purpose. We do learn math in schools and universities, but it is very rare to find such a high education.

Usually, we do not get the chance to digest theoretical knowledge, and then we do not know how to use it, but thanks to FAST, we get to all the gray areas and finally become comfortable with the practice. Without deep knowledge, learning computer science and AI and doing anything innovative yourself is impossible.

David Tumanyan
Program beneficiary, 3rd batch graduate

ADVANCED SOLUTIONS CENTER (ASCENT)

PILLAR: COMMERCIALIZATION

TIMELINE: FEBRUARY 2019 - JULY 2022

CAPACITY: INTELLECTUAL FINANCIAL NETWORK

SDG TARGETS:

	4 QUALITY EDUCATION	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	17 PARTNERSHIPS FOR THE GOALS
PRIMARY		8.3.1	9.5.1, 9.B.1	17.6.1
SECONDARY	4.4.1, 4.5.1	8.5.2, 8.6.1		

Introduction

Globally, incubators, venture studios, and R&D hubs strive to enhance deep-tech startup success by iterating approaches while managing costs. A key challenge is timely recognizing product-market fit issues that waste resources and motivating venture programs to develop robust ideation methodologies for increased success and efficient prototyping. In Armenia, FAST noted a lack of venture-building culture among STEM researchers, prompting the establishment of ASCENT, Armenia's first science-intensive venture builder, focused on scalable AI and Biotech startups.

ASCENT employed 14 researchers. In the scope of ASCENT, over 250 venture hypotheses (VH) were generated at the exploration phase, of which 8 VHs have been deeply explored. Out of these eight VH, one Prototype Company developing AI algorithms for drug discovery was spun off – Denovo Sciences Inc. The startup received funding from STAN in 2020 and was accepted to Berkeley's Startup Accelerators program in 2022. The latter included funding and a 6-month accelerator program allowing the co-founders to network and pitch to investors in Silicon Valley and close the next capital raise round.

From its establishment till the middle of 2020, FAST invested 1,060,000 USD in ASCENT. In the middle of 2022, ASCENT was spun off and continued its operations as a distinct legal entity.

Problem

Armenia's high-tech (mainly IT) sector has predominantly very low levels of R&D activity. While indigenous R&D is increasing slightly, only a handful of Armenian science-backed or deep-tech startups develop their own tech products based on in-house R&D.

By contrast, most IT companies use existing providers for services and outsourcing. Moreover, a lack of science-intensive venture builders needed to accelerate the startup creation process hinders the generation of companies capable of achieving a higher valuation status to compete at the same level as their outsource-oriented counterparts. Recent studies suggest that venture builder-backed companies have a 60% likelihood of providing a successful exit compared to just a 5-20% likelihood among venture capital-backed startups.

Solution

FAST designed ASCENT, the multifunctional platform that aims to develop science-intensive ventures that can become internationally competitive deep tech companies.
The program aims to use its innovation model and a stage-gate process to evolve ideas from VH through prototype companies to new companies and, eventually, spin-off ventures. The innovation model is inspired by the Flagship Pioneering model, a leading venture-building company based in Boston, which has generated more than 100 companies since 2013.

Results

The first batch was launched in February 2019. Overall, more than 250 VHs were generated during the exploration phase, of which 8 VHs have been deeply explored.

By autumn 2020, the ASCENT model for science-intensive venture building, having been tried and tested, reached maturity and became ripe for spin-off as a separate for-profit entity. Moreover, ASCENT's first AI track, ProtoCo, a startup that creates AI algorithms for drug discovery, has received funding from investors and is formally incorporated as Denovo Sciences Inc., becoming the first startup to spin off from ASCENT. The startup received funding from STAN in 2020 and won Berkeley's Startup Accelerators program in 2022. The latter win included funding and a 6-month accelerator program allowing the co-founders to network and pitch to investors in Silicon Valley to raise more funds for the next round.

Another ProtoCol, 8nook Inc., was formed in late 2020, focusing on synthesizing AI applications and behavioral models for more accurate loan scoring in the banking sector.

The first success stories, created with the resources and innovative pipeline of ASCENT, prove that with a suitable model of support and access to top-notch expertise, a venture-building model can be successful with locally educated and trained human resources.

ONGOING PROGRAMS

ADVANCE RESEARCH GRANTS

PILLAR: RESEARCH

TIMELINE: MARCH 2020 - PRESENT

CAPACITY: INTELLECTUAL FINANCIAL NETWORK

PARTNERS/DONORS:
YEREVAN STATE UNIVERSITY
AMERICAN UNIVERSITY OF ARMENIA, JOE BARNES, SARKIS AND NUNE SEPETJIAN

IMPLEMENTING/HOSTING PARTNERS:
INSTITUTE OF MOLECULAR BIOLOGY, NAS RA
INSTITUTE FOR PHYSICAL RESEARCH, NAS RA
L.A.ORBELI INSTITUTE OF PHYSIOLOGY, NAS RA
ARMENIAN BIOINFORMATICS INSTITUTE

Introduction

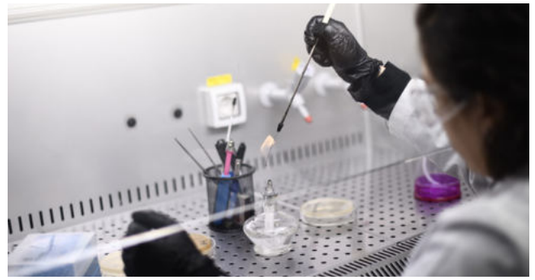
Science and research are integral parts of the technological transformation of the quickly-shifting modern world. To engineer the new global order, nations compete for innovativeness and dive deep into research that will identify sustainable solutions to global challenges.

Armenia can participate in this global process by strengthening and strategically using its human resources. Armenian global professional network, for instance, is an important resource that has just been properly discovered and utilized.

Both the Armenian diaspora and non-Armenian global scientists within our network make up a pool of internationally distinguished talent ready to invest intellectually in the country. In this regard, helping the local scientists advance while being part of groundbreaking research projects and integrating international researchers into Armenia's ever-so-forming scientific ecosystem can potentially become a precedent of global success and an added reason for repatriation to Armenia.

We developed the ADVANCE Research Grants program with this potential in mind. It targets the development of scientific research practices among local scientists in Armenia, inviting and engaging international experts to lead research as Principal Investigators (PIs). The program's vision at large is attracting groundbreaking research into Armenia using global networks and driving success through our local talent.

Through ADVANCE's funding scheme and framework, STEM researchers and PIs form international research teams based in Armenia, helping the local scientists and researchers advance, while working on groundbreaking research topics. These processes can potentially become precedents of global success and reasons for repatriation.



Problem

Today's researchers in Armenia have a hard time finding systemic and network access to continue with their topic and advance their research to an internationally competitive level. The research institutes in the country need more resources and output. More than ⅓ of all researchers are above retirement age, and more than 40% of all the publications do not have citations. As a result, the number of students interested in pursuing science-related PhDs in Armenia keeps steadily decreasing. In contrast, the country's overall number of young researchers has reduced by 45%.

Overall, the fundamental challenge for Armenian science is the need to develop a new generation of STEM researchers, encourage the formation of scientific communities, and increase the country's R&D expenditure, which is currently 0.2% of GDP, 12 times less than the OECD average. Suppose those sections of the scientific community producing tangible results are to be sustained. In that case, well-structured mechanisms for raising a new generation of researchers to preserve and grow that legacy are essential. Currently, Armenia has very few scientific institutions that foster the growth of scientific communities and has limited state-of-the-art research labs.

Solution

To create a competitive scientific community, it must be enhanced while we simultaneously nurture a new generation of researchers. We see doing this through creating mechanisms and grounds for national support to research, attracting prominent international scientists to Armenia, creating new research groups, and forming clusters around them. This is when creating modern, up-to-date labs would become a feasible next step.

In 2020, FAST designed the first-of-its-kind grant scheme for the scientific community in Armenia. It aims to bring top expertise in targeted scientific fields to Armenia by connecting international PIs with local researchers and students. New research teams composed of 2 to 7 researchers get formed under the direct supervision of international PIs by selecting the most qualified researchers, regardless of their institutional affiliation. The research groups receive comprehensive long-term institutional and financial support. The funding includes remuneration for local researchers, lab supporting materials, travel, and capacity-building opportunities, publication costs, and travel covered for international PIs. Each grant ranges from 45,000 to 125,000 USD annually, and each project lasts 3 to 4 years.

Naturally, interested in bringing positive change to Armenia, among the first ones to respond were scientists from the diaspora. Thanks to their great efforts, the platform has now developed to a level that attracts foreign scientists intrigued with Armenia's potential.

Results

In 2020, FAST launched the first pilot for this program. Two projects in the fields of biotechnology and ML were formed under the leadership of prominent PIs, Garabed Antranikian (Hamburg University of Technology, Germany) and Arnak Dalalyan (Institut Polytechnique de Paris, ENSAE Paris, France). In August 2020, the two new teams formed around these two PIs began their research work on the "Development of innovative biobased technologies to promote circular economy" and "Statistical analysis of ML algorithms (SAMlab)" research topics accordingly. These projects have been funded by FAST and Yerevan State University since 2020.

These two programs served as an important foundation for improving the ADVANCE Research Grants framework and preparing it for a scale-up. The framework was also presented to the Ministry of Education, Science, Culture and Sports with its Science Committee, which agreed to use it as a new tool for funding research in Armenia in case of successful piloting. We are thrilled to witness a process where the Science Committee has developed a replica framework and has started to fund projects with this framework since 2022. This became a solid example of a collaboration with the government where FAST developed and piloted new frameworks, which were later adapted by the state.
After the pilot's success, the program expanded, launching calls for new research projects worldwide. Ten projects were selected through a careful process. However, the three-year FAST and Apkarian Foundation Neuroscience project with Yerevan State Medical University, led by Professor A. Vania Apkarian of Northwestern University, Feinberg School of Medicine, concluded in October 2023.

The total number of active researchers benefiting from the program now is 59, including 54 local researchers and five international researchers. This has also been possible through the generous contributions of our large network of donors and supporters from all across the USA who have all come to join our Advance Armenia Global Campaign since 2022.

Thus, in 2023, FAST has supported nine research grants concentrating on Materials Science, Vine Bioinformatics, Drug Discovery, Space Radiobiology, Mathematical Analysis, Data Science, Computer Vision, Biotechnology, and Machine Learning. Complete information on projects under ADVANCE Research Grants is presented below.

RESEARCH PROJECTS

MACHINE LEARNING

Principal Investigator: Professor Arnak Dalalyan

Professor of Statistics at ENSAE, Institut Polytechnique de Paris; Director of the Center of Research in Economics and Statistics (CREST)

Hosting Institution: Yerevan State University

BIOTECHNOLOGY

Principal Investigator: Professor Garabed Antranikian

Head of CBBS; Senior professor at the Institute of Technical Biocatalysis, Hamburg University of Technology

Hosting Institution: Yerevan State University

COMPUTER VISION

Principal Investigator: Professor Sos Agaian

Professor of Computer Science at the Graduate Center/CSI, CUNY;
Professor at the Graduate School of Biomedical Sciences UTHS-CSAD

Hosting Institution: Yerevan State University

DRUG DISCOVERY

Principal Investigator: Professor Ruben Abagian

Professor at the Skaggs School of Pharmacy and Pharmaceutical Sciences, University of California San Diego; Molsoft LLC founder

Hosting Institution: L.A. Orbeli Institute of Physiology NAS RA

MATERIALS SCIENCE

Principal Investigator: Alexander Mukasyan

Research Professor at the Department of Chemical and Biomolecular Engineering, University of Notre Dame

Hosting Institution: Institute for Physical Research of NAS, RA

BIOINFORMATICS

Principal Investigator: Professor Hans Binder

Senior Scientist (Former Managing Director of Interdisciplinary Center for Bioinformatics, University of Leipzig, Germany)

Hosting Institution: Armenian Bioinformatics Institute (ABI)

DATA SCIENCE

Principal Investigator: Professor Nelson Baloian

Associate Professor at the Department of Computer Science, University of Chile

Hosting Institution: American University of Armenia

SPACE RADIOBIOLOGY

Principal Investigator: Professor David Goukassian

Tenured Professor of Medicine/Cardiology at Cardiovascular Research Institute, Icahn School of Medicine at Mount Sinai

Hosting Institution: Institute of Molecular Biology NAS RA (IMB)

MATHEMATICAL ANALYSIS

Principal Investigator: Professor Michael Ruzhansky

Senior Professor of Mathematics at Ghent University, Belgium

Hosting Institution: Yerevan State University

IMPACT INDICATORS	PLANNED BY 2027	ACHIEVED
INTERNATIONAL PIS ENGAGED	10	9
RESEARCHERS FUNDED	50	78
RESEARCHERS TRAVELED ABROAD FOR TRAINING	20	16
COURSES CONDUCTED BY PIS FOR THE STEM COMMUNITY IN ARMENIA	22	17
BENEFICIARIES OF COURSES CONDUCTED BY PIS	1200	600
PUBLICATIONS IN THE HIGH IMPACT FACTOR JOURNALS	20	14

SDG TARGETS:	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	17 PARTNERSHIPS FOR THE GOALS
PRIMARY	9.5.1, 9.5.2	17.6.1
SECONDARY	9.B.1	

I have come to realize that what FAST does is right on the track with developing science, and if a change is possible in Armenia, it is through shifting the narrative to show how to do it, and it can only be done if all the people are interested and willing to develop science in Armenia, join efforts.

Arnak Dalalyan
Professor of Statistics and Director of the CREST at ENSAE

To nurture the mind with education and mentorship is to give it the foundation upon which so much can be built. Helping our scientists and engineers build that foundation will allow Armenia to offer innovation and advancement for generations to come.

We are so pleased to support FAST in its mission of helping our budding scientists and engineers Advance Armenia.

Mr. and Mrs. Kevork and Elizabeth Zoryan

I am very pleased that we already have such a program that enables us to support the ongoing educational reforms in our country across several fronts. With the advancement of technological and mathematical education, entirely new tools and conditions are being created, which contribute to enhancing the quality of education in science, technology, engineering, and mathematics.

I want to emphasize that the program aligns fully with the new standards, incorporating tools such as project-based learning, a credit system, and flexible, innovative approaches. These elements will cultivate a completely new environment for our teachers and students.

We know that a challenging journey lies ahead, but we believe the results will surpass our expectations.

Hovhannes Hovhannisyan
The Rector of the Yerevan State University

GENERATION AI: HIGH SCHOOL PILOT PROJECT

PILLAR: EDUCATION

TIMELINE: JANUARY 2022 - PRESENT

CAPACITY: INTELLECTUAL FINANCIAL NETWORK

STRATEGIC PARTNERS:
MINISTRY OF EDUCATION, SCIENCE, CULTURE AND SPORTS
MINISTRY OF HIGH TECH INDUSTRY

SUPPORTERS:
ILLUMINATOR
SARKIS AND ZARUHI GALADJIAN

COMPUTER LAB ARCHITECTS
ASHOT HOVANESIAN
COGNIZE
SYNERGY
VESTA

KNOWLEDGE PARTNERS:
ANALYSIS GROUP
ARMENIAN CODE ACADEMY
AYB EDUCATIONAL FOUNDATION
MIT GLOBAL TEACHING LABS
PROFOUND ACADEMY
QARAKUSI.AM
ZLEENK EDUCATIONAL PLATFORM

Introduction

AI is undeniably the most remarkable force of change in modern society, with the AI global market projected to reach a staggering $459.3 billion by 2030, potentially delivering an additional economic output of $13 trillion and increasing global GDP by 1.2% annually. Its pervasive influence has infiltrated every level of the economy, leaving no aspect of people's lives untouched. As a platform technology, AI can be applied across various industries. AI sector development can happen independently from GDP, natural resource wealth, or geographic positioning, making it an undeniable candidate to become the key catalyst for Armenia's global STI ambitions.

According to our analysis, which was further strengthened through a 2020 World Bank study, Armenia has the potential to be competitive in AI, and the two most important factors - human capital and state support - are good starting points for developing an AI pipeline in Armenia.

Generation AI aims at systemic change vs. short-term solutions to create a pipeline that upskills and motivates students towards AI researcher and innovator careers. The program starts from the high school level. It creates opportunities at the university level, integrating the beneficiaries into STI development in Armenia through research or the creation of new globally competitive products. These new talent pools will also help the core purpose of FAST interconnected programming: programs such as ASCENT, "Unit 1991", ADVANCE, and others will directly benefit from talent ready to advance their careers in AI.

Problem

Armenia's education system is hindered by a lack of foundational solid education in mathematics and computer science at the school level, with approximately a quarter of students failing the state graduation math exams. Furthermore, there is a concentration of exemplary practices in only a few specialized schools in Yerevan. Only 5 Universities offer AI-related degrees (the share of AI-related programs in the total number of programs is 0.84%, according to the Ministry of Education, Science, Culture and Sports of RA). Still, the number of students entering such programs needs to be higher. Armenia's academic track record in AI publications is also considered poor, with only 76 publications in AI subject categories from 1996 to 2021.

According to the Scimago Journal and Country Ranking, Armenia occupies the 116th position out of 195 countries in this regard. Moreover, the thriving IT sector further exacerbates the issue by recruiting top mathematical talents directly from high school, leading to a decline in university enrollment and discouraging further education.

To enhance global competitiveness, Armenia needs to prioritize AI development from the school level, improve math and computer science education, popularize AI careers, especially in research and innovation, and establish industry-connected education pathways.

Solution

FAST has designed the "Generation AI" program to create the educational and career pipeline and nurture a new generation of AI researchers and innovators with the knowledge and skills critical to succeed in the AI-driven reality.

Starting from the high school level, the program seeks to provide the required math and computer science competencies, introduces the foundations of AI, and raises motivation toward the AI research career. Simultaneously, it will focus on the tertiary education opportunities (including motivation mechanisms) in AI fields, based on enhancing the already existing programs and creating new ones. New projects will be developed for students' involvement in real-life projects, scientific and industrial research, entrepreneurial activities, and studies.

The program is implemented in partnership with the Ministry of Education, Science, Culture, and Sports of the Republic of Armenia based on the Partnership Agreement signed on September 1, 2022. On June 14, 2023, we announced the official partnership agreement, which paved the way for us to begin the school selection process. Moreover, in the near future, we anticipate the release of decrees and orders pertaining to the comprehensive details and curriculum of the Generation AI program, ensuring its seamless integration into our system. It will be holistically incorporated into the public education system to ensure sustainability and support systematic change. The partnership with different NGOs, academia, and industry specialists is provisioned to serve as a model that features the robust public-private partnership.

Results

The pilot program started in September 2023 in 16 high schools (14 public and two private) in Yerevan and six regions of Armenia (Armavir, Gegharkunik, Kotayk, Lori, Shirak, Syunik).

The following courses are defined as mandatory components of the curriculum:

Advanced Math course that aligns with the state curriculum for "Algebra and Math Analysis" and follows the methodology developed by FAST. This ensures that students gain practical knowledge and are well-prepared for studying AI. "Computer Science" (Python programming) and "AI" are elective courses offered based on the curriculum and methodology developed by FAST. AI Project to be implemented at the last grade of the study. As part of the Generation AI: High School Project, FAST organizes extracurricular programs focused on career guidance and improving English skills.

As a result of the pilot stage, a scalable model will be developed to:

- Nationally provide the prerequisite math and computer science competencies needed for learning AI.
- Nationally raise students' literacy and motivation towards AI and math-based research careers with the help of prof orientation programs.
- Implement differentiated (basic and advanced levels) AI education for those interested in the domain and facilitate credit transfer to Universities.

SDG TARGETS:

	4 QUALITY EDUCATION	17 PARTNERSHIPS FOR THE GOALS
PRIMARY	4.4.1	17.6.1
SECONDARY		17.17.1

The pilot of the high school project will last for three years, and the project will further be expanded across the country, provided it produces the anticipated results.

In parallel, initiatives are being developed for the university level in cooperation with the universities to meet the further education needs of this program's alumni.

Impact

The implementation of the Generation AI program will have several long-term outcomes, including:

- Nationwide improvement of K-12 math (advanced algebra) performance on an international level.
- Access to AI education on a national level through the enhancement of domestic educational institutions and the introduction of new educational technologies.
- Increased advanced knowledge in AI since the program targets a goal of up to 10-15% of all high school students having a solid understanding of the foundations of AI by the time they complete high school. This will ensure a broader base of students with fundamental AI knowledge and help further build the pipeline at the university level.
- Growth in Applicants for AI-related programs: As a result of the program's influence, there will be an increase in the number of applicants for diversified AI-related programs at the bachelor's and master's levels.
- Significant rise in the number of AI Researchers and Innovators.
- Enhanced AI literacy among broader stakeholder groups on a national level, ensuring that more individuals will be equipped with the knowledge and understanding of AI's potential.

Planned Impact Indicators for Generation AI High School Pilot over three years

INDICATOR	PLANNED	ACTUAL
NUMBER OF PARTNER HIGH SCHOOLS TO BE INVOLVED IN THE PILOT	≥10	16
NUMBER OF THE 10TH GRADE HIGH SCHOOL STUDENTS TO BENEFIT FROM THE PILOT DURING THE FIRST YEAR OF IMPLEMENTATION	250	388
NUMBER OF HIGH SCHOOL STUDENTS TO BENEFIT FROM THE PILOT DURING THE THREE YEARS	450	N/A
SCHOOL MATH AND CS TEACHERS AND INDUSTRY SPECIALISTS FOR SPECIALIZED SUBJECTS TO BE TRAINED	30+	49

I am glad that we already have such a program that enables us to support the ongoing educational reforms in our country across several fronts. With the advancement of technological and mathematical education, entirely new tools and conditions are being created, which contribute to enhancing the quality of education in science, technology, engineering, and mathematics.

I want to emphasize that the program aligns fully with the new standards, incorporating tools such as project-based learning, a credit system, and flexible, innovative approaches. These elements will cultivate a completely new environment for our teachers and students.

We know a challenging journey lies ahead, but we believe the results will surpass our expectations.

Zhanna Andreasyan
Minister of Education, Science, Culture and Sport of the Republic of Armenia

B-ON BIOTECH PROTOTYPING LAB

PILLAR: COMMERCIALIZATION

TIMELINE: SEPTEMBER 2022 - PRESENT

CAPACITY: INTELLECTUAL FINANCIAL NETWORK

PARTNER: ANAU

DONORS/SUPPORTERS: GOVERNMENT OF ARMENIA
GATEWAY INDUSTRY INC.
DR. GARABED ANTRANIKIAN
ELABNEXT, EPPENDORF GROUP
DR. HASMIK KESHISHIAN
ARMENIAN BIOTECH GROUP OF BOSTON (DR. ASHOT PAPOYAN, MS. ZARA SOLAKHYAN, DR. ZAVEN KAPRIELIAN)

Introduction

Armenia has a unique opportunity to position itself in the global market by leveraging its comparative advantages and developing solutions for specific industries, such as biotech. Biotech is one of the areas where Armenia has a foundation built up from the Soviet era. In some of its niches, it can even play a role in the global value chain in the near future. This was reaffirmed by the 2020 World Bank report, which also provided some recommendations on specific niches.

As a starting point, Armenia has many scientists in the field, including a high rate of women in specific niche sectors. At the same time, there needs to be more activity in terms of technology transfer and commercialization of science. Combining our scientists, new startup bases, and relevant AI knowledge can bring multiplicative effects and potentially result in commercial success.

In recent years, a number of biotech startups were created in Armenia. To develop a dynamic biotech startup cluster, it is imperative to start strengthening our research; therefore, an urgent need for wet labs has come forth. This vision was also shared by the Government of Armenia and our supporting partners and donors when FAST decided to initiate the process of creating a new platform serving this need.

In 2022, construction works to establish a B-On biotech prototyping lab at ANAU were initiated in collaboration with the Government of Armenia. The first batch of equipment has also arrived through the generous support of our partners and donors from the diaspora.

The wet laboratory powered by startup incubation programs will foster biotech scientists and researchers to take their innovative ideas from imagination to practical implementation. Such a platform will stimulate the creation of a community connected with international mentors, coaches, and investors. This can transform Armenia into a global hub for biotech startups and strengthen the foundation for the further development of life sciences.

Problem

According to research conducted by the Scimago Journal and Country with a database powered by Scopus, it was revealed that Armenia's research articles in life science disciplines come second (~25%) after physics (~34%). The potential workforce of life scientists includes approximately 1,000 students and Ph.D. students and can be ranked second by its magnitude. Thus, there is a critical mass of current and upcoming scientists and promising prospects for incubating startups in Armenia.

Since the recent rising interest in biotech in Armenia, there have also been several biotech startups founded by Armenian founders abroad with back offices in Armenia. However, despite all the promising scientific potential, the core value proposition of Armenian teams in biotech lies in digital solutions, such as data processing automation. This is due to the lack of a wet lab facility where startups can prototype. Thus, Armenia's potential in the biotech industry remains unlocked so far.

Solution

To enable biotech innovators to bring their ideas to life and develop world-changing technologies, FAST is establishing the B-On biotech prototyping lab, the region's first wet lab, providing access to biotech laboratory equipment and a coworking space. The lab will operate as a platform for incubation programs to help build biotech startups. B-On will offer special mentorship, training, and workshops for students, researchers, and startups to build a vibrant biotech community in Armenia.

SDG TARGETS:

PRIMARY		9.5.1, 9.5.2, 9.B.1	
SECONDARY	4.4.1, 4.5.1		17.6.1

Results

In 2022, a laboratory space was allocated and renovated at the ANAU due to collaboration between FAST and the Government of Armenia. With the support of the diasporan donors and partners, more than 40 types of specialized biotech equipment were acquired to set up the wet lab. The equipment will allow scientists and researchers from the Life sciences, Biotech, Medtech, Agritech, and Pharmaceutics to experiment and work on their ideas.

The laboratory is equipped to handle such types of research activities as

- Western blotting and analysis
- Quantitative and qualitative DNA and protein analysis
- Real-time qPCR analysis
- Cell culturing
- Cell imaging
- High-performance liquid chromatography
- Gas chromatography
- Biochemical assays
- Spectrophotometry and spectrofluorimetry
- Ultracentrifugation

The important final works on space renovation and lab setup were completed by fall 2023. For the laboratory to function properly, more than 60 Standard Operation Procedures (SOPs) were developed, and 36 logbooks for protocol records to be made after each usage of equipment were developed by November 2023. The official launch of the B-On lab was done in mid-November 2023.

Expected Impact Indicators

- Number of resident teams per year: 10
- Researchers and students impacted within six years: 850

FUTURE IDEAS

THE INNOVATION DISTRICT AND THE ADAPTIVE INNOVATION CAMPUS

PILLAR: ECOSYSTEM LEVEL

No single entity can drive innovation alone. Innovation is rather a story of co-creation, collaboration, and exchange of ideas among many contributors over the years and even decades. This interplay among vast networks of researchers, engineers, investors, and precursor technologies creates an innovation ecosystem where theories and ideas lead to experimentation, which generates new technologies that can be scaled into products and commercial ventures.

Innovation is becoming progressively defined by spaces allowing people to share ideas and work collaboratively on creative solutions to modern problems. This understanding has led FAST to propose the development of an ID as a concept: an all-encompassing sustainable environment where people live, learn, work, and create.
Armenia's **ID** will serve as a venue for co-creation, open innovation, prototyping, and regulatory and policy innovations to meet national priorities and goals and contribute to the country's socio-economic development. It would offer globally competitive education, research, and innovation infrastructure, combining R&D growth, open innovation, innovation sandboxing, urban renewal, and smart and green infrastructure. Having been designed to boost the country's global innovation standing, it will also form a landing pad for regional and international public and private stakeholders. To this end, the District would be driven by an AIC. As the District's powerhouse, the AIC will be supported by ancillary facilities housed in a carbon-neutral green environment and powered by clean energy.

The **AI** is intended to provide a base for inspirational discoveries, scientific breakthroughs, and transformative technological advances. It would act as a collaboration hub where scientists, students, entrepreneurs, business professionals, and investors can come together to generate new ideas for disruptive innovation, test them using advanced lab infrastructure, and create products and solutions capable of commercialization. Campus operations will include three main areas: experimentation, incubation, and acceleration, thus cultivating a science-intensive innovation ecosystem that hosts and fosters the entire innovation lifecycle by offering tools and skills needed at every stage.

Problem

Over the past decade, Armenia's ICT industry has experienced remarkable expansion, primarily focusing on exporting ICT services. While this export-oriented approach has driven significant growth, it has also highlighted a neglect of the essential requirement for a robust STI ecosystem. This ecosystem is crucial for ensuring sustained economic development beyond export activities.

In-depth analyses, including those conducted by the World Bank through the Systematic Country Diagnostic and scenario-building initiatives, have revealed various challenges the Armenian ICT sector faces. These challenges stem from both external conditions and demographic factors. It is imperative to recognize that addressing these issues and fostering a holistic STI ecosystem are critical steps toward nurturing a resilient and thriving ICT industry that can contribute significantly to Armenia's overall economic well-being.

The implications of key global technologies and innovation developments are not fully understood at present, but they are expected to usher in substantial uncertainty and disruption in the coming years.

Advancements in technology, digital transformation, and changing consumer behaviors are at the forefront of a new "convergence economy,"

catalyzing the emergence of more competitive ecosystems. These ecosystems have the potential to boost economic output, create quality jobs, and spur scientific progress both within a country and abroad.

As part of reshaping Armenia into a globally competitive innovation hub, there is a need to implement a comprehensive, large-scale ecosystem-level program to catalyze scalable change. This transformation aims to turn Armenia into a science-driven, top-innovative nation that is resilient and prepared for the challenges of this new technological era.

Armenia needs an all-inclusive ID encompassing research, education, commercial, residential, and nature zones to achieve local greatness and global competitiveness. In such a district, various industries, stakeholders, and talent come together to cross-pollinate ideas, share knowledge, and collaborate.

Opportunity

In the ever-evolving landscape of the ICT sector, Armenia stands as a testament to unprecedented growth and dynamism. A mere glance at the sector's trajectory reveals an astonishing surge in entities and skilled professionals, propelling it to new heights. In four years, from 2018 to 2022, the number of companies in the sector skyrocketed from 800 to an astounding 5,600, accompanied by a nearly tripled workforce, surpassing 30,000 individuals.

Traditionally dominated by software programming and outsourcing, Armenia's ICT services exports are transforming toward automation. This paradigm shift allows forward-thinking firms to pioneer automated software design services, aligning with global trends emphasizing efficiency and innovation.

The ID is at the heart of Armenia's ambitious vision for the future of technology and innovation. Positioned as a microcosm of a fully functioning STI, ID aspires to redefine the nation's approach to research, technology, and innovation. This visionary ecosystem seamlessly integrates research, education, commercial endeavors, residential spaces, and nature zones, creating an environment conducive to cross-pollinating ideas and cultivating innovation.

Beyond its physical footprint, ID addresses pressing challenges within Yerevan, such as deforestation and inadequate green spaces. In doing so, it aims to attract international talent and provide a high-quality living environment—a critical factor in the global competition for skilled professionals.

This ID is not just a locale; it's a catalyst for a globally competitive education, research, and innovation infrastructure. ID aims to propel groundbreaking discoveries into global markets by surpassing sectoral boundaries and institutional constraints. Through its AIC, ID offers a holistic model for science commercialization, nurturing science-intensive ventures with a strategic focus on AI and Biotech.

As a nexus of cutting-edge advances, Armenia positions itself globally, enhancing competitiveness and drawing in top-tier talent. The approximately $1 billion investment over ten years for ID is not merely a financial venture but a national initiative with a socio-economic impact at its core. Here, the value of social progress stands on equal if not greater footing than business outcomes, symbolizing Armenia's commitment to a future where innovation, sustainability, and prosperity are intricately interwoven. In developing an ID that is both accessible and supportive to all, Armenia charts a course toward a future where technological excellence converges with societal well-being.

Solution

FAST's ID employs a holistic systems thinking approach, strategically intertwining STI to address Armenia's challenges. This multifaceted initiative comprises the education zone, a crucial player in human capital development, attracting top talents, and fostering global connectivity. Simultaneously, the research zone, seamlessly integrated with the commercial zone, cultivates a synergistic environment that propels innovation, collaboration, and the growth of deep-tech ventures.

In pursuing comprehensive community development within the ID, a key emphasis is placed on establishing residential and green zones.

Acknowledging the crucial role of green spaces in improving well-being and quality of life, the district will address Yerevan's historical challenges, specifically the deforestation induced by the 1990s energy crisis.

Currently falling short of the World Health Organization's recommended green space per capita, the district plans to incorporate extensive green spaces, including a remarkable 10+ hectares botanical garden and water reservoir. Thoughtful urban planning will promote eco-friendly living environments and environmentally conscious consumption patterns, elevating residents' lives and positioning the district as a prime choice for international talent.

The ID, centered in Yerevan, aligns its objectives with UN SDGs, notably SDG9, SDG8, and SDG17, while also contributing to SDG4 and SDG12. By investing in the district, stakeholders ensure the systematic inclusion of Environmental, Social, and Governance (ESG) considerations, enhancing long-term risk-adjusted returns.

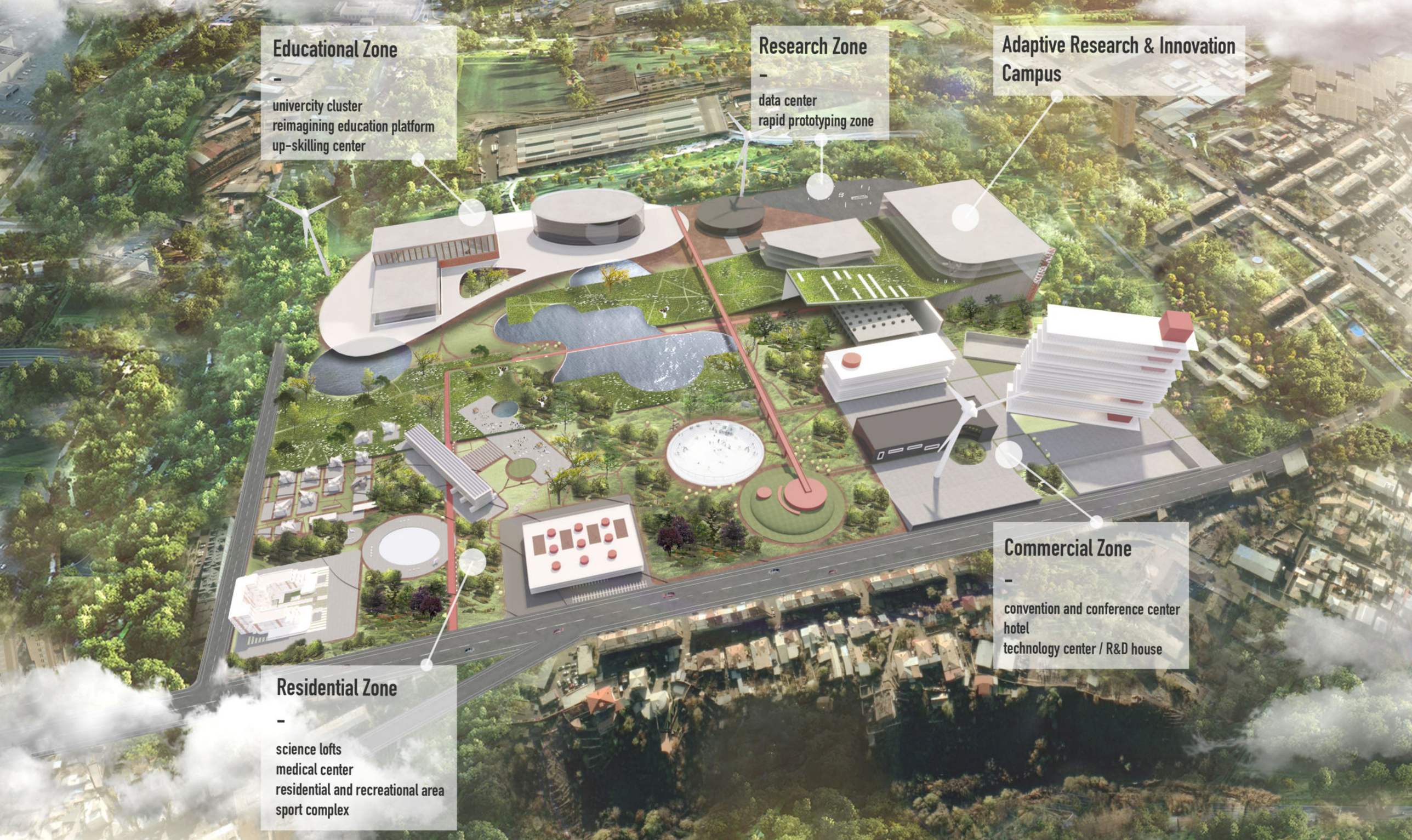
The socio-economic and environmental impact is exemplified by a significant GDP contribution of $2.5 billion, driven by increased labor productivity and high-value job creation—approximately 25,000 jobs, with 30% classified as high-quality positions. This marks progress toward UN SDGs and establishes the ID as a transformative force, redefining Armenia as a top driver of global innovation.

Through active partnerships and collaborations with academia, industry, and government, the AIC will develop a rich network of public and private R&D, investment, and educational organizations at the regional and international levels capable of elevating and strengthening Armenia's position on the global innovation map.

FAST's ID flagship program has received government approval as a program of national interest.

The AIC mega-project is part of FAST's long-term planning for Armenia's STI advancement over a 20-year horizon. A large part of the need for an AIC is because Armenia's R&D growth and absorption capacity for R&D expenditure is expected to saturate by around 2023, at which point current R&D expenditure levels will have doubled. Sustaining R&D growth beyond that time toward the Innovative Armenia of the future requires attracting large numbers of international scientists, engineers, startups, and companies and catalyzing resources within the country. The AIC is expected to break Armenia's R&D plateau within two to three years of its operation. The program's impact assessment foresees that by year three, incubated/accelerated companies will start to generate revenue and expand to create more high-tech jobs and R&D, ultimately going on to diversify the country's high-tech and deep-tech industries, which are currently primarily ICT-focused. This scenario offers the trigger for Armenia's technological leapfrog.

The AIC offers impact investors an opportunity to amplify the reach of their capital investments. It does so by shoring up the efforts of multiple players in the national and international STI ecosystem to drive home cutting-edge innovation and scientific advancement for the global good.


Educational Zone
–
univercity cluster
reimagining education platform
up-skilling center
Research Zone
–
data center
rapid prototyping zone
Adaptive Research & Innovation Campus
Residential Zone
–
science lofts
medical center
residential and recreational area
sport complex
Commercial Zone
–
convention and conference center
hotel
technology center / R&D house

REIMAGINING EDUCATION

PILLAR: EDUCATION

Today's education system does not serve the current era's needs. Until the 16OOs, few ordinary people were educated in Europe or Asia. The broader application of education in societies worldwide took place between the 16th and 18th centuries, with the rise of the Nation-State idea. However, even today, the classical education practice and approach have not changed much besides curriculum and discipline adjustments to modern infrastructure. The educational system in Armenia is no exception. We are additionally struggling with the former Soviet Union's lack of focus on developing students' thinking and analysis, striving for an evidence-based approach as well as allowing freedom of thought and expression.

Today, technology has driven the labor market development and the economy at large. It drives the education market, removing the need for some jobs and creating new ones. This, in turn, constantly escalates the need for STEM-focused, higher-order thinking and analytical skills.

We need to reshape the existing system and flip the structure of society with more innovators at the top.

The Reimagining Education program aims to define an innovative and transformative large-scale approach and system to build a competitive society capable of meaningfully contributing and leading in technological and scientific progress, impacting Armenia and the world.

Just as the world once transformed the school system to enable the shift from an agricultural to an industrial economy, we are hard-pressed to reinvent the educational system once more today, this time to satisfy the rapidly changing and increasingly technological global economy. Math and science belong at the center of that transformation, as STEM embodies habits of mind and methods for discerning meaning that enable students to learn deeply and critically in all areas.

The knowledge and skills from STEM fields are the backbones of logic and analytic thinking from early childhood through the most advanced levels of learning across the academic disciplines. The accumulation of such knowledge capital will facilitate the evolution of the knowledge-based economy and further disruptions in science and technology.

Reimagining Education suggests developing an educational system based on the provision of deep knowledge of three basic sciences that encompass all the levels humans look at things - physics (the atomic level), chemistry (atomic bonds and, as a result - the molecular level), and biology (molecular interaction and as a result - the cellular level), and a set of languages as tools: 1) spoken language(s), 2) measuring language (mathematics), and 3) computer language(s).

The primary goal is to create efficient solutions for continuously nurturing talents that can become scientists and innovators in the future. Based on the proposed approach, it is suggested that starting from early childhood, all people, regardless of their purpose in life, shall possess fundamental knowledge in physics, biology, and chemistry as basic sciences and in mathematics and computer programming as the core language/tool for obtaining and utilizing knowledge in those sciences.

Moreover, the teacher's role should be entirely redefined, and the role of technology as "a knowledge provider" should be shaped. Most advanced technological solutions shall be holistically incorporated to accelerate the learning process.

The solutions may include applications of AI to facilitate multidimensional, personalized, and efficient learning processes for the students, VR/AR solutions to enable immersive and gamified learning experiences, etc. The main goal is to identify the most efficient combinations of teaching methodologies, tools, and environments based on neuroscientific research.
There is an undeniable challenge in teaching children to relate to science. Humans are generally predisposed to understand better cases directly interacting with their senses. The difficulty of relating to and engaging with physics, chemistry, and biology stems from the dissociation of our senses with the subjects we study, in this case, atoms, molecules, and cells, as we cannot see atoms through the naked eye, nor can we feel or taste them. Here, the new teaching methods for children become imperative, including gamification of the curriculum to make receiving the knowledge engaging.

This way, knowledge should be provided based on a fully reimagined educational process. It includes a transformed learning environment composed of augmented and virtual realities, a redefined role of a teacher as a mentor, and, where needed, a coach with adjusted teaching methods. Through those methods, the student acquires social and soft skills such as leadership, teamwork, social interactions, communication, and culture.

All these elements should be defined based on the leading-edge research in neuroscience, which FAST is interested in contributing. Those will help identify the most efficient learning process based on a child's learning capacity.

The first phases of the program will encompass bringing together all the data and needs in the research phase and starting implementation of the pilot in the plotting phase. The main objective here will be to do research, develop a methodology, and identify the scale-up plan for the prototype model in Armenia and beyond. The entire work cycle to meet these initial objectives will require three years.

FAST organized the Global Thinkers Salon, a conference held over two days from April 22-23, 2023, to foster a global perspective. Outside of Yerevan, Armenia's modern capital, the serene natural setting provided a tranquil environment for approximately 15 accomplished and imaginative leaders, artists, neuroscientists, and experts to convene. Their collective aim was to explore new educational possibilities and solutions that would best serve society's future and contribute to reimagining education.

The conference's primary focus was on the future of education, intending to inspire innovative thinking and explore alternatives to the current educational ecosystem. The event featured thought-provoking talks and short provocative presentations that invigorated participants' thinking. Moderated debates were conducted to delve into the future of education while exploring and co-creation sessions engaged diverse expert groups in developing actionable ideas for transforming the education system.

All the proposed approaches and innovative solutions generated during the Global Thinkers Salon will be embedded into actionable research and programs. These initiatives will be implemented in Armenia to extend their impact beyond the country's borders.

WOMEN INNOVATORS (WIN)

PILLAR: EDUCATION

Opportunity

Numerous previous studies indicate that **women are an underexploited source of increased opportunities** for business development, employment, wealth creation, innovation, and overall economic development. According to a study conducted by BCG in 2020, companies founded or co-founded by women generated 10% more cumulative revenue over five years than those founded by men.

Another report by McKinsey showed that companies with gender-diverse executive teams were 21% more likely to experience above-average profitability than companies with less gender diversity.

Support for women's entrepreneurship is not only a means of poverty reduction but also a way to uplift women from poverty by providing increased opportunities to generate their own income. Furthermore, gender diversity is advantageous for businesses, particularly in STEM fields, as it addresses issues such as skills shortages, productivity, innovation, creativity, and a better understanding of customers' needs.

Armenia stands out due to the high percentage of women working in tech industries and the number of researchers in STEM.

- In 2021, there were 6706 women students in Bachelor in STEM out of 15378 (43.6%), 906 women in MA in STEM out of 1864 (48.6%), and 120 women PhD students in STEM out of 331 (36.3%). The overall number of active female researchers in STEM was 911 out of 1794 (50.8%).
- According to data from UNESCO, the global average proportion of women enrolled in STEM-related programs at the tertiary level was 28%, while in Armenia, this indicator was equal to 44%.
- According to the ABI, 60% to 70% of professionals in Armenia's biotech industry are women, which is significantly high compared to an estimated 47% in biotech companies worldwide.
- On average, the world's share of women employed in the tech sector does not exceed 20%, even though the tech world aspires to achieve gender balance and diversity. As per Forbes, Armenia's tech sector is 30% women.
- Statistics on doctoral degrees reflect the following trend: figures from 2007 show 81.3% male vs 18.8% female enrollment, and then ten years later, in 2017, women made up 66.7% of enrolled students.
- According to Forbes, some 50-60% of applicants at university IT departments in Armenia are women.

Problem

According to recent data, the percentage of venture capital investments going to women founders is still relatively low. In 2021, only 2.3% of venture capital dollars globally went to startups with all-female founders, and only 15% of total venture capital funding went to companies with at least one female founder. In 2021, women held only 28% of senior leadership roles globally despite making up 48% of entry-level employees.

According to the recent Global Entrepreneurship Monitor (GEM) "Women's Entrepreneurship Report" 2021-2022, almost half of women entrepreneurs surveyed worldwide are involved in the Wholesale/ Retail sector, and one in five women entrepreneurs in the Government and Social Services sector (18.5% women versus 10.1% men). However, only 2.7% of women, compared to 4.7% of men, are starting businesses in Information, Computers, and Technology (ICT), the sector that draws the majority of venture capital dollars worldwide.

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The 2020 report by Dell Technologies found that only 12% of female entrepreneurs worldwide are involved in the technology sector, compared to 21% of male entrepreneurs. Women represent 1 in 3 high potential entrepreneurs, so policy programming is needed to mobilize financing and other support toward the sectors where women are currently active.

These numbers indicate that despite the progress, there is still a significant gender gap in venture capital funding and senior leadership roles. **Women are highly underrepresented as entrepreneurs worldwide, especially in STEM fields.**

In particular, the entrepreneurial potential of Armenia demonstrated above is disabled currently, especially in STEM fields:

- Despite the higher educational achievement of young women and the same motivations to go into business among men and women, young men are twice as likely to work in managerial positions.
- The Global Gender Gap Report 2018 highlights that 34% of all firms in Armenia have women co-owners, and 24% of firms have women as top managers. Women are underrepresented among business owners, although obtaining valid data on business ownership in the country is still challenging. It is a common practice for men in Armenia to register a business in the name of a female family member.
- According to the GEM report, in 2021, 90% of Armenian women entrepreneurs acknowledged gaps in business knowledge and skill sets needed to conduct entrepreneurial activities properly.
- Women in Armenia are less likely to be involved as entrepreneurs in the tech sector. Women entrepreneurs in Armenia are involved in the trade and service sector, while men tend to be more involved in the manufacturing sector.

Women entrepreneurs in Armenia are more likely to start a business out of necessity rather than opportunity, while men are more likely to start a business due to opportunity.

Considering all these trends, we can assert that Armenian women are more actively involved in STEM fields than the global average. However, there remains a substantial portion of unrealized potential for women in STEM-related businesses in Armenia, presenting an unprecedented opportunity for economic development. Women's empowerment is imperative for the Armenian economy, where women are viewed as an invaluable asset, especially in light of recent challenges.

The country experienced a significant decline (by 6%) in the male population in 2020-2021 due to the 44-day war and the COVID-19 pandemic. This has led to a new generation of over 11,000 young men with disabilities, a consequence of military service. In response to these circumstances, women in Armenia are taking on more financial responsibilities, emerging as economically active members of society.

Solution

FAST designs the Women Innovators (WIN) program to empower and unlock the entrepreneurial potential of women in Armenia's STEM field by providing them with the necessary knowledge, mindset, and network. By doing so, WIN aims to boost the realization of Armenian women's entrepreneurial potential in STEM and contribute to the growth and development of the Armenian economy.

The following **objectives** provide the achievement of the defined goal:

- Develop a competitive curriculum with the attraction of prominent international and local experts.
- Implement a 2-month long mindset-shifting and capacity-building program for women in STEM in Armenia.
- Evaluate the results and improve the program's content and format.

Outcomes

The program's expected outcomes are as follows:

- **Increased economic activity of women in STEM in Armenia.** The following outputs provide this outcome:
  - capacity-building and mindset-shifting training,
  - provision of access to mentorship, networking opportunities, and funding.
- **Increased sense of self-realization in STEM fields among women in Armenia.** Due to this outcome, more women will become visible as role models, inspiring and encouraging younger generations of girls to pursue STEM careers.

In the long-term, these outcomes will significantly contribute to developing **a vibrant ecosystem of women-led startups in STEM in Armenia**, encouraging women to embrace an entrepreneurial mindset and begin a startup journey tackling worldwide challenges. This will help to break down gender stereotypes, create a more diverse and inclusive society, and drive innovations and economic growth.

Targeted Beneficiaries

Girls and women in STEM are targeted as participants. In particular, the following groups are expected to apply for the program:

- Women working in STEM-related industries,
- Active researchers or PhD students in STEM fields,
- Women having or receiving a Bachelor's or Master's degree in STEM fields,
- Women with a degree or previous work experience in STEM-related fields not engaged in the STEM-related fields at the moment.

Following a successful implementation, the WIN program can pave the way for the commencement of venture-building initiatives in the future.

CONTRIBUTING TO THE SUSTAINABLE DEVELOPMENT GOALS

In plotting a course toward Innovative Armenia, macro-level goals and indicators have been our directives in determining where we are and where we need to go. That is why we also use the United Nations SDG system to give us the framework to gauge our progress. The dedication with which we pursue our vision is grounded in a desire to bring about the change and profound benefits that STI advancement can create for Armenia, namely, sustainable local, national, regional, and international development. Our programming consciously contributes to the SDG targets by using the indicators as objectives and impact metrics.

WHAT ARE SDGS, AND WHY ARE THEY IMPORTANT?

The SDGs are a set of 17 goals and 169 targets aimed at resolving the challenges faced by peoples and nations across the globe, including poverty, inequality, climate change, environmental degradation, peace, and justice. They offer a 15-year road map to achieving a better and more sustainable future for all by 2030. The SDGs recognize that development is possible only if there is a balance between social, economic, and environmental sustainability. They aim to impact all levels of society, reach across all sectors, and embrace equity, inclusion, and universality.

The interdependent and holistic nature of the SDG framework highly complements FAST's approach to STI programming. We acknowledge that effectively utilizing the profound advantages of an Innovative Armenia to address current social, economic, and environmental needs requires engagement with some complex sustainability challenges. However, it is only through collaborative efforts with others that we can truly overcome these challenges. The SDGs provide a universal and visionary framework that enables global cooperation, facilitating the creation of shared value and a broader shared vision for all involved.

Over its 6-year activity, FAST has contributed to six different SDGs. Of 25 implemented programs, more than half have contributed to SDG4, which makes "attaining quality education" a big emphasis in FAST's programming. SDG4, SDG9 (Industry, Innovation, and Infrastructure), and SDGI7 (Partnership for Sustainable Development) are essential. At the same time, we also contribute to SDG5 (Gender equality), SDG8 (Decent work and economic growth), and SDGI2 (Responsible consumption and production).

Graphic 2.1. FAST impact on SDGs

Primary impacts

SDG 4: Thus far, 18 programs have contributed to ensuring inclusive and equitable quality education and promoting lifelong learning opportunities by increasing the relevant skills for work and entrepreneurship. This has included over 3,500 hours of high-quality training on science, technology, and behavioral skills for more than 2,500 participants, primarily young people of various educational backgrounds.

The Generation AI program implements an advanced educational program in Math (Algebra) and Computer Science (Phyton) for almost 400 students and a training program for nearly 50 teachers. In addition, about 60 students and young professionals have obtained advanced AI training. The Fellowship program funded 19 Ph.D. students exclusively, but more than 120 local researchers were funded, and more than 100 researchers were attracted from abroad to teach, train, and collaborate with local researchers.

SDG 9: In total, 16 programs have contributed to building resilient infrastructure, promoting inclusive and sustainable industrialization, and fostering innovation by enhancing scientific research and upgrading the technological capabilities of industrial sectors. More than 120 local researchers, including 72 local researchers supported through the ADVANCE Research Grants program, have been supported to raise Armenia's R&D capacity, including the provision of direct funding.

FAST support through its ADVANCE Research Grants, Fellowship, and Travel Grant for Collaborative Research programs has helped generate more than 85 papers in various internal journals. In general, 13 Armenian and 20 international academic institutions participated in supporting this SDG. FAST initiatives have advanced technology development, research, and innovation in Armenia by building startup capacities, attracting venture capital, and expanding networks.

SDG 17: In total, 16 of our programs have contributed to strengthening the means of implementation and revitalizing the Global Partnership for Sustainable Development. FAST's expertise has helped support sustainable development implementation through its contribution to six international donor studies and its open sharing of data and analyses with development-focused entities.

The 2017 NSF-FAST Workshop on ML for Discovery Sciences brought together nearly 300 participants to bridge national and international intellectual communities. As a logical continuation, the GIF has since developed as a platform to foster ties between over 4,450 representatives of academia, industry, government, and international organizations in science and technology innovation. These are the two most significant of over 120 events and networking initiatives involving over 8,500 participants that FAST has organized over the last six and a half years. Meanwhile, FAST continues to lay the ground for generating further partnerships in the sphere of STI nationally and internationally.

Our own partnerships and joint initiatives engage a diverse pool of academic, state, industry, and innovation collaborators united in pursuing the broad aims of the Foundation's vision. Some of our collaborations are first of their kind for Armenia in either scope or parties involved, including intergovernmental partnerships between Armenia, Rwanda, and Indonesia, which allow for mutual capacity building and open potential avenues for trade.

Secondary Impacts

SDG 5: We have committed to ensuring that our programs and initiatives achieve gender equality and empower women. We emphasize gender balance across all our initiatives and offer structured programs with seats allocated explicitly for women, including our fellowship for talented STEM doctoral students and our AFEP. The numbers speak for themselves. Around 44% of our educational beneficiaries are women, and women lead 55% of startups enrolled in our programs or have women in their leadership team. Moreover, at an institutional level, 79% of FAST's permanent recruitments have been women.

SDG 8: The six-year period has seen FAST promote inclusive and sustainable economic growth, productive employment, and decent work for all by creating around 50 permanent direct jobs over the last six years. Over 350 interns and volunteers have also been engaged and trained in our programs and activities.

Furthermore, FAST events have seen over 300 international business tourists visit Armenia, indirectly supporting jobs across the tourism value chain with an additional tourist expenditure of over 750,000 USD. Finally, our training, startup programs, and research initiatives have engaged 2,000 young people in educational, employment, or entrepreneurial activities for one month or more, enhancing knowledge-intensive labor in Armenia.

SDG 12: FAST has sought to enshrine sustainable consumption and production patterns within its organizational culture, in part by following office practices geared at ensuring sustainable and environmentally friendly use of office space to reduce energy costs, water waste, and plastic usage and ensure better waste management. We constantly strive for better practices to provide more environmentally friendly conditions and practices.

FAST PARTNERS

OVERVIEW

Armenia's resources extend far beyond its borders to a global network of individuals and organizations committed to the idea that science and technology play a vital role in shaping the future of Armenia and beyond. We are dedicated to uniting this network and working towards a bold vision: transforming Armenia into a Top IO Global Innovator nation and a Top 5 leader in DS and AI by 2O4I.

FAST is committed to developing and implementing innovative programs enabled by partnerships and support from this global network and its intellectual and financial resources to achieve this goal. The Foundation hosts events, meetups, workshops, and forums to build and strengthen relationships with industry, government, non-profits, diaspora, academia, investors, and supporters. The goal is to consolidate resources to help restore Armenia's scientific and technological potential, reinvigorate the industry, and foster an innovation ecosystem.

During its six-year period, FAST has significantly impacted the professional paths of young intellectuals and researchers in Armenia, providing fellowships, grants, startup support, and access to professional and funding networks.

Through these efforts, FAST has cultivated several important local and international partnerships that have laid the foundation for more ambitious programs and approaches. Our partners and supporters value our mission, vision, impactful programs, and our reputation for being inclusive, diligent, credible, and transparent in our methods. We are grateful to this network for their ongoing collaboration and support and look forward to expanding it to amplify our collective impact.

GOVERNMENT RELATIONS

The Armenian Government and its agencies are FAST's organic partners on the mission of shaping STI advancement and fostering a sustainable ecosystem in the country. Government interest and support have been key to FAST's accomplishments to date. At the same time, our mission, objectives, advocacy, and programming have increased the influence and amplification of the Government's own national strategic STI agendas.

Our collaboration with the Government aims to shape tactical interventions to realize Armenia's innovative future through strategic planning, providing research-backed roadmaps, participation in committees, and co-creating programs. FAST pilot solutions and frameworks that the government can later scale to meet its targets. This approach ultimately empowers state institutions to take ownership of programs that prove to have successful outcomes. FAST, represented by its CEO, VPs, and program leads, is often invited to sit on various expert advisory bodies adjacent to the Ministries, thus being a key part of creating plans for new initiatives and propelling future progress.

Our partners are state entities with their own strategic role in developing STI sectors. FAST's cooperation with the following Armenian governmental bodies has been of particular strategic importance:

The President's Office, the Prime Minister's Office, the Ministry of Education, Science, Culture and Sports, the Ministry of High-Tech Industry, the Ministry of Defense, the Ministry of Health, the Ministry of Economy, the Ministry of Foreign Affairs, the Ministry of Environment and the Office of the High Commissioner for Diaspora Affairs.

To better understand needs, create a foundation for effective cooperation with the Government, and learn about best practices for Armenia's future policy reforms in STI-related areas, FAST has implemented a program called PLDP.

POLICY AND LEGAL DISCUSSION PROGRAM (PLDP)

In 2O19, FAST launched its PLDP as a pilot aimed at helping to shape the policy environment affecting STI. It aimed at complementing government efforts in STI reforms by generating industry dialogue and holding discussions among professionals on policy areas. Participants included representatives from relevant government branches, the Central Bank, law firms, local startups, and investment and finance specialists.

Discussions have focused primarily on challenges around commercialization, including policy reforms in the field of debt financing instruments for the startup economy, as well as possible tax incentives to boost innovation. In open meet-up sessions, additional discussions were also carried out to introduce Armenia's startup community to the concept of debt financing and how it can help early-stage startups.

During this program, upon consultations and collaboration with various public and private entities in 2O19, FAST adopted the standard SAFE agreement template developed by Y Combinator to conform to the regulations of Armenian legislation. Since then, FAST and STAN have been using them in the legal implementation process of startup investments. The PLDP program continued until the spring of 2O2O.

FAST's cooperation with the Government of the Republic of Armenia on STI-related programs was evident in its direct partnership with the Neruzh program.

NERUZH

The Neruzh Diaspora Startup Program, founded in 2018, was co-designed by FAST, who worked alongside the Ministry of Diaspora to promote the inflow of innovative, capable, and scalable tech startups from the Armenian diaspora. The project achieved its goal to enrich the local startup landscape by attracting those seeking to invest in their advancement and growth within Armenia and to serve as a gateway for deploying and scaling up impactful Armenian technologies and business models throughout world markets.

As an implementing partner of the program, FAST mobilized its global solid network of members to invite prominent mentors, coaches, and international experts to participate. The program offered intensive startup development sessions, interactive training, networking, and exposure and pitching sessions. Participating startups could learn about the benefits of doing business in Armenia and have a chance to compete for grants of up to 30,000 USD to grow their ventures. FAST also supported the grant winners in establishing their ventures in Armenia through follow-up programs implemented specially for the winning teams.

Neruzh 2018 received support from ImpactHub Yerevan, Business Support Office - EBRD, UNDP ImpactAim VA, the Gulbenkian Foundation, Armenian Caritas, and the Russian-Armenian University. The first program batch supported 49 Diaspora and 16 local startups from 20 countries worldwide. As a result, 12 winning teams received awards and grants provided by the Ministry of Diaspora and its partners. The top 3 startups received the Ministry's grants of 30,000 USD each and partner support to grow their businesses in Armenia.

In 2019, after the restructuring of Armenia's Ministries, the program was transferred to the leadership of the Ministry of High-Tech Industry with co-organization from the Office of the High Commissioner on Diaspora. FAST and the Business Angel Network of Armenia members joined as co-organizers and content partners. At the same time, the IDeA Foundation, UWC Dilijan College, and Orion Worldwide Innovation became implementing partners.

> With the program, I wonder if we would have considered Armenia as a location to establish our startup. Through the program, we expanded our potential and set long-term goals in Armenia. As a result, we were able to grow and develop our startup to become a Silicon Valley American business.
>
> **Arevik Vardanyan**
> Country Director, Lemonade Fashion, Armenia

In 2019, Neruzh hosted 47 startups from 19 countries around the world. During the final pitching session, six teams from 2 startup stage categories were awarded grants totaling 135,000 USD and other awards from partners.

While this program was formerly a joint program of the Ministry of Diaspora and FAST, it has evolved to become entirely led by the Ministry of High-Tech Industry in collaboration with the High Commissioner on Diaspora. For FAST, this transfer of ownership represents the optimal sustainability outcome for any co-run project.

> Neruzh had an unbelievable impact on my expertise as an entrepreneur. I had a chance to learn so much from experts in the field, mentors, and other founders. It was my first public pitching experience, with so many vital learnings. But the most important was our connections with Armenia and the Diaspora. In a week, I was able to connect to nearly every industry that touches the Armenian startup ecosystem. I have seen how the ecosystem is developing and the challenges, noting the great opportunities. Neruzh made me feel part of the Armenian ecosystem. Now, I am putting all my efforts into creating something in Armenia instead of anywhere else.
>
> **Haik Ter-Grigoryan**
> Product Owner, Mixed Reality Technologies, Germany

INTERGOVERNMENTAL

FAST partners with many international diplomatic representatives and governments. FAST has sought to nurture strategic partnerships between Armenia and other regions to create mutually beneficial opportunities. Opportunities include access to growing markets for cutting-edge products and solutions developed in Armenia and partner countries.

Among examples of highly promising collaborations with foreign governments are FAST's efforts to link Armenia with regional tech hubs in Africa and Asia.

The untapped investment potential, market expansion, and a shared vision for development create reciprocal opportunities for capacity enhancement, networking, and business exchange.

Two rapidly advancing nations, Indonesia and Rwanda, show incredible potential in this regard. The Indonesian and Rwandan Governments have also drawn upon FAST's knowledge and expertise to help accelerate their growth trajectories while benefiting from Armenia's standing as a gateway to Europe and Asia. The vast potential for mutual benefit and learning from such projects is hugely exciting.

Indonesia: Gateway to Asia

As the world's fourth most populous country, with a population of around 280 million, Indonesia has leveraged this as an asset towards developing its own science and technology sector over the years. The Indonesian Ministry of Research and Technology (RISTEK) is FAST's tactical partner in a collaboration that began with FAST's first roadshow in March 2019 and has included mutual visits and further discussions of joint programs.

As a result of the first Indonesian inter-ministerial visit to Armenia, a subsequent MoU was signed between the Armenian Ministry of Education, Science, Culture, and Sports and the Indonesian Ministry of Research and Technology. As a result of the second visit headed by Indonesia's Director-General for Science and Technology, Indonesian Government representatives from the Ministries of Research and Technology and Foreign Affairs, as well as members of Indonesia's startup and incubator communities, visited Armenia in November 2019 within the framework of a one-week co-incubation and incubator training program organized by FAST. In March 2020, FAST made its first official visit to Indonesia at the invitation of the Indonesian Government, which significantly contributed to advancing discussions on further collaboration in research and commercialization between the two nations.

The progress towards finalizing the action plans with all partners faced significant challenges due to unforeseen global events and geopolitical complexities, most notably the impact of the COVID-19 pandemic. As a result, the momentum was disrupted, and the initiatives were temporarily put on hold. However, despite these obstacles, we remain optimistic that this collaboration will be reinstated on the agenda in the near future.

> Today, as technological development is rapidly advancing and societies are trying to catch up, innovative approaches and expertise become invaluable. This is the essence of the cooperation that started between Armenia and Indonesia, between FAST and Indonesia's Ministry of Research and Technology. To utilize Indonesian potential, cooperation in science and education has been established between the two countries with a long-term strategy to allow moving research into the commercialization phase.
>
> **H. E. Dziunik Aghajanian**
> Former Ambassador Extraordinary and Plenipotentiary of the Republic of Armenia to the Republic of Indonesia

Rwanda: Gateway to Africa

Rwanda's Government places great importance on science and technology within its economic growth and development, recognizing the need to strengthen STI across Africa. It has built several Centers of Excellence for Science and Technology at the regional level and has become an important partner across the continent.

Rwanda is also the driver of the Smart Africa initiative, which aims to increase the economic competitiveness of African countries and build a continental knowledge economy, making it a regional hub for Africa's scientific and technological transformation. The Rwanda-Armenia intergovernmental partnership intends to build solid intellectual capital among scientists and entrepreneurs through joint educational programs and intercontinental collaboration programs, creating science-backed ventures in Armenia and Rwanda for global consumption.

In October 2018, President Paul Kagame visited FAST's Creative Campus and shared his vision for building a culture of entrepreneurship with young founders and scientists who were beneficiaries of FAST programs. Following the visit, a May 2019 FAST Roadshow in Rwanda facilitated important meetings with Rwandan Government representatives, including President Kagame and the Minister of Information and Communication Technologies, to find common ground for potential international cooperation.

The fruitful meetings led to a Rwandan Government delegation's visit to Armenia within the 2019 GIF framework. Planning discussions took place around a partnership program focused on AI and startup capacity building and exchange programs. These discussions were followed by the signing of an MoU in March 2020. The first of these planned collaborations kicked off in October 2020 within the scope of FAST's AI Bootcamp, where three Rwandan data scientists underwent advanced AI training with their Armenian counterparts. This marked the first exchange of its kind between the two countries.

We must create economic opportunity, build a culture of entrepreneurship, and get people to take responsibility for improving their lives.

H. E. Paul Kagame
President, Rwanda

As most of the world enters the post-COVID era, FAST, despite the hardships with progress within the last two years, is working hard to capitalize on projects that have been slowed down by the pandemic in both Indonesia and Rwanda are looking forward to the potential benefits that can be found in strategic partnerships with the STI markets in countries mentioned above.

INTERNATIONAL ORGANIZATIONS

FAST partnerships with international organizations have helped bring global subject matter expertise to Armenia and develop an exchange of global practices.

Several international organizations with whom FAST has partnered to develop and implement various initiatives and programs include the **British Council, the Asian Development Bank, the United Nations Development Programme, and the World Bank.**

EDUCATIONAL INSTITUTIONS

FAST engages in the global curriculum of SDG-related task development with its international partners. A vast majority of stakeholders from academia join our network.

FAST's collaboration with academic institutions is essential for fostering education and research. We closely work with students, faculty, and researchers within the broad scope of our programming, nurturing our beneficiaries' growth and ensuring the success of their initiatives. With our academic partners, we enhance the quality and diversity of education in emerging fields such as AI, biotech, and agritech.

We strengthen students' research and entrepreneurial skills and foster the innovative potential of school-age children while increasing academic and research output.

Our partnerships with educational institutions vary from the involvement of a small number of researchers in a specific program to large-scale, long-term collaborations in creating new educational models, R&D initiatives, and sustainable ecosystems. While the broader scope of these partnerships can be found in the Programs Section of this report, some of the main partners through the years have been the following institutions:

Armenian National Agrarian University, Armenian State University of Economics (including its Gyumri branch), American University of Armenia, Aston University, French University in Armenia, Hamburg University of Technology, National Academy of Sciences, United World College Dilijan, Yerevan State University.

PRIVATE SECTOR AND INDUSTRY

Science and business-driven industry players and companies within the ecosystem, contributing their tangible and intangible assets to develop and advance the ecosystem, are invaluable partners for FAST.

We actively seek industry engagement in our programs to meet market needs and deepen connections between research output and commercial applications. These partnerships provide access to apprenticeship and training programs, talent sourcing schemes, initiatives to explore solutions to industry problems, and networking opportunities in emerging high-tech areas.

In supporting Armenian startups, FAST collaborates with entrepreneurial initiatives such as incubators and accelerators, as well as angel investors and venture capitalists. Our efforts enhance synergies across different initiatives and ensure complementarity between programs, enabling more efficient resource utilization.

Our collaboration with the industry has successfully engaged a broad scope of the STI sector. While maintaining the industry ties we have established over the years, we remain open to exploring new frontiers through new partnerships.

Some of our industry partners actively involved in FAST activities and programs over the last five years include **ACBA Bank, Amber Capital, Ameribank, Cognaize, Digitain, Fimetech, Epam Systems, Improvis Aerospace and Defense, IntelinAir, Picsart, SmartClick AI, SoftConstruct, Synergy International Systems, Solaron, 500 Startups,** and **PMI Science**.

OTHER FOUNDATIONS AND NON-PROFIT ORGANIZATIONS

Through NGO partnerships and a global network of like-minded organizations, FAST has been able to create mutual support and be part of broader change-making to help bring some of the most ambitious Armenia-benefitting ideas to life.

Among our notable community partners have been the **Apkarian Foundation, Armenian Biotech Group of Boston, Armenian International Women Association, Armenian Scientific Diaspora Association, Armenian Technological Future Initiative, Ayb Educational Foundation, British Council, IDeA Foundation, OneArmenia, Soldiers without Borders, Teach for ArmeniaA, SASTIC, Union of Advanced Technology Enterprises**.

FAST GLOBAL SUPPORTERS

ADVANCE ARMENIA GLOBAL CAMPAIGN

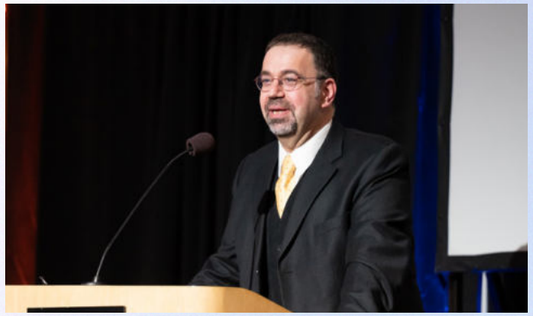
FAST has successfully carried out its programs since its establishment, thanks to the support of its founders and board of trustees. The co-founders, particularly organizations such as the Ayb Educational Foundation and Luys Cultural Foundation, have played crucial roles in supporting the foundation's endeavors.

Over six years, FAST's programs have matured and evolved, with scaling a critical approach to accelerating their impact. In 2022, FAST hosted its inaugural fundraising event, the Advance Armenia Gala, in Los Angeles, which raised additional funds to scale up the ADVANCE research projects from 2 to 10. Participants had the opportunity to directly contribute to funding teams in Armenia engaged in competitive research in AI, Life Sciences, and Advanced Materials under the guidance of distinguished international scientists.

Launching various programs with public support has been a significant privilege for FAST. A series of events have been organized to encourage engagement and investment in FAST's mission. In 2023, the global Advance Armenia campaign was introduced to generate support and participation in programs focused on advancing science and technological innovation in Armenia and beyond.

The "Advance Armenia" Series successfully held events in Boston and Los Angeles during Spring 2023, with upcoming events planned for 2024. The funds raised are accelerating progress in two key foundation programs: the ADVANCE Research Grants and Generation AI.

Prominent Armenians, including **Dr. Noubar Afeyan**, **Dr. Daron Acemoglu**, and **Dr. Ardem Patapoutian**, delivered their speeches during these events.



With programs like ADVANCE and Generation AI, FAST supports research and education that will inspire the next generation by providing access to knowledge and mentors. Let us work together to improve STEM education, and you will see that many more students, just like me, will help humanity and lift the nation of Armenia with it."

Dr. Ardem Patapoutian
2021 Nobel Prize Laureate in Physiology or Medicine, Professor in the Department of Neuroscience at Scripps Research, an Investigator of the Howard Hughes Medical Institute, United States

We value the opportunity to launch programs with public support, as each supporter contributes resources, knowledge, expertise, vision, and passion for an advanced and prosperous Armenia. We sincerely appreciate and honor the following individuals and organizations for their trust and continuous financial and in-kind support.

Co-Founders

Dr. Noubar Afeyan
Artur Alaverdyan
Ayb Educational Foundation
Luys Cultural, Scientific, Educational Foundation
Ruben Vardanyan

Visionaries

+250,000 USD

Sarkis and Nune Sepetjian

Anonymous
Gateway Industry Inc.
Reliance

Innovators

+125,000 USD

Sarkis and Zaruhi Galadjian
Stepan Gevorgyants
Artur Soghomonyan

Pioneers

+100,000 USD

Raffi and Nina Festekjian Family

PMI Science Armenia

Champions

+50,000 USD

Anonymous
Garabed Antranikian
Sargis Badalyan
Jack Bayramyan Family Foundation
Armen and Katherine Panossian
Leon Semonian Family Trust
Kevork and Elizabeth Zoryan
Armenian Biotech Group of Boston (Dr. Ashot Papoyan, Zara Solakhyan, Dr. Zaven Kaprielian)

BluIP Inc.
Fastex
Fasttoken
Flagship Pioneering
Noah's Children
SADA
Thermo Fisher Scientific

Advocates

+25,000 USD

Aram Adourian and Anna Ohanyan
Ara Mahdessian and Vahe Kuzoyan
Sergey Mahtesyan
Vardges and Serena Markosyan
Hagop and Zarig Youredjian

Goodwin
Emil Kazaz Museum and Fine Art Academy
L.A. Banquets
Quantori
Vesta

Catalysts

+10,000 USD

Ara Agopian
Hratch and Olga Andreassian
Anonymous
Anonymous
Anonymous
Ara Apkarian
Nishan and Margrit Atinizian
Ruzanna Avetisyan
Bilazarian Family
Solange and Jean-Manuel Bullukian
Benjamin and Adrienne Charchian
Arshag and Eleanor Dickranian Foundation
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Edward and Froncsoise Djerejian
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Yervand Stepanyan
Artyom Vardapetyan and Kevin Setanyan
Andre and Lina Yarian
Ashot Hovanesian
Ghailian Family
Vigen and Houry Ghazarian
Hajjar Family Fund
Armen and Gloria Hampar Family Foundation
Ruben Harutyunyan
Kieu Hoang
Armen and Lenna Hovanessian
Avak and Christine Kahvejian
Berdj and Mary Karapetian
Kevork George Kassabian
Hasmik Keshishian
Olivier and Fanny Leclerc
Frank and Hoori Melkonian
Charleen Mosesian Onanian
Steven Papazian
Vahik and Alice Petrossian
Ara Petrosyan

ACBA Bank
Amazon Web Services
ARLOOPA Inc.
Axiom Print
Children of Armenia Fund (COAF)
City National Bank
Cognaize
DeepFrame
Dvin Music Hall and Tovmasyan Foundation
eLabNext, Eppendorf Group
ERI
GenX Laboratories Inc.
GrittGene Therapeutics
HCVT LLP
Health Bridge
HENDERSON
Hvm Law Firm
Ignite Onward
McKinsey & Company
Proone Labs
Russian-Armenian University
SolarOn
SoftConstruct
Team Telecom Armenia
Tequila Mandala
WinesofArmenia.com

Spark

+5,000 USD

Suzy Adamyan
Anonymous
Anonymous
Artem Artunyan
Stephen Berenson and Louise Barzilay
Vahe Fattal Foundation
Harry and Katrina Glorikian Family
Guldalian Family
Stepan Harutyunyan
Viken and Nora Hovsepian
Gary Jerjerian
Saro and Narineh Khemichian
David and Claire Khougazian
Berdj and Margaret Kiladjian
Hayk Mamajanyan
Gerard Mekhsian
Vahik Paul Meserkhani
Shant and Celine Minas
Tina Odjaghian
Diron Ohanian
Yana Saakyan
Judith Saryan and Victor Zarougian
Sinan and Angele Sinanian
Ardem and Annie Tabakian
Gevorg and Arax Voskanian
Anushavan Yeranosyan

Adventist Health Glendale
Amber Capital
Auto Speed LA
Glovo
Koor Wines
Latham & Waitkins
ONEArmenia
QAPIplus a Health Forum Plus, Inc Product
TeaYan
Yerevan Brandy Company

NETWORK-BUILDING PLATFORMS AND EVENTS

For Armenia's STI ecosystem to generate efficient and prolific innovative outputs, we need strong links among the various stakeholders. Thus, FAST programming devotes considerable effort to strengthening existing links and creating new ones. In addition to organizing regular small and mid-scale engagements, we have strived to build large-scale scientific and tech events to strengthen Armenia's position as an emerging innovation hub.

Over six years, FAST has engaged around 8,500 individuals in more than 120 events and network-building initiatives. Such events have ranged from Science Talks by scientists for scientists, special events for school students to engage with young successful scientists, meetings with high-level officials, such as the President of Rwanda, special workshops for startups with prominent speakers from world-leading venture capital firms as well as various roadshows to engage further the Armenian diaspora and a broader international set of players.

ROADSHOWS

We have developed and carried out several roadshows in different countries to engage relevant international STI stakeholders and Armenians abroad in events designed to help them discover and engage in STI opportunities in or with Armenia. Since 2019, FAST has conducted seven roadshows in North America (US), Eurasia (Russia, Indonesia), and Africa (Rwanda). In organizing some of these, we have closely collaborated with the Ministry of Foreign Affairs and relevant embassies. In November 2020, we continued our efforts by holding another roadshow in the United States. Our roadshows have engaged over 500 participants in 10 larger and over 20 smaller events.

AST's roadshows have offered stakeholder organizations, institutions, and individuals a chance to learn more about current developments and opportunities in Armenia's science and high-tech industry. Harnessing the advantage of Armenia's diaspora, referred to in an EU-commissioned study as "one of the largest and most sophisticated diasporas in the world," the events aim to emphasize how involvement in FAST programs provides an opportunity for stakeholders and patrons to enhance their intellectual, financial, and network capacities.

NSF-FAST WORKSHOP ON ML FOR DISCOVERY SCIENCES

A core task in beginning to enhance Armenia's international profile as a global innovation hub is developing large-scale STI-themed events at which the country's full potential can be showcased.

Recognizing the latter's importance, in October 2017, FAST and the United States National Science Foundation (NSF) jointly organized a Workshop on "ML for Discovery Sciences." The four-day workshop brought together 45 top-level speakers and nearly 250 researchers and specialists from various disciplines in DS. The workshop's primary objective was to bring researchers and practitioners from ML and other data-intensive disciplines to advance cross-disciplinary collaborations that could facilitate scientific science discovery.

Another important objective was establishing and promoting mutually beneficial collaborations between international and Armenian scientists, researchers, and students. The workshop featured leading experts from several fields, including researchers focused on foundational aspects of ML and practitioners interested in its various applications. It also featured a New Voices session, during which young and innovative Armenian researchers were given the chance to present the results of their work.

The NSF-FAST Workshop provided widespread publicity for Armenian science and Armenia. It offered a rare opportunity for the Armenian academic community to network with international colleagues and identify possible points of collaboration. As part of this collaboration platform, several important memoranda were signed by FAST, including with Armenia's Ministry of Education, Science, Culture, and Sports, the University of Southern California, and the Hamburg University of Technology.

This event and its success became the basis for creating the FAST flagship event - the GIF.

NFS Workshop partner was The University of Southern California, and the donors/sponsors were the NSF, IntelinAir, Granatus Ventures, Ararat Brandy Company, and ArmAs.

GLOBAL INNOVATION FORUM

At an early stage of its operations, FAST identified the need for a large, regular international forum to create a bridge across academia, industry, governments, and international organizations. This forum would assemble the brightest minds and executives from diverse worlds to discuss and shape the future of scientific and technological transformation. The GIF was formed out of this vision. It has become one of the most important and largest FAST events, intending to be held annually since 2018.

Each year, GIF carries a specific umbrella topic and offers companies, academic institutions, international organizations, governments, donors, and investors a unique opportunity to showcase and discuss the latest achievements in the field of tech and AI. It also provides a chance to participate in high-level networking with some of the world's sharpest minds shaping today's STI scene. The forum has become a hub for vigorous debates, captivating presentations, and worldwide policy discussions by outstanding scientists, innovators, executives, and thought leaders.
The first event, GIF18, was titled "Engineering the Evolution," and GIF19 explored "Transforming Intelligence." After skipping the years 2020 and 2021 due to the COVID-19 pandemic, GIF22 was dedicated to "Life-altering Technologies and AI."

GIF18 and GIF19 cumulatively had over 1,400 forum participants and 1,700 guests who attended 80 special talks as side events in academic institutions.

Numerous partner events were hosted on the GIF platform, including corporate innovation training with the Applied Innovation Institute, Angel Investment training with Seedstars and the EBAN; the Government of Armenia hosted a donor coordination meeting for the ID initiative; several MoUs have been signed, such as one between FAST and San Jose State University, and several local universities.

Event forums were organized in partnership with the Armenian Government and have benefited from the participation of government officials as distinguished speakers and individuals representing the world industry and academia.

After a 2-year break due to the COVID-19 pandemic, GIF22 took place in October 2022 and had over 1,300 participants, 66 speakers, and 27 talks and sessions. GIF22 again collaborated with the Government of the Republic of Armenia as its main partner. Over its three editions, in total, GIF has hosted 4,450 participants from 26 different countries, as well as held 107 talks and sessions by around 370 international and local speakers.

GIF partners:

Government of Armenia
Armenian Scientific Diaspora Association
The Ministry of Environment
Central Bank of Armenia
UNDP ImpactAim Venture Accelerator
American University of Armenia
Innovative Solutions and Technological Center
National Polytechnic University of Armenia
Tumo Center for Creative Technologies
Yerevan State Medical University
Yerevan State University
Armenian State University of Economics
Alikhanyan National Laboratory
National Academy of Science
500 Startups
Synergy International Systems
Arloopa
DeepFrame
Picsart
Smartclick
Plug.am
Tovmasyan Foundation
Domino Production
UCOM
Rostelecom
The Alexander, a Luxury Collection Hotel
Armenia Marriott Hotel
Doubletree by Hilton
Ramada Hotel
Public TV Company of Armenia
Move2Armenia
N+1
Naked Science
News.am
Armenpress
Armenia TV
Spring PR
Ararat Brandy Company
Karas Wines
Koor
Chocodin
Loma Systems Event Management
United Armenian Volunteers League

GIF Sponsors:

PMI Science Armenia
SoftConstruct
Ameriabank
SolarOn
Russian–Armenian University
ACBA Bank
Team Telecom Armenia
HENDERSON
Hvm Law Firm
Amber Capital
Cognaize
Glovo

Ensuring Future Sustainability

FAST aims to broaden its global network of partners and supporters, share opportunities to collaborate on impactful initiatives, and attract the intellectual and financial capacity required for its programs to create sustainable outcomes in Armenia. The outcomes we co-create have immense potential to create positive change throughout the interconnected world beyond its borders.

FAST is scaling up its core programs and launching initiatives that will take the impact of our existing and prospective relationships to new levels. In addition to expanding its global fundraising campaign, a near-term priority for FAST is creating an endowment fund that will be critical in enabling the sustainability and continuous growth of FAST and its programs.

ORGANIZATIONAL CULTURE

Our Foundation employs open-minded people with the capacity to think long-term and on a large scale.

Our team is wholeheartedly convinced that together, we can help make Armenia a strong country with a highly developed economy. In doing so, the following professional ethics help us to get there:

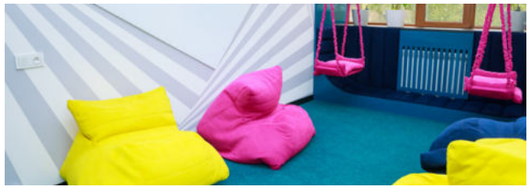
- **Efficiency:**
  This means ensuring the necessary results are achieved while implementing the skills and knowledge needed to advance the common interest. We strive to deliver the best possible quality of work and the best outcomes.

- **Honesty, Trust, and Mutual Respect:**
  This means working and living in an environment of mutual trust and respect. We support each other both at work and in life.

- **Transparent and Open Communication:**
  We strive to be open and honest in all our deeds, including the results we have and have not achieved, and in communications with donors, stakeholders, team members, and partners.

- **Teamwork and Involvement:**
  We support each other and lend a hand wherever it is needed.

- **Governance and Self-Motivation:**
  This means supporting daily tasks and responsibilities in an inspirational manner. We encourage creative, motivated professionals who knowingly join FAST and share its vision and mission to develop and expand our organization's scope.

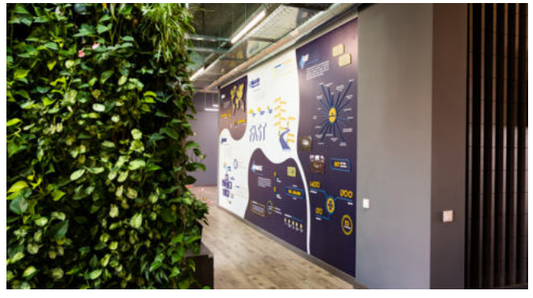


- **Development and Employee Advancement:**
  This means developing our team's vocational skills and growth within the Foundation. We expect our team members to develop professionally and personally and are ready to do their utmost to support them in those endeavors.

- **Justice and the Primacy of the Common Interest:**
  We take a self-aware and self-reflective approach in any situation, prioritizing cooperation.

- **Corporate Social Responsibility:**
  We are dedicated to preserving FAST's organizational identity and taking responsibility for its social impact.

- **Acknowledging Expenses and Appreciating Money:** We take a careful approach and a responsible attitude to manage our precious resources and avoid unnecessary expenditures.



VALUES AND PRINCIPLES

Our activities are based on the following values and principles, which have been embedded in our internal policies:

- **Responsibility and Compliance with the Law:**
  FAST complies with applicable legal provisions, professional ethics, and internal regulations. Our interests can not, under any circumstances, be pursued in violation of the law or ethical principles.

- **Anti-bribery and Corruption:**
  We deal with international organizations and governmental institutions in our activity. In any dealing with a government institution, FAST adheres to the highest standards of honesty and integrity and abides by applicable laws.

- **Transparency:**
  We undertake to provide timely, complete, and transparent information to all our counterparties.

- **Impartiality:**
  We avoid discrimination based on age, sex, sexual orientation, racial origin, political opinion, religious belief, and health status of our stakeholders. Also, to ensure impartial decision-making, any conflict of interest or potential conflict of interest shall be fully disclosed in writing before a decision is made within the Foundation under any defined procedure.

- **Professionalism:**
  We protect professionalism as an essential value for our growth and success. Accordingly, management and personnel conduct are based on high professionalism, commitment, and diligence standards.

- **Confidentiality and Protection of Privacy:**
  The acquisition and processing of data and the storage of information and personal data of our personnel and other partners comply with applicable data protection legislation. This legislation, including the Armenian General Data Protection Regulation, ensures that data is not disclosed to unauthorized persons and/or entities.

- **Collective Vision and Conviction:**
  United by the conviction that Armenia has the potential to become a hub of advanced technology and innovation, our founders have joined forces, combining their efforts to propel this vision forward. Their contributions have played a pivotal role in advancing progress.

- **Social Responsibility:**
  We strive for a better Armenia for all by contributing to the country's scientific, technological, social, and cultural advancement by creating a thriving STI sector. We keep this broader mission in sharp perspective throughout our programming and daily activities.

- **Environmental Best Practice:**
  FAST is committed to complying with all local, municipal, and international laws and regulations on environmental protection. Furthermore, FAST is committed to building environmentally friendly infrastructures and encouraging consideration of environmental issues and impacts throughout its programming and office practices.

FINANCES AND FUNDING

FAST funding comprises blended sources, including grants, donations, in-kind sponsorships, and earned revenue from fee-based services.

Our founders invested significant resources toward testing and improving our programs in the early days, setting the stage for future success.

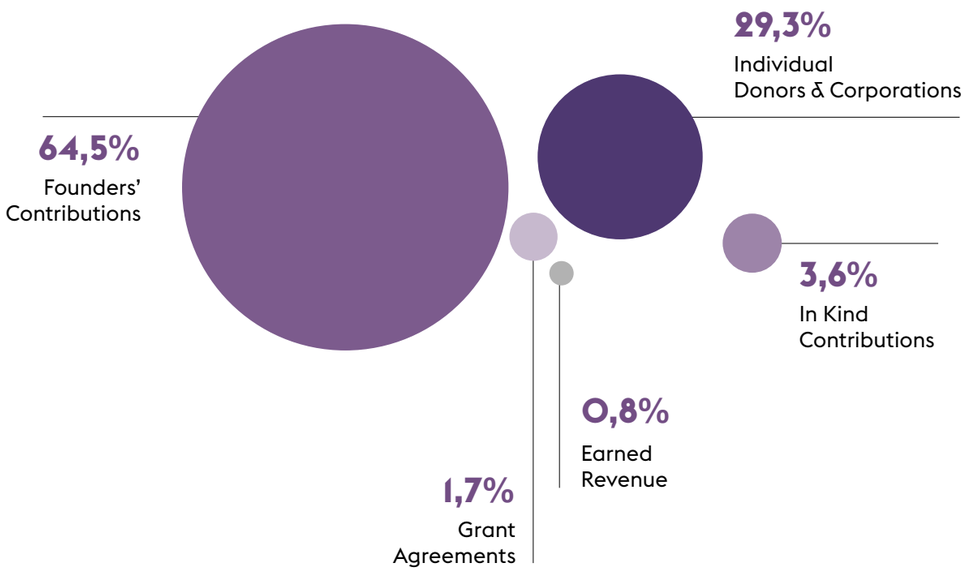
As our programs matured and reached a critical inflection point, we embraced the power of collaboration. We actively invited the global community to join us in strategic partnerships, fostering a dynamic ecosystem that amplified our impact and propelled us into a new era of growth. This pivotal transition marked a shift to a collaborative model, where collective action drove our progress.

This collaborative approach has made our programs more successful and solidified FAST Foundation's position in its field. We look forward to continuing this journey of shared success with our partners, shaping a brighter future for science, technology, and innovation.

By December 2023, FAST has secured over $12.6 million in funding for six and a half years.

Of this, about 65% comes from our founders: RVVZ Foundation, Artur Alaverdyan, Noubar Afeyan, Ph.D., and Ayb Educational Foundation.

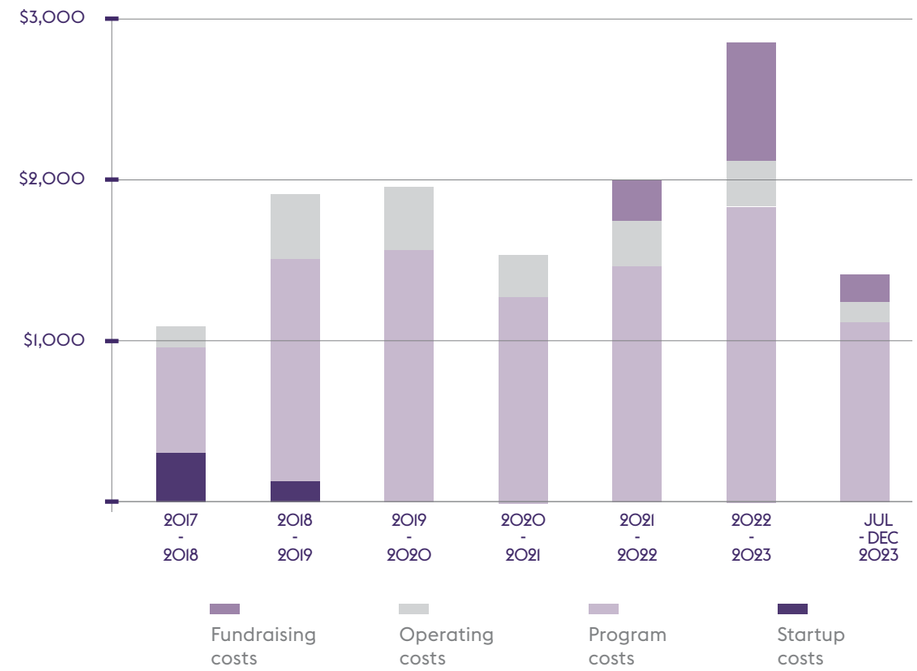
4.1. Source of funds received during 2017-2023, by type



The company's financial year begins in July and concludes in June. The cumulative funds used over the past six and a half financial years, up to December 2023, is approximately 12.6 million USD.

The funds used have been further analyzed to determine the ratios of startup, operating, fundraising, and program costs to total expenses. All expenses necessary for starting the Foundation, including research and capital expenses, are categorized as startup costs. The FAST team consistently strives to enhance operating efficiency by allocating more funds toward program costs.

Graphic 4.2. Budget progress over six years, in thousands of USD



TRANSPARENCY AND ACCOUNTABILITY

FAST is committed to transparency and accountability. As part of this commitment, we have undergone a full financial audit each year conducted by Ernst & Young CJSC for the past four years. Our audit opinions have been consistent for the past six years, meaning that our financial statements have been presented fairly in all material respects.

TRANSFORMATIVE INITIATIVES

SHAPING ARMENIA'S INNOVATIVE FUTURE

In the ever-evolving science and technology landscape, FAST has emerged as a prominent catalyst for substantial change in Armenia and beyond. Functioning as a pioneering force, our foundation has played a pivotal role in spearheading an innovative movement with a steadfast commitment to cultivating an ecosystem that propels scientific advancements and technological innovations.

The impact of FAST extends, contributing to a broader tapestry of transformation. At the core of its initiatives, the foundation assumes the role of an architect of change, effectively bridging the gap between groundbreaking ideas and their tangible realization.

The foundation's dedication to fostering an environment conducive to scientific and technological progress has resulted in a ripple effect, positively impacting various sectors. By providing a bridge between conceptualization and implementation, FAST has facilitated the translation of innovative ideas into tangible outcomes, thereby contributing to the overall growth and development of the scientific and technological landscape.

Through the visual arrangements presented below, we seek to illustrate the Foundation's significant role in helping advance Armenia's science, technology, and innovation ecosystem since its inception.

ECOSYSTEM LEVEL

BEFORE 2017	FAST WAS FOUNDED IN 2017	NOW
AI was not mainstream. There was no prioritization of AI. Armenia had a limited vision of its innovative future and lacked large-scale cluster projects.	Since 2017, FAST has been highlighting the crucial role of AI in advancing the innovation ecosystem. Since 2017, FAST has organized, including a 4-day workshop on machine learning as part of the NSF-FAST initiative and three Global Innovation Forums held in 2018, 2019, and 2022. Since 2017, FAST has initiated ongoing dialogues with the government at the highest level, as well as public institutions, including the National Assembly, advancing the process of developing a national AI strategy. In 2019, FAST collaborated with international organizations, contributing to the World Bank's report on Armenia's tech potential, prioritizing AI. In 2021, FAST presented the analysis of Armenia's AI Index position to the government and international as well as local partners. Between 2017 and 2018, FAST developed the Adaptive Innovation Campus and subsequently, the Innovation District (ID) concepts, inclusive of three main areas: Research, Commercialization, and Academic. In 2018, FAST introduced the concept to the Prime Minister of the Republic of Armenia. On October 18, 2019, within the ID framework, the government organized the first donor coordination meeting in collaboration with FAST. On April 23, 2020, the ID concept was scheduled to be pitched at the UN SDG Investment Fair by the government and FAST.	AI on the national agenda: • The government co-organized all GIFs. • AI has become a priority field in several state documents, reflecting its importance in national strategies and policies. • Generation AI high school program is being implemented in collaboration with MESCS and MHTI. • Implementing Generation AI high school program with MESCS and MHTI. • The Armenian Society of Fellows (ASOF) and the government are collaborating to establish a $8.5 million Center for Intelligent Computing, focusing on AI. This initiative was approved by Parliament in 2023. In 2023, the government developed the Academic City project, drawing inspiration from FAST's ID framework and its academic component.

EDUCATION

BEFORE 2017	FAST WAS FOUNDED IN 2017	NOW
There was a lack of media awareness about AI.	In 2017, 2019, and 2022, FAST conducted three media trainings.	Enhanced knowledge of AI and proper media coverage of AI have cultivated a culture of responsible tech journalism.
There was no focus on AI in the military.	In 2018, FAST introduced AI in the military with the launch of Unit 1991, focusing on education, training, and supervision of R&D.	In 2023, the program spun off and is now independent.
There was a lack of formal AI education.	In 2023, FAST introduced Generation AI, a high school project.	The project is being executed in collaboration with The government to demonstrate commitment to AI education. The government presents this to large international donors as its success in advancing STEM education.
Efforts on STEM education were fragmented.	FAST facilitated the ongoing consolidation of stakeholders through the creation of partnerships and supported the establishment of a partnership platform within MESCS.	STEM Education Policy Paper to be drafted by key stakeholders with and for MESCS.

RESEARCH

BEFORE 2017	FAST WAS FOUNDED IN 2017	NOW
Minor funding was provided to PhDs and limited funding for International Research collaborations.	In 2018, FAST provided the first substantive fellowship to PhDs, along with the first international travel grants.	In 2019, the Enterprise Incubator Foundation, an initiative of the Armenian government and the World Bank, integrated the models.
There was no institutional support for international collaborative research.	In 2020, FAST pioneered the ADVANCE Research Grants program.	Since 2022, the Ministry of Education, Science, Culture, and Sport has initiated the Remote Labs Fellowship program, providing 27 grants integrated with the ADVANCE program framework.
There was a limited culture of transferring cutting-edge research and hosting visiting professorships.	Since 2020, FAST has conducted fifteen workshops and two credit-based courses featuring international PIs and their networks in local universities.	Universities officially commit to hosting the research projects and gradually adopt the culture of Visiting Professorship.
There was inadequate education in the fundamentals of research design and technology transfer.	In 2020, FAST developed two modules and manuals, faculty were trained, and courses were deployed in more than 15 universities.	Universities adopted the course, and some even created new academic courses based on the program.

COMMERCIALIZATION

BEFORE 2017	FAST WAS FOUNDED IN 2017	NOW
There were no angel networks.	In 2018, the first angel network, STAN, was established by FAST.	There are currently six angel networks in operation.
There was one acceleration program.	Since 2018, FAST implemented six acceleration programs.	In total, 14 acceleration programs have been implemented.
There was a limited expertise in venture building.	In 2018, a lecture on venture building was delivered by Dr. Noubar Afeyan, co-founder of FAST. In 2019, FAST established ASCENT, and launched the InVent program. Various consultations were provided to international donors, including the World Bank and the European Union, on the importance of supporting venture building in Armenia.	Key large VCs have created some venture-building programs, and several large donors are now prioritizing such programs when providing funding to the government or the ecosystem players.
There were no wet labs.	In 2023, FAST opened the first Biotech Prototyping Lab in Armenia in collaboration with the government.	The first lab in the country officially opened in collaboration with the government, creating an opportunity for biotechnology startups and researchers to engage in rapid prototyping.

NEXT STEPS

A century ago, the majority of issues and conflicts had their origins in specific regions. However, new technologies have surpassed borders, boundaries, and other traditional obstacles in today's world. Yet, it is essential to understand that technology development is complex. Attempting to categorize all technological advancements under a single umbrella could lead to disastrous consequences. Entering the future with a well-defined plan and purpose could ensure the sovereignty of any nation is maintained. This is especially critical in the case of Armenia, considering our unique geopolitical situation. The implications are significant.

The Foundation's primary focus will be to promote science-preneurship and science-intensive venture building in the coming years. We firmly believe Armenia can compete globally with the proper education, methodology, financing, network, and tools. A holistic approach spanning education, research, and commercialization is needed to achieve this.

To nurture international science-intensive startups and successful global products, Armenia must cultivate talent and support future companies from the ground up. Our strong potential in mathematics and natural sciences gives us a competitive edge, especially with the help of AI. However, realizing this potential requires a laser-focused approach and a well-structured mechanism for developing the next generation of researchers and scientists.

We are directing our educational and research pillars to fully support future innovators and researchers while enhancing research and entrepreneurial education.

Programs like Generation AI aim to boost the skills and motivation of schoolchildren from an early age and are intended to be implemented nationwide, holistically connected with the public education system.

While FAST's efforts have been diverse and numerous, we anticipate rapid innovation growth around 2027 to 2030 when the outputs of Armenia's education, research, and commercialization pillars are enhanced and synergized. This will lead to optimal return on investment capital and generate further investment and reinvestment. As a result, greater revenue generation, more high-tech job opportunities, and increased R&D can be expected, triggering Armenia's own technological leapfrog.

FAST creates new opportunities through its network-building platforms and events. Initiatives like the GIF have provided unique networking opportunities, supporting Armenia's scientific and technological development.

Over the past six years, we have worked hard to facilitate strategic dialogues and groundbreaking programs, and we remain committed to investing in Armenia's scientific and technological advancement with current and future partners. We believe that Armenia has the potential to become a vital part of the global value chain.

The vision of putting Armenia on the world innovation map is not just a dream but an achievable goal that requires collective effort and commitment. As individuals, we possess the power to ignite change and shape the future of our country.

R&D investments are critical in shaping the future of numerous industries. As such, governments and private organizations across the globe need to continue investing heavily in the sectors. With the race for technological dominance already in motion, staying ahead of the curve and driving innovation forward is contingent on investment.

FAST is powered by teamwork. We thus offer many opportunities for collaborators, donors, investors, and partners to explore possibilities for alignment between our work and theirs in driving Armenia's trajectory. You can be a big part of this transformative journey. Your contributions are a valuable asset in this change-making process.

The journey towards achievement starts with a visionary outlook, followed closely by effective execution. Thus, a shared vision and coordinated efforts are imperative. The road to success may be challenging, but we can achieve the extraordinary with determination, perseverance, and collective support. Join the journey.

www.fast.foundation