



G FCC

Global Federation of
Competitiveness Councils

Transform Competitiveness! Best Practices in Competitiveness Strategy

2019

© 2019 Global Federation of Competitiveness Councils

900 17th Street, NW, Suite 700, Washington, D.C. 20006

The Global Federation of Competitiveness Councils (GFCC) is a network of leaders and organizations from around the world committed to the implementation of competitiveness strategies to drive innovation, productivity and prosperity for nations, regions and cities. The GFCC develops and implements ideas, concepts, initiatives and tools to understand and navigate the complex competitiveness landscape.

The Global Federation of Competitiveness Councils (GFCC) is a nonprofit, 501(c)(3) organization as recognized by the U.S. Internal Revenue Service. The GFCC's activities are funded by contributions from its member organizations.

For more information, please visit www.thegfcc.org.



/thegfcc



@thegfcc



GFCC

Global Federation of
Competitiveness Councils

Transform Competitiveness!

Best Practices in Competitiveness Strategy

2019

CHAIRMAN'S LETTER



Enabling the sharing of concepts, tools, experiences and lessons learned among its members is a core mission of the Global Federation of Competitiveness Councils (GFCC). In the spirit of fulfilling that mission, and on behalf of the board of directors and members of the GFCC, I am pleased to present the 2019 report *Transform Competitiveness: Best Practices in Competitiveness Strategy*.

GFCC members are working to meet the challenges and leverage the economic opportunities emerging in this unfolding era of globalization and accelerating technological change by transforming their nations, industries, cities, talent and energy use. This year's *Best Practices* report features transformation strategies, policies and programs focused on education and skills development, manufacturing, energy, public services provision and higher education institutions, highlighting outstanding examples from Ecuador, Kazakhstan, Qatar and the United States. We hope this year's report will stimulate learning and be a useful tool for competitiveness organizations and initiatives around the world.

Best Practices in Competitiveness Strategy is issued annually by the GFCC. I hope you enjoy the 2019 edition.

Sincerely,

A handwritten signature in black ink, reading "Charles O. Holliday, Jr." in a cursive style.

Charles O. Holliday, Jr.

Chairman, Global Federation of Competitiveness Councils
Chairman, Royal Dutch Shell, plc

TABLE OF CONTENTS

EXECUTIVE SUMMARY	
Transformation in an Era of Rapid Change	4
ECUADOR	
Innovative Smart Cities: The Case of Guayaquil, Ecuador	12
KAZAKHSTAN	
Government for Citizens: Developing “last mile” solutions for public services through integrated processes and digital technologies	16
“Bolashak” International Scholarship Program for Talented Youth	19
QATAR	
Development of a National Innovation Strategy for Impact and Competitiveness	22
UNITED STATES	
The New American University	31
Accelerating and Transforming Advanced Manufacturing in the United States	37
Transformation through Global Public-Private Partnership: Webster University and the Republic of Uzbekistan	47
GFCC	
Membership	55

EXECUTIVE SUMMARY

Transformation in an Era of Rapid Change

Globalization and accelerating technology advancements are transforming industries, markets, and jobs. The ability to leverage the opportunities and meet the challenges of this new era of rapid change will be fundamental to a nation's competitiveness and economic success. As countries, companies, cities, and their governments around the globe are called to navigate this new landscape, they are launching transformation strategies, policies, and programs. The 2019 *Best Practices in Competitiveness Strategy* describes some of these initiatives.

Ecuador: Developing Human Capital for Innovation

To become a more innovative and globally competitive city, the municipality of Guayaquil implemented a strategy to increase opportunities for education and improve the skills of citizens. The initiative builds on its modernized infrastructure and smart city with more than 7,000 points of access to the Internet. The effort includes computer labs, training using educational technologies, and the APCI education platform which enables students to learn at their own pace. The private sector provides computers for the labs, and the city provides financial resources to implement the program.

APCI has been implemented in 1,100 schools benefiting 605,220 students and 10,000 teachers. Guayaquil's educational initiative was evaluated by the World Bank, along with 111 other technol-

ogy-enabled programs worldwide. Educate and Guayaquil's Mas Tecnología project were found to have the best performance, particularly in mathematics learning outcomes.

In 2017, the city launched Guayaquil Innovate, a comprehensive effort covering citizens of all ages, entrepreneurs, and business owners. It includes: Jóvenes IN (in-person and online skill development to prepare citizens to enter the labor market), Innovatalk (annual conference on the new digital era for business personnel, entrepreneurs, academics, etc.), and Hogares IN (40 percent subsidy for the purchase of a computer tablet and digital training for the city's 50,000 low-income households). Also, the city is subsidizing digital transformation coaching and training for small and medium-sized enterprises through a program called DigitalSME Challenge.

LAB INs are spaces in the city designed to encourage design thinking, problem solving, and solution development among Guayaquil's citizens. Four LAB INs have areas equipped for robotics and design. The fifth, called the LAB IN+, includes: a design area for group problem solving; and 3D printing, robotics, CNC, laser, and virtual reality stations and equipment. Through these laboratories, 273 children have worked in the PIENSA INs, and have contributed 39 solutions. Also, 682 young adults have been trained in new abilities.

As a result of these efforts, Guayaquil advanced to second place in the ranking of competitive cities; but, if greater Guayaquil is taken into

account, its ranking rises to No. 1. In measuring high school achievement through a test called Ser Bachiller, the city's quality of education rose from 58th place in 2015, to 31st place in 2018 among 113 cities.

Kazakhstan: Developing “Last Mile” Solutions for Public Services through Integration and Digitalization

Kazakhstan undertook several initiatives to improve the efficiency and ease with which citizens use public services. Prior to these initiatives, obtaining public services was slow and bureaucratic, requiring significant paperwork and visiting numerous locations to get supporting documents. To address this challenge, a non-profit joint-stock company, State Corporation “Government for Citizens,” was created and funded by government. Using the “one-stop-shop” principle, Government for Citizens centralized and digitized the system.

First, in 2007, the government created “Public Service Centers” (PSC), enabling citizens to access most public services at a single location. Today, a citizen has access to more than 600 public services through a PSC, covering the entire life cycle, such as marriage, birth of a child, queueing for preschool, etc. Currently, Government for Citizens provides 85 percent of public services in Kazakhstan.

Second, the government digitized the public services system and established an e-government portal through which citizens can access services online through an app or website. By using the online portal, which collects all the necessary information and documentation for them, citizens avoid long queues and unnecessary paperwork. The most demanded public services (certificates of address, no criminal record, pension deductions, registered property rights, and presence/absence of housing) have been transferred to “paper-free” format.

“Mobile Citizens Identification” allows citizens to gain access to the e-government portal through the PSCs, and biometric data reading ensures security in using the services. In a further enhancement, the state obtains all the required services for citizens, eliminating the need to visit PSCs for paperwork. Clients can receive the paperwork through free SMS messages or Telegram messenger application. Today, 72 percent of public services are offered electronically.

Third, the government improved the PSC infrastructure by installing comfortable seating and temperature controls in waiting areas, self-service sectors, cash desks, electronic queue ticket machines, copy machines, photobooths, and infrastructure for people with disabilities, who may also receive services through home visits.

Looking to the future, Government for Citizens plans to implement blockchain technology to allow commercial banks to register their mortgages online. In another effort, the Unified State

Real Estate Registrar will create an information database on the land fund and real estate. And, Government for Citizens is hoping to expand to the commercial sector including national telecommunications and utilities.

Kazakhstan: Educating and Training Talent to Transform a Nation

When Kazakhstan gained its independence from the Soviet Union, the country had no knowledge about running the state or the specialists to do it. It had no experience setting up a private sector, a law or a civil structure because everything had been passed down from the government in Moscow. Now, as an independent country, Kazakhstan had to educate specialists and find citizens who would be able to develop the country.

In 1993, the government created the Bolashak International Scholarship Program to send the brightest applicants to study at leading universities abroad. Open to all citizens to apply, the program includes tuition, travel, visa and living expenses. The program is financed by the government and managed by the Ministry of Education. Upon graduation, scholars are required to work for five years in Kazakhstan, ensuring that the country can capitalize on the acquired knowledge. Since its inception, 13,500 students have been educated through the program. Recently, Bolashak started financing MBA education from the 30 leading programs. The scholarship has

changed the lives of Kazakh students by giving them access to educational and career opportunities they might not have had otherwise.

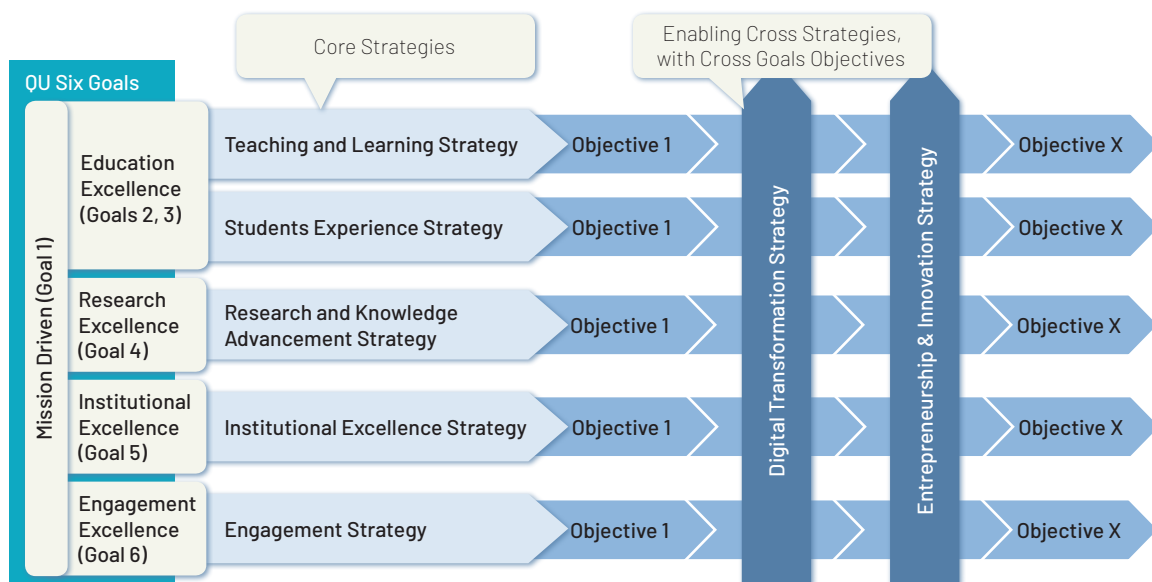
The program's impact on the national level has been profound. The Bolashak scholars have been a major force in the transformation of the Kazakh economy through the development of the private sector. Bolashak graduates today are part of leading companies such as Procter & Gamble, Shell, and Air Astana. Many more have impacted the country's policies through their work in government ministries and national companies. The program has indirectly helped bring investment into the country; investors see that the country has a huge pool of very talented job candidates with a global outlook. Also, Bolashak graduates have formed networks with equally capable students who will be future leaders in their own spheres, networks that will be invaluable to the future of Kazakhstan.

Qatar: Developing a National University Transformation Strategy

QU, the National University of Qatar, developed a comprehensive strategy for transformation, impact, and competitiveness beyond the traditional role of a university as a provider of education and producer of research.

QU is the largest provider of higher education in Qatar with 10 colleges, 17 research centers, 86 undergraduate and postgraduate programs,

Structure of QU Strategy (2018-2022)



and more than 20,000 students. As a national university, QU is expected to provide higher education aligned with the national and socio-economic needs of the country. As the country seeks to transform into an innovation- and knowledge-based economy, guided by the Qatar National Vision 2030 and national development strategies, QU is expected to play a major role in this national transformation.

The first step in developing the new strategy was a strategic context analysis that identified national and stakeholder needs, international and regional trends, and future plans as outlined in the Qatar National Vision 2030. Based on that analysis, a QU vision and mission were identified,

and characterized by “strategic headlines” and drivers. For example, Vision Driven Headlines aim to achieve “Distinctive Excellence” in the key performance areas of education, research, institution, and engagement. Mission Driven Headlines include using QU’s excellence in its mission as the national university to maximize impact on its stakeholders, advance knowledge, and drive entrepreneurship and innovation.

The guiding mission, new vision, and strategic headlines led to formulating six QU core values (excellence, integrity, academic freedom, diversity, innovation, and social responsibility), and six strategic goals.

Then, seven core strategies were developed for achieving the strategic goals: for Teaching and Learning, Student Experience, Research and Knowledge Advancement, Institutional Excellence, and Engagement; and for two cross-cutting enabling strategies—digital transformation, and entrepreneurship and innovation. For each strategy, a set of objectives were formulated, together with details on initiatives for implementation.

For example, objectives for Goal 1—enabling Transformation of Higher Education in Qatar (mission driven)—include developing statements of graduate attributes and a competency-based curriculum; enhancing access to higher education with an increased focus on STEM; flexibility of educational offerings, delivery models, and graduate pathways; developing a digital culture; and nurturing entrepreneurship and innovation.

United States: Transforming a University to an Enterprise Model

ASU has worked to transform from an academic model to an enterprise model that not only connects education and instruction to knowledge generation, but also creates lifelong master learners capable of connecting the classroom to the post-graduation professional world. ASU's enterprise model is driven by collaboration with both industry and government.

Engaging with industry ensures ASU understands what employers need in future college graduates, allowing the university to evolve course offerings to ensure a skilled and workforce-ready graduate pool. This includes embedding students with employers to acquire practical real world experience. For example, ASU's Practice Labs™ serve as problem-solving teams for companies. Students are immersed in the corporate environment, assess needs, and develop solutions to business problems. Corporate partners get fresh perspectives from students, and labs create a pathway to employment opportunities for ASU graduates. In ASU's Luminosity Lab, students participate in invention and development projects, including the design of novel technology products. They frequently work with corporate partners and government agencies.

Social transformation and economic success are the objective of ASU's academic enterprise model, and achieved by connecting instruction to knowledge generation at society-impacting scale. For example, ASU has developed best practices for closing the gap in educational attainment for Hispanics, demonstrating the economic impact that could be realized through this effort. Closing this gap could have a \$428.5 billion annual nationwide impact on earned wages for this demographic, and a \$127.7 billion increase in state and federal income tax revenue. ASU's Indigenous Design and Construction Initiative brings together tribal community members, industry, and ASU students and faculty to co-develop solutions for tribal communities in Arizona.

As a key element of its competitiveness strategy, ASU engages with local, state and national governments to address societal and economic development challenges. For example, at the local government level, ASU's Healthy Urban Environments Initiative is partnering with the Maricopa County (AZ) Industrial Development Authority in research on urban heat and air quality improvement measures. The goal is developing a model that could be implemented in other extreme environments around the world.

At the state level, ASU leadership serves in an advisory capacity on critical technology and research-related matters. For example, in 2018, ASU Executive Vice President and Chief Research and Innovation Officer Sethuraman (Panch) Panchanathan was named Arizona Governor Doug Ducey's Senior Science and Technology Advisor. Nationally, Panchanathan is a member of the National Science Board, providing guidance on national science policy.

Internationally, ASU has increased investment in global research, instruction, and public service by 40 times since 2008 and, in the past six years, engaged with more than 270 partners in more than 40 countries. In 2018, ASU received the Association of Public and Land Grant Universities' Gold Level Institutional Award for Global Learning, Research and Engagement.

United States: Accelerating an Advanced Manufacturing Renaissance

Recognizing the critical role energy plays in competitiveness, in 2007, the Council on Competitiveness began to explore the nexus between energy and manufacturing through its Energy Security, Innovation and Sustainability Initiative. At that time, America's growing dependence on energy imports accounted for 45 percent of the trade deficit. This dependence on foreign sources of natural gas and petroleum posed a serious challenge to U.S. national and economic security.

Today, America is facing a promising new frontier shaped by two powerful transformations working in tandem: the re-emergence of advanced manufacturing in the United States; and increasing abundance of sustainable, affordable, and domestically-sourced energy. Rising wages overseas, and a remarkable shale oil and gas boom enabled by new technology have given many American producers a critical cost advantage. Also, U.S. manufacturing is transforming with new digital and smart manufacturing technologies, big data, the Internet of Things, and autonomous systems. The stage is set for the United States to leverage these trends through a comprehensive strategy.

In 2015, the Council launched the Energy and Manufacturing Competitiveness Partnership (EMCP), led by C-suite executives from industry,

academia, labor, and the national laboratories. Through dialogues and studies on six sectors—water and manufacturing, advanced materials, biosciences, agriculture and consumer water use, energy, and aerospace—the EMCP explored factors shaping each sector, and common challenges and opportunities, such as cybersecurity. Based on these studies and dialogues, a call to action and national policy agenda and recommendations to drive U.S. energy and manufacturing competitiveness were developed:

- In the area of physical and regulatory infrastructure, recommendations involve issues such as developing regulations at the pace of technology advancement, increasing investment in physical infrastructure, and tax changes to encourage innovation in the utility sector.
- In fueling innovation, recommendations focus on issues such as Federal government investment in R&D, aligning the Federal research agenda with industrial grand challenges and technologies with high potential for economic and societal impact, increasing support for regional technology testbeds, streamlining intellectual property agreements between national laboratories and universities and businesses to encourage technology transfer and partnerships, private sector financing to close the technology “valley of death,” and increasing supply chain cybersecurity and cyber resilience of the electric grid.
- In developing a workforce for advanced manufacturing, recommendations focus on: integrating technical training into K-12 education, strengthening lifetime linkages between universities and graduates to encourage life-long learning, a public awareness campaign to increase scientific literacy, and getting industry practitioners into classrooms.

United States: Transformation Through Global Partnership in Higher Education

As a global university, Webster University has a mission of ensuring learning experiences for students that transform them for individual excellence and global citizenship. This has long included engaging the world through faculty and student exchanges, and study abroad opportunities. Webster University has operated its own campuses in Europe for more than 40 years, expanded to Asia in the 1990s, and opened the first American university campus in Ghana in 2013.

Webster University has entered into a unique partnership with the Republic of Uzbekistan, which will result in the opening of a Webster campus in Tashkent in Fall 2019. Webster University's objective is to build the capacity of higher education in Uzbekistan and Central Asia, and to increase the Webster community's understanding and knowledge about that region.

The socio-economic landscape of Uzbekistan has been evolving since its independence in 1991. This includes a challenging period of transformation, including privatizing businesses, encouraging entrepreneurship, and improving the business environment. In 2016, newly elected President Shavkat Mirziyoyev signed the decree *On Additional Measures to Ensure the Accelerated Development of Entrepreneurship, the Full Protection of Private Property, and the Qualitative Improvement of the Business Environment*. In 2017, Uzbekistan adopted a 2017–2021 National Development Strategy, which calls for reforms in numerous areas including economic development, modernization of agriculture and industry, greater product and services competitiveness, and social reforms to drive toward higher incomes and better jobs.

In 2012, Webster University leadership began exploring opportunities to expand the university's global presence to Uzbekistan. Aware of the initiatives being advanced by newly-elected leadership, Webster leaders entered into a series of conversations, visits, and in-person meetings among key stakeholders to gather data and assess the needs of the Uzbek workforce, and to identify Webster's capacity to meet those needs.

The immediate result of the evolving partnership between Webster University, Uzbekistan's Ministry of Education, and several Uzbek universities has been the offering of graduate programs onsite in the Republic with enrollments in the hundreds at the first offerings. Through these programs and the soon-to-be-opened Webster

campus, transformative strategies are meeting the workforce and economic development goals of the Republic, and creating a new academic and business model for Webster's operation in a new area of the world.

Models of higher education built on the Soviet model will be supplemented with Western-style offerings taught in English. Webster will be the first American university offering degree programs onsite in the Republic, and an increasing number of Uzbek students are pursuing degree programs at Webster campuses in St. Louis and in Europe. The results to date include enrollments onsite in the Republic of more than 120 master's students in Webster's Teaching English as a Second Language program, to be followed by a Fall 2019 launch of Webster's MBA program onsite. The TESL program is important because it equips more Uzbek educators to teach English to Uzbek youth, increasing their capacity to undertake degree programs in English.

In Fall 2019, through an innovative public-private partnership and revenue-sharing model, Uzbekistan's Ministry of Higher and Secondary Specialized Education will provide dedicated state-of-the-art facilities in Tashkent for Webster's use, supporting the operational, programmatic, and physical expansion of Webster University in the Republic.

ECUADOR

Innovative Smart Cities: The Case of Guayaquil, Ecuador

According to the Inter-American Development Bank (IDB), effective investment in skills acquisition is “a necessary condition to harvest the results of technological change.”¹ The municipality of Guayaquil, its citizens, business leaders and academics have decided to do precisely that: enhance its human talent as the key strategy in becoming a more innovative city. Guayaquil has already reached one landmark of a smart city, having more than 7,000 points of access to the internet and the modernized infrastructure to foster competitiveness and entrepreneurship. Guayaquil is further aiming to bridge the ability gap in mathematical thinking and language, and provide its citizens with the resources to harness their innovation capacity and compete globally.

The city of Guayaquil — despite lacking autonomy over its own education, given the heavily centralized Ecuadorian education system — has been investing in the accessibility of knowledge through the provision of computer labs, training children and young adults through cutting-edge educational technologies. This has been done through the education platform APCI, which has been implemented in 1,100 schools benefiting 605,220 students and 10,000 teachers. The city has implemented, with the help of the private sector, modern tech labs in schools to aid with the learning of math and language. Through these labs, children and young adults have improved their academic capabilities, learning at

their own speed, through the APCI Platform. This tech educational program was evaluated by the World Bank² among 111 other worldwide tech-enabled programs; finding that *Edúcate* and the Municipality of Guayaquil’s *Mas Tecnología* project have the best performance, particularly in math learning outcomes. This program is a state of the art public-private partnership, where the private sector provides computers for the labs in the city and the municipality provides the financial resources to hire educators to implement the program.

In 2017, the municipality implemented the Guayaquil Innovation Initiative using an integrated approach that reaches citizens of all ages as well as entrepreneurs and business owners. Through funding from the municipality, this program is aimed at improving the innovation capabilities of its citizens by fostering 21st-century talent. To do this, Guayaquil has implemented a comprehensive program which involves working with households to provide subsidized tablets loaded with the APCI program. Other initiatives include massive citizens tech training efforts; extracurricular courses in coding; robotics; design and digital printing. In addition to these efforts, the city has implemented a design thinking program, in which through courses and competitions, teams of children and young adults design and implement solutions to Guayaquil’s challenges.

1 Learn better: public policies for skill development / Matías. Busso, Julian Cristia, Diana Hincapié, Julian Messina, Laura Ripani. Felipe Herrera Library of the Inter-American Development Bank.

2 World Bank. (January 10, 2017). World Development Report 2018 - Concept note. Pg.14.

The program “Jóvenes IN”³ provides face-to-face and online learning opportunities for residents, preparing them for their entrance into the labor market. In the first phase of the program, “NiNis” — the young people participating who do not study or work — are taught life skills and soft-skills, through online and face-to-face courses. In the second phase of the program, short courses are taught through which young people obtain a technical certification. These certifications seek to prepare young people for careers of the future, aligning with the needs of the private sector.

The municipality understands that culture can be a barrier to economic development. To combat this, they host “Innovatalk”, a series of annual conferences, covering topics regarding the new digital era. The people who participate in these conferences are businessmen, entrepreneurs and academics, among others. This event aims to lessen the knowledge gap in digital transformation as well as generate awareness among entrepreneurs and businessmen in the city.

Through the “Hogares IN”⁴ component of the program, technology acquisition is generated in 50,000 low-income households in the city, with a 40 percent subsidy granted for the purchase of a tablet. Citizens are trained in digital practices such as how to use learning platforms to boost their businesses and to help their kids with their educational challenges.

At the centerpiece of the innovation capabilities strategy is the platform of LAB INs, which have been established throughout the city. These spaces are designed to encourage and promote innovative practices. The municipality aims to generate active participants in the innovation process by doing and learning. Through the use of the laboratories and the innovation tools Guayaquil provides, citizens are brainstorming, discussing, and prioritizing problems and design solutions through the use of prototypes.

There are five LAB INs in the city, four equipped with resources related to areas of robotics and design (these are located in vulnerable/poor places in the city). The fifth is called the “LAB IN+” which has the following functionalities:

- **Design Areas:** designed for multidisciplinary groups that seek to create or improve viable alternatives for a given specific problem.
- **3D Printers:** 3D printing technology is capable of constructing the most diverse, three-dimensional objects. They can be used for applications including the printing of medical implants, architectural pieces, objects of machinery mechanisms and other elements, with simple, user-friendly interfaces.

³ Young people from 17 to 26 years old in life skills, and young people from 18 to 29 years old in technical certifications.

⁴ Participants: Head of household (18 years or older, Father or Mother of Family, Single Father or single mother (or), big brother or another relative).

- **Robotic Labs:** A space that allows for hands-on learning by fusing electronics, mechanics, and computer science through constructive processes such as programing, sensors, and actuators usage.
- **CNC Station:** With these, participants can design reliefs and contours with fine details in pieces of wood or metal using numerical processing, executing the CAD / CAM of the objects to work.
- **Laser Station:** enables the making of different structural schemes with perfect shapes, strokes and infinity of figures to assemble or execute according to the vectorization of designs.
- **Virtual Reality:** Provides an immersive experience for discovering how information processing manages to submerge in an almost real environment and obtain a perspective of digital environments.

Through these laboratories, 273 children have worked in the PIENSA INs and have contributed 39 solutions to problems such as urban garbage collection, accessible technology and more. Additionally, 682 young adults have been trained in new job-relevant skills, as well as life skills, with a goal of reaching nearly 1,000 in the next two years. As a result of all these strategies, Guayaquil has climbed in rankings of competitiveness cities, regularly ranking in the top percentile. As a result of changes in the methodology used by the Ministry of Education to measure high school

achievements — known as Ser Bachiller — the city's quality of education measure has seen great improvement, placing 31st among 113 cities measured. Ser Bachiller is an instrument that evaluates the development of skills that students must achieve by the end of middle education. The test is 100 percent digital and contains 165 questions distributed in the following assessment fields: mathematics, language, social sciences, natural sciences and abstract skills.

To accelerate its innovation strategy, the city of Guayaquil is also part of the MIT Regional Entrepreneurship Acceleration Program (REAP). Representatives from the business sector, local government, and society are working together to design an innovation acceleration plan, and aim to complete it by August 2019. Additionally, the city is subsidizing the provision of digital transformation coaching and training through the program called "Digital SME Challenge." Through this program, the city aims to generate awareness about the innovation and digital transformation taking place among small and medium enterprises. Before leaving his post, the former mayor of Guayaquil, Jamie Nebot, formed an innovation advisory council and public municipality company to continue to implement and prioritize innovation-based projects. The new mayor of Guayaquil, Cynthia Viteri, confirmed the committee and has made it a priority of her administration.

There are many lessons that Guayaquil can share with other citizens, to mention some:

1. Transformation requires leadership: Political leadership, business leadership, and academia leadership are all key.
2. Long Term Commitment: Guayaquil has been led for the last 25 years by political leaders from the same party. This has contributed to the creation of long-term, sustainable strategies led by different mayors with the same purpose.
3. Continued Investment in Education, Digital Access and Innovation Capabilities: Though the direct funding of education was out of Guayaquil's hands, roughly seventeen years ago the city began investing in the digital literacy of the citizens, and funding the evolution of Guayaquil into a smart city. Those efforts continue today.
4. Role of the Private Sector: The private sector plays a key role in the transformation, providing computers and innovation kits. Similarly, they must share what skills that they are looking for in their human talent.
5. Dynamic, Solution Oriented Focus: Cities should be results-focused, but should not be afraid to reinvent itself, generating new ideas and best practices.
6. Integrated Approaches to Innovation: Guayaquil provides state of the art infrastructure, open spaces for art creation, and innovation districts where the private sector had decided to invest. One example is Puerto Santa, where soon "Distrito 100" will be implemented, bringing together the Catholic University and the state university, providing spaces for entrepreneurs. Similarly, the city has invested in spaces to showcase art and music, through the creation of dedicated venues.

Challenges will always arise, but it seems that Guayaquil has the vision clear and the processes in place to review them from different perspectives and find solutions to overcome them. This makes us at the Center of Competitiveness and Innovation very optimistic for a future for Guayaquil as the innovation capital of Ecuador.

For more information

Max Nuñez Tomaselli, General Director — Educate Foundation.
(mnunez@e-ducate.org)

Author: María José Cabrera: Research Coordinator — Center of Competitiveness and Innovation

KAZAKHSTAN

Government for Citizens

Developing “last mile” solutions for public services through integrated processes and digital technologies

Challenge

Establishing an efficient, stable public sector is the challenge for any economy. For Kazakhs, the process for accessing public services was extremely inefficient; and obtaining government services required a lot of paperwork and waiting time. The system was bureaucratic, decentralized and slow. To access a specific service, citizens would have to go to numerous physical locations just to get the necessary supporting documents, which would take a lot of time.

This paper focuses on the solutions implemented to address this challenge, the problems encountered during the process, and the future outlook of these initiatives.

Solution

To address this challenge, the government financed the creation of a non-profit, joint-stock company known as “Government for Citizens.” Using a “one-stop-shop” principle, Government for Citizens digitized and centralized the public sector services in Kazakhstan. Several initiatives were implemented by the government to achieve the “one-stop-shop” goal for public services. First, the government created “Public Service Centers” (PSC) to consolidate public service resource centers. Secondly, the government digitized the system and introduced innovative technologies designed to reduce wait times and paperwork requirements. Finally, the government developed and renovated the associated infrastructure of these services to further enhance citizens’ experience.



rience. These systems allowed people to obtain any public service from one access point in a quick, easy manner.

Public Service Centers (PSC)

In order to solve the citizens’ problem of having to go to various locations to obtain different documentation, the government introduced the Public Service Centers in 2007, which centralized most of the available public services so that citizens only had to go to one place. Today, a citizen has access to more than 600 public services through a PSC, that cover the entire life cycle; such as marriage licenses, birth certificates, preschool enrollment, etc. Most of all available services in Kazakhstan today are offered through PSCs, which greatly reduces the required administrative processes associated with public services.

In order to deal with the increased demand, the operating hours were extended from 9am–8pm, including Saturdays. This increased the number of services that PSC could provide in a year. In order to increase the efficiency of PSCs, universal standards for front offices and a universal service system were introduced. This centralization enhanced the efficiency with which PSCs could serve the population. Currently, Government for Citizens provides 85 percent of all public services in Kazakhstan.

Digitalization

Another way in which we addressed the problem was by digitizing public services and promoting a new e-government portal, where citizens could access the available services online through an app or webpage. Today, citizens can avoid long queues and unnecessary paperwork by using the online portal, which collects all the necessary information and documentation for them. The most in demand public services — address certificate, certificate of no criminal record, certificate of pension deductions, certificate of registered property rights, certificate of presence/absence of housing, etc. — have been transferred to a completely “paper-free” format, so there is no longer a need to receive certificates in paper form.

Furthermore, PSCs underwent digitalization as well. The introduction of “Mobile Citizens Identification” project allows citizens to gain access to the e-government portal through facilities in the PSCs. The implementation of biometric data reading ensures security in using these services. PSCs also offer computer literacy training to teach the population how to use the e-government portal. With the help of this training, the population’s computer literacy rates are expected to reach over 80 percent by 2020.

Most recently, in 2017, in an effort to further enhance the citizens’ experience and increase the sector’s efficiency, Government for Citizens began to take a more proactive approach. Today, the state itself obtains all the required documentation for citizens, eliminating the need to visit

PSCs for paperwork. Clients can then receive the paperwork through free SMS messages or through the Telegram messenger application.

Digitalization of the public services system allows citizens to obtain services in a faster, easier way. The existence of an online portal means that citizens can access all their information with just one-click. The increased speed with which a service can be completed means that the public sector is finally becoming efficient. Today, 72 per cent of public services are offered electronically.

Infrastructure Renovation

To further enhance citizens’ experience while accessing public services, Government for Citizens set out infrastructure renovation initiatives at PSCs and other similar points of access.

The PSCs are equipped with all the necessary infrastructure to allow access for people with disabilities. All the PSCs have ramps, elevators, call buttons and separate areas for documentation processing tailored specifically to serve the disabled. Furthermore, Government for Citizens provides home visits to people with disabilities that prevent them from travelling to PSCs.

To elevate the client experience at the PSCs, Government for Citizens installed comfortable seating and temperature control in the waiting areas. Similarly, today there are also self-service sectors, cash desks and electronic queue ticket machines. There are also copy machines and photo booths allowing citizens to collect any necessary documentation and identification without

leaving the PSC. Everything is designed to make the process of obtaining public services as fast and convenient as possible.

In order to ensure the high quality of the process, Government for Citizens created a “Situation Center,” which conducts on-line video surveillance of the PSCs. This allows officers to quickly respond to problems such as long waiting lines and enables workers to find areas for improvements.

Further Challenges

Full digitalization of the public sector remains unattainable for the near future. There is still work to be done concerning the integration of information systems for authorized bodies and synchronization of databases in order to offer services to all the citizens of Kazakhstan. Part of the problem lies in the fact that the information databases are controlled by various agencies. Furthermore, some of the public services, such as the registration of acts of civil status of citizens of Kazakhstan abroad, or the issuance of sick leave from medical organizations, are not issued by the government and therefore cannot be integrated with other services offered through the PSCs.

Future Outlook

Government for Citizens is striving for more transparency, optimization and accessibility of public services. This will be done by expanding the process of digitization to further increase the efficiency of the public service system.

Government for Citizens is planning to implement blockchain technology to allow commercial banks to register their mortgages online. The company hopes that blockchain technology will allow financial transactions to become safer and more transparent while also becoming cheaper and faster.

Another major project is the “Unified State Real Estate Registrar,” which will create an information database of all the land fund and real estate objects, and consequently make life easier for enterprises and citizens.

Furthermore, Government for Citizens is hoping to expand beyond public services to the commercial sector including national telecommunications and utilities.

For more information contact

Zhuldyz Sadvakassova, Department of Management Committee Administration — Nur-Sultan (zh.sadvakassova@gov4c.kz)

References

Non-profit Joint-Stock Company “State Corporation “Government for Citizens” <https://gov4c.kz>

Ministry of Digital Development, Innovations and Aerospace Industry of the Republic of Kazakhstan <http://mdai.gov.kz/en>

“Digital Kazakhstan” Government program <https://digitalkz.kz/en/about-the-program>

The Strategy for the development of the Republic of Kazakhstan http://www.akorda.kz/en/official_documents/strategies_and_programs

KAZAKHSTAN

“Bolashak” International Scholarship Program for Talented Youth

Challenge

When Kazakhstan got its independence from the Soviet Union, it found itself unprepared and lacking the experienced leadership needed to run a sovereign state. The country had no experience with setting up a legal or a civil structure or establishing a private sector, because everything was passed down to them from the government in Moscow. Now, as an independent country, Kazakhstan had to find a way to educate leaders and bureaucrats; and find citizens who would be able to develop the country.

This paper outlines the solution found for that challenge and the positive impact it has had on the country. After, the paper discusses future challenges and outlooks for the program.

Solution

In 1993, the government created the Bolashak (from Kazakh for “the future”) Presidential Scholarship Program, where it would send the brightest applicants to study in leading universities abroad. The program, which includes tuition, travel, visa and living expenses, is completely financed by the government and is managed by the Ministry of Education. Since its inception to the present day, 13,500 students were able to get an education from universities such as Harvard and MIT. Recently, Bolashak has started financing MBA education opportunities from the 30 leading programs.



The Bolashak scholarship comes with the requirement to work five years in Kazakhstan upon graduation, which helps prevent brain drain from the country and ensures that the country gets to capitalize on the acquired knowledge.

The rigorous application requirements ensure that accepted students will succeed in a leading, foreign university and bring benefits to the country later on.

The program has changed Kazakh society in many ways. The program's diversity requirement allows students from even the most remote areas a chance to improve their financial future. The program has also given the country a supply of specialists to change the country's economy; it brought even more investment into the country; and the program also saw its participants become a bridge connecting Kazakhstan to the rest of the world.

Bolashak Quick Facts

- In 25 years of Program operation 13,449 scholarships have been awarded.
- Presently, 10,585 graduates have been trained under the Bolashak Program, including 5,546 Master students, 2,848 Bachelor students, 141 PhD candidates, 1,914 research scholars and 136 postgraduate researchers, interns and clinical residents (medical scholars).
- Out of the total number of alumni:
 - 54 percent completed training in humanities;
 - 37 percent in engineering and technical subjects;
 - 7.2 percent in medical subjects; and
 - 1.8 percent in fine arts.
- Country breakdown among graduates:
 - UK and Ireland, 44.8 percent;
 - USA and Canada, 25.6 percent;
 - Europe, 14.7 percent;
 - Asia, 6.9 percent; and
 - Russia, 8 percent.

The Bolashak program has a strong diversity requirement. This means that the program gives equal opportunity for all citizens to apply. To this day, scholars represent 29 ethnicities from various regions and are evenly split between male

and female. The scholarship has changed the lives of Kazakh students by giving them access to educational and career opportunities they might not have had otherwise.

The program's impact on the national level is even more profound. The Bolashak scholars have been a major force in the transformation of the Kazakh economy through the development of the private sector. Bolashak graduates today are part of leading companies such as Procter & Gamble, Shell and Air Astana. Many more have impacted the country's policies through their work in government ministries and national companies. Additionally, Bolashak scholars use their knowledge to improve their workplaces, enhance ethical standards and teach their colleagues.

The Program has also indirectly helped to bring outside investment into the country. Having graduates from leading universities worldwide give Kazakhstan a competitive advantage. Investors are able to see that the country has a huge pool of very talented candidates with a global outlook.

Globally, Bolashak scholars have acted as proud ambassadors for Kazakhstan, which until 1991 had been secluded from the rest of the world. Bolashak has trained a cohort of young people who have a global network of connections. Studying abroad gives Bolashak graduates the advantage of forming a network of equally capable students who will be leaders in their own spheres one day. This network will be invaluable to the future of Kazakhstan.

What Comes Next and Future Challenges

With the pace of technological change, Bolashak must continue to evolve alongside it. This increased pace of change has highlighted the challenges that the program faces today.

A college degree itself is no longer the sole requirement in a job application, and many scholars encounter hardships having had no prior work experience. One of the proposed initiatives to tackle this problem has been to give scholars a choice to postpone their return date so they can get an internship abroad. This would allow the returning candidates to bring back knowledge to further improve the country's business, research and education sector.

Another ongoing issue is the development of the country's STEM field. A proposal has been to increase the number of Bolashak scholars in STEM fields in order to bring back the essential knowledge.

QATAR

Development of a National Innovation Strategy for Impact and Competitiveness

Keywords

Strategy and Leadership, Higher Education Institutional Development, Transformative Innovation, Competitiveness

Abstract

In this paper, details on the development of a comprehensive transformation strategy for a large scale national University are provided. The Qatar University Strategy (2018-2022) is organized around strategic highlights and drivers derived directly from the University's mission, new vision, core values, and comprehensive strategic context analyses. Qatar University (QU) strategically aims to foster "distinctive excellence" in its four key performance areas: Education, Research, Institution, and Engagement. QU's goal is to maximize impact on its internal and external stakeholders; and advance knowledge, and drive entrepreneurship and innovation on a national level. This broad aim has been translated into six main strategic goals to be actualized through efforts in seven focus areas: (1) Teaching and Learning, (2) Student Experience, (3) Research and Knowledge Advancement, (4) Institutional Excellence, (5) Engagement, (6) Digital Transformation and (7) Entrepreneurship and Innovation. The overall strategic goals of QU were mapped into a set of objectives for each focus area, a set of objectives, along with initiatives for implementation. This paper provides details on the QU 2018-2022 transformation strategy, as a model of development for higher education institutions that seek



transformation, impact, and competitiveness beyond the traditional role of University as a provider of education and producer of research.

Introduction and Strategic Context Analysis:

Qatar University is the National University of Qatar and the largest provider of higher education in the country; with 20000+ students, 10 colleges, 17 research centers and 86 undergraduate and postgraduate programs. QU is one of the fastest growing universities in the Middle East in terms of research and is ranked in both QS World University Rankings (#276 in 2020), and in Times Higher Education (Top 500 in 2018; Top 200 in engineering and technology). The majority of QU programs are internationally accredited.

The 2018-2022 Qatar University Strategy has been built upon the accomplishments and experience of previous strategy cycles, with the aim to attain a transformative leap for QU. A significant strategic context analysis was performed, which examined national needs; stakeholders' aspirations and requirements; international and

regional trends; and Qatar's future plans as outlined in Qatar National Vision 2030 (QNV, 2030). Following the strategic context analysis, QU's vision and mission were updated to incorporate key strategic headlines and drivers, addressing the necessity of building upon previous achievements of QU reform to advance transformation in this upcoming cycle.

In terms of Qatar's national educational needs, Qatar University is a significant contributor to higher education capacity; with a network of over 45,000 alumni. The University at any given time hosts 12,000+ national students, which is significantly high number given the low overall population of the state of Qatar. Several QU programs are unique and only offered in Qatar by QU. As a national University, QU is increasingly expected to cater to the national need for access to higher education for Qatari students; produce flexible programs aligned with the socio-economic needs of the country; and commit to the success of these students while in University. As the country is stepping towards transformation into an innovation and knowledge-based economy as set by the National Vision 2030, QU is expected to play a major role in contribution to this national transformation. This requires QU, as a driver of innovation and knowledge advancement, to excel further in education, research, innovation and socio-economic development to contribute to the nation of Qatar.

Furthermore, on top of emerging national needs, the international higher education community is expected to undergo a significant evolution, with higher demand for focusing on innovation and entrepreneurship; embracing the fourth industrial revolution and digital transformation; and diversifying institutional revenues beyond governmental support, while also maximizing sustainability of resources. Universities that have embraced widening national/regional engagement and adopted recent developments in higher education roles have been referred to as Universities of the Future, or, "University 4.0."

The current critical rethinking of higher education roles and responsibilities from pure teaching and research institutions, to those actively engaged in sustainable development and socio-economic impact, is being reflected in the new "University Impact Ranking" from Times Higher Education. This context analysis led to the formulation of a new vision for QU, emphasizing on its key mission. In the next section, more details on the emerging strategic headlines that drove the strategy development are provided.

Strategic Headlines

There are two key strategic headlines that have been derived from the context analysis and QU vision and mission. From these strategic headlines are derived QU's six transformative goals for the University; which guided the development of their detailed strategy.

The strategic headlines are:

Vision Driven Headlines: Qatar University will aim to promote and achieve “Distinctive Excellence” in its main thematic key performance areas:

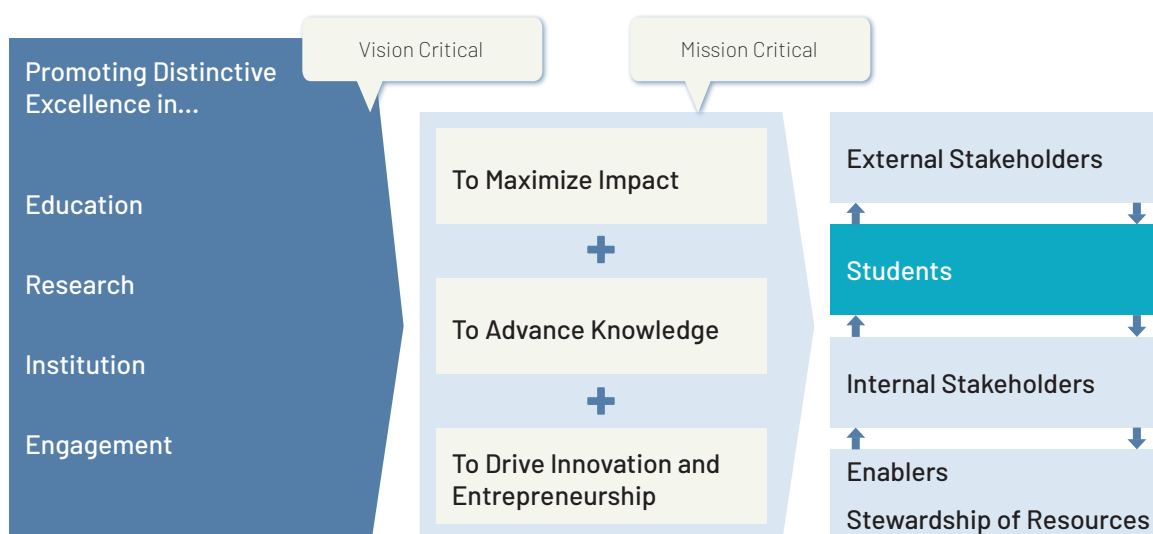
- Education (Teaching and Learning, and Student Experience)
- Research
- Institution
- Engagement

Mission Driven Headlines: Qatar University will utilize its distinctive excellence in its mission as the National University to:

- Maximize impact on its stakeholders (in particular students, as QU strives to be a student-centered institution)
- Advance knowledge
- Drive entrepreneurship and innovation

Figure 1 shows a conceptual diagram of the QU strategic headlines shaping its new transformative strategy (2018-2022).

Figure 1. Key QU Strategic Headlines

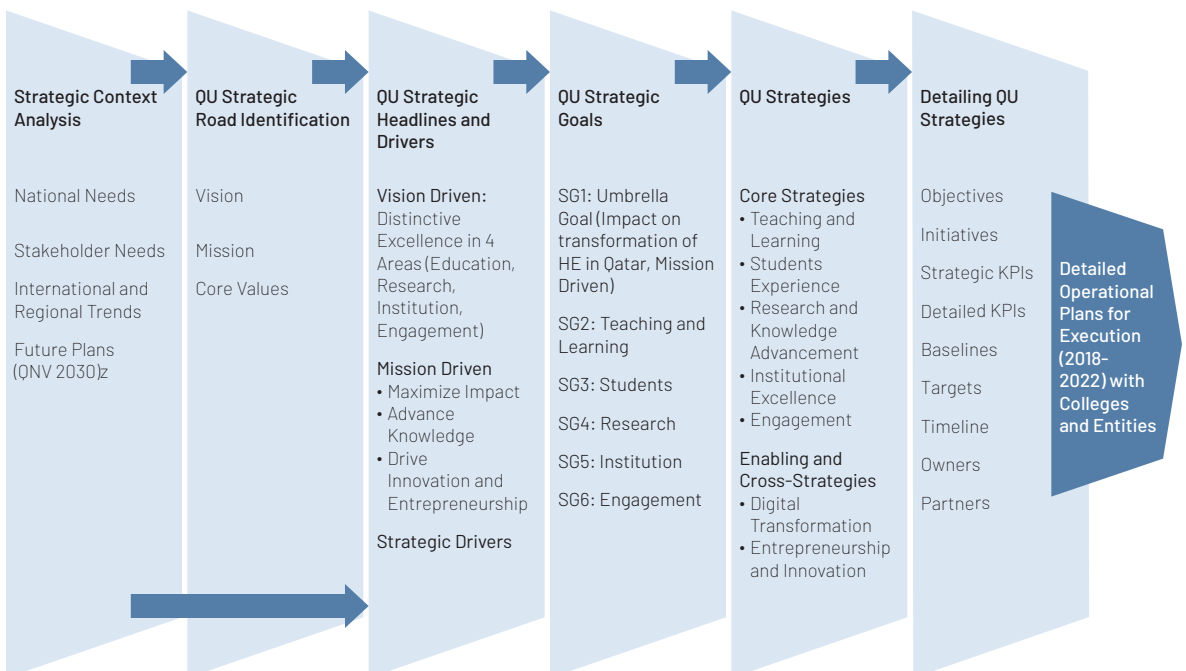


From Guiding Vision & Mission Toward Initiatives for Implementation

The guiding mission, new vision, and the derived strategic headlines and drivers have led to the formulation of QU's core values and six transformative strategic goals for the University. Subsequently, seven strategies have been developed in order to address how QU will implement these goals. For each strategy, a set of objectives

have been formulated, together with details on initiatives for implementation (including key performance indicators, targets, timeline, etc.). See Figure 2 for details on the process of moving from strategic context analysis through mission & vision, strategic headlines & drivers, goals, strategies, objectives, and initiatives for implementation.

Figure 2. Process of Moving from Strategic Context Analysis Through to Implementation Initiatives



2018–2022 Qatar University Strategy Structure

The QU strategy is composed of six goals and seven strategies to achieve these goals. Each of the strategies is broken down into primary objectives and initiatives for implementation. All sub-strategy objectives have been mapped according to the six strategic goals of the University, as it will be highlighted in the next section of this paper. The seven strategies are divided into core strategies (structured around the themes of “distinctive excellence” in QU key performance areas as shown in figure 1) and cross-sector enabling strategies.

Core Strategies

- Teaching and Learning Strategy
- Student Experience Strategy
- Research and Knowledge Advancement Strategy
- Institutional Excellence Strategy
- Engagement Strategy

Cross-Sector Enabling Strategies:

- Digital Transformation
- Entrepreneurship and Innovation

Figure 3. shows a conceptual diagram of the structure of QU strategies, where objectives are mapped into the QU six strategic goals. Those goals are addressing the strategic headlines emerging and strategic drivers. The next section

will outline the main highlights of QU Strategy, including its vision, mission, core values, strategic goals and objectives.

Vision & Mission of QU

Vision: To be regionally recognized for distinctive excellence in education and research, as well as for being an institution of choice for students and scholars; and a catalyst for the sustainable socio-economic development of Qatar.

Mission: Qatar University is the premier national institution of higher education in Qatar. Its mission is to provide high quality undergraduate and graduate programs that produce competent graduates, destined to shape the future of Qatar. To this end, the university community fosters diverse and committed faculty not only teach, but conduct research which addresses relevant local and regional challenges; advances knowledge; and contributes actively to addressing the needs and aspirations of society.

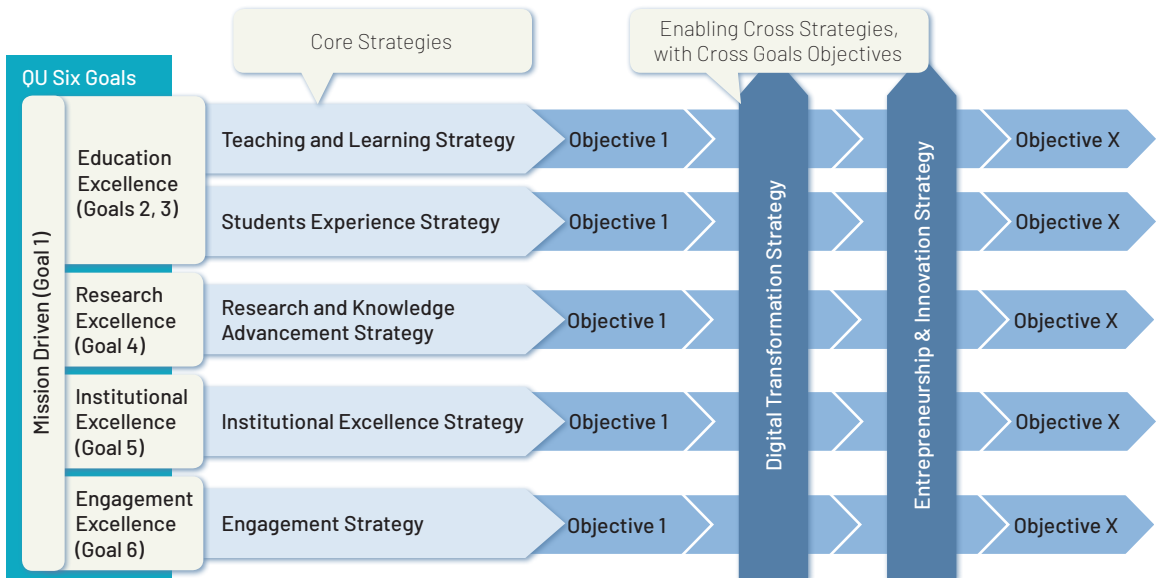
Core Values

Qatar University is committed to a system of core values derived from its guiding principles. These values are aligned with the University’s mission statement, and include six core values as mentioned below.

Excellence: We are committed to the highest standards of quality and professionalism; and to achieving excellence in everything we do.

Figure 3. Structure of QU Strategy

Mapping areas of excellence identified from the strategic headlines to goals, core strategies, and objectives. Cross-strategies have objectives that are spread cross QU Goals.



Integrity: We are committed to integrity and to the highest ethical standards of honesty, fairness, transparency, responsibility and accountability.

Academic Freedom: We are committed to an environment that supports responsible freedom of inquiry, expression and the search for truth.

Diversity: We embrace diversity that respects our religious and cultural tenants; and we con-

sider a diverse faculty and student body a source of strength that enriches our educational and work environment.

Innovation: We foster innovation through encouraging our students, faculty and staff to explore novel ideas in an environment of free and open inquiry; to pursue the discovery and application of knowledge; and to develop innovative solutions.

Social Responsibility: We promote positive and proactive engagement with the community grounded in a sense of its aspirations and needs.

Strategic Goals & Their Underlying Objectives

Goal 1 Statement (Transformation of Higher Education in Qatar)

To proactively play a leading role in shaping and enabling the transformation of the Higher Education System in Qatar.

Objective 1.1 (QU Qualifications Framework):

Develop the QU Qualifications Framework based on clear statements of graduate attributes and a comprehensive competency-based curriculum in line with QU mission, vision, values and distinctive mandate as a national university.

Objective 1.2 (Access): Enhance overall access of Qatari nationals higher education, with an increased focus on STEM areas.

Objective 1.3 (Flexibility): Foster flexibility in educational offerings, delivery models and graduation pathways; and adapt programs to current and emerging future needs.

Objective 1.4 (Impact): Enhance talent development and capacity building programs in order to meet university and national needs.

Objective 1.5 (Digital Culture and Competency): Develop the digital culture and competency of the QU community and beyond.

Objective 1.6 (Entrepreneurship and Innovation Mindset): Foster and nurture the culture and mindset of entrepreneurship and innovation in QU and beyond.

Goal 2 Statement (Education Excellence)

To be regionally recognized for the provision of holistic education that is transformative, learner-centric, experiential, research-informed, competency-based, digitally enriched and entrepreneurial.

Objective 2.1 (Excellence Framework): Implement the QU Education Excellence Framework of learner-centric, experiential, research-informed, digitally enriched and entrepreneurial education.

Objective 2.2 (Quality): Nurture quality enhancement processes across QU's educational system and improve QU's international standing in overall regional and global rankings, as well as in discipline-specific rankings.

Objective 2.3 (Efficiency): Develop new models for sustainable, efficient and revenue generating educational offerings.

Objective 2.4 (Entrepreneurial Competency): Develop entrepreneurial competency of QU students, faculty, the wider Qatar community and beyond.

Goal 3 Statement (Graduate Excellence)

To prepare graduates who are well rounded, with attributes and values that maximize their impact.

Objective 3.1 (Student Experience Framework): Provide students an environment to engage with their studies and co/extra-curricular opportunities, through which they can develop the essential QU graduate attributes, competencies and employability skills.

Objective 3.2 (Assessment): Ensure students' needs, aspirations and expectations are understood through regular and comprehensive assessment, evaluation and databased action.

Objective 3.3 (Communities): Create and support multiple communities through which students can learn and develop.

Objective 3.4 (Student Support): Provide support to students that is pro-active as well as reactive and that grants students the opportunity to fulfill their potential through timely and helpful feedback.

Objective 3.5 (Leadership): Provide learning and leadership opportunities that promote student development, growth and success.

Goal 4 Statement (Research Excellence)

To excel in research that is focused, relevant, measurable, solution oriented, impactful, collaborative and advances knowledge and innovation.

Objective 4.1 (R&D Impact): Enhance impact and support of research and innovation in certain fields that are in line with national research priorities, as well as respond to the current and future socio-economic needs of Qatar.

Objective 4.2 (R&D Culture and Environment):

Foster research and innovation culture within the Qatar University community and offer the necessary supporting environment.

Objective 4.3 (R&D Sustainability): Diversify and sustain funding resources for research projects at Qatar University.

Objective 4.4 (Graduate Studies Excellence):

Emphasize excellence in QU graduate programs in order to serve research priorities and to ensure the active participation of graduate researchers in enriching knowledge-based economy in Qatar.

Goal 5 Statement (Institutional Excellence)

To be recognized as a benchmark for organizational and operational excellence and sustainability.

Objective 5.1 (Finance): Enhance financial sustainability.

Objective 5.2 (Operations): Improve operational/process efficiency.

Objective 5.3 (People): Increase talent sustainability.

Objective 5.4 (Organization): Achieve efficient and optimized organizational structure.

Objective 5.5 (Legal Standing): Achieve full legal, financial, and administrative independence.

Objective 5.6 (Digital Institution): Enhance effectiveness and efficiency of infrastructure, governance and administrative processes in the University via technology and digital transformation.

Goal 6 Statement (Engagement Excellence)

To foster effective engagement with local and international stakeholders to enrich education, strengthen research, impact socioeconomic development and enhance our visibility and image.

Objective 6.1 (Expertise): Promote the role of Qatar University as a source of expertise to serve national needs.

Objective 6.2 (Partnership): Strengthen effective local, regional and international partnerships in strategic areas to be a catalyst for the sustainable socio-economic development of Qatar.

Objective 6.3 (Belonging): Cultivate a sense of loyalty to and engagement in University initiatives among university employees, students and alumni.

Objective 6.4 (National Digital Impact): Position QU as a driver of national digital ecosystem development and an international leader in digital innovation and transformation.

Objective 6.5 (E&I National Impact): Enhance Qatar's entrepreneurship and innovation ecosystem in collaboration with Qatar's government, industry and funding organizations.

Conclusion

In this paper, details of a major change in the transformation strategy of Qatar University have been provided. The new strategy design was driven and inspired by national transformation needs, stakeholders' aspirations and recent international trends and emergences in higher education. While the strategy has been developed for Qatar University, its vision, mission, goals, and objectives can be adopted and adapted to other national Universities seeking transformation, impact, and competitiveness, with varying degrees of minor to major modifications depending on the context of the University. As implementation of the QU transformation strategy progresses in the future, it aims to disseminate emerging models and outputs together with the process of implementation for the wider community of higher education senior leaders and strategic development stakeholders.

About the author

Dr Mahmoud Abdulwahed, Dr Hassan Al-Derham

UNITED STATES

The New American University

At Arizona State University, we pride ourselves on being a model of the New American University. Our focus is on providing not only a comprehensive quality education, but also an environment of inclusiveness, where higher education is accessible for all. Our transformational strategies and initiatives are designed to have a global impact on higher education, economic development, future workforce preparation, technological growth and advancement, and cultivation of public-private partnerships.

Academic to Enterprise Model

ASU has worked diligently to transform our educational dynamic from a solely academic model to an enterprise model. Our objective is to be an illustrative model of community engagement that has a transformative impact not only on students and the community, but on the economic growth of Arizona as a whole. The animating purpose of this strategy is in achieving measurable social transformation and realizing various degrees of economic success. In an academic enterprise model of education, we connect instructional education priorities to real-world knowledge generation — it is not simply learning for the sake of learning, but for creating entrepreneurial-minded, lifelong learners capable of embracing the connection between the classroom and the post-graduation professional world.

In an academic enterprise, expectations of management includes leadership at all levels working in entrepreneurial fashion with a level of



accountability drawn from demonstrated, measurable economic and social progress. As a global community and a leading research institute of choice for international scholars, the impact on society should accordingly have global reach and applicability.

Industry and Government Collaboration

ASU's enterprise model is driven by collaboration with industry and government. This is a critical element of our competitiveness strategy.

Engaging with industry creates a synergy which grants us a current, comprehensive understanding of what corporates want and need in future college graduates. This allows us to continually evolve our course offerings and educational paradigms to ensure a skilled and workforce-ready graduate pool. We don't simply ask business owners what they look for in future employees; rather, we embed our students within businesses, which provides them with practical real-world experience, while simultaneously creating

a custom talent pipeline for employers. One such example of this concept is demonstrated by our newly introduced Practice Labs.TM

Practice Labs offers an experiential learning framework in the context of a strong university-corporate partnership. Practice Labs serves as a problem-solving team for companies, embedded in the university environment. This emerging brand of university-corporate partnership chooses dynamic ASU students from a variety of academic disciplines to engage as innovators in companies of all sizes. Students have an opportunity to work in the corporate world in a team environment, while also participating in university academic pursuits. Students enrolled in university are thereby immersed in the corporate culture, learning the environment, assessing needs and developing actual solutions to pressing business problems. Corporate partners who sponsor Practice Labs gain access to unique, diverse, and most importantly, fresh perspectives from our students. They work in tandem to evaluate, develop and implement high-level strategies for solving complex issues.

The Practice Labs concept is a concrete example of a best practice in competitiveness strategy. It provides students with unparalleled learning opportunities; it fosters long-term, mutually-beneficial relationships with corporate partners from a wide range of industries; it creates a pathway to high-level employment opportunities for ASU graduates, which increases recruitment opportunities for the university; and it allows for

experiential learning and research that have the potential for far-ranging societal and economic impact.

One such example of this practice in operation is ASU's collaboration with Starbucks: The Starbucks College Achievement Plan. This affiliate agreement provides all eligible U.S. Starbucks partners with 100 percent tuition coverage at ASU, allowing them to choose from more than 80 online bachelor's degree programs. The program is an example of both an effective corporate partnership and the integration of technology with educational offerings. In 2019, EdPlus, an ASU enterprise unit that develops innovative digital learning platforms, was recognized as Fast Company's Most Innovative Company in the education category.

Another innovative approach to experiential learning can be found in ASU's interdisciplinary Luminosity Lab, an applied research and development space that aims to positively impact society through the use of emerging technologies. Students have the opportunity to participate in high-level invention and development projects, including the design of novel technology products. They frequently work in concert with corporate partners and government agencies.

Engaging with government entities at the local, state and national levels provides an additional element to ASU's competitiveness strategy. We work proactively in collaboration with government entities to address societal and economic development challenges with the understanding

that a healthy and thriving community benefits us all. Operating in collaborative, symbiotic fashion with all levels of government has been a key element of ASU's best practices model that has borne significant positive results.

ASU's Consortium for Science, Policy, and Outcomes (CSPO) operates on multiple scales, with offices in Tempe, AZ and Washington, DC. CSPO is an independent unit within the [College of Liberal Arts and Sciences](#) at ASU, with university-wide faculty appointments, faculty affiliates, staff, programs and projects. CSPO collaborates with an array of other units including the [Biodesign Institute](#), the [Global Institute of Sustainability](#), the [Center for Biology and Society](#), the [Center for Cognitive Ubiquitous Computing](#) and the [Center for the Study of the Law, Science, and Technology](#).

Another example of local governmental collaboration can be found in the launch of ASU's Healthy Urban Environments Initiative, conducted in partnership with the Maricopa County (AZ) Industrial Development Authority. The project was aimed at conducting research on urban heat and air quality improvement measures with a goal of developing a smart, sustainable future. The project also had an objective of developing an innovative model that could be implemented in other extreme environments around the world through the application of use-inspired research. The result: a pairing of an academic entrepreneurial mindset with a local government entity that created real-world solutions with significant and far-reaching societal and economic impact.

While ASU works in accord with the state of Arizona on numerous issues of shared importance, we also maintain a degree of autonomy, and are continually assessing ways in which to advance our mission and goals. In 2002, ASU had an operational scale of close to \$840M, with approximately 38 percent coming from the state — by 2017 only 12.6 percent of funding came from the state and revenue topped \$2.4B.

At the state level, ASU leadership serves in an advisory capacity on research-related matters, further strengthening the relationship with government. In 2018, ASU Executive Vice President and Chief Research and Innovation Officer Sethuraman (Panch) Panchanathan was named Arizona Governor Doug Ducey's Senior Science & Technology Advisor. This role allows ASU to play a leading role in affecting science and technology policy in critical areas including economic development, data science, biotechnology and the internet of things; as well as in the burgeoning field of autonomous vehicle development and integration.

Nationally, ASU serves in an even larger governmental advisory role. Panchanathan is a long-standing member of the National Science Board, providing guidance and insight on key issues related to science policy on a national scale. He is further involved in advising on issues related to best practices in academic and research integrity and prevention of intellectual property theft, while simultaneously supporting fundamental collaborative research prac-

tices across borders. Panchanathan is similarly involved with the U.S. Government's Industries of the Future and American AI Initiatives, serving as a vocal expert resource on matters related to developing comprehensive AI research and ethics policies, as well as on sharing strategies for ensuring a fully educated, trained and versatile future workforce.

The local, state and international advisory roles held by ASU leadership are another example of best practices in competitiveness strategy. Government entities benefit by having access to ASU resources, research and intellect, while the university has the benefit of influencing public policy on a number of levels.

Workforce Preparation and Lifelong Learning

While institutes of higher education have always been challenged with continually identifying, refining and implementing best practices for preparing students for the future of work, advances in artificial intelligence and machine learning are changing this paradigm. To remain competitive, universities must take a proactive approach to modifying and evolving educational offerings to ensure student and employer needs are well served, now and in the future.

ASU has always been proactive in terms of encouraging students to work across disciplines and immerse themselves in experiential learning environments. We have also promoted the

necessity of developing as lifelong learners, helping students learn how to learn across continually shifting professional borders. The advancement of AI and ML have necessitated the university embracing this concept at the institutional level as well.

In past iterations of industrial transformation, low-skilled manual labor jobs were the ones most often impacted by advances in technology. Today, even jobs previously thought of as "safe" from automation — such as healthcare and transportation — are likely to be impacted by AI in one form or another, mandating educators to find new ways to prepare students for a continually evolving workplace landscape. In fact, the World Economic Forum Report, *The Future of Jobs 2018*, indicates machines and algorithms in the workplace are expected to create 133 million new roles, but cause 75 million jobs to be displaced by 2022.

Universities worldwide would benefit from developing and sharing innovative approaches to addressing the advancing change being borne of AI advancement. At ASU, best practices include cross-disciplinary education and experiential learning opportunities; educating students on the changing nature of various occupations and the potential pivots that will likely be necessary to remain relevant in the future; setting an expectation for the need of lifelong learning, re-education, upskilling and retraining, and developing methodologies for implementation. Emphasizing the importance of "soft skills," including empathy

and creativity, across every academic discipline, is another means for creating well-rounded graduates. We are also exploring all manners of ways to deliver relevant educational options in the future — including stackable credits, micro-credentials, certificate programs and mentoring programs, as well as an approach to working with other educational institutes, particularly those that focus on skilled technology workers.

International Engagement

ASU is one of the top research institutions of choice for international students. We pair our commitment to cross-cultural, interdisciplinary research and education with active engagement and support for our diverse student population. More than 13,460 students at ASU represent 135 different countries. Financial contributions from foreign students attending ASU totals \$366.3 million, and nearly 60 percent study in STEM fields.

In a traditional academic setting, enlightenment of individual students is the focus, delivered via immersive instruction and self-governing professionals; in an academic enterprise model, social transformation and economic success is the objective, and is achieved through connecting instruction to knowledge generation at a society-impacting scale. This type of model promotes diversity, results in demonstrated social and economic progress, and has the potential to be scaled and implemented on a global level.

One such way that ASU demonstrates the relationship between educational attainment and economic growth is by focusing on underserved and underrepresented student groups, as well as on our vast international student population. We have developed best practices for closing the gap in educational achievement for Hispanics, demonstrating the potential economic benefit of this effort. From 1975-2017, more than 34 percent of the adult population earned bachelor's degree, while amongst the Hispanic population, that figure was cut by half. The result of this paradigm is not only an under-education of a significant portion of Arizona's population, but a decreased earning and spending power of this significant base. We estimate closing this educational attainment gap could have a \$428.5 billion annual, nationwide impact on earned wages for this demographic, as well as a resulting in a \$127.7 billion increase in state and federal income tax revenue.

ASU is also home to the Indigenous Design and Construction Initiative, a use-inspired design and construction program which brings together tribal community members, industry, and a multidisciplinary team of ASU students and faculty to co-design and co-develop solutions for tribal communities in Arizona.

There is, of course, ongoing international discussion and debate about the intrinsic value of international collaboration in both fundamental and applied research in university settings. At the core of the matter is the issue of protecting

intellectual property. ASU has taken an active role in addressing this issue, as well as in continually evaluating our own internal policies and further developing high-level protocols in this arena. Best practices include acknowledging the substantial contributions international faculty and students have on ASU's research enterprise, while simultaneously employing steps to ensure protection of IP and sensitive research. We fully recognize that a competitiveness strategy in this vein requires firm protocols paired with an appreciation and welcoming approach to facilitating international collaboration.

ASU's commitment to diversity and global engagement is embedded in our university charter, design aspirations and culture, and is consistent with our commitment to societal impact and lifelong learning. We have increased investment in global research, instruction and public service by 40 times since 2008, and in the past six years, engaged with more than 270 partners in more than 40 countries. In 2018, ASU proudly received the Association of Public and Land Grant Universities' (APLU) Gold Level Institutional Award for Global Learning, Research and Engagement. The award recognizes institutions with a demonstrated commitment to inclusivity, internationalization of research and engagement, leadership and pervasiveness and assessment.

Maintaining a competitive strategy is dependent on a willingness to continually evolve and develop best practices across all areas of engagement. It is also fostered by creating partnerships, sharing ideas and resources and focusing on creating societal impact, with speed, at scale. ASU's most notable effort in this arena can be found in leveraging our inclusive approach, harnessing our innovation mindset and maintaining a commitment to work in tandem with other entities to collaborate efforts toward solving global grand challenges.

UNITED STATES

Accelerating and Transforming Advanced Manufacturing in the United States

Setting the Stage

Throughout history, the great leaps in productivity and prosperity at the heart of national competitiveness have come through the emergence, adaptation and adoption of new processes, materials and technologies. Innovation — the intersection of invention and insight, leading to the creation of social and economic value — is the life-blood of the global economy and the catalyst behind these trends. Innovation is deeply embedded in America's DNA. From birth, the United States has been fundamentally about exploration, opportunity and discovery; about new beginnings; about setting out for the frontier.

When the Council on Competitiveness (Council) began to explore the energy and manufacturing nexus in 2007 through its Energy Security, Innovation and Sustainability Initiative, the world looked very different. Energy consumption was rising exponentially, driven by worldwide population growth, swiftly developing economies, improving global living standards and the burgeoning use of ever more energy-dependent technologies. America's growing dependence on imports to meet energy needs had become a major factor in the trade deficit, accounting for more than 45 percent, while dependence on foreign oil translated into an outflow of \$439 billion dollars annually by the third quarter of 2008.¹ At the same time, the growing dependence on



foreign sources of natural gas and petroleum was posing a serious challenge to U.S. national and economic security, and private sector leaders were beginning to embrace the imperative for sustainability and transition to a low-carbon world.

Today, America finds itself facing a new, promising frontier shaped by two powerful transformations working in tandem:

- The generational re-emergence of advanced and highly productive manufacturing capacity in the United States; and
- The increasing abundance of innovative, sustainable, affordable and domestically-sourced energy.

The ability to capitalize on these transformational shifts will be paramount for U.S. competitiveness, now and in the decades to come.

¹ <https://www.eia.gov/todayinenergy/detail.php?id=17191#>, July 29, 2019.

The Manufacturing Engine

The U.S. manufacturing sector remains the nation's primary driver of research and development, a major employer of science and engineering graduates and a central catalyst for technology innovation throughout the economy.

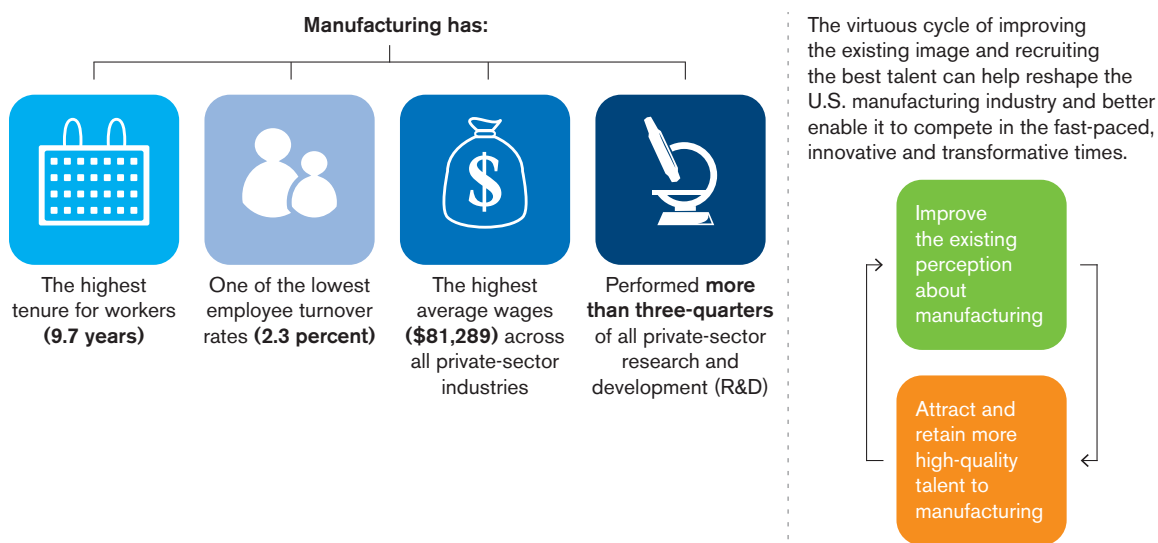
Manufacturing remains critical to American economic prosperity and the future of U.S. global competitiveness. As a sector, manufacturing

contributes approximately 11.6 percent of U.S. GDP² and employs more than 12 million people directly in addition to supporting 5.4 million more jobs indirectly.³

As Figure 1 highlights and the Council's 2011 *Make* report made clear, manufacturing jobs are no longer dirty, dumb, dangerous and disappearing, but are high-tech, high-paying and highly sought after positions at the forefront of the U.S. manufacturing resurgence. Importantly, the

Figure 1. Addressing the Manufacturing Skills Gap: Sharing the Good News to Attract and Retain Top Talent

Source: Deloitte and the Manufacturing Institute. *A Look Ahead: How Modern Manufacturers Can Create Positive Perceptions with the U.S. Public.*



² Gross Domestic Product by Industry: First Quarter 2018, Bureau of Labor Statistics and Bureau of Economic Analysis.

³ Bureau of Labor Statistics, Employment by Major Industry Sector, October, 2017.

manufacturing sector adds \$1.34 in output from other sectors for every dollar in final sales of manufactured products—the largest multiplier of any sector.⁴

A Transformation in Production

Today, U.S. manufacturing stands at a critical juncture. A deep and disruptive transition in U.S. manufacturing has taken place since 2000, with more than 60,000 American factories, companies and almost 5 million manufacturing jobs lost from 2001 to 2014.⁵

However, particularly since the Great Recession, the pendulum has started to swing back in the direction of the United States. Wages overseas are rising; for example, labor costs in China more than quadrupled from 2004 to 2016.⁶ The shale oil and gas boom has given many American producers a critical cost advantage. Meanwhile, according to the *Global Manufacturing Competitiveness Index*, a joint Council effort with Deloitte, industry executives now rank the U.S. No. 2 globally for manufacturing competitiveness, only behind China, and trending up during the past decade.

At the same time, U.S. manufacturing is in the midst of an ever-evolving digital disruption. The physical and digital worlds are converging

across numerous dimensions through sensors, networks, additive manufacturing and a data tsunami. Sensing and computing across natural, built and social environments are generating data at unprecedented scale, complexity and speed.

In production alone, companies will have the ability to better understand the operation of every machine and device, the cut of every blade, every movement of material and the consumption of energy minute-by-minute. Virtual design through modeling and simulation using advanced computing will accelerate innovation and product development, while dramatically reducing costs and risks.

Autonomous systems are advancing rapidly. Applications such as drones and driverless vehicles are being applied in factories to detect and react to problems, enabling the adaptation of machinery and systems to changing conditions. This is a productivity revolution in the making. According to a March 2019 report by Microsoft Dynamics 365, investments in smart manufacturing and the explosion of the Internet of Things could generate cost savings and productivity gains worth \$10-\$15 trillion in global GDP over the next 15 years — that is almost as big as the U.S. economy.⁷

⁴ Facts About Manufacturing, Manufacturing Institute, MAPI, National Association of Manufacturers.

⁵ Statistics of U.S. Businesses, The United States Census Bureau, 2015 (accessed September 2018).

⁶ Bank of America Merrill Lynch Global Research, January 14, 2016.

⁷ <http://info.microsoft.com/rs/157-GQE-382/images/EN-US-CNTNT-Report-2019-Manufacturing-Trends.pdf>, July 29, 2019.

Decoupling Energy from Growth

Interestingly, American economic growth is picking up steam without a parallel increase in energy consumption. Since 2008, primary energy usage has shrunk 1.7 percent, even as GDP has accelerated by 15.3 percent (see Figure 2).⁸

This occurrence of economic growth without a corresponding increase in energy consumption is consistent with a long-term decoupling trend the United States has seen during the past 20+ years. From the years 1950–1990, demand for electricity increased annually at an average rate of 5.9

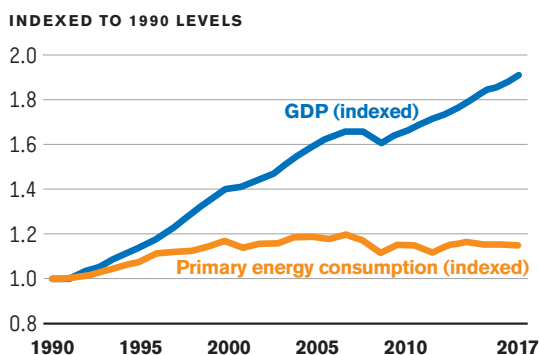
percent. However, this pattern took a dramatic turn from 1990 through 2007, when the demand for electricity dropped to 1.9 percent growth per year. Since 2007, however, the United States has seen a contraction in electricity demand per year by an average rate of 0.2 percent. And in 2017, energy usage shrunk 1.7 percent while U.S. GDP increased by 15.3 percent.⁹

This decoupling of economic growth from energy use can be attributed to a variety of factors, including an increase in energy productivity—doing more with less—generating greater economic well-being for the amount of energy used,

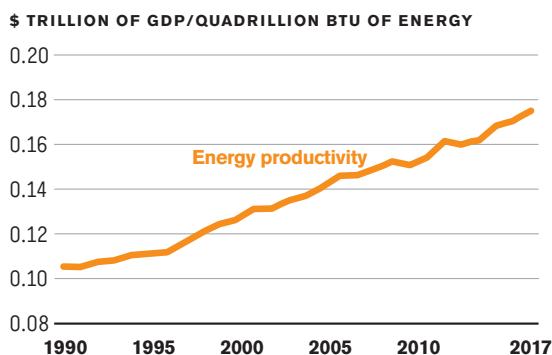
Figure 2.

Source: Bureau of Economic Analysis, EIA, Lawrence Berkeley National Laboratory, BNEF.

U.S. GDP and Primary Energy Consumption



U.S. Energy Productivity



⁸ 2018 Sustainable Energy in America Factbook, Bloomberg, 2018.

⁹ *ibid.*

and improving living standards and quality of life.¹⁰ In response to a presidential call to action and in recognition of the importance of energy productivity to American competitiveness, the Council in 2014 partnered with the U.S. Department of Energy and the Alliance to Save Energy to launch a series of public dialogues and executive roundtables to raise awareness, galvanize support and develop the strategies necessary to double the United States' energy productivity by 2030. The outcome, *Accelerate Energy Productivity 2030: A Strategic Roadmap for American Energy Innovation, Economic Growth and Competitiveness*, put forth a plan to achieve significant growth in energy productivity — which, because of this and related work, is largely being realized today.

Another factor that has contributed to the weakened correlation between economic growth and energy usage is the increase in energy-efficient technologies, processes and practices. This transformation has been driven in large part by the availability of low-cost natural gas, which is three times more efficient than electricity in providing energy for end-use applications and has increased exponentially as a share of total energy used in U.S. manufacturing. In fact, natural gas comprised nearly 40 percent of all energy consumed by the industrial sector in 2015 — up almost 10 percent from 2006.¹¹

A Changing Energy Mix

Historically, industrial power prices in the United States have been among the most affordable in the world — second among the G7 nations only to Canada.¹² Even as exchange rates have brought down the dollar cost of energy for consumers in China, Japan and Mexico, U.S. energy costs remain competitive, with prices nearly half as low as Japan and Germany. And as the energy mix in the United States continues to shift away from its former reliance on fossil fuels, corporations and state and federal governments are increasingly driving the energy transformation, demanding cleaner energy and seeking to capture gains from energy efficiency.

Meanwhile, the legacy coal and gas-supported electric grid is under tremendous strain due to increasingly diverse energy sources coupled with environmental instabilities and extreme weather phenomena and volatility. American advanced manufacturing requires a reliable, resilient, diverse and flexible energy mix that encourages efficiency and supports the opportunity for investment in new technologies that benefit Americans, underpin national security needs and convey competitive global advantage to U.S. businesses.

10 Accelerate Energy Productivity 2030, U.S. Department of Energy, Council on Competitiveness and the Alliance to Save Energy. September 16, 2015.

11 U.S. Primary Energy Consumption by Source and Sector, U.S. Energy Information Administration, 2017.

12 2018 Sustainable Energy in America Factbook, Bloomberg, 2018.

From Scarcity to Abundance

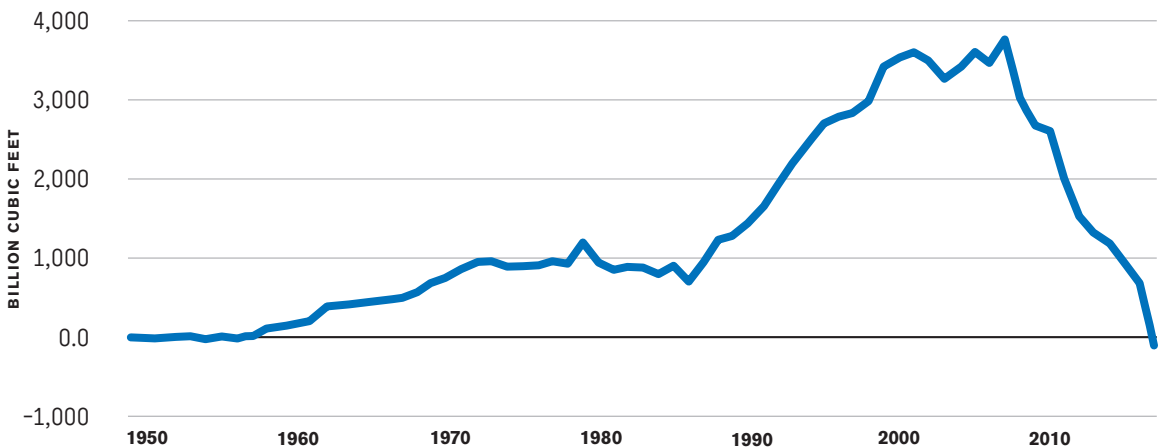
Concurrent with the divergence between energy use and economic growth, the United States solidified its role as a global exporter of liquefied natural gas in 2017 when, for the first time, it became a net exporter—rather than importer (see Figure 3)—of natural gas in each month of the year.¹³ Enabled largely by a 7.2 percent decline in the amount of natural gas used to generate gas-fired power, domestic gas demand decreased by 2.8 percent year-on-year. The growth in foreign demand for liquefied natural gas occurred at the

same time as this growth in efficiency, allowing the United States to become a net exporter of natural gas. The United States currently exports liquefied natural gas to 25 countries, with its primary importers being Mexico, South Korea, China and Japan.¹⁴

But natural gas is just one piece of America's energy puzzle. Nuclear power, for example, is an important part of the energy sector and provides another clean, viable energy alternative. In the past thirty years, operating capacity in nuclear power plants increased from 60 percent to over

Figure 3. Natural Gas Imports

Source: U.S. Energy Information Administration



¹³ *ibid.*

¹⁴ 2018 Sustainable Energy in America Factbook, Bloomberg, 2018.

90 percent.¹⁵ Yet even with this marked increase, regulatory barriers hinder the nuclear industry from reaching its full potential. A recent study by the Nuclear Energy Institute (NEI) found that oil, gas, hydro, solar, wind and biomass received more than 90 percent of all economic incentives — tax policies, regulation, research and development, market activity, government services and disbursements—provided to the energy industry since 1950.¹⁶ And while the government has supported nuclear energy development through research and development programs, over the last twenty years, federal spending on research and development for coal and renewables has exceeded funding allocated to the nuclear industry. Throughout a recent six-year period alone (2011-2016), renewable energy obtained more than 27 times more federal aid in incentives than nuclear energy. Maintaining America's leadership position in nuclear technology and innovation is essential for economic competitiveness in the global energy market.

The stage is set for the United States to leverage these transformations in energy and manufacturing through a comprehensive public and private sector strategy that capitalizes on the nation's unparalleled competitive assets. An America that operates in a 21st century infrastructure — with a high-skilled workforce and access to the capital needed to grow and scale

entrepreneurial businesses — has the potential to become the catalyst for a new wave of productivity and prosperity and to usher in a low-carbon world.

Call to Action

Building upon more than a decade of work on energy and manufacturing policy as key enablers of U.S. productivity, prosperity and security, the Council in 2015 launched the Energy and Manufacturing Competitiveness Partnership (EMCP). Led by a C-suite group from industry, academia, labor and the national laboratories, the EMCP approached America's diverse industrial landscape not as a monolith, but as a network of distinct yet interdependent sectors, each with its own challenges and opportunities.

Through six sector studies, the EMCP explored how cross-cutting factors play out within each sector, identified discrete factors shaping each sector and assessed common challenges and opportunities that span across the economy — most prominently, cybersecurity, which was explored in-depth through three regional dialogues across the country.

Based on the Council's decade-long leadership and the learnings of the EMCP, this call to action constitutes a national policy agenda to drive the United States' future energy and manufacturing

¹⁵ Nuclear Power in the USA, World Nuclear Association, August 4, 2017.

¹⁶ Analysis of U.S. Energy Incentives — 1950-2016, Nuclear Energy Institute, 2017.

competitiveness. If implemented, this agenda would turbocharge the U.S. manufacturing renaissance and drive economic prosperity for the nation and for all Americans.

Develop next generation physical and regulatory infrastructure to support the nation's advanced energy and manufacturing enterprise.

1. Create a modern, enabling regulatory infrastructure to keep pace with innovation and spur economic growth.
 - 1.1. Encourage state and local governments to continue experimenting with new regulatory frameworks to test and evaluate the viability of disruptive technologies, from autonomous vehicles to next-generation nuclear power.
 - 1.2. Review federal regulations to avoid redundancy and ensure states and other entities have the flexibility to propose and implement innovative regulatory models and explore new technologies needed to enable the advanced energy and manufacturing enterprise.
 - 1.3. Make permanent Executive Order 13771 requiring that, subject to a rigorous cost/ benefit analysis, two regulations be eliminated before a new regulation can be promulgated.
2. Break the cycle of incremental infrastructure improvements to spur creative and forward-looking approaches to the movement of goods, services and people.
 - 2.1. Substantially increase federal and state investment in U.S. infrastructure to repair and modernize the roads, airports, rails and water systems upon which the economy relies.
 - 2.2. Dedicate a percentage of federal infrastructure funding to leapfrog demonstration projects that leverage next-generation technologies, obviating the "patch and repair" cycle of current infrastructure spending.
 - 2.3. Create partnerships between industry and local governments to develop and propose innovative infrastructure models that support next generation energy and transportation initiatives.
3. Bring the United States energy market infrastructure and regulatory ecosystem into the 21st century.
 - 3.1. Secure U.S. leadership and investment in nuclear technology by leveling the regulatory playing field, ensuring adequate funding for basic nuclear research and increasing support for nuclear engineering degree programs.

- 3.2. Modernize the electric grid by reforming state regulations to allow utilities to depreciate outdated equipment more quickly.
- 3.3. Catalyze innovation in the utility sector by allowing utilities to recoup a percentage of investments in R&D through rate increases.

Fuel the innovation and production economy from idea to implementation.

- 4. Reaffirm U.S. leadership in new knowledge creation and better align research efforts to meet the grand challenges facing the nation and the world.
 - 4.1. Increase federal investment in research and development across all agencies at a consistent, predictable rate with an overall target of one percent of GDP.
 - 4.2. Under the direction of the Science Advisor to the President, align the national research agenda with industrial grand challenges and prioritize disruptive technologies with high potential for economic and societal impact.
- 5. Capture the value of investments in research by supporting and accelerating the development of advanced technologies in the United States.
 - 5.1. Increase federal and state support for regional technology test beds, such as the Manufacturing USA institutes.
 - 5.2. Incentivize technology transfer and partnerships between national laboratories, universities and businesses by streamlining intellectual property agreements, considering industry collaboration as part of promotion and tenure decisions, and clarifying that industrial partnerships with national labs are consistent with their mission.
 - 5.3. Close the valley of death in private sector financing to enable startup to scale-up.
- 6. Leverage and secure the Internet of Things to drive industrial productivity.
 - 6.1. Incentivize the use of sensors and monitoring equipment for energy and water usage in public and private sector facilities at the state and local level through tax credits and other mechanisms.
 - 6.2. Encourage greater uptake and use of standardized criteria, such as the UL Cybersecurity Assurance Program to increase supply chain security.
 - 6.3. Require that all new technology applied to the electric grid meet widely-accepted security standards to build cyber resilience.

7. Extrapolate insight and value from the data tsunami.
 - 7.1. Create a federal verification system for crowdsourced data to enhance the validity and usefulness of knowledge databases across multiple sectors.

Catalyze the power and potential of the American worker to thrive in an advanced manufacturing economy.

8. Develop a workforce capable of succeeding in the hyper-connected, cross-disciplinary, advanced technology-based economy of the next decade.
 - 8.1. Integrate technical training into K-12 education, including industrial arts programming, to build a better base of technological understanding by all Americans.
 - 8.2. Strengthen the lifetime linkages between universities and graduates to enable life-long learning opportunities.
 - 8.3. Develop a multi-stakeholder public awareness campaign to increase scientific literacy.
9. Facilitate greater collaboration, interaction and exchange between industry and secondary and higher education institutions to spur partnerships and highlight workforce opportunities.
 - 9.1. Reduce state and education institutional barriers to allow more practitioners into the classroom and to inspire the next generation of advanced manufacturing workers.
 - 9.2. Encourage industry partnerships with educational institutions to enable practitioners to engage with students in K-12 and higher education.

Based on the Report “Accelerate.”

Edited by William Bates, Executive Vice President, Council on Competitiveness

UNITED STATES

Transformation through Global Public-Private Partnership: Webster University and the Republic of Uzbekistan

Introduction

As a global university system, Webster University has a mission of providing learning experiences for students that instill in them the values of individual excellence and global citizenship. This mission is built on a long history of engagement through traditional activities such as faculty/student exchanges and study abroad opportunities, as well as through the design of academic programs and experiences that enhance students' knowledge of themselves and the world. As a standard-setter in global education, Webster University has operated dedicated American-style campuses in Europe for more than 40 years, expanded to Asia in the 1990s, and opened the first American university campus in Ghana in 2013. Each of our campuses offers full degree programs suited to meet local needs, and carries US accreditation in each site, often accompanied by local in-country accreditation.

This case focuses on the process by which Webster University has entered a unique global public-private partnership with the Republic of Uzbekistan, which will result in the opening of a Webster campus in Tashkent in Fall 2019. This partnership embodies several transformation strategies that leverage the comparative strengths of a global university system and a storied, independent nation emerging on the world stage in order to meet their respective needs.



Historical Context of Uzbekistan

The first human settlements that lived in the territory of what is now Uzbekistan can be traced back to the Paleolithic Period. The early states of Bactria, Khwārezm, and Sogdiana, which emerged during the 1st millennium BCE, eventually became the Indo-Greek Empire; and the fertile region around the Amu Darya river along the Silk Road became a center of trade and cultural exchange between East and West.

Following the introduction of Islam into Central Asia in the 8th century, Turkic-Mongol tribes migrated from northwestern Siberia and settled in the territory now forming Uzbekistan. They adopted the ethnonym Uzbek after the Muslim ruler of the Golden Horde, Ōz Beg (Uzbek) Khan who reigned from 1312–41 CE.

The most influential medieval Uzbek ruler was Amir Temur, who drove the Mongols out and greatly expanded Uzbek territory. He centralized state affairs and introduced comprehensive reforms which greatly improved the economic, social and cultural life of the country. In particular, his tax reforms provided an impetus for the rapid

growth of craft trades. The intensified trade was followed by vigorous diplomacy and the strengthening of relations with major European states.

While the subsequent reigns of Ulugbek, Husain Baykara and Babur were characterized by continuous advancement in science, literature, and the arts, the centralized state steadily weakened, which then led to the formation of the Emirates of Bukhara, Khiva, and Kokand khanates in the 18th century. The later expansion of the Russian Empire into Central Asia ended these independent states. Bukhara and Khiva were invaded in 1868 and 1873, both becoming Russian protectorates. The annexation of Kokand in 1876 completed the Russian conquest of Uzbek territory (Government of Uzbekistan).

The subsequent Russian and then Soviet rule brought many changes to the region, including educational reforms and industrialization. Modernization of the region included introduction of the telegraph, telephone, press, and a railroad that reached Samarkand and Tashkent by 1905. During the Soviet era, Uzbekistan's industrial sector development included electric power generation, engineering, and chemical production. The natural gas industry became a cornerstone of the economy, and the production of mineral fertilizers for cotton farming became the staple of their chemical manufacturing enterprises. The fastest-growing industrial sectors included agriculture machinery, production of tractors, construction and road machines, electrical engineering; aviation, electronic and instrument-making, and chemical and petroleum engineering.

Following Uzbekistan's proclamation of independence in 1991, changes were gradually brought to the socio-economic milieu of the country. The Uzbek government led by President Islam Karimov cautiously introduced small-scale privatization modeled after a tradition of family homes and small businesses. In the first half of the 1990s, the Uzbek economy benefited from an abundance of cotton and Uzbekistan was arguably the best performing of all Soviet successor states in the 1990s; and by the end of the decade, it was the first Soviet successor state to regain its pre-1991 real GDP level. However, falling cotton prices in 1996 exposed the serious limitations of Uzbekistan's economic model, and led to stricter government control and the emergence of a substantial black market. Government inefficiency became one of the major societal challenges to growth and development in Uzbekistan, contributing to many obstacles for the Uzbek economy, including unemployment. By the 2010s, Uzbekistan's social policies — once a source of pride — were perceived to be deteriorating.

On October 5, 2016, the newly elected President Shavkat Mirziyoyev signed a decree entitled: "On Additional Measures to Ensure the Accelerated Development of Entrepreneurship, the Full Protection of Private Property, and the Qualitative Improvement of the Business Environment." This initiative clearly illustrated his priority: for the private sector to be the key driver of economic growth and job creation in Uzbekistan going forward.

In February 2017, Uzbekistan adopted a 2017–2021 National Development Strategy, which identified five priority areas:

1. Reform of public administration;
2. Judicial Reform, strengthening the rule of law and parliamentary reform;
3. Reforms promoting economic development and liberalization, focusing on the modernization of Uzbek agriculture and industry, oriented towards greater competitiveness of the products and services;
4. Social reforms, based on higher incomes and better jobs, oriented around higher-quality health care, education, housing, etc.; and
5. National Security Reforms, focusing on domestic stability and a balanced and constructive foreign policy with the ultimate goal of strengthening the independence and sovereignty of the state.

Mirziyoyev's first year in power was marked by vigorous diplomatic activity that enabled him to establish relations with leaders of neighboring states, as well as the world's most developed economies. The outreach to Uzbekistan's neighbors signaled a shift in policies and priorities and highlighted Uzbekistan's reintegration into the regional economic circle. This has begun to deliver results, including new direct air connections linking Tashkent to Dushanbe and Kabul, greatly facilitating travel, as well as growing trade figures.

Uzbekistan is making progress in reforming its governance and public services, taking steps that are having an impact on the lives of ordinary citizens and making it easier for businesses to operate. The experience of 2017 is encouraging, and while Uzbekistan's reforms are at an initial stage, it appears that the Mirziyoyev administration is committed to implementing systemic reforms. Educational reform especially plays a prominent role in the ongoing changes introduced by the new administration. This opened the door for establishing a strategic partnership between Webster University and the Government of Uzbekistan in addressing the educational needs of the region.

Webster University Responds to Unmet Needs of the Republic of Uzbekistan

Webster University was founded in 1915 in St. Louis, Missouri, USA, to address an unmet need of the time — providing bachelor's degrees that prepared women for careers and lives of service. This distinctive origin, an institution founded by women for women, formed the foundation of a commitment to serving community needs, typically voiced by the Webster community as “meeting an unmet need.” As a result, the university's identity and impact necessarily expanded as the needs of students and their communities evolved. Over time, Webster has innovated to meet the needs of men and women not only in St. Louis but across the United States and in Europe, Asia, and Africa through dedicated campuses

and robust online technologies. Key milestones in the evolution of this global university system illustrated in Figure 1 have been described in cases previously published by the GFCC (Stroble, Cottam)(Stroble).

No stranger to partnering with global communities unserved by American higher education, Webster University leadership first began exploring opportunities to expand our global presence into the Republic of Uzbekistan in 2012. Aware of the strategic initiatives being advanced by newly-elected leadership; the Republic's ambition to be a player on the world stage; and acquainted with individuals serving in the Ministry of Edu-

cation, Webster leaders entered into a series of conversations and visits to assess opportunities and challenges.

Each of Webster's international campuses and sites has developed as a result of unique opportunities present in the region that Webster can distinctively serve. Relationships with key leaders and an openness to learning new ways of doing business, while preserving mission integrity, have characterized the successful development of our global network in Europe, Asia, and Africa. Effective leaders at Webster advance such conversations by using their knowledge of the economic and political landscape, cultural competency, and

Figure 1. University System Key Milestones

1915	Loretto College is founded	1978	Webster expands into Europe by opening a campus in Geneva (Vienna would follow in 1981, Leiden in 1983, and London in 1986)
1919	Loretto College hosts first international students	1983	Webster College changes its name to Webster University
1924	Loretto College changes its name to Webster College	1986	Webster establishes programs in China and a campus in Thailand opens in 1999
1963	Webster welcomes male students for the first time; by 1968 the College would be co-ed	1999	Webster launches its first online programs
1967	Webster transfers administration to a lay board	2013	Webster's first campus in Africa opens in Accra, Ghana
1974	Webster opens its first campus on a military base – Fort Sheridan near Chicago	2019	Proposed Opening of Tashkent Campus

language fluency to establish shared interests and identify potential barriers. The success of each campus depends upon its ability to leverage 1) the advantages of a global university system; tapping opportunities for mobility, talent development, and knowledge creation among globally diverse faculty, staff, and students; and 2) the embeddedness of that campus in its local community as an anchor for the university and the community.

In this instance, actualizing the opportunity to work in the Central Asian Republics required extensive in-person meetings among key stake-

holders to gather data, assess the needs of the Uzbek workforce and identify Webster's capacity to meet those needs. As President and Chief Operating Officer of Webster, we played complementary roles; communicating the institution's values and vision, and representing the university in consultations with Uzbek university, diplomatic and business leaders. Figure 2 highlights key developments in the process by which understandings were reached and a new business model was developed, which will result in the opening of Webster University's campus in Tashkent in Fall 2019.

Figure 2. University System Key Developments

2012	Initial Explorations Begin Webster Delegation Presentation	Program Agreement between Webster and the University of World Languages
2012–2016	Continued Engagement with Uzbek Ministry and Universities	Program Agreement between Webster and the Samarkand Institute of Foreign Languages
2017	Planning Discussions with Uzbekistan Ambassador in New York Webster Delegation Visits Uzbekistan Uzbekistan Ministry Delegation Meetings with Webster Leadership in St. Louis Cooperation Framework Between Webster and Ministry of Education	Program Agreement between Webster and Tashkent University of Economics Program Agreement between Webster and Tashkent University of Information Technologies
2018	President Stroble Delivers Address at Independence Celebration in D.C. MOU of Academic Program Development Between Webster and Ministry of Education	Fall 2018 Launch of TESL Program
		Spring 2019 Recruitment for Launch of MBA Cohorts and Additional TESL Cohorts
		Fall 2019 Opening of Webster Campus in Tashkent

The immediate result of the evolving partnership between Webster University, the Ministry of Education of the Republic of Uzbekistan, and several Uzbek universities has been the creation of graduate programs onsite in Uzbekistan, with enrollments in the hundreds at the first offerings. Through these programs and the soon-to-be-opened Webster campus, transformative strategies are meeting the workforce and economic development goals of Uzbekistan and creating a new academic and business model for Webster's strategic operations in a new area of the world.

Transformation Strategies

Webster University's objective in this venture is to build the capacity of higher education in Uzbekistan and Central Asia, as well as to increase understanding and knowledge within our university community regarding the past, present, and future of the region. Over the past century, Webster has pursued strategies to open the world to Webster students and Webster students to the world – hosting students from France in 1919, organizing faculty/student exchanges and purposeful partnerships since the 1930s, and opening of the university's first international campus in Geneva, Switzerland in 1978. Globally-focused academic programs and policies that encouraged mobility among faculty, staff, and students were accompanied by campus leadership that strengthened ties between the Geneva campus and the Geneva canton. During the 1970s and 1980s, Webster's international campuses

expanded to include Vienna, Austria and Leiden, Netherlands. In the 1990s Webster began to provide onsite programs in Asia through a residential campus in Thailand, and partnerships to offer joint degrees in China. The important step of then opening a campus in Accra, Ghana in 2013 reflected the university's goal of opening the world to Webster students through opportunities for engagement with, and immersion in, other geographies, cultures, perspectives and lived experiences.

We know that the best opportunities for learning happen when we have the chance to talk about important and meaningful topics with people different from ourselves. That is why Webster's leadership has intentionally pursued strategies that have the power to transform our understandings of ourselves and others through direct contact among people in areas of the world often little known to each other. Opening a Webster campus in Tashkent provides just such an opportunity for Webster and Uzbekistan. To know the world, it is important to know Uzbekistan's singular history and cultural achievements; and to learn about this nation's heritage and contributions to science, mathematics, astronomy, medicine, arts, and literature—contributions providing centuries of enlightenment. Geographically positioned to provide a connection between the east and the west, Uzbekistan has contributed to the advancement of the shared store of human knowledge worldwide. And in this time of global connectivity – of our economies as well as our shared challenges regarding health,

security, energy, and the well-being of people everywhere – Uzbekistan is prepared to lead as an independent country on the world stage. As a global university system, Webster is poised to help build Uzbekistan's capacity, while at the same time accomplishing our transformative goals in education.

As Uzbekistan's leadership seeks to strengthen business ties with the Western world, longstanding models of higher education built on the Soviet model will be supplemented with Western-style offerings taught in English. The role for Webster – well-established as an American university offering high-quality English programs in multiple international locations – is to be the first American university offering degree programs onsite in Uzbekistan. Building educational capacity rapidly demands onsite solutions, although an increasing number of Uzbek students are also pursuing degree programs at Webster campuses in St. Louis and Europe. The results to date include enrollments onsite in Uzbekistan of more than 120 master's students in Webster's Teaching English as a Second Language program, to be followed by a Fall 2019 launch of Webster's MBA program onsite. The TESL program has specific strategic importance in that it equips more Uzbek educators to teach English to Uzbek youth, thereby increasing their capacity to undertake degree programs in English.

In Fall 2019, through an innovative public-private partnership, the Republic of Uzbekistan's Ministry of Higher and Secondary Specialized Education will provide a dedicated state-of-the-art facility in Tashkent for Webster's use, supporting the operational, programmatic, and physical expansion of Webster University in Uzbekistan. Through an innovative revenue-sharing model that reflects the mutual investment underlying this strategic partnership, Webster University and Uzbekistan are supporting transformative learning in Central Asia and building a best practice for other yet to be explored regions worldwide.

Conclusion

We know that the flow of information, people, and ideas across countries and continents is needed to build a stronger future for the transformations of cities, industries, and nations; and indeed for the human condition. Only through shared knowledge and commitment will the leaders we are educating be successfully in seeking global solutions to the world's most pressing challenges in economics, health, environment, and security.

The globalization of education, a necessary vehicle to increasing global competitiveness, requires that the students we educate as citizens and leaders in their communities gain a deeper understanding of world events that surpasses simple awareness. What is needed is a cause and

effect inquiry, a thorough understanding of the rapidly changing world. The understanding of the global world is ultimately possible only by globally educated and globally-minded individuals. It is this intention, on the part of Webster University and the Republic of Uzbekistan, that our partnership will advance. Through the cooperative design and opening of the facility and programs offered at Webster Uzbekistan, we will as partners live a contemporary paradigm of global education. The model we are creating will offer tailored degree programs and programs of scholarship and service to the local region, supported by faculty and staff who are globally diverse. Fostering greater convergence with important sectors of the economy on a global scale will enable Webster Uzbekistan, as a campus of Webster's global university system, to become a vortex of effective communication via information sharing, social and cultural interchange, and ultimately knowledge creation, dissemination, and preservation on a global scale.

About the authors

Elizabeth (Beth) J. Stroble, Ph.D.

Julian Z. Schuster, Ph.D.

Webster University
12 July 2019

Works Cited

CACI Forum — Reform in Uzbekistan: A Turning Point for Central Asia and Beyond. Silk Road Studies, 2018. <https://silkroadstudies.org/forums-and-events/item/13313-caci-forum-reform-in-uzbekistan-a-turning-point-for-central-asia-and-beyond.html>. Accessed 22 July 2019.

Stroble, Elizabeth. *Sustaining Cities by Connecting People: Global Public Purpose Partnered with Private Investment*. Annual. Washington, D.C.: Global Federation of Competitiveness Councils, 2016. 56-63. Print.

Stroble, Elizabeth and Cottam, Michael. *Global Webster University*. Annual. Washington, D.C.: Global Federation of Competitiveness Councils, 2017. 58-66. Print.

The Government Portal of the Republic of Uzbekistan. https://www.gov.uz/en/pages/historical_heritage. Accessed 22 July 2019.

Tsereteli, Mamuka. *The Economic Modernization of Uzbekistan*. © Central Asia-Caucasus Institute & Silk Road Studies Program — A Joint Transatlantic Research and Policy Center American Foreign Policy Council, 509 C St NE, Washington D.C.

GFCC

Membership

SUSTAINING AND GENERAL MEMBERS

Argentina

EXCELENCIA (FPNC – FUNDECE – IPACE)

Australia

Advisory Board on Technology and Healthcare Competitiveness

Government of Australia

Brazil

National Confederation of Industry – CNI/SENAI/SESI/IEL

Brazilian Innovation Agency – Finep

Canada

GO Productivity

Western Economic Diversification Canada

Greece

Council on Competitiveness of Greece – CompeteGR

Delphi Economic Forum

Japan

Japan Innovation Network

Japan Science and Technology Agency – JST

Kazakhstan

Kazakhstan Competitiveness Council

Malaysia

Malaysian Industry-Government Group for High Technology – MIGHT

Qatar

Qatar Research, Development and Innovation Council – QRDI

Russia

Eurasia Competitiveness Institute

United Arab Emirates

Abu Dhabi Department of Economic Development

United Kingdom

Centre for Competitiveness

United States of America

Council on Competitiveness

UNIVERSITY AND RESEARCH MEMBERS

Australia

Aikenhead Centre for Medical Discovery

Bond University

Monash University

Swinburne University

Canada

Western University

Germany

Ludwigs-Maximilian University Munich

Greece

American College of Greece

Malaysia

Universiti Teknologi PETRONAS

University of Malaya

Mexico

Monterrey Institute of Technology and Higher Education

New Zealand

University of Auckland

Peru

Universidad Nacional de San Agustín de Arequipa

Portugal

Catholic University of Portugal

Qatar

Qatar University

Saudi Arabia

King Abdullah University of Science and Technology

United Kingdom

Imperial College London

Queen Mary University of London

Ulster University

University of Southampton

United States of America

Arizona State University

Georgetown University

Michigan State University

Northeastern University

Ohio State University

Purdue University

University of California San Diego

University of Chicago

University of Illinois

University of North Carolina at Chapel Hill

University of Pittsburgh
University of South Carolina
Webster University

CORPORATE MEMBERS

Al-Dabbagh Group
Athens Exchange Group — ATHEX
BlueSpace
Center for Research and Consulting
Consolidated Contractors Company
Justitia Advisory
Lockheed Martin
Nadim Industries
Piraeus Bank
Stratega
Whitecap Investments LLC
Xinova

GFCC FELLOWS

Distinguished Fellows

Zakri Abdul Hamid
Amr Al-Dabbagh
Nathalie Cely
Lee Yee Cheong
Luciano Galvão Coutinho
João A. H. Da Jornada
Petros G. Doukas
Luis Fernandes

Nika Gilauri
Yanos Gramatidis
Karen A. Holbrook
Jerry M. Hultin
Carole Hyatt
Charles Kiefel, AM
Stephen Kingon
Ashwani Kumar
Tae Shin Kwon
Joan MacNaughton, CB Hon FEI
Christos Megalou
Peter Meyers
Jan Mládek
Michiharu Nakamura
Liam Nellis
Lucas Papademos
Richard Parker, CBE, FREng
Emmanuel Pohl
Frank-Jürgen Richter
Laura Sandys
Jack Sim
Rogerio Studart
Ahmad Tajuddin Ali
Manuel Trajtenberg
Gregory F. Treverton
Simon Peter “Pete” Worden
Kandeh K. Yumkella

Senior Fellows

Edward D. Agne
Marcelo Augusto de Felippes
Rehan N. Chaudri
Fred Davies
Margareta Drzeniek
Mark Esposito
Dionisio Garcia
Banning Garrett
Kwanza Hall
Kathryn Hauser
Greg Horowitz
Elisa Jagerson
Nkem Khumbah
Susan McCalmont
Mark D. Minevich
Michael Nelson

GFCC TEAM

Charles O. Holliday Jr.
Chairman
The Hon. Deborah L. Wince-Smith
President
Roberto dos Reis Alvarez
Executive Director and Secretary to
the Board
Chad Evans
Treasurer
Yasmin M. Hilpert
Senior Director of Policy and
Engagement



GFCC
Global Federation of
Competitiveness Councils

