



**GFCC**

Global Federation of  
Competitiveness Councils

**Scaling-up Innovative and  
Sustainable Businesses**  
Best Practices in  
Competitiveness Strategy

2018

## **Scaling-up Innovative and Sustainable Businesses**

### Best Practices in Competitiveness Strategy

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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.

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Competitiveness Councils

# **Scaling-up Innovative and Sustainable Businesses**

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Competitiveness Strategy

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## CHAIRMAN'S LETTER



On behalf of the board of directors and members of the Global Federation of Competitiveness Councils (GFCC), I am pleased to present the 2017 report, *Scaling-up Innovative and Sustainable Businesses: Best Practices in Competitiveness Strategy*.

When the GFCC was formed almost nine years ago, it was predicated on the belief that sharing best practices among national competitiveness organizations and among nations would provide benefit to all. With the release of this year's report, we have again put all that belief into practice and created what we hope will be a useful tool for competitiveness organizations and initiatives around the world.

GFCC members understand more than anyone that the nexus of sustainability, innovation, national competitiveness and economic prosperity can manifest into a higher standard of living for all.

It is the mission of the GFCC to actively promote debate and dialogue, competition and collaboration, and innovation above all else. This year's Best Practices highlights seven outstanding examples from Argentina, Brazil, Canada, Ecuador, the United Arab Emirates, the United Kingdom and the United States. We hope they can inspire action and open new opportunities for engagement.

*Best Practices in Competitiveness Strategy* is issued annually by the GFCC. I hope you enjoy the 2018 edition.

Sincerely,

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

**Charles O. Holliday, Jr.**

Chairman, Royal Dutch Shell, plc

Chairman, Global Federation of Competitiveness Councils

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## EXECUTIVE SUMMARY AND OVERVIEW

### Scaling-up Innovative and Sustainable Businesses

The 2018 Global Federation of Competitiveness Council Best Practices describe how different countries implemented a diversity of programs, technologies and models addressing the transition to a new and sustainable business, economic and social future in an era of rapid change. These include scaling a food bank; stimulating health care and energy innovation; funding innovative start-ups and helping them grow; and programs to improve company productivity, product quality and competitiveness.

**Argentina:** The Peers Boards of Directors Program (Peers BODs) sought to improve the competitiveness of a group of companies located in the province of Buenos Aires, Argentina, and increase their management and networking capabilities. These companies in the machinery production sector shared similar problems that were hindering their productivity.

As a first step in 2016, common challenges the companies faced were identified. These included problems associated with certifications and meeting technical regulations needed for export markets, low quality levels from suppliers, and lack of technical and financial support for research and product development.

To help these businesses meet these challenges, the Peers BODs methodology was implemented. The program convenes groups of six to 10 small and medium-sized business

enterprise (SME) owners in meetings that rotate from company to company on a monthly basis with different members hosting the meetings. The host company presents its company performance or issues to the group which, in turn, gives input on addressing problems or challenges. At the next meeting, the host from the previous meeting presents the conclusions and decisions made based on the recommendations generated at the previous meeting, shares any progress made, and this presentation becomes the formal "Action Plan." When the company is once again the host, the host shares results of the actions implemented versus the "Action Plan."

Although it has been a short time since it started, business directors are beginning to see the value in the program, and they are engaging in the process in more productive ways. They are implementing recommendations emerging from the program. These include: new types of structured and formal meetings within their own companies to follow up and solve daily problems, new ways to organize their objectives, urging the use of KPIs to gain visibility on company operations, and some benchmarking. Companies have also increased their visibility, access and relationship with relevant players at the National Ministry of Production, such as participating in other SME national programs.

**Brazil:** Created in 1952, the Brazilian Development Bank (BNDES) is the main financial agent for development in Brazil. Originally, the BNDES focused mainly on the energy and transport sectors, and basic industries. However, the BNDES has evolved and, today, provides support for exports, technological innovation and sustainable socio-environmental development.

Established in 1982, the BNDES Participações S.A. (BNDESPAR), an integral subsidiary of the BNDES, carries out capitalization operations of undertakings controlled by private groups and contributes to strengthening Brazil's capital market through subscription of bonds, corporate securities in public offerings and investment funds. Start-ups and emerging companies can be supported by BNDESPAR's funds aimed at encouraging entrepreneurship and innovation. For example, Criatec Seed Capital Funds focus on early-stage and start-up companies. The total committed capital is USD 152 million, of which USD 100 million is from the BNDESPAR. Primatec is an equity fund designed to invest in innovative companies with high growth and value creation potential. The targets are companies incubated in or graduated from incubators and technology parks (revenues up to USD 4.8 million). The capital committed may reach up to USD 30 million, 40 percent of which is from the BNDESPAR.

By the end of 2017, BNDESPAR had 43 active funds in its portfolio, with about USD 900 million in committed capital invested in more than 170 companies. These resources leveraged about USD 4.7 billion in private investments. The support provided by the BNDESPAR's funds has contributed to the creation and growth of several innovative companies in Brazil.

Since 2008, Magnamed Tecnologia Médica S.A. has been supported by the Criatec 1 fund. The company, founded by three engineers in 2004 as a start-up, produces high precision medical equipment, particularly associated with respiratory care. Between 2008 and 2016, net operating revenues increased from about USD 35,000 to USD 8.5 million. Exports represent about 25 percent of revenues, and products have been sold to more than 35 countries.

Created in 2012, Yller Biomateriais S.A. manufactures products used in a wide variety of dental treatments. Since its founding, Yller has invested heavily in research and development, and most of the 30 products developed by the company use exclusive technologies protected by patents and industrial secrecy. In January 2016, Criatec 2 funds were directed to Yller. Since then, the company: launched its own branded products focused on market segments dominated by imported brands; expanded its operations to a new corporate headquarters able to

accommodate more employees; and began to export to Chile and Paraguay. As a result, Yller's annual gross revenue increased from less than USD 17,000 in 2015 to about USD 1.1 million in 2017.

Vindi was created in 2013 by entrepreneurs with backgrounds in finance, payments operations and Internet games. A fintech start-up, Vindi specializes in online payments and financial solutions. With financial support from the Criatec 2 fund in 2016, Vindi hired 35 people to improve sales performance and customer service, and expanded its facilities. Also in 2016, the company began to implement a business strategy to broaden its portfolio to other market segments and business sectors. Vindi is now the largest independent payment gateway in Brazil. Since 2015, its customer base has increased from 541 clients to more than 2,500, and gross revenue has grown from USD 320,000, to USD 2.5 million in 2017.

**Canada:** Over the past decade, the government of Canada has focused on diversifying Canada's economy, encouraging movement away from a dependence on natural resources and placing more emphasis on innovation and productivity. As part of the government's diversification and innovation strategy, a significant focus is placed on fostering entrepreneurship through support programs such as grants, loans and tax incentives for start-ups. However, in spite

of this support, half of Canadian startups do not make it to the five-year mark, and the majority of firms that start out small experience zero or negative employment growth.

High-growth enterprises are important to the Canadian economy because they contribute disproportionately to job creation. Between 1993 and 2003, these firms accounted for only 4 percent of businesses in Canada but were responsible for 45 percent of net jobs created.

Go Productivity identified a need for support services to assist entrepreneurs in scale-up and expansion activities. Focused on enhancing productivity and increasing management competencies, the ARC support service has three key stages: **A**ssessment, **R**oadmap, and **C**oaching (ARC). To initiate the process, an introductory meeting is held with the firm's leadership team to understand the challenges of the business. A Productivity Workshop is delivered on site to begin to identify improvement opportunities. A Productivity Capability Assessment is then conducted with direct input from employees to identify the gaps and strengths of the organization. This is followed up with a half-day site assessment performed by a GO Productivity expert. In the Roadmap Stage, using quantitative and qualitative analysis of the results of the assessments, gaps and opportunities for improvement are identified, and a summary of conclusions and recommendations is provided. GO Productivity and the firm's



employees collaboratively develop a roadmap, or plan of action, with priorities, identified projects, and timelines. The ARC advisory approach continues to coach and work with the company to implement the Roadmap.

The ARC program has been delivered to more than 30 firms across Canada. On average, firms experienced a 10-20 percent productivity improvement. In addition, firms undertook projects and initiatives that led to the creation of new products, entry into new markets, creation of new jobs, reduction of operating costs and revisions of business models.

Alberta Women Entrepreneurs (AWE) is another entrepreneurship effort. According to the 2015/16 Global Entrepreneurship Monitoring Report on Women's Entrepreneurship, Canadian women are highly engaged in entrepreneurship. However, their ventures on average remain less than half the size of their male-owned counterparts. In Canada, 37 percent of women-owned businesses are considered high growth SMEs, while 63 percent of male-owned businesses are considered high growth SMEs. Reasons why include lack of key networks, role models and mentors; understanding how to expand into new markets; and access to financing.

AWE developed the PeerSpark™ program to support emerging and high growth women-owned businesses. The program is a one-year intensive business acceleration program that includes leadership

development, business skills development, advisory support and mentorship in a structured peer group setting that is designed to address the unique needs of entrepreneurs seeking to grow their businesses. Participants also have access to trade missions to supplier diversity events in Canada, the United States, Mexico and Europe. Since its inception in January 2015, this market access project has generated \$71 million in contract leads, from which participating western Canadian women have secured 264 contracts valued at \$16.4 million. PeerSpark™ graduates report average year-over-year revenue and employment growth of approximately 20 percent, with some businesses doubling in size within two years. Since its inception in 2012, 84 women entrepreneurs have participated in the program.

**Ecuador:** One hundred tons of food is wasted daily in the city of Quito. The excessive waste occurs in a city where inequality is high and food security is low. The Food Bank of Quito (BAQ) was created to tackle food insecurity and make waste management more efficient.

BAQ prevents food waste by managing the donation of products that have reached the end of the marketing cycle in two main areas: companies producing or marketing food, and in wholesale distribution centers. Food companies donate products that have packaging defects, near expiration dates or products that have some aesthetic defect, but are still suitable for human consumption. BAQ

employees and volunteers collect products from the company's storage location; this reduces business's transportation costs and product discarding. In addition, donations are subject to tax reductions, creating an incentive for companies to donate. In the case of wholesale supply centers, each week 25 volunteers walk through the Wholesale Market of Quito, recovering fruits, vegetables and fresh food.

After a few years, BAQ had a logistical and systems transformation. BAQ moved into a bigger space. The equipment needed to process food was purchased or obtained with funds acquired through grants and social project contests. This included equipment that processes fruit pulp and jams, prepares vegetables for canning and processes fortified soy meat. BAQ gained more support and could hire permanent staff, allowing them to distribute and collect food every day.

BAQ receives technical support from students and professors from the faculty of Chemistry and Engineering of the National Polytechnic School, who define the necessary processes to transform donated goods into ready-to-eat products. For example: ripe fruits are used to make pulps, jams and concentrates; vegetables and vegetables that are imperfect are used to make natural dressings and preserves; fortified meat is made using soy protein; and eggs that have not met quality controls, due to their small size or marks, are made into egg flour.

Today, the Food Bank of Quito is the only food bank in the country that operates as a business, and the only one using innovative reprocessing procedures. At the beginning of the project, during their first attempt, volunteers and founders were able to recover 252 kg of food, which served 300 people. Currently, BAQ recovers, on average, 10 to 15 tons of food per month, making it possible to help 9,637 people. In addition, BAQ processes more than 3,500 kg of food to produce fruit pulp, jams, biscuits, crackers, fortified soy meat, seasonings and egg flour. More than 1.5 million kg of potential food waste does not end up in the municipal landfill. BAQ is helping decrease malnutrition and chronic hunger in Quito. BAQ has improved the public image of donor companies, and reduced their transportation costs and the costs of final disposal of products that have reached the end of their marketing cycle. This cost reduction represents about \$1,406 dollars per ton saved if companies rely on BAQ to "dispose" of their waste.

**United Arab Emirates:** In its 2018 vision, the UAE government has embraced innovation as a key principle to build a knowledge-based community. In addition, the government has established the Abu Dhabi Economic Vision 2030, a strategic plan to guide the growth of the Emirate of Abu Dhabi. The plan identifies health care as one of the key strategic pillars of development, and maps out the path to

achieve a secure and healthy society, and to position Abu Dhabi as a center of excellence and innovation in health care.

As a result, the Department of Economic Development-Abu Dhabi, the Department of Health and the Ministry of Economy have partnered in 2018 to launch the Technology Innovation Pioneer (TIP). TIP was created to support the UAE innovation strategy by increasing patent filings and grants, and increasing technology development and its implementation within several sectors, such as health care, environment and energy.

TIP was initiated by targeting the UAE health care sector as a pilot, and TIP Healthcare Awards were established to support the development of innovations in the sector. The TIP Healthcare Awards called on pioneers in technology and innovation from around the world to contribute to the creation of innovative solutions to challenges in UAE's health care sector. As the first proactive innovation effort, TIP has reached more than 10,000 people on social media, attracting 1,180 applicants from many different countries.

TIP Healthcare Awards are split into different categories including patents, proof of concept and start-ups. Projects must develop solutions for treating medical issues prevalent in the UAE such as diabetes, cardiovascular disease prevention, oral health, etc. The Department of Health-Abu Dhabi was responsible for evaluating the proposed ideas

and innovations, and giving the winning group of companies and entrepreneurs an opportunity to turn these ideas into projects or start-ups in the UAE. TIP awarded the 23 Technology Innovation Pioneers with prizes totaling AED 3 million (~816,705 USD), with AED 30 million (~8,167,050 USD) potential funding from interested private investors.

Among the 2018 TIP Healthcare finalists, 15 percent were for patent registration, 35 percent for start-ups, and 50 percent for proof of concept. Examples of the innovations include: a new class of antibiotic compounds; a device to correct ear Eustachian tube dysfunction; a new catheter that is safer and easier to use; and nano-sized capsules that deliver chemotherapy drugs to the surface of cancer cells, minimizing effects on healthy cells. The current value of the inventions supported by TIP awards is 30 million dirhams (~8,167,050 USD), but the future value of these inventions is expected to reach 100 million dirhams (~27,223,500 USD) in five years.

**United Kingdom:** The vision to develop a 21<sup>st</sup> century Supply Chain (SC21) for the aerospace industry was introduced by the Society of British Aerospace Companies and its members, culminating in 2006 with a new program to improve the UK aerospace supply base and help the industry be more competitive in the supply of products and services. The program was launched at the Farnborough International Airshow with 16 of the

country's largest primes and three key small and medium-sized enterprises signing up for the program.

The SC21 Program involves award recognition for achieving levels for delivery and quality that meet specific standards using a rolling 12-month average, completed for each of the major customers of the firm. If the firm submitting data for an award is a supplier to any of the SC21 signatories, then data for these customers must also be submitted. The award level defaults to the lowest audited level of business excellence, manufacturing excellence, quality and delivery performance assessed. The award — either Bronze, Silver, or Gold level — lasts for one year from point of recognition. It is recommended that award winners submit for re-recognition to demonstrate that improvements are sustained. Award criteria include: Delivery and Quality Performance; Business Diagnostics (business excellence, manufacturing excellence and relationship management metrics); and the Continuous Sustainable Improvement Plan. A full European Foundation for Quality Management (EFQM) Excellence Model and RADAR assessment (similar to the Baldrige Award) must be completed to obtain Gold status. SC21 accredited Business and Manufacturing Excellence practitioners must be used to carry out the award assessments.

Moyola Precision Engineering — a supplier of precision components to the defense, medical, power generation and automotive industries — is one of two of the first manufacturing companies in the UK to achieve the Gold award in July 2018. Through continual reinvestment in the latest multi-axis machining technologies and off-line programming software, Moyola is able to produce the highest quality products at very competitive prices. In achieving its Gold recognition, the company has demonstrated operational excellence evidenced through the SC21 process. This included delivery performance ranging from 99–100 percent with quality performance at 99.9–100 percent, and an EFQM score in excess of 500 points.

In 2005, Denroy Plastics identified SC21 as its model for continuous sustainable improvement. The structure of the program through Bronze, Silver and Gold provided a challenging but achievable goal for Denroy. The required delivery and quality performance through the three levels demonstrated a progressive route to supply chain excellence. SC21 gave structure to the key elements of business, manufacturing and relationship excellence by focusing on LEAN and a culture of continuous improvement. With employee engagement essential, the commitment given by all employees became the norm and the processes adopted through

SC21 became "just how we do it." Without this sound base, Denroy would not be able to sustain a 99–100 percent on-time-in-full delivery and 99.9–100 percent quality performance.

Both companies attained additional benefits, including quality cost reduction, reduced cost of scrap and rework, and reduced dispatch cost (re-delivery). Stakeholder relationships benefitted through cross-company team work, better contract management, long-term planning between customers and suppliers, and communication before and during the manufacturing process.

Since established, the SC21 program has seen hundreds of companies from the civil and defense aerospace sectors dramatically improve their bottom lines. Business benefits include:

- Lead time reduction;
- Better cash flow;
- Reduced inventory;
- Labor and set-up time reduction;
- Increased return on capital employed;
- Reduced number of overdue/backlog orders;
- Increased sales per employee;
- Machine breakdown time reduction;
- Better floor space utilization; and
- Reduced warranty claims.

SC21 now offers opportunities also to companies in the defense, security, and space industries, delivering millions of pounds (Stg) worth of benefits to all sizes of business in these industries.

**United States:** With the world in a transition to cleaner energy, the quest for energy efficiency, and a natural gas boom in the United States, there are growing opportunities to both capitalize on low-cost energy supplies, and to develop and commercialize new energy-related innovations. In this context, the Council on Competitiveness — in a public-private partnership with the U.S. Department of Energy — launched the American Energy and Manufacturing Competitiveness (AEMC) Partnership in 2013 to tackle two goals: increase U.S. competitiveness in the production of clean energy products, and increase U.S. manufacturing competitiveness across the board by increasing energy productivity.

The AEMC has engaged thousands of leaders, and energy and manufacturing stakeholders from industry, academia, labor and government in a series of nine regional and progressive dialogues, original research and four national summits to catalyze policy solutions and models for public-private partnership pilot projects.

In the past five years, new initiatives have been launched including: the first U.S. Clean Energy Manufacturing Analysis Center; and \$1 billion in public and private investment in U.S. shared manufacturing innovation infrastructure, including five Department of Energy supported ManufacturingUSA innovation institutes, two Manufacturing Demonstration Facilities and a new Energy Materials Network. In addition, efforts are underway to leverage the assets at U.S. national laboratories through high performance computing for energy, manufacturing and materials programs, and a new Technologist in Residence Program.

Many of the Nation's top researchers and innovators in energy and manufacturing technology lack access to tools and resources to bring their visions to market. Software and service start-ups draw funders due to their ability to scale quickly, their relatively low capital needs, and their potential to create a quick exit for investors. In contrast, the levels of investment needed to demonstrate an energy innovation are much greater, the time-frame is much longer and the ability for quick wins are relatively non-existent.

Understanding that these innovators require significant capital and physical resources, U.S. national laboratories created accelerators targeting distinctive needs in the energy and manufacturing domains. Instead of a "spin-out" to the marketplace model, these national

labs are creating a new model: **"spinning in" innovation**. National laboratories spin potential innovators into the labs and pair them with laboratory resources and facilities, access to laboratory talent for technical assistance and seed funding to help bring their innovations to market.

Piloted at Lawrence Berkeley National Laboratory in 2014, Cyclotron Road holds a competitive process to attract potential innovators. If selected, the innovative company/leader joins a cohort of innovators, is given a two-year stipend to work, and is granted access to Berkeley Laboratory talent and technical resources for five years. Innovators are expected to attract sufficient outside funding to bring new technologies to market.

In the first cohort application process, 150 applicants registered. From these 150, eight innovators were selected to be in the pilot cohort. To date, Cyclotron Road has awarded more than \$13 million to 41 innovators who have gone on to generate more than \$48 million in early stage funding to support their projects.

Created in 2016, Chain Reaction Innovations (CRI) at Argonne National Laboratory gives teams of innovators a two-year runway to develop and scale their technologies while being supported through fellowship funding that covers salary, benefits, and use of laboratory equipment and office space. Through a partnership with mentor organizations, CRI

participants get assistance developing business strategies, conducting market research, and finding long-term financing and potential commercial partners. The first cohort of CRI innovators are in the second year of their two-year runs in CRI and have made notable progress. The teams have raised \$400,000 in external funding. Cohort 1 innovators have also partnered with industry, developed prototypes and received top prizes in prestigious competitions.

## ARGENTINA

### Peers Boards of Directors Program

#### The Challenge

The Peers Boards of Directors Program (Peers BODs) needed to improve the competitiveness of a group of companies located in the province of Buenos Aires, Argentina, and increase both their management and networking capabilities. These companies belong to the Province of Buenos Aires Agricultural Machinery Association (MAGRIBA) and shared similar problems that were hindering their productivity. The opportunity for improvement was first identified by the "Argentina Quality Program" (AQP) which operates within the Secretariat of Productive Transformation in the National Ministry of Production.

AQP's main objective is to provide the regulatory, financing, and training tools and to generate the abilities required by local companies to raise the quality of products and services they produce in Argentina, improving their global competitiveness, achieving entry into foreign markets, and successfully competing against foreign competitor offerings in the domestic market. The AQP also coordinates the different public bodies whose responsibilities are related to its mandate, building a unified vision and strategy among them. Participants include the National Institute of Industrial Technology (INTI), the Argentine Accreditation Organization, the Argentine Agency of Investment and International Trade, and National Ministries.



#### The Solution

The Peers Boards of Directors (Peers BODs) initiative was developed as part of the Production Ministry special focus on specific and strategic vertical industries, one of which was the Machinery Production Sector.

First, in 2016 the AQP asked a group of advisors from the "Network for improvement of industrial productivity," part of the INTI Mar del Plata, to assess the competitive profile of the MAGRIBA group (agricultural machinery manufacturers). The survey identified a common set of challenges the companies faced:

1. Regulations:
  - Low or non-existing compliance alignment between local and European Union regulations, and lack of mutual recognition between the local certification body (IRAM) and those in export destination countries.
  - Narrow product scope on the ISO 8076.
  - Weak participation and feedback in the formulation of local Technical Regulations.



## 2. Suppliers development:

- Low quality levels from suppliers across the value chain, and few, if any, quality and production processes certifications.
- Lack of credit instruments to support and develop suppliers.

## 3. Need for a sector-specific ERP.

## 4. Need to develop quality control laboratories to certify compliance with Technical Regulations.

## 5. Need to access competitive financing:

- Lack of funding incentives for companies that comply with quality certification programs.

## 6. Research and development:

- Lack of technical and financial support for research and product development.
- Burdensome paperwork to apply for patents.

Once the AQP had a clear picture and consensus on common challenges the sector faced, the National Ministry of Production looked for strategies, plans and methodologies that worked in the past to improve SMEs competitiveness, and identified the successful experience of AACREA (Asociación Argentina de Consorcios Regionales de Experimentación Agrícola) groups. For almost 50 years, AACREA has generated groups called "CREA," peer groups that facilitate technology transfer. Throughout this period, the peer group model has been applied in the Argentinian rural sector. The results have

been highly satisfactory as many companies that participated improved both their technical and economic efficiency. Also, many business owners and managers, employees and family members have been trained in the application and use of technologies, and interpersonal relationships. Joining a CREA group is voluntary. Typically, when there is a call to form a new CREA group, about 30 are summoned initially, and about 10 volunteer to participate. Sometimes, the same CREA Group works at different levels. This means that the directors of the companies, administrative staff, plant managers, etc. meet periodically, but on a separate meeting schedule to address different issues.

At the same time, the EXC network, FUNDECE (Business Foundation for Quality and Excellence), FPNC (National Quality Award Foundation), and IPACE (Argentine Professional Institute for Quality and Excellence) were working with AACREA to adapt its methodology to different contexts for developing SMEs of any sector and economic activity. This model, "Peers Boards of Directors program" (Peers BODs), started with the goal of disseminating technical knowledge and tools among different companies. Over time, it has helped companies develop management skills such as strategic planning and financial management. But, most important, it now also includes soft skills essential to any business, such as networking, information sharing, professional growth, and shareholder governance for owners and their descendants.

To address the challenges companies in the agricultural machinery sector face and increase their competitiveness, the Peers BODs methodology was proposed as an ideal model to be used with MAGRIBA.

The program convenes groups of 6 to 10 SME owners in meetings that follow Board of Directors (BOD) practices and rotate from company to company on a monthly basis with different members hosting the meetings. A mentor facilitates the meeting discussion, the host presents its company performance, gets input from peers, and then commits to a final plan which will be reviewed the next time the company hosts a meeting.

Using this format, SME owners not only train on BOD protocols, processes, and dynamics (the vast majority of SMEs do not have a formal and functional corporate governance body), but also have access to senior business executives' advice and experience, and relevant contacts with other company owners at zero cost.

The "Peer Directory" methodology includes the following steps:

1. Formation of a group of company owners and/or top executives who meet on a monthly basis at one of the group's companies (**The Host**). These companies, which can come from different industries, face common challenges and problems. A "**facilitator**" assigned to the group participates in these meetings.
2. Meetings rotate among the companies (on a monthly basis), with the host responsible for preparing for the topic he /she wishes to discuss, as well as logistics for the event.
3. The host company presents the topic to the rest of the group which, in turn, develops a proposal to address the problem or challenge.
4. At the beginning of the next meeting, the host from the previous meeting presents the conclusions and decisions made based on the recommendations generated at the previous meeting, sharing any progress made. This presentation becomes the formal "Action Plan."
5. When the company is once again the host (return of the cycle, visit 2), the meeting is planned with the report of the previous visit as an input, and the host shares RESULTS of the actions implemented versus the "Action Plan" built on the recommendations generated in visit 1.
6. The group decides which topics are priorities for its work. These issues can be sector or company-specific, but relevant to the whole group.
7. Meetings are in-person and the member cannot designate another person to attend on his/her behalf. The contents of the meetings are confidential, and the information will not be shared outside the group without specific permission from presenters or discussants. The minimum time required for participation is one morning per month.

## Objective

Identify and overcome obstacles to growth and improvement

## Roles

- Members
- Host
- President
- Facilitator/Adviser

## Monthly Meeting of the Group

Rotating; each company in the group hosts at least once a year.

Takes place in host's facilities

**Main Activity,  
Group Engine**

## Activities

- Analyze production and projects of the companies
- Work on "the project" of the host company
- Present results of the experiences
- Discuss different experiences of each participant
- Report new topics
- Make decisions and define actions

8. Meeting facilitators are independent experts and advanced professionals in the field of SME management who would, otherwise, be expensive to access as consultants or advisors.

## The Stakeholders

There are six main stakeholders involved in the project:

1. National Ministry of Production represented by the "Argentina Quality Program" (AQP) within the Secretariat of Productive Transformation
2. EXC network
3. National Institute of Industrial Technology (INTI)
4. MAGRIBA, acting as a business association
5. Ten companies from MAGRIBA participating in the program:
  - Yomel SA
  - Allochis Cabezales
  - Industrias Metalúrgicas Cestari SRL
  - Abel Zubelda SA
  - El Chalero SA
  - Martínez & Staneck SRL
  - Nieves Argentina
  - Metalúrgica FEYFE S.A
  - Industrias Victor Juri SA
  - Secadoras Mega SA

## Leaders, Catalyzers and Enablers

As the project originated in the National Ministry of Production's "Argentina Quality Program" (AQP), coordinators Mariano Perez and Matias Gutman, and the Agricultural Machinery Sector analyst Julieta Cabezon have been in charge of implementation. This role includes transportation and meeting logistics, and facilitating the link between the companies and others involved.

Monica Campanaro representing the National Institute of Industrial Technology, connects the companies to available tools they need.

Representing EXC, Federico Sedevich has been the facilitator of the group. Playing a key role, he works with hosts in preparing for the meetings, and is responsible for transferring the methodology to the group.

From MAGRIBA, Carlos Martinez (Martinez y Staneck) and Marcelo Valfioriani (Ingenieria Mega) initially invited and engaged the rest of the group. Carlos Fueguin (MAGRIBA) eventually facilitated organization of the meetings by coordinating the whole group.

## Implementation Barriers

The principal barriers faced in the implementation were:

Logistical:

- There are significant geographical distances between the companies. The problem was partially solved by organizing

the order of some meetings among nearby enterprises, so that one trip serves for both the actual meeting and for visiting the next host enterprise to prepare for the next meeting. This problem still persists.

- Payment to the facilitator can be delayed due to problems in the Argentine public sector. This problem was overcome with the collaboration of EXC, which finances payment until the official payment is delivered.

Human/interpersonal:

- Some companies rejected the methodology, judging it as soft and not needed at the moment. The facilitator solved the problem by sharing leading cases using the methodology.
- Most of the companies complained about the lack of national measures to improve the macroeconomic situation. The problem was solved when the National Ministry of Production representative showed the companies that the macroeconomic problems were out of their reach, but there were many other improvements for which the companies were responsible.

Operational:

- The companies had difficulties characterizing their issues using data, facts, and statistics that provide a solid framework for discussions during the meetings.

To partially overcome the problem, the facilitator gave the companies tools to improve the accuracy of their presentations.

- There was a lack of common indicators for comparisons. To solve the problem, first, the facilitator suggested adopting the set of indicators some members of the group were already using. Second, the group started using the EXC / IPACE Benchmarking platform of indicators, a very simple tool with a proven track record.
- Finally, some company directors were not open completely, and willing to listen to their partners' recommendations and opinions.
- Business owners and executives are beginning to identify and avoid behavior that does not contribute to the order of the dialogue and, therefore, to the effectiveness of the meeting. This "soft" skill is also permeating inside their own organizations, and making quite an impact on the existing relationship between owners and their employees.
- Companies are reserving first judgments, changing them to questions to better understand the host's problem. Also participants are recognizing inhibitors that can constrain honest exposure of opinions.

## Results Achieved

The methodology is still being deployed; only half of the scheduled meetings have taken place.

The following improvements have been identified:

### Meeting dynamics

- Business directors are beginning to see the potential of the strategy and tools deployed by the program.
- The sincerity and "sharpness" of their contributions have been increasing from the first to the last meeting.

### Business opportunities

- Companies identified the need to have a series of common indicators to have a solid platform for reporting, sharing, and tracking ongoing actions.
- Companies are identifying common needs and opportunities, helping them share their problems with the government and key stakeholders.

Finally, the commitment of the members is worth noting. They have always attended the meetings. In some cases, the company changed its representative (entrepreneur father for his son, for example), but has always been represented at the meetings.

## Impact of Implemented Solution

Although it has been a short time since it started, members are implementing recommendations emerging from the program. This includes: new types of structured and formal meetings within their own companies to follow up and solve daily problems, new ways to organize their objectives, urging the use of KPIs to gain visibility on ongoing company operations, and some benchmarking.

Companies have also increased their visibility, access and relationship with relevant players at the National Ministry of Production, such as participating in other SME national programs which were previously unreachable (for example, due to lack of trust in the government or not knowing the right channel to submit their query or request). They have also gained the ability to prioritize and communicate their needs and requests in a much more efficient and assertive way.

## Investment

### IMPLEMENTATION COSTS

Monthly cost per company	Concept
\$5,700	Group coordinator/facilitator fees
\$2,600	Membership to FUNDECE for small businesses
\$4,600	Membership to FUNDECE for medium-sized companies (Medium: industrial companies that have an annual turnover of \$ 70 million and a staff of 70 employees; service companies that exceed \$ 50 million and 50 employees)

The National Ministry of Production, particularly the "Argentina Quality Program" under the Secretariat of Productive Transformation, was responsible for paying the fees for six meetings. During the same period, FUNDECE will pay for 100 percent of the membership, enabling program implementation at 6 of 10 companies at no cost to them.

## Innovation Approach

The methodology is innovative in that it deals simultaneously with soft and hard issues at the center of the company decision-making process (the owner), issues critical to competitiveness (SMEs are, by far, the least sophisticated businesses in Argentina) with material impact on national wealth (SMEs employ 80 percent of the private labor force).

Both hard and soft leadership issues are addressed: strategy definition and implementation, financial planning, organizational alignment, talent development and empowerment, etc. Most important, the methodology provides SME owners not only access to a wealth of contacts, clients, and suppliers, but also to a peer group to relate to at a personal level (the "owner" job is a lonely one) and with whom they can discuss personal issues (e.g., one hot topic is always succession plans, the role of relatives in the organization, etc.).

At the same time, the methodology develops collaboration networks, and disseminates world-class management practices and area-specific technology among traditional competitors

Finally, the program has a lot of "capillarity," as it is relatively easy to disseminate across different geographies and does not require a sophisticated or complex managing structure. During a second stage, conditions and the

size of the network permitting, the program can be scaled up into a sophisticated benchmarking network, with all the benefits that such visibility brings on an individual, group, or national level.

## What Went Wrong?

Among the challenges the program faced were:

- The time planned for implementation versus the actual realization time. The program was to be carried out over a six-month period. However, program implementation will take about a year due to the unavailability of the companies to meet on the planned meeting dates.
- In one of the participating companies, the work to be done prior to the meeting with the facilitator was not carried out properly, because the preparation work did not include the owner. Then, in the meeting at his company, the depth and openness of the information presented about the company were not achieved as in the rest of the cases.
- Some entrepreneurs may present information on irrelevant or secondary problems, which does not allow for capitalizing on the potential of the group.

## Lessons Learned

Some entrepreneurs may not feel comfortable opening up their companies and sharing their problems and concerns. This is addressed by paying special attention to the process of group integration and developing trust.

There is a power of influence that exists among peers, recognized as superior to that of a consultant. The reason may be empathy among them, given their similarities which allows them to see the complexity that exists beyond the articulation of a problem.

Moreover, the process is also an opportunity to remove personal and emotional biases about the problem and the company, since the review and advice comes from peers external to the company and free of such biases.

Lessons learned call for two changes in a second implementation of the program. First, schedule meeting dates at the beginning of the program, even if they may be later rescheduled. Second, prior to program implementation, ensure timely disbursement of payments can be made to those involved.

## What Comes Next?

In the next meetings, companies should move toward creating action plans since, until now, the sessions ended with clear recommendations but without a structure that provides a guide for the ongoing commitment to implement these recommendations.

The program should continue to guide groups to incorporate good communication and collaborative work practices.

In addition to continuing planned cycles in the headquarters of the different companies in the group, addressing some management needs — for example, the lack of key performance indicators — can have a positive impact both on individual organizations and the evolution of the group. To this end, the following is proposed:

- Theoretical/practical training for developing key performance indicators; and
- Visit a company in the FUNDECE network that, due to its characteristics and results, serves as a model for the start-up.

It is important to keep track of the actions that past hosts are able to implement and those they could not, identifying difficulties early. It should be kept in mind that the evolution of the group is related to the improvements they understand can be achieved by participating in this performance improvement model.

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## BRAZIL

### Scaling-up Innovative and Sustainable Businesses

The Brazilian Development Bank and its mechanisms to enable businesses' growth in large scale

#### Introduction

The financial market is a key to fostering economic growth, promoting social development, and sustaining structural economic changes. Especially in less developed countries, the lack of financial institutions capable of providing the amount of resources required to support strategic projects over the long term makes room for public development banks.

Created in 1952 to provide long-term credit to both productive and infrastructure investments in the country, the Brazilian Development Bank (BNDES) is the main financial agent for development in Brazil. In addition to credit provision, the bank carries out economic analyses and identifies the country's main problems, drawing up and supporting strategic planning guidelines.

Originally, the BNDES' activities focused mainly on the energy and transport sectors, as well as on basic industries. Over the course of its history, however, the bank's operations have evolved in accordance with Brazilian socioeconomic challenges. Today, in addition to stimulating the expansion of productive activities and infrastructure in Brazil, the BNDES provides support for exports, technological innovation (along with the Brazilian Innovation Agency — FINEP), sustainable socio-environmental development, and the modernization of public administration.



Although the financial system in Brazil has grown in size, strength, sophistication, and diversification, it remains mainly concentrated on short-term instruments. Also, macroeconomic instability, large fiscal deficits, and high interest rates have opened gaps that undermined economic growth.

Therefore, the BNDES still plays an essential role in the Brazilian financial system. Among many relevant purposes, which include an active role in reducing market failures, today the bank manages what are probably the most relevant initiatives to scale up innovative and sustainable businesses.

The so-called BNDES System includes not only the Brazilian Development Bank, but also two integral subsidiaries: i) the BNDES Participações S.A. (BNDESPAR), acting in the capital market to carry out capitalization operations; and ii) the Special Agency for Industrial Financing (FINAME), financing production and commercialization of machinery and equipment.

This paper discusses the BNDES' mechanisms to enable businesses' growth in large scale. In particular, it presents an overview of the BNDESPAR's investment funds that support the scaling-up of businesses and briefly describes their focus. It also presents three selected case studies to show how financial support can help the creation and growth of innovative and sustainable companies in Brazil.

## The BNDESPAR

Established in 1982, the BNDESPAR is a business corporation set up as an integral subsidiary of the BNDES, which is its sole shareholder. It carries out capitalization operations of undertakings controlled by private groups and contributes to strengthening Brazilian's capital market through subscription of bonds, corporate securities in public offerings, and investment funds. As stated in its bylaws, the BNDESPAR's purposes are the following:

- To carry out operations aimed at raising capital for projects controlled by private groups, subject to the plans and policies of the BNDES;
- To provide support to companies that meet economic, technological, and management efficiency conditions, and that present an appropriate prospect for return on investment, under terms and conditions consistent with the risk and the nature of their activity;

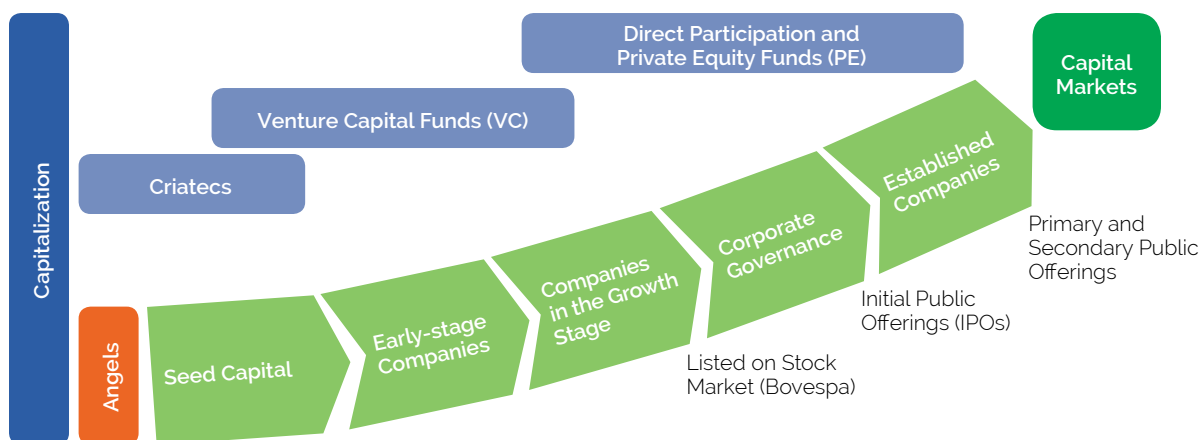
- To provide support to develop new projects, whose activities incorporate new technologies;
- To help strengthen the capitals market by increasing the offer of securities and democratizing company capital ownership; and
- To manage its own and third parties' securities portfolios.<sup>1</sup>

In this regard, the BNDESPAR promotes the dissemination of investments all over the country, enabling growth through innovation by sharing risks with other investors and supporting companies through equity participation in all stages of development. Accordingly, start-ups and emerging companies (beginners or in the growth stage) can be supported by the BNDESPAR's funds aimed at encouraging entrepreneurship and innovation, at stimulating best practices in management and corporate governance, and at spreading the culture of venture capital in the country.

By the end of 2017, BNDESPAR had 43 active funds in its portfolio, with about USD 900 million in committed capital invested in more than 170 companies.<sup>2</sup> These resources, reaching 20 Brazilian states, were invested in 15 different economic sectors and have leveraged about USD 4.7 billion in private investments. For the moment, the corporation is the country's largest investor of seed money and venture capital.

**Figure 1: Participation, Funds and Capitalization Programs**

Source: BNDES



The so-called seed companies can count on the Criatec Seed Capital Funds. For early-stage and start-up companies, the bank offers support preferably through venture capital funds. Investments in emerging and established companies are ultimately made through private equity funds and direct support. The following illustration shows the growth trajectory of a company and the respective modalities of support provided by the BNDESPAR.

Three main aspects explain the relevance of BNDESPAR's support to venture capital and private equity funds focused on innovation in Brazil:

- The importance of strengthening the capital market in the country and the provision of financial resources to innovative firms;

- The need to promote sustainable growth of firms that present positive externalities to the Brazilian economy; and
- The need for improving governance, resulting from both the diversification of the bank's assets and the requirements imposed on the projects the bank supports.

Responding to the challenge of promoting economic development in partnership with the private sector, the BNDESPAR can also be considered an innovation in Brazilian public policy, as it contributes to the bank's own sustainability and profitability. Indeed, being selected through transparent public calls, companies requesting financial support should present promising perspectives for return on investment (considering deadlines and conditions).

The BNDES selects fund managers according to the focus of the fund (regions, sectors, or company size, for example) and mobilizes other potential investors to increase the volume of resources available for investments. The expertise, commitment, and reliability of the BNDES contributes to attracting those interested in investing in innovative projects.

Additionally, the proposals of the selected companies undergo a broad analysis of their socio-environmental aspects. BNDESPAR's operations, then, also induce the adoption of better sustainability performances, while strengthening innovative capacity and helping stimulate good management and governance practices by the supported companies.

## **BNDESPAR investment funds and the scaling-up of businesses in Brazil**

The programs carried out by the BNDESPAR reinforce the availability of resources directed to innovative projects in Brazil. These programs focus on innovation, and small and medium-sized enterprises through the acquisition of:

- Shareholding in public or private companies,
- Debentures convertible into stocks of public or private companies, and
- Quotas of investment funds — in public or private companies — such as venture capital and seed money.

The investment funds are corporate structures that bring together the resources of a number of individuals and use them for investment in securities (frequently shareholdings in companies). The BNDES is usually responsible for structuring the investment funds and helping leverage the resources of other investors. The funds are released in stages, according to the project implementation schedule.

The following table shows the net equity and the BNDES share in the funds that already reached the investment stage. These funds are aimed at scaling up businesses and strengthening innovation projects, and are grouped according to their focus on start-ups, innovation and environment, information technology, or systems/defense.

Some of these funds, as well as some new initiatives that have not yet reached the investment stage, are briefly presented in Table 1.

### **Seed Capital (Criatec Funds)**

These two funds focus on investments in micro, small, and medium-sized innovative companies, and are expected to support at least 108 firms in all five macro-regions of Brazil. The total committed capital is USD 152 million, of which USD 100 million is from the BNDESPAR.

**Table 1: Active Funds in the Investment Phase**

Source: BNDES.

FOCUS	FUND	NET EQUITY (USD MILLION)	BNDES SHARE
Start-ups	Criatec 2	56	67%
	Criatec	66	60%
	Primatec	25	40%
Innovation and environment	Inseed FIMA	50	82%
	FIP Amazônia	30	80%
	Performa	53	77%
Information technology	Capital Tech 2	63	35%
	AvanTI	30	40%
Systems / defense	FIP Aeroespacial	40	30%

**Primatec Fund**

Primatec is an equity fund designed to invest in innovative companies with high growth and value creation potential. The targets are companies incubated in or graduated from incubators and technology parks (revenues up to USD 4.8 million). The capital committed may reach up to USD 30 million, 40 percent of which is from the BNDESPAR.

**Corporate Venturing Experiences**

Corporate Venturing Investment Funds (FIP) aimed at promoting innovation and the development of venture capital in Brazil can also be found in BNDESPAR portfolio. The FIP Aerospace, the FIP Educational 2, the Criatec 3, and the Capital Tech 2 are successful funds that encourage big companies such as Embraer, Bertelsmann, Valid, and Telefónica to invest in the Brazilian innovation ecosystem.

### Angel Co-Investment Funds

Efforts are being made to structure a USD 30 million fund to support start-up companies over the next 10 years. Investors include the BNDESPAR, development agencies, and innovative companies. Pre-qualified angel investors or accelerators may also provide capital in the ratio of 1 to 1. The fund manager's selection is currently in progress.

### Venture debt fund

The venture debt fund will focus on 25 innovative enterprises with high growth potential, adopting more flexible guarantee policies. Total equity is estimated at USD 48 million and the BNDESPAR expects to invest up to USD 24 million.

### Selected case studies

The support provided by the BNDESPAR's investment funds has contributed to the creation and growth of several innovative companies in Brazil. This section presents three case studies on some of these companies, including information on their business and performance.<sup>3</sup>

#### Magnamed Tecnologia Médica S.A.

The medical critical care landscape is undergoing fast changes in Brazil. These changes bring challenges that include, among others, the need for research on appropriate equipment to help health care providers and the competitive manufacturing of innovative

medical devices. To address these challenges, it is important not only to improve the ecosystem that supports research institutions, but also to offer opportunities to companies able to take risks and innovate, providing competitive products to the market.

Since 2008, Magnamed has been supported by resources of the Criatec 1 fund. The company, originally founded by three partners (all of them engineers) in 2004 as a start-up to supply modules for medical equipment manufacturers, later became a lung ventilator manufacturer.

Now, Magnamed produces high precision medical equipment and is specialized in critical care systems, particularly associated with respiratory care. These products are not only used in intensive care units, but also during patient transportation, for example.

The equipment produced by Magnamed includes:

- BabyMag, equipment for neonatal intensive care units;
- FlexiMag, a fast response ventilator that provides the main features for ventilation in neonatal, pediatric, and adult patients, and claims to offer the lowest total cost of ownership in its category;
- FlexiMag Plus, complete equipment claimed to meet all types of ventilation services needed within an intensive care unit;

- OxyMag, transport equipment designed for emergency teams;
- Ventmeter, a gas flow analyzer; and
- OxyMag Vet, equipment designed for veterinary use, which ventilates from extreme low weight to big animals.

Launched in 2011, OxyMag can be considered the company's main product. It can be used both in ambulances and in emergency rooms. The key competitive differentials of OxyMag are: i) it adapts to any kind of patient (adult, elderly, or child); ii) it is easy to use; and iii) it has a reasonable cost.

The company also introduced the Magnamed Remote Assistance, present in all pulmonary ventilators. This technology allows identifying a possible problem through the Internet, without requiring a technician visit to the hospital.

Magnamed is considered one of the fastest growing small and medium-sized companies in Brazil, according to the ranking published by a respected Brazilian business magazine (Exame). In 2017, the company is positioned 20th in this ranking.

Indeed, between 2008 (when Magnamed first received investment from the Criatec fund) and 2016, net operating revenues increased impressively from about USD 35,000 to USD 8.5 million.<sup>4</sup> Exports are another competitiveness indicator. They represent about 25 percent of Magnamed's revenues, and the products have been sold to more than 35 countries.

#### **Yller Biomateriais S.A.**

The Brazilian dental market has a great potential to grow, since local citizens are very concerned with oral health and the appearance of their teeth. According to the Brazilian Medical and Dental Devices Manufacturers Association (ABIMO), national industries have the largest share of the dental market in the country. Furthermore, dental research performed in Brazil is respected in the international scientific community. Twenty percent of all dentists in the world work in Brazil, and about two million dental implants are performed every year in the country.<sup>5</sup>

Created in 2012, Yller manufactures products for dentists and their patients used in a wide variety of dental treatments. Since its foundation, Yller has invested heavily in research and development, which is a driving force of the company.

For more than ten years, Yller's partners have been active in cutting-edge research in dental materials, developing products with high technological complexity, and innovations to ensure the best usability and performance. One of the founding partners has had more than 70 papers published in national journals, 151 papers presented at scientific events, 16 patents granted (including the sole invention patent granted to a Brazilian by the United States Patent and Trademark Office — USPTO), and 26 products developed and launched in the market.

Focusing on high-quality and innovative items, Yller offers, among a variety of high value added products, dental bleaching, dental cement, adhesives, resins, silicones, and sealants. Most of the 30 products developed by the company use exclusive technologies protected by patents and industrial secrecy.

In January 2016, resources of the Criatec 2 fund were directed to Yller. Since then, the company:

- Launched its own branded products (grouped into different product lines) focused on market segments dominated by imported brands;
- Expanded its operations to a new corporate headquarters able to accommodate an increased number of employees; and
- Began to export to Chile and Paraguay, and conducted negotiations (already at an advanced stage) with Costa Rica, Colombia, Peru, Mexico, and the Dominican Republic.

As a result, Yller's annual gross revenue increased from less than USD 17,000 in 2015 to about USD 275,000 in 2016 and USD 1.1 million in 2017 (54 percent higher than budgeted for this last year). These numbers highlight the remarkable performance of the company. In addition to its financial success, the main achievements in 2017 were:

- Yller's brand consolidation in the market;

- Operation permits to start up a new 500m<sup>2</sup> manufacturing facility (that will include administrative and manufacturing areas), which will enable the company to triple in size; and
- Approval and award of USD 1.5 million in grants in the framework of "Inova Mineral" plan, a joint initiative of BNDES and Finep to foster business plans that include the development of innovative and sustainable products or processes, aimed at the development of Brazilian companies and technologies in the production chains of the mining and mineral processing industry.

### Vindi

Information and Communication Technologies (ICT) are changing many aspects of how companies and consumers deal with money. Start-ups offering tech-enabled payments, called fintech (finance and technology) companies, are sprouting all over the world.

Brazil is one of the most interesting places to invest in financial solutions and products, not only because the Brazilian population is becoming more used to financial technologies, but also because of its highly concentrated banking sector. Currently, the country is experiencing the rise of new high technology-based financial services providers, because the Internet banking services offered by the major banks have some usability problems. According to the Brazil



FintechLab Report 2017, some of the most notable problems are difficulties in linking payment receipts with transactions, difficulties in choosing and comparing investment options, and the lack of tools for the integrated tracking of personal finances.<sup>6</sup>

Brazil is the most important Latin American fintech market, and hosts the largest number of these start-up companies, as shown in Figure 2.

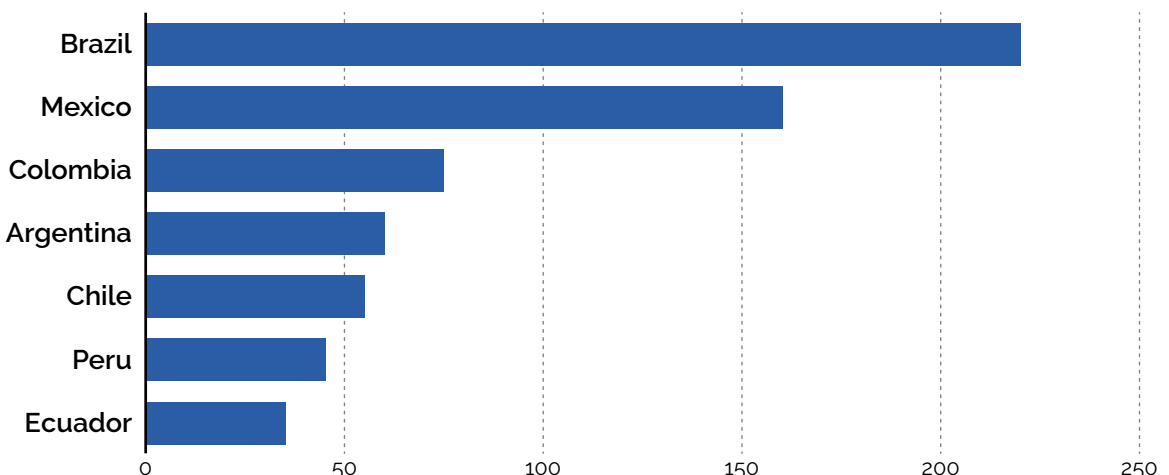
Vindi is a Brazilian technology company created in 2013 by entrepreneurs with backgrounds in finance, payments operations, and Internet games. As a fintech start-up company, Vindi offers financial services that

were, until recently, provided exclusively by traditional banks and financial services firms. The drive of this young company is to innovate and break with the heavily bureaucratic manual routines for payment processing, risk management, and financial reconciliation of payments.

Specialized in online payments and financial solutions, Vindi's platform provides payment gateways, invoice billing, and financial services to small and middle market business. Considered by Endeavor (a global non-profit organization that selects, mentors, and accelerates the best high-impact entrepreneurs around the world) as one of the essential

## Figure 2: Number of Fintech Start-ups in Latin America

Source: Available at: <https://goo.gl/bTChhU>. Accessed: 24 May 2018.



tools for the financial market, these payment methods serve hundreds of businesses that have recurring sales (plans, monthly fees, or subscriptions).

Currently, the Vindi platform is used by educational firms, fitness centers, subscription e-commerce firms, software as a service (SaaS) providers, health insurance companies, and several other business activities with recurring sales. Its ultimate purpose is to uphold and scale business operations, providing support for the automated collection of recurrent payments, for example, for companies that offer monthly subscription plans.

After receiving financial support from the Criatec 2 fund in April 2016, Vindi has hired 35 people to improve sales performance and customer support services. The company has also expanded its facilities, buying equipment and renting a new space.

Also in 2016, the company began to implement a business strategy to broaden its portfolio to other market segments and business sectors. Therefore, it bought the sub-acquirer Aceita Fácil, subsequently named Aceita.<sup>7</sup>

A short time later, a new company was born within Vindi's business ecosystem — Fast Notas, created to be a platform for managing and issuing invoices.

Finally, in June 2017, Vindi and its main competitor, Smartbill, announced the merger of the two companies. The creation of a mega

fintech provider is considered a step toward consolidation of the industry serving the market for payment solutions focused on the service sector in Brazil.

To date, the company highlights are:

- Vindi has established itself as the largest independent payment gateway in Brazil;
- Its customer base has increased from 541 clients (August 2015) to more than 2,500 recurring customers, including Multiplus, Editora Abril, Thomson Reuters, VivaReal, Movile, Empiricus Research, Buscapé, Wizard, Serasa, Pearson, Endeavor, and some of the fastest growing start-ups in the country;
- Its gross revenue has grown from USD 320,000 in 2015, to USD 2.5 million in 2017;
- Total payments circulating on Vindi's platform (Total Payment Volume — TPV) exceed USD 300 million.

Among its competitive differentials, Vindi's payment gateway is the only one in the market capable of offering a platform ready to integrate the most diverse means of payments, such as credit card, debit order, or monthly invoice. Its gateway is supported by consistent databases and tests performed by audit firms such as Trustwave. The company is also certified by Payment Card Industry (PCI) Compliance, which prevents data breaches, and ensures healthy and trustworthy payment card transactions.

## Concluding Remarks

Innovative and sustainable companies are central to promoting economic development. In the long term, the growth of output, employment, and productivity is certainly dependent on scaling up this kind of business.

In Brazil, the BNDES System is the main financing agent for development, enabling investments in most economic sectors. Through the BNDESPAR, it carries out capitalization operations aimed at raising funds for innovative projects and at providing support to companies that meet economic, technological, and management efficiency conditions.

The BNDESPAR also acts as an investor, financing resources as a member of funds managed by private administrators selected in the market. Focusing on development and competitiveness, it also puts in place programs and policies to encourage individual firms and investors to take part in investment funds to leverage innovation potential and enable businesses to grow in large scale.

In this paper, some of these investments funds, and some initiatives still under development, were described. Additionally, three selected case studies were presented to show how financial support, when targeted to areas where there are market failures or significant externalities, can contribute to the creation and growth of strong and healthy companies.

These case studies demonstrate that institutions like the BNDESPAR can enable businesses to expand, and create opportunities to scale-up sustainable and innovative corporate plans. Therefore, the Brazilian Development Bank has a crucial role in supporting productivity improvements and in promoting structural changes in the Brazilian economy.

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### Endnotes

1. Available at: <http://goo.gl/Uh6pyg>. Accessed: 25 May 2018
2. Unless otherwise stated, all values in this paper were calculated using exchange rates between US Dollars (USD) and Brazilian Reais (BRL) at the end of each corresponding year.
3. CNI is grateful to the BNDES for the information provided.
4. USD values calculated using exchange rates at the end of each year.
5. Available at: <https://goo.gl/YJgUpu>. Accessed: 24 May 2018.
6. Available at: <https://goo.gl/WLzHZp>. Accessed: 24 May, 2018.
7. A sub-acquirer is a company that processes payments and transmits the generated data to the other players involved in the payment flow, performing as an intermediary between the acquirer and the store.

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**The National Industry Confederation (CNI)** represents and advocates for Brazilian industry's interests before federal, state, and municipal governments through a nationwide network of private entities responsible for initiatives to support industrial development.

## CANADA

### Be Exponential — Growth Through Innovative and Inclusive Alliances: Canada's Emergent Leadership

A Collaboration of GO Productivity, Alberta Women Entrepreneurs (AWE), and the Institute on Governance

#### Importance of Growth/Scaling-up to the Canadian Economy

Over the past decade, the Government of Canada has focused on diversifying Canada's economy, encouraging movement away from a dependence on natural resources and placing more emphasis on innovation and productivity to grow the economy, and improving global competitiveness.

As part of government's diversification and innovation strategy, a significant focus is placed on fostering entrepreneurship through a range of support programs: the provision of federal and provincial grants, loans, and tax incentives for start-ups. According to the World Bank, Canada is now the second easiest country in which to start a company, behind New Zealand.

However, in spite of all of this entrepreneurial support, the productivity gap is not closing, and Canada's innovation is not improving. A lot of this is due to the fact that half of Canadian startups do not make it to the five-year mark. In addition, the majority of the firms that start out small, experience zero or negative growth employment. Of the more than 1 million Canadian businesses, 98 percent have fewer than a hundred employees. More than 75 percent employ ten or fewer people and more are micro-enterprises, with no more



than four employees.<sup>1</sup>

Research suggests a relationship between firm size and productivity. One study concludes "relative to firms with 0–100 employees, firms with more than 500 employees are roughly 30 percent more productive and firms with between 100 and 500 employees are roughly 20 percent more productive." When compared to larger firms, smaller firms with lower productivity are unable to take advantage of economies of scale and lack the financial resources to invest in productivity enhancing technology. Small firms need stronger incentives to pursue growth and international expansion.<sup>2</sup>

High-growth enterprises, coined "gazelles," are young companies that transform markets with radically innovative products, services, and processes. These firms grow by leaps and bounds inspiring the name gazelles.

<sup>1</sup> National Post Article — Age of the Gazelle (Excerpted from *How We Can Win* by Anthony Lacavera and Kate Fillion. Copyright ©2017 Anthony Lacavera. Published by Random House Canada, a division of Penguin Random House Canada Limited).

<sup>2</sup> Centre for Digital Entrepreneurship • Economic Performance (deepcentre). Dan Herman and Anthony D. Williams. Driving Canadian Growth and Innovation — Five Challenges Holding Back Small and Medium-Sized Enterprises in Canada.

Start-ups must pass through four key stages to transform into successful gazelles:

- The **Founding Stage** spans from the launch of a company to when its first demonstration product is created. During this stage, start-ups are funded by the entrepreneurs and their friends and family.
- In the **Traction Stage**, the company refines its product. Financing during this period is provided primarily by angel investors (high net-worth individuals, typically entrepreneurs who have successfully founded one or more companies themselves) and venture capital funds (independently managed pools of start-up capital).
- In the **Growth Stage**, the business model is validated, and the company now requires significant capital from larger financial institutions, professional management teams, and access to international markets.
- At the **Maturity Stage**, growth rates stabilize, and the gazelle becomes a large international company.

Most Canadian start-ups fail to make the transition from the Traction Stage to the Growth Stage because they lack the necessary human capital — experienced mentors

and skilled managers — as well as the necessary connections to networks of needed resources such as early-stage financiers, customers, partners, and suppliers. Those firms that do make it stumble in the Growth Stage either because they are acquired by larger firms or, more often, because they have difficulty obtaining the large amounts of capital and building the international channels and professional management team required to take growth to the next level.<sup>3</sup>

The OECD has defined gazelles as enterprises up to five years old with average annualized growth in employees greater than 20 percent per year over a three-year period and with at least ten employees at the beginning of the period.<sup>4</sup>

There is growing evidence that the type of entrepreneur matters, especially when it comes to fostering long-term economic growth. According to the Global Entrepreneurship Monitor (GEM), there are three entrepreneurial sub-segments based on growth:

1. **High-Growth Entrepreneurs** with revenue growth of 20 percent or more per year;
2. **Moderate-Growth Entrepreneurs** with revenue growth rates of between 5-20 percent per year; and

<sup>3</sup> Fueling Canada's Economic Success: A National Strategy for High-Growth Entrepreneurship This report was prepared by a Task Force of 2010-2011 Action Canada Fellows: Terry Beech, Brenna Donoghue, Geordie Hungerford, Ali Okhowat, Shannon Wells-Kinder, Jeff (2018) Presentation to the Alberta Policy Matters Conference, June 13 (Institute on Governance, Ottawa, Canada).

<sup>4</sup> Organization for Economic Cooperation and Development (OECD), *Measuring Entrepreneurship: A Collection of Indicators 2009 Edition*, Paris: OECD-Eurostat Entrepreneurship Indicators Programme, 2009, p. 30. <http://www.oecd.org/dataoecd/43/50/44068449.pdf>.

**3. Low-Growth Entrepreneurs** own firms with an annual revenue growth rate of less than 5 percent.<sup>5</sup>

Recent research from the Kauffman Foundation demonstrated that fast growing firms in the United States are responsible for 10 percent of new job creation each year, even though they make up fewer than 1 percent of firms.<sup>6</sup> These high-impact entrepreneurs growing firms add new jobs and develop new innovations, generating millions in wealth.

Gazelles are important to the Canadian economy because they contribute disproportionately to job creation. Between 1993 and 2003, gazelle firms accounted for only 4 percent of businesses in Canada but were responsible for 45 percent of net jobs created.<sup>7</sup>

Industry Canada has found that firms engaged in exporting are more likely to be gazelles than firms that do not export, and firms that export contribute proportionally more to job creation.<sup>8</sup>

High-Growth Entrepreneurs, regardless of sector or region, share common attributes — they generally start with scale-up in mind and are export oriented. In Canada, however,

almost 75 percent of our newest entrepreneurs have no intention of competing in the global economy. Currently, 12 percent of small businesses and 28 percent of medium sized businesses participate in the export market. This suggests Canadian firms' exposure to competition has been minimal, fostering a culture of complacency and a satisfaction with being late adopters of innovations pioneered by others — at the time, a cheap and easy route. This complacency has led to a reluctance to enter the global marketplace. However, the rules of the game have changed. What worked in the past won't work in the future.<sup>9</sup>

This was aptly stated by Mayor Don Iveson from Edmonton, Alberta, Canada at his May 2018 State of the City Address to hundreds of community leaders and business executives. "If my recent trade excursions to San Francisco and Asia have taught me anything, it's that getting by is not going to be good enough anymore. From the moment you hit the ground in these places, the hustle is on. Everyone is working it hard — to get that next deal, to own that opportunity, to secure that capital, to broker that partnership, to grow and

<sup>5</sup> Global Entrepreneurship Monitor (GEM), Rhett Morris — Center for High-Impact Entrepreneurship. 2011 High-Impact Entrepreneurship Global Report.

<sup>6</sup> High Growth Firms and the Future of the American Economy, published by the Kauffman Foundation in 2010 and authored by Dane Stangler, cited in 2011 High-Impact Entrepreneurship Global Report — Global Entrepreneurship Monitor.

<sup>7</sup> Fueling Canada's Economic Success: A National Strategy for High-Growth Entrepreneurship —reference 5; Chris Parsley and David Halabisky, Profile of Growth Firms: A Summary of Industry Canada Research (Ottawa: Industry Canada, 2008, p.1. [http://www.ic.gc.ca/eic/site/sbrp-rppe.nsf/eng/h\\_rd02278.html](http://www.ic.gc.ca/eic/site/sbrp-rppe.nsf/eng/h_rd02278.html)).

<sup>8</sup> Fueling Canada's Economic Success: A National Strategy for High-Growth Entrepreneurship, reference 7; David Halabisky, Exporting Matters: Job Creation Performance of Exporters, 1993–2002, Further Results from the Growth Firms Project, Ottawa: Industry Canada, 2005, [http://www.ic.gc.ca/eic/site/sbrprppe.nsf/eng/h\\_rd01638.html](http://www.ic.gc.ca/eic/site/sbrprppe.nsf/eng/h_rd01638.html)

<sup>9</sup> National Post Article — Age of the Gazelle (Excerpted from How We Can Win by Anthony Lacavera and Kate Fillion. Copyright ©2017 Anthony Lacavera. Published by Random House Canada, a division of Penguin Random House Canada Limited).

to move up that food chain. That, ladies and gentlemen, is what the game looks like now."

He issued a call to action for businesses to focus collectively on growth and export, stating "...this city also has great success stories and is ready to change. Ready to get off the bench and play at a global level."

By creating new markets and industries, Gazelles support the diversification of the Canadian economy and reduce its vulnerability to economic shocks.<sup>10</sup>

Growth (i.e., scaling-up) and innovation are complementary pieces; businesses aspiring to adopt a growth strategy must also adopt an innovation culture.

Alberta and Canada offer significant support for early stage entrepreneurs and limited support for growing next stage entrepreneurs, and building entrepreneurs and entrepreneurial-innovation thinking throughout the businesses. However, as the competition heats up and global disruptions accelerate, governments and funded institutions and programs will need to bring new awareness to the role of government in leading related public sector innovation. As governments shift to greater citizen-centered focus, they aim to continue getting better at listening to innovators and entrepreneurs at various

stages of growth, so they can more effectively get behind what innovators and entrepreneurs need.

As described by the Institute on Governance (IOG), innovation policy has traditionally focused primarily on economic innovation to increase productivity and competitiveness. Recently, social innovation targeting greater social resiliency, and policy innovation seeking to improve delivery and results have been receiving more attention. However, these three realms of innovation have largely been isolated from one another. Increasingly, policy makers seek to achieve a more integrated innovation ecosystem that combines economic, social, and policy innovation to foster "inclusive and robust prosperity in the 21<sup>st</sup> century." The IOG envisions a role for government in enabling inclusive innovation that better supports women, indigenous people, and others who may initially be at a disadvantage in innovation and entrepreneurship.<sup>11</sup>

## Barriers/Challenges for Scaling-up (Deep Report)

What are the obstacles for entrepreneurs to scale-up? The following five key challenges are identified<sup>12</sup> as barriers to why firms do not pursue growth:

<sup>10</sup> (Fueling Canada's Economic Success: A National Strategy for High-Growth Entrepreneurship)

<sup>11</sup> (Kinder, 2018; Schillo and Robinson, 2017)

<sup>12</sup> Centre for Digital Entrepreneurship + Economic Performance (deepcentre). Dan Herman and Anthony D. Williams. Driving Canadian Growth and Innovation — Five Challenges Holding Back Small and Medium-Sized Enterprises in Canada.

1. Owners' lack of personal ambition to grow; they are satisfied with the current size/scope of the firm;
2. Shortage of the management skills required to achieve high growth;
3. Under-investment in technology to enhance productivity and growth;
4. Lack of investment in research and development (R&D) to drive innovation; and
5. Insufficient access to capital to finance growth (investment in required technology, management capacity, R&D).

Ambition is a key determinant of transforming into a high-growth firm.<sup>13</sup> A significant proportion of Canadian business owners, for a variety of personal reasons, have no ambition to grow their small businesses into large scale companies with the capacity to compete internationally. Survey data collected by BDC (2011) indicates that 44 percent of Canadian small and medium-sized enterprises (SMEs) are not active internationally, 26 percent see no benefits to expanding, despite the well-established link between export activity and high-growth potential. And what is even more troubling, 80 percent of Alberta businesses do business only in Alberta.<sup>14</sup> A CIBC study (Tal 2005) found that 57 percent of

Canadian small business owners were “interested in using their businesses as a means of generating income while balancing other commitments or lifestyle choices.” Incentives are required to encourage firms to become high-growth firms.<sup>15</sup>

Rapid growth places significant pressure on management capabilities, adding to the weight of maintaining the existing organization, processes, and workforce. Studies have indicated that management skills are key competencies required by innovative companies for transformation into successful high-growth firms. Looking at the technology sector, as the start-up company matures, technological skills critical in the founding stage are now overshadowed by the increasing importance of managerial skills and competencies required for growth and expansion.<sup>16</sup>

While technology adoption drives productivity growth and competitiveness, most Canadian companies lag behind their international competitors in adopting productivity enhancing technology. In 2006, Canada ranked 11<sup>th</sup> among 21 OECD countries in total economic investment in information and communication technologies. Small businesses are forgoing opportunities to use technology to

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<sup>13</sup> Bank of Canada 2015.

<sup>14</sup> Iverson, State of the City Address 2018.

<sup>15</sup> Centre for Digital Entrepreneurship • Economic Performance (deepcentre). Dan Herman and Anthony D. Williams. Driving Canadian Growth and Innovation — Five Challenges Holding Back Small and Medium-Sized Enterprises in Canada.

<sup>16</sup> *ibid.*



their advantage to increase exports, enable new business models, boost employee productivity, and dramatically reduce overhead costs.<sup>17</sup> As firms often care about the impact of such changes from emerging technologies on their employees, lifelong employee-driven learning and fostering a culture of learning will become the norm throughout organizations, so employees can shift into higher value roles.

To grow their business, firms need to conduct R&D to foster innovation to continually improve existing or develop disruptive new products, services, and business models. The relationship between R&D is complementary with exporting internationally. Industry Canada reports that, on average, exporters were more R&D focused, growth oriented, and operational for more years than non-exporters. Canadian high-growth firms spend 20 percent more of their investment budget on R&D.<sup>18</sup>

Canadian SMEs identify insufficient access to sources of capital as a primary barrier to support technological, managerial, and R&D investment required for scaling-up. The effects of global financial risk have made Canadian financial institutions hesitant to lend funds to risk-taking firms wanting to grow.

The best practices highlighted in this paper support the transition of entrepreneurs from the Traction Stage to the Growth Stage

through customized mentoring and connections to networks of support, enabling the firm to become successful gazelles. Canada is fortunate to have a growing number of individuals committed to "giving back," high quality organizations and effective networks providing specific support to entrepreneurs throughout the innovation and entrepreneurship ecosystems.

Our practices use a facilitative approach to develop an inclusive and collaborative entrepreneurial eco-system that fosters the development of innovative and sustainable businesses. We will also provide an overview of some programs and initiatives that are beginning to support scale-up businesses, and highlight some case studies that have demonstrated great promise in business success, diversity, and inclusion.

## Solutions Developed and Adpoted

### GO Productivity — ARC Services

Go Productivity identified a need for support services to assist entrepreneurs in scale-up and expansion activities. The ARC program focuses on two of the identified growth challenges — enhancing productivity that is integrally linked to innovation and increasing management competencies. Focus is placed at the firm level to build capacity

<sup>17</sup> *ibid.*

<sup>18</sup> *ibid.*

and competencies for competitiveness. The ARC support service has three key stages: **A**ssessment, **R**oadmap, and **C**oaching (ARC). Embedded into each of the three stages are four areas of focus: Innovation, Leadership, Collaboration, and Operation. The advisory ARC approach provides support at each stage of the continuum, working closely alongside the firm during the assessment process of identifying opportunities for improved productivity and growth, developing a plan, and then coaching execution.

To initiate the process, an introductory consultative meeting is held with the firm's leadership team to understand the challenges of the business and get perspective directly from key senior managers on their goals and the pain points that stand in their way. This allows for the customization of ARC services to meet the specific needs of the firm.

Since the service shines a spotlight on productivity improvements, a Productivity Workshop is delivered on site to educate and inspire staff to build a common language around productivity and innovation, and then begin to identify valuable improvement opportunities. The Productivity Workshop covers the key concepts of innovation, operations and leadership, as well as best practices for productivity improvement.

A Productivity Capability Assessment is then conducted with direct input from employees to identify the gaps and strengths of the



organization. The self-assessment involves engaging employees through a detailed process using the proven Productivity Assessment Tool (PAT). This is followed up with a half-day site assessment performed by a GO Productivity expert. The Roadmap Stage then helps the company identify a clear plan for productivity improvement. Using a combination of quantitative and qualitative analysis of the results of the assessments, clear gaps and opportunities for improvement are identified, and a summary of conclusions and recommendations is provided. GO Productivity and the firm's employees collaboratively develop a roadmap, or clear-cut plan of action, complete with areas of priority, identified projects, and timelines.

Research has indicated that 80 percent of projects fail at the critical execution stage. Therefore, the ARC advisory approach continues to coach and work with the company to

implement the Roadmap. Appropriate time-lines and accountability measures are created to strengthen the Roadmap. Throughout the process, ARC advisers are available to answer questions and share ideas about strategies to successfully implement the Roadmap. Additional networking resources are provided to connect the firm to appropriate stakeholders and programs to assist with the productivity improvement plan's implementation.

## Results of the Best Practice

The ARC program has been delivered to more than 30 firms across Canada, engaging more than 400 employees. On average, firms experienced a 10-20 percent productivity improvement. In addition, firms undertook projects and initiatives that led to the creation of new products, entry into new markets, creation of new jobs, reduction of operating costs, and revisions of business models.

Perhaps the largest and hardest to quantify ARC impacts on small and medium size businesses looking to scale-up are:

1. It builds laser focus on what specific projects will support productivity improvement and a scale-up strategy;
2. It helps firms clearly prioritize new investments; and
3. It aligns leaders, managers, and all manner of valuable contributors across the organization toward a productivity and innovation strategy.

Over the course of later following up with firms to see how they did on their roadmap, it became clear why some companies succeeded in executing the roadmap elements, and others failed. The main reasons for failure were:

1. Leadership did not maintain the improvement plan as a key strategic priority;
2. Too many new projects and ideas were put through the pipeline;
3. Processes were not established for planning, testing, updating, and implementing new improvement projects; and
4. Investments in new systems, technology, and capital equipment were not guided and supported through an aligned implementation strategy owned by the employees.

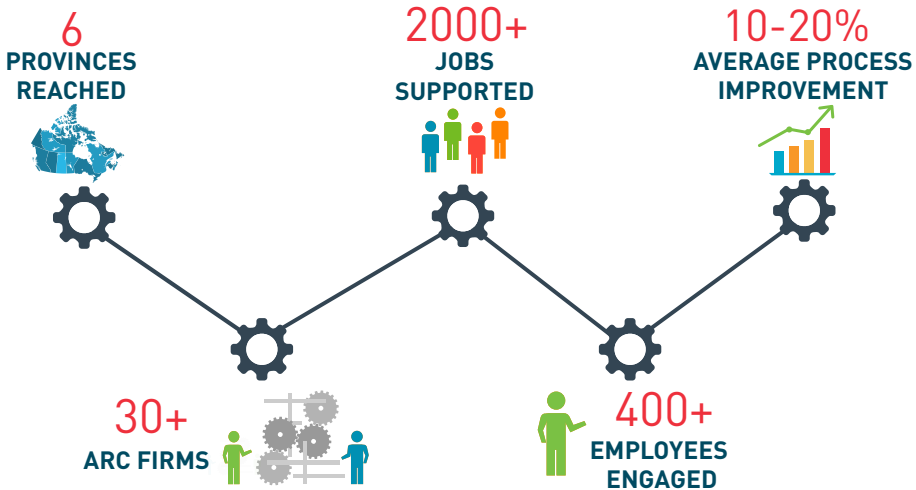
In all of the cases where we saw success in executing elements of the ARC-generated roadmaps, the opposite of the above was true. Leadership made innovation and improvement a key strategic priority. Early wins through small achievable projects drove momentum in the program. Structures and processes existed to move improvement projects through various stages of development. And, perhaps most importantly, tools by themselves were not expected to save the day; staff took ownership of and were invested in all aspects of change associated with the improvements.



# The ARC Story

2015-2017


The Productivity ARC helps companies at any stage of their productivity journey to improve their competitiveness and cultural alignment.



## INDIVIDUAL SUCCESS STORIES

 Identified **9** key improvement areas

 Increased daily production capacity **13%**

 Identified training opportunities & process for idea generation / follow through

 **6** New jobs created

 Re-thinking business model in light of new competition

 Reduced lost time labour by **15%**

 Reduced inventory carrying costs by **6%**

 Improved net income by **\$100,000**

ARC support services were delivered over six Canadian provinces during the 2015-2017 time period, and involved about 30 firms, engaging more than 400 employees. Overall, firms experienced, on average, a 10-20 per cent increase in process improvement.

## Alberta Women Entrepreneurs

Alberta Women Entrepreneurs (AWE) is a not-for-profit organization dedicated to enabling women to build successful businesses with the belief that communities and economies are stronger when women are full participants in entrepreneurship.

The entrepreneurial journey from business start-up, to expansion of capacity and scale, to export or large contract readiness requires different types of entrepreneurship support at each stage. AWE provides unique programs and services to women across sectors at all stages of business through advising, financing, mentoring, and skills and network development.

According to the Task Force for Women's Enterprise Growth, 20 percent revenue growth by women owned firms would lead to a \$2 billion annual impact on the national economy. The 2015/16 Global Entrepreneurship Monitoring Report on Women's Entrepreneurship confirms the value of women-owned businesses to our economy. "Canadian women are highly engaged in entrepreneurship. In 2016, they had the

highest activity rates amongst innovation-driven economies for early-stage ventures, and the fifth highest activity in established businesses. Amongst the key assets Canadian women bring to their businesses are positive attitudes, opportunity-based motivations, high human capital, and strong interest in internationalization and innovation."

Since its inception in 1995, AWE has worked with more than 100,000 emerging and high growth female entrepreneurs and has secured more than \$100 million in financing for clients who employ hundreds of thousands of Canadians. Alberta leads Canada in approaching parity in participation rates of women as business owners, in part due to AWE's holistic, community building programs structured around "Build the Person, Build the Business, Build the Community." As a founding member of the Women's Enterprise Organizations of Canada (WEOC), AWE works actively with this group of women's entrepreneurship organizations across the country to deliver best in class programs.

The 2015 Global Entrepreneurship Monitor (GEM) Alberta report shows that Alberta has exceeded gender parity in starting businesses. This participation rate exceeds every jurisdiction surveyed across Canada and globally, and represents a pool of companies well positioned to engage in scalable, knowledge-based industries with strong export potential. Yet, while overall participation rates

by women are high, these ventures on average remain less than half the size of their male owned counterparts. In Canada, approximately 37 percent of women owned businesses are considered high growth SMEs, while 63 percent of male owned businesses are considered high growth SMEs. Experts point to reasons why, including:

- Lack of networks connected to the center of power and decision-making;
- Lack of role models, mentors, and confidence;
- Lack of specific understanding of how to expand into new markets;
- Lack of access to and readiness to use significant financing; and
- Under representation of women in most development and incubator programs.

One of the key areas of focus for AWE is building leadership capacity and business knowledge in women entrepreneurs to support their ability to grow businesses, create jobs, and diversify into new markets. The organization aims to surround entrepreneurs with the resources they need at each stage of growth including capital, peer learning, mentoring, and advising. In addition to internal expertise, AWE connects clients with subject matter experts to share up-to-date information and experiences.

AWE developed the PeerSpark™ program to support emerging and high growth women owned-businesses. The program (formerly named "Excellerator") is a one-year intensive business acceleration program that includes professionally facilitated leadership development, business skills development, advisory support, and mentorship in a structured peer group setting that is designed to address the unique needs of entrepreneurs seeking to grow their businesses. This community of practice works collectively to help each participant overcome critical business challenges.

Entrepreneurs in the program:

1. Have a desire to grow their business and increase profitability;
2. Are willing to learn from and share with others;
3. Are willing to commit time and energy to the program; and
4. Have a steady growth of annual sales.

The PeerSpark™ program has shown tremendous potential for business and community success with graduates reporting average year-over-year revenue and employment growth of approximately 20 percent, with some businesses doubling in size within two years.

During 2017-18, AWE expanded the reach of the PeerSpark™ program across Western Canada through the Women's Enterprise

Initiative (WEI) partners (Women's Enterprise Centre BC, Saskatchewan Women Entrepreneurs, and the Women's Enterprise Centre Manitoba). Since the program's inception in 2012, 84 women entrepreneurs have participated in the program.

AWE offers specialized support to many PeerSpark™ and other growth-focused clients exploring outside markets. AWE shares connections and resources, and provides specialized advising to help women business owners better understand and make the most of opportunities. Through a market access project funded by Western Economic Diversification (2015–2018), western Canadian participants have access to trade missions to supplier diversity events in Canada, the United States, Mexico, and Europe, which offer great opportunities to make new connections into a new network of supplier diversity professionals and women owned businesses from around the world. Since its inception in January 2015, the market access project has generated \$71 million in contract leads, from which participating western Canadian women have secured 264 contracts valued at \$16.4 million.

Intersecting with the need to support women entrepreneurs who wish to participate equally in entrepreneurship is a need to meaningfully engage under represented indigenous women with entrepreneurial aspirations. To meet this need, AWE created NextStep to Success, a specialized program that provides indigenous participants with skills, knowledge, and



"If you want to go fast, go alone. If you want to go far, go together."

African proverb

confidence. Since the program's inception, it has reached more than 440 aspiring entrepreneurs and early stage business owners.

In addition to the NextStep to Success program, AWE collaborates with like-minded partners to develop programs to increase entrepreneurial capacity to access supply chain opportunities, and build awareness of and connections to these opportunities for indigenous women. Project findings to date demonstrate that improving awareness of and connections to these opportunities in conjunction with capacity building, with a specific focus on meeting the procurement needs of corporations, will significantly increase the success rate of indigenous women entrepreneurs in supply chains.

### **Beyond Next Steps to Next Leaps for Scale-up**

There is an argument to be made that there is more to scaling-up growth than presuming bigger is better, or all that market winners must do is just beat the competition.

Collaborative prototypes working in clusters or through innovative contracting models are emerging.

For example, a new mindset around a collaborative business model is emerging. A case in point is Rainforest Alberta, an early-stage collaboration community of diverse business people. They adopted the rainforest metaphor toward entrepreneurship based on continuous growth and adaptive "eco-system" approaches to innovation. It was inspired by *The Rainforest: The Secret to Building the Next Silicon Valley*, written by Victor Hwang and Greg Horowitz.

While still nascent, this movement is attracting both growth oriented young entrepreneurs and seasoned business people who seek new approaches and solutions beyond win-lose competitive models. It reflects the well-known African Proverb: "If you want to go fast, go alone. If you want to go far, go together."

This movement of individual business people is based in Edmonton and Calgary, Alberta. It has members who publicly commit to the Rainforest Social Contract, which is arguably a revision of the Enlightenment period concept of the Social Contract ideals. It is an organic social media and face-to-face initiative that is evolving into a post-competitive business networking model. It applies innovation rooted in collaboration and still sustains success values that include profitability and

shareholder value, but reaches beyond the typical zero-sum mindsets of traditional competitive market models.

The Rainforest Social Contract signatories commit to certain values in how they will do business within the network. Those values start with "embracing diversity to create equal opportunity for everyone in the network." It promotes the free sharing of valuable information within the network community, and "paying it forward as a result of positive benefits received." The principles of trust, fairness, and honesty, coupled with bringing people together and listening to diverse perspectives, are based on the belief that "none of us are smarter than all of us." This is intended for individuals to "open themselves to learn from others...they will share their knowledge in the spirit of the Creative Commons to nurture learning in others."

This new spirit of co-creating wealth and prosperity is taking hold as people come to realize that conventional private enterprise capitalism needs to be upgraded. They seem to promote that individual talents should be applied toward personal benefits but concurrently with serving the greater good. It is still early in the community and consciousness building process, but this idealism is catching on and gaining some traction. Will it become sufficiently significant to be successful and become normalized? Only time will tell. But it is an interesting scale-up that is not a race



to the bottom on cost cutting and cut-throat competition. If anything, it is a leap of faith away from the mature stage of the old competitive market model. It is a jump to the start-up stage beginning of another "S-curve" that is a collaborative mindset toward co-creating prosperity. It is early days, but it is worth watching.

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## ECUADOR

### Food Bank of Quito

One hundred tons of food is wasted daily in the city of Quito. Most of the waste comes from restaurants, hotels, supermarkets, and local markets around the city. The excessive waste occurs in a city where inequality is high and food security is low. In 2003, the "Escuela Politécnica Nacional" (National Polytechnic School) — EPN identified this problem and created the Food Bank of Quito as a way to tackle food insecurity and make waste management more efficient. For 15 years, through the efforts and dedication of its President, Alicia Guevara, the Food Bank has managed to feed around 9,000 people per month. Alicia Guevara's initiative started as a small business with only three people and several volunteers. Their logistical capacity has doubled, and they have reorganized food redistribution in the city. Today, the Food Bank of Quito is the only food bank in the country that operates as a business, and the only one using innovative reprocessing procedures.

To scale-up their operations, increase the number of beneficiaries served, and raise the volume of food rescued, the Secretariat of Productive Development and Competitiveness of the City of Quito, together with the International-American Development Bank-IADB, is assisting the Food Bank in developing a city strategy to create real, lasting change in food security in Quito. The approach will increase the overall infrastructure and operational capacity of the food bank, while creating a sustainable system



of circular economy. This innovative way of reducing and repurposing waste will help the most vulnerable populations, but also involve key private partners that will not only see the food bank as a way of reducing costs, but also as a way to give back to the community and reduce their carbon footprint.

Urban areas are well known for their great access to different sorts of products and services, and for being the center of business and economic development. But, cities are also hotbeds for poverty, inequality, and food waste. One third of the food produced in the world is wasted; meanwhile, more than 800 million people are living in hunger every day. In Latin America and the Caribbean, each inhabitant wastes an average of 223 kg of food (FAO). The problem of hunger is not due to the lack of food, it exists, but rather the incorrect distribution of food within the limits of the city. In fact, food that is wasted is more than enough to satisfy the needs of the region.

Ecuador has one of the highest levels of food waste among Latin American countries; we live in a country with abundant resources and we produce an unreasonable amount of waste without even giving it a thought. Although hundreds of tons of food fit for human consumption are wasted daily, between 24.5 percent and 41.7 percent of Ecuadorians live in conditions of extreme poverty and indigence (INEC). In Quito, more than 100 tons of food is discarded daily, while there are neighborhoods with poverty rates above 85 percent.<sup>1</sup>

To change this divergent reality, the Foundation Food Bank of Quito-BAQ (its acronym in Spanish) was created. This institution provides a "zero waste" alternative to those who produce and distribute food.

The Food Bank is responsible for preventing food waste by managing the donation of products that have reached the end of the marketing cycle in two main areas:

1. Companies producing or marketing food
2. In wholesale distribution centers

In the first case, food companies donate products that have packaging defects, near expiration dates, or products that have some aesthetic defect, but are still suitable for human consumption. Companies donate this produce because they are aware of the benefits they achieve, for example:

- **Environmental:** They reduce waste and increase the life cycle of the products.
- **Social:** They generate a positive impact on the society that suffers from hunger and promote Corporate Social Responsibility.
- **Economical:** Products are collected directly by BAQ employees and volunteers in the company's storage location; this saves time and business's resources because they reduce transportation costs and product discarding. Additionally, donations are subject to tax reductions, which create a significant incentive for companies to donate.

In the case of the wholesale supply centers, each week a group of 25 volunteers walk through the Wholesale Market of Quito, recovering fruits, vegetables and fresh food at each sale point. They classify and process the food recovered to be distributed among the most vulnerable population. During the weekly visit to the market, each volunteer gathers an average 100 kg of food which will ultimately feed about 10 families for one week.

It is important to mention that the BAQ has been presenting detailed reports of the donations and food distribution for the past 15 years of its operation. All donors can easily verify the destination of their food and money donations. This transparency led more and more companies and traders to trust BAQ's work.

<sup>1</sup> Larrea, C., et al. "La geografía de la pobreza en el Ecuador." (2006).

The origin of the Food Bank of Quito goes back to 2003, when a group of five young professionals led by Alicia Guevara, a chemical engineer, concerned with Quito's food waste reality decided to take matters into their own hands. Their main objective was to have an efficient and targeted impact on hunger and chronic malnourishment in the city of Quito by redistributing potential food waste. Aided by the National Polytechnic School (EPN), volunteers with social conscience who generously donate their time to be part of the project, local wholesale suppliers, and EPN students, they were able to set-up the first and only Food Bank in the city and country at that time.

The tenacity and leadership of Alicia Guevara took the BAQ from a small charity initiative to a social enterprise which provides food and nutrition to an important section of Quito. After 15 years of work and daily struggle, the BAQ is now the most relevant and organized Food Bank in Ecuador. It is, in fact, the only food bank that has involved academia and innovative technology to increase the life cycle of the perishables it receives, without losing the food's nutritional value. Nevertheless, their success story was not a walk in the park; along the way they faced several issues and problems which abruptly made them realize they had a steep road ahead.

When they first started, the main challenge and barrier the BAQ faced was changing people's mentality. We live in a country where fresh produce is available all year

round, so people have wasting habits; therefore, climate change and healthy habits are not a priority for citizens. For his reason, raising awareness about the disparities between food waste and chronic hunger in the same urban region has been a challenge. Furthermore, Ecuador lacks specific policies or regulations to avoid food waste or to encourage circular economies.

The second biggest challenge was reaching a consensus with local vendors from wholesale markets. Local producers are commonly known for being hard to work with and sometimes close minded. Nevertheless, after a few years of learning about BAQ needs and point of view on food waste, Ms. Guevara's approach finally made sense to them. "It wasn't easy," Alicia says, "but only after local producers learned about the impact in their own communities, they began to cooperate" (Guevara). In this context, one of the greatest difficulties was transmitting the message of donations not as a gesture of "charity" toward people, but as an act of "solidarity" for those who were in a vulnerable situation.

Another big challenge was working with the private sector. Some companies have a "no-donation" policy for their products to maintain the consumption of their brands among segments of the population with a greater purchasing power. In this sense, the BAQ needed to approach the private sector from a different angle, by targeting and doing a cost-benefit analysis of donating their production. Overall, there is on average a waste

valued at \$2.6 billion USD per year; thus, reducing disposal costs will generate a significant advantage in the production costs of the companies.

The Food Bank of Quito also had to endure internal problems and logistical barriers which initially constrained their desired impact. BAQ's founding members contributed seed funding to start the project, about \$100 USD per person. This amount was barely enough to cover the rent for a 12m<sup>2</sup> cellar, which made it difficult to store, refrigerate, and distribute food. Furthermore, the Food Bank did not have the necessary equipment to process fruits and vegetables in an integral way, wasting 10 percent of the food collected. Additionally, at the beginning of the project, the refrigeration system was not large enough to store the recovered products and part of the food could not be used. An additional 10 percent of what was recovered was also wasted because they did not have all the necessary equipment for refrigeration and food processing. In the end, about 20 percent of what was recovered ended up being wasted.

Another challenge the Food Bank faced was strong interest from several media outlets, which made reports publicizing the BAQ as an opportunity to avoid food waste and reduce costs, while helping the most vulnerable population. This publicity was aimed at the private sector to obtain greater support from businesses and wholesale vendors and attract more donations. Nevertheless, the effect was contrary to the effect desired, and

the demand from people in extreme conditions of hunger increased beyond BAQ's capacity. They had to place a large number of people on the waiting list, because the food recovered was not enough.

Lastly, BAQ had to obtain legal status to operate; the procedure required a lawyer and the Food Bank did not have enough money or time for this administrative burden. Nevertheless, after a year and a half and the work of volunteers, the Food Bank of Quito started operating officially as a nonprofit organization.

All of these challenges were overcome with the help of donors, volunteers, and founders. Founders constantly visited vendors at wholesale supply centers and business owners, effectively communicating and disseminating the message. The purposeful and constant work of the volunteers and founders enabled them to participate in assemblies and meetings, raising awareness of the catastrophic effects of food waste and poor residual management. This gradually helped expand the field of action of BAQ and finally raise awareness of the dangers of food waste.

After a few years, BAQ had a great logistical and systems transformation. The physical space of the initial warehouse changed when BAQ moved into a bigger space donated by EPN, located in the San Bartolo neighborhood in the south side of Quito, where BAQ continues to operate. Facilities were rehabbed thanks to the work of founders and

volunteers. The equipment needed to process food was purchased or obtained from different lines of funding including grants and social project contests. In fact, projects presented in some international contests won cash awards that enabled BAQ to purchase the equipment that processes fruit pulp and jams, prepares vegetables for canning, and processes fortified soy meat, among others. Eventually, BAQ gained more and more support and could hire permanent staff (administrative and storage) which allowed them to distribute and collect food every day.

At the beginning of the project, during their first attempt, volunteers and founders were able to recover 252 kg of food, which served 300 beneficiaries. Currently, and after all the system updates, BAQ recovers on average 10 to 15 tons of food per month, which makes it possible to provide assistance to 9,637 people, who are part of 45 institutions and 485 families of need in the south side of Quito. Additionally, BAQ processes more than 3,500 kg of food to produce fruit pulp, jams, biscuits, crackers, fortified soy meat, seasonings, and egg flour. Now, BAQ is supported by important groups of entrepreneurs and wholesale vendors, in addition to 25 permanent volunteers and 6 people working full time, which has increased the impact they have within city limits.

BAQ's work has generated positive impacts in a number of areas. From an environmental perspective, more than 1.5 million kg of

potential food waste has been saved and distributed among 9,637 people of limited resources. Otherwise, the destination of the food, still suitable for human consumption, would have been the municipal landfill, deepening the negative impact waste has on the environment.

From a social standpoint, BAQ has generated a positive impact on the population suffering from hunger in the city of Quito, helping decrease malnutrition and chronic hunger in the south side of the city. At the same time, BAQ has increased the life of food products, and improved the public image of donor companies, increasing their corporate social responsibility (CSR) initiatives.

In addition, BAQ helped reduce transportation costs and the costs of final disposal of products that have reached the end of their marketing cycle. This cost reduction represents about \$1,406 dollars per ton saved if companies rely on BAQ to "dispose" their waste. Furthermore, as mentioned before, by donating to BAQ, companies are able to deduct some taxes, under the figure of "sale at a loss."

BAQ's management model has several innovative features which can be replicated as good practices. One of the things that makes BAQ different is that perishable produce is re-processed most of the time and made into products that last longer. In this regard, BAQ receives technical support from students and professors from the faculty of Chemistry

and Engineering of EPN, who define the necessary processes and steps to transform donated goods into ready-to-eat products. For example:

- Ripe fruits are used to make pulps, jams, and concentrates;
- Vegetables and vegetables that are imperfect are used to make natural dressings and preserves;
- Fortified meat is made using soy protein; and
- Eggs that have not met quality controls, due to their small size or marks, are made into flour, which can be hydrated and used as a fresh egg (up to 18 months after it was produced).

BAQ will continue to support people in need, as well as contribute to mitigating the negative environmental impact that food waste represents. Furthermore, BAQ will continue to work with academia on new research projects that make the most out of the donated food, by implementing processes that transform and conserve their nutrients more efficiently. In fact, they are already working together on projects such as: production of fortified meals, dog food (made from the inevitable waste produced from food processing), and compost preparation, among others.

A management restructuring project for BAQ is being implemented with the participation of professionals in areas such as mechanical

engineering, computer systems, management, and nutrition to strengthen the work being carried out. In terms of infrastructure, with the support of EPN, the IADB, and the Municipality of Quito, BAQ is planning to build additional warehouses, a total of 1,200 m<sup>2</sup>, with the aim of increasing capacity in 2020.

Throughout the years BAQ has been working toward the improvement of their processes and use of technology with the aim of increasing their impact. In 2017, they achieved the one million kg of food delivered mark which benefitted about 800 families in Quito. The Food Bank of Quito has set a precedent for how a food bank should be organized and managed. Now, four food banks operate in Ecuador, in cities such as Quito, Guayaquil, Cuenca, and Loja, which are starting to use the model developed by the Food Bank in Quito. Inspired by the BAQ story, Guayaquil's, Loja's, and Cuenca's food banks had strengthened their efforts to recover more food and help more people with limited resources.

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# UNITED ARAB EMIRATES

## Technology Innovation Pioneer

### Introduction

In its 2021 vision, the UAE government has embraced innovation as a key principle to build a knowledge-based community, led by forward-thinking innovators who support the UAE's progress and strengthen its international position (UAE Vision 2021). In addition, the government has established the Abu Dhabi Economic Vision 2030, a strategic plan to guide the growth of the Emirate of Abu Dhabi. In this plan, health care has been identified as one of the key strategic pillars of development. The plan maps out the path to achieve the vision of a secure and healthy society, and to position Abu Dhabi as a center of excellence and innovation in health care.

As a result, the Department of Economic Development - Abu Dhabi, the Department of Health, and the Ministry of Economy have partnered in 2018 to announce the launch of the Technology Innovation Pioneer (TIP). TIP was created to support the UAE innovation strategy by increasing patent filing and grants, and increasing technology development and its implementation within several sectors in the country, such as health care, environment, and energy. TIP awarded 23 Technology Innovation Pioneers with prizes worth AED 3 million (~816,705 USD), with AED 30 million (~8,167,050 USD) potential funding from interested investors (Gulf news, 2018).



### The Challenge

Several challenges to strengthening the country's capacity for innovation were identified by the government. One challenge is the lack of sufficient funding solutions and programs for innovators across the UAE, due to the high risk their innovations may hold, along with lower financial and marketing capabilities of those innovators. Although a number of initiatives, including Takamul,<sup>1</sup> have provided some support, a need for a more sophisticated and mature programs was clear not only to retain in-house innovators, but also to attract innovators globally.

Building an innovation culture in the country was yet another challenge to be addressed. A proactive innovation culture would anticipate changes that occur in an identified sector and, as a result, provide a product or a service that would fulfill this gap. To achieve this proactive approach, new methodologies are needed to help identify the changes needed before they become problems, leading to

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<sup>1</sup> An initiative that partly funds patent applications, provides legal assistance and takes steps to make inventions commercially viable.



the development of a system that interlinks stakeholders at all levels and provides the structure to support it. Therefore, a sectorial movement is necessary to create this form of culture in the UAE, one that enables the involved organizations and individuals to stay competitive and draw in ideas from all stakeholders, such as customers and investors.

## The Solution

The leadership of the UAE government is working to promote innovation through policies and targeted initiatives aimed at developing the society while also addressing key enablers. TIP was initiated, targeting the UAE health care sector as a pilot, and TIP Healthcare Awards were established to support the development of innovations in the sector.

The TIP Healthcare Awards established a platform that called on the global community to contribute to the creation of innovative solutions to the challenges in UAE's health care sector. The Tip Award has encouraged innovation and competition among the community of pioneers in technology and innovation locally, regionally, and globally, bringing together individuals and institutions from around the world to compete in the UAE.

TIP Healthcare Awards are split into different categories including patents, proof of concept, and start-ups. The ideas and projects under all categories have to develop solutions (medical devices, drugs, or software)

for treating medical issues prevalent in the UAE such as diabetes, cardiovascular disease prevention, oral health, etc.

The Department of Health–Abu Dhabi was responsible for evaluating and bringing together the proposed ideas and innovations, and giving the winning group of companies and entrepreneurs an opportunity to turn these ideas into projects or start-ups that support the health sector in the UAE. Selected finalists will receive a prize of 3 million dirhams distributed among them, with an additional AED 30 million in commitments from the private sector, including investments, sponsorships, licensing, and other forms of support.

## The Stakeholders

Direct and indirect stakeholders in this project include the Department of Health–Abu Dhabi, Ministry of Economy, the Department of Economic Development–Abu Dhabi, sponsors from the private sector, a supporting academic community, the applicants, and potential buyers from the private sector and government that would finance and adopt the products developed.

The success of the TIP Healthcare Awards is heavily reliant on the support of the program's initiators and leadership — the Department of Health, Ministry of Economy, and the Department of Economic Development. It is also important to acknowledge the support

that was received from the sponsors, including New Medical Center,<sup>2</sup> Tamkeen,<sup>3</sup> and VPS Healthcare.<sup>4</sup>

From the academic community, a number of pioneering local and private universities — such as the United Arab Emirates University, the American University of Sharjah, and Khalifa University — served as enablers to the TIP Awards by serving as research and development centers. Scientists and innovators from these institutions provided the needed support through the use of the academic literature in addition to the facilities offered by their respective universities.

In addition, the national and global community provided input on the potential effects of the products generated by this initiative.

## Implementation Barriers

The program's implementation is a complex process that has been hampered by several barriers including, but is not limited to, the World Health Organization's regulations, difficulty adapting to the newest technology shifts, governmental policy implementation, and the financial costs associated with the program.

## World Health Organization (WHO)

As there are several steps in the course of a new medical device or drug development, a constant record is to be maintained of all changes to the design, and each change should be verified, tested, and reviewed by the WHO to ensure it will not change the intended functions and features or the design or in any way impact the standards or the regulations in regard to the device. Getting approvals by WHO on the developed medical devices and/or drugs would normally follow a complex path that may extend for many years from the initial stages to final market launch, causing a dilemma for the program originally intended to last one year.

## Enhanced Technological Shifts

Deficiencies in the level of knowledge and skills of those involved in the process of implementing a new technology has been another program constraint. As there was a high level of collaboration among various entities in this project, communication and knowledge sharing was crucial to ensuring a smooth process flow; however, a majority of the direct users (such as the employees of the various entities) needed time to adapt to new technologies and systems. The most important measures to mitigate the resistance to change were increasing worker

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<sup>2</sup> Multi-specialty hospital in the UAE.

<sup>3</sup> Abu Dhabi government owned company that delivers projects to meet the government's vision of knowledge-based development.

<sup>4</sup> An integrated health care service provider in the MENA region, Europe and India.

participation, information sharing, communication within the hierarchy, and providing training when needed.

### **Policy Barriers**

As the output of this program affected the health and well-being of members of society, it was important to emphasize the level of responsibility that comes along with it. New medical devices and drugs that are introduced into the market undergo immense scrutiny to ensure the highest levels of health and safety which, in turn, translates into a long time-consuming process. Therefore, the lack of legal powers to ease the process of registration on the inventors was an obstacle as it limited the ability to rapidly adopt the inventions.

### **Financing**

Cost and budget constraints tend to be one of the key barriers in any program. As the first of its type in the region, the program needed to guarantee results that would justify the scale of the needed budget. Therefore, budget restrictions limited overall expenditures on the program, as well as the specific financing instruments needed during the process. This limitation has led to a lack of flexibility in financing the full range of inventions, as well as the inability to execute some parts of the program. In addition, the lack of funding in the program's early stages has hindered progress toward some of the expected outcomes.

## **Overcoming Implementation Barriers**

The constant government engagement and support has led to clear and direct instructions to alleviate any barriers that would hinder implementation and adoption of the inventions that have been put forward, if they have proven to be suitable for use in the UAE health care sector.

## **Results Achieved**

The program has led to a conversation in the region about the importance of innovation in today's world. As TIP is the first proactive innovation effort, it has led to the development of a platform that has reached more than 10,000 people in social media, attracting 1,180 applicants from various countries including France, Pakistan, Egypt, India, and many more. Among the 2018 TIP Healthcare finalists awards to be granted, 15 percent were for patent registration, 35 percent for start-ups, and 50 percent for proof of concept. The innovations include, but are not limited to, the introduction of a new class of antibiotic compounds, a device to correct an ear defect (Eustachian tube dysfunction) that affects millions across the world, and a new catheter that is safer and easier to use.

One of the inventions was developed by a professor from the American University of Sharjah (AUS, 2018), who presented his innovation in cancer nanomedicine. His work is a

culmination of six years of research, during which he has studied encapsulating a chemotherapy drug in nano-sized capsules, then inserting a tool that would direct the nano-carrier to the surface of the cancer cells. Once the capsule reaches the cancer cells, an ultrasound is applied on the affected area to break the capsules. With this invention, the chemotherapy effects on healthy cells would be minimized.

The program demonstrates how improved health care solutions can be obtained through the use of human talent and technology. It has also empowered members of the global community, as it enabled them to have an impact on the health care sector. The program has helped cultivate empowerment and self-efficacy among innovators through an educational component. About 990 registrants have been trained and certified through online training courses, and 104 applicants have participated in workshops.

### Impact of Implemented Solution

The economic impact of the program arises from the expected return on investment generated by the TIP inventions. For instance, the current value of the inventions supported by TIP awards is 30 million dirhams (~8,167,050 USD), but the future value of these inventions is expected to reach 100 million dirhams (~27,223,500 USD) in 5 years.

### Investment

Financial investment is not the only factor that leads to the quality of work produced. The TIP program team has invested an increased amount of time to produce high quality work, which has led to a substantial payoff in the results achieved. In addition, the passion that the program team poured into the program was truly what led to the realization of such a vision in a short time frame of six months, even with a constraint on the operational budget that has been placed on the team.



## Innovation Approach

This program has been led by Emirati talents, and this team led the development of this innovative proactive methodology. The project approach is unique, as it allows the inventor to initially develop the product and then put it out in the market, rather than having the inventor develop the product based on the market needs.

## What Went Wrong?

As previously mentioned, the program interlinks various entities, and the team was given a narrow time frame to establish a program of this scale aimed at attracting global talents. Furthermore, expectations for the community outreach program were high; it was expected that the program could have attracted a larger audience and, as a result, obtained more applications from various countries and associations.

In addition, the challenges faced with the outreach program led to fewer connections with other open research and development platforms that, otherwise, would have provided the applicants with access to applied technologies as well as mature feedback on solving the challenges in the health care sector.

## Learned Lessons

Large programs such as TIP need to be approached with careful attention to detail and analysis at every step, and an understanding of how the program could impact stakeholders. A program of this scale requires a long time-span to plan and implement. Furthermore, in the future, additional details about the exact challenges in which technology is needed is to be provided, as more information can help innovators provide better solutions that may be easier to implement. A better outreach program would also serve in identifying the appropriate audience (such as innovators, enablers and stakeholders) for the upcoming cycle of the TIP awards.

## What Comes Next?

The next step for the TIP Awards would be to identify better interactions to leverage the health care track, and further develop other strategic tracks in need of innovative solutions, for example, environmental sustainability. Furthermore, an attempt should be made to attract a higher level of talent willing to apply current advancements in technology, and develop tools and products that would better the UAE economy. Another step would be to carefully map out challenges that could be realistically addressed in the TIP program, incorporate them in the next award cycle, as well as attempt to link them with other entities and events in the UAE.

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## UNITED KINGDOM

### Best Practices Benefitting Industry Supply Chains in Aerospace, Defense, Security and Space

The vision to develop a 21<sup>st</sup> century Supply Chain (SC21) for the aerospace industry was introduced by the Society of British Aerospace Companies (SBAC) and its members, culminating in 2006 with a new program to improve the UK aerospace supply base and help the industry be more competitive and effective in the supply of products and services. The program was launched at the Farnborough International Airshow with government support. Nineteen founding companies (sixteen of the country's largest primes and three key small and medium-sized enterprises — SMEs) also signed up for the program at the Airshow.

The important contribution the aerospace and defense sectors make to the UK economy is well recognized. Industry and government have been working together through the Industrial Growth Partnerships to ensure that the UK retains and grows its position in these valuable and wealth-producing sectors. To achieve this ambition, it was crucial that UK companies at all levels throughout the supply chain were supported in making the most of significant global growth opportunities.

In October 2009, SBAC merged with the Defence Manufacturers Association (DMA) and the Association of Police and Public Security Suppliers (APPSS) to become the Aerospace, Defence and Security Association (ADS), later joined by space organizations. The program continues to grow, with new

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[www.cforc.org](http://www.cforc.org)



signatories every week, giving industry a bright future and strong support from within its own community. Today, several years after its launch, the SC21 program has established itself as a class-leader in enabling supply chain excellence, delivering millions of pounds (Stg) worth of real benefits to all sizes of business across the aerospace, defense, security, and space industries. The SC21 program has also succeeded in raising awareness across the industry, communicating key messages such as the importance of

first class performance and nothing less. This and many other critical success factors need our focus if the UK is to continue to build on its strengths and attract new business. The program has the toolbox of measures and mechanisms that can be applied to supply chains in each sector of the economy.

The UK-wide program operates through accredited regional partnerships for supporting supply bases in England, Ireland, Scotland, Wales, and overseas. Each region provides government support schemes assisting their local industries. The Centre for Competitiveness (GFCC Member), working with government agencies Invest Northern Ireland and Enterprise Ireland in the Republic of Ireland, provides the lead services supporting the ADS SC21 program on the island of Ireland.

### SC21 Recognition Criteria

Levels for delivery and quality must meet specific award standards using a rolling 12-month average, completed for each of the major customers of the organization. If the organization submitting data for an award is a supplier to any of the SC21 signatories, then data for these customers must also be submitted. This data must then be ratified and accepted by the key customers. Award performance levels are outlined in the figure below.

The award level defaults to the lowest audited level of business excellence, manufacturing excellence, quality, and delivery performance assessed. Current accreditation approvals must be submitted.

The award lasts for one year from point of recognition. It is recommended that award winners submit for re-recognition to

Award Level	Delivery	Quality	Sustainable Improvement Program	Improvement Framework
Gold	>99 – 100%	99.9 – 100%		Excellence level > 500
Silver	>95 – <99%	99.5 – 99.9%	Plan progressed Regular reviews	Excellence level > 400
Bronze	>90 – <95%	98 – <99.5%		Framework deployed



demonstrate that improvements are sustained. For re-recognitions, suppliers must submit data to the project office within 12 weeks prior to recognition expiration. All award criteria must be re-validated: **Delivery and Quality Performance, Business Diagnostics, and the Continuous Sustainable Improvement Plan.**

#### Delivery and Quality Performance Data

- Suppliers must submit 12 months rolling average data for re-recognition (as for the recognition process). This must be continuous data (i.e., January to December) and for all customers.

#### Business Diagnostics

- In general, the company can determine the appropriate point to re-diagnose the Business Excellence criteria (Bus Ex), Manufacturing Excellence (Man Ex), and the Relationship Management Metrics (RMM).
- If the company is staying at the current award level, repeat diagnostics are not required if within the three-year period from when they were conducted. Current scores to be shown and target date for re-assessment.

- If the company believes they are ready to move up to silver or gold award levels, they must ensure the diagnostics (Bus Ex and Man Ex) meet the threshold relating to that award level. It is recommended that RMMs are completed to demonstrate a robust relationship.
- A full European Foundation for Quality Management Excellence Model and RADAR assessment (similar to Baldrige Award), and based on Management Commitment, must be completed to obtain Gold status. An updated Submission Summary sheet must be provided.

#### Continuous Sustainable Improvement Plan

- Excerpts from the current Continuous Sustainable Improvement Plan documents must be supplied with the submission to show how actions are being addressed, and to demonstrate continuous and sustainable improvement within the business. This can be validated by the customer or the SC21 strategic training provider. The high-level improvement process is outlined in the diagram below.



SC21 accredited Business and Manufacturing Excellence practitioners must be used to carry out the award assessments. To encourage improvement, Excellence scores are valid for three years from date of assessment; after that, new assessments are required. PDF exposition will be submitted with delivery and quality data, Bus Ex and Man Ex data, Continuous Sustainable Improvement Plan (CSIP) evidence, a brief summary of the benefits from the SC21 program, along with a Relationship Management overview. Awards will last for one year from point of recognition at either Bronze, Silver, or Gold level achievement. All award approvals are subject to the decision of the ADS industry judging panel, based on the independent submission and audit reports from the regional SC21 Lead partner.

## **Manufacturing 2018 ADS GOLD Award Winners — Northern Ireland**

### **Moyola Precision Engineering — Gold Award**

Established in 1976, Moyola Precision Engineering is one of two of the first manufacturing companies in the United Kingdom to achieve the ADS Gold award at the international Farnborough Airshow in July 2018. A highly certified cost-effective supplier of precision components to the defense, medical, power generation, and automotive industries, their prime objective is to delight their customers through the provision of complex

machined components, assemblies, and tooling solutions, and the provision of a comprehensive range of services to clients, enabling them to access a range of experience and expertise under one roof.

The company is a certified and approved supplier to BAE Systems, Bombardier Aerospace, Airbus, General Electric, Spirit Aviation Systems (Europe) Ltd, Aerosud Aviation, GKN Aerospace, and Thales Air Defense. It has also been certified to both ISO 9100 and BS EN ISO 9001 standards for the manufacture of aerospace structures, jigs and fixtures, and machined component parts for aerospace and other industries using 6-axis CNC facilities including the provision of mechanical assembly and kitting.

Through continual reinvestment in the latest multi-axis machining technologies and off-line programming software, Moyola Precision Engineering is able to produce the highest quality products at very competitive prices. These products are generally characterized by tight tolerances and difficult to machine features. The facility is also adaptable to the manufacture of parts with volumes from low to medium batch production, from materials such as aluminum, steels, titanium, exotic metals, plastics, and glass reinforced plastics (GRP). Moyola's highly skilled workforce is complemented by the company's precision engineering apprenticeship program leading to nationally recognized qualifications delivered by its own full-time craft instructor.

In achieving its GOLD recognition, the company has been able to demonstrate operational excellence evidenced through the Supply Chain 21 process to have delivered its products and services to its customers consistently over a 12 month period measured through an audit of the customers' and its own internal recording systems.

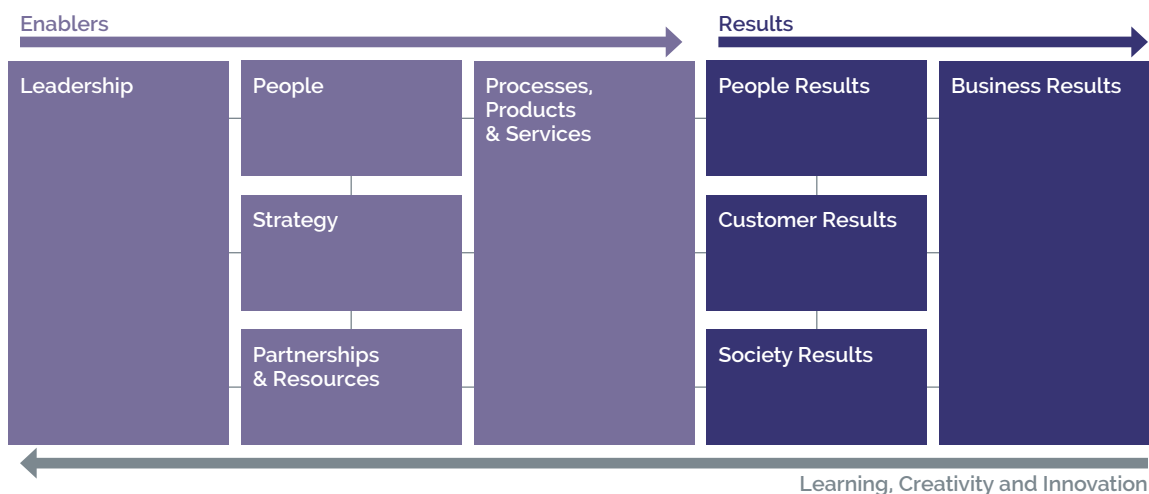
Delivery performance ranging from 99 percent–100 percent with quality performance at 99.9 percent–100 percent and a European Business score (similar to Baldrige Award) in excess of 500 points.

### Denroy Plastics – GOLD Award

Denroy Plastics Limited is a subsidiary of Denroy Group Ltd. The Group was formed in 1972 following the purchase of Ulster Plastics Ltd by the Rainey family and is still privately owned.

The Group consists of Denroy Plastics Ltd (Denroy), Denman International Ltd, and Denman Inc., USA. Denroy is the manufacturing division of the Group, and is a design, engineering, and contract manufacturing business specializing in plastics injection moulding. Denman International and Denman Inc. are a

### EFQM Business Excellence Framework



worldwide distributor of haircare products to many professionals and high street names, with much of the product sold manufactured by Denroy. In addition to the two facilities in Northern Ireland, the Group has offices in London, Boston, and Holland, with these offices mainly servicing the Denman side of the business.

Operating from premises in Bangor, Northern Ireland, Denroy Plastics' total factory space covers an area of 4,400 square meters and houses 35 moulding machines ranging from 35T to 900T clamping force. Considerable investment in machine technology and R&D is an ongoing strategy which facilitates innovation and Denroy's leading position as a polymer injection moulding solutions provider. Denroy also offers in-house design, added value operations, and an on-site tool room.

In addition to the company's core business of plastics injection moulding, it offers a complete service from initial design, tool making, material selection, and advice to production and delivery of the component to the point of use. The company has diversified into several different market sectors including haircare, automotive, aerospace, defense, and health care. The current workforce at Denroy is 162.

Denroy has established itself as a specialist within the aerospace sector with contracts currently in place with Bombardier, Airbus, Spirit, GKN, Triumph, etc. In particular, the

company focuses on the processing of engineering grade polymers for the aerospace sector, including PEEK and PPS, and has a number of unique processing capabilities critical to aircraft manufacture.

In 2005, Denroy identified the ADS — SC21 as its model for continuous sustainable improvement. The structure of the program through Bronze, Silver, and Gold provided a challenging but achievable goal for Denroy. The required delivery and quality performance through the three levels demonstrated a progressive route to supply chain excellence, and was essential to remaining a competitive supplier and meeting the demands of the aerospace sector.

SC21 gave structure to the key elements of business, manufacturing, and relationship excellence by focusing on LEAN and a culture of continuous improvement. Employee engagement was and remains essential. The commitment given by all employees has become the norm and the processes we have adopted through the SC21 journey have become "just how we do it." Without this sound base, we would not be able to sustain a 99–100 percent on-time-in-full delivery and 99.9–100 percent quality performance on an ongoing monthly basis with every customer.

## 21<sup>st</sup> Century Supply Chain Business Benefits

The SC21 Program is an important instrument for supporting supply chain improvement in operational efficiencies, productivity, and profitability, and to free capacity to take advantage of growth opportunities. It has been designed to accelerate the competitiveness of industry through reducing suppliers' overheads, implementing leaner production methods, and lowering manufacturing equipment set-up times. Since established, the program has seen hundreds of companies from the civil and defense aerospace sectors dramatically improve their bottom lines. In doing so, SC21 has established itself as a class-leader in achieving supply chain excellence both in the UK and internationally. Business benefits include:

- Lead time reduction
- Better cash flow
- Reduced inventory
- Labor and set-up time reduction
- Greater focus on "fit for purpose" equipment
- Consistent forecasting
- Increased return on capital employed
- Reduced number of overdue/backlog orders
- Increased sales per employee

- Accurate planned vs. actual labor cost
- Machine breakdown time reduction
- Floor space utilization
- Reduced warranty claims

Both companies attained additional benefits in total quality management and relationship management. These included quality cost reduction, reduced cost of scrap, reduced cost of rework, and reduced dispatch cost (re-delivery). Stakeholder relationships benefitted through cross-company team work, better contract management, long-term planning between customers and suppliers, and communication before and during the manufacturing process with far fewer customer complaints.

The result from the best practice business improvement program is that SC21 now offers opportunities to companies not only in the aerospace industry, but also to those in the defense, security, and space industries. Recognition of improvement is governed by ADS against very complete and evidenced-based results on improved performance criteria.

While the SC21 program has been designed and driven by the aerospace, defense, security, and space industries in the UK, its implementation reaches suppliers in India, China, and other countries that supply products to Tier 1 and Tier 2 customers in the UK. When they sign up to SC21, companies commit to the program's seven principles, one of which

is to commit "that all business is conducted in a principled manner, with the highest degree of personal and business integrity." A strategic business improvement program could be implemented in other key sectors to achieve similar results.

## **Conclusion**

This case study clearly demonstrates that best practices are based on a set of guidelines and ethics that represent the most efficient and prudent course of action toward growth and competitiveness. In the case the aerospace, defense, security, and space industries, best practices were the result of evidence-based research, clearly set forth in collaboration with Tier 1 industries governing supplier management. The Centre for Competitiveness, a strategic partner in supporting the SC21 program on the island of Ireland, encourages the adoption of best practices across all sectors of the economy for which the SC21 program is an exemplar.

## UNITED STATES

### Next-Generation National Innovation Infrastructure Innovation Accelerators and “Spin-In” Initiatives

For the past decade, the United States has been in the midst of the early stages of a domestic natural gas boom that is re-attracting and encouraging new manufacturing investments to capitalize on stable, low-cost energy supplies. Prior to 2009, the tone of the Nation’s energy conversation was centered on how to deal with long-standing energy security challenges and scarcity. Today, the tone of the conversation is centered on energy abundance and growth. It is focused on seizing emerging energy growth opportunities to transform America’s industrial base and job creation outlook; and unleashing new energy innovations to make, commercialize, and export new technologies and products — particularly next-generation clean energy technologies and products — at much higher rates than in the past.

In this context, the Council on Competitiveness — in a pioneering public-private partnership with the U.S. Department of Energy — launched the American Energy and Manufacturing Competitiveness Partnership (AEMC Partnership) in 2013 to tackle two overarching goals:

1. Increase U.S. competitiveness in the production of clean energy products by strategically investing in technologies that leverage American competitive advantage and overcome competitive disadvantages; and



2. Increase U.S. manufacturing competitiveness across the board by increasing energy productivity.

The AEMC Partnership has engaged thousands of leaders, and energy and manufacturing competitiveness stakeholders from industry, academia, labor, and government in a series of nine regional and progressive dialogues, original research, and four national summits. A key goal of the AEMC Partnership has been to catalyze policy solutions — including concepts and models for scalable, public-private partnership (PPP) pilot projects — to increase competitive manufacturing of clean energy and energy efficient products in the United States.

To date, there have been many tangible outcomes from the AEMC Partnership, including but not limited to:

1. Bolstering America’s manufacturing competitiveness intelligence through the creation of the Nation’s first-ever Clean Energy Manufacturing Analysis Center.



Compete.

Council on  
Competitiveness

# HISTORY OF AMERICAN ENERGY MANUFACTURING COMPETITIVENESS

## Building a Clean Energy Innovation Infrastructure

### President's Mandate

“Building a robust  
clean energy sector is  
how we will create the  
jobs of the future --  
jobs that pay well  
and can't be  
outsourced.”

Phase 1  
Survey &  
Research

Dialogue 1:  
LAUNCH  
@Gallup

Dialogue 3:  
EVALUATE  
@ General Electric

Public-Private  
Leadership Survey  
@Council on  
Competitiveness

DOE  
announces \$20M  
for small businesses  
to work with national  
lab resources via Small  
Business Vouchers  
pilot program.

DOE launches  
Lab-Corps – a  
new, \$2.3M pilot  
program to accelera  
the transfer of innov  
clean energy technol  
from the Natl Lab  
into the commerci  
marketplace.

Dialogue 5:  
Strengthen  
@ Univ. of  
California,  
Berkeley

2013

2014

Partnership  
Announcement  
Oak Ridge Natl Lab

Dialogue 2: BRIDGE  
@ Univ. of Toledo

Dialogue 4:  
FOCUS  
@ Applied Materials  
Santa Clara, CA

AEMC Summit 2  
Washington, DC

AEMC Summit 1:  
AMPLIFY  
Washington, DC

DOE Secretary  
Moniz announces  
Accelerate Energy  
Productivity 2030  
partnership

Berkeley  
Lab's M37  
project official  
launches as Cyclo  
Road –increase  
speed from lab  
market.



# INDUSTRY BUSINESS PARTNERSHIP

“We’re all interested in making sure that advanced manufacturing is taking place here in the United States.”

Lawrence Livermore Natl Lab’s HPC4Energy pilot examined for applicability to advanced manufacturing

DOE announced up to \$3 million for industry partners to participate in its second Manufacturing Demonstration Facility, the **High Performance Computing for Manufacturing Program (HPC4Mfg)**.

**AEMC Summit 4 Northeast Regional @ City University of New York**

DOE previewed the powerful data and analytical capabilities of the new **Clean Energy Manufacturing Analysis Center (CEMAC)**.

**AEMC Summit 3 Washington, DC**

**Dialogue 6: Scale Washington, DC**

**2016**

**2015**

DOE announces \$70M for the next **National Network for Manufacturing Innovation** institute, which will focus on smart manufacturing.

DOE launched \$40M **Energy Materials Network (EMN)** to dramatically decrease the time-to-market for advanced materials innovations critical to many clean energy technologies.

**AEMC/CEMI Accelerating Advanced Materials Dialogue 3 @ Texas A&M University**

DOE announces **seven “technologist” pairs** selected to receive \$2.6 million to participate in its two-year **Technologist in Residence** pilot.

“We create. We innovate. We build. We do it together.”

**AEMC/CEMI Accelerating Advanced Materials Dialogue 1 @ University of Oregon**

**AEMC/CEMI Accelerating Advanced Materials Dialogue 2 @ Argonne Natl Lab Chicago, IL**

2. Building up America's shared manufacturing innovation infrastructure, with nearly \$1 billion in public and private investment over the past five years, including:
  - a. Five Department of Energy supported ManufacturingUSA innovation institutes,
  - b. Two new Manufacturing Demonstration Facilities, and
  - c. A new Energy Materials Network.
3. Unleashing National Laboratories to advance manufacturing innovation by:
  - a. Proposing and helping develop new, High Performance Computing for Energy, Manufacturing, and Materials programs at the Department of Energy; and
  - b. Defining and launching a new Technologist in Residence Program for the national laboratory infrastructure.

In addition to these efforts to reinvigorate and innovate America's "shared national infrastructure for innovation," the AEMC Partnership recognized that, in the face of a rapidly accelerating pace of innovation, many of the Nation's top researchers and innovators in energy and manufacturing technology lack access to tools and resources to bring their visions to the market.

Software and service start-ups draw the attention of funders due to their ability to scale quickly, their relatively low capital needs, and their potential to create a quick exit for investors.

The picture for innovation in the energy and manufacturing sectors could not be more different. The levels of investment needed to take an idea to demonstration are much greater, the timeframe in which to do this is much longer, and the ability for quick wins with traditional angel and venture capital are relatively non-existent. With less access to capital and, by extension, the physical tools and peer networks that facilitate innovation, researchers and innovators in the energy and manufacturing sectors are missing out on significant opportunities to develop new, disruptive technologies.

Building off these findings from the AEMC Partnership, several pioneering U.S. national laboratories have sought over the past few years to change the innovation landscape for the energy and manufacturing sectors through unconventional and untested models of technology transfer and commercialization. Armed with the understanding that these "hard science" innovators require significant capital and physical resources, these national laboratories created a next-generation of innovation accelerators targeting the distinctive needs in the energy and manufacturing domains.

Focusing less on "spinning out" technologies into the marketplace, these national laboratories are creating an entirely transformative, new model: **"spinning in" innovation.**

Through competitive means, national laboratories would spin potential innovators into the labs, pairing these aspiring innovators with:

1. Laboratory resources;
2. Non-replicable and/or world-class user facilities;
3. Access to world-class laboratory talent and team members for technical assistance and mentorship; and
4. Seed funding to help bring their innovations to market.

## Cyclotron Road and Chain Reaction Innovations

The first of these novel “spin-in” innovation accelerators, Cyclotron Road, was piloted at Lawrence Berkeley National Laboratory in 2014. Chain Reaction Innovations (CRI) launched in 2016. Both were born from the understanding that the existing innovation ecosystem in the United States was not doing enough to support high-impact energy and manufacturing innovators. Nor was it poised to help American-based innovators seize the opportunities inherent to a world in which the global population — mostly an emerging middle class — is expected to grow by 33 percent by 2050, boosting energy demand by five times that of today’s levels. At the same time, along with this growth opportunity, innovators also have the chance to address the global grand challenge of reducing

greenhouse gas emissions by 80 percent. As Argonne National Laboratory notes, “the only way to accomplish both is to develop revolutionary new technologies.”

The “spin-in” accelerators share common characteristics as well as focusing on core strengths at their home labs.

### Cyclotron Road

Cyclotron Road has attempted to bridge the chasm between innovation and scale-up by exploring a new approach to cross this divide and draw interest to the work of pilot participants.

To achieve the goals of the pilot program — bring to the lab the world’s best energy and manufacturing innovators and help them bring new technologies to the market — Cyclotron Road holds a competitive process to attract those potential innovators. If selected in this competition, the innovative company/leader joins a cohort of innovators, is given a two-year stipend to work, is granted access to Berkeley Laboratory talent and technological resources for five years, and is typically supported by securing additional funds. Expected outcomes are for innovators to attract sufficient support from outside funders to bring new technologies to market.

The Cyclotron Road pilot showed success from the start. In the three weeks the first cohort application process was live, 150 applicants registered. From these 150, eight

innovators were selected to be in the pilot cohort. Granting the cohort access to lab resources and user facilities saved the cohort millions in capital expenses, obviating the need for additional funding for specialized tools and equipment, etc. Laboratory staff began interacting with the pilot cohort to provide unique insight into each other's work, representing a value-add both to the Laboratory as well as to members of the pilot cohort. Members of the pilot cohort also received a stipend to help catalyze their work. This funding from the pilot also sent a signal to other funding sources about the significance and potential of the innovator to succeed. Similarly, the program has successfully attracted institutional support from a wide array of private sector partners, furthering the support and exposure provided to innovators in the program.

To date, Cyclotron Road has awarded more than \$13 million to 41 innovators who have gone on to generate more than \$48 million in early stage funding to support their projects and jumpstart job creation.

This overwhelming success revealed the potential for similar programs at national laboratories around the country, leading to the creation of Chain Reaction Innovations at Argonne National Laboratory and Innovation Crossroads at Oak Ridge National Laboratory in 2016.

### **Chain Reaction Innovations (CRI)**

CRI at Argonne National Laboratory gives teams of innovators a two-year runway to develop and scale their technologies while being supported through fellowship funding that covers salary, benefits, and use of laboratory equipment and office space. Through a partnership with mentor organizations, CRI participants get assistance developing business strategies, conducting market research, and finding long-term financing and potential commercial partners.

CRI recently unveiled its second cohort of innovators who will participate in the CRI program. These innovators will be moving to the Chicago area from places such as California, Massachusetts, and Michigan.

The first cohort of CRI innovators are in the second year of their respective two-year runs in CRI and have made notable progress. The teams have raised \$400,000 in external funding, including grants and investments. As they seek to scale up their innovations and launch them into the marketplace, Cohort 1 innovators have also:

- Partnered with industry;
- Developed prototypes; and
- Received top prizes in prestigious competitions (for example).

Details about the Cohort 1 and Cohort 2 innovators can be found on the CRI website. Additional details about CRI and the current CRI projects can be found on the CRI website.

## Conclusion

Each of these innovative "spin-in" programs shares a similar basic structure with minor differences drawing on the strengths and resources at the given national laboratory. Some of the common elements are shaped by lessons learned early in the programs' development process and cohort selection:

- 1. Keep the cohort application window open for as long as possible.** Program leaders can maximize the potential of future cohorts by keeping the application window open longer to draw a wider pool of applicants.
- 2. Locate the program on-site at national laboratories.** Hosting the accelerator program on campus enabled face-to-face interactions and deeper, more effective collaborations as well as lowered capital costs for research equipment due to shared resources.
- 3. Encourage cohorts with business mentoring.** Cohort members have an opportunity to leverage their program support for additional funds from public and private sector partners enthusiastic about supporting validated technologies.

The strength of these innovative "spin-in" accelerators grows as their active and alumni participants grow which, in turn, draws more interest to the next year's annual cohort selection. Though the programs are young, their investment has proven to be a success both for the innovators themselves as well as America's future competitiveness, and have helped to build on the legacy of positive outcomes from the Council on Competitiveness/U.S. Department of Energy AEMC Partnership.

## GFCC

# Foundational Global Competitiveness Principles

**Build coalitions and public-private platforms to nurture innovation ecosystems and support innovative companies.** Globally competitive innovation ecosystems thrive in the presence of regulatory frameworks that promote public-private engagement and enable the free circulation of resources and talent across sectors and organizations. Public and private sectors must collaborate and pool resources to develop talent, connect innovation stakeholders, and provide the funding, infrastructures, business structures and expertise needed throughout the lifecycle of innovative and sustainable companies.

**Make innovation the centerpiece of growth strategies, deploying concrete initiatives across industries, sectors and borders.** Innovation is the key enabler for future growth and sustainability. Countries, regions and cities that want to build future-oriented economies must focus on solving global problems and must not miss the sustainability opportunity. Policy frameworks and initiatives should be engineered to catalyze and reward value development from new ideas and technologies. In doing so, they should consider the changing nature of innovation, enabled by new technologies, processes, organizational models and tools.

**Invest in developing the business and technology skills needed for new companies' formation, growth and global expansion.** Sustainable development presents opportunities for innovative business to be scaled-up across borders. Scale-up requires a variety of business skills and capabilities, in addition to scientific and technical ones. Private and public-sector stakeholders need to work together to develop technology and business capabilities concomitantly, preparing entrepreneurs, managers and the workforce in general. Talent development initiatives should recognize that new and even unforeseen skills will be needed in the workforce in the years and decades to come. They should create opportunities to engage new demographics and social groups in business, technology and innovation.

**Build strong, resilient, adaptive and globally connected local innovation ecosystems.** The emergence and scaling-up of innovative and sustainable businesses requires a critical mass of resources at the local level. Vibrant city and regional innovation ecosystems provide innovative businesses with the essential skills, connections and knowledge they need to scale-up. Global engagement and circulation of resources are essential for the development and relevance of local innovation ecosystems. Cities and regions must simultaneously nurture their local ecosystems and connect globally.

**Implement and support the global deployment of functional, fast and forward-looking IP regimes to unleash innovation.** New technology solutions are essential to tackle global challenges. Businesses that develop and commercialize such solutions have significant opportunities for global scale-up. Such ventures will emerge and be deployed in places where IP regimes help ensure that innovators, entrepreneurs and companies will receive rewards for their efforts, investments and risk-taking. Speed will also be critical for IP regimes, as technology and global competition accelerate.

**Leverage global infrastructure needs to create demand and catalyze the emergence of innovative and sustainable businesses.** The world faces a big infrastructure deficit across a variety of areas — water, energy, transportation, housing, connectivity, etc. New innovative and sustainable technologies, business models and ventures are needed to close these gaps and drive sustainable development. Countries, regions and cities can leverage investments in sustainable infrastructure to accelerate innovation and global scale-up of new ventures. Innovative finance, regulation, trade and investment platforms will be essential to develop forward-looking infrastructure systems.

**Implement platforms to connect innovative companies internationally and focus on global scalability.** Global challenges and sustainable development cannot be successfully addressed by any country in isolation. Cross-border collaboration is a necessity. Global markets present an enormous opportunity for innovative and sustainable companies. International flows of goods, capital, information and ideas are instrumental to innovation, sustainable development, growth and prosperity. Policy and business stakeholders should support open and transparent markets, and implement innovative platforms for global collaboration, trade and investment.

**Boost resource productivity via new technologies and innovative business models deployed globally.** Population growth, urbanization and economic development put pressure on natural resources, highlighting the need for sustainable solutions and business models. Companies can leverage new technologies — such as the Internet of Things, artificial intelligence, computation, networks, and advanced materials — to tap into that opportunity, substantially increasing the efficiency and productivity of energy, land, water, minerals, etc. In bringing such new technology-enabled solutions to the world, businesses will find enormous opportunities for global expansion, while reconciling growth with biodiversity and natural assets preservation.

**Implement forward-looking, seamless and efficient regulations that allow innovative companies and governments to experiment, learn and scale-up new solutions.** Efficiency, transparency and predictability are key attributes for functional and innovation-positive business environments. Regulation plays a central role in industries at the center of the sustainability issue — energy, food, water, mining, forestry, etc. — and should be engineered to be conducive to innovation, not to hinder it. Innovation and scale-up are also inextricably related to learning and adaptation, for companies, governments, institutions and societies. Local and national governments should craft regulatory environments that allow for experimentation, and speedy institutional and business learning, serving as global launch pads for innovative and sustainable businesses.

**Support scaling-up through systematic strategy, regulation and policy global benchmarking.** Innovative businesses scale-up only if they have market traction. To get there, they need to understand the realities, necessities and preferences of clients, as well as the competitive landscape across sought-after markets; benchmarking is essential for this objective. Governments and other stakeholders should also systematically engage in strategy, regulation and policy benchmarking, ensuring that companies in their cities, regions and nations have competitive conditions comparable to the world's top performers.



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# GFCC

Global Federation of  
Competitiveness Councils

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.

For more information, please visit  
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