Stimulating Economic Development in the Caribbean: Caribbean Science Foundation

A CADSTI PUBLIC LECTURE

HYATT REGENCY, TRINIDAD

March 29, 2010

Professor Cardinal Warde
warde@mit.edu

MIT Photonic Systems Group

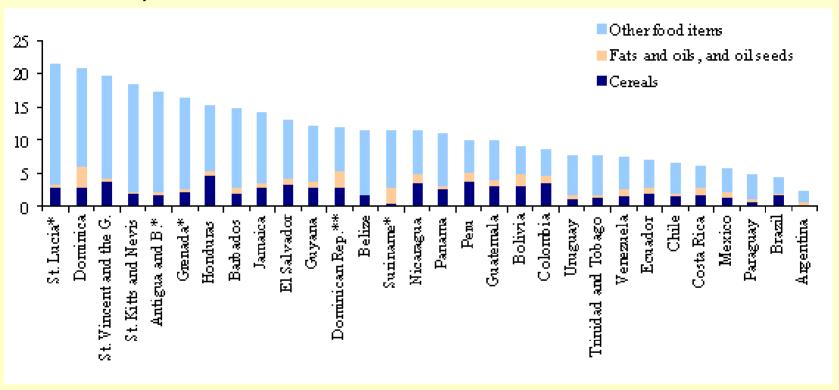Department of Electrical Engineering & Computer Science

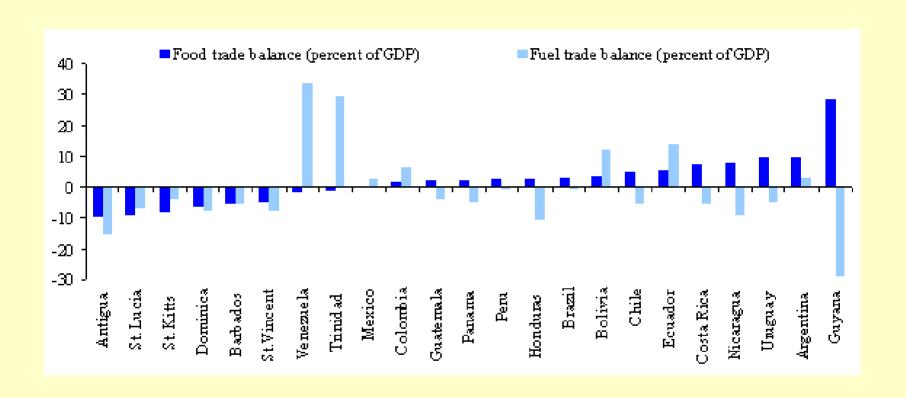*massachusetts institute of technology*

Challenges in the Region

- **Weak entrepreneurial culture**
- **High unemployment**
- **High import bill - Low exports**
- **Weak Infrastructure (roads, schools, ports, etc.)**
- **Inadequate inter-island transportation systems**
- **Digital divide**
- **Educational systems in need of reform**
- **Low levels of relevant research and development**
- **Food insecurity**
- **Energy insecurity**
- **Inadequate health care problems**
- **Poverty and crime**
- **Environmental damage at sea and on land**

Share of Food in Total Imports, 2006

% Total Imports

From web.worldbank.org, 'What are the facts about rising food prices and their effect on the region?'

3

Food and Fuel Trade Balance in 2005 as Percentage of GDP

Legend:
- ■ Food trade balance (percent of GDP)
- ■ Fuel trade balance (percent of GDP)

Countries (x-axis): Antigua, St. Lucia, St. Kitts, Dominica, Barbados, St. Vincent, Venezuela, Trinidad, Mexico, Colombia, Guatemala, Panama, Peru, Honduras, Brazil, Bolivia, Chile, Ecuador, Costa Rica, Nicaragua, Uruguay, Argentina, Guyana

A Strategy for Stimulating Economic Development

Develop and Nurture a More Entrepreneurial Culture

- **Education reform with more emphasis on science, technology and business**

- **Provide better leadership and vision for our young people (identify role models, offer more encouragement)**

- **Bring in tools, means and expertise – forge international partnerships**

- **Find ways to provide more financing for companies (from outside and inside the region)**

- **Capitalize on proximity to North America**

- **Learn from mistakes and successes of Brazil, Israel, Singapore, Ireland, etc.**

- **Engage the Diaspora (especially scientists, other professionals and institutions outside the Region)**

- **Governments must play a facilitating role**

These are among the goals of the Caribbean Science Foundation

Engaging the Diaspora

The Caribbean Diaspora for Science Technology & Innovation (CADSTI)

Has only one project at the moment: Establishment of the

Caribbean Science Foundation (CSF)

http://www.cadsti.org

Caribbean Diaspora for Science, Technology and Innovation (CADSTI)

- **Scientific community in the Region brought together April 2006 in Trinidad & Tobago by Prof. Harold Ramkissoon (UWI, St. Augustine) with support from UNESCO, CARICOM with help from Prime Minister Mitchell (Grenada)**

- **Goal was to mobilize scientists, engineers, medical and business professionals in the Diaspora to make a contribution to economic development of the Region**

- **Also to identify and set up collaborations between businesses and universities in the Diaspora and in the Region**

- **CADSTI was formed and incorporated in Barbados**

CADSTI Founding Board

- **Prof. Cardinal Warde - President**
- **Prof. Baldwin Mootoo - Treasurer, Caribbean**
- **Dr. Basil Burke - U.S.A**
- **Prof. Suresh Narine - Canada**
- **Dr. Brian Tom - U.K.**
- **Prof. Harold Ramkissoon - Secretary, Ambassador**
- **Prof. John-Paul Clarke - U.S.A**
- **Prof. Maya Trotz - U.S.A, Chair Youth Committee**
- **Mr. Ravi Ramkissoon – Information &**
  Communications officer

CADSTI Committees

- **Education-Reform Committee**
  - **Curriculum reform and teacher retraining**
- **Youth Committee (Maya Trotz, Chair)**
  - **Engage the youth**
- **Private-Sector/Fund-Raising Committee**
  - **Planning and fundraising**

Private-Sector/Fund-Raising Committee

- **Mr. Nicholas Brathwaite,** Partner & CTO - Riverwood Capital

- **Dr. Basil Burke,** UWIConsulting

- **Mr. Dodridge Miller,** CEO - Sagicor Insurance

- **Mr. Hollick Rajkumar,** CEO - HRC Associates

- **Prof. Harold Ramkissoon** (UWI-TT)

- **Mr. Robert Riley,** CEO - BP Trinidad

- **Prof. Cardinal Warde** (MIT) - Chair

- **Mr. Gervase Warner,** CEO - Neal & Massy

Caribbean Science Foundation (CSF)

- **An independent semi-autonomous Caribbean agency whose mission is to:**
  - promote sustainable economic development, national health, prosperity and the welfare of Caribbean people through the advancement of science, technology and innovation (STI)

- **An agency that will liaise with international organizations, donor agencies and NGO's interested in collaborative science education, research, innovation and entrepreneurship**

- **A resource that all Caribbean nation states can turn to for assistance with local science, technology, innovation and medical projects**

- **CSF will be officially launched on September 21, 2010 in Port of Spain, Trinidad & Tobago**

MAJOR ROLES AND RESPONSIBILITIES of CSF

Assistance with Education Reform

The broad goal in education reform is to help stimulate technology-based entrepreneurship by promoting science and technology in schools, universities and other educational venues.

Identification and Funding of Relevant Science and Technology Projects

Identify and fund new projects that are relevant to the economic development of the Region, and that would be carried out by new and existing companies.

CSF Activities

- **Keeps close track of research around the world and maintains constant contact with research communities**

- **Identifies and funds work at the frontiers of STI (with a "bottom up" approach) that is of relevance to the development of the Caribbean.**

  - ➢ **Process begins with workshops and conferences to identify and discuss problems of the Region**

  - ➢ **Agency (CSF) secures funding**

  - ➢ **Agency publishes solicitation for proposals**

  - ➢ **Facilitates partnerships between research institutions, private industry, governments in the Region and overseas**

  - ➢ **Ensures that research is fully integrated with education**

  - ➢ **Supports technology transfer, and invests in engineering and manufacturing developments in areas of relevance**
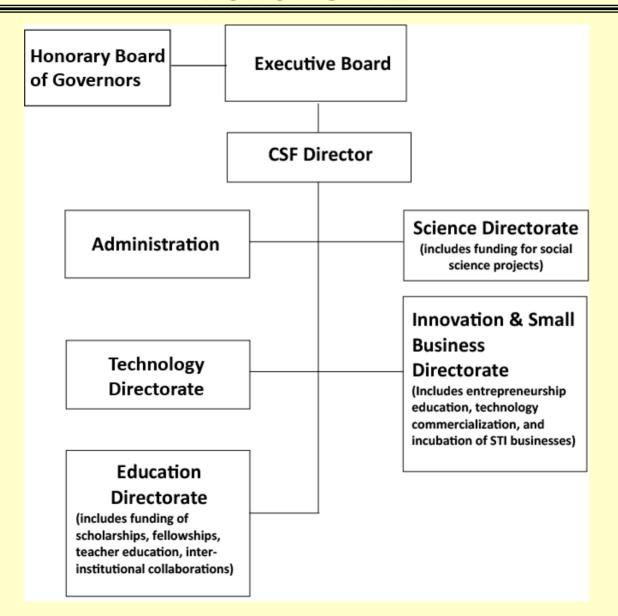
CSF Activities (continued)

- **Offers professional development activities for our teachers, development of new learning techniques, and the creation of higher academic standards**

- **Offers public science education programs on TV and at museums of science**

- **Statistical studies of the impact of research in the Region**

MAJOR AREAS OF FOCUS for CSF

The major areas of focus could include:

- **Energy, Water and Materials**
- **Transportation**
- **Agriculture and Food Science**
- **Manufacturing**
- **Small and Medium Business Development & Entrepreneurship**
- **Information and Communication Technologies (ICT)**
- **Environmental Science and engineering**
- **Medicine and Health Care**
- **Crime Prevention**

CSF ORGANIZATION CHART WHEN FULLY FUNCTIONAL

PERFORMANCE ASSESSMENTS

- The CSF Director will prepare an annual report for submission to the Board of Directors (including financials) which will show how the CSF has (or has not) achieved its long-term objectives.

- The CSF will rely on external committees of experts to evaluate its long-term outcomes and the performance of its mission on a biennial basis.

- The performance assessment will be guided by the CSF's strategic plan.

- The goal will be to provide its donors, investors, and the people of the Region with vital information about the return on their investments in STI

- The criteria for assessment will include discovery, learning, research, entrepreneurship development, innovativeness and overall economic impact

Who are the Entrepreneurs?

Common traits of successful entrepreneurs:

Dreamers, visionaries, creative, disciplined, flexible, goal-oriented, highly motivated, well-informed, well-connected, opportunistic, optimistic, workaholic risk takers, resourceful, persuasive, pragmatic, and have the ability to inspire and motivate people.

Developing an Entrepreneurial Culture: Role of Government

Government, as facilitator, should:

- Use radio, TV, Internet, billboards and education system to indoctrinate (brainwash) the people with the new entrepreneurship culture

- More aggressively set up small business technology development plans that provide equity-based capital

- Act to make all types of investment capital more accessible to start-up businesses

- Devise creative taxation systems that are not a disincentive to business development

- Help to establish centralized IP system for Caribbean

- Expedite CSME (good idea but moving too slowly)

Developing an Entrepreneurial Culture: Role of Government (continued)

Government, as facilitator, should:

- **Motivate the people in the same way effective corporate leadership does (incentives and rewards)**
- **Work to reverse the sense of hopelessness in many of our young people**

  - ➢ **Develop a social safety net and social programs for the less fortunate**

  - ➢ **Provide free learning opportunities for some sectors of the population (transform unemployed tax takers into tax payers)**

- **The people, on the other hand, must practice discipline, diligence, a shared sense of responsibility for self, and a code of self-reliance**

Education Reform

Increase access to education and information

- **Conquer Digital Divide (e.g. through community centers that provide access to computers and Internet)**

- **Early exposure of our students to business principles and entrepreneurship through curriculum reform that includes:**

  ➢ **how businesses make money, contracts and contract negotiation, intellectual property, patents and inventions**

  ➢ **how the stock market works**

  ➢ **international trade, global economics**

  ➢ **accounting principles**

  ➢ **information technology**

  Can begin early – at age 8 !

Youth Development and Education Reform
(Continued)

- **Establish more distance learning programs**

- **Promote science and technology in schools; educate more women in science and engineering**

- **Undergraduate degree - the flagship educational credential**

- **Our Universities, or major parts thereof, should focus on research and technology with economic relevance, including formation of incubators and IP transfer to business sector**

- **To teaching, research and service, we could add "impact on economic development" as a fourth metric by which we evaluate our university faculty**

CSF SBTD Program*

Small Business Technology Development Program

CSF plans to heavily advertise the availability of seed capital and solicit proposals (with business plans included) for evaluation and funding

- Will encourages plans from teams of individuals for joint product or service development between industry and universities

- Plans will be evaluated based on technical merit, competence of the management team, size of the potential market, the realism of proposed market share, global competitiveness, impact on economy, etc

- Evaluations will be carried out by a committee of experts (no nepotism, no special-interest advantages, no committee members with conflicts of interest)

* Model first proposed in 1998 (see *http://cadsti.org/documents.php*)

CSF SBTD Program (continued)*

- **Phase I - Technical feasibility of the product or service is established**

- **Phase II (by Invitation if Phase I is successful) – Businesses submit new technical proposal and updated business plans for possible Phase II funding**

- **CSF will take a small equity stake in companies that are awarded Phase II funds**

- **If company becomes highly successful (only a handful) CSF will eventually sell its equity and plough the proceeds back into the basic pool of SBTD funds**

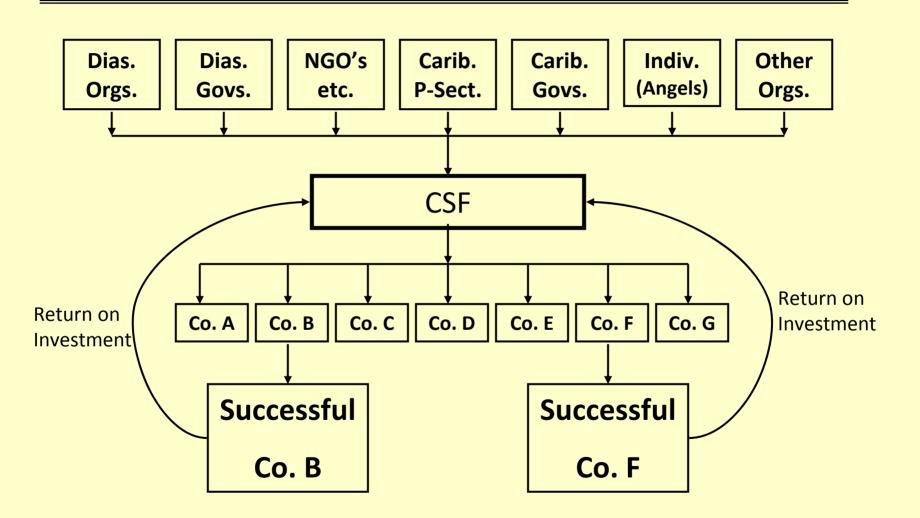- **Pool could actually grow after about ten years and be self-sustaining, if well-managed**

Model first proposed in 1998 (see http://cadsti.org/documents.php)

Support

Sources of CSF Support to include:

- • International agencies/organizations
- • Member countries (~5%)
- • Private sector
- • The Diaspora
- • Equity holdings in CSF-invested companies
- • Dividends or profits from invested
    endowment/trust funds

Sustainability Model

CSF Potential Partners

ARGENTINA
ANPCYT: *Agencia Nacional de Promocion Cientifica y Tecnologica*
CONICET: *Consejo Nacional de Investigaciones Cientificas y Tecnicas*
AUSTRALIA
AAS: *Australian Academy of Science*
ATSE: *Australian Academy of Technological Sciences and Engineering*
Australian Research Council: *Foundation for Research, Science and Technology*
CSIRO: *Commonwealth Scientific and Industrial Research Organization*
DEST: *Department of Education, Science and Training*
ITR: *Department of Industry, Tourism and Resources*
BRAZIL
ABC: *Academia Brasileira de Ciencias*
CNPQ: *National Council of Scientific Research*
FINEP: *Financiadora de Estudos e Projetos*
CANADA
NRC: *National Research Council*
NSERC: *Natural Sciences and Engineering Research Council*
SSHRC: *Social Sciences and Humanities Research Council*
CHILE
CONICYT: *National Council of Science and Technology*
FONDECYT: *Fondo Nacional de Desarrollo Cientifico y Tecnologico*
FONDEF: *Fondo de Fomento al Desarrollo Cientifico y Tecnologio*
CHINA
CAS: *Chinese Academy of Sciences*
CERN: *China Education and Research Network (Universities)*
NSFC: *National Natural Science Foundation of China*
COLOMBIA
COLCIENCIAS: *Consejo Nacional de Ciencia y Tecnologia*
FRANCE
CNES: *National Center of Space Studies*
CNRS: *Centre National de la Recherche Scientifique*
IFREMER: *French Institute of Research on Sea Use*

INRA: *National Institute of Agricultural Research*
INRIA: *Institut National de Recherche en Informatique et en Automatique*
INSERM: *National Institute of Health & Medical Research*
MOR: *Ministry of Research and Technology*
GERMANY
BMBF: *Federal Ministry for Education, Science, Research, and Technology*
DAAD: *German Academic Exchange Service*
DFG: *German Research Association*
JAPAN
NSF/Tokyo: *National Science Foundation--Tokyo Office site*
KOREA
KOSEF: *Korea Science and Engineering Foundation*
KUSCO: *Korea-U.S. Science Cooperation Organization*
KRF: *Korea Research Foundation*
MEXICO
CONACYT: *Consejo Nacional de Ciencia y Tecnologia*
FUMEC: *The United States-Mexico Foundation for Science*
SOUTH AFRICA
CSIR: *Council for Scientific and Industrial Research*
HSRC: *Human Sciences Research Council*
NRF: *National Research Foundation*
SAAG: *South African Association for Geotechnology*
SASBMB: *South African Society of Biochemistry and Molecular Biology*
SASC: *South African Science Councils*
SPAIN
CSIC: *Higher Council for Scientific Research*
MCYT: *Ministry of Science and Technology*
TAIWAN
NSC: *National Science Council*
UNITED KINGDOM
BBRSC: *Biotechnology and Biological Sciences Research Council*
EPSRC: *Engineering and Physical Sciences Research Council*
ESRC: *Economic and Social Research Council*
MRC: *Medical Research Council*
NERC: *Natural Environment Research Council*
OST: *Office of Science and Technology--Related Sites*
RCUK: *The Research Councils of the United Kingdom*
UNITED STATES
NSF: *National Science Foundation*

Final Remarks

… Google could have started in Barbados!

We are limited only by our imagination!