Economic Growth Strategy: Capacity Building for Innovation and Entrepreneurship in Trinidad/Tobago

... the talent base and national priorities

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Greetings from Stevens Institute of Technology

Founded in 1870, “By America’s First Family of Inventors”

2,200 Undergrads – Residential, 3,400 Graduate Students – Worldwide
Outline

- Shared Definitions
- The Case for Innovation
- Recommended Strategy: Build an Innovation System
- A New Model for University Based Innovation
- Lessons Learned
- Conclusion
Shared Definitions

Innovation: The design, invention, development and/or implementation of new or altered products, services, processes, systems, organizational structures, or business models for the purpose of creating new value for customers and financial returns for the university, the region and the nation.

“...the entrepreneur must be a person of “vision,” of daring, willing to take chances, to strike out, largely on the basis of intuition...

...The entrepreneur is more of a “heroic” than an “economic” figure:

...must have the desire to create new things...”*

* Source - John E. Elliot.
Introduction to *The Theory of Economic Development* by Joseph A. Schumpeter
Why Innovation and Entrepreneurship?
<table>
<thead>
<tr>
<th>Economic Activity</th>
<th>Level of Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustaining transformational inventions and business growth</td>
<td>Innovation in research and development</td>
</tr>
<tr>
<td>Inventing new products and services</td>
<td>PhD’s with experience in entrepreneurship and innovation</td>
</tr>
<tr>
<td>Improving existing products and services</td>
<td>Master and Bachelor degrees</td>
</tr>
<tr>
<td>Manufacturing of existing products</td>
<td>Associate – 2 year – and Bachelor degrees talent base</td>
</tr>
</tbody>
</table>
## The Case for Innovation
### Global Competition

<table>
<thead>
<tr>
<th>Country</th>
<th>Manufacturing as a percentage of GDP, 2008***</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaysia</td>
<td>29.2</td>
</tr>
<tr>
<td>Singapore</td>
<td>27.6</td>
</tr>
<tr>
<td>Korea</td>
<td>24.7</td>
</tr>
<tr>
<td>Taiwan</td>
<td>21.4</td>
</tr>
<tr>
<td>Japan</td>
<td>21.0</td>
</tr>
<tr>
<td>USA</td>
<td>12.6</td>
</tr>
<tr>
<td>Jamaica</td>
<td>12.0</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td>7.2</td>
</tr>
</tbody>
</table>

*** Source: Economist.com Country Briefings, Economic Structure
# The Case for Innovation

## Global Competition

**Patents granted per 100,000 residents Year 2007**

<table>
<thead>
<tr>
<th>Country</th>
<th>Patents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Korea</td>
<td>190.93</td>
</tr>
<tr>
<td>Japan</td>
<td>113.14</td>
</tr>
<tr>
<td>Taiwan</td>
<td>79.82</td>
</tr>
<tr>
<td>USA</td>
<td>26.42</td>
</tr>
<tr>
<td>China</td>
<td>24.1</td>
</tr>
<tr>
<td>Netherlands</td>
<td>10.95</td>
</tr>
<tr>
<td>Singapore</td>
<td>10.66</td>
</tr>
<tr>
<td>Israel</td>
<td>5.47</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td></td>
</tr>
<tr>
<td>(could not find data)</td>
<td></td>
</tr>
<tr>
<td>Malaysia</td>
<td>0.66</td>
</tr>
</tbody>
</table>

**Target goal in five years?**

**Message:** Create in-country talent pool
The Case for Innovation: United States Data

Manufacturing as a Percentage of GDP
1947 to 2006
Data from Dept of Commerce Bureau of Economic Analysis
The Case for Innovation:
US Patents and Revenue from Traditional Model

Number of Patents granted to US Universities per year*

*Source: United States Patent and Trademark Office

**Source: Association of University Technology Managers

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New Plateau/Decline or backlog in Patent Office?

Bayh Dole Act

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*Source: United States Patent and Trademark Office

**Source: Association of University Technology Managers
Recommended Strategy: Build an Innovation System

- **National agenda** for innovation and entrepreneurship: highest level of government creating a national mindset throughout the public and private sectors.
- **Champion** to work across organizations and demonstrate early success
- **Focus areas**
  - manufacturing technologies
  - alternative energy
  - environmental stewardship for tourism and society
  - software development
  - improved processes for public and private sectors
- **Growing SME’s**: R & D fund for university - SME partnerships
- **Venture capital**: angel funding for startups and later stage for SME’s. Market place discipline.
Recommended Strategy: Build an Innovation System

- Engage universities
  - Incentives for faculty and students
  - License technologies
  - Launch new enterprises – product prototypes, business model, CEO, venture capital
  - Develop courses and extracurricular programs for tomorrow’s entrepreneurs – technological, business and organizational

- Specialized training for public and private sectors
- Engage diaspora – networking and investment capital
- Business friendly policies: tax incentives and avoid onerous regulations
- National awards
  - Technologies licensed; startup enterprises; SME growth; improved processes for public sector; and high school projects
Traditional Research University Model

Research → patents/trademarks → license to outside → universities get royalties

The Stevens Model: Path to Sustained Academic Entrepreneurship

Academic Entrepreneurship as a core academic value → Research → Patents/trademarks → Prototypes with business models

Investors → Companies launched with ownership by university, faculty, students, investors → Exit Strategy – sale/IPO
Stevens Model Value Proposition

- Knowledge of Marketplace
- New Companies
- Investors
- Prototypes and business models

Enriched Student Learning

- Faculty and student inventors
- Research
- Patents/trademarks

Students graduate with ability to grow and launch companies

Stevens is a source of Academic Entrepreneurship

August 30, 2007 – The Business Week article titled “Who Needs the Ivies?” cites the strong entrepreneurial environment at Stevens: “Schools like MIT and Stanford don't graduate more founders than Stevens Institute of Technology or Arizona State University. Even the famed Indian Institute ...”
## Successful Examples

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
<th>Disruptive Features</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDROGLOBE</td>
<td>Removes heavy metals from water</td>
<td>Effective at small scales</td>
<td>Sold to Graver</td>
</tr>
<tr>
<td>PLASMA SOL Corporation</td>
<td>Medical Sterilization Equipment</td>
<td>Quick turn around sterilization, portable, safe for sensitive surgical instruments, no environmental disposal</td>
<td>Sold to Stryker</td>
</tr>
<tr>
<td>myideashare</td>
<td>Ideation software that helps organizations energize and manage their ideation process</td>
<td>Employs sophisticated gaming technology using an active stock market of ideas that empowers employees</td>
<td>Product actively being sold; seeking 1st round financing</td>
</tr>
<tr>
<td>Attila Technologies</td>
<td>Intelligent multi network wireless router/software that dynamically connects to multiple networks for high throughput, secure &amp; non-interrupted service</td>
<td>First of a higher level class of communication systems – a cognitive network that senses and uses available bandwidth on the fly</td>
<td>First product in market; 1st round of financing complete in Dec 2009</td>
</tr>
<tr>
<td>AutoMap</td>
<td>Advanced robotic mapping system for site mapping and dimensionalized engineering drawings of buildings and terrain</td>
<td>Creates site plans in CAD format in &lt;30 minutes. Replaces surveying teams and labor to produce as-build building drawings</td>
<td>Prototype complete: seeking 1st round of financing</td>
</tr>
<tr>
<td>DICE</td>
<td>A new Mass Spectrometry source that revolutionizes MS analysis from medical diagnostics to analytical chem.</td>
<td>Atmospheric ionization of non-polar compounds; GC/LC MS on a single machine without changing sources</td>
<td>Prototype complete; partnership with MS company; seeking 1st round of financing</td>
</tr>
<tr>
<td>Tidal Turbine</td>
<td>New design for harvesting power from currents and tides</td>
<td>Highly efficient duct and blade design, 6 by 3 meter unit produces 250 kilowatts with 2 knot current</td>
<td>Prototype for Hudson River application in process</td>
</tr>
</tbody>
</table>
Universities That Turn Research Into Revenue
Maureen Farrell, 09.12.08, 6:00 PM ET
“Stanford University's fertile breeding ground for breakthrough technology may have spawned the likes of Hewlett-Packard and Google, but little Stevens Institute of Technology in Hoboken, N.J., really knows how to get serious returns on its research and development.”

Stevens Institute of Technology Ranked 3rd in U.S.
Lessons Learned

1. Incentives to align academic and marketplace timescales
2. Supportive infrastructure for licensing and launching startups
3. Engage alumni (and diaspora)
   • networking
   • domain Experts
   • venture capital
   • CEO talent Pool
Conclusion

Building an innovation system will transform the economy.

Many examples: U.S., Taiwan, Korea, Japan, Singapore and BRIC