turning knowledge into practice

Creating Technology-based Spin-off Companies

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RTI International

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RTI International

Our mission:

to **improve the human condition** by turning knowledge into practice.

Since 1958

- *Headquarters in Research Triangle Park, North Carolina*
- *Projects in 100+ countries*
- *Multidisciplinary staff of more than 2650; annual revenue of $700 million*
- *Expertise in health, education, international development, environmental sciences, and advanced technology*
- *Many collaborative partnerships*

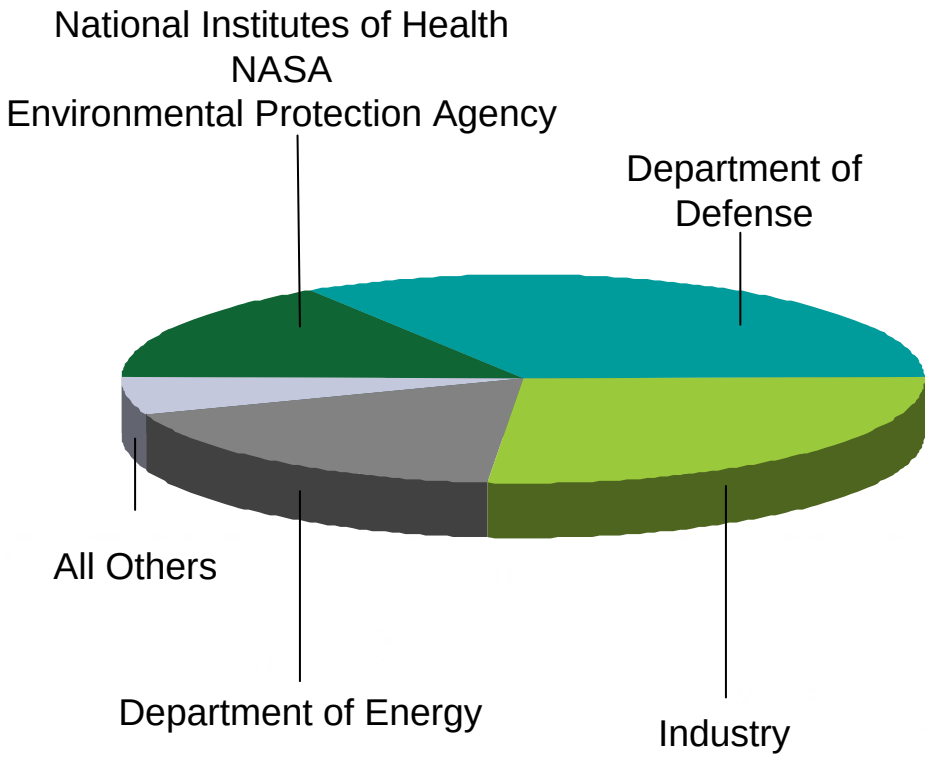
Advanced Technology at RTI

Focus Areas

- Energy
- Microelectronics
- Advanced Materials
- Biomedical engineering
- Technology Commercialization

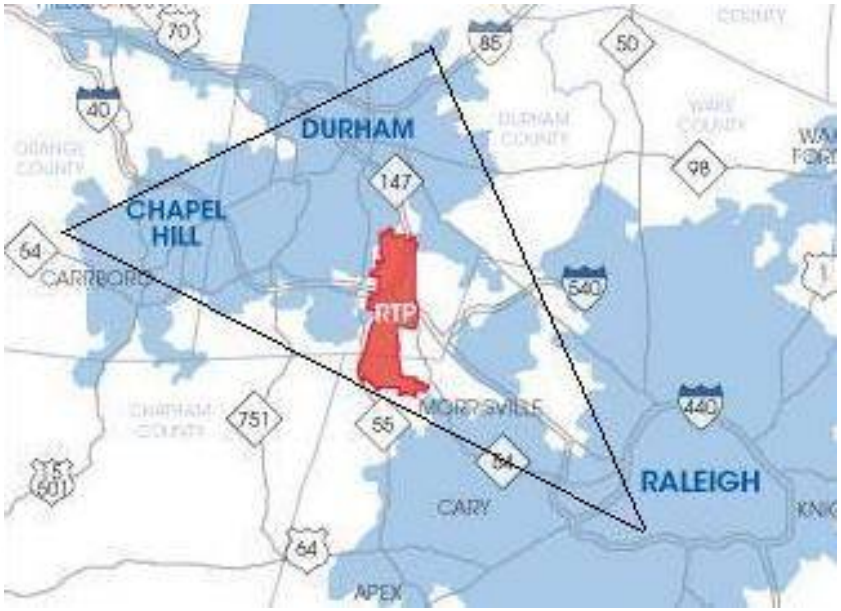
Revenue: $40 Million

Staff: 180



RTI and Research Triangle Park (RTP)

- RTP -- Founded in 1959 to stem “brain drain” and shift the agricultural and manufacturing economy to a research and technology focus
- Success based on:
  - Proximity to three flagship research universities
  - Private leadership balanced with public purpose
  - A scale large enough to achieve global prominence
  - Patience and perseverance – a long-term view



Research Triangle Institute (now RTI International) – Created as the first research entity in RTP to work collaboratively with the region's research universities with a focus on solving complex scientific challenges and “turning knowledge into practice”.

RTP Innovation Ecosystem

*Over decades, the RTP region has developed many elements of an innovation ecosystem that **interact** in discovery, development, production, diffusion and use of new, and economically useful, knowledge.*

Entrepreneurship

RTP Incubators
Park Research Center
First Flight Venture Center
Alexandria Innovation Center
BD BioVenture Center

Higher Education

$1.59 billion R&D expenditures in 2007

Capital Formation & Commercialization

$430 million average annual venture investment 2002 – 2007

A.M. Pappas & Associates
Aurora Funds
Dogwood Equity
Intersouth Partners
Research Triangle Ventures
Wakefield Group

Research Capacity

Critical Mass
170+ world-class firms employ 42,000
2.1 million m^2 of developed space

Centennial Campus

- University, corporate, and government facilities intertwined to create multi-disciplinary R&D neighborhoods based on the University's strengths in:
  - Information & Communications Technologies
  - Biosciences and Biotechnology
  - Advanced Materials
  - Education
- Quick facts:
  - 5.4 km² area
  - $620 million invested in facilities and infrastructure to date
  - 250,000 m² of space constructed in 25 major buildings
  - 61 corporate and government partners
  - 1,600 corporate and government employees;1,350 university faculty, staff and post-docs; 3,400 university students;

Research Triangle Energy Consortium (RTEC)

- RTEC is an energy-sector alliance of RTI, Duke University, North Carolina State University, and the University of North Carolina. Established in September, 2007.
- Focus is on solving high-impact energy problems by combining science, technology development, environmental sciences, and policy. "*Translational Research*": *Basic research with the ability to commercialize*.
- Executive Director: Dr. Vikram Rao, former Chief Technical Officer of Halliburton

Why Commercialize Technology?

- Financial Motivations
  - Income from IP licensing and spin-off companies
    - Critical source of funds for new technology development projects
  - New research projects funded by licensees or spin-offs

- Non-Financial Motivations
  - Organizational mission (“turning knowledge into practice”)
  - Organizational stature
  - Creating an entrepreneurial culture
  - Career path and opportunities for staff (an important tool for attracting and retaining for some of the most creative and ambitious scientists)

Management of Emerging Opportunities

Idea Evaluation	R&D	Business Planning	IP Transfer in Progress	IP Transferred to Commercialization Partner
Invention Disclosure 1	Project 1	Program A	Negotiation 1	Ziptronix
Invention Disclosure 2	Project 2	Program B	Negotiation 2	Nextreme
Invention Disclosure 3	Project 3	Program C		siXis
Invention Disclosure 4	Project 4	Program D		
Invention Disclosure 5	Project 5	Program E		
Invention Disclosure 6	Project 6	Program F		
Invention Disclosure 7	Project 7	Program G		
Invention Disclosure 8	Project 8			
Invention Disclosure 9	Project 9			
Invention Disclosure 10	Project 10			
Invention Disclosure 11	Project 11			
Invention Disclosure 12	Project 12			
Invention Disclosure 13	Project 13			
Invention Disclosure 14	Project 14			
Invention Disclosure 15	Project 15			
Invention Disclosure 16				
Invention Disclosure 17				
Invention Disclosure 18				
Invention Disclosure 19				
Invention Disclosure 20				
Invention Disclosure 21				
Agreement in place				
Agreement expected in 2009				
Agreement expected in 2010				
Agreement expected in 2011				

Value of Pipeline

- Common language for discussing the status of technologies
- Clarifies the need to fill the pipeline with high quality new ideas
- Focuses internal resources on technologies with the highest probability of success
- Provides visibility for management from the earliest stages to gain consensus for commercialization strategy and investments

Management of Internal Investments

- Even if the only organizational investment is the allocation of staff time, these decisions need to be made wisely
- Focus commercialization resources on those technologies which have:
  - a team and champion with a passion for commercializing the technology
  - a strong competitive advantage versus existing products/services, and those known to be in development
  - a clear path to commercialization (a spin-off or license is within the means of the organization)

Management of Internal Investments

Potential Investments

- "Translational research" to move technology from the bench to the scale which can be accepted by industry
- Building an IP estate
- Market research
- Constructing a business plan (if spin-off)
- Creating an internal management team (if spin-off)
- Executing the spin-off or license

RTI approach is to make substantial investments in technologies being commercialized (fewer, but better funded projects)

Best Commercialization Mode

Although there are a wide variety of transaction types in each industry, different sectors tend toward preferred mechanisms for implementing technology from external sources:

- Electronics – start-ups
- Energy, Chemicals – licenses, partnerships
- Pharmaceuticals – start-ups, licenses, partnerships

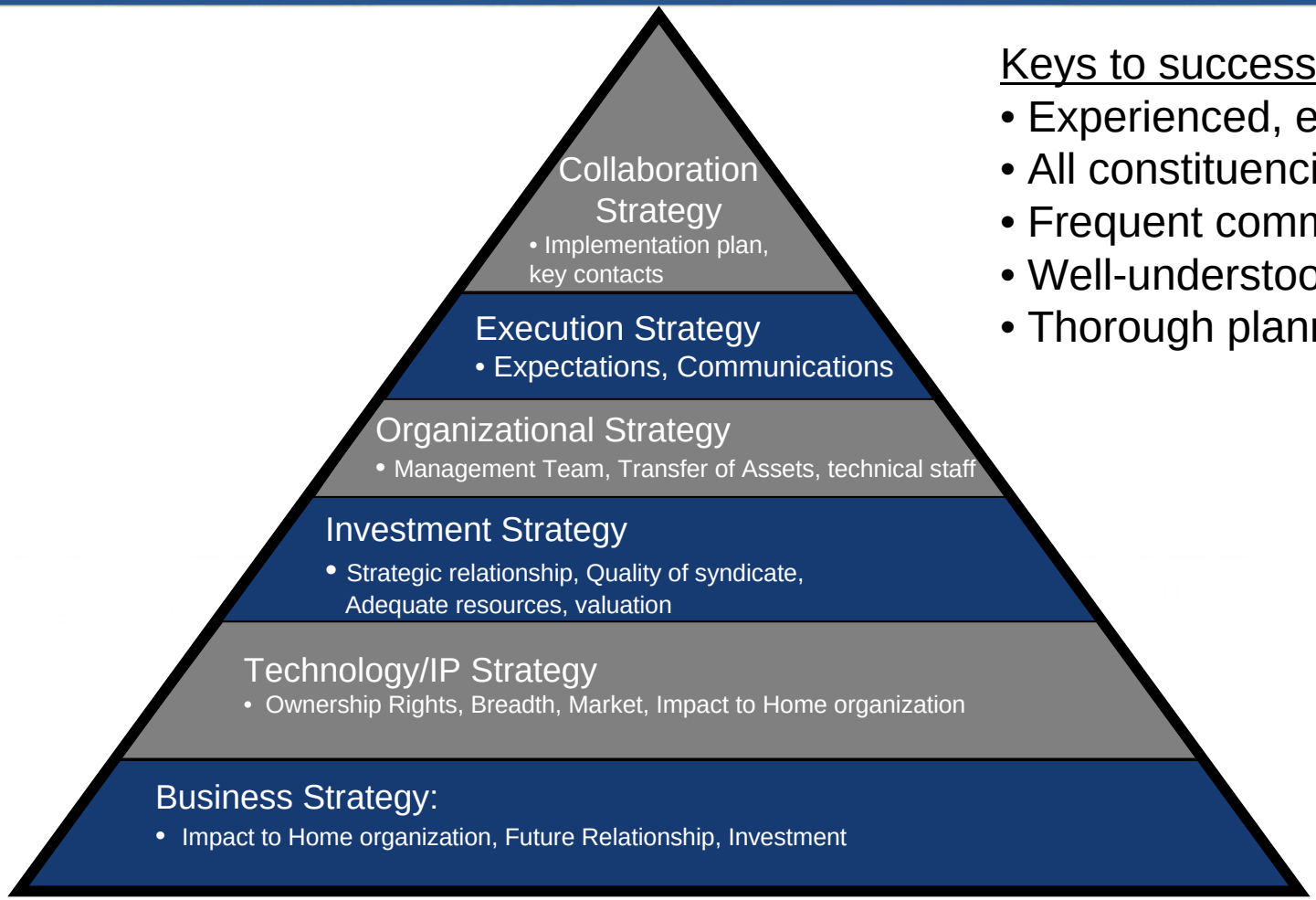
⇨ The approach has to be compatible with practices in the sectors in which we intend to commercialize

Best Commercialization Mode

Considerations used at RTI for choosing Spin-Off vs. License

Criterion	Indicates License	Indicates Spin Out
Addressable Market size	<$1 Billion	> $1 Billion
Technical Scope	Narrow; can be part of a much larger system	Broad technical platform; multiple end uses
Technology Development Risk	Commercialization path is lengthy and/or includes significant regulatory hurdles; development costs are large and/or difficult to quantify	Costs to commercialize well defined and tolerable within anticipated internal rate of return (IRR)

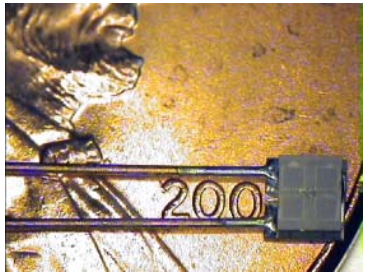
Execution of the Spin-Off: Critical Considerations for Success



Keys to successful execution:

- Experienced, empowered team
- All constituencies represented
- Frequent communication
- Well-understood boundaries
- Thorough planning

Case Study: Nextreme™



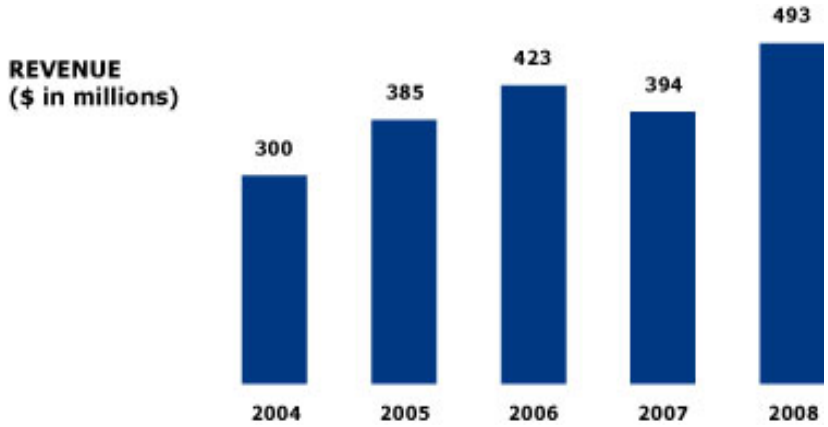
- Background:
  - 1992 DARPA/ONR initial funded work
  - RTI identified novel superlattice material with highest efficiency ever observed
  - Spun off from RTI in 2004
- Thermoelectric technology converts heat into electricity, or acts as a solid state heat pump to rapidly cool or heat surfaces
- Meets need in advanced electronics for “hot spot” cooling; is an emerging green technology for recovery of waste heat to produce power and improve energy efficiency
- Over $27M USD raised in venture capital in two rounds
- Manufacturing and Engineering moved out of RTI to create the company; basic materials R&D remained at RTI.

University (non-RTI) Case Study: CREE Inc.

- Technology:
  - SiC and other wide band gap semiconductors for solid-state lighting and other applications
- Founded in 1987 by students and a post doc from North Carolina State University
- Obtained exclusive, worldwide rights to the relevant IP and limited access to university labs in exchange for funding the patent costs and providing a 5% stake in Cree to NC State
- Initially funded by $1.2M of private equity capital. All subsequent funding provided by private equity.

Case Study: CREE Inc.

- $10 million IPO on NASDAQ in 1993
- Today: 3200 employees
  $500 million annual sales
  $2.4 billion market capitalization



Summary

- Technology-based spin-offs are hard work, but can be very rewarding for the organization on a number of levels; many of the benefits are not financial ones
- Good processes and clear internal communication are keys to good execution and successful outcomes
- Experience is critical; the process can be streamlined considerably when an organization has completed the process multiple times

Creating Technology –based Spin-off Companies-David Myers

Presentation Link:

www.rti.org/technology

Questions?

ziptronix

unitive ELECTRONICS INC.

Nextreme THERMAL SOLUTIONS

CRONOS INTEGRATED MICROSYSTEMS INC.

SiXIS

Back up slides

Executing the Spin-Off

There are several critical decisions essential to a successful outcome, all of which need consideration:

- Business Strategy
- Technology Strategy and Intellectual Property rights
- Investment Strategy and Funding Methods
- Organizational Strategy-People, Place and Things
- Exit Strategy-Impact and Operational
- Collaboration Strategy
- Internal decision making process of Spin-Off

Executing the Spin-Off

A few thoughts to consider before starting out…

- <u>Business Strategy/Model</u>
  - Impact that the spin-off will have on the home organization (depletion of key management or technical skills)
  - Relationship between the home organization and the new entity at the outset, and after a potential sale, IPO, or bankruptcy
  - Level of cash investment to be made in the new entity

Executing the Spin-Off

- <u>Technology and IP Strategy</u>

  Think over at very beginning…..

  - Typical sticking points are driven by the need for the new company to have sufficient freedom to operate, versus the parent organization desire to continue doing research
  - Breadth of technology and patent coverage
    - Technology definitions
    - Market scope
    - Geographical coverage
  - Rights to future inventions, improvements
  - Rights for home organization to use for R&D purposes
  - Consider impact future R&D programs at home organization

Executing the Spin-Off

- <u>Investment Strategy:</u>
  - Seek a strategic relationship; helps to get over the rough spots
  - Will add quality to the board, better decisions
    - Relevant investment experience in the space
    - Industry knowledge and contacts
  - Funding adequate for multiple funding rounds if needed

Executing the Spin-Off

- Organizational Strategy
  - Management team
    - The right CEO is critical to execute the creation of the new company and to drive it towards success
    - Good compatibility with the home organization, potential investors, and the key technical staff is critical. This can be very difficult to achieve, but is a major success factor.
  - Transfer of critical assets
  - Professional Staff

Executing the Spin-Off

- <u>Execution Strategy:</u>
  - Manage expectations with investors, staff exiting with the company, and home organization senior management
  - Keep all functional areas involved and aware of the key dates (human resources, benefits, security, …)

Executing the Spin-Off

- <u>Collaboration Strategy-Post Spin-Off</u>
  - A comprehensive plan should be developed which sets out the timing and responsibility for specific activities after the spin-off occurs. *Anything not planned for will likely cause problems later*.
  - A key point of contact should be established for both the home organization and the new company post-spin, for handling routine work and any issues which arise.
  - Frequent meetings between senior executives on both sides maintains perspective, and trust.

Executing the Spin-Off

- <u>Internal Decision Making Process (Spin-off)</u>
  - A high level of experience, and empowerment, is critical for the team executing the spin-off
  - All major constituencies should be represented (R&D, legal, human resources, security, IT, finance…)
  - Team members must communicate frequently within their own chain-of-command to ensure senior executives remain informed and supportive
  - Negotiation strategy (and boundaries) has to be agreed upon in advance