



Translating research into commercial value: some realities, some myths

Angus Kingon

University Professor of
Entrepreneurship and Organizational
Studies

Professor of Engineering

angus@brown.edu



Starting question

How well are we (as universities) doing in converting the investment in science and technology into direct commercial and social value??



Commercialization prowess

- Distinctly different views of the record of the research universities in commercialization of emerging science and engineering:
 - ✓ Patents, licenses, startups
 - ? “It’s not our job”
 - XX Commercialization impact low relative to the investment in science and engineering research
- Perspective is important, as in determines whether commercialization activities represent a “full court press” or simply a sideline activity



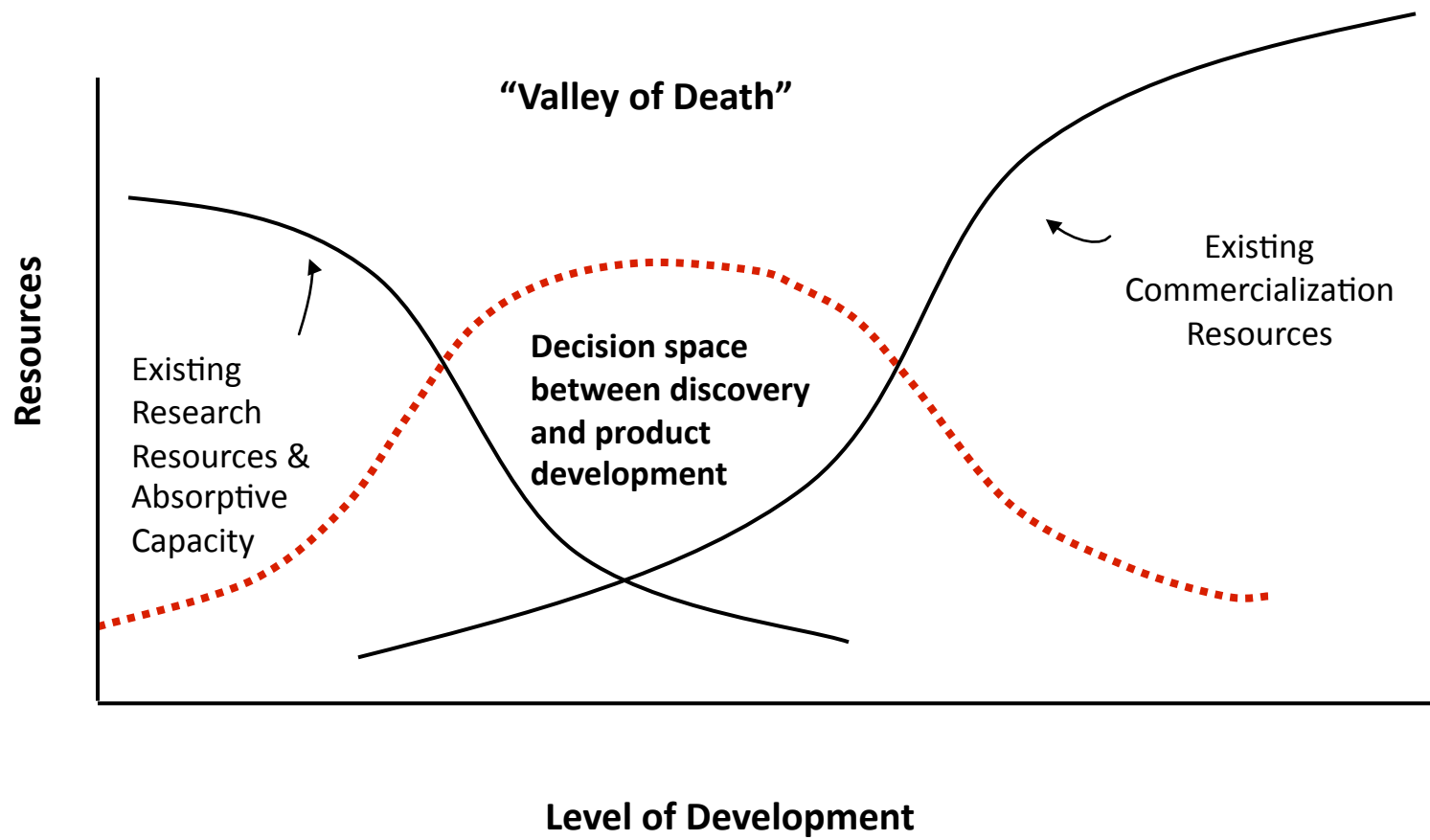
Commercialization

- Requires translation or transformation of an innovation from the domain of science and engineering into the commercial domain
- ‘Transformative science’ is insufficient
- Continuous capability through this spectrum
- ‘Valley of Death’ analogy reflects the lack of university expertise across the entire spectrum



The Valley of Death

Gap between Research and Commercial Application: Little support for the iterative process linking technologies and markets





Two key points

1. The commercialization process: helpful to break down into key milestones



Key milestones

Innovations

→ Product idea

→ Business Opportunity

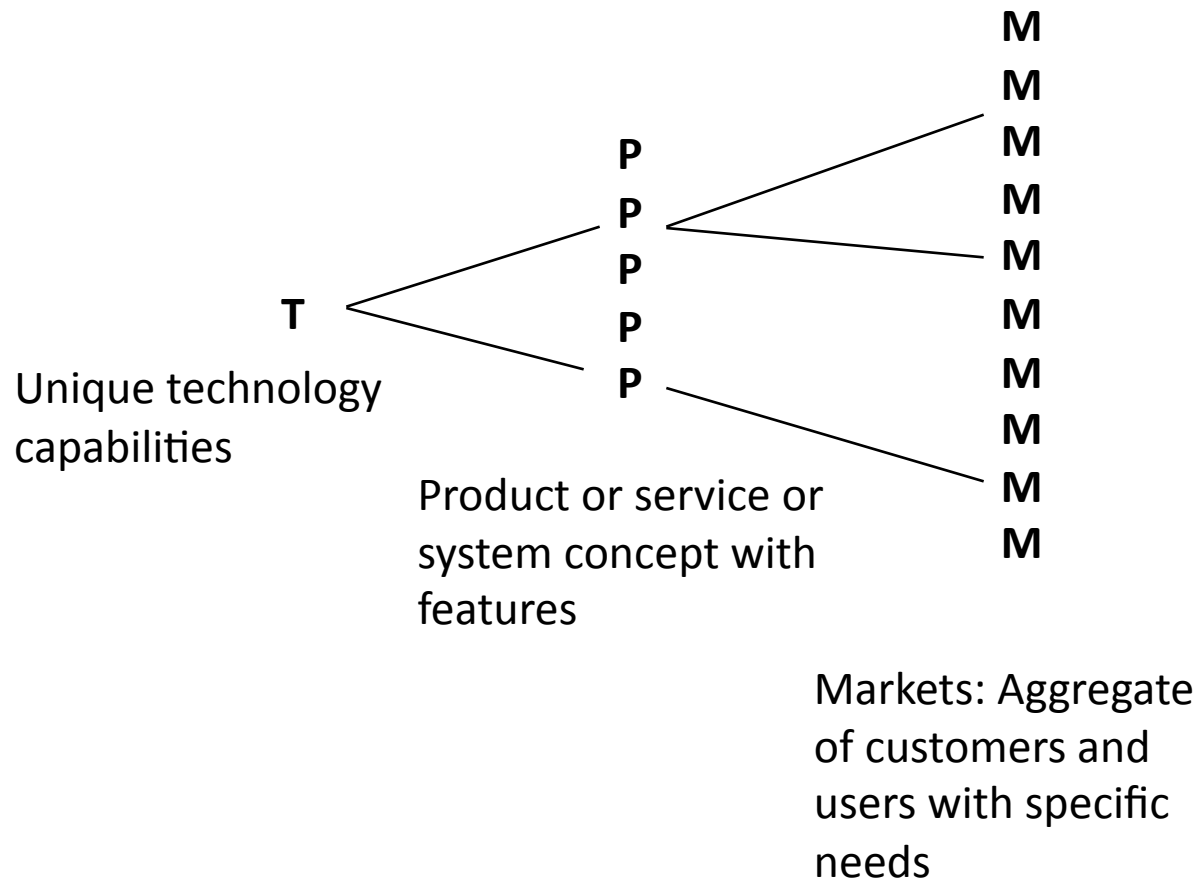
→ Business case



2. A useful conceptual framework

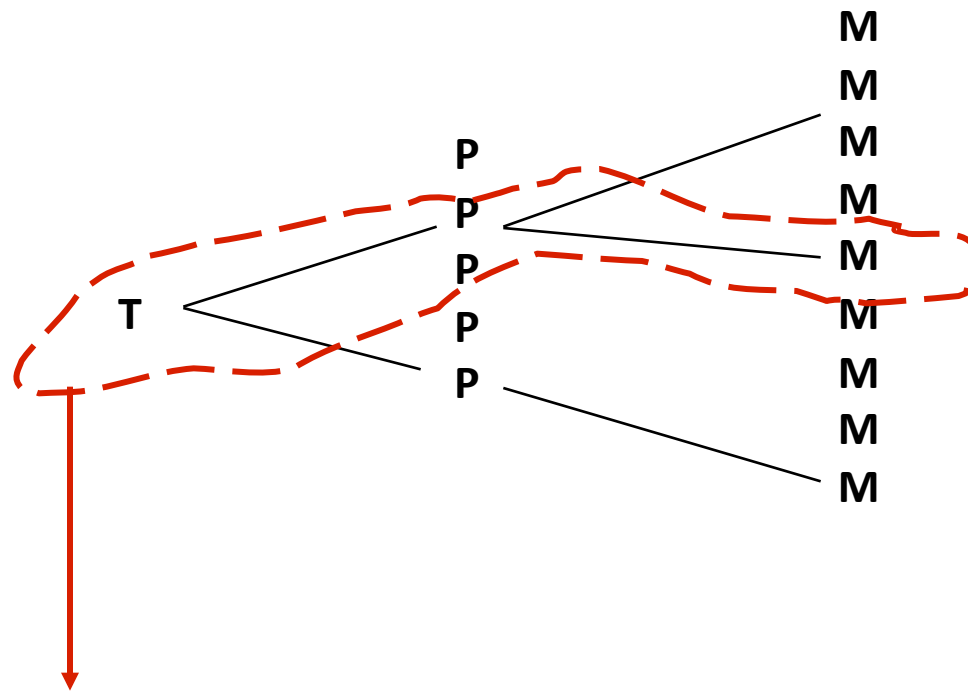


The TPM framework





Technology - Product - Market Linkages

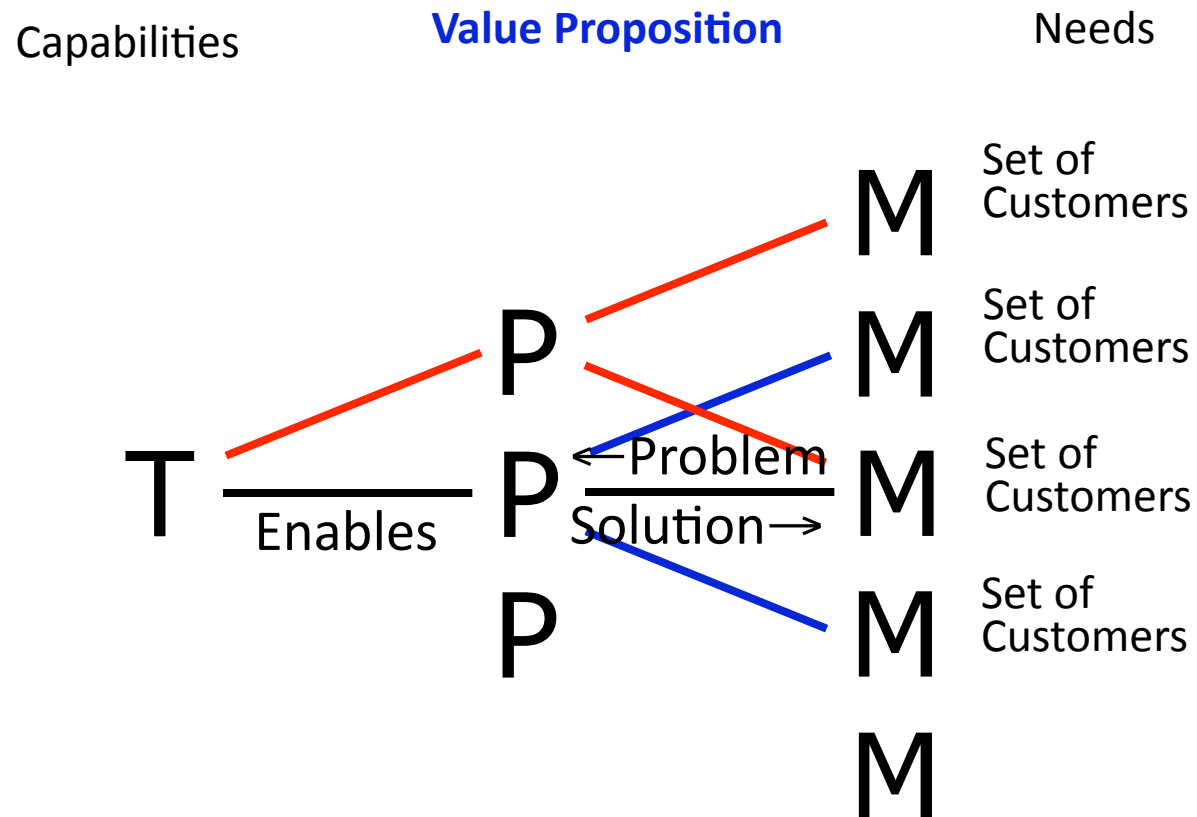


The cornerstone for the Business Case



Building a Value Proposition

The T-P-M logic is the foundation for any company's Value Proposition. The value proposition helps determine if there is a viable business opportunity





TPM Framework: Comments

- Most basic building block for the business case
- Technology push must be converted into market pull
- Requires knowledge that spans from innovations to market need (even at the conceptual stage)
- Who do we rely upon to create the product concepts??



Two Rich Opportunities

1. Increase the pipeline of creative product/service/system concepts based upon the innovative science and technology
2. Ensure there is greater capability to undertake the process from innovation to concepts to opportunities to business case

I will briefly give two specific examples



The TEC Program

- Technology Entrepreneurship and Commercialization Program
- Teaching MBAs and PhD students to undertake the entire process through guided experiential learning
- Implemented as a two-course sequence at NC State University



The TEC Program: Impact

- Various metrics
- Projects resulted in:
 - Approximately 600 jobs
 - Raised about \$225 million in venture capital
 - A new generation of young PhDs skilled in science and commercialization
- Successfully adapted for use in other parts of the US and world



Example 2: 'Ideation Workshops'

- Part of NSF project entitled "National Partnership for Creating Value from Upstream Innovation: The case of nanoscience and technology"
- Prime the idea pipeline
- Single day or 1.5 day format that involves innovative faculty and industry partners
- Efficient, structured and facilitated format to create a portfolio of new product ideas from the pool of science and technology



Ideation Workshops: Impact

- Supplements the usual “Industry Days” and similar existing formats
- Result in viable new concepts that impact faculty research
- Method for ‘inventorying’ the science
- Specific collaborative projects result
- Method to ‘connect’ faculty and industry partners around an embryonic idea
- Provides perspective for faculty, graduate students and post-docs
- Method for industry partners to understand the unique center capabilities



Conclusions

1. There are rich opportunities to substantially facilitate the commercialization of science and engineering innovations
2. Increase the number of faculty and graduate students who have real skills in 'crossing the valley of death'
3. Significantly increase the pipeline of product and business opportunities that are being developed from the innovations



ADDITIONAL SLIDES



Commercialization: Two cases

- Science or engineering innovations:
 - Commercialize in collaboration with existing companies
 - Commercialize as a new venture
- This should be a strategic choice, with capability to accomplish by either route
- Both routes require the *business opportunity* to be articulated, at a minimum



The process of commercialization

- Two cases:
 - The need is well identified (Examples)
- OR
- There is a science or engineering innovation without clear knowledge of the commercial products or services (Examples)



Engineering Research Centers

- System-level focus, assume that there is a business opportunity
- Also opportunities for new product or service concepts