University Industry
Demonstration Partnership

Session #: UIDP Metrics Workshop

Portfolio Metrics for University – Industry Engagement

Steven T. Perri
External Innovation Technology Manager
Eastman Chemical Company

Sept. 26, 2017
UIDP Meeting, Detroit, MI

Outline

- A Look at Eastman
- External Collaboration Motivation
- University Network Model
- Project Outputs
  - Active Projects
  - Closed Projects
- How We Share Learnings and Benefits

A look at Eastman

Who we are

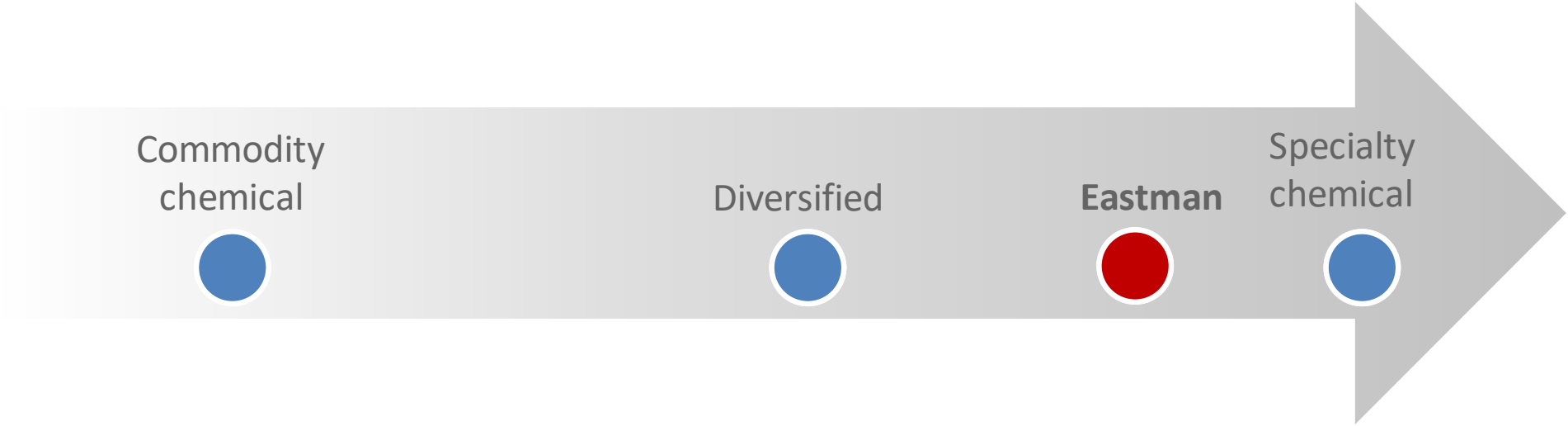
- Headquartered in Kingsport, Tennessee
- Spin-out that has been publicly traded (NYSE:EMN) since 1994
- 2016 revenue of $9 billion
- Approximately 14,000 employees and over 50 manufacturing sites around the globe
- Serving customers in approximately 100 countries
- A company dedicated to environmental stewardship, social responsibility, and economic growth
- 2017 ENERGY STAR® Partner of the Year Sustained Excellence
- Ethisphere's 2017 World's Most Ethical Companies® award
- 2016 Glassdoor Employees' Choice Best Places to Work (# 11)

Our manufacturing locations

Anniston, AL
Antwerp, Belgium
Canoga Park, CA
Chestertown, MD
Columbia, SC
Dresden, Germany
Fengxian, China
Fieldale, VA
Franklin, VA
Ghent, Belgium
Hefei, China
Indianapolis, IN
Itupeva, Brazil
Jefferson, PA
Jurong Island, Singapore
Kashima, Japan
★ **Kingsport, TN**
Kohtla-Järve, Estonia
Kuantan, Malaysia
Lemoyne, AL
Leuna, Germany
Linden, NJ
Longview, TX
Martinsville, VA
Middelburg, The Netherlands
Monongahela, PA
Nanjing, China
Newport, Wales
Nienburg, Germany
Oulu, Finland
Pace, Florida
Santo Toribio, Mexico
São Paulo Mauá, Brazil
Sauget, IL
Shenzhen, China
Springfield, MA
St Gabriel, Louisiana
Sun Prairie, WI
Suzhou, China
Texas City, TX
Trenton, MI
Ulsan, Korea
Uruapan, Mexico
Watertown, NY
Wuhan, China
Yixing City, China
Zibo, China

Eastman: A portfolio of specialty businesses

- Consistent, superior earnings growth
- Leading positions in diverse, attractive end-markets
- Innovative technology platforms
- Management track record of outperformance



External collaboration motivations

Motivation - Innovation acceleration and value creation with universities

- Accelerate innovation
  - Save time by collaboration rather than build expertise in-house
  - Leverage university resources for rapid execution
  - Access specialized facilities, faculty and students
- Cultural shift from commodity to specialty
  - Drive projects to align with corporate strategy
- Drive new business & customer insights
  - Defend and expand existing businesses
  - Deliver value to customers/engage the market
  - Attract new customers
- Increase brand value
  - Data-driven valuations and impact in attracting talent

New university engagement model

Eastman university partnership strategy – An equation for success

EASTMAN + NORTH CAROLINA STATE UNIVERSITY + UNIVERSITY OF NORTH CAROLINA CHAPEL HILL + THE UNIVERSITY OF TENNESSEE 1794 = **Cooperation & growth**

- Multi-year, multi-million dollar collaborations with NCSU,UNC and UT
- Collaborations across >16 departments and three universities
- Eastman Innovation Center with employees located on campus at NCSU Centennial Campus
- Network University partnerships with UNC and UT
- Over 36 projects running in parallel at steady state

Open innovation principles

Why?

- Access to additional 'Mind-Share' as well as diversity – of thought, skill, and experience
- Use others' (existing) resources rather than build it - reduces risk & cost
- Support corporate strategy and business needs in a rapidly changing environment
- Help expedite internal programs if internal resources are committed to short term needs
- Find new talent

Vision

- Company center of expertise to seek out technical objectives in rapid analysis of market needs and prototyping of possible solutions
- Key component is part of broader external engagement strategy that involves fewer, deeper relationships
- Our partnership becomes a model for how to partner

Key elements of external collaborations

- Master research agreement establishing key terms of engagement and pre-defined terms for IP resulting from sponsored research work
- RFP process to solicit proposals (includes feasibility studies and 1-3 yr projects)
- Non-disclosure and publication review provisions
- Single points of contact and joint steering team

Eastman university network

Eastman Centers of Excellence:

- NC State

Innovation Network Schools

- University of North Carolina Chapel Hill
- University of Tennessee

University Sponsored Research Projects:

- Multiple universities in the US with individual research groups
- Multiple universities OUS with individual research groups

Public Funding – State & Federal

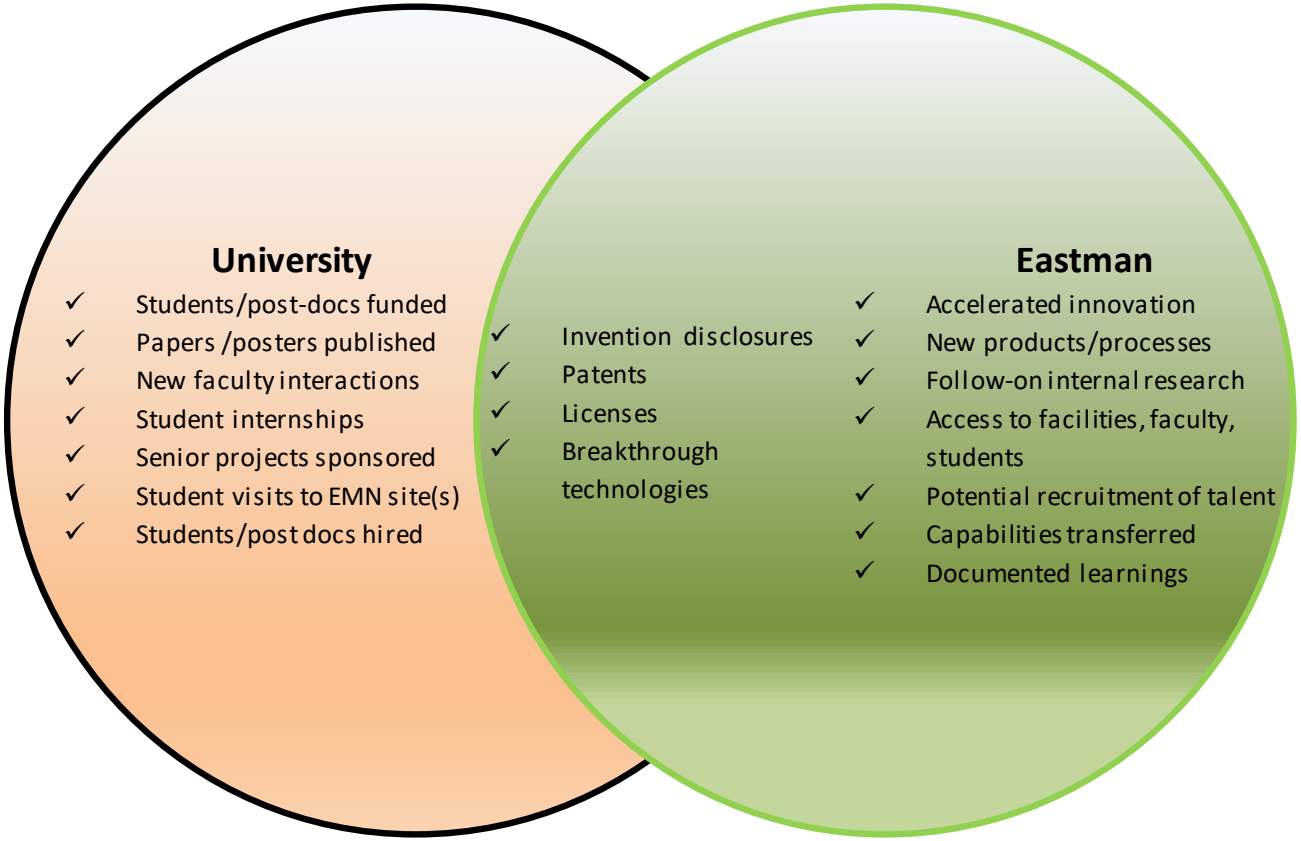
- Horizon 2-3 Developments
- Consortia and Institutes (SORT at UT Austin; NextFlex, Textiles, ASSIST)

Focus Schools & Community:

- Recruiting
- PhD Fellowships
- On Campus Student Organization Support

Project outputs

Eastman university network



Adapted from: UIDP Project Webinar: U-I Collaboration Metrics
December 15, 2015

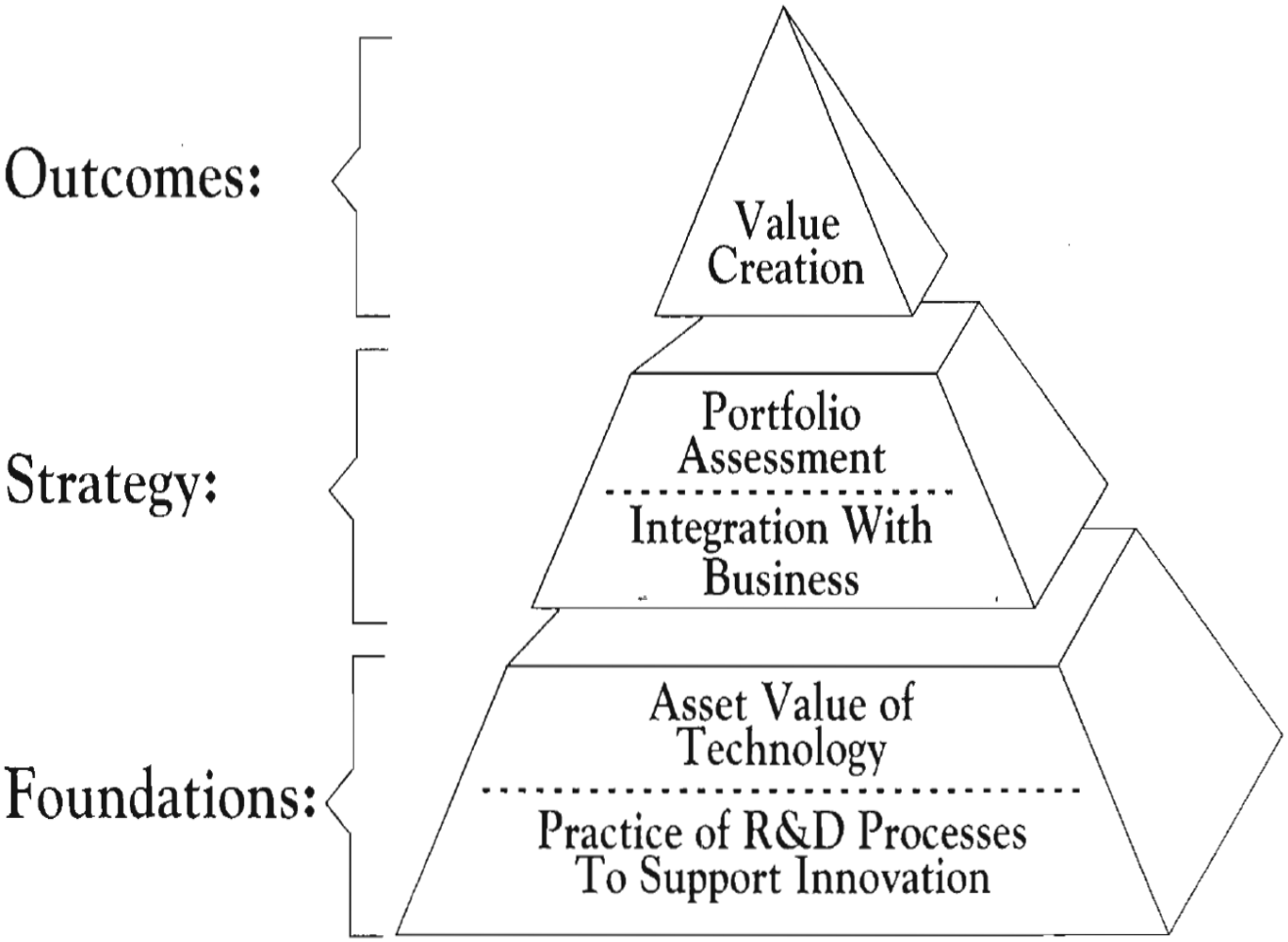
UIDP Metrics Study
Quick Guide Resource* – > 40 suggested attributes

University	Company
Strategic partnership (8)	Strategic partnership (8)
Involvement with researchers (7)	Involvement with researchers (7)
Involvement with students (7)	Involvement with students (11)
Access to resources (6)	Access to resources (4)
Involvement in centers & consortia (8)	Involvement in centers & consortia (6)
Economic development (5)	Economic development (5)
Marketing (3)	Marketing (4)

*Document available at www.uidp.org/wp-content/uploads/documents/Metrics-Quick-Guide-091516.pdf is not final
Consult website for updated information in 2017

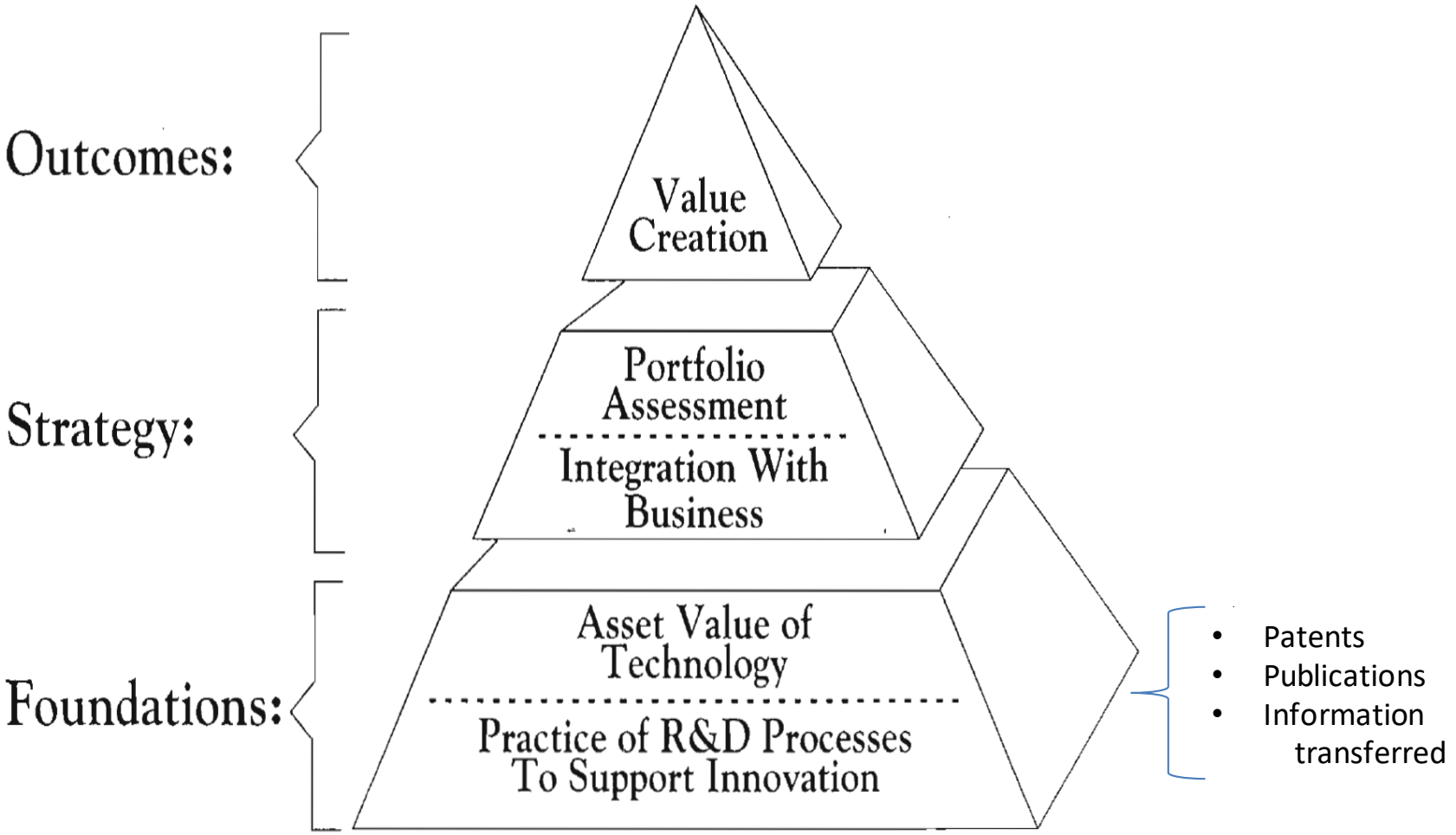
Value creation from engagement

Proposed value creation measures



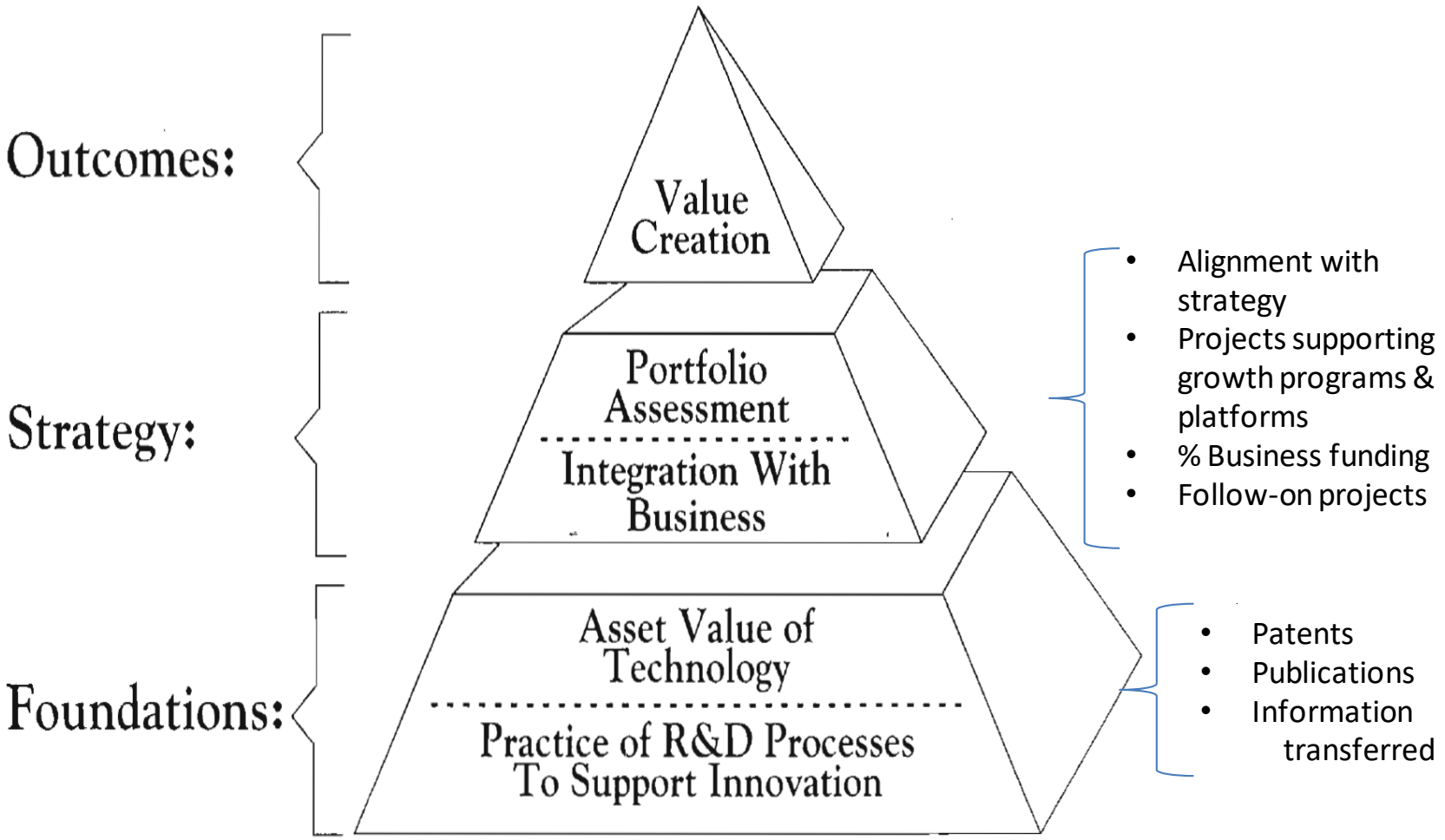
Acknowledgements: IRI ROR Technology Value Pyramid

Proposed value creation measures



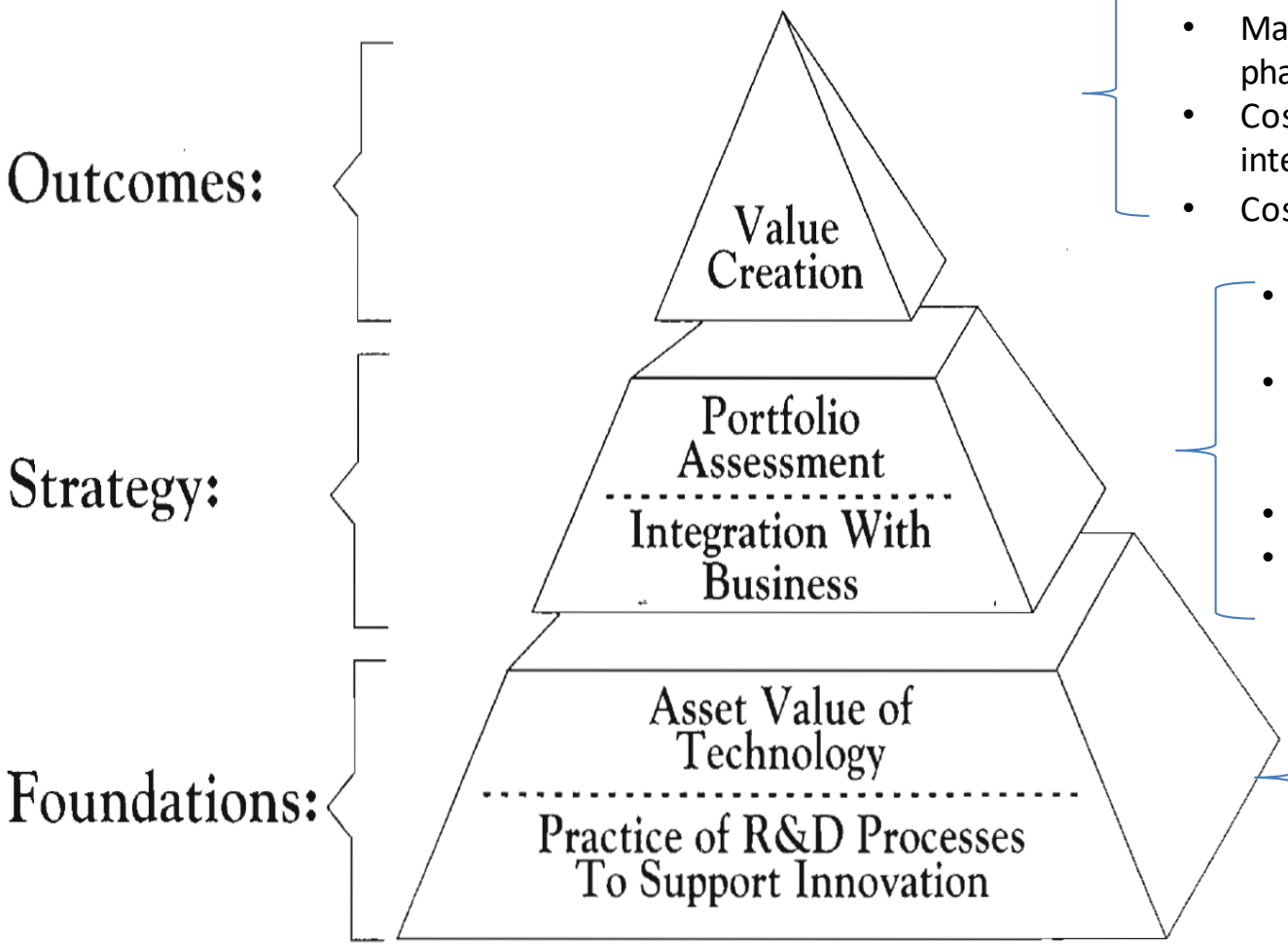
Acknowledgements: IRI ROR Technology Value Pyramid

Proposed value creation measures



Acknowledgements: IRI ROR Technology Value Pyramid

Proposed value creation measures

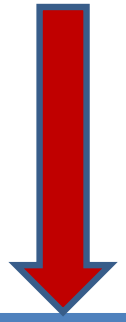


Acknowledgements: IRI ROR Technology Value Pyramid

How to value projects at different stages

Portfolio valuation approach

Phase 1



Active projects assessment
Portfolio market and technology fit
Portfolio maturity
Portfolio valuation

Manage in Excel sheet

Time

Portfolio valuation approach

Completed project outcomes
Project technical success
Value creation
Effectiveness of the engagement
Level of researcher engagement
Level of student or postdoc engagement
Access to university resources
Economic benefit
Marketing/brand visibility impact

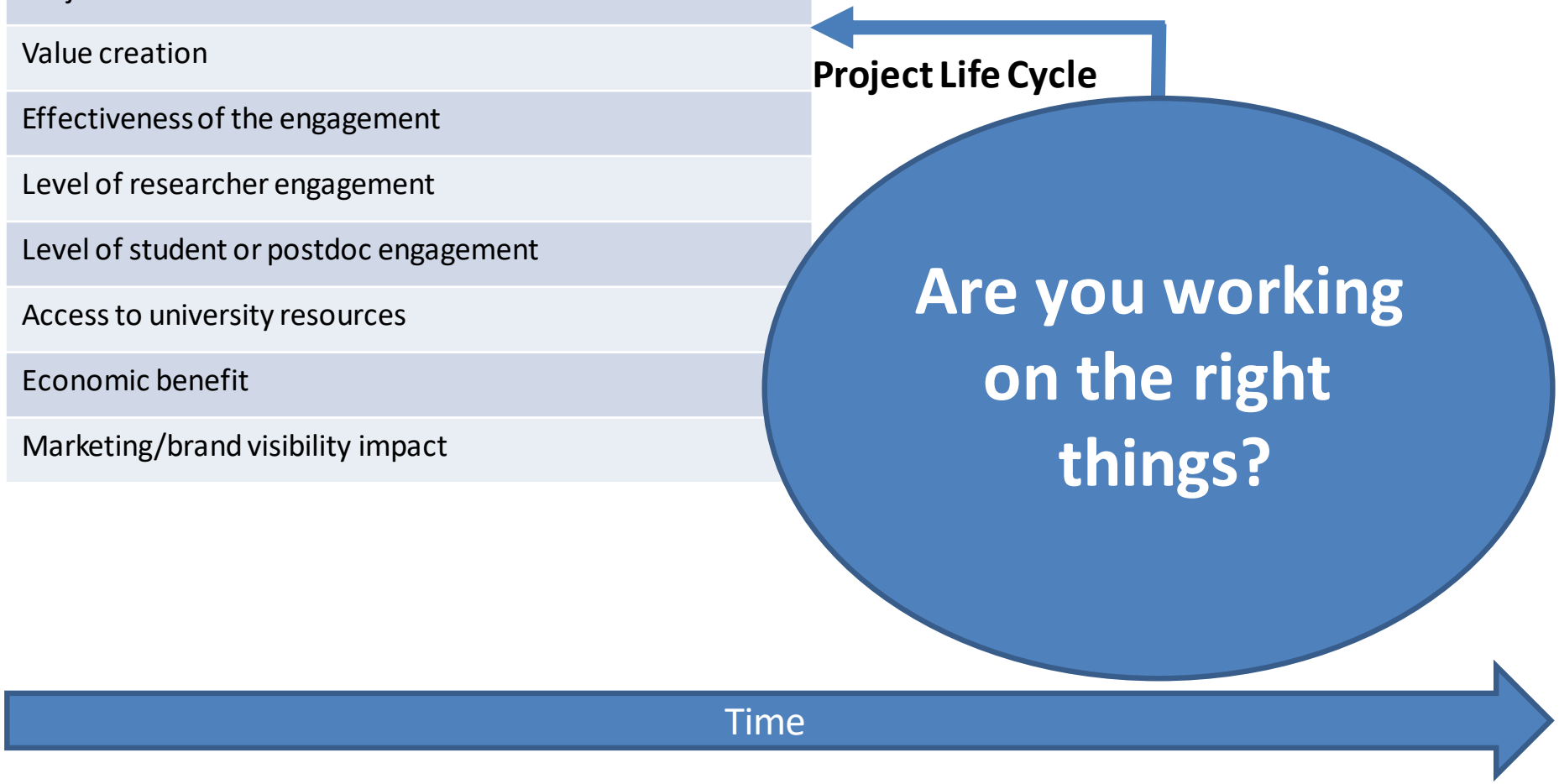
Phase 2

Hard to get without surveying or multiple sources

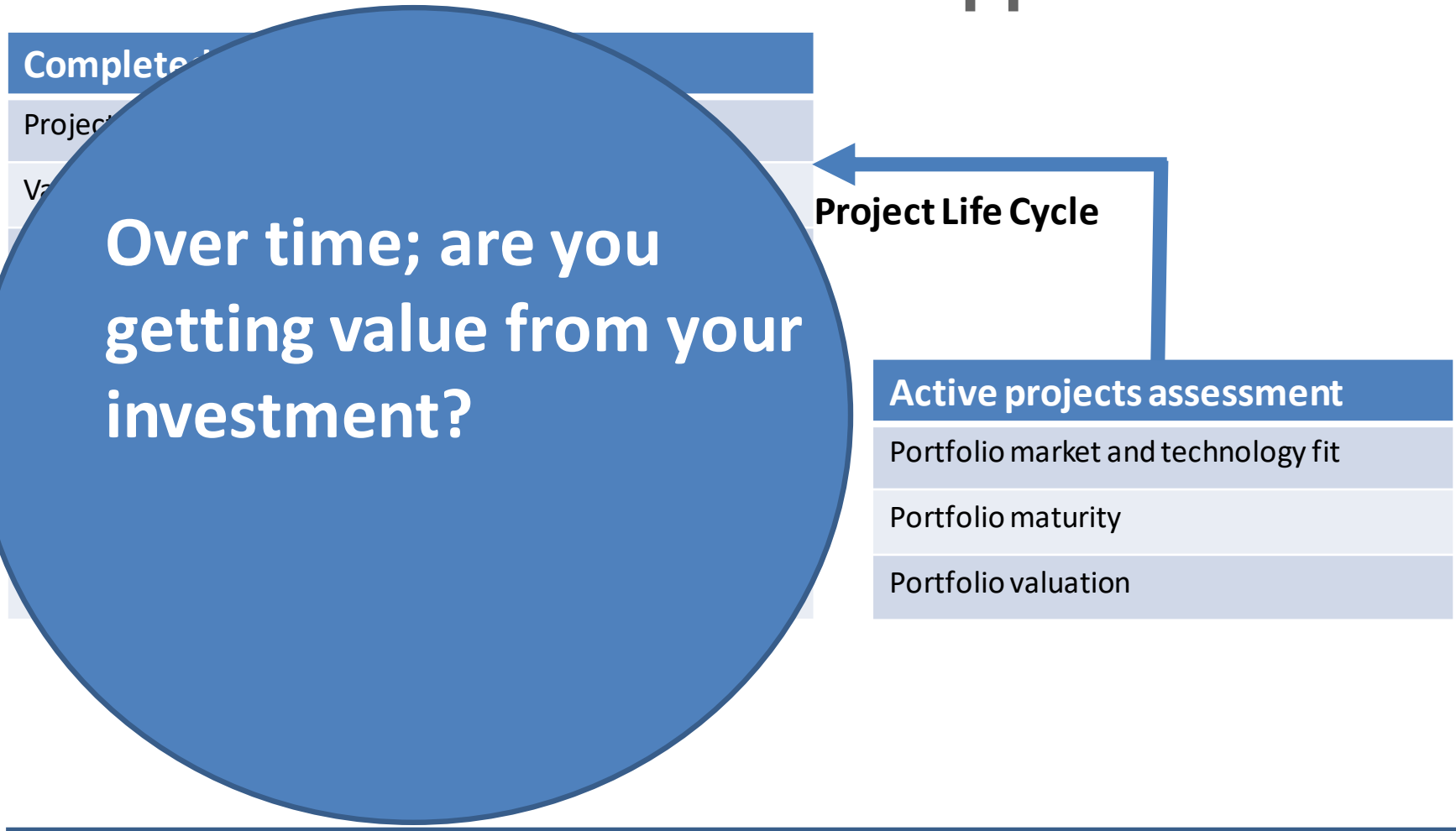
Time

Portfolio valuation approach

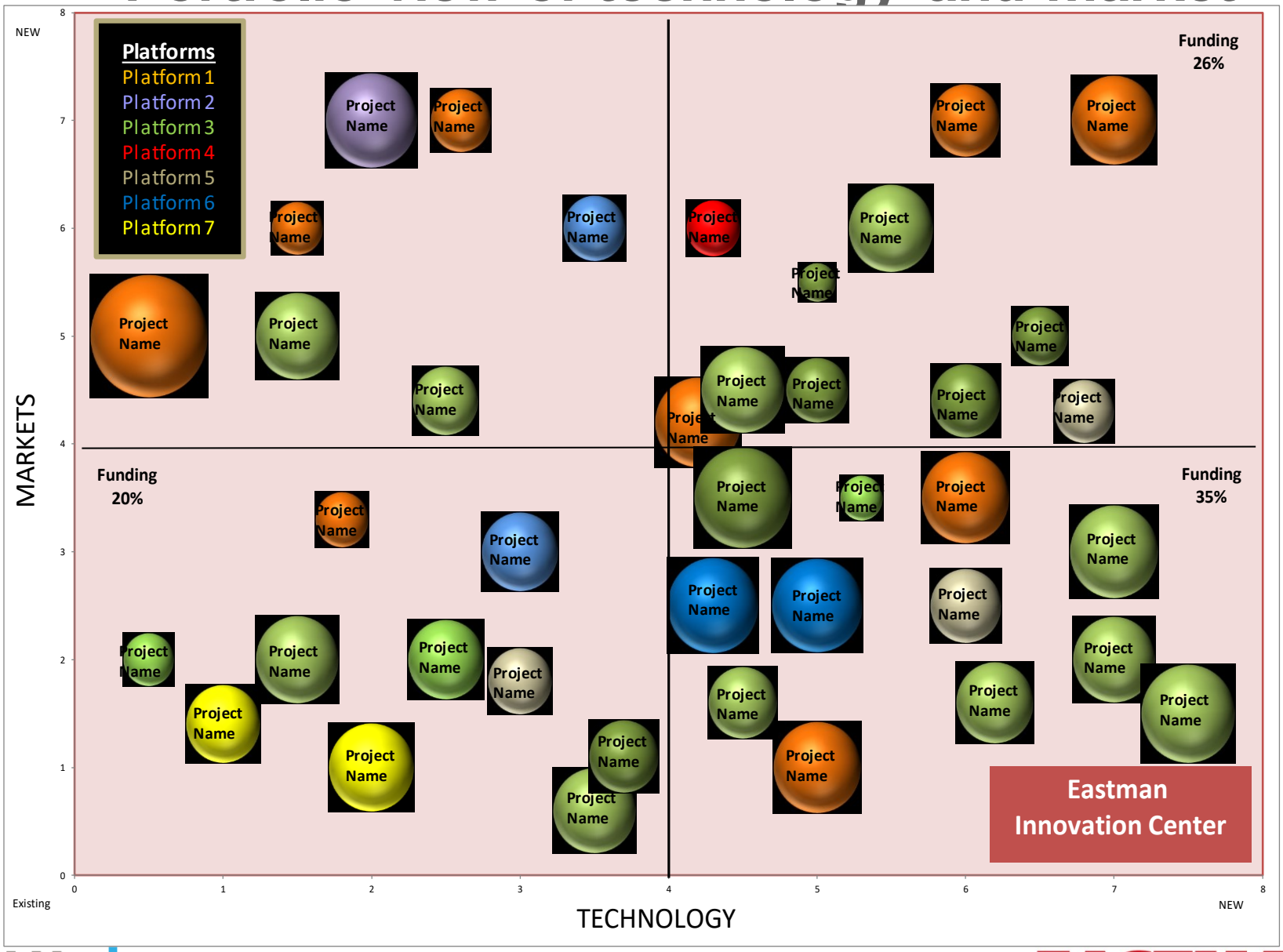
Completed project outcomes
Project technical success
Value creation
Effectiveness of the engagement
Level of researcher engagement
Level of student or postdoc engagement
Access to university resources
Economic benefit
Marketing/brand visibility impact



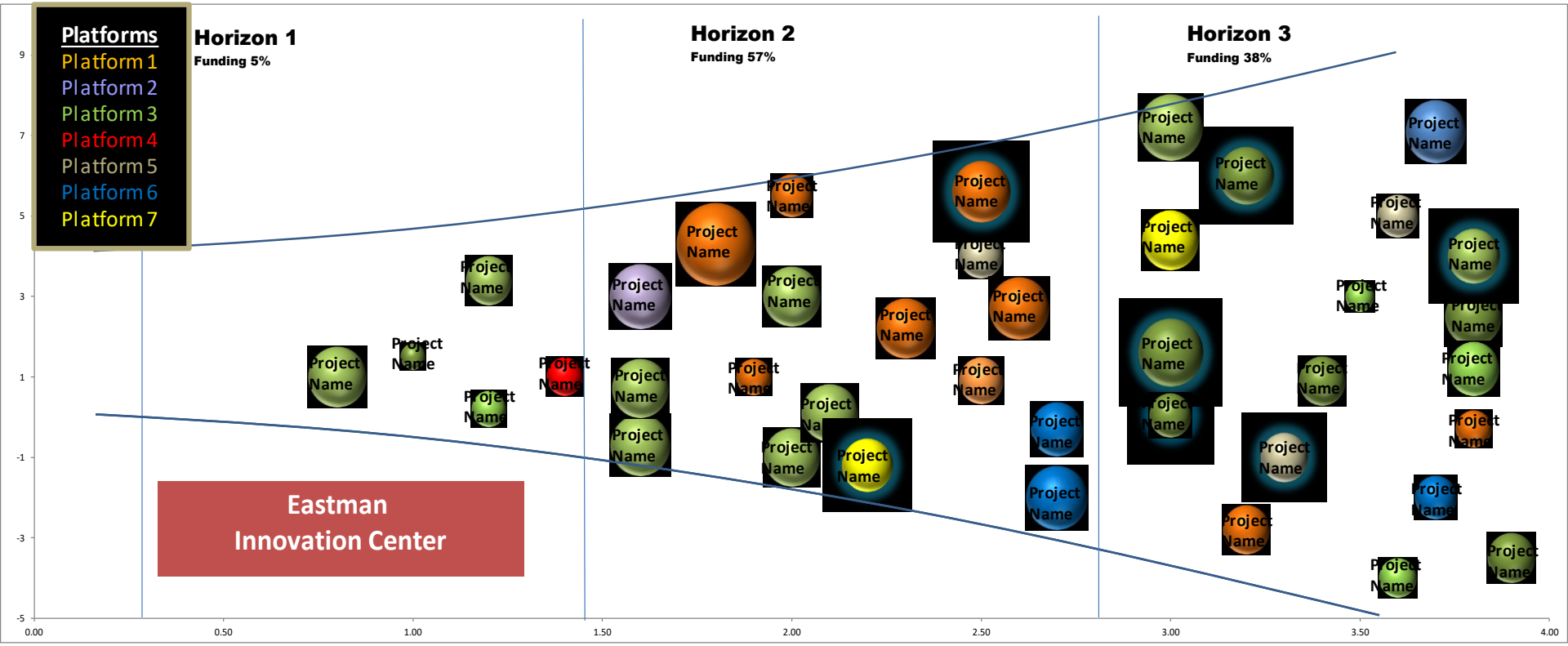
Portfolio valuation approach



Portfolio view of technology and market

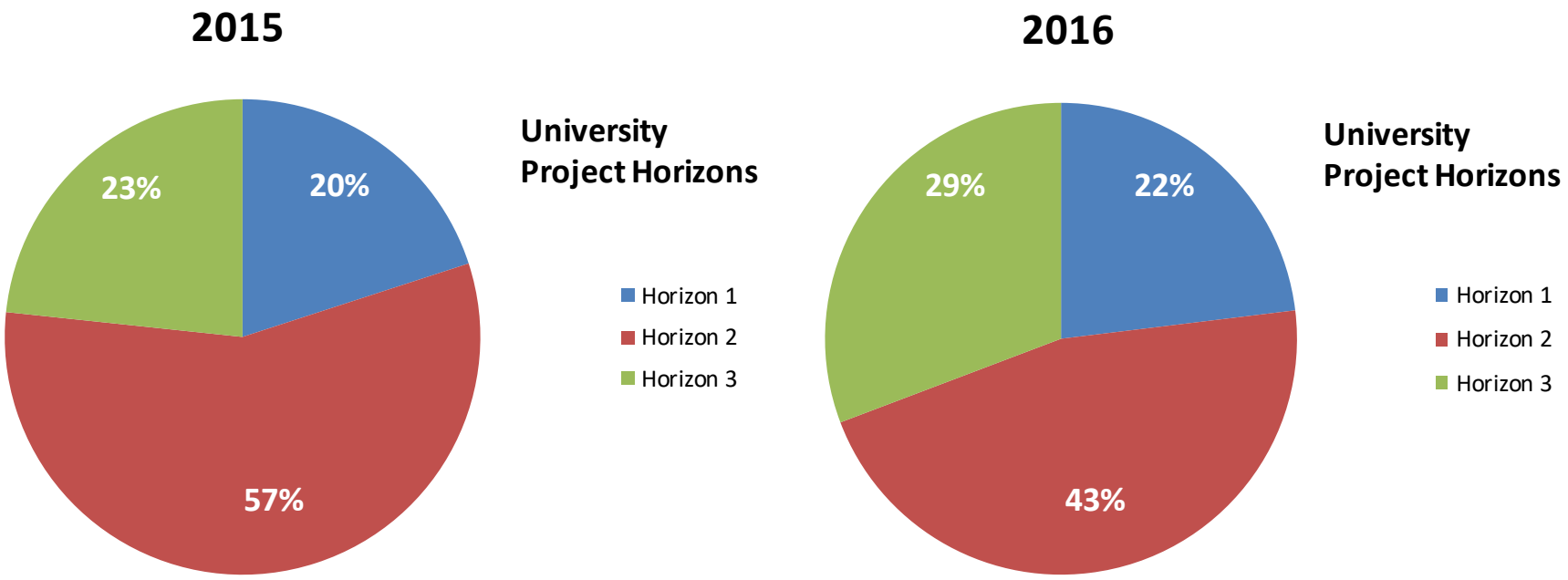


Portfolio technology readiness



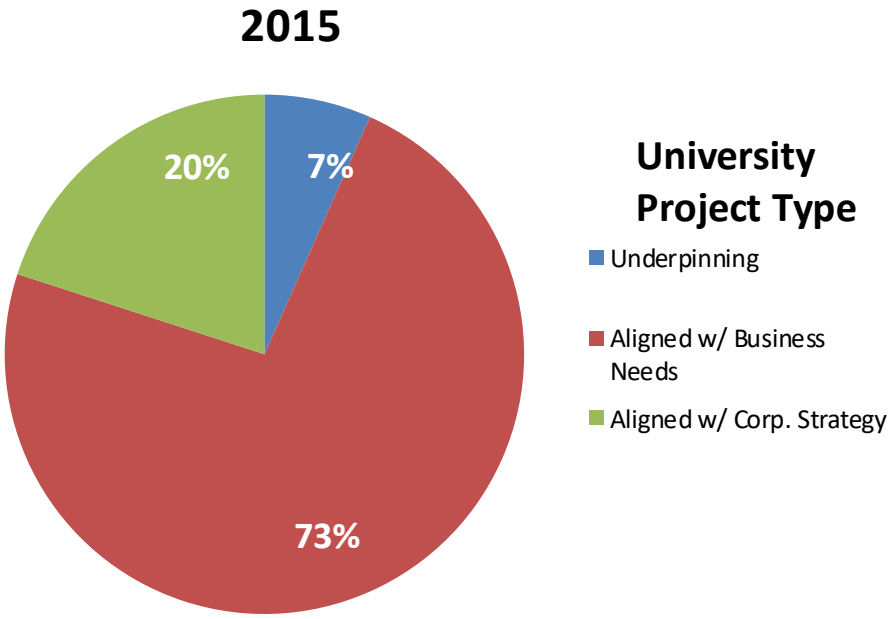
Time/yrs

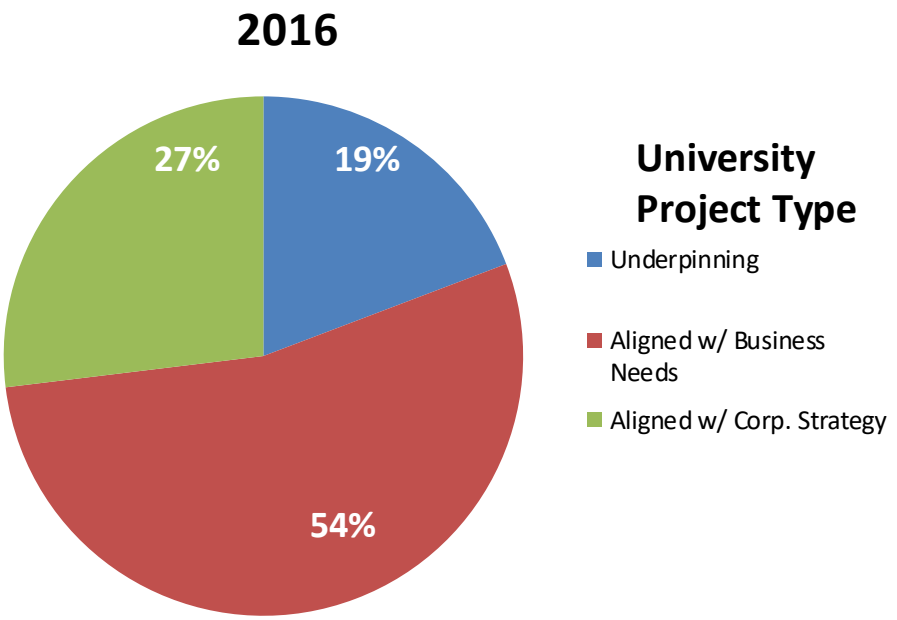
Project horizons



Change in portfolio horizons as a percentage of number of projects

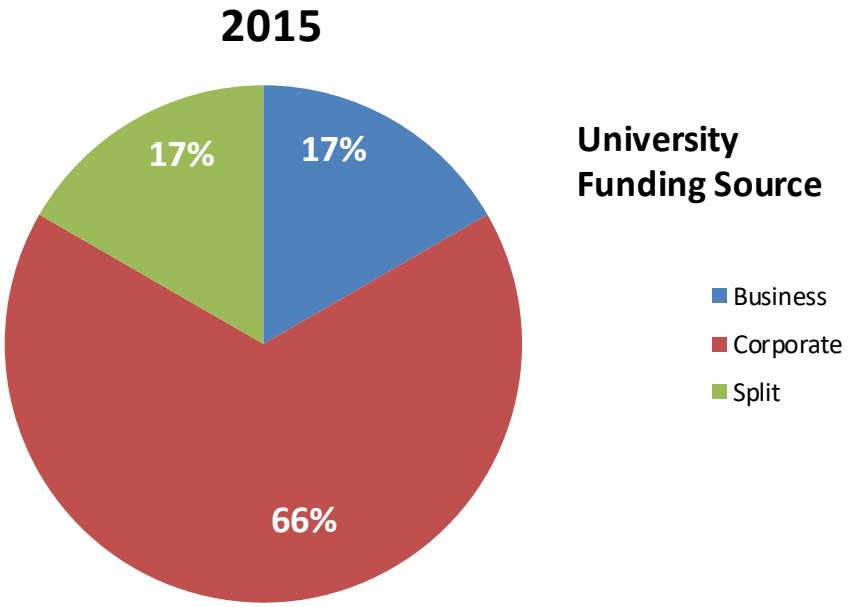
Project alignment

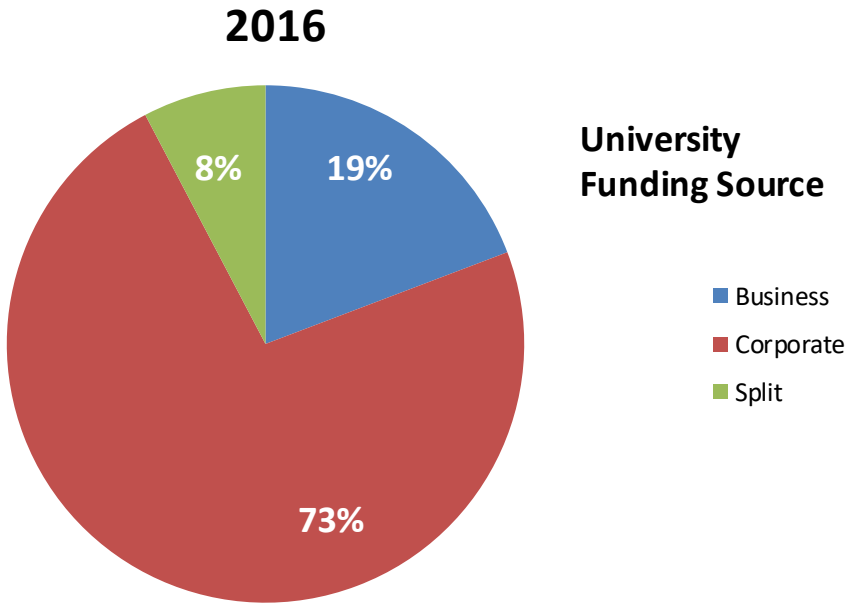




Change in portfolio as a percentage of project alignment category

Project funding





Change in portfolio as a percentage of funding sources

Strategic alignment: matrix table of top projects

Market Segment

Technology Platform

Program Area	Segment 1	Segment 2	Segment 3	Segment 4
Program 1	Project A	Project B	Project C	
Program 2		Project D		Project E
Program 3	Project F	Project G		
Program 4			Project H	Project I
Program 5		Project J		

Strategic alignment: matrix table of top projects

Market Segment

Technology Platform

Program Area	Segment 1	Segment 2	Segment 3	Segment 4
Program 1	Project A	Project B	Project C	
Program 2		Project D		Project E
Program 3	Project F	Project G		
Program 4			Project H	Project I
Program 5		Project J		

Hypothetical listing of projects where university projects are related to internal initiatives
Different colors can depict certain attributes (ie. different universities)

Estimated project values of active projects*

	Research Cost Savings	Projects w/ NPVs	Projects w/ ACS	Projects w/ Earnings	Potential Licensing Oppty's	Projects w/ New Sales	Projects w/ Market Oppty
2015	$ M	$ M	$ M	$ M	X	$ M	$ M
2016	$ M	$ M	$ M	$ M	X	$ M	$ M
2017	$ M	$ M	$ M	$ M	X	$ M	$ M

Potential impact to bottom line

Total Portfolio value:
(Sum of NPV, ACS and Earnings)

2015 ~$ M
2016 ~$ M
2017 ~$ M

Research Cost Savings: ability to do projects faster or avoid work based on funded work. This is usually assigned to projects that have a lot of uncertainty in terms of how to value it
NPV's: projects with a calculated or estimated NPV
ACS: projects with calculated or estimated annual cost savings in energy or materials
Earnings: projects with a calculated or estimated contribution to earnings
Potential Licensing Oppty: projects that could potentially be licensed outside of EMN
New Sales: projects with potential new sales income generated from new products if commercialized
Market Oppty: projects that have estimated values of the market opportunities identified (total addressable market)

**** Valuations do not include projects already completed.***

Estimated project values of active projects*

	Research Cost Savings	Projects w/ NPVs	Projects w/ ACS	Projects w/ Earnings	Potential Licensing Oppty's	Projects w/ New Sales	Projects w/ Market Oppty
2015	$ M	$ M	$ M	$ M	X	$ M	$ M
2016	$ M	$ M	$ M	$ M	X	$ M	$ M
2017	$ M	$ M	$ M	$ M	X	$ M	$ M

Total Portfolio value:
(Sum of NPV, ACS and Earnings)

2015	~$ M
2016	~$ M
2017	~$ M

Portfolio health

Research Cost Savings: ability to do projects faster or avoid work based on funded work. This is usually assigned to projects that have a lot of uncertainty in terms of how to value it
NPV's: projects with a calculated or estimated NPV
ACS: projects with calculated or estimated annual cost savings in energy or materials
Earnings: projects with a calculated or estimated contribution to earnings
Potential Licensing Oppty: projects that could potentially be licensed outside of EMN
New Sales: projects with potential new sales income generated from new products if commercialized
Market Oppty: projects that have estimated values of the market opportunities identified (total addressable market)

**** Valuations do not include projects already completed.***

Estimated project values of active projects*

	Research Cost Savings	Projects w/ NPVs	Projects w/ ACS	Projects w/ Earnings	Potential Licensing Oppty's	Projects w/ New Sales	Projects w/ Market Oppty
2015	$ M	$ M	$ M	$ M	X	$ M	$ M
2016	$ M	$ M	$ M	$ M	X	$ M	$ M
2017	$ M	$ M	$ M	$ M	X	$ M	$ M

Total Portfolio value:
(Sum of NPV, ACS and Earnings)

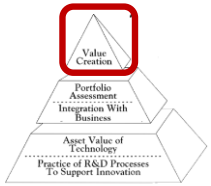
2015	~$ M
2016	~$ M
2017	~$ M

Growth potential

Research Cost Savings: ability to do projects faster or avoid work based on funded work. This is usually assigned to projects that have a lot of uncertainty in terms of how to value it
NPV's: projects with a calculated or estimated NPV
ACS: projects with calculated or estimated annual cost savings in energy or materials
Earnings: projects with a calculated or estimated contribution to earnings
Potential Licensing Oppty: projects that could potentially be licensed outside of EMN
New Sales: projects with potential new sales income generated from new products if commercialized
Market Oppty: projects that have estimated values of the market opportunities identified (total addressable market)

**** Valuations do not include projects already completed.***

How to assess completed projects



Value creation

Develop a method or system to assess the contributions from projects that have been completed at universities

Project application success

- Was an innovation generated from this work (new process, product, or process improvement)?
- Was intellectual property generated by this work?
- Was something commercialized or implemented?
- Was something licensed?

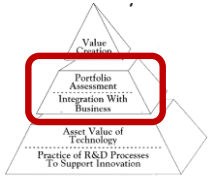
How did work translate to financials

Contributions in the form of:

- Cost savings
- NPV
- Annual cost savings
- Earnings contributions
- New sales

These may need to be reassessed over time

Strategy



Project technical success

- Did project meet its technical objective?
- Was something unexpected/novel learned?

How effective was the engagement

- Was project info applied internally?
- Was there internal follow-on work?
- Did project affect customer engagement?
- Was a new team formed or a new project started?

How to share learnings and benefits

Communication of collaboration benefits

Technical community

- Project team reviews
- Group meeting presentations
- Newsletters
- Internal lectures
- Poster sessions
- Divisional reviews
- Review with senior management

Business community

- Review with business unit leaders that may benefit from output
- Review with senior management
- Highlight success stories relative to businesses
- Other ideas?

Broader communication of collaboration benefits

Broadly within company

- Internal website home page
- Corporate homepage highlight
- Highlight successes in town hall meetings

External communications

- Technical presentation forums
- Feature in external website
- Feature article in university communications
- Submit articles for journal publications (Research Technology Management, J. of Education, etc.)

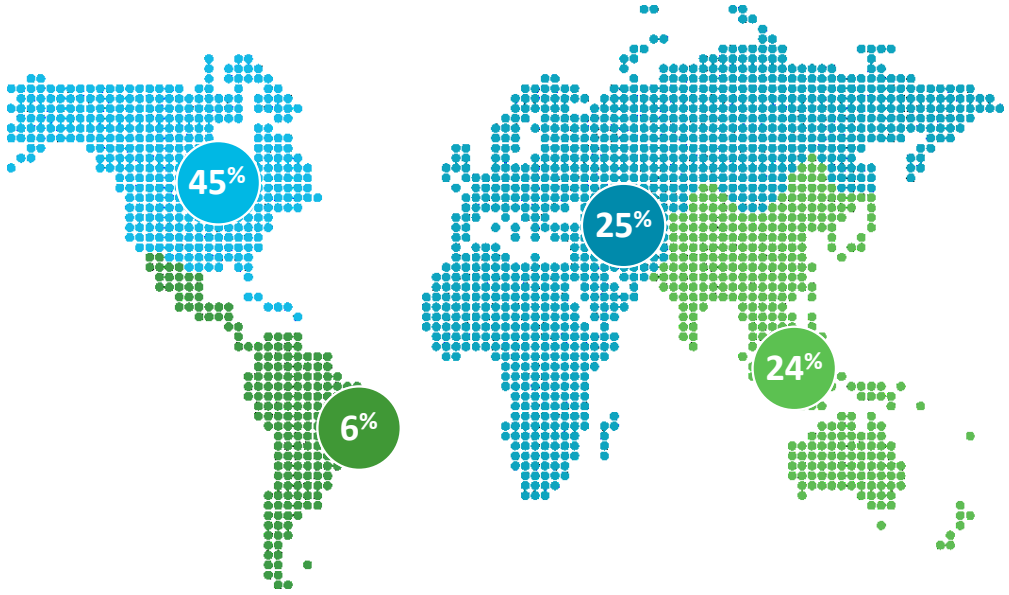
Thank you!

Backup Slides

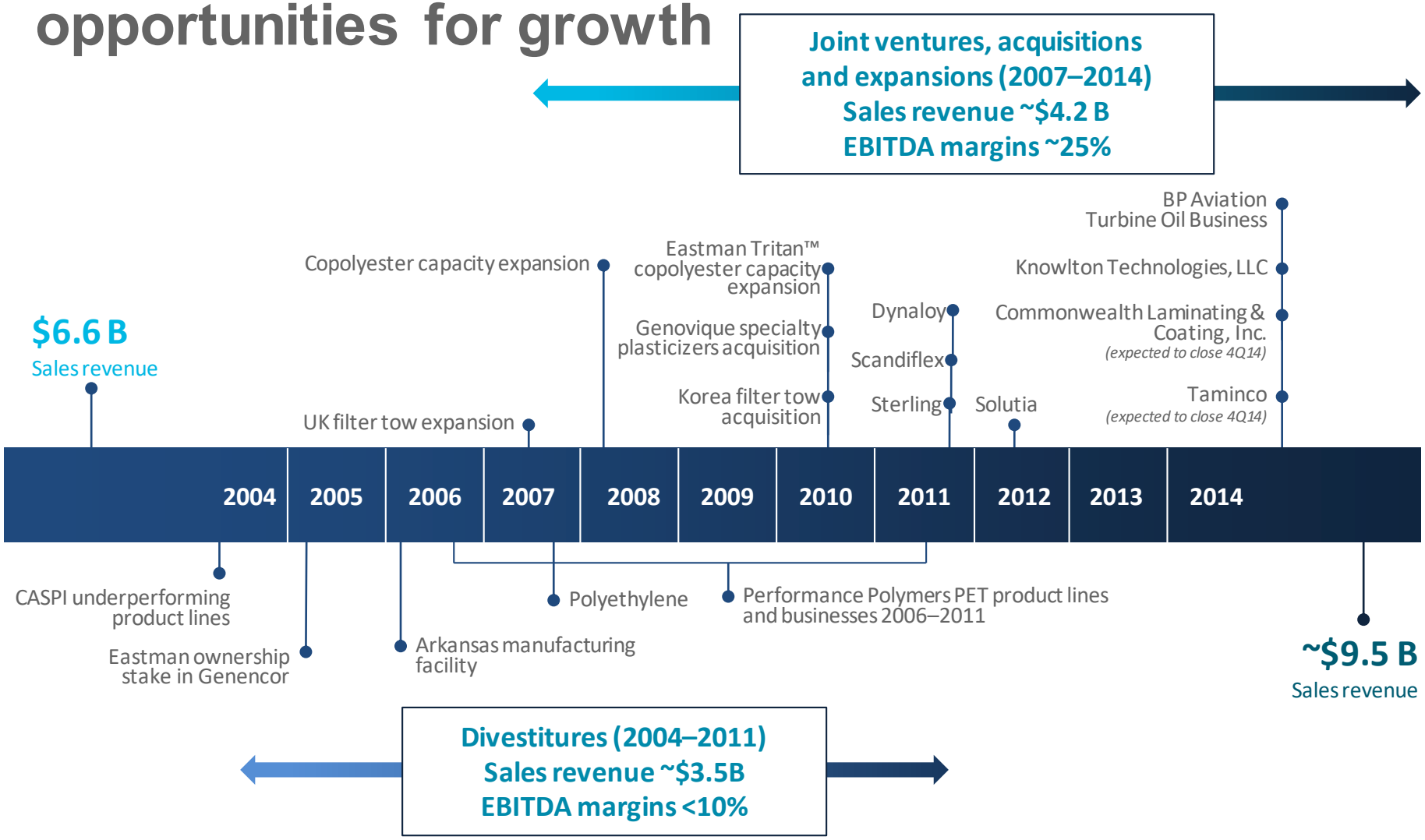
End-market and geographic diversity contribute to growth

2016 sales revenue by end market and geography

20%	Transportation
16%	Consumables
14%	Building & Construction
11%	Tobacco
10%	Industrial Chemicals & Processing
7%	Personal Care/Health & Wellness
7%	Consumer Durables
6%	Food, Feed & Agriculture
4%	Energy, Fuels & Water
3%	Electronics
2%	Other



Recent changes in portfolio driving opportunities for growth



Traditional university engagement

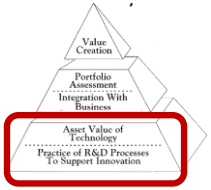
Former university engagements were established by organizational divisions or groups with technical or competency needs

The number of university agreements set up were fairly significant, time consuming to execute (6-8 months), and involved legal resources in addition to the technical leads
time

The acquisitions of Solutia, BP Fluids, and Taminco added additional university engagements with seemingly an opportunity to reassess how to consolidate resources and better align activities

Time and multiple resources required for many single professor, short-term agreements

Foundations



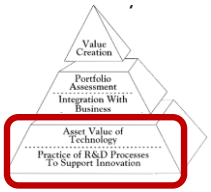
Level of researcher engagement

- Number of faculty funded?
- Number of departments funded?
- Number of strategically aligned departments?
- Number of publications, patents filed?
- Number of employees spending time in faculty labs?
- Number of faculty visiting company sites?
- Number of courses faculty taught company employees?
- Number of meetings employees had with perspective university new hires?

Level of student/postdoc engagement

- Number of students/postdocs funded?
- Number of students/postdocs visiting company sites?
- Number of students/postdocs counseled?
- Number of employee presentations to student classes?
- Number of internships offered?
- Number of hires?

Foundations



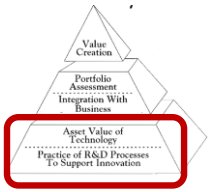
Access to university resources

- Number of employees located on-site?
- Number of service agreements?
- Number of projects accessing unique equipment or novel capabilities?
- Number of capstone projects funded?
- Number of center/consortia memberships?

Economic benefit

- Amount of fees or royalty payments?
- Value of joint government funded projects?
- Revenue from sale of licensed products?

Foundations



Marketing/brand impact

- Number of Ph.D. applications received?
- Number of students/postdocs interviewed on campus?
- Number of new hires?
- Number of forums where company is engaged on campus?
- Number of people reached by company in forums on campus?