Entrepreneurship Methods

Doctoral Programme in Electrical Engineering

José Barata

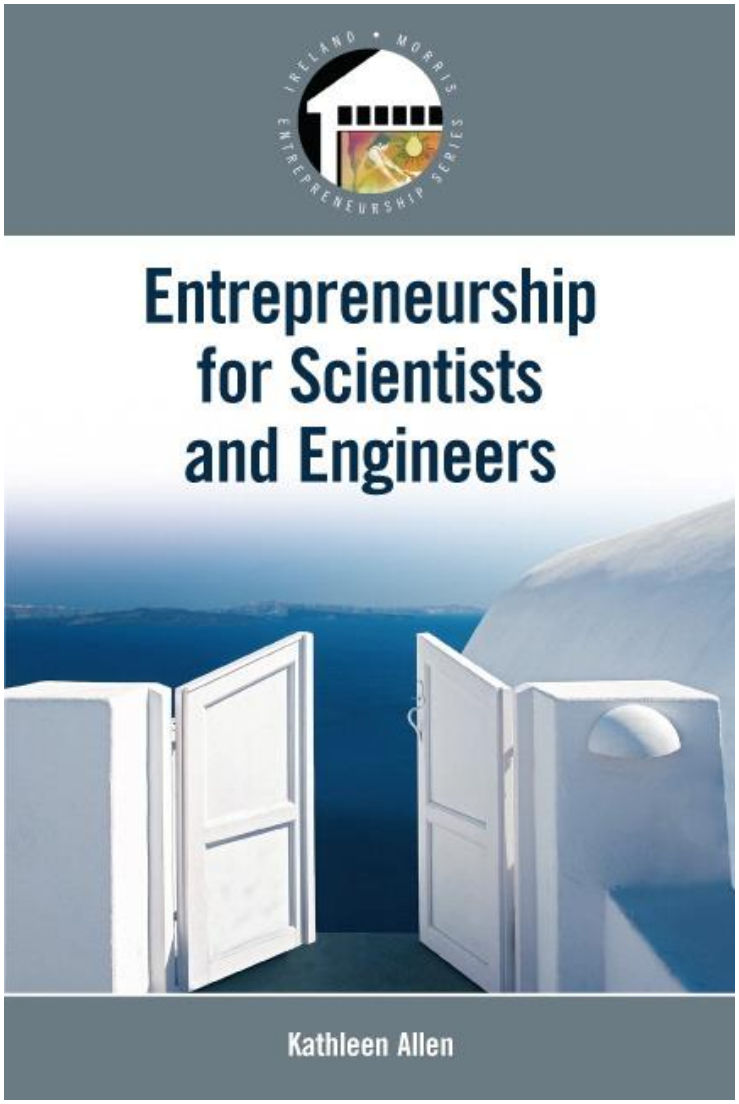
Classes Scheduling

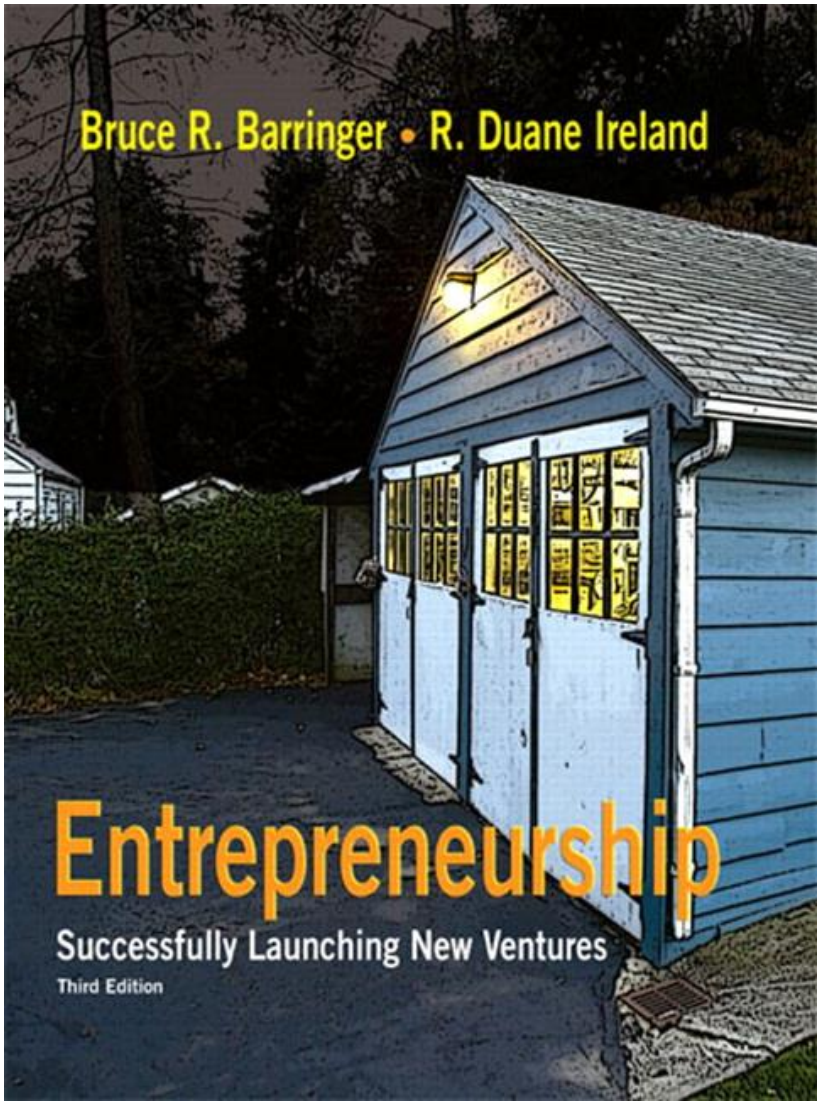
Date	Time	Session	Speaker	Affiliation			
25/fev	16-18	1 - INTRODUCTION and BASIC CONCEPTS	Prof. José Barata	FCT-UNL		jab@uninova.pt	
25/fev	18-20	2 - INTRODUCTION and BASIC CONCEPTS	Prof. José Barata	FCT-UNL	Work 1		
26/fev	16-18	3 - BUSINESS PLAN A	Dr . Javad Jassbi	UNINOVA		j.jassbi@uninova.pt	
26/fev	18-20	4 - SOCIAL FACTORS IN INNOVATION	Prof. Brandão Moniz	FCT-UNL	Work 2	abm@fct.unl.pt	
27/fev	16-18	5 - BUSINESS PLAN B	Dr . Javad Jassbi	UNINOVA	Work 3		
27/fev	18-20	6 - CREATIVITY	Drª Sanaz Nikghadam	UNINOVA	Work 4	sanaznik@uninova.pt	
28/fev	16-18	7- TECHNOLOGY TRANSFER	Doutor José Silva Lopes	FCT-UNL	Work 5	jasl@fct.unl.pt	
28/fev	18-20	8 - COMPUTATIONAL CREATIVITY and OPEN INNOVATION PARADIGM	Drª Sanaz Nikghadam	UNINOVA	Work 6		
1/mar	16-18	9 - IP in ACADEMIA	Drª Marta Cereja	FCT-UNL	Work 7	m.cerejo@fct.unl.pt	
1/mar	18 -20	10 - INNOVATION IN NETWORKS	Profº Camarinha Matos	FCT-UNL	Work 8	cam@uninova.pt	
6/mar	16-18	11 - PRODUCTIZATION OF RESEARCH RESULTS	Engª Lara Moura	BRISA	-	lara.moura@a-to-be.com	
6/mar	18-20	12 - INCUBATORS AND TECHNOLOGICAL PARKS	Eng. José Damião	MADAN PARK		jose.damiao@madanparque.pt	
7/mar	16-18	13 - STRATEGY & LEADERSHIP	Prof. José Barata	FCT-UNL	Work 9		
8/mar	16-18	14 - NEW VENTURE FINANCING	Prof Paulo Pinho	FE-UNL		pjpinho@novasbe.pt	
15/mar	16-20	15 - ELEVATOR PITCH	Prof. José Barata, Prof. Pedro Sousa, Dr. Javad Jassbi, Dr. Sanaz Nikghadam e Prof. Tiago Cardoso	FCT-UNL	Work 10		

Evaluation

- 10 Works to be distributed along the course

Bibliography





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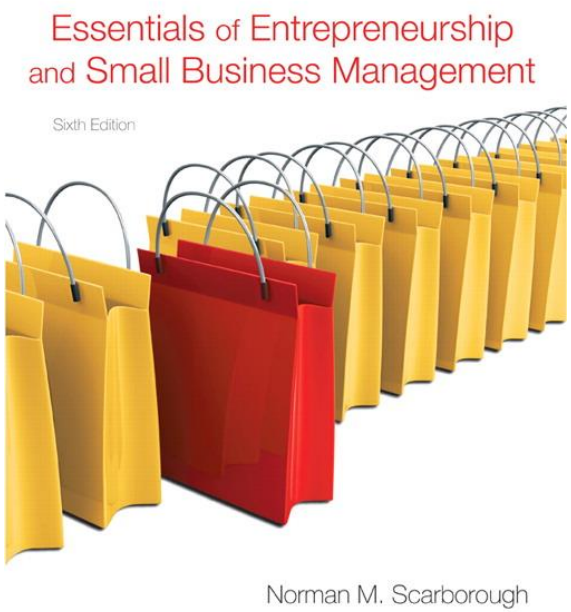
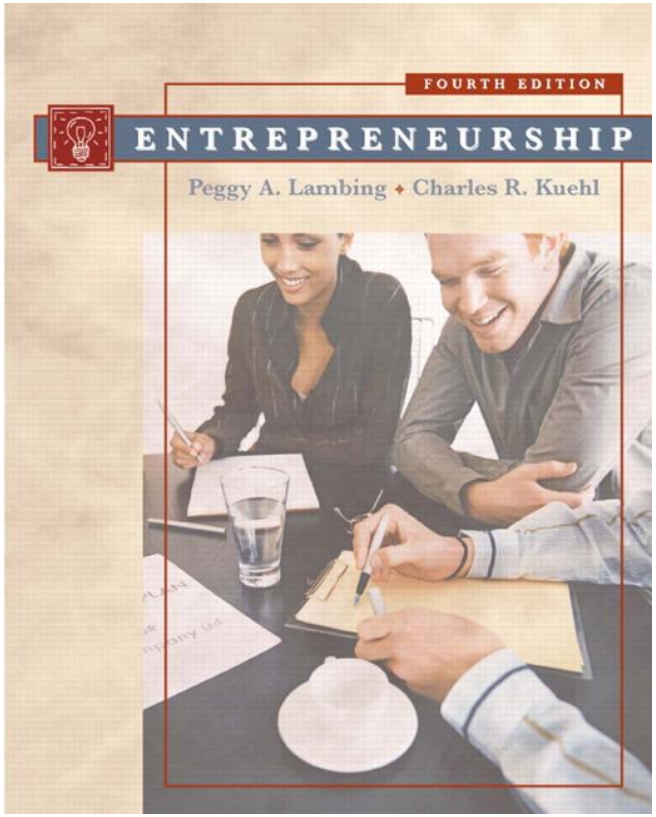
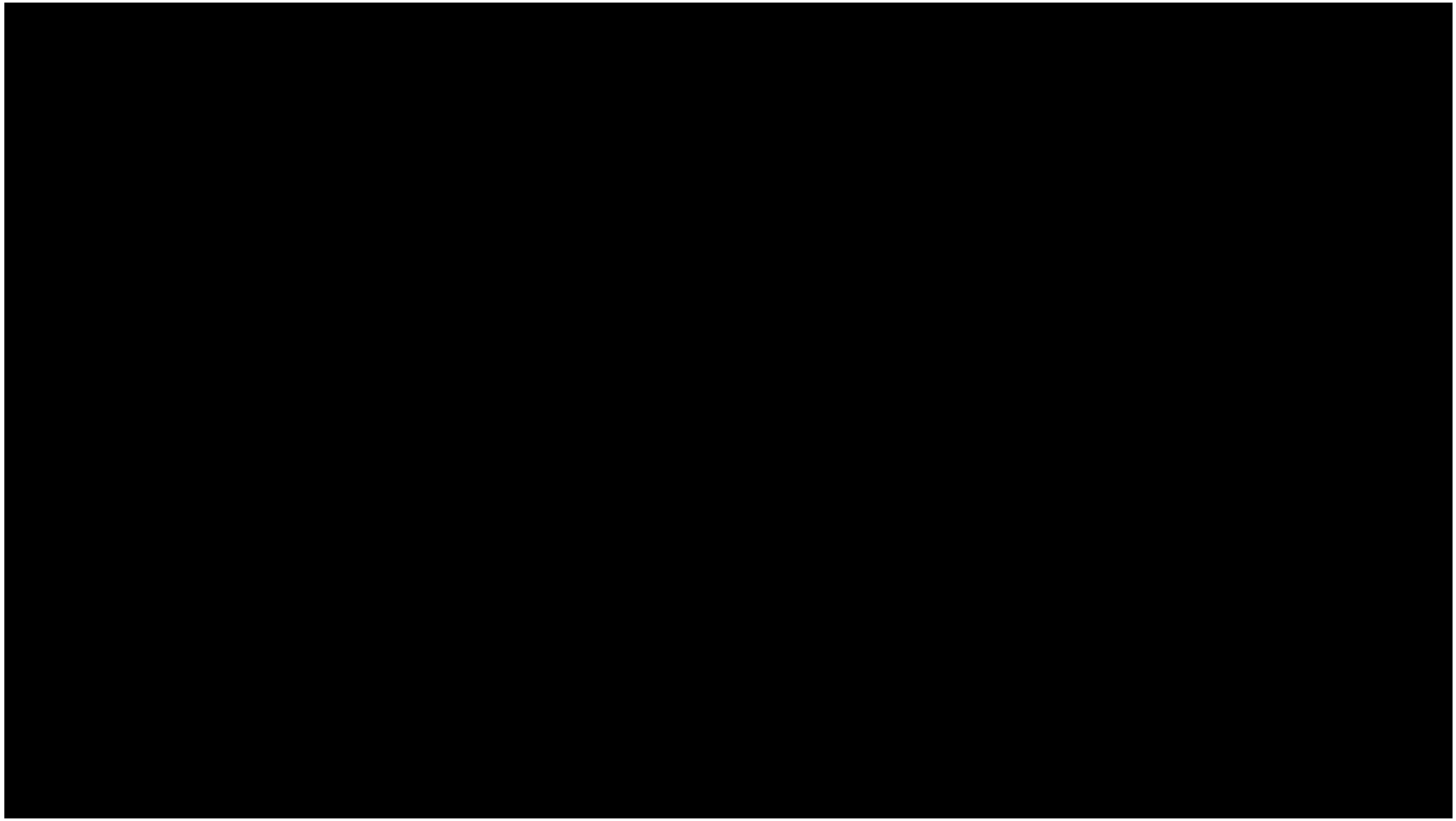




Motivation

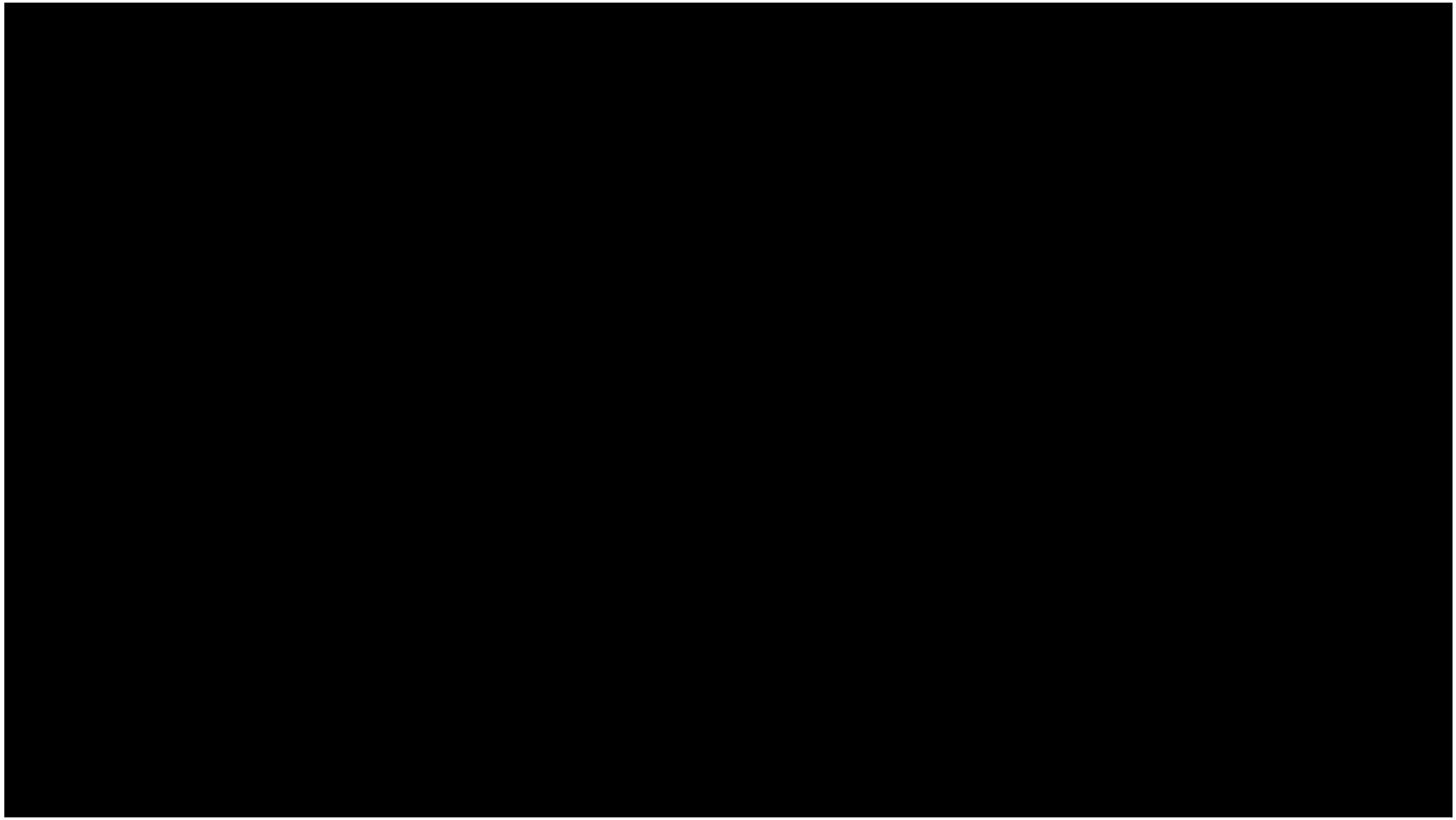
https://www.youtube.com/watch?v=330SU7EzGA4#t=18

Motivation



https://www.youtube.com/watch?v=zXD5vt0xhyI

Motivation



https://www.youtube.com/watch?v=HKAFfejdJ7E

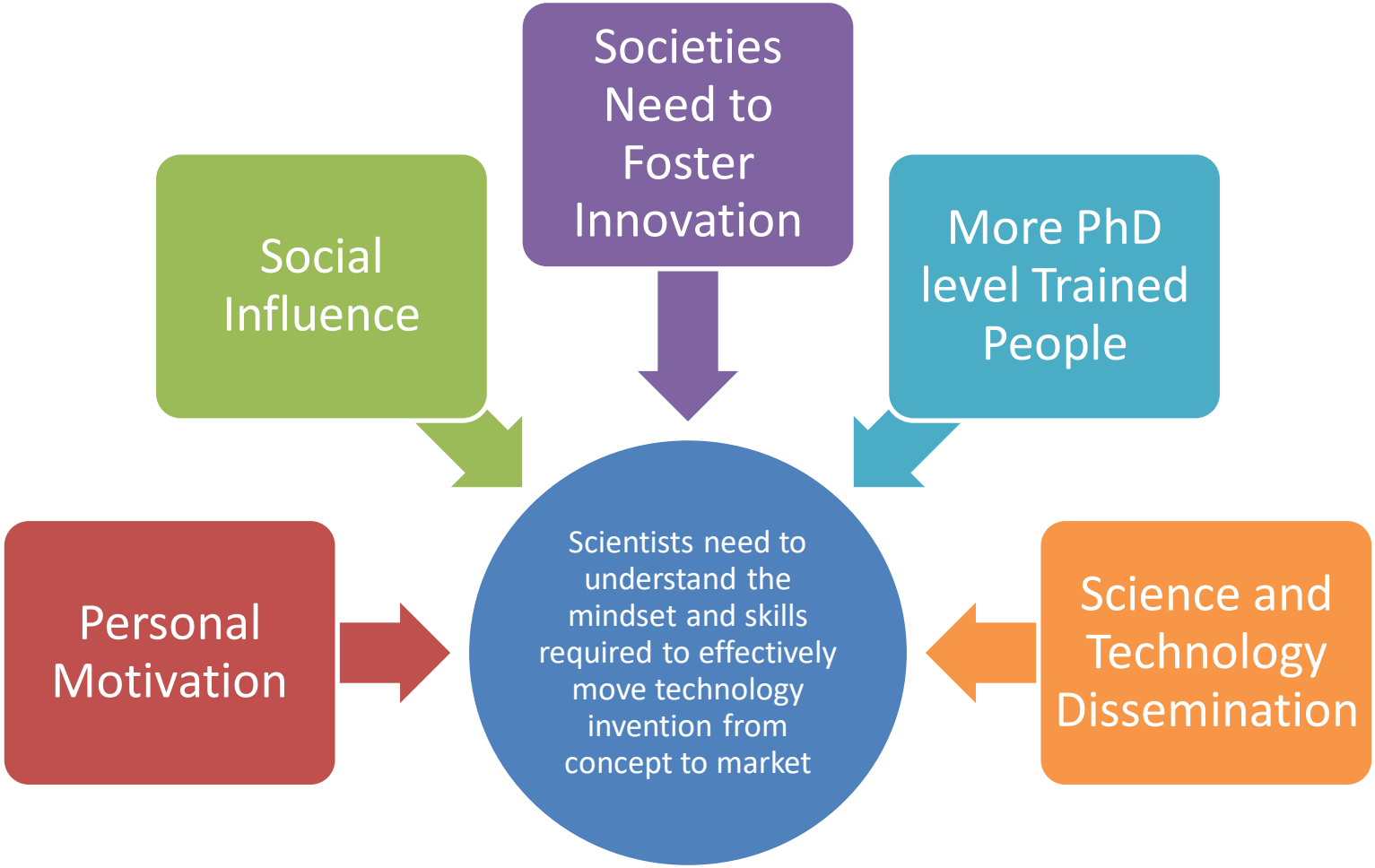
Why Entrepreneurship Methods?

- Massification of High level Education is an upward trend.
- More PhD level educated people in Industry and Research Centres
  - Not everybody can have an academic career as it was the norm before
- More people exchange the security of industry for the uncertainty and chaos of creating their own companies
  - Want to control their lives (individualism is an important characteristic of western societies) – be my own boss, pursue my own ideas, realise financial goals, ...
  - Societies more and more require innovation to guarantee their sustainability and therefore support entrepreneurship
  - Societies tend to valorise individual achievements and entrepreneurship
  - Not enough high-level positions for all PhDs

Why Entrepreneurship Methods?

- Scientists and engineers who want to lead companies need to know how to back up ideas with numbers
- You will learn the complex business processes involved in commercialization
- You learn how to make trade-offs among features, benefits, price, markets, and operations
- You learn how to adapt to uncertainty and change
- You learn techniques for managing people

Why Entrepreneurship Methods?



Why Entrepreneurship Methods?

The goal is not to turn scientists into entrepreneurs but to develop a **way of thinking** and the critical tools need to **recognise opportunities** and work effectively with business people

From Concept to Market

Entrepreneurship

Perceptions on starting a business as a good career choice:

64.6%
FACTOR DRIVEN ECONOMIES

65.7%
EFFICIENCY DRIVEN ECONOMIES

57.0%
INNOVATION DRIVEN ECONOMIES

MOST POSITIVE PERCEPTIONS: Africa

74.5% believe that entrepreneurs are admired in their societies.

76.2% consider entrepreneurship as a good career choice.

LEAST POSITIVE PERCEPTIONS: Latin America and the Caribbean (LAC) & Europe

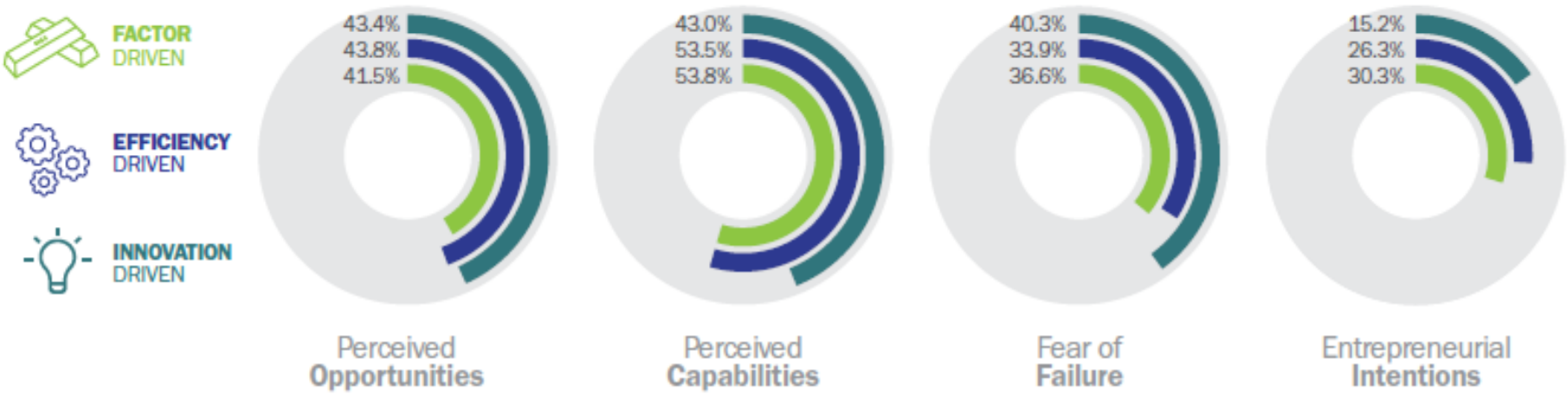
60.7% in LAC believe that entrepreneurs are admired in their societies

58.5% in Europe believe entrepreneurship is a good career choice. They have the lowest media publicity for entrepreneurial activity at 54.3%

Entrepreneurship

Percentage of adults who have positive perceptions about starting a business (aged 18-64)

Perceptions around starting a business across 3 economic development groups:



Entrepreneurship

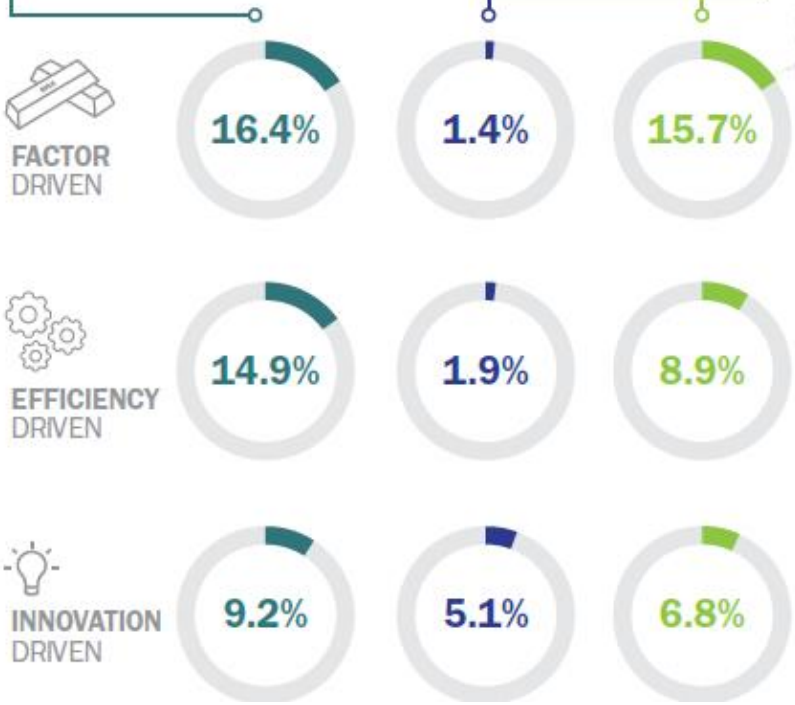
Phases/Types of Entrepreneurial Activity

The GEM survey monitors entrepreneurial activity by using 3 indicators:

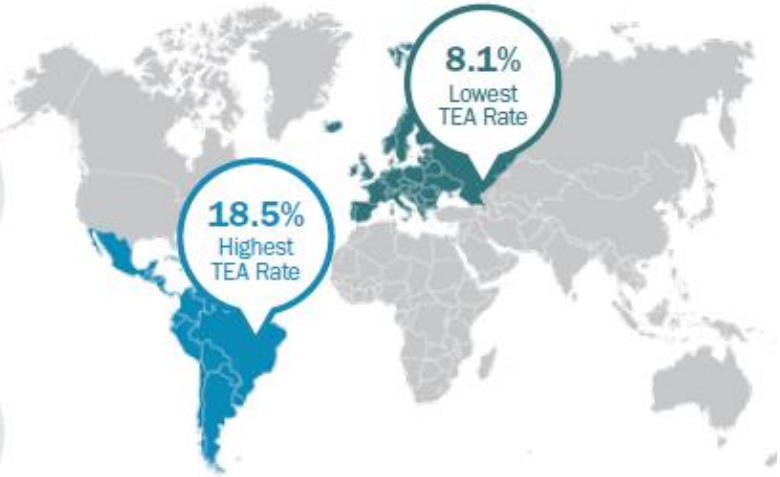
Total early-stage entrepreneurial activity (TEA)
(% of adults who have started or are running a business up to 3.5 years)

Entrepreneurial employee activity (EEA)
(% of employees developing new goods and services for their main employer)

Established businesses rates (business over 3.5 years)



TEA RATES are highest in Latin America and the Caribbean (LAC) and in Africa. Just under one fifth of working-age adults are engaged in early-stage entrepreneurial activity. TEA rates are lowest in Europe (8.1%)



EEA RATES

Lowest EEA rates	
Africa	0.9%
LAC	1.6%

Highest EEA rates	
North America	7.9%
Europe	4.4%
Asia and Oceania	3.1%

Entrepreneurship Portugal

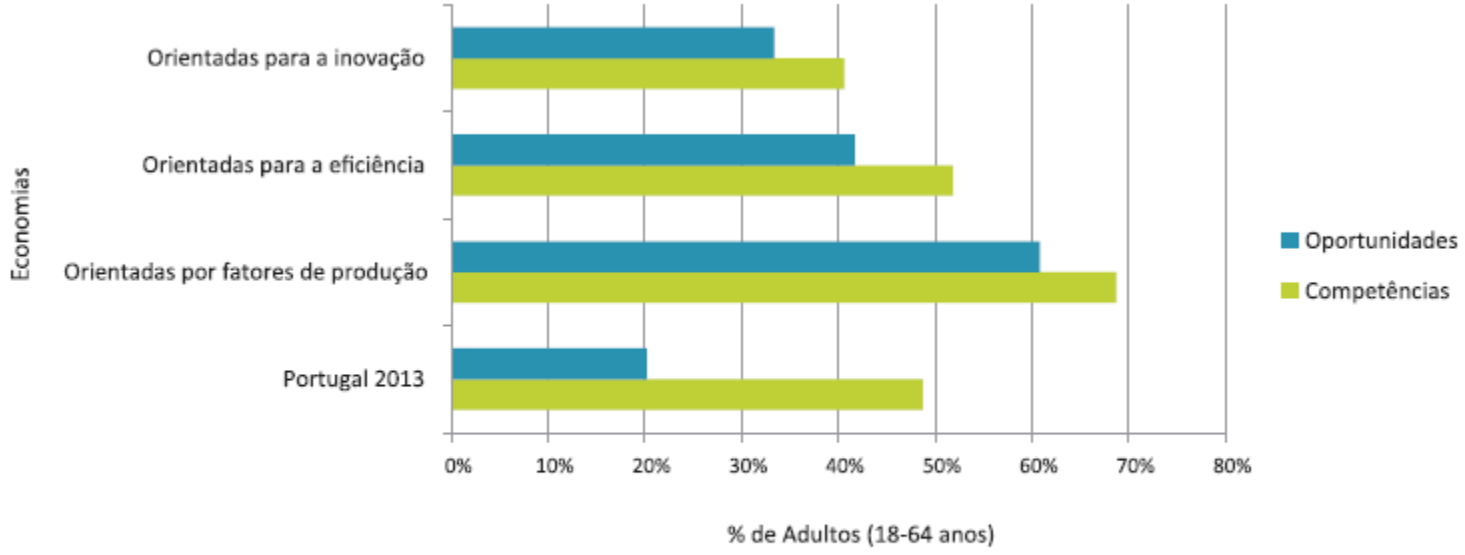


Figura 3: Proporção da população adulta que considera possuir competências empreendedoras e que identifica oportunidades empreendedoras num futuro próximo

Entrepreneurship Portugal

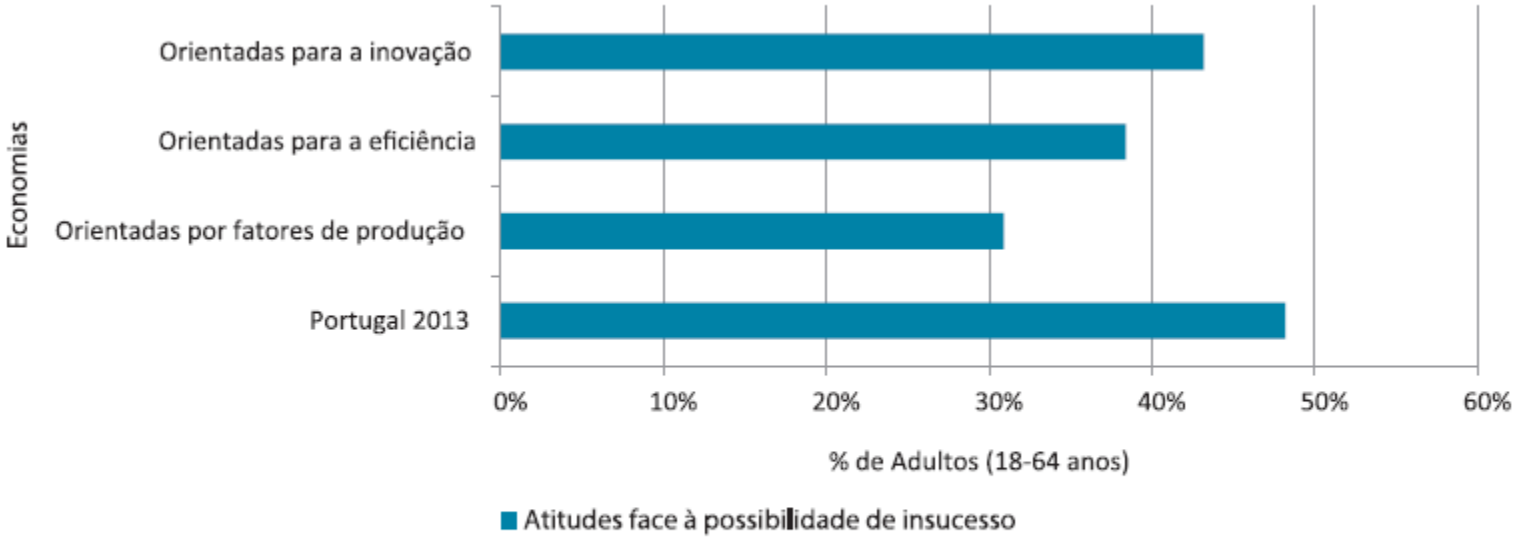


Figura 7: Proporção da população adulta que seria impedida de iniciar um negócio por receio de falhar

Fonte: Sondagem à População Adulta 2013

Entrepreneurship Portugal

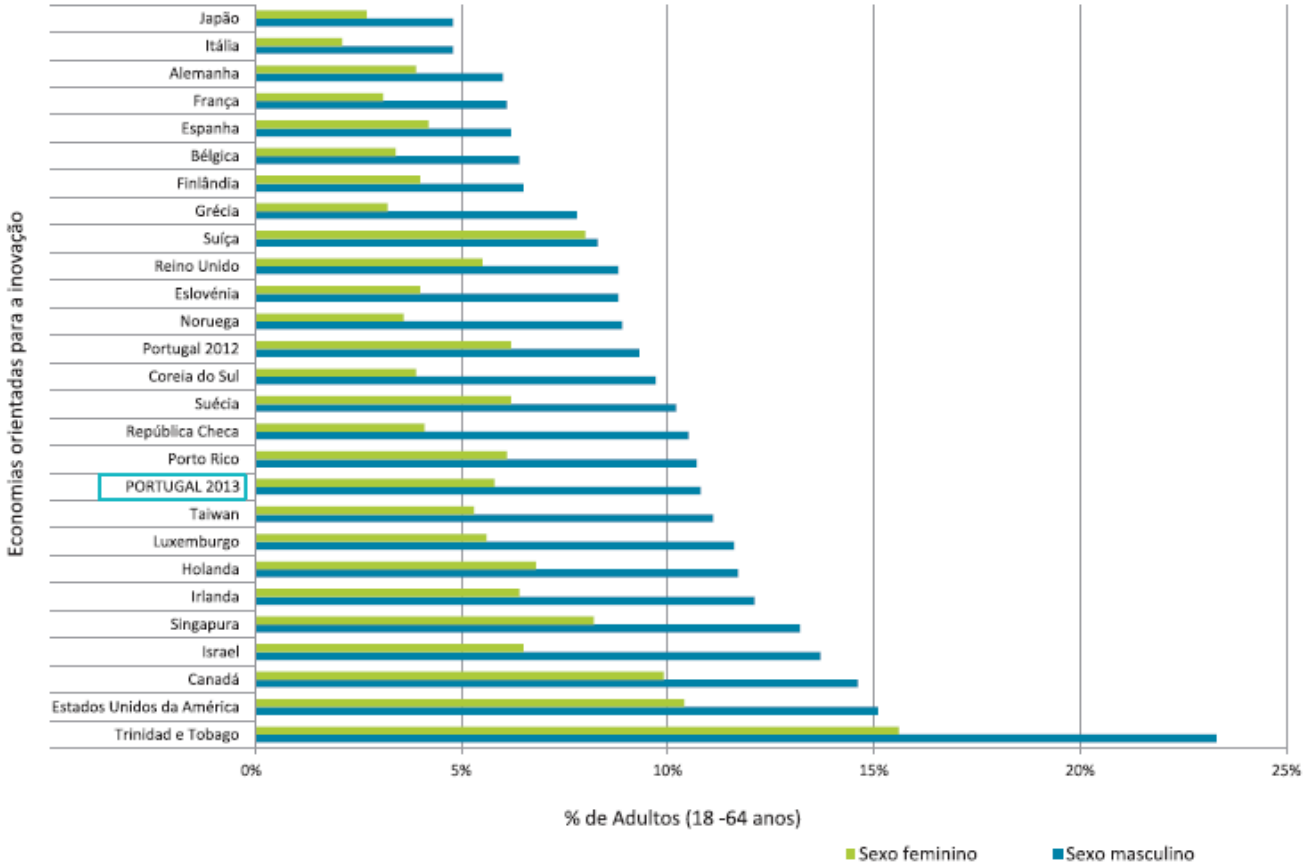
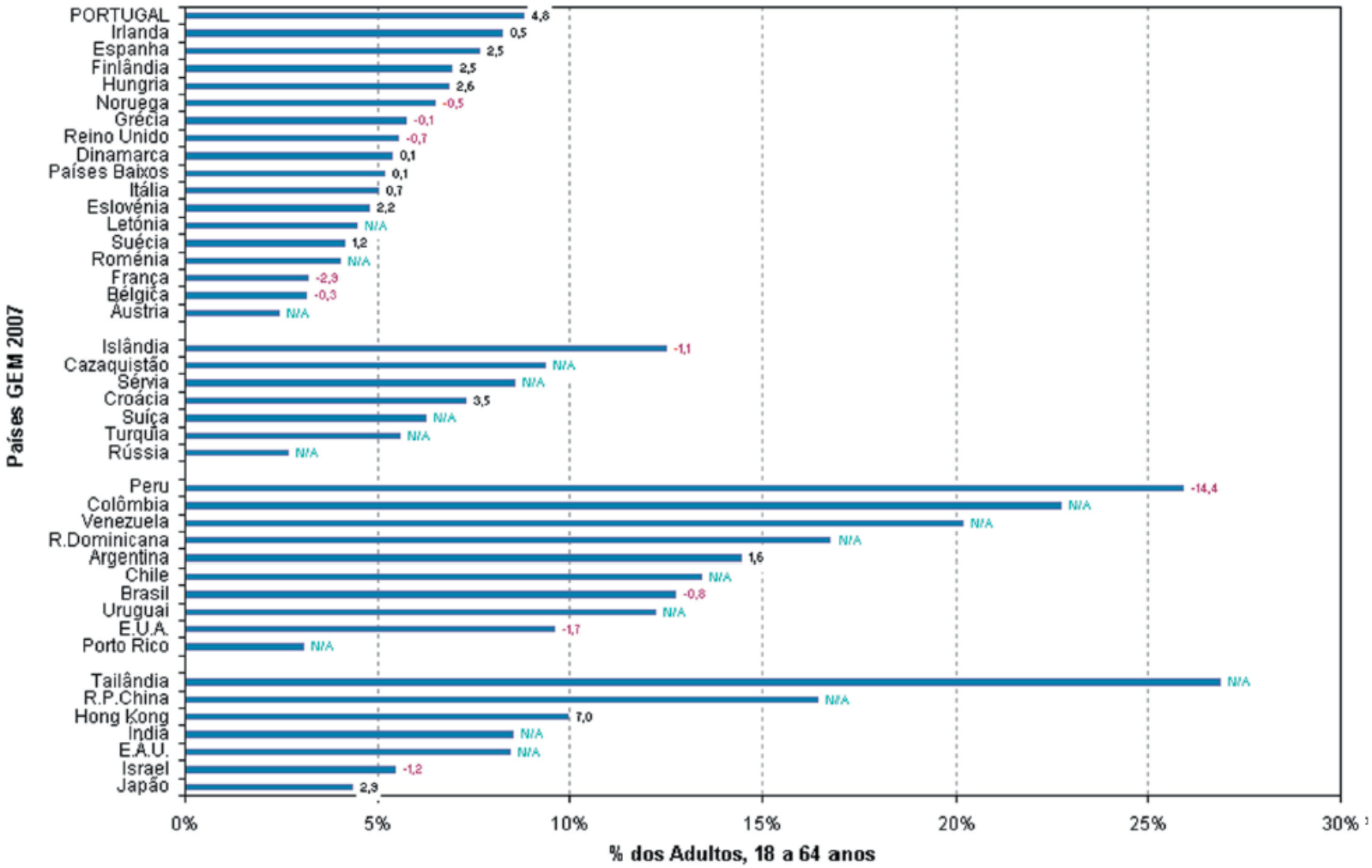


Figura 19: Taxa TEA nas economias orientadas para a inovação do GEM 2013, por género

Entrepreneurship - Portugal

Figura 3:
Taxa TEA
2004 e 2007



Fonte: Sondagem à População Adulta 2007
Notas: O número à direita de cada coluna indica a variação percentual desde 2004.
Em 2004, a taxa TEA no Peru foi de 40%.

Source: ***The Global Entrepreneurship Monitor - 2007 Portugal Executive report***

Entrepreneurship Portugal

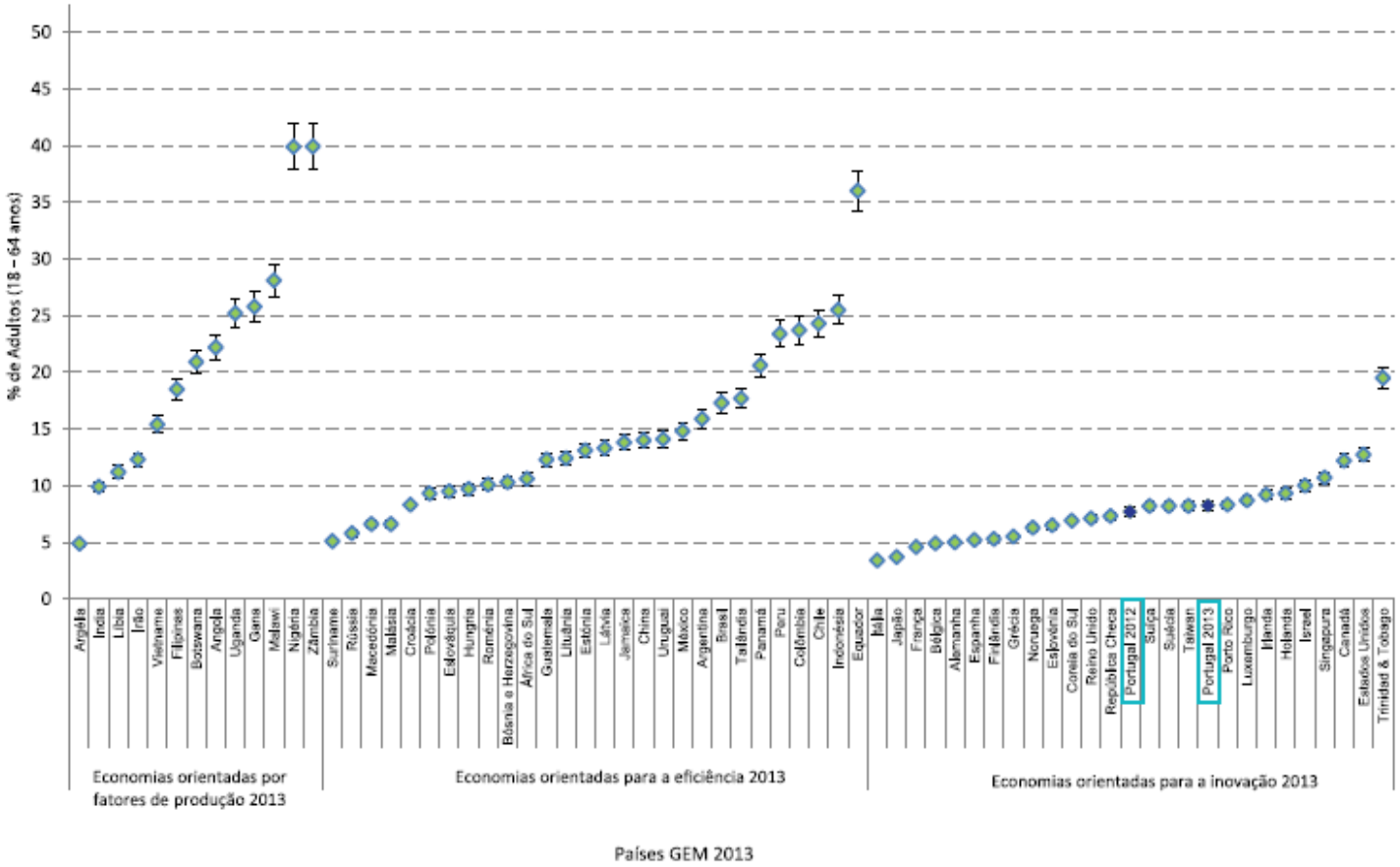


Figura 13: Taxa de Atividade Empreendedora *Early-Stage* (TEA)

Entrepreneurship - Definitions

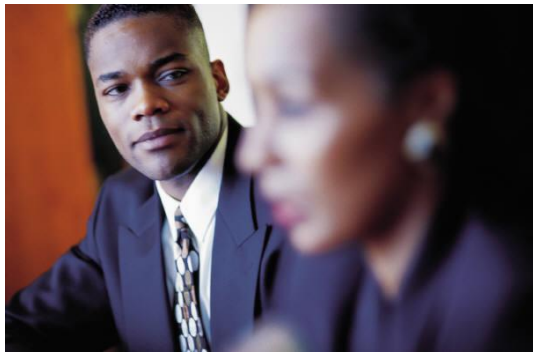
- The word “Entrepreneur” was adopted from the French word “entrepreneur” – one who undertakes or manages.
- Originally used to describe people who “**take on the risk**” between buyers and sellers or who “undertake” a task such as starting a new venture.
- Very important to emphasise the difference between **Inventors** and **Entrepreneurs**:
  - Inventor creates something new
  - Entrepreneur assembles and then integrates all resources needed to transform the invention into a viable business

Entrepreneurship - Definitions

- *A risk-taker who has the skills and initiative to establish a business*.
  - "entrepreneur" *Wall Street Words*. Houghton Mifflin Company. 08 Feb. 2010. <Dictionary.com http://dictionary.reference.com/browse/entrepreneurship>.
- *One who starts a business or other venture that promises economic gain but that also entails risks*.
  - "entrepreneur." *The American Heritage® New Dictionary of Cultural Literacy, Third Edition*. Houghton Mifflin Company, 2005. 08 Feb. 2010. <Dictionary.com http://dictionary.reference.com/browse/entrepreneurship>.
- *One who organizes, manages, and assumes the risks of a business or enterprise*.
  - "entrepreneur." Merriam-Webster Online Dictionary. 2010. Merriam-Webster Online. 8 February 2010 <http://www.merriam-webster.com/dictionary/entrepreneurship>

What Is an Entrepreneur?

One who creates a new business in the face of risk and uncertainty for the purpose of achieving profit and growth by identifying opportunities and assembling the necessary resources to capitalize on them.



Source: ***Essentials of Entrepreneurship and Small Business Management, 5/e, Chapter 1***

Entrepreneurial vs Conservative

Entrepreneurial	Conservative
• Proactive • Innovative • Risk Taking	• Take a more “wait and see” posture • Less innovative • Risk Adverse

Characteristics of Successful Entrepreneurs (1)

- Passion for the Business
  - The number one characteristic shared by successful entrepreneurs : passion for their business; stems from the entrepreneur's belief that the business will positively influence people's lives
- Desire for responsibility
- Preference for moderate risk – risk eliminators
  - However, risk takers
- Product / Customer Focus
  - Keen focus on products and customers stems from the fact that most successful entrepreneurs are, at heart, craftspeople
- Know Well Technological and Scientific trends

Characteristics of Successful Entrepreneurs (2)

- Execution Intelligence
  - The ability to **fashion a solid business idea into a viable business** is a key characteristic of successful entrepreneurs
  - **The ability to effectively execute a business idea means**:
    - developing a business model – Unit 2 & 9
    - putting together a new venture team – Unit 4
    - raising money – Unit 4
    - marketing your product – Unit 5
    - establishing partnerships – Unit 8 & 13
    - managing finances – Unit 3
    - leading and motivating employees -
    - translating thought, creativity, and imagination into action and measurable results – Unit 6, 7 & 12
    - protecting ideas – Unit 10 & 11

Characteristics of Successful Entrepreneurs (2)

- Confidence in their ability to succeed: tenacity despite failure
  - Because entrepreneurs are typically trying something new, the failure rate associated with their efforts is naturally high
  - Developing a new business may require experimentation before success is attained
  - Setbacks and failures are inevitably
  - The litmus test for entrepreneurs is the ability to persevere through setbacks and failures
- Desire for immediate feedback
- High level of energy
- Future orientation – serial entrepreneurs
- Skilled at organizing
- Value achievement over money

Entrepreneurship

- One fundamental characteristic of entrepreneurship is **Diversity**!
- *Anyone* – regardless of age, race, gender, color, national origin, or any other characteristic – can become an entrepreneur (although not everyone should).
- There are some prejudices (Myths) that is necessary to **fight and eradicate**:
  - Entrepreneurship is an innate characteristic
  - Entrepreneurship has a strong link with geographic regions
  - Entrepreneurs are gamblers
    - In fact they are moderate risk takers
  - Entrepreneurs are primarily motivated by money
    - Despite seeking financial rewards, this reason is rarely the most important
  - Should be young and energetic
    - More than energetic is necessary to be strong

Benefits of Entrepreneurship

<u>The opportunity to:</u>

- Create your own destiny
- Make a difference
- Reach your full potential
- Reap impressive profits
- **Contribute to society and to be recognized for your efforts**
  - **Social Conscience is fundamental**
- Do what you enjoy and to have fun at it

Source: ***Essentials of Entrepreneurship and Small Business Management, 5/e, Chapter 1***

Drawbacks of Entrepreneurship

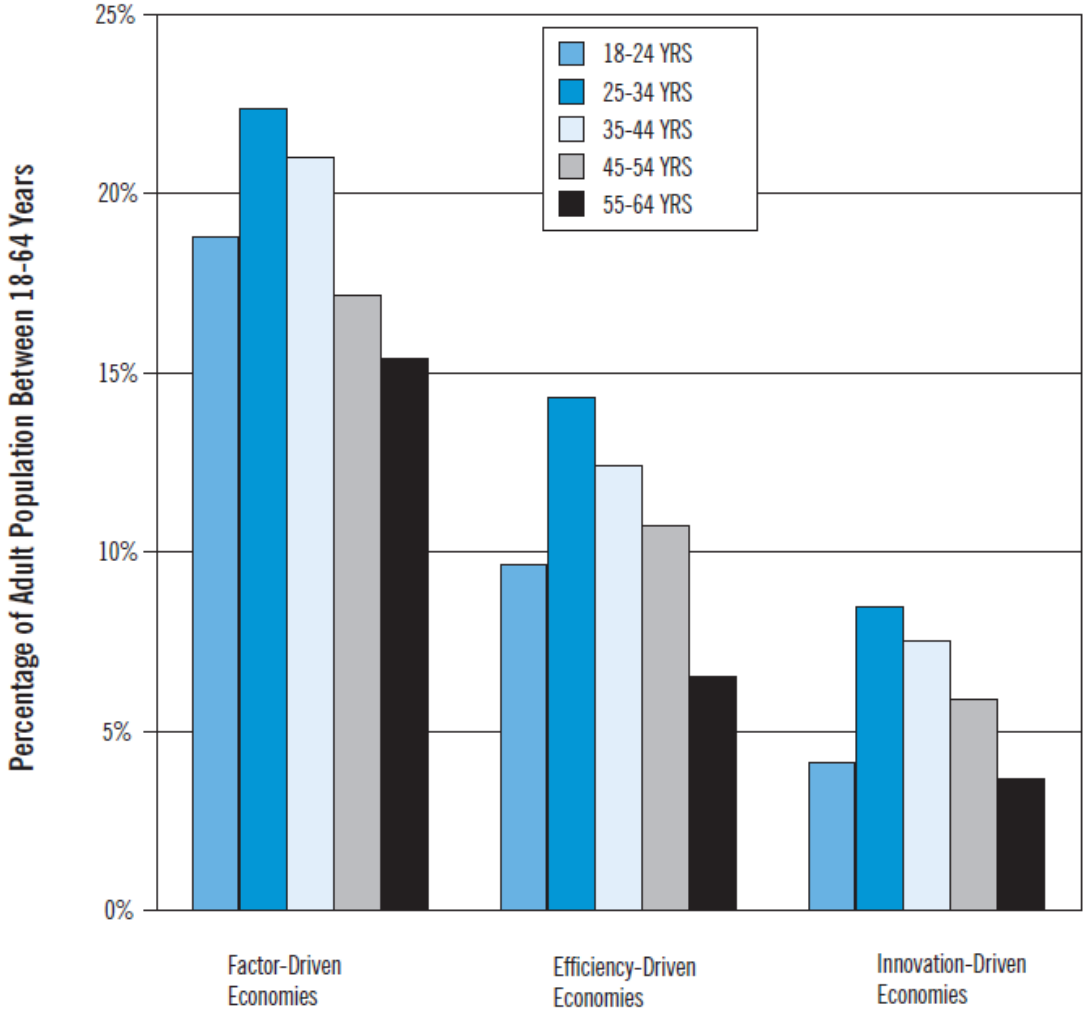
- Uncertainty of income
- Risk of losing your entire investment
- Long hours and hard work
- **Lower quality of life until the business gets established**

Drawbacks of Entrepreneurship

- Uncertainty of income
- Risk of losing your entire investment
- Long hours and hard work
- Lower quality of life until the business gets established
- High levels of stress
- Complete responsibility
- Discouragement

Entrepreneurship and Age

Figure 9 — Early-Stage Entrepreneurial Activity for Separate Age Groups, 2009



Source: GEM Adult Population Survey (APS)

Feeding the Entrepreneurial Fire

- Entrepreneurs as heroes
- Entrepreneurial education
- Demographic and economic factors
- Shift to a service economy
- Technological advancements
- Independent lifestyle
- E-commerce and the World Wide Web
- International Opportunities

Source: ***Essentials of Entrepreneurship and Small Business Management, 5/e, Chapter 1***

Types of Start-Up

- **Salary-Substitute Firms**
  - small firms that afford their owner or owners a similar level of income to what they would earn in a conventional job
- **Life Style Firms**
  - provide their owner or owners the opportunity to pursue a particular lifestyle and earn a living while doing so.
- **Entrepreneurial Firms**
  - bring new products and services to market by creating and seizing opportunities regardless of the resources they control

Ten Deadly Mistakes of Entrepreneurship

1. Management mistakes
2. Lack of experience
3. Poor financial control
4. Weak marketing efforts
5. Failure to develop a strategic plan

Source: ***Essentials of Entrepreneurship and Small Business Management, 5/e, Chapter 1***

Ten Deadly Mistakes of Entrepreneurship

6. Uncontrolled growth
7. Poor location
8. Improper inventory control
9. Incorrect pricing
10. Inability to make the “entrepreneurial transition”

Source: ***Essentials of Entrepreneurship and Small Business Management, 5/e, Chapter 1***

Putting Failure into Perspective

- Entrepreneurs are *not* paralyzed by the prospect of failure.
- **Failure – a natural part of the creative process**.
  - We need to use this in scientific activities
- Successful entrepreneurs learn to fail *intelligently*.

Avoiding the Pitfalls of Small Business Failure

- Know your business in depth
- Develop a solid business plan
- Manage financial resources
- Understand financial statements
- Learn to manage people effectively
- Keep in tune with yourself

Source: ***Essentials of Entrepreneurship and Small Business Management, 5/e, Chapter 1***

Entrepreneurship

- ***Entrepreneurship*** – the result of a disciplined, systematic process of applying creativity and innovation to the needs and opportunities in the marketplace.
- Entrepreneurs connect their creative ideas with the purposeful action and structure of a business.

Source: ***Essentials of Entrepreneurship and Small Business Management, 5/e, Chapter 2***

The Role of Innovation and Entrepreneurship

- Technological change and entrepreneurship are critical components of growth models based on market incentives.
- The new economy is characterized by:
  - Knowledge workers
  - Globalization
  - Innovation
- Time-to-market is a key competitive advantage

What is Innovation?

- Producing something new
- Commercializing or extracting value from ideas
- Schumpeter's five types of innovation
  - New product or substantial change in existing product
  - New process
  - New market
  - New sources of supply
  - Changes in industrial organization
- Incremental innovation = improvements on existing products
- Disruptive innovation = game changers

Dispelling Innovation Myths

- The myth of the great idea
- The myth of the replicable process
- The myth of doing what's expected
- The myth of the solo inventor
- The myth of the first mover

Source: ***Entrepreneurship for Scientists and Engineers, Chapter 1***

Creativity and Innovation

Creativity – the ability to develop new ideas and to discover new ways of looking at problems and opportunities; ***thinking*** **new things**.

Innovation – the ability to apply creative solutions to problems or opportunities to enhance or to enrich people's lives; ***doing*** **new things**.

Source: ***Essentials of Entrepreneurship and Small Business Management, 5/e, Chapter 2***

Failure: Just Part of the Creative Process!

- For every 3,000 new product ideas:
  - Four make it to the development stage.
  - Two are actually launched.
  - One becomes a success in the market.
- On average, new products account for 40 percent of companies' sales!!
- Creativity is an important source for building a competitive advantage.

Source: ***Essentials of Entrepreneurship and Small Business Management, 5/e, Chapter 2***

Can We *Learn* to Be Creative?

By overcoming paradigms and by suspending conventional thinking long enough to consider new and different alternatives!

Entrepreneurial Firms Economic Impact

- **Innovation**: small entrepreneurial firms responsible for 55 percent of all US innovations; these innovations help working more efficiently and effectively
- **Job creation**: economic activity has move increasingly in the direction of smaller entrepreneurial firms; possibly because of ability to innovate and focus on specialized tasks
- **Globalization**: today, more than 97 percent of all United States exporters are small businesses with fewer than 500 employees

Entrepreneurial Firms Social Impact

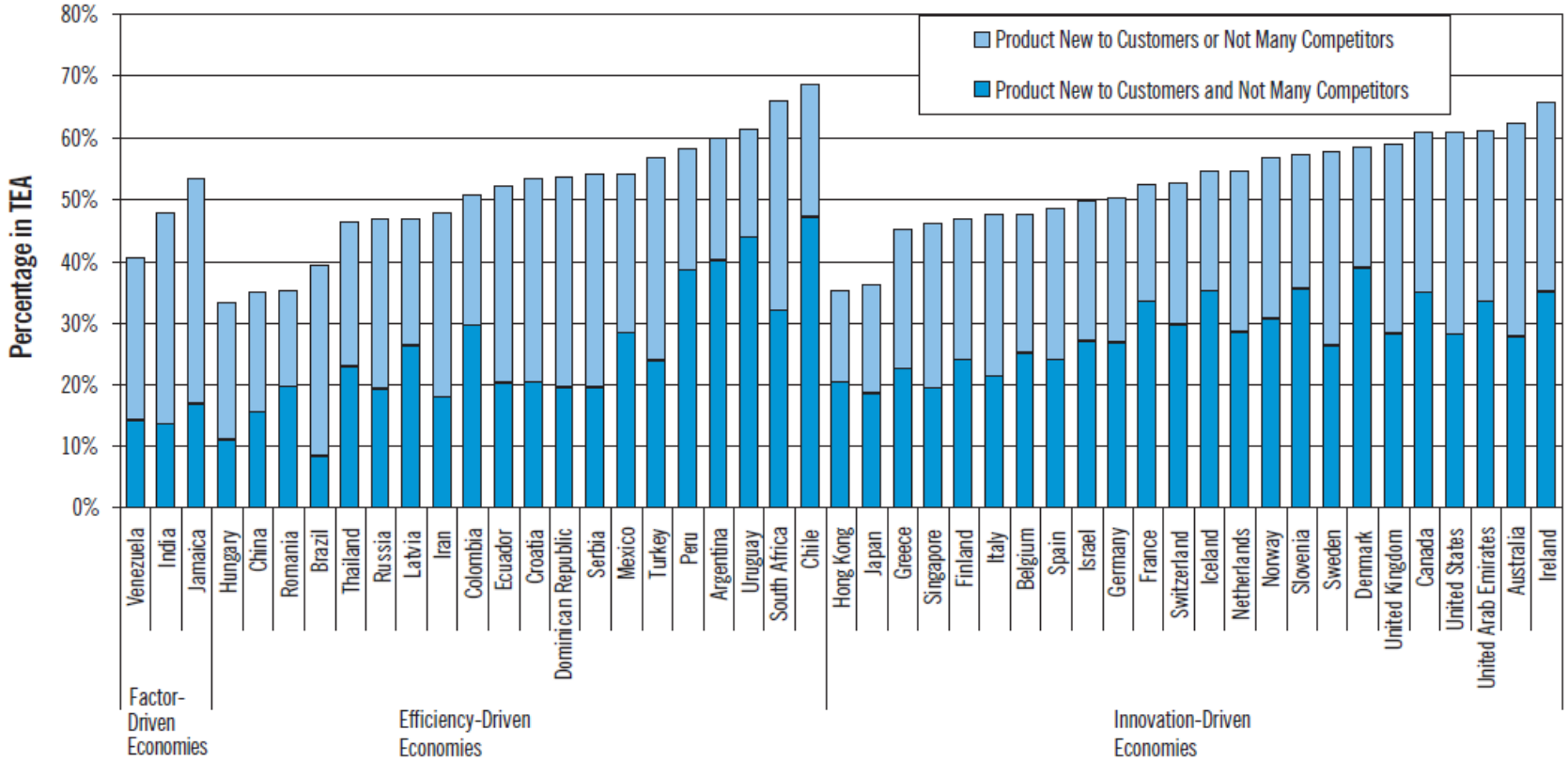
- Innovations of entrepreneurial firms w/ dramatic impact on society
- new products and services that make lives easier, enhance our productivity at work, improve our health, and entertain us
- Many of these products and services were brought to market by entrepreneurial firms!

Economic Definitions

- In the **factor-driven** stage countries compete based on their factor endowments, primarily unskilled labor and natural resources. Companies compete on the basis of prices and sell basic products or commodities, with their low productivity reflected in low wages
- As wages rise with advancing development, countries move into the **efficiency-driven** stage of development, when they must begin to develop more efficient production processes and increase product quality. At this point, competitiveness becomes increasingly driven by higher education and training, efficient markets, and the ability to harness the benefits of existing technologies.
- Finally, as countries move into the **innovation-driven** stage, they are only able to sustain higher wages and the associated standard of living if their businesses are able to compete with new and unique products. At this stage, companies must compete by producing new and different goods using the most sophisticated production processes and through innovation.

Entrepreneurial with New Products

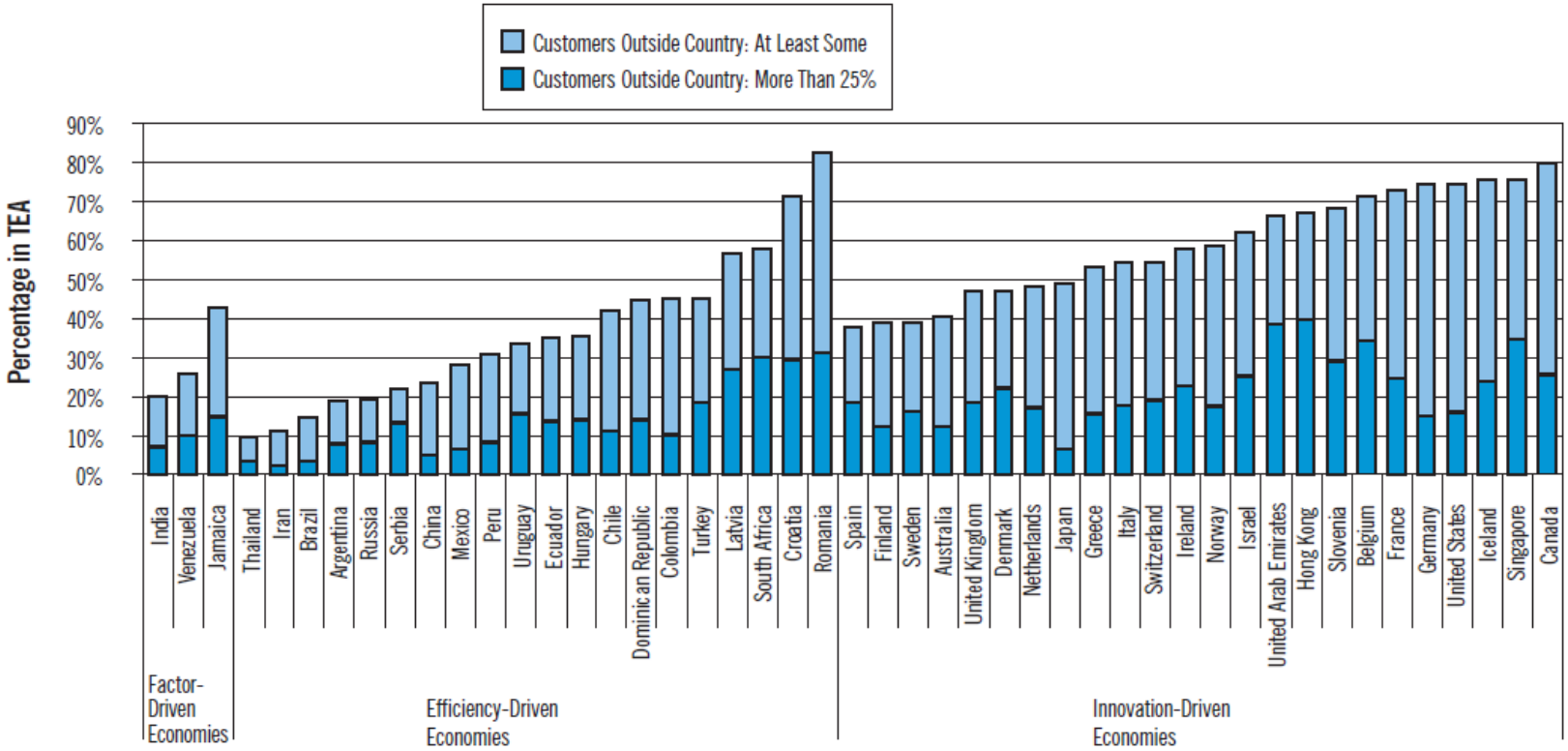
Figure 14 — Percentage of Early-Stage Entrepreneurial Activity with New Products or New Markets, 2004-2009



Source: GEM Adult Population Survey (APS)

International Orientation

Figure 15 — Percentage of Early-Stage Entrepreneurs with International Orientation, 2004-2009



Source: GEM Adult Population Survey (APS)

Entrepreneurship & Science

Scientists who work around other scientists who had started companies are more likely to become entrepreneurs themselves

Ding, W., & Stuart, T. (2006). When do scientists become entrepreneurs? The social structural antecedents of commercial activity in the academic life sciences. American Journal of Sociology

The model predicts that faculty members are more likely to engage in founding new ventures as the commercial applicability of their research orientation increases. It also predicts that increasing scientific prominence raises the likelihood of new venture creations.

Anak Agung Istri, Shanti Dewi, Faculty Transition to Entrepreneurship (May 5, 2009). Atlanta Competitive Advantage Conference 2009 Paper. Available at SSRN: http://ssrn.com/abstract=1351794

Academic & Business

- Major Difference
- Academics Use Different Language

Academic & Business Languages

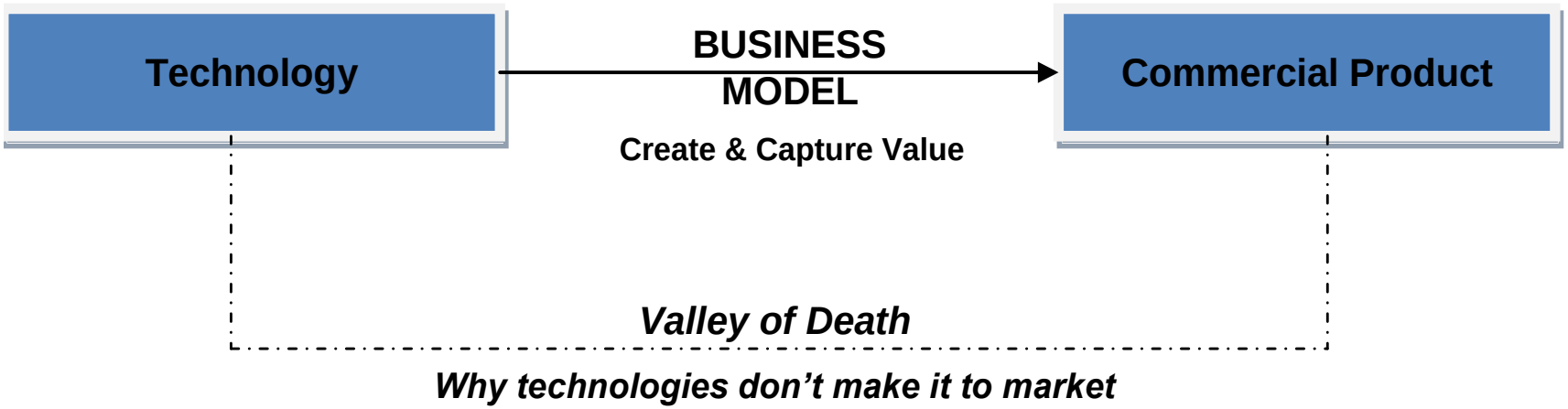
Business	Academic
• Payment	Honorarium
• Income	Grant
• Money	Funds
• Manager	Principal Investigator
• Contract	Agreement
• Market research	Needs Analysis

The Transition to Entrepreneurship

- **What translates**
  - Engineers conceive, design, build, and operate useful objects or processes
  - Engineering education is a logical foundation for entrepreneurial concepts
- **What does not easily translate**
  - Linear thinking
  - Formulas
  - Solutions in search of a problem
  - Understanding the way entrepreneurs think

Source: ***Entrepreneurship for Scientists and Engineers, Chapter 1***

From Bench to Market



Source: *Entrepreneurship for Scientists and Engineers, Chapter 1*
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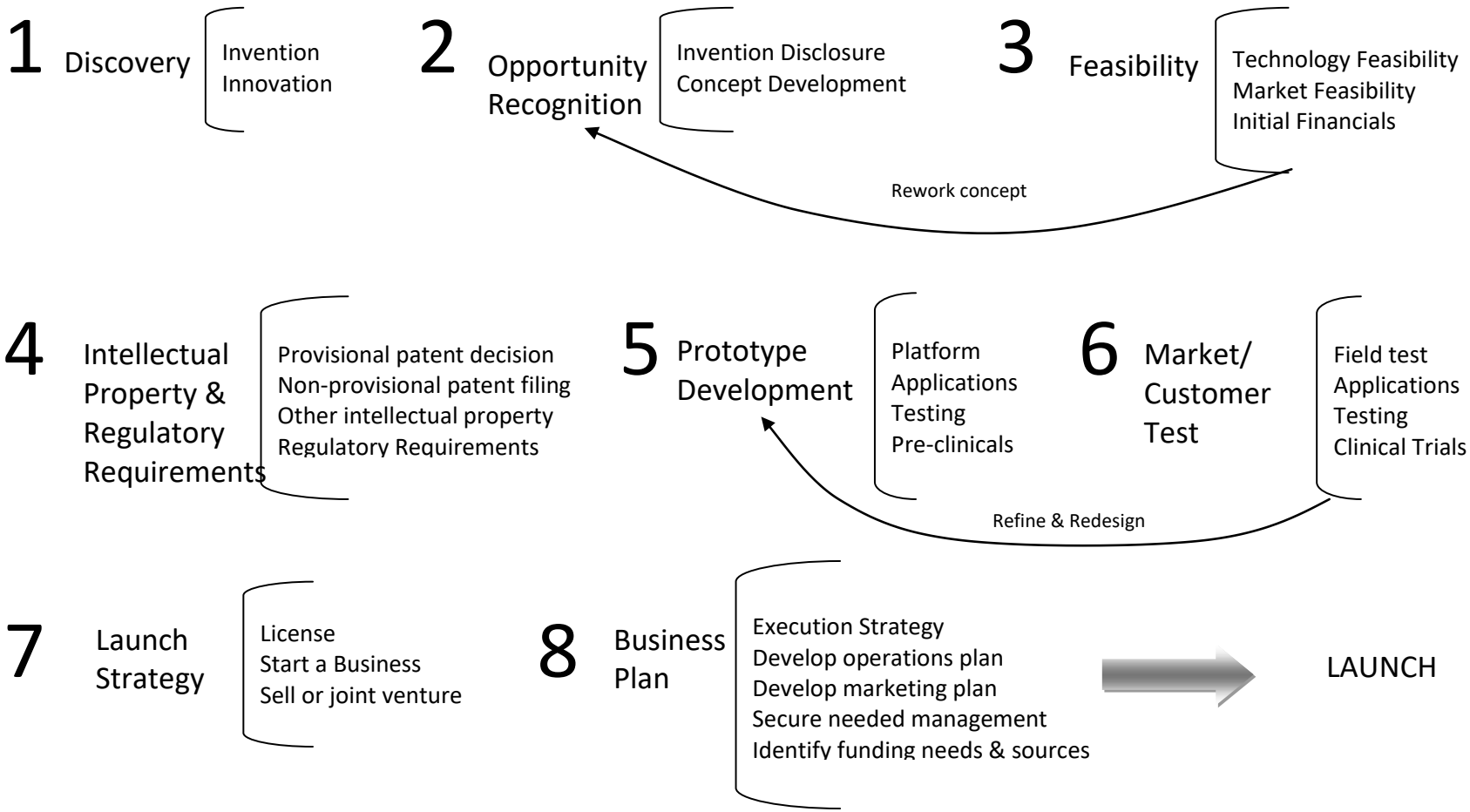
The Commercialization Process



Source: ***Entrepreneurship for Scientists and Engineers, Chapter 1***

2ª Aula

- Opportunity recognition and creation
- Sources of opportunity
- Screening technology opportunities

Recognising and Screaning Technology Opportunities

- Ideas and opportunities are not the same concepts.
- An **opportunity** is an idea that can be turned into a business or commercialized in some manner.
- Today nearly every technology company is pursuing new opportunities and new ways to serve customers and solve problems.
- **Opportunities** typically come about when a need is apparent.
- But breakthrough innovations are normally the result of a serendipitous connection that, with experimentation, leads to a new technology and eventually a product in the market.

Ideas & Opportunities

- Any idea for a product is just that—an idea, until the inventor figures out a way to apply that idea or commercialize it with a business model.
- That is precisely why so many Internet businesses failed in 2000.
- They were simply ideas with no viable way to make money by selling something of value to customers.
- Selling groceries online was an idea with merit in some markets, but the idea involved delivering groceries free to the consumer, a concept that prevented the idea from becoming a viable opportunity because there was no way for the entrepreneur to make a profit under that kind of business model

How Opportunity Happens

- When entrepreneurs are involved in an active search for opportunities
- When entrepreneurs have the skills to spot an opportunity in the market
- When they have experience in an industry or field of endeavor

Opportunities

- Opportunity recognition and creation
  - Employing creative problem-solving skills for opportunity recognition and creation
  - Restating the problem
  - An engineering approach to creative problem solving
  - TRIZ approach to innovation

Employing Creative Problem-Solving Skills

- Divergent thinking
  - Pulls you away from a central point to explore different directions
  - Used to generate many ideas quickly

- Convergent thinking
  - Brings you back to focused thought
  - Evaluate ideas and devise solutions

- Simplistic problems: only one answer
- Deterministic problems: a formula produces one answer
- Random problems: different answers are possible
- Indeterminate problems: many different answers are possible, but you need all the information or the right formula

Restating the Problem

- Initial problem statement: We don’t have enough lab space.

- *Restatement: There are too many people for the space we have.*
- *Restatement: How can we reduce the number of people we have?*
- *Restatement: How can we use the space we have more effectively?*

Engineering Approach to Creative Problem Solving – Clegg & Birch

- Surveying
  - Gather information to solve the problem and set a goal for the end of the process using divergent and convergent thinking.
- Building
  - Based on the information gathered, devise a method for getting to the goals, identifying all potential obstacles
- Waymaking
  - Turn what is built into a solution. This is an iterative process that considers the views of all the stakeholders
- Navigating
  - Determine resources required to implement the solution and metrics to track progress and signal reaching the goal

TRIZ Approach – defining the real problem

- This approach focuses on the problem in the belief that the problem defined may not be the actual problem.

- Problems suitable for TRIZ

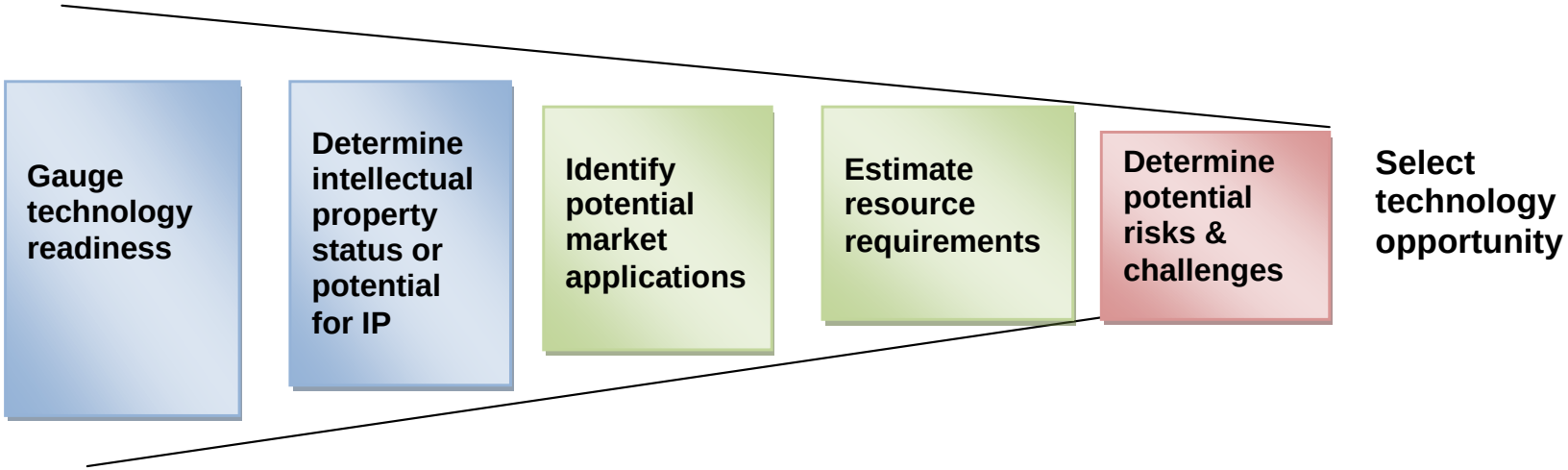
  – Technical conflict and physical contradiction
  – Inventive problem – involves a trade-off or invention a solution to resolve a conflict
  – Ideal machine – finding the simplest way to make the invention work – how to simplify the device

Source: ***Entrepreneurship for Scientists and Engineers, Chapter 1***

Sources of Opportunity

- Study an industry
- Search the patent literature
- Talk to customers
- Look into university opportunities
- Investigate government sources
- Find new value in existing technology

Screening Technology Opportunities



Chapter 3

- Developing a business concept
- Conducting a feasibility analysis
- Is this business feasible?

Developing a Business Concept

- Two-sentence statement:
  - Customer, benefit, product/service, distribution

HeadBlade Co. LLC provides a state-of-the-art way for men to easily and safely shave their heads. Customers control the blade with their own hands, preventing unwanted cuts. HeadBlade is delivered direct to the consumer through the company's Internet site.

- Features versus benefits
  - Features are attributes such as an ergonomically-designed handle
  - The benefit answers the question, "what's in it for me?"
  - Here the benefit is convenience and safety

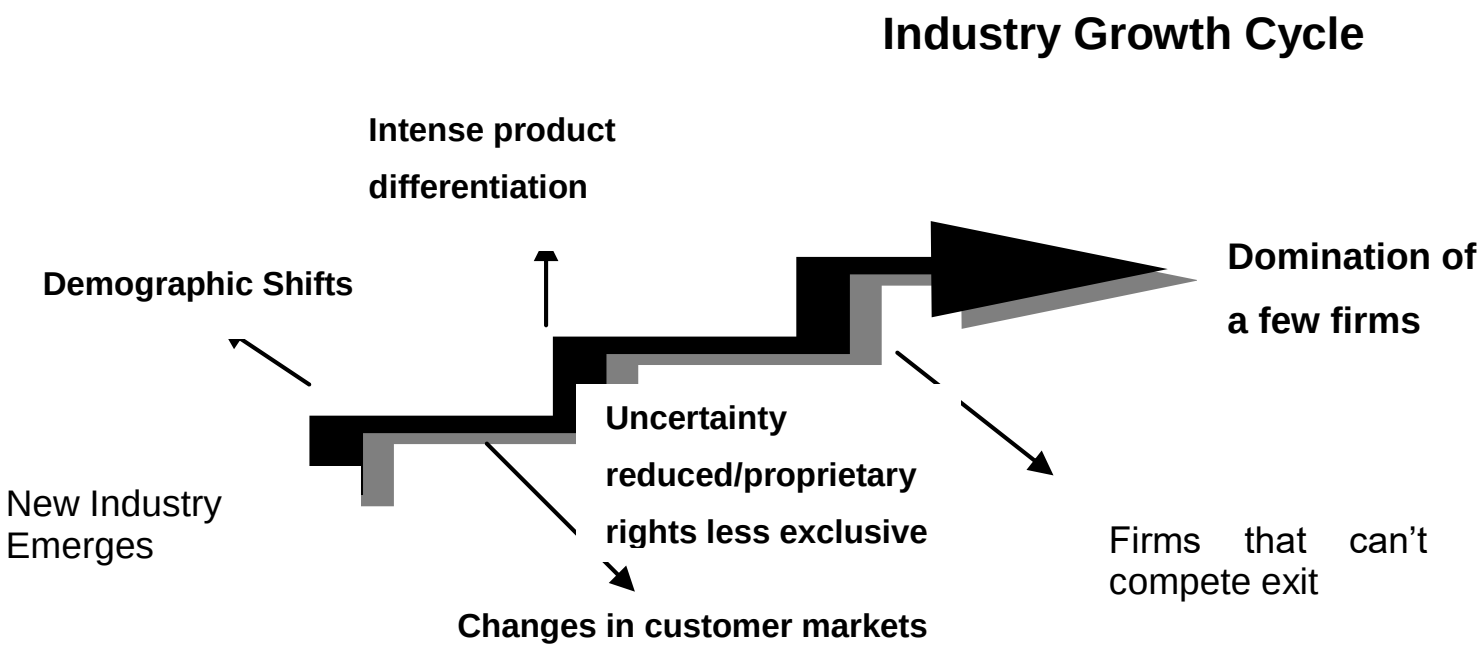
Feasibility Analysis – Key questions

- Are there enough customers to make the business work?
- Do the capital requirements to start the business make sense?
- Does the entrepreneur have the right team put together to execute the concept?

Components of Feasibility Analysis

- Industry analysis
- Market and first customer analysis
- Product/service analysis
- Founding team assessment
- Financial analysis

Analyzing the Industry Growth Cycle



Key Industry Information

- Demographics: size, lifecycle stage, growth, rate, etc.
- Trends and patterns that predict change
- R&D expenditures
- Regulatory requirements
- Intellectual property acquisition
- Opinion leaders
- Threats
- Typical gross margins

Market Analysis – Key Questions

- Who is most likely to be the first customer for this product? In other words, who is in the most pain?
- What does this customer typically buy, how do they buy it, and how do they become aware of it?
- How often does this customer buy, and what is their buying pattern?
- How loyal is the customer to the current solution?
- What are the switching costs to the customer of moving to the new technology?
- How can this company meet the customer's needs?

Market Research

- Evaluate information needs
- Conduct a customer test
  - Definition of the target market
  - Identification of first customer
  - Estimate of demand
  - Willingness of customer to purchase from the entrepreneur
- Create the customer profile
- Forecast demand
  - Triangulate from points of view of the entrepreneur's knowledge and experience, analogous products, and industry experts
  - Experiment by going into limited production

Analyze the Competition

- Good competition: companies that serve their customers poorly

- Bad competition: companies that are doing a good job of serving customers

- Visit competitors' physical sites
- Purchase their products
- Study public companies as benchmarks of excellence
- Talk to trade associations

Analyze Product/Service Feasibility

- Is the technology technically feasible?
- Can it be produced in quantity at a reasonable cost?
- What are the intellectual property requirements
- Are there regulatory requirements?
- What is the plan for product development?
- How much money will be required
- What is the timeline for completion?

Analyze the Management Team

- Relevant experience
- Ability to execute the plan
- Gaps in experience and how you will fill them
- Advisory board

Business Model and Capital Requirements

- Choices for commercialization
  - Licensing to third parties
  - Selling the technology outright
  - Partnering with a larger company and sharing the technology
  - Starting a new venture

- How can the venture create and capture value?

- How much cash is needed to start the business and operate to a positive cash flow from the revenues generated by the business?

Is the Business Feasible?

- Have the major challenges been identified and dealt with?
- Does the industry provide an environment conducive to success?
- Can the new venture enter and capture a market niche?
- Can the team make this happen?
- Can funding be raised to support the venture until revenues are sufficient.

Chapter 4

Advantages of a Team

- If well-formed, it contains all the core functions: marketing, finance, and operations.
- All the activities, risks, and decisions of a start-up can be shared
- A founding team with skills and experience will be more credible in the eyes of investors, bankers, and strategic partners.
- Decision-making will be enhanced by diversity of opinion.

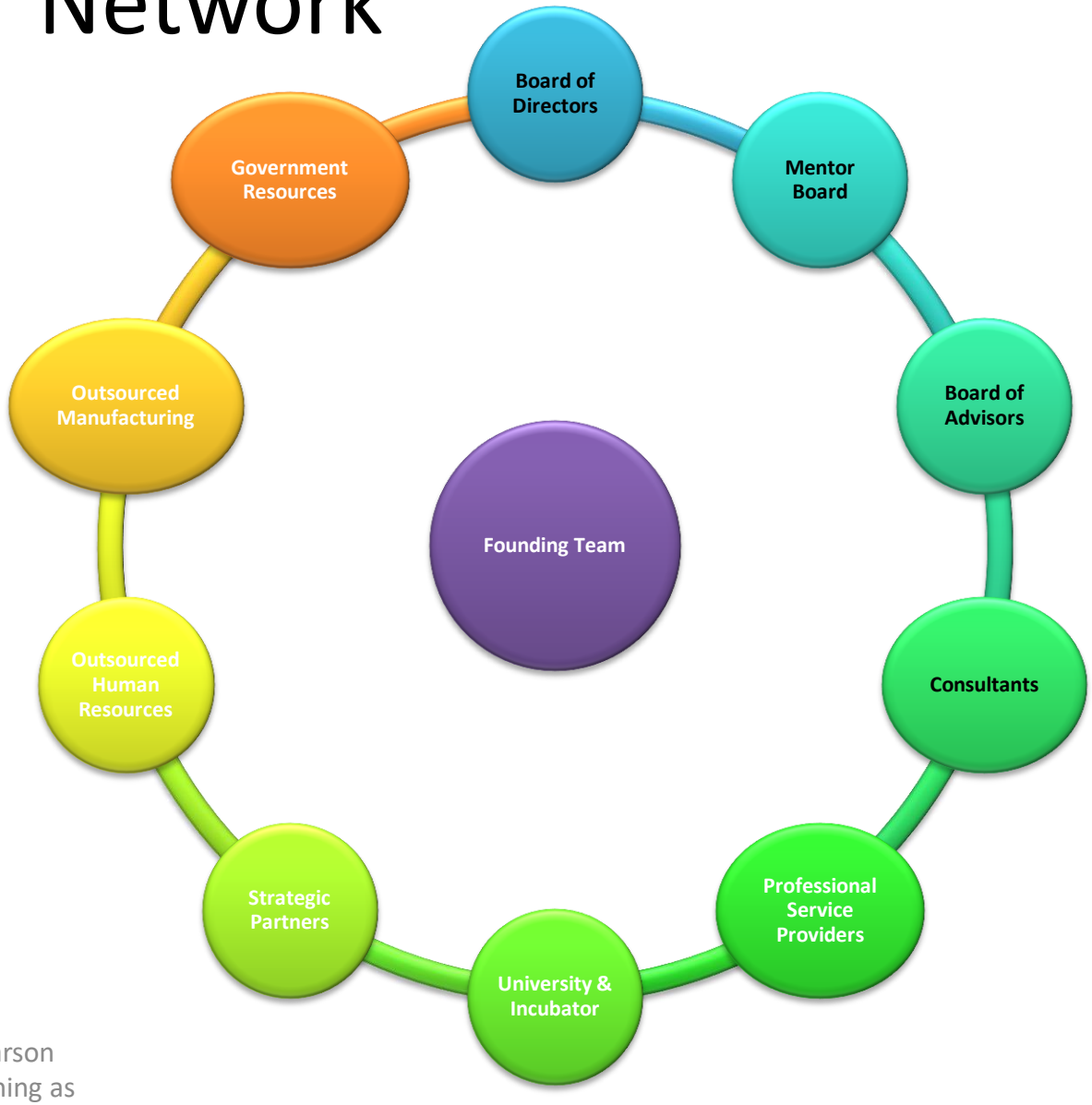
An Effective Founding Team

- Managerial capabilities – skills, knowledge, experience
- Technical competencies
- Common vision
- Worked together previously
- At least one member with experience in the industry
- A network of industry contacts
- Expertise in the basic functional areas of the business
- Dedicated to the start-up and able to endure any financial constraints.

Technology Founding Team Problems

- Linear thinking
- Lack of ability to use right-brained conceptual and big-picture thinking
- Ego and sense of destiny on the part of the scientists
- Cling to technologies despite declining prospects for commercial success.
- Lack of business expertise

The Entrepreneur's Network

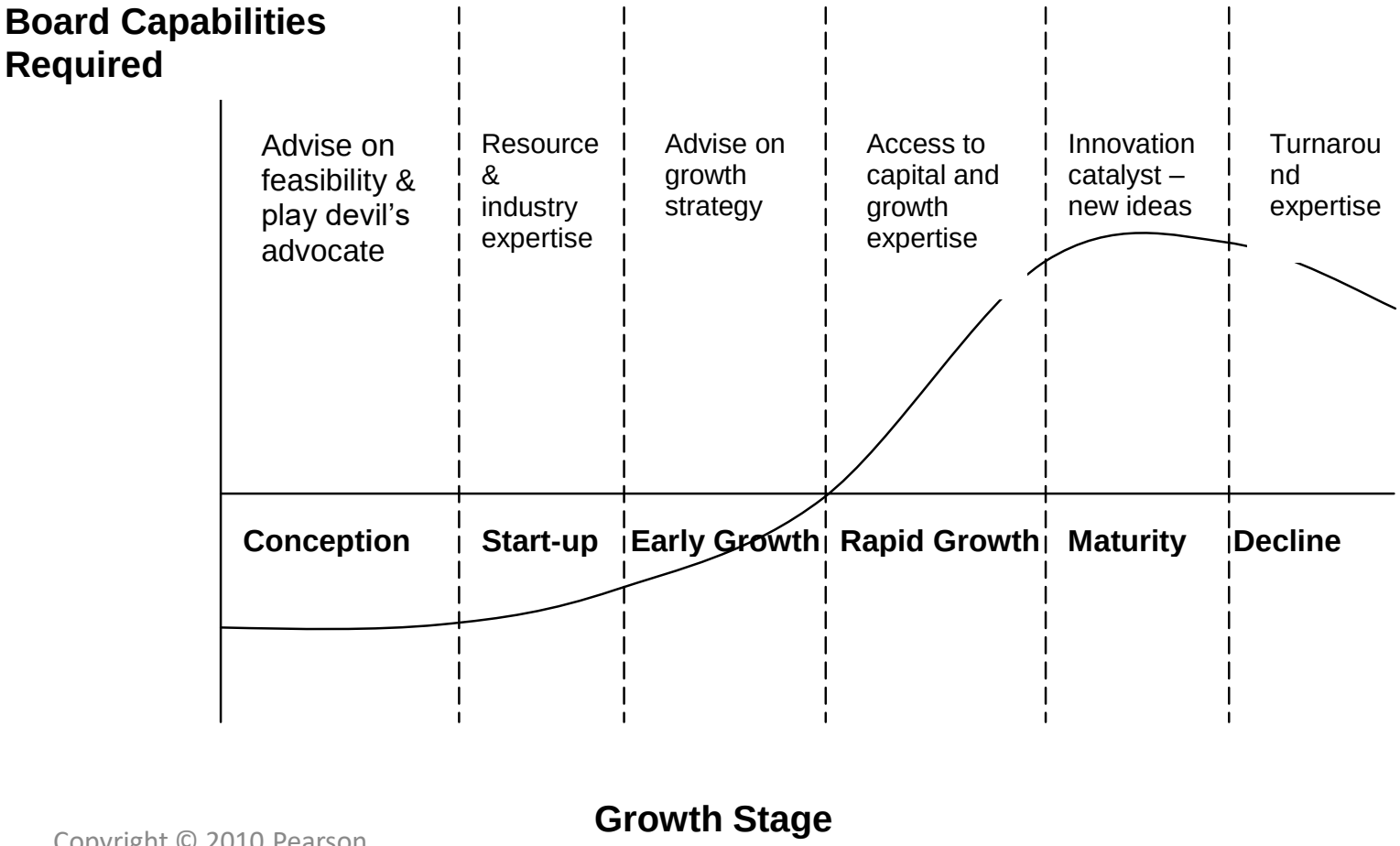


Extending the Founding Team

- Professional Advisors
  - Attorneys, accountants, bankers, investors, consultants, insurance experts

- Board of Directors
  - 7-10 members
  - Fill gaps in expertise
  - Assist in establishing corporate strategy and philosophy

Boards and Firm Growth Stages



Independent Contractors

- Become familiar with the IRS 20-point test for classifying workers (http://www.fedexaminer.com/FedEx/view-436.html).
- Seek the advice of a qualified attorney.
- Draw up a contract with each independent contractor spelling out all the particulars of the agreement.
- Verify that the independent contractor carries workers' compensation
- insurance and possesses the appropriate licenses.

Additional Resources

- Employee leasing and human resources services
- Manufacturing
- Distribution and logistics companies
- Sales agencies
- Small Business Administration
- Service Core of Retired Executives (SCORE)
- SBIR programs

Move From Start-up to Rapid Growth

- Rapid growth requires systems, controls, and logistics to meet an increasing level of demand
- Initial growth characterized by a focus on survival, innovation, and resource acquisition
- Rapid growth characterized by internal efficiencies
- Problematic for entrepreneurs used to micro-managing

Chapter 5

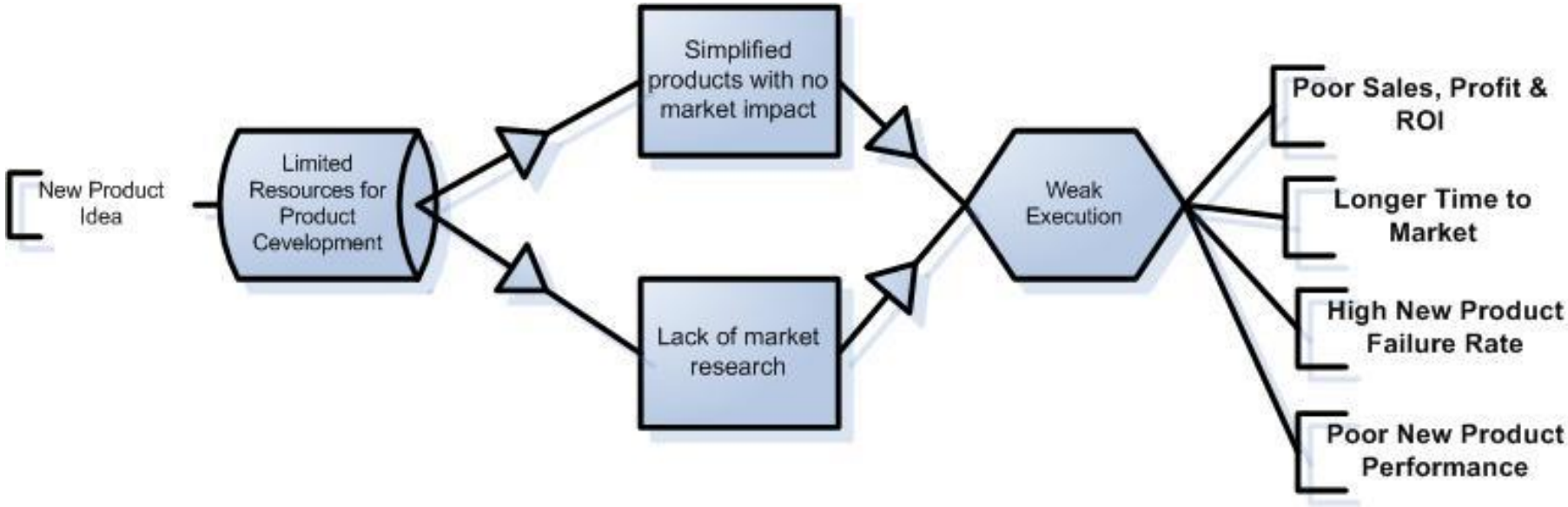
Chapter Overview

- Entrepreneurial product development model
- Measuring success and risks
- Outsourcing technology innovation
- Developing a regulatory strategy

Entrepreneurial Product Development Model

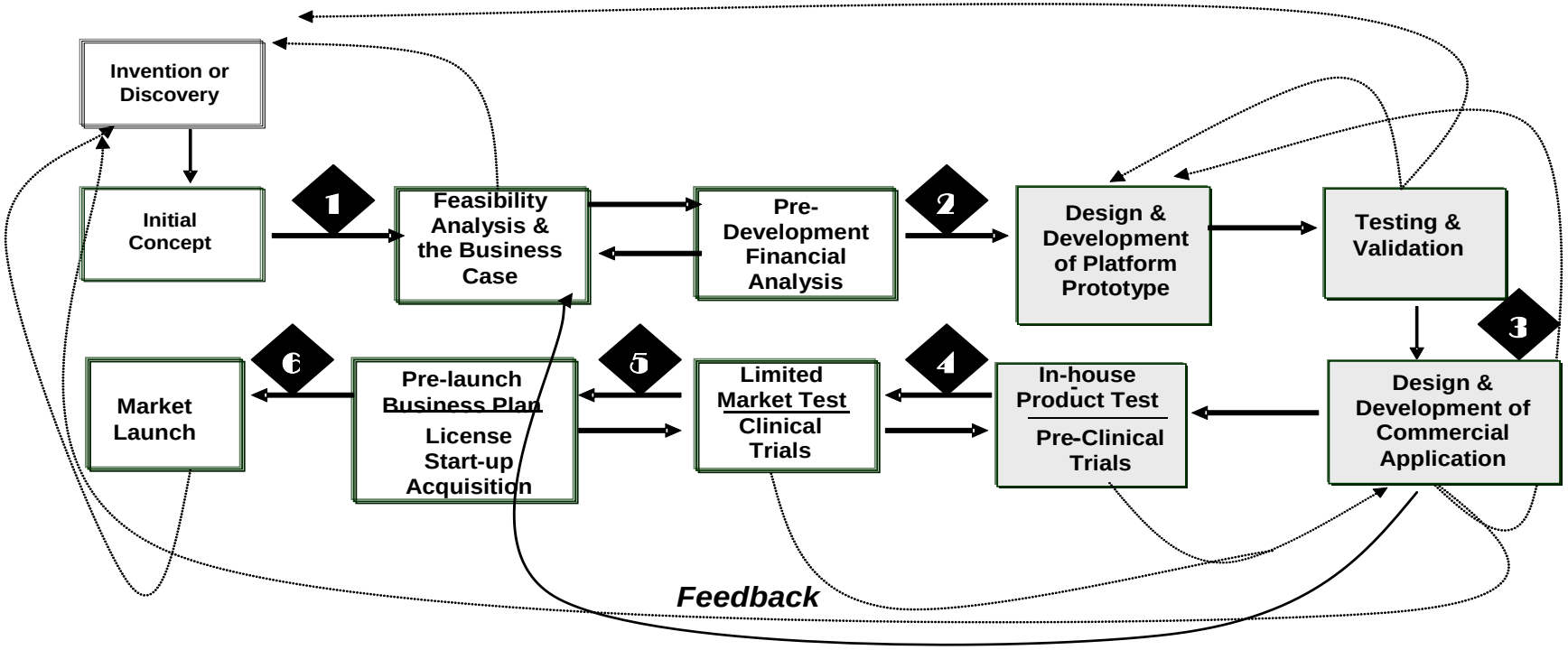
- Why new products fail
  - Lack of effective market research
  - Limited resources
  - Not understanding customer needs
  - Poorly defined product concept
  - Weak competitive intelligence
  - Poor execution of marketing plan

The Problem with a Lack of Resources



The Commercialization Process

Figure 7.2: New Technology Product Development Process



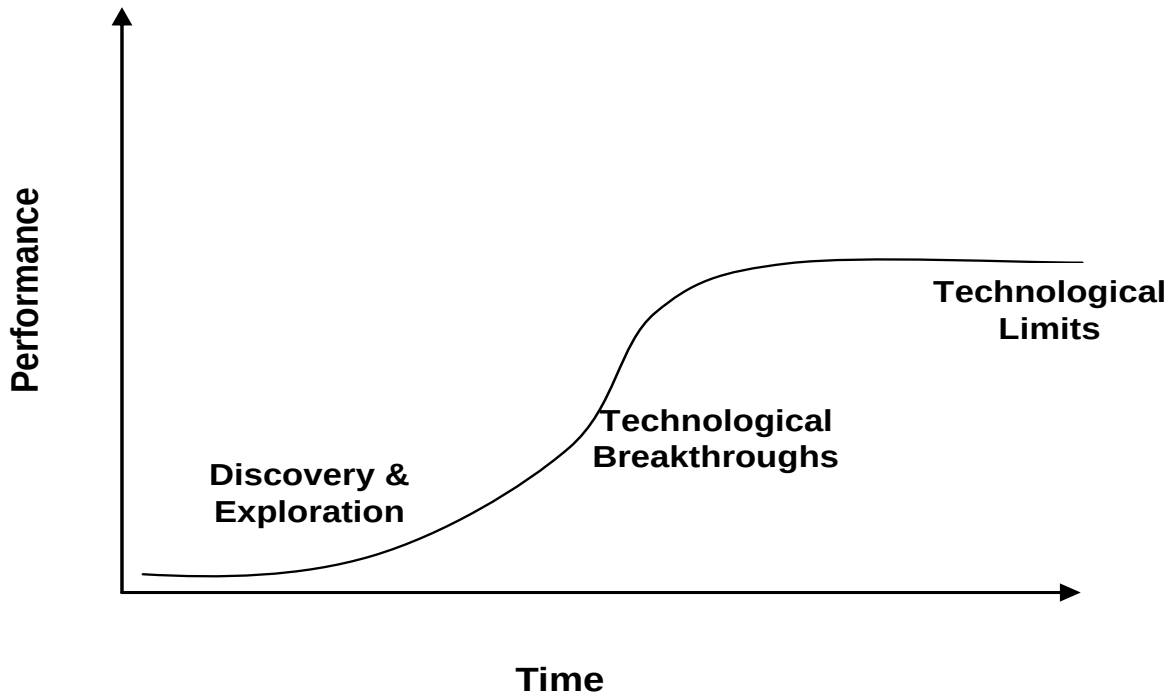
Roadblocks and Speed Bumps	
1. Fear of the unknown. Is there something novel and patentable?	2. What is the level of demand and the adoption pattern?
3. No market knowledge. Is there a customer and a compelling need?	4. Launch Strategy. License? Start a company? Be acquired?
5. Funding for prototyping. Finding the right applications	6. Difficulty of moving from laboratory to company.

Factors That Affect the NPD Process

- Capabilities including technological and market knowledge

1. A superior, rigorous new product process
2. Resources such as financial and access to people
3. The quality of the development team
4. An entrepreneurial culture

Technology S Curves



Evaluating New Technology – Primary Areas of Evaluation

- Role of the customer
  - Learning curve, needs, usability, buying cycle, growth of market
- Role of company capabilities
  - Extend or begin a new S curve, technical requirements, risks, manufacturing, unique capabilities, status of competitor technology, fit company's current capabilities
- Role of business development
  - Effective market research, time factor, incorporating customer input, intellectual property and regulatory issues

Reducing Time to Market and Achieving Higher Performance

- Network with external partners and internal resources not on the development team
- Document the workflow associated with the NPD process
- Set goals for completion times
- Make the team accountable for its performance

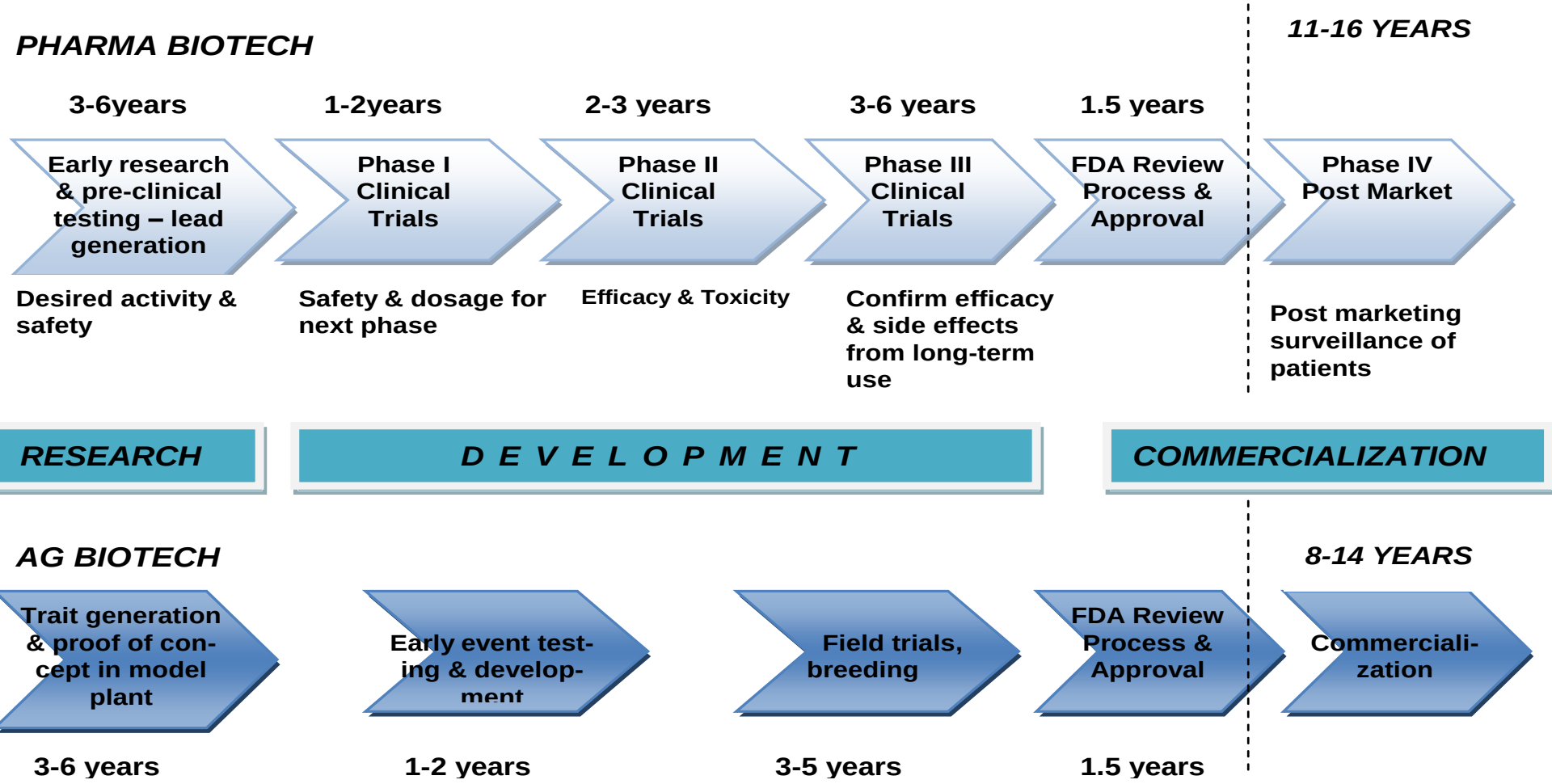
Measuring Success and Risks

- Technology risk
  - Obsolescence, complexity, product definition
  - Mediate by using off-the-shelf or proven components, not forcing a solution, talking to the customer, and tackling the riskiest issues first
- Investment risk
  - Risk of poor information about the market
  - Non-alignment with company's goals
  - Mediate by asking the critical questions before investing
- Project management risk
  - Balance resource constraints: time, funds, product requirements
  - Involve customers and suppliers in the business
  - Form internal links between technical and nontechnical groups

Outsourcing Technology Innovation

- Many new focused niches for innovation on a global level
- Availability of investment capital
- Access to knowledge experts globally through open source platforms
- Outsource non-core capabilities

A Regulatory Strategy



Chapter 6

Chapter Overview

- Transitioning from project to operations
- Deciding on a launch strategy
- Deciding on an operational strategy
- Organizing from a legal perspective

Making the Transition from Project to Operations - Challenges

- Business partners during R&D may no longer be appropriate
- Team is now under pressure to generate cash flow
- Uncertainty about how applications and markets will develop

Remedies for the Transition

- Build a first-class team
  - Technology people
  - Operations people (manufacturing, marketing, finance)
  - Entrepreneur or CEO
- Develop the mission
  - Get stakeholder input
  - Define the components of the mission
  - Create the mission statement
  - Communicate the mission statement

Deciding on a Launch Strategy

- License the technology
  - Transfer rights to further develop, manufacture, or distribute
- Sell the technology
  - Works if the technology does not fit the company's core capabilities or mission
  - Potential buyer is better positioned to commercialize
- Start a company
  - Good when the technology is not easily licensed or there are no companies capable of further development
- Form a strategic alliance
  - Gain access to resources, skills, and knowledge too costly to develop
  - Consider vertical alliances up and down the value chain or horizontal with companies in same position on the value chain

Preparation for a Strategic Partnership

Pre-Alliance	**1. Study the industry landscape to identify potential partners** **2. Conduct due diligence on the potential partner to insure that the two firms will be compatible in their company goals and culture.** **3. Talk with firms that have worked with the potential partner to understand the pros and cons of such an alliance** **4. Put procurement and contract management specialists in place to track the experiences of the alliance and monitor its progress.**
During the Alliance	**5. Develop knowledge systems to collect, evaluate, and monitor what outside suppliers are doing.** **6. Develop feedback mechanisms that make it possible to use the knowledge gained from the alliance to improve other areas of the business and create a better interface between suppliers, the company, and downstream partners**
Post Alliance	**7. Evaluate the outcomes against goals.** **8. Check for satisfactory completion of all contracts**

Deciding on an Operational Strategy

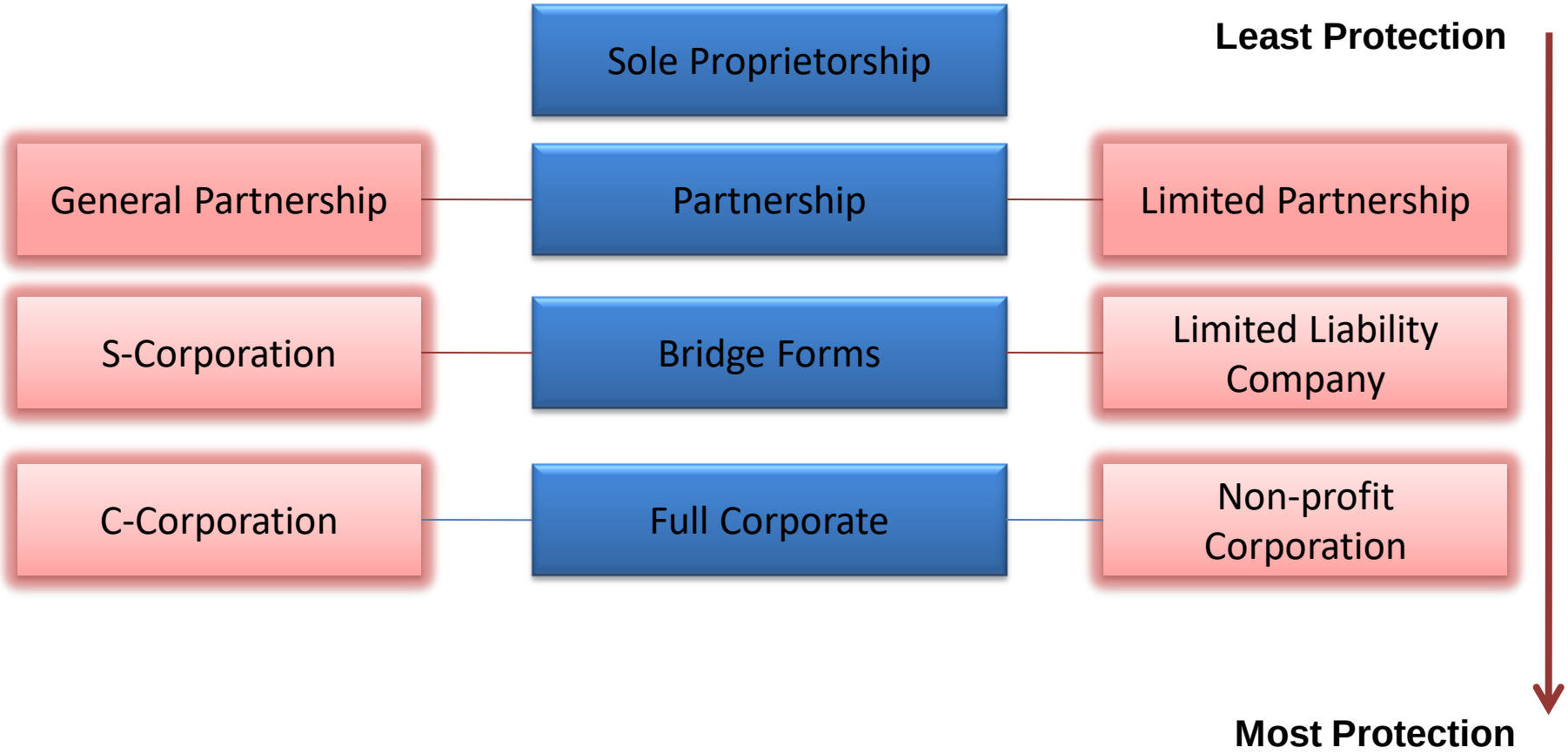
- Figure out the process flow in the company
  - Include personnel required and equipment needed to fulfill tasks
  - Determine which non-critical functions can be outsourced
- Develop the organizational architecture
  - Formal and informal systems and their interactions
  - Star Model of Organization Design
    - Culture
    - People
    - Structure
    - Rewards
    - Business processes

Organizing from a Legal Perspective

- Choice factors
  - How much liability protection is required
  - The company's operating requirements
  - The company's tax strategy

- Business form issues
  - Continuity of life of the business
  - Transferability of interest
  - Distribution of profits
  - Management control

Summary of Forms



R&D and Pre-launch Forms

- Sole proprietorships and partnerships
  - Quick, easy, and inexpensive to set up
  - Do not protect the owner from liability, which is minimal at this stage
- Partnership should have a written agreement
  - How profits and losses will be shared
  - Term of the agreement
  - Arbitration in case of disagreement
- In both forms earnings and losses pass to the owners to pay taxes at their personal income tax rates.

Legal Forms that Protect Owners

- General Corporation
  - Only form that is a legal entity
  - Limited liability
  - Multiple classes of stock
  - Employee incentive plans
  - Taxed on profit and dividends
- Sub-chapter S
  - Not a tax-paying entity
  - Pass-through
  - No more than 100 investors
  - Must be U.S. citizens
  - One class of stock
- Limited Liability Comp.
  - Combines limited liability with pass-through tax advantages
  - No limitations on members or classes of stock

Legal Form Strategy

- If need to raise capital - corporation
- If team can assume personal liability during R&D – partnership
- If business has initial losses – pass-through form
- If plan to IPO – corporation

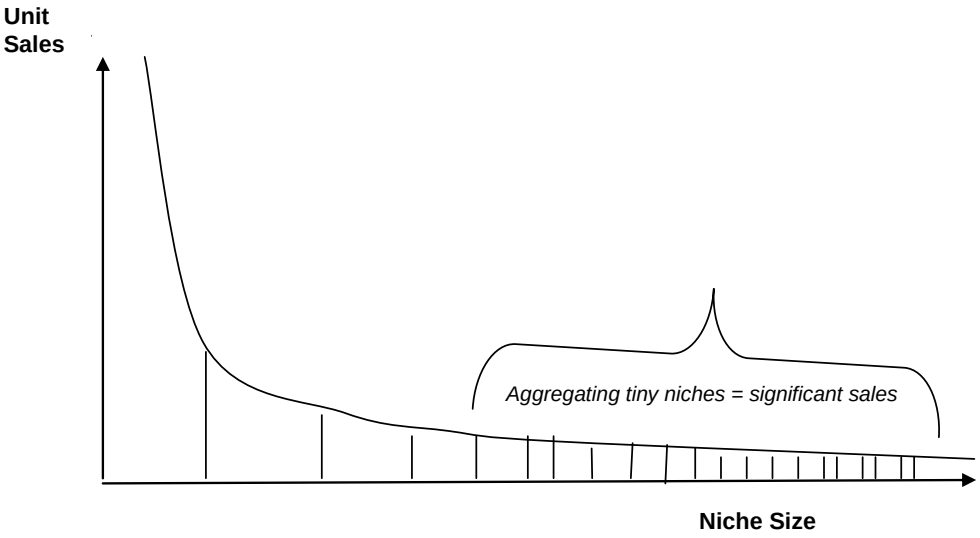
- Form may change as company evolves
  - Move from sole proprietorship/partnership in formative and product development stages to corporate or LLC in the launch phase.
  - May move from LLC to C-corporation to secure third party investment

Chapter 7

Chapter Overview

- The nature of high-technology markets
- The technology adoption cycle
- Determining a marketing approach
- Pricing high-technology products
- Developing a marketing plan
- Promoting high-technology products

The Long-Tail Impact

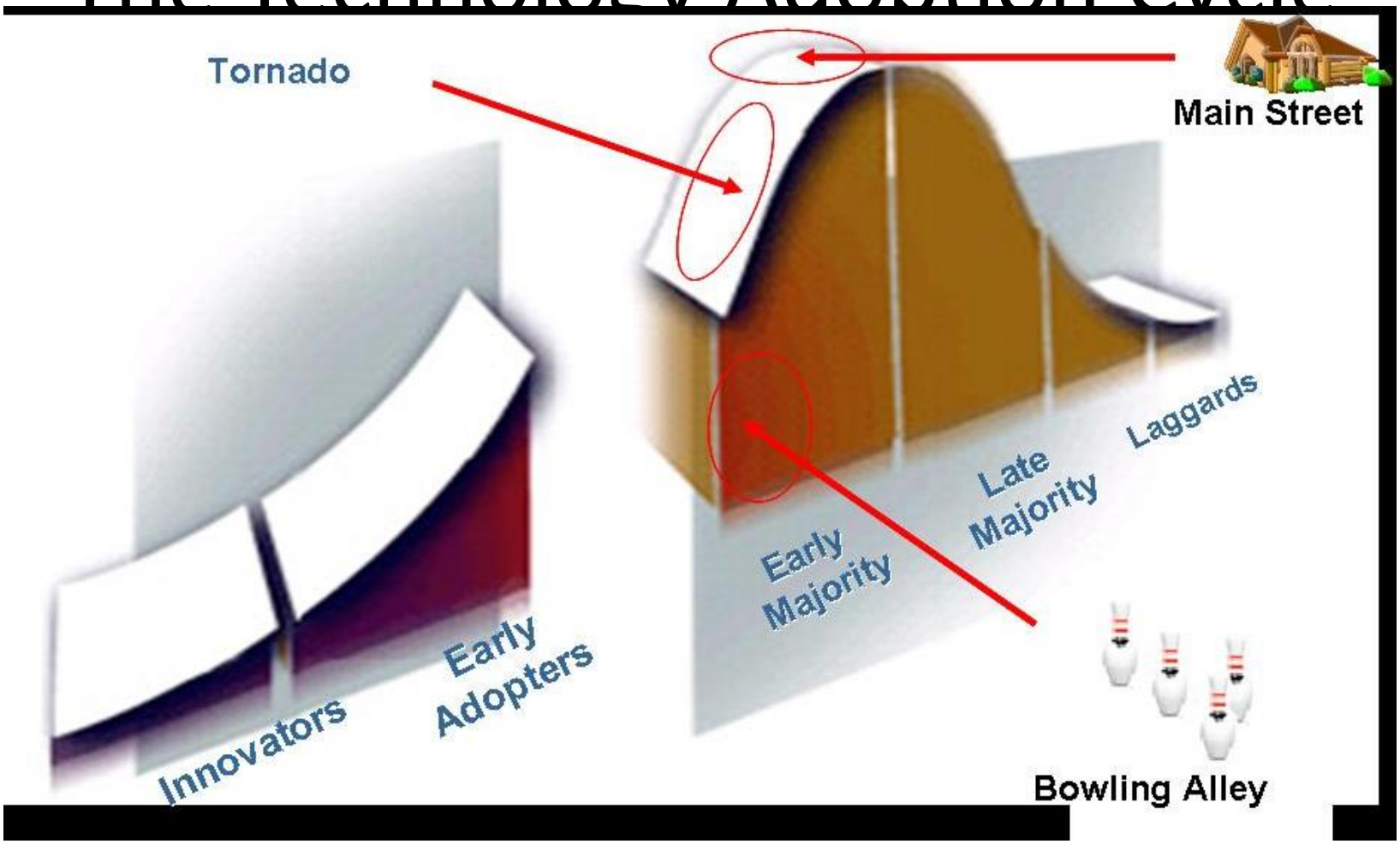


- Reach millions of customers relatively cheaply via Internet
- Creates revenues not available in the offline world
- Social networking and new media tools can deliver highly targeted messages

Nature of High-Technology Markets

- Market uncertainty
  - Customer resistance to trying a new technology
  - Customer needs changing at a more rapid pace
- Technological uncertainty
  - Can the technology meet customer needs?
  - What is the rate of obsolescence?
  - Which features matter?
- Competitive uncertainty
  - Competitors may come from outside the industry
- Know-how, complexity, and velocity effects
  - Tacit knowledge creates a significant advantage and defies the economic law of scarcity
  - The speed at which know-how increases accelerates as more people become proficient at using the technology

The Technology Adoption Cycle



Source: Based on research at the Agricultural Extension Service at Iowa State College, *1957* and Moore,G. (1999) *Crossing the Chasm (*New York: HarperBusiness), pp. 1–11.

Building Critical Mass for a Tornado

- Crossing the chasm is needed to be adopted by the mainstream market and become the standard
  - Seek out niche markets and encourage early adopters to develop new applications
- Develop niches in multiple markets to create critical mass that will propel the company into a tornado
  - Mainstream market switches to the new technology
  - Demand exceeds supply
  - Focus shifts to manufacture and distribution
- After the tornado, the company shifts focus to satisfying customers and building sustainable relationships

Determining a Marketing Approach

- First year goal is survival – find market niche where the pain is greatest

- Technology products differ from other types of products
  - The value proposition does not endure – customers seek the latest version
  - Tech products are often part of a system governed by an architecture or rules
  - They are the result of significant embedded tacit knowledge
  - Challenge in conveying the benefits to the customer
  - Radical technology exacts high switching costs from customers

Understanding Customer Needs

- What do customers buy?
- When do they buy?
- Why do they buy?
- How do they buy?
- How much do they buy?

Five factors that impact the purchasing decision

1. Cost/benefit – does the higher price deliver the benefit expected?
2. Compatibility with existing technology – reduce switching costs
3. Difficulty of use – customers look at complexity
4. Readily identifiable benefits – should be obvious to the customer
5. Ability of benefits to be observed – can the customer see the benefits?

Pricing High-Technology Products

- Pricing issues with technology
  - Technologies experience rapid decline in price after introduction
  - Firm must lower costs faster than prices are declining
  - Technologies eventually become commodities
  - Need to achieve the highest price point at launch

- Components of price
  - Cost of producing the product
  - Overall price strategy and goals of pricing
  - Promotions and discounts
  - Degree of standardization or customization involved
  - Profit required
  - Industry margins

Converging on a Price Point

- Look at pricing from three perspectives
  - Direct costs of producing the product
  - Competition pricing as a gauge, but not to benchmark
  - Customers and value chain partners

- Pricing strategy
  - Based on company's goals and life cycle stage
  - Simple versus complex pricing. Complex is more difficult to compare across the competition
  - Customer goals – reduce costs or solve a problem

Developing a Marketing Plan

- Purpose of the plan
- Benefits of the product and any services
- The target market and first customer
- The market niche and how the company differentiates itself
- The marketing tactics and tools
- The company's identify – how the customer will perceive the company

Marketing Tools – What to Consider

- Spend time with lead users who can provide insights into what customers want to see and through what medium.
- Use network effects – get the product into the hands of users
- Price for the 20 percent of customers who contribute 80 percent of revenues
- The first customer should have the highest cost/benefit ratio

Promoting High-Technology Products

- Preannouncements
  - A way to persuade customers to delay purchasing until the new technology is ready.
  - Builds excitement for the launch
- Developing a brand presence
  - The brand should have meaning – elicit an emotional response
  - The most effective route to branding is to brand the company and a platform of innovations to stabilize the brand
  - Use co-branding with great companies
- Publicity
  - Tell a great story and use customers as PR people

THE END

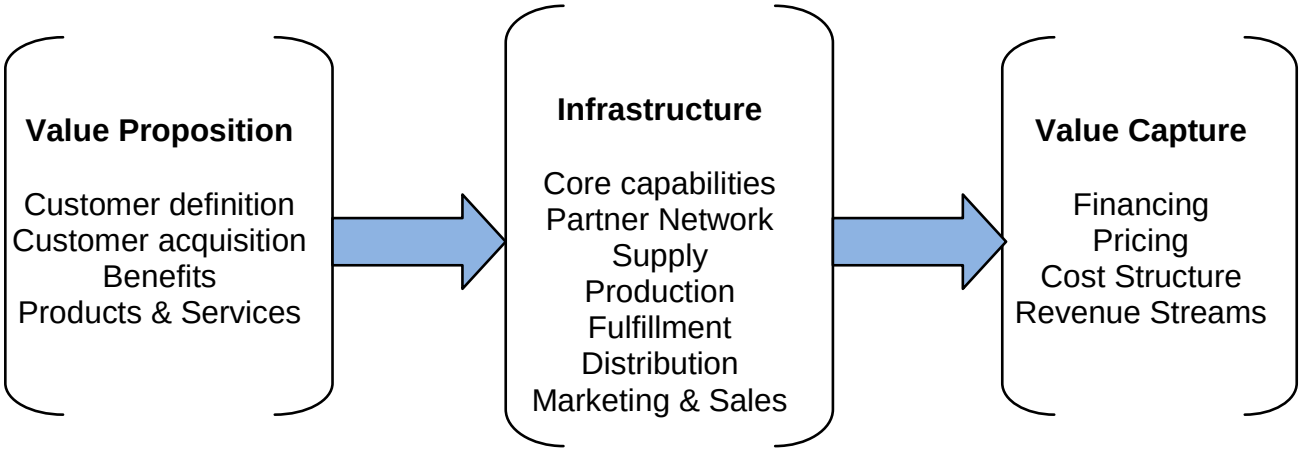
Chapter Overview

- Understanding business models
- Developing a business model
- Understanding why business models fail

What is a Business Model?

- A way to create and capture economic value
- Convert new technology to economic value and deliver that value to the customer
- Business model characteristics
  - Creates new value
  - Difficult to replicate
  - Based on accurate assumptions about the customer

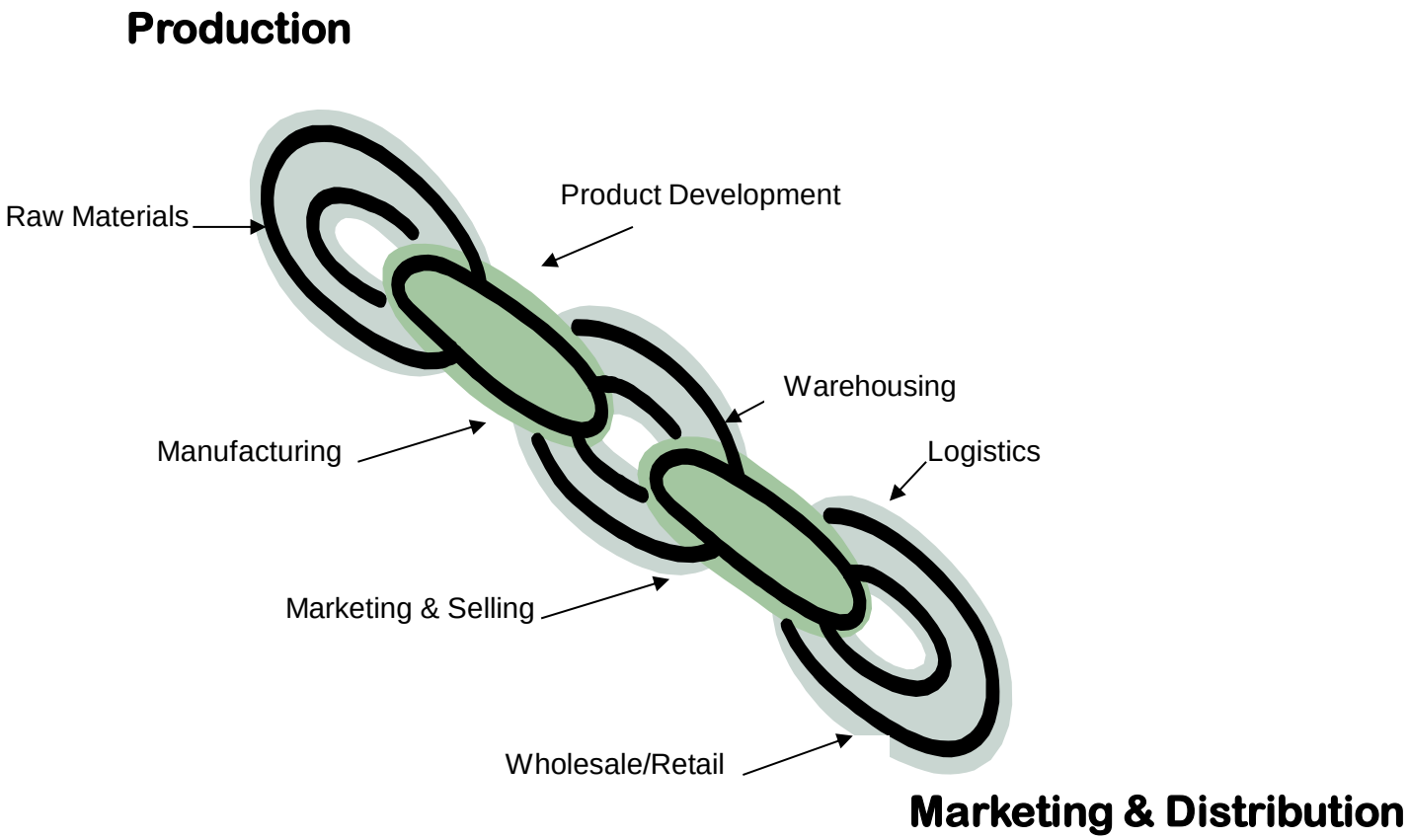
Business Model is the Implementation of Strategy



Strategically Position the Company in the Value Chain

- Location is a function of:
  - The company's capabilities
  - Whether the technology is licensed or forms the basis for a start-up
  - What kind of business the entrepreneur wants to operate

The Value Chain



Value Chain Characteristics

- Warehousing of inventory
  - Hold or outsource
- Ownership
  - Allow ownership in the channel?
- Financing and payments
  - Credit to smooth out cash flow variances
- Risk management
  - Mitigate with insurance carriers
- Member power
  - Degree that strong members control the system

Factors in Market Coverage

- Distribution: methods and processes used to take a product from manufacturer to customer
  - How much control over the product does the entrepreneur want?
  - Will the distribution strategy force customers to change the way they acquire and use the product?
  - Do customers regularly use the channel?

Sources of Opportunity for New Business Models

Reposition on the value chain	**Look for unserved or underserved niches and customer dissatisfaction.**
Reinvent the value chain	**Tear apart what currently exists and create a whole new value chain. Extrapolating from other industries is often the inspiration for a reinvented value chain in an industry.**
Redefine value-added	**If, for example, competitors in the industry seek out contracts for work from customers, a company may choose instead to learn what customers typically want, do the work first, and then sell it to them in a turn-key package. It is then selling convenience. This is what J.D. Powers & Associates did in the market research industry.**
Redefine distribution	**Think about where customers spend a lot of their time and put a product there. If customers typically are at the end of a long chain of intermediaries, consider selling direct.**

Identify Cost Drivers

- Components/processes involved in developing the final product
  - Supply
  - Production,
  - Fulfillment
  - Distribution
- How do critical success factors (sales team, marketing strategy, occupancy, etc.) drive revenues, costs, and cash flow?

Other Factors to Consider

- Capture value with pricing, cost, and financing
  - Premium v. lower pricing
  - Purchase orders, credit cards, PayPal
- Test for weaknesses in the business model
  - Launch in limited markets to test
  - Get feedback from customers and stakeholders
  - Conduct ongoing sensitivity analysis on the critical success factors

Business Models Change

- Expanded geographically, new markets, different product offering
- Selling new products/services to existing customers
- Taking current business model into new product/service areas
- Expanding through acquisition or strategic alliances
- Leveraging existing capabilities to develop new business models

Metrics for Success

- Does the business model
  - Inspire complementary products and services?
  - Increase network effects among customers?

Why Business Models Fail?

- Predictions based on faulty logic
- Does not create and capture value
- The customer has not been identified

Creativity

- Professor Robert J. Sternberg at Yale University believes that creativity requires the following essential elements to occur:
  - ***Intelligence***. This includes synthetic intelligence or the ability to combine existing information in new ways; analytic intelligence, the ability to distinguish worthy and non-worthy ideas; and practical intelligence, the ability to promote one's ideas and persuade.
  - ***Knowledge***. This is the ability to recognize what is actually new. It also provides skills required to undertake experimentation and design new products.
  - ***Thinking Styles***. Creative people typically challenge current thought and rarely passively accept conventional wisdom. So creative people also have a tolerance for conflict.
  - ***Personality***. Creative people tend to be risk takers, are courageous, and seem to persist in the face of objection and criticism.
  - ***Motivation***. Creative people tend to be intrinsically motivated, setting their own goals. They are less motivated by external or extrinsic motivators like money.
  - ***Environmental Context***. Creative people place themselves in environments that stimulate their creativity.