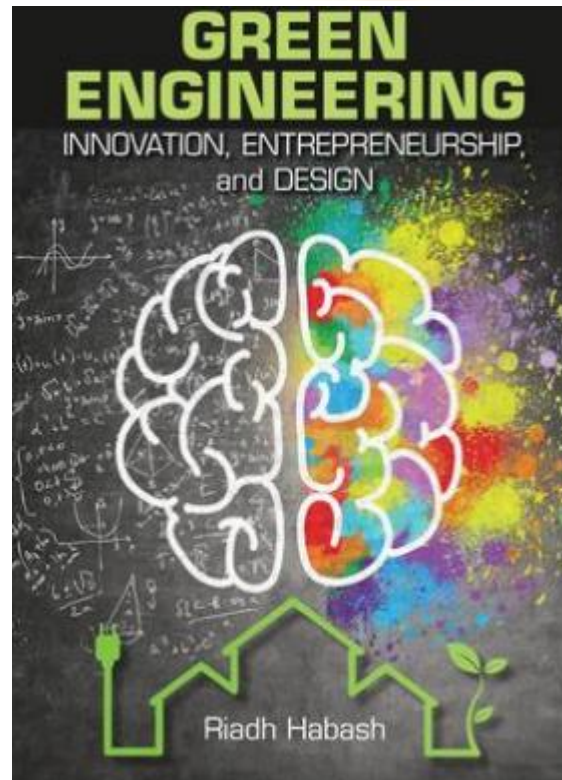


Engineering Entrepreneurship

Entrepreneurship refers to an individual's ability to find and understand an important industry problem and turn it into action. It involves creativity, innovation, and risk-taking, as well as the ability to plan and manage projects in order to achieve objectives.



Early Example of an Entrepreneur

- An early example of the earliest definition of an entrepreneur as a go-between is Marco Polo, who attempted to establish trade routes to the Far East. As a go-between, Marco Polo would sign a contract with a money person (today's venture capitalist) to sell his goods. A common contract during this time provided a loan to the merchant adventurer at a 22.5% rate, including insurance.
- While the capitalist was a passive risk bearer, the merchant adventurer took the active role in trading, bearing all the physical and emotional risks. When the merchant adventurer successfully sold the goods and completed the trip, the profits were divided with the capitalist taking most of them (up to 75%), while the merchant adventurer settled for the remaining 25%.

The Middle Ages

- The term entrepreneurship may be traced back to as early as the Middle Ages, when the entrepreneur was just a person who performed tasks, such as acting or managing projects. In such large production projects, this individual **did not take any risk**, but simply managed the project using the resources provided.
- However, it was during the sixteenth century when business was used as a common term, and the entrepreneur came into focus as a person who is responsible for undertaking a business venture.
- A typical entrepreneur in the Middle Ages was a person in charge of large architectural works, such as castles and defences, public buildings, convents, and cathedrals.

The Eighteenth Century

- The industrial revolution marked another profound shift in the history of entrepreneurship. Starting in the eighteenth century, entrepreneurship moved from small-scale production in small towns to large-scale production in big cities.
- During that period, the person with capital was differentiated from the one who needed capital. In other words, the entrepreneur was distinguished from the capital provider (the present-day venture capitalist).

The Twentieth Century

- In the middle of the twentieth century, the notion of an entrepreneur as an **innovator** was established: the function of the entrepreneur is to reform or revolutionize the pattern of production by exploiting an invention or, more generally, an untried technological method of producing a new commodity or producing an old one in a new way, opening a new source of supply of materials or a new outlet for products, by organizing a new industry.

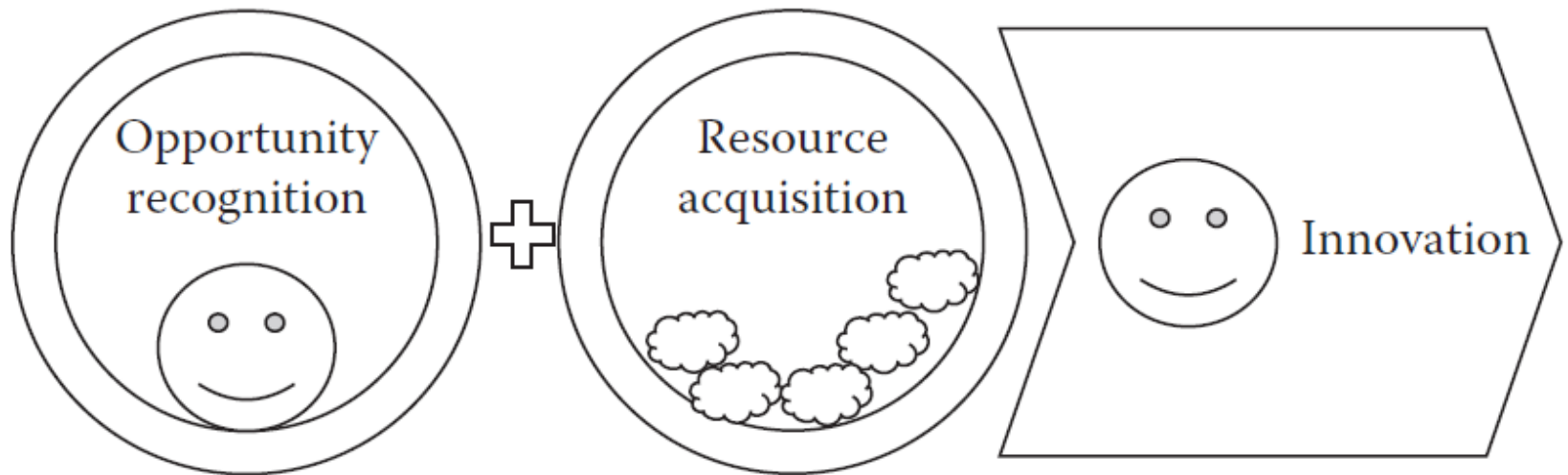
The 1980s and the 1990s

The increased interest in smaller firms can be attributed to a fundamental change in the world economy, related to the intensification of global competition, the resulting increase in the degree of uncertainty, and greater market fragmentation; and changes in the characteristics of technological progress giving large firms less of an advantage

Modern Entrepreneurship

- Today, entrepreneurs are the essence of economies all over the world. The global economy, combined with modern infrastructure, has introduced a new range of competition to the domain of entrepreneurship.
- No longer are you competing with entrepreneurs in your school, town, village, or city: you are competing with entrepreneurs all over the world.
- Many of these entrepreneurs can access inexpensive means of production. They may have better access to raw resources of cheap materials and labor. This has made modern entrepreneurship more challenging.

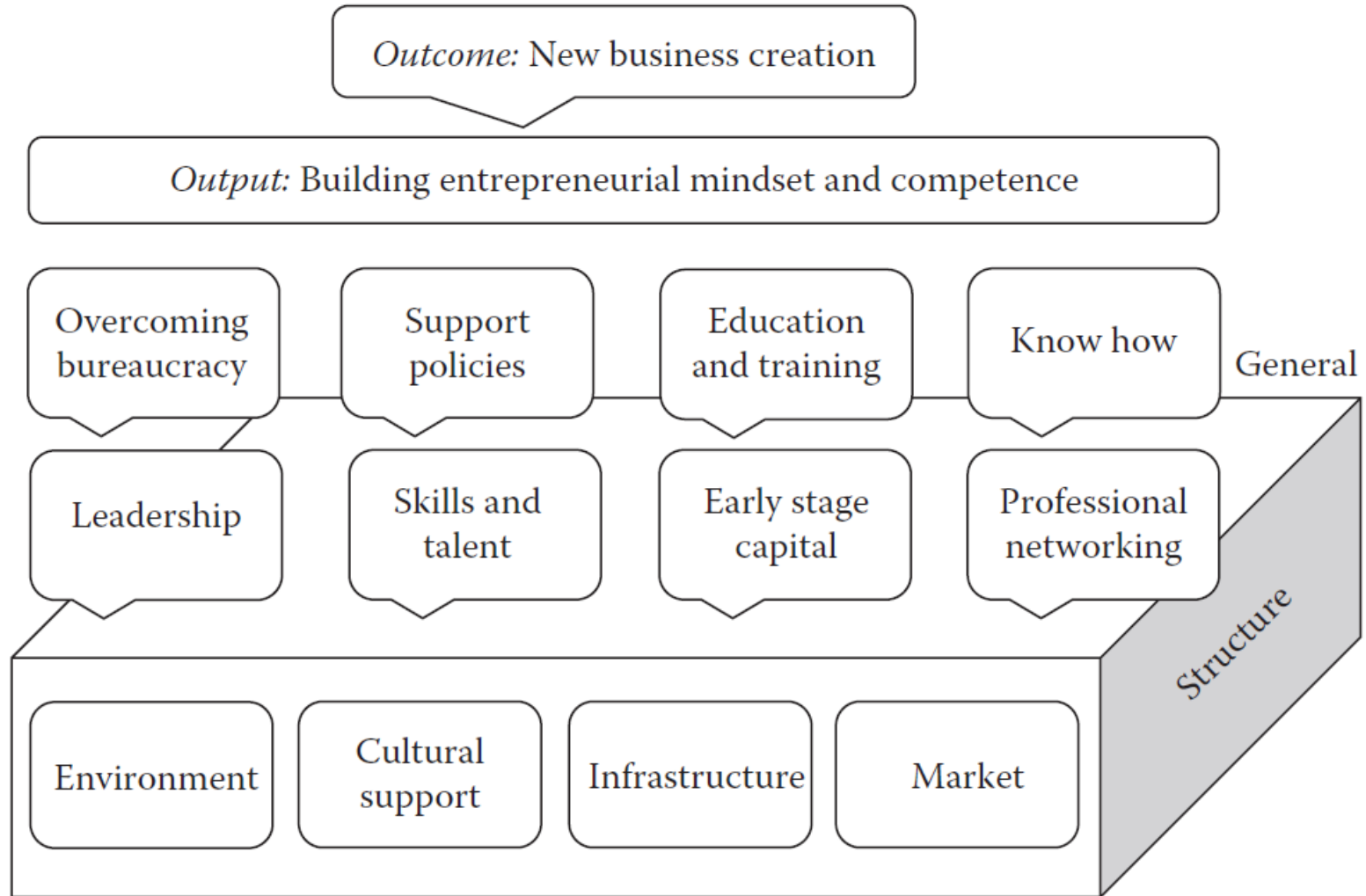
Three Aspects of the Entrepreneurial Process



Entrepreneurial Activity

- The entrepreneurial spirit for being proactive, innovative, creative, accretive, and enthusiastic.
- Entrepreneurial action is conceived as a human attribute, such as the willingness to face uncertainty, accepting risks, and the need for achievement.
- Economic, environmental factors that motivate and enable entrepreneurial activity, such as the dimension of markets, the dynamic of technological changes.
- The functioning of institutions, culture, and societal values.

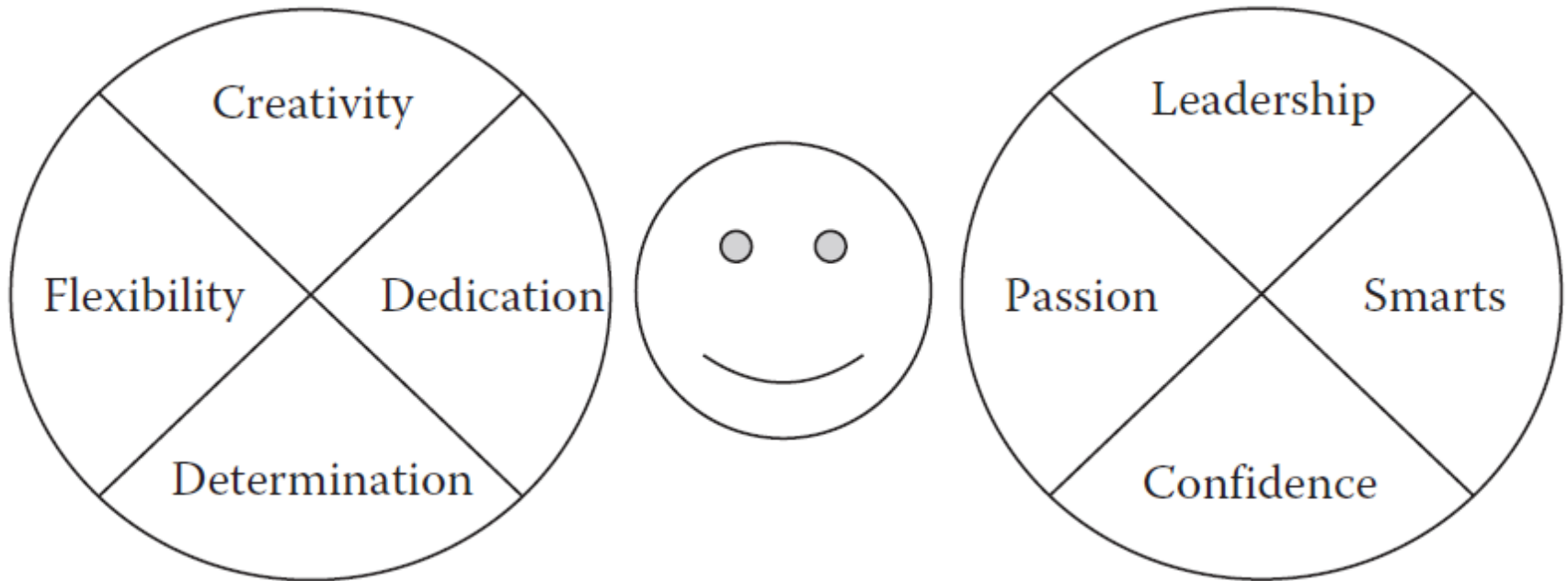
Entrepreneurial Ecosystem



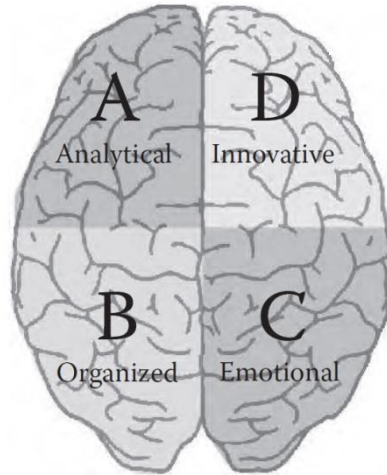
The 12 Overlapping Definitions of the Entrepreneur

The entrepreneur is a	Person who assumes the risk associated with uncertainty
	Supplier of financial capital
	Innovator
	Decision-maker
	Leader
	Manager or superintendent
	Organizer or coordinator of economic resources
	Proprietor of an enterprise
	Employer of factors of production
	Contractor
	Arbitrageur
	Person who allocates resources to alternative uses

Personal Attributes that Make Someone an Entrepreneur



Enhancing D Part of Brain



- Looking at the big picture and the context
- Participating actively, simulating, and asking “what-if?”
- Respecting multiplicity and aesthetics
- Brainstorming for and playing with wild ideas
- Exploring unobvious facts and figures
- Thinking about present and future trends
- Synthesizing to come up with innovations

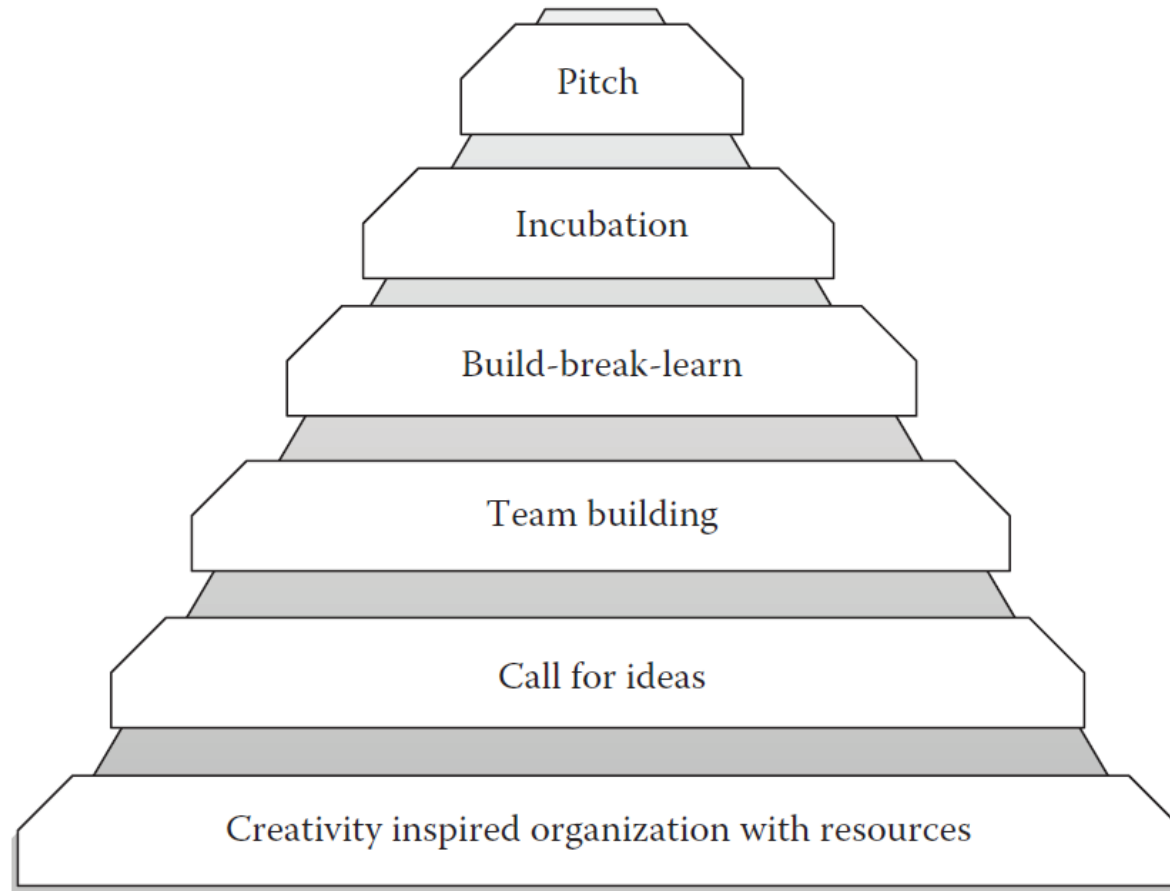
Intrapreneurship

- The term intrapreneurship (entrepreneurship within an existing business structure) (also termed “corporate entrepreneurship” or “corporate venturing”) is derived from a combination of “intra” or internal, and “entrepreneurship.”
- Intrapreneurship is defined as a collection of formal and informal activities within an organization leading to the implementation of innovative ideas and behaviors

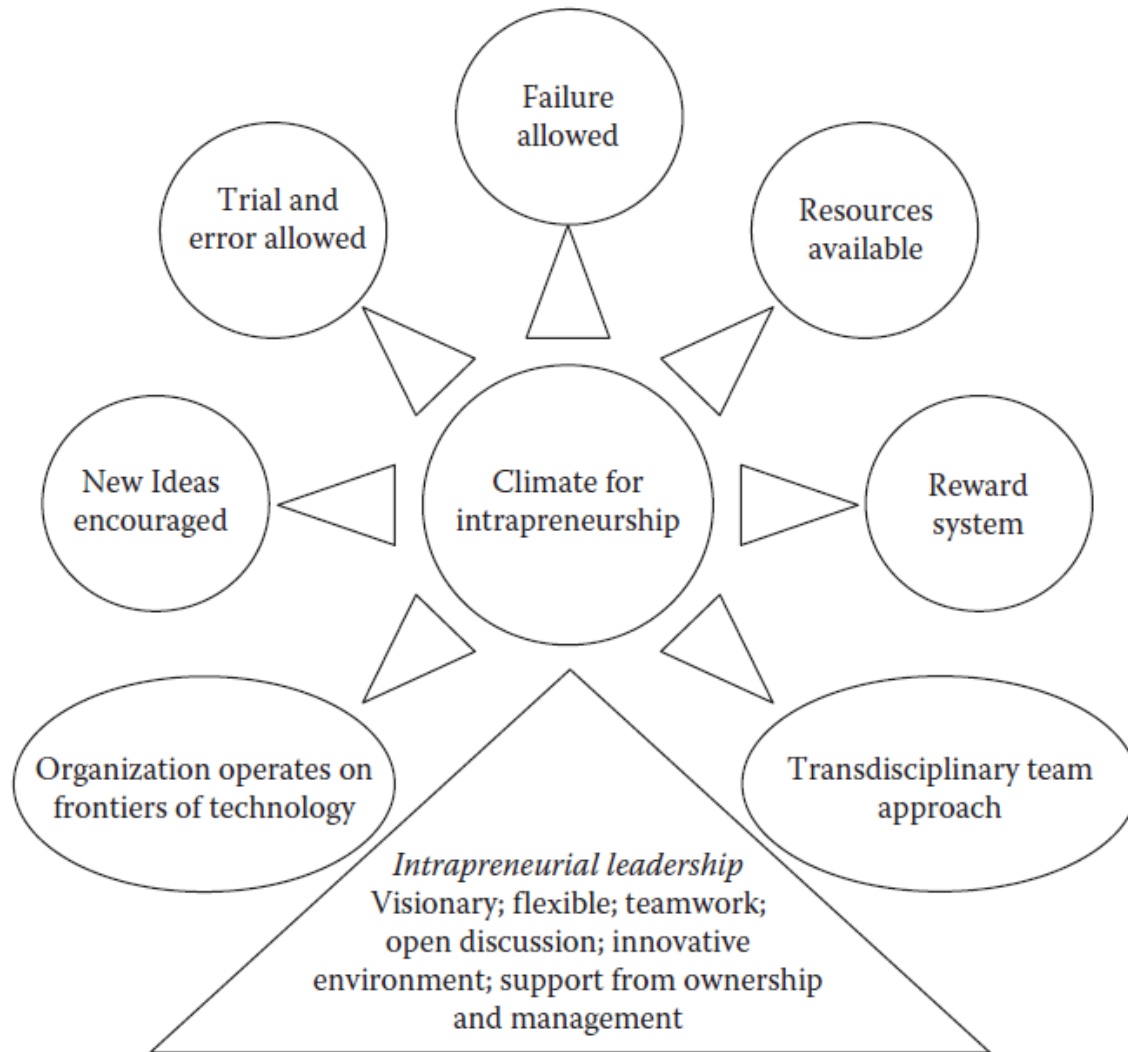
Who is the Intrapreneur?

- An intrapreneur is a person within an existing company who takes a responsibility for turning an idea into a product or service through risk-taking and innovation.
- Intrapreneurs are usually highly self-motivated, proactive, and action-oriented people who are willing to taking the initiative, even within the system of an organization, in pursuit of an innovative product or service.

Intrapreneurship Pathway within an Organization

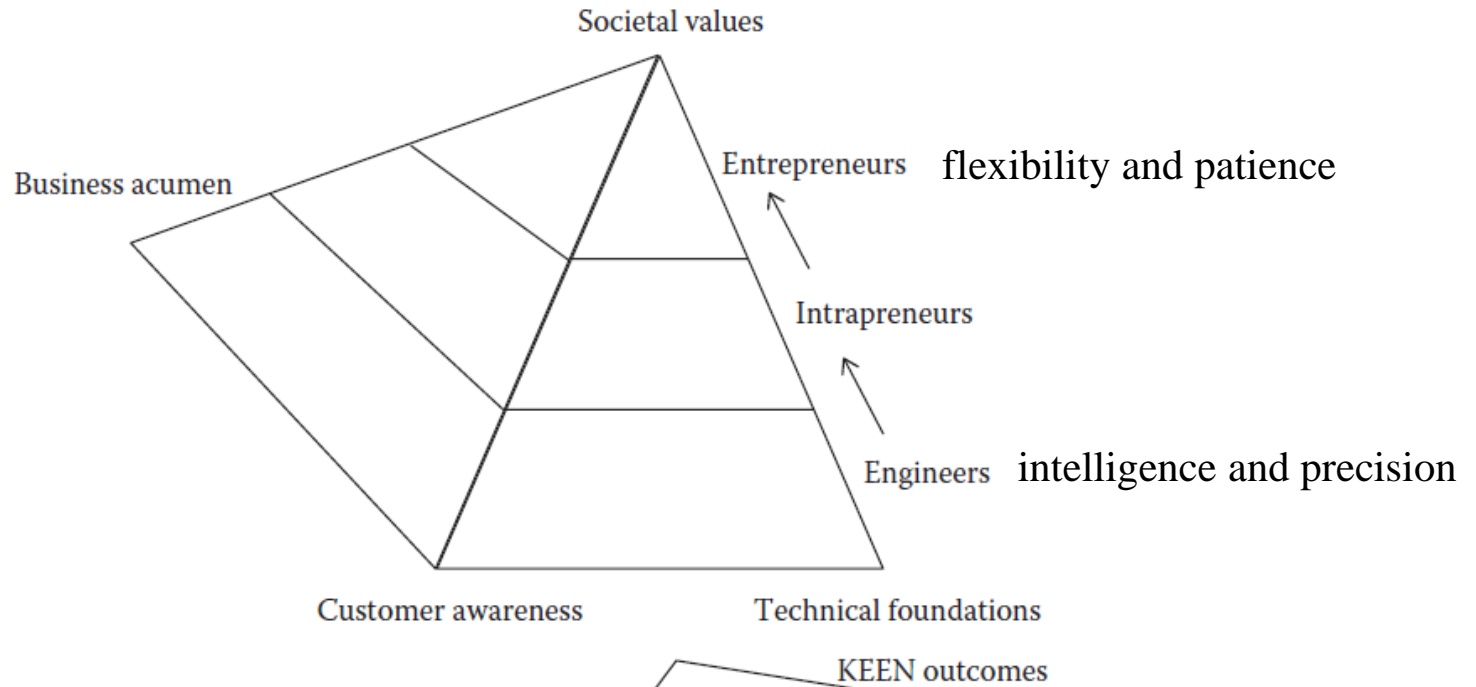


An Ideal Environment for Intrapreneurship



The KEEN Pyramid

the attributes of an entrepreneurial engineer



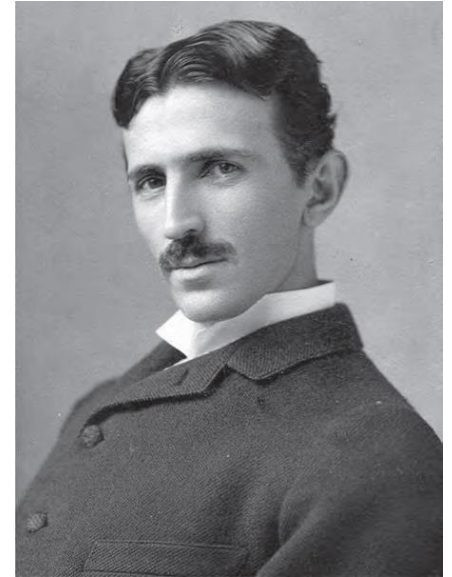
- Collaborate in a team setting
- Apply critical and creative thinking to ambiguous problems.
- Construct and communicate customer-appropriate value proposition.
- Persist through and learn from failure.
- Manage projects through appropriate commercialization.
- Demonstrate voluntary social responsibility.
- Relate personal liberties and free enterprise to entrepreneurship.

Inspirational Role Models

Henry Ford, Edison, Firestone



Nikola Tesla



I do not think there is any thrill that can go through the human heart like that felt by the inventor as he sees some creation of the brain unfolding to success... such emotions make a man forget food, sleep, friends, love, everything.

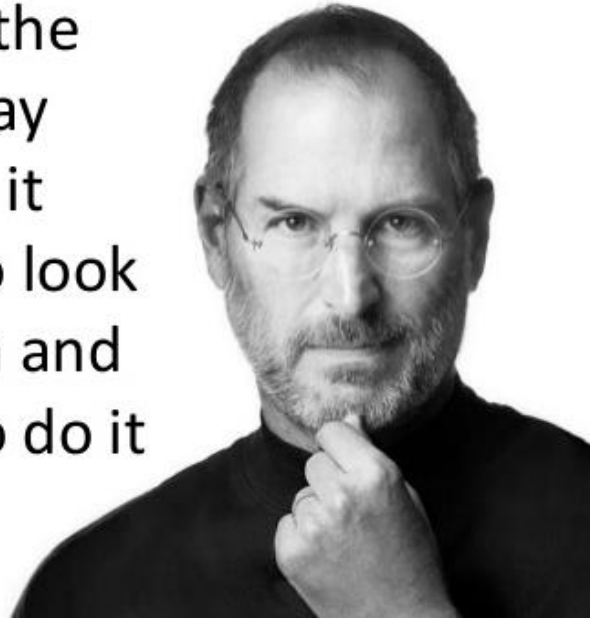
Nikola Tesla (1856–1943)

inventor, electrical engineer, mechanical engineer, and futurist

The Intrapreneur **Steve Jobs**

“You can't look at the competition and say you're going to do it better. You have to look at the competition and say you're going to do it differently.”

- *Steve Jobs*



Innovation distinguishes between a leader and a follower.

Your time is limited, so don't waste it living someone else's life.

Richard L'Abbé

the Ottawa Entrepreneurial Engineer



Richard L'Abbe graduated from uOttawa, Canada, with a degree in mechanical engineering in 1979.

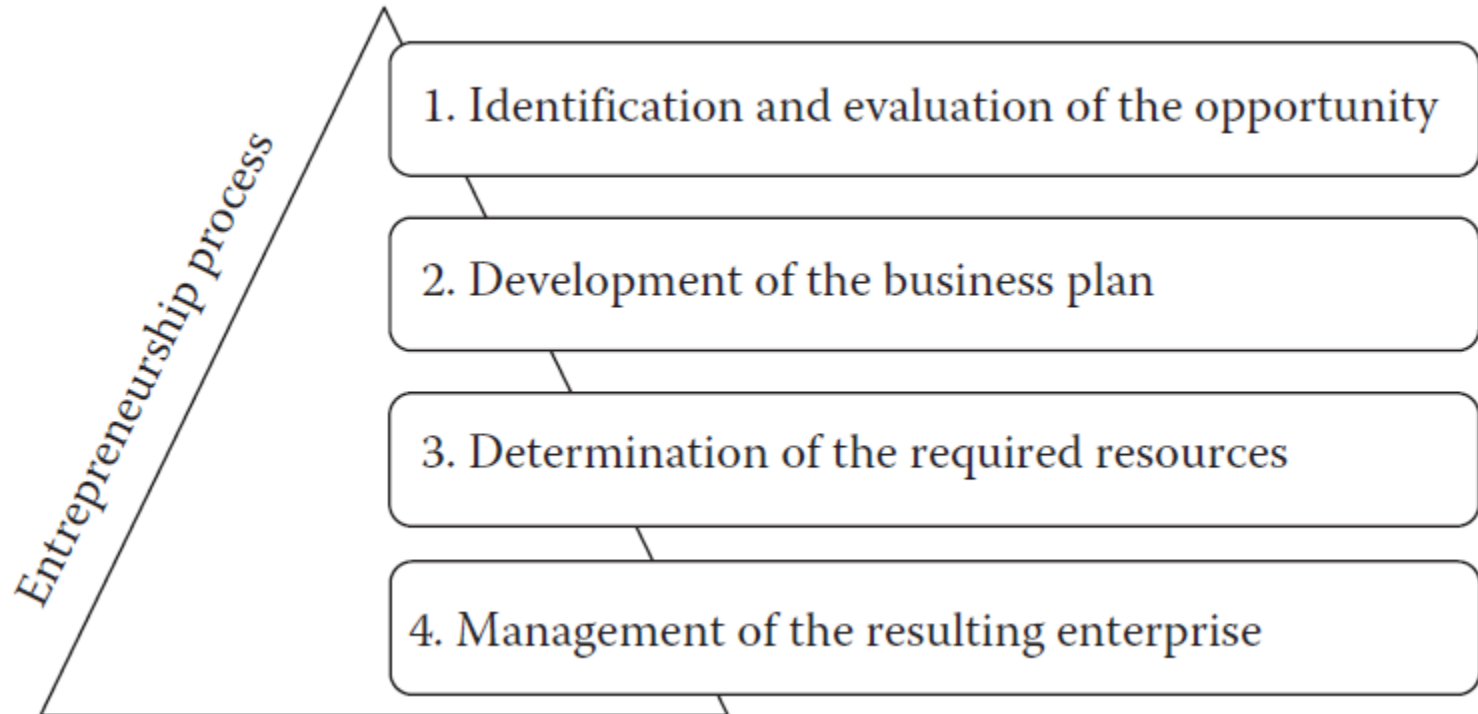
The *Ottawa Business Journal* recounts **this in 1980**

- He was busy studying the mechanics of bodily injury when his company received a contract from the Royal Canadian Mounted Police to design a bomb-disposal helmet.
- When the president of the company approached L'Abbe to ask for some fresh ideas, L'Abbe sat down for three hours and drew a basic blueprint of what he thought the prototype should look like.
- After seeing the drawing, his boss replied, "That's pretty cool, why don't you build it?"

From the Success of Med-Eng Systems to Community Outreach

- Richard L'Abbe has been visionary in his devotion and support to education and community outreach. He played a leading role in initiating and encouraging entrepreneurial activities at the uOttawa.
- The **uOttawa Richard L'Abbe Maker Space** is one of his lasting contributions to the University. This facility is a sandbox where students can design and develop projects. It is the first invent-build-play space at the University. It is a home to a lot of technologies such as 3D printing, virtual reality, the IoT, and wearables. Its goal is to further creativity, problem-solving skills, and interest in technology entrepreneurship.
- In addition, Richard L'Abbe has used his vast experience to help students deliver better design and entrepreneurial ideas and projects.
- In 2016, Richard L'Abbe was awarded an **honorary doctorate** by the uOttawa for being a visionary Canadian entrepreneur and philanthropist

The Entrepreneurship Process



Entrepreneurial Marketing

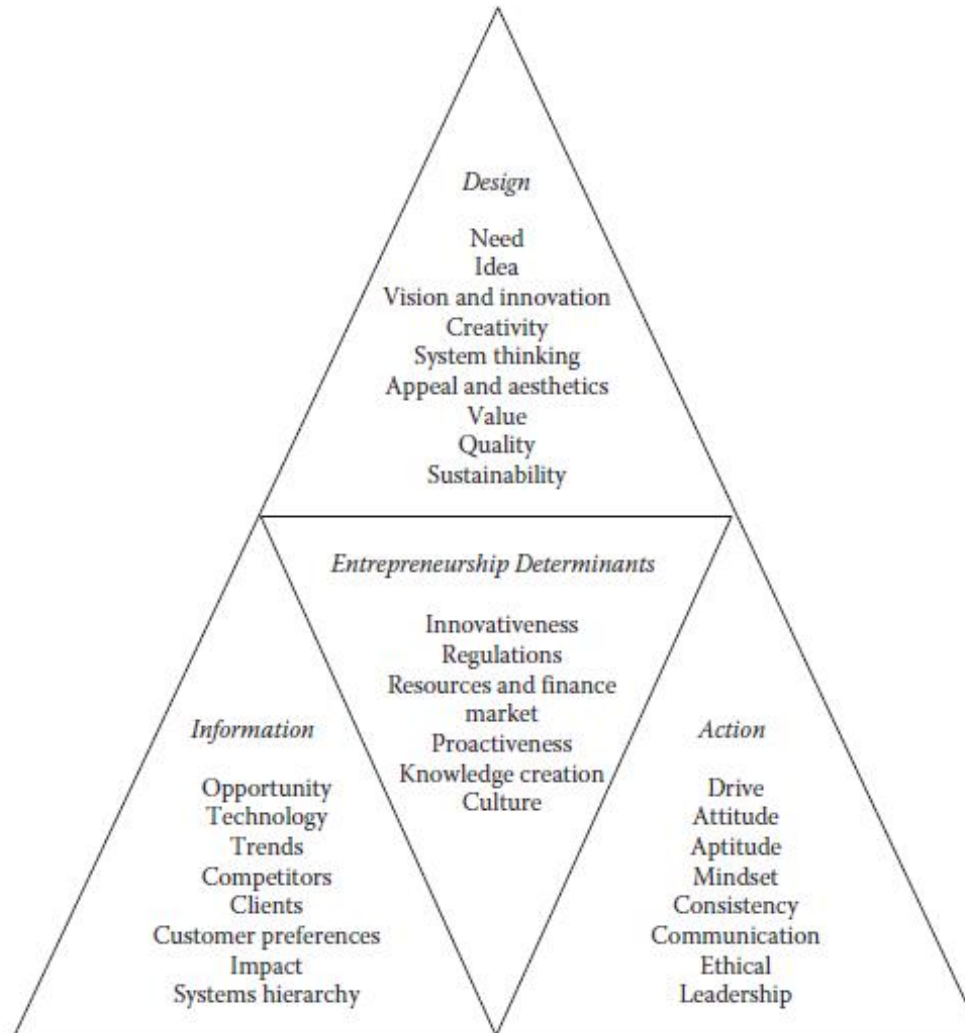
Your most unhappy customers are your greatest source of learning.

Bill Gates

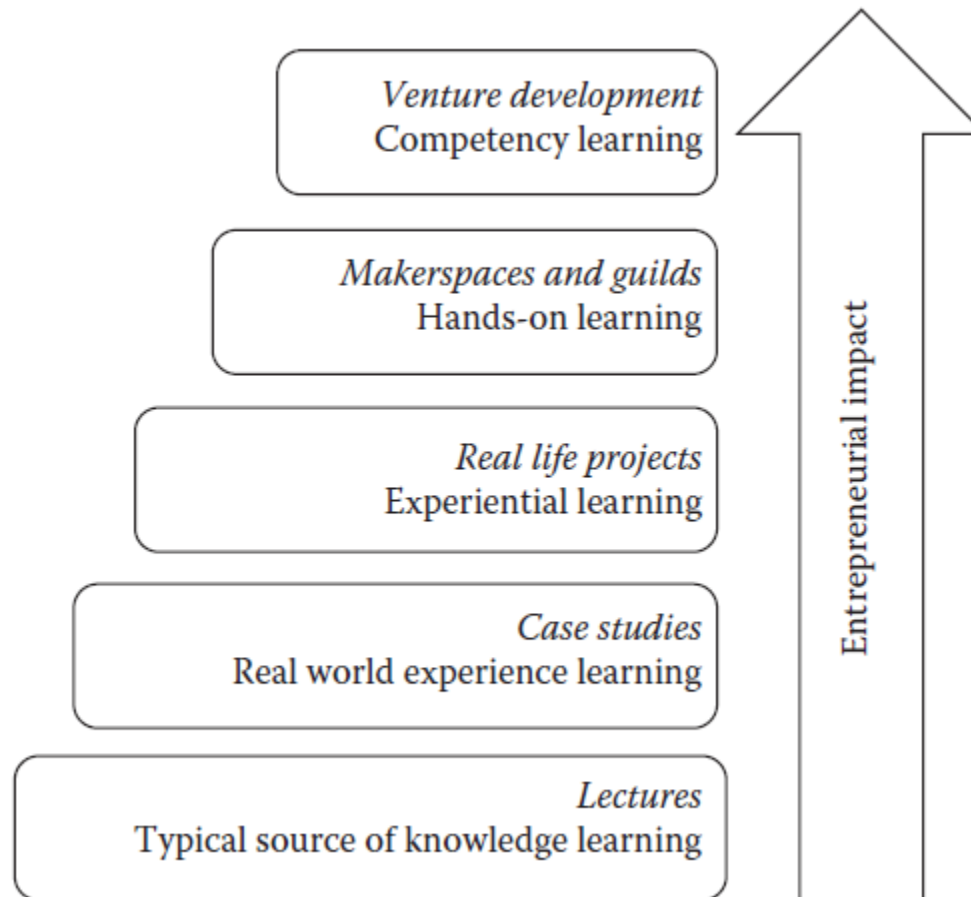
The six Ps of Marketing Variables

Product	Product enhancement: What is your real product? What should or should not you offer?
People	Customer focus: Who uses your product? What do they care about?
Price	Market focus: Can customers afford your product or service? How do they value it?
Place	Product distribution: How do customers get to your product? Where is it distributed? How is it delivered?
Production	Unique proposition: Can you do what you promise? Can you meet the market demand? Is your production flexible enough to meet changing market needs?
Promotion	Innovative marketing: How do you let people know what you have? How good does your promotion work?

Interactive Dimension of the Entrepreneurial Space



Entrepreneurial Learning Building in the Undergraduate Level



Entrepreneurship Essentials

- **Identify** an opportunity
- **Evaluate** an idea and gage the market
- **Appreciate** the risks and rewards
- **Leverage** experiments to validate the idea and refine business strategy
- **Discover** the key financial decisions in the early stages of a new venture
- **Understand** the process of raising capital and how to speak to investors
- **Learn** from successful entrepreneurs and leading venture capitalists.

Knowledge Creation

- Ask five entrepreneurs what the term entrepreneurship means to them. Be prepared to present the commonalities and differences of these definitions to the class.
- As an entrepreneur, how will you develop your technology and products, transfer or license them, and ensure commercial success?
- Speak to people from five different sectors and ask what entrepreneurship means to them and how their sector culture helps and/or hinders entrepreneurship.

Class Pitch: Entrepreneurship is about the **What, Why, Who, How** of a **Problem**

- Teams of two students may try to **find** and **understand** an important industry **problem** in an area of interest.
- Research the problem, understand its history, context, scope, and impact before trying to solve it.
- Pitch the findings in one minute to demonstrate the best understanding of the problem (Use one slide or the board) to answer the following questions.
 - **What** exactly is the history, context, and scale of the **problem**?
 - **Why** is the problem **important**?
 - **Who** is the **problem** important to, who has complained about it?
 - **How** many customers is the problem important to?

Why Historical Research?

- Find and document past failed efforts to solve the problem.
- How long has the problem existed?
- Who made the mistake?
- Why did they fail?
- Learn from the mistakes of others in order to avoid repeating the same mistakes.
- All above is called “**Failure Analysis.**”

Why Context of a Problem is Important? **because it is everything!**

- To understand the environment in which the problem exists.
- To realize the conditions affecting the problem.
- To know the competitors.
- To recognize the legal structure impeding or facilitating the problem.
- To identify the impact of technology.

What is Scale of a Problem?

- Is the problem important to individuals, organization, or to general?
- Is the problem important to few or many?
- What characteristics do those affected by the problem, have in common.
- What other problems are related to your problem?
- Do those affected by the problem have the resources or capacity to spend money to solve the problem?