

iMDE: international Market-Driven Engineering

Lecture 9: Entrepreneurship

2014-10-15



ZHEJIANG UNIVERSITY



LUND UNIVERSITY

Lectures

The course will take you from “how to generate innovations”, though “the writing of Business Plans, and understanding Product development and Production” to the “how to sell and market a product”.

- Lecture 1: Introduction
- Lecture 2: Innovation-1 (Inspiration)
- Lecture 3: Innovation-2 (Ideation)
- Lecture 4: Innovation-3 (Implementation)
- Lecture 5: Innovation-4 (Research visit at new campus)
- Lecture 6: Innovation cultures and Business plan
- Lecture 7: Product Development and Production
- Holliday
- Lecture 8: Marketing and Sales
- [Lecture 9: Entrepreneurship](#)
- Lecture 10: Final presentation



Today's lecture

Entrepreneurship

- What is Entrepreneurship?
- Info and discussion about project presentations (Thursday Oct 23/10)



Innovations and Entrepreneurship

CREATIVITY

“Ability to generate novel ideas”

INVENTION

“Novel idea transformed into reality”

INNOVATION

“Successful implementation of a novel idea”

(from iMDE 2014 Lecture-1, Anders Warell)



Entrepreneurship?



What is Entrepreneurship?

Entrepreneur is originally a French word.

First used in 1734.

“Entrepreneurs are non-fixed income earners who pay known costs of production but earn uncertain incomes”



What is Entrepreneurship?

Newer definition:

“An Entrepreneur is someone who commercializes his or her innovation”

“Entrepreneurship is the art of being an entrepreneur”



Where can one find Entrepreneurship?

In a society, entrepreneurship exist at three distinct levels;

- individuals,
- firms,
- and macro level.

Entrepreneurship at Macro level

National success = economic development

Entrepreneurship is important the at macro level since it is the primary mechanism for “Creative disruption” and thereby economic development.

Creative disruption: New combinations of resources (human, physical or financial resources) give rise to new industries and increased wealth (Economist Joseph Schumpeter).

Entrepreneurship at the macro level requires successful entrepreneurship at the firm and individual levels.



Entrepreneurship at Macro level

Success of entrepreneurship at the macro level implies economic growth.

According to the economist Schumpeter, the primary mechanism for economic development is “Creative disruption” .

Creative disruption: New combinations of resources give rise to new industries and wealth.

Entrepreneurs are the dynamic individuals that cause creative disruption to happen by creating new, unforeseen products/services that completely changes the market.

Entrepreneurship at the macro level requires successful entrepreneurship at the firm and individual levels.



Example:

Governments worldwide are pushing for education programs that produce more “entrepreneurial engineers” who are “bilingual” in the sense that they possess dual managerial and technical competencies.

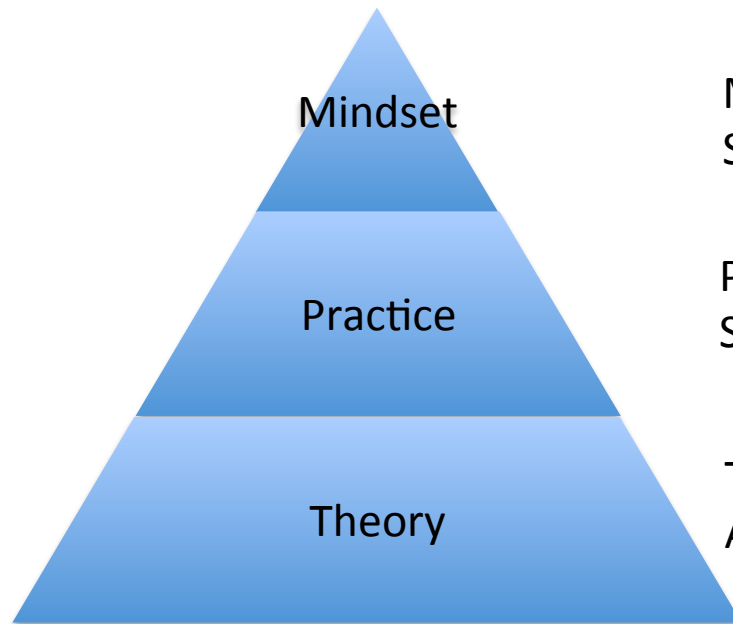
Example: The goal for Lund University has been reformulated,

from “Education, Research and Outreach”

to “Education, Research and Outreach and Innovation”



Entrepreneurial education



Mindset = the way to approach something new.
Seldom included in entrepreneurial education.

Practice = learning skills
Sometimes included in entrepreneurial education.

Theory = acquiring knowledge
Always included in entrepreneurial education.

Entrepreneurial education- Theory

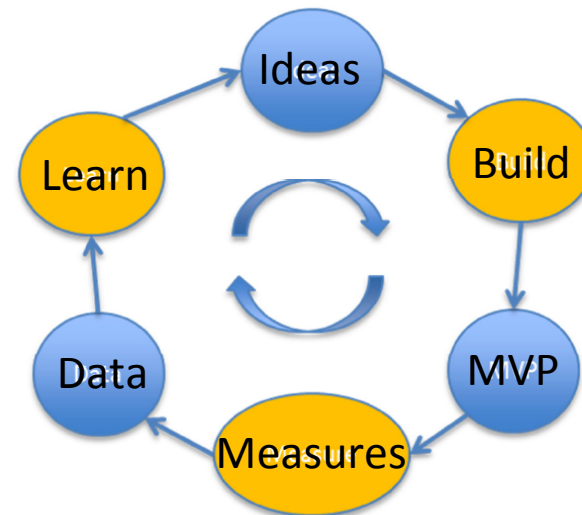
Theory = acquiring knowledge
Always included in entrepreneurial education.

Traditional approach (linear):



Newer approaches (non-linear):

- More iterative
- Unique selling points
- Minimal viable products



Entrepreneurial education - Practice

Practice = learning skills
Sometimes included in entrepreneurial education.

- A skill is not the knowledge itself but rather the knowing of what to do with the knowledge.
- In order to become successful entrepreneurs, opportunities to practice is important.
- Skill development is increased if constructive feedback provided on the performance.

Newer trends:

- Get-out-of-the-building approach (Steve Blancs)
- Build-Measure-Learn cycle (Eric Reis)



Entrepreneurial education Mindset

Mindset = change/confirm the way to approach something new
Seldom included in entrepreneurial education.

Two relevant theories: Theory-of-Planned-Behavior and Fixed-and-Growth-Mindset

Theory of Planned behavior (reference: Icek Ajzen)

- Before a behavior takes place, there is an intention.
- An intention is based on three components
 - Attitude (the persons positive or negative evaluation of the behavior)
 - Subjective norm (the perceived social pressure from significant others)
 - Perceived behavioral control (the subjective evaluation of the ease/difficulty to perform the behavior).



Entrepreneurial education - Mindset

Example:

A student will only invest energy and time into studying for a test if

- a) he/she thinks that studying will be beneficial to reach a certain outcome, e.g. a good grade,
- b) whether his/her friends will regard studying to be an important activity and
- c) whether the student thinks that the time invested in studying will actually result in a better grade.

If all three are evaluated positively => motivation and engagement



Entrepreneurial education - Mindset

Example:

In the context of entrepreneurship, most individuals will only be motivated to start their own company if

- a) they think doing so is a good thing to do,
- b) at least someone in their personal network supports the idea and,
- c) whether the individual thinks he/she has the time, resources, etc. to do so.

If all three are evaluated positively => motivation and engagement



Entrepreneurial education Mindset

Mindset = change/confirm the way to approach something new
Seldom included in entrepreneurial education.

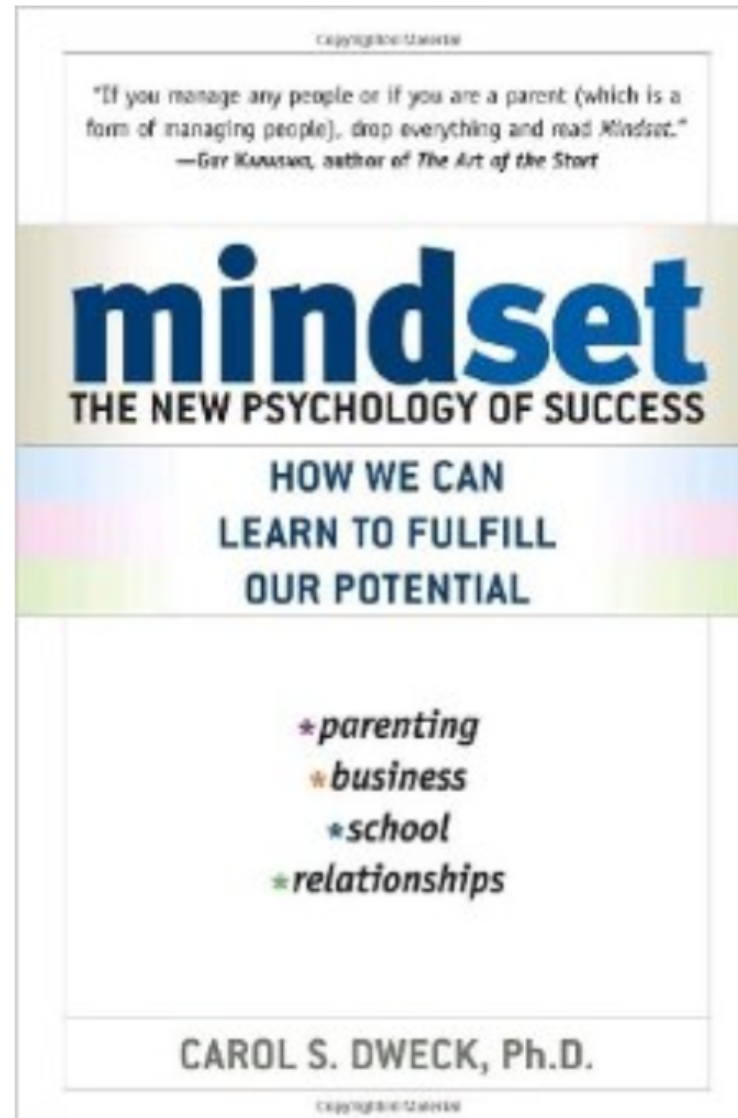
Two relevant theories: Theory-of-Planned-Behavior and Fixed-and-Growth-Mindset

Theory of Fixed and Growth mindset (reference: Carol Dweck)

- Mindset = set of attitudes and beliefs
- Fixed mindset = a belief that skills and ability reflect inherent traits that are stable.
- Growth mindset = believe in the malleability of skills and ability, success is the reflection of effort.



Mindset



Mindset

In one world, effort is a bad thing. It, like failure, means you're not smart or talented. If you were, you wouldn't need effort. In the other world, effort is what *makes* you smart or talented.

- Carol Dweck



TWO MINDSETS

CAROL S. DWECK, Ph.D.

Graphic by Nigel Holmes

Fixed Mindset
Intelligence is stable



Growth Mindset
Intelligence can be developed



Leads to a desire to look smart and therefore a tendency to...

Leads to a desire to look smart and therefore a tendency to...

Leads to a desire to learn and therefore a tendency to...

Leads to a desire to learn and therefore a tendency to ...

CHALLENGES

...avoid challenges

...embrace challenges

OBSTACLES

...give up easily

...persist in the face of setbacks

EFFORT

...see efforts as fruitless or worse

...see efforts as the path to mastery

CRITICISM

...ignore useful Negative feedback

...learn from criticism

SUCCESS OF OTHERS

...feel threatened by the success of others

...find lessons and inspiration in the success of others

As a result, they may plateau early and achieve less than their full potential.

As a result, they reach ever higher levels of achievement

All this confirms a deterministic view of the world.

All this gives them a greater sense of free will



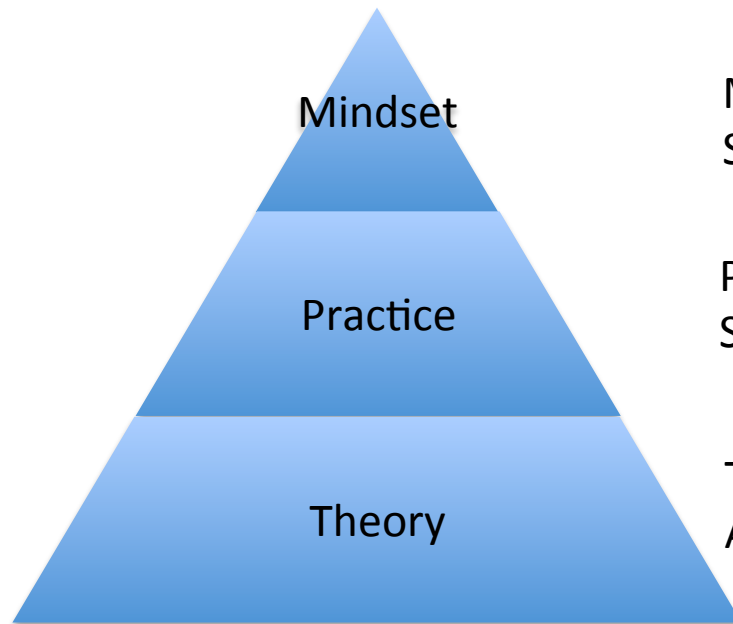
Mindset

I think intelligence is something you have to work for ... it isn't just given to you.... Most kids, if they're not sure of an answer, will not raise their hand to answer the question. But what I usually do is raise my hand, because if I'm wrong, then my mistake will be corrected. Or I will raise my hand and say, 'How would this be solved?' or 'I don't get this. Can you help me?' Just by doing that I'm increasing my intelligence.

- a 7 year old, captured by Carol Dweck



Entrepreneurial education

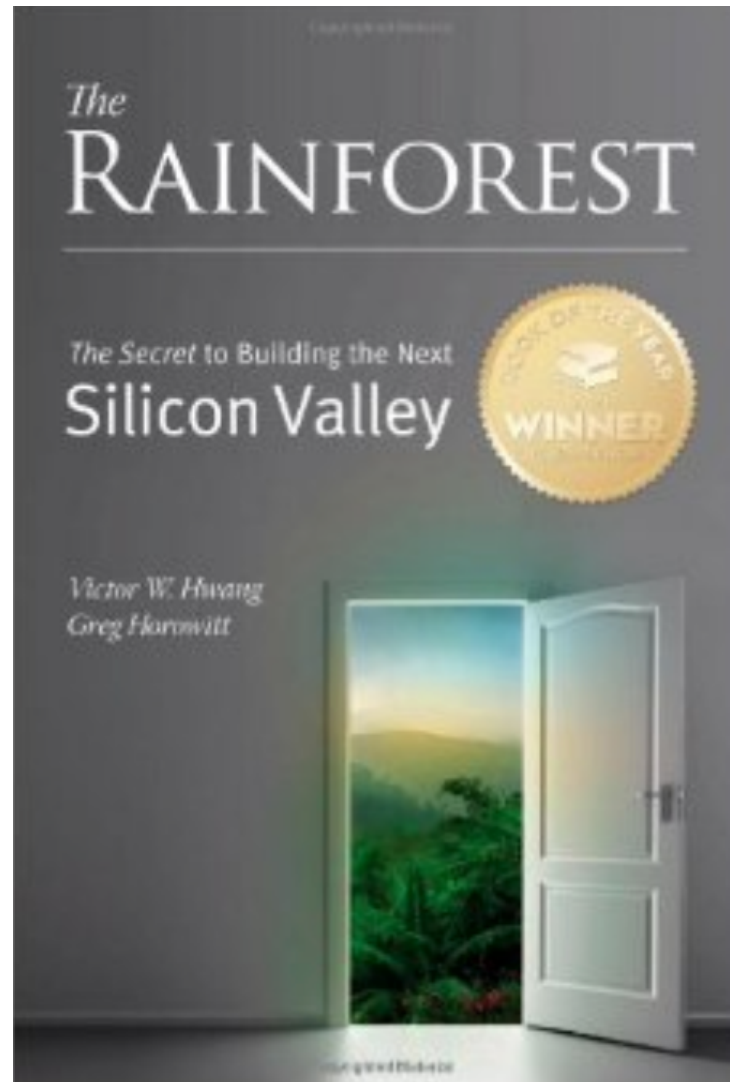


Mindset = the way to approach something new.
Seldom included in entrepreneurial education.

Practice = learning skills
Sometimes included in entrepreneurial education.

Theory = acquiring knowledge
Always included in entrepreneurial education.

So, what are the behaviors of successful entrepreneurs?



Rules and Behavior in the Rainforest

1. Thou shalt break rules and dream.
2. Thou shalt open doors and listen.
3. Thou shalt trust and be trusted.
4. Thou shalt experiment and iterate together.
5. Thou shalt seek fairness, not advantage.
6. Thou shalt err, fail and persist.
7. Thou shalt pay it forward



Rules and Behavior in the Rainforest

1. Thou shalt break rules and dream.

For a rainforest to thrive, people must accept that rule-breaking and believing in grand aspirations are acceptable forms of social behavior. They enable someone to believe that what has previously been considered impossible is in fact possible. Rainforest thrive because people honor the dreams of others as well as their own.

Silicon Valley: Start-ups do not compete with salary, but with a vision.



Rules and Behavior in the Rainforest

2. Thou shalt open doors and listen.

In the Rainforest, people should treat every conversation like an open invitation, and be willing to learn and listen to the other person. Opening doors becomes even more powerful when there is greater diversity of doors to open.

Silicon Valley: one day people can be strangers, the next day they could be in business together.
Silicon Valley: The rate of foreign-born are the highest in the US (25%), 50% of startups includes at least one immigrant.



Rules and Behavior in the Rainforest

3. Thou shalt trust and be trusted.

In a conversation, the entrepreneur is afraid the idea will be stolen, but if not shared it will be a non-starter. The Rainforest can not thrive without a trust among strangers. There is a social punishment to stealing.

Silicon Valley: “People from other areas are so afraid of sharing that they end up hurting themselves.”



Rules and Behavior in the Rainforest

4. Thou shalt experiment and iterate together.

It is unknown to the people in the Rainforest exactly how the business should be built. People must experiment together. People learn not to build for perfection, but to build for iteration. Prototyping is widespread. Natural selection apply.

Silicon Valley: Facebook chat and Facebook Video are two examples that were build in a hack-a-thon (over a night) and showcased at “prototype forums” for feedback.



Rules and Behavior in the Rainforest

5. Thou shalt seek fairness, not advantage.

All partners in the Rainforest should benefit from the collaboration. Clearly 1+1 is greater than 2. Startup teams must constantly recalibrate to maintain fairness.

Silicon Valley: Venture capitalists know that successful start-ups are run by highly motivated entrepreneurs, who feel they got a fair deal. The unwritten expectation is that everyone will treat the other person fairly in the end.



Rules and Behavior in the Rainforest

6. Thou shalt err, fail and persist.

People in the Rainforest know there will be many ups and downs, there will be wrong turns and false starts. The key is to get up and try again. There is no real failure in the Rainforest, only learning.

Silicon Valley: In other places, the price of doing something wrong is very high and the personal calculus necessary to take the risks needed to succeed as an entrepreneur usually does not add up.

Silicon Valley: A successful start-up is preceded by a-larger-number of non-successful ventures.



Rules and Behavior in the Rainforest

7. Thou shalt pay it forward.

The organizational structure of the Rainforest is mostly horizontal, not vertical. Therefore it is easy to talk to just anyone (high or low). The aspect of doing a favor for someone without expecting to get paid back directly (pay it forward) applies. People believe it eventually “comes back around”.

Silicon Valley: Experience shows that it pays to be open-minded to new people, to be helpful and to treat every person as if they might have “the next valuable opportunity”.



Rules and Behavior in the Rainforest

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**If everyone in a community acts like this,
There will be avibrant entrepreneurial culture**

Summary

- Entrepreneur: someone who commercializes his or her innovation
- Entrepreneurship: the art of being an entrepreneur
- Entrepreneurship at Macro, Firm and Individual level
- Theory, Practice, Mindset
 - Theory of Planned Behavior
 - Fixed vs Growth mindset
- The Silicon Valley Rain Forest (Ecosystem)
 - Rules and behaviors in the Rainforest (7 rules)
 - Individuals and Society form a cultural ecosystem



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- Info and discussion about project presentations (Thursday Oct 23/10)



Applying Entrepreneurship

How can entrepreneurial skills be applied?

- Own start-up company
- Invent within a larger firm
 - Increased interest in Lean start-up methodology



LEAN START UP METHODOLOGY

Project made by a senior cross-company team (Yahoo, Qualcomm, Rockwell, Applied Materials, Lam Research) interested in Lean Start up Methodology.

Background: Enterprises must innovate or they will decline through disruptive innovation from perceived non-competitors.

Hypothesis: Enterprises can adopt Lean Startup Methodology to both create and sustain innovation while executing on their existing business model.

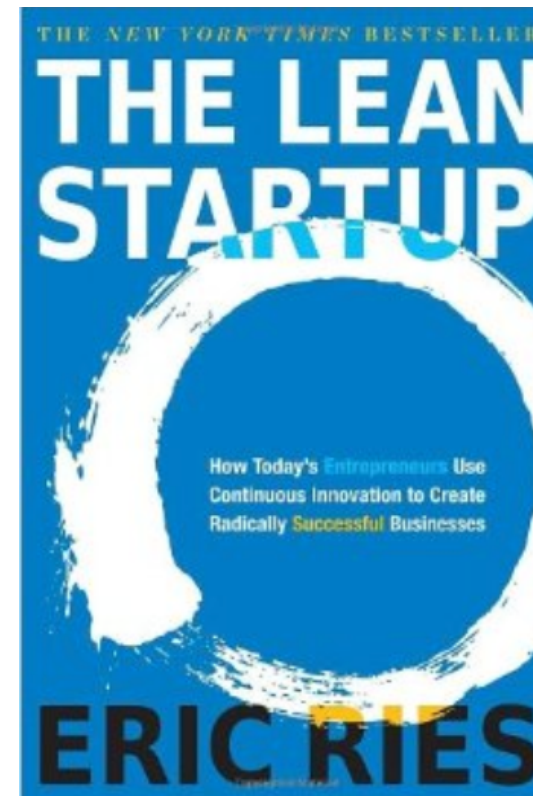


Lean startup

- **Who:** A temporary organization
- **What:** Searching for a repeatable business-model
- **How:** Iteratively validating hypotheses on customers using minimal resources
- **When:** In a minimum amount of time

Questions:

- How could enterprises adopt lean startup?
- Have enterprises successfully adopted lean startup methodologies before?



Lean Start-up

The goal of unlocking innovation within an enterprise is not new. Two types of innovations exist:

1. Extend existing successful products:
 - a) Processes in place
 - b) Extensive R&D divisions
2. New disruptive innovations (not in line with existing products and business models)
 - a) not in line with existing products and business models
 - b) Usually no processes in place
 - c) Existing processes can effectively kill new disruptive innovations.

=> Lean start-up methodology

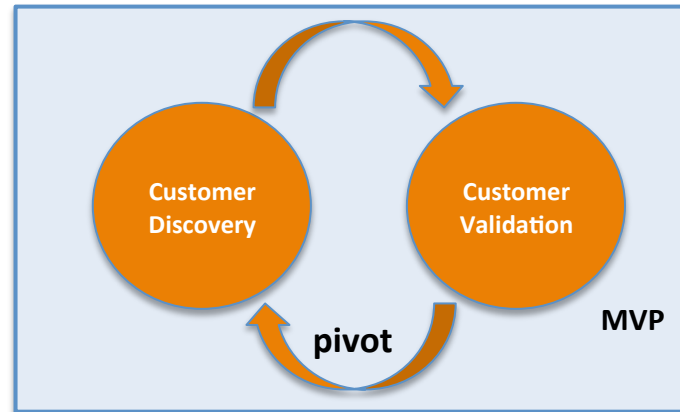
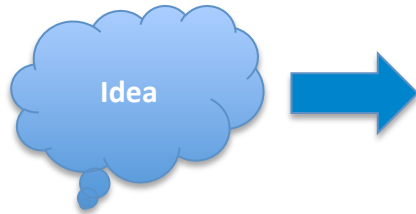
Traditional vs Lean Start up

Organizational Area	Traditional	Lean Startup
Goal / Business Plan	Execution	Discovery
Model	Biz Model Canvas	Lean Canvas
Testing Focus	Internal	External
Product	Full product launch	Test (MVP)
Metrics	Corp acct	Innovation (OMTM)
Strategy	Red Ocean	Blue Ocean
Process	Schedule / Quality	Learning

Innovation in Enterprise

Phase 1: Idea Phase

- From any employee



Phase 2: Lean Startup Phase

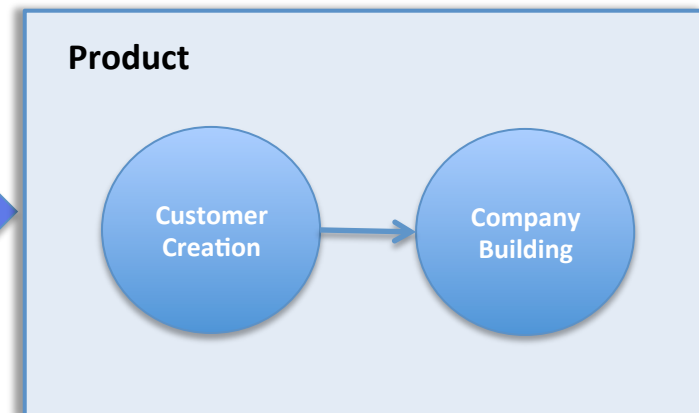
- Small Cross functional team
- Interacts with customers
- MVP (Product Features)
- Lean KPI
- Fail often, Fail fast
- Proves / Disproves hypothesis.

Phase 3: Strategy Phase

- Business strategy
 - Integrate vs. spinoff



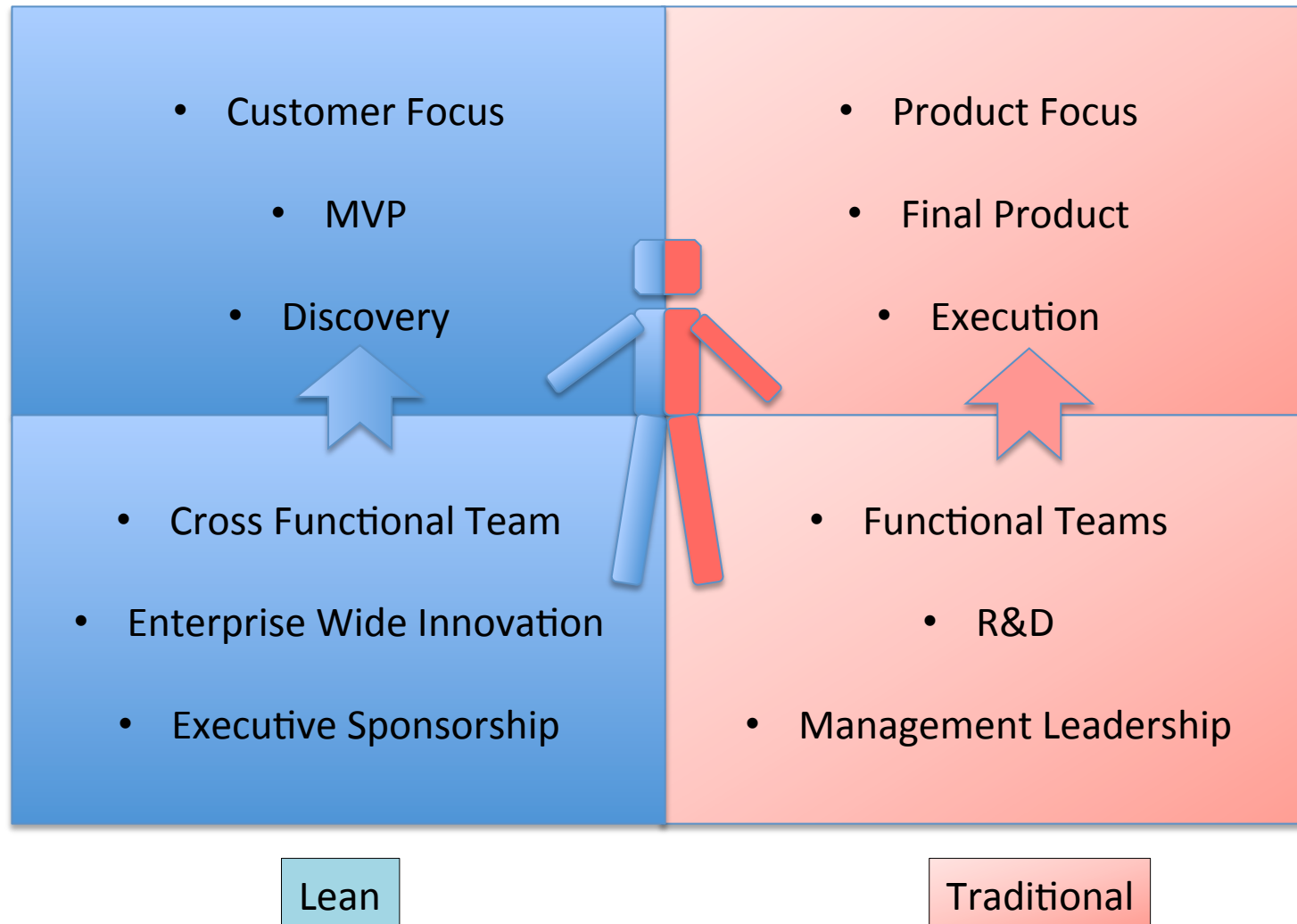
Phase 4: Execution phase



Case studies

- General Electric
 - Aviation, Power, Automation, Healthcare, Appliances
 - Initiative: FastWorks
 - Results:
 - Diesel motor developed via FastWorks, development time reduced, costs reduced with 70%.
 - Aviation motors developed via FastWorks. 2 new motors developed in 2011 (Pre Fastworks) and 7 new motors developed in 2013 (Post FastWorks)
 - GE had 100+ FastWorks projects in 2013.
 - Method do not eliminate errors but Errors are corrected early – saves money
- Intuit
 - Personal finance and tax software
 - Initiative: Unstructured Time
 - Results: New product (TurboTax). Very close collaborations with customers, i.e. product is always an answer to what customer needs.
- Qualcomm
- U.S. Government
-

Lean Startup within Enterprise



Lean Enterprise – Can we do better?

- **Incentives:** Include equity for employees in addition to innovation funds
- **Organization:** A contextual ambidextrous organization
 - Ambidextrous = Capable of Exploration & Exploitation
 - Contextual = Using Social and behavioral means for ambidexterity
 - Structural = Using Spatial separation for ambidexterity
- **Process:** Feed lean startup outcome to a product strategy phase
 - Internal development
 - Acquisition of early stage companies (e.g. Google/ Nest strategy)
 - Invest in companies that may be further along (e.g. Microsoft / Facebook strategy)
- **MVP strategy:** Divide a complex product into many smaller independent projects in which progress can be iterated more quickly

Summarize Key High-level Principles

- Enterprises will fail if their business model stagnates
- Enterprise-wide Innovation: Propose, evaluate, select, support, measure, and reward
- Direct executive-level support is critical
- Dynamic formation of cross functional teams – in *customer discovery and validation*
- Need to continually minimize conflict with existing business units
- Focus on lean KPIs for innovation programs
- After validating new business model, move to integrate into existing or new business for customer creation and scaling phase



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Lecture 9: Entrepreneurship-I

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