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Technology Strategy (MGMT 731)

Karl T. Ulrich

Definition of technology Session 1: Introduction Roles relative to technology What is a technology strategy? Incremental vs. radical innovations / H1, H2, H3 innovation S-curves Technology push and market pull Drivers of diffusion rates Rogers' categories of adoption / "crossing the chasm" Industry patterns of entry/exit and the "dominant design" Competence-enhancing vs. competence-destroying technologies Disruption of incumbents - disruption from below and the "innovator's dilemma Drivers of value capture - appropriability and complementary assets Patents as mechanism for appropriation Standards as mechanism for appropriation Timing of entry, first mover "advantage" Open innovation, open tournaments Make-buy decisions in innovation, establishing an innovation frontier Technology ecosystems Technology and society





















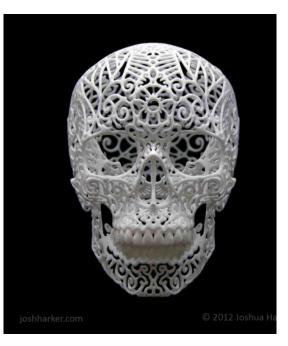


Cases













courserd



Jutebox by Temperpack



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360-degree feedback

From Wikipedia, the free encyclopedia

In human resources or industrial psychology, 360-degree feedback, also known as multi-rater feedback, multi source feedback, or multi source assessment, is feedback that comes from members of an employee's immediate work circle. Most often, 360-degree feedback will include direct feedback from an employee's subordinates, peers (colleagues), and supervisor(s), as well as a self-evaluation. It can also include, in some cases, feedback from external sources, such as customers and suppliers or other interested stakeholders. It may be contrasted with "upward feedback," where managers are given feedback only by their direct reports, or a "traditional performance appraisal," where the employees are most often reviewed only by their managers.

The results from a 360-degree evaluation are often used by the person receiving the feedback to plan and map specific paths in their development. Results are also used by some organizations in making administrative decisions related to pay and promotions. When this is the case, the 360 assessment is for evaluation purposes, and is sometimes called a "360-degree review." However, there is a great deal of debate as to whether 360-degree feedback should be

A Consensus Definition of *Technology* Based on Student Submissions

Technology is the usage and accumulated knowledge of tools, machines, materials, techniques, systems, and methods of organization, in order to achieve some objective.

Frequent mention of:

Solves Problem, Addresses Need, Performs Function, Achieves Goal.

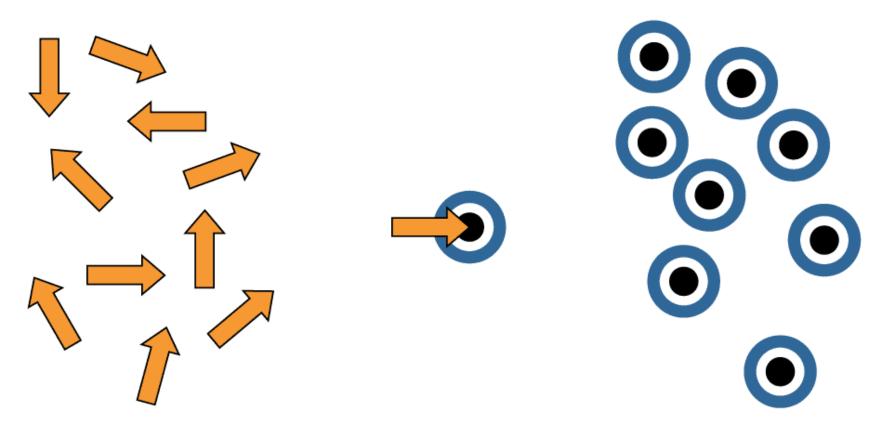
Includes tangible and intangible, so includes organizational processes.

Technology is often a consequence of science and engineering — although technology as a human activity precedes the two fields.

Technology as "embodiment" of knowledge vs. technology as the knowledge itself. (Is it the "know how" or the thing the know how lets us build?)

innovation

A new match between a solution and a need.



In our context, *technology* is the *solution*.

"Need" is broadly defined

"We wanted flying cars, instead we got 140 characters."

Peter Thiel Founders' Fund



Value Creation in Innovation

I. Is the need real?



- 2. Does the solution meet the need?
- 3. Is the "customer" willing to pay more for the solution than it costs to deliver

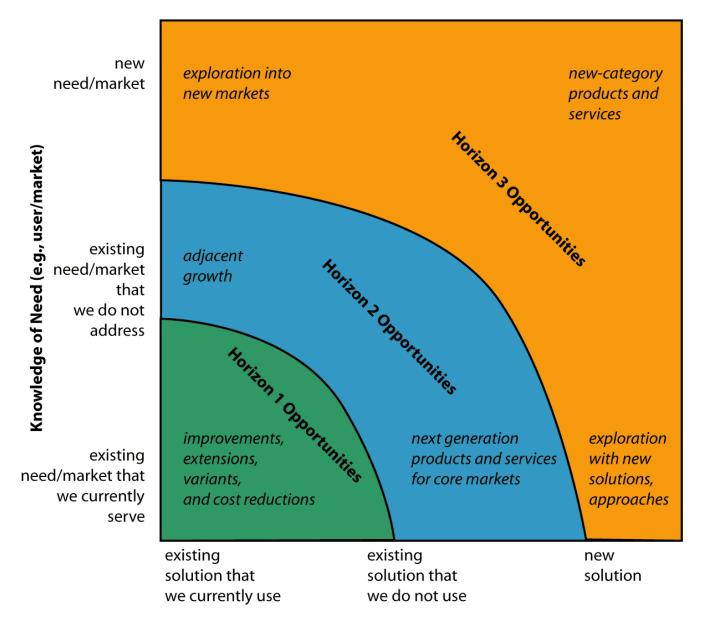




Price – Cost >> 0



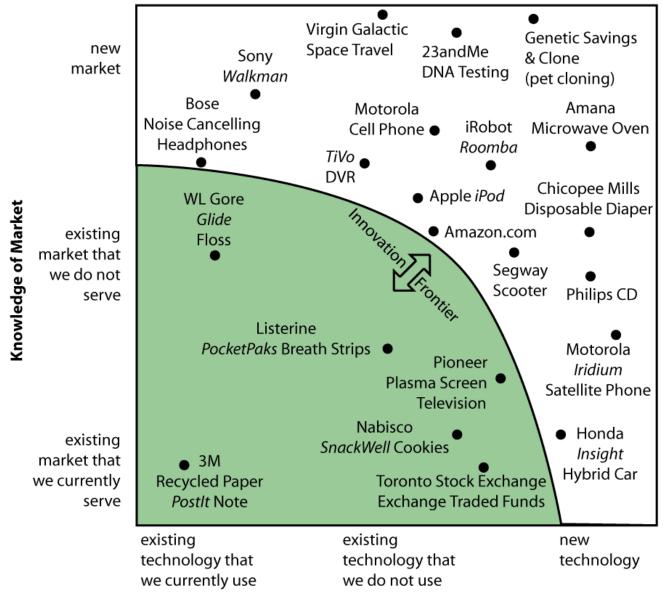
Categorizing Innovation from Perspective of a Firm



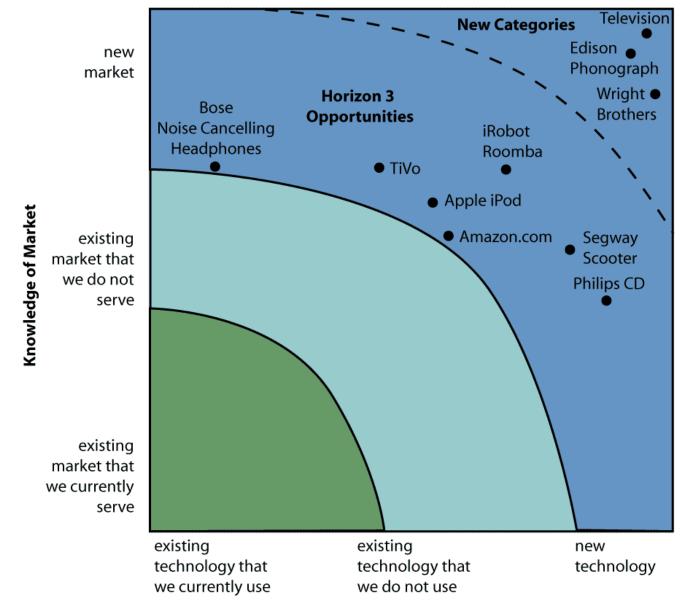
Knowledge of Solution (e.g., method/process/technology)

Source: Terwiesch and Ulrich, Innovation Tournaments.

Most Established (i.e., "incumbent") Firms Will Stay Within an Innovation Frontier



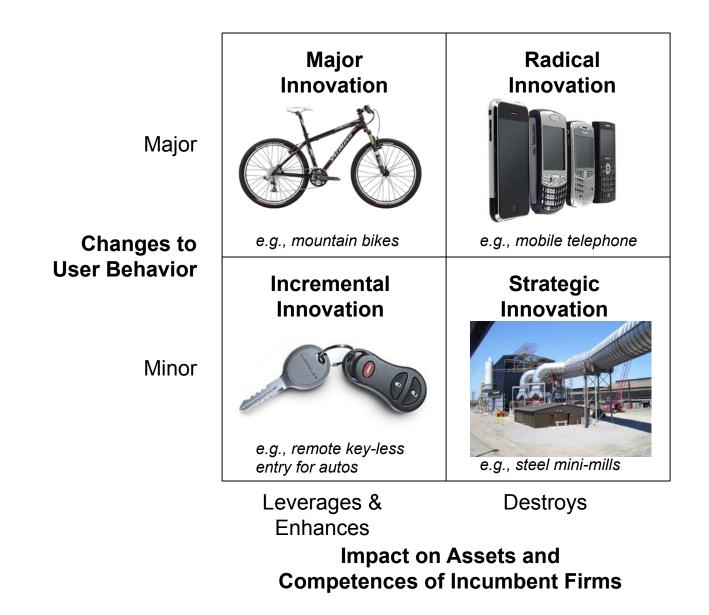
Knowledge of Technology



New Categories are Usually Established by New Entrants

Knowledge of Technology

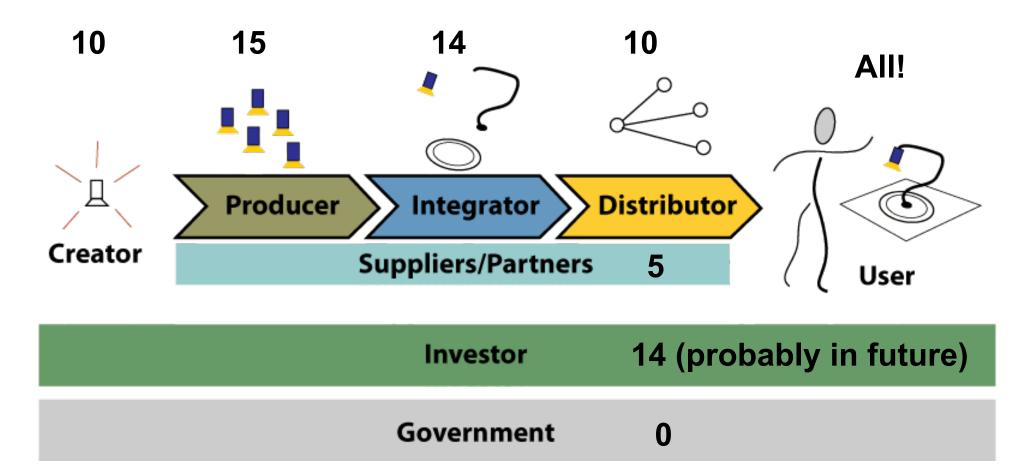
Categorizing Technology in terms of Users and Incumbents



Porter's Five Forces



Number of students indicating expectations of playing each role. (Multiple responses allowed.)



What is a Technology Strategy?

Decisions intended to gain advantage, related to the use and development of technology.

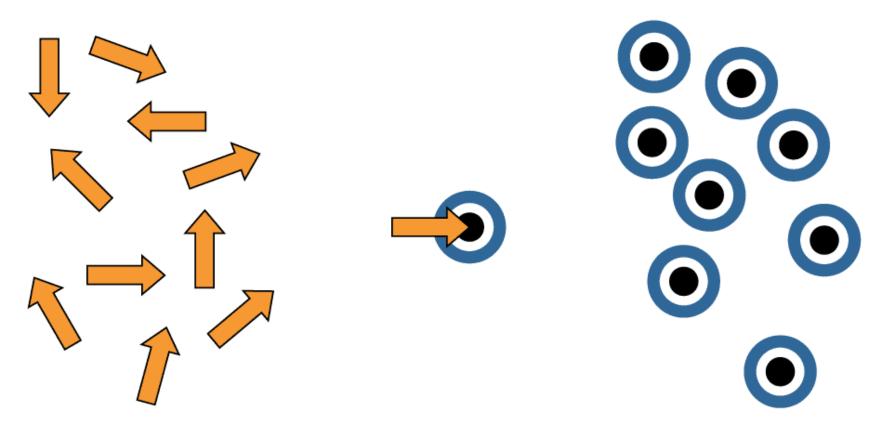
- Do we lead or follow in our adoption and development of new technologies?
 - What are the boundaries of our innovation frontier (the maximum level of risk and uncertainty we take in our innovation projects)?
 - If and when we follow, do we acquire or imitate the pioneers?
- What aggregate level of investment do we make in developing and appropriating new technologies
- What methods do we use to appropriate technologies?
 - Patents, trade secrets, standards, speed
- What comprises our technology platform(s)-- the technologies shared across our products, services, and processes?
- Do we "make" or "buy" our technologies?
 - To what extent do we open our innovation process to the outside world?
 - To what extent and in what ways do we engage partners and suppliers in technology development?
- What role do we play in our technological ecosystem?

MGMT 731 is about the "basic physics of technology," explaining how the world of technology works in order to support better strategy decisions.

OPIM 614 is about how to DO innovation; how to create new matches between solutions and needs.

innovation

A new match between a solution and a need.



In our context, *technology* is the *solution*.

Pull

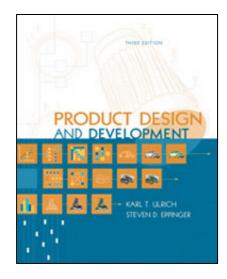
How can we solve this particular problem?

Which solution best meets the needs at attractive cost?





(e.g., OPIM 614, 652, 654)







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Released: Sep 18, 2014

Category: News

Version: 1.0

Rated 4+

Size: 14.3 MB

Language: English Seller: Stringr Inc

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Compatibility: Requires iOS 7.0 or later. Compatible with

iPhone, iPad, and iPod touch. This app is optimized for

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🗄 This app is designed for

Description

Crowd sourced video market place for news organizations seeking video from independent professionals, also known as "Stringers", hence the name of the app.

Stringr Video Support >

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Image: Second second

Petco Park

TITLE

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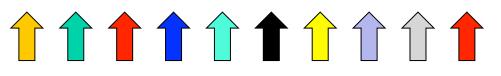
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PullHow can we solve this particular problem?

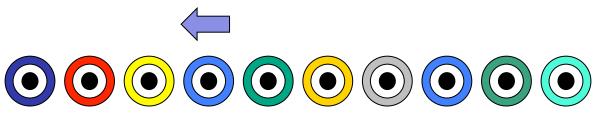
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Which solution best meets the needs at attractive cost?





Push What can we do with our solution?







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Solution Push May Be the Only Alternative, e.g. "Small Molecule" Pharmaceuticals

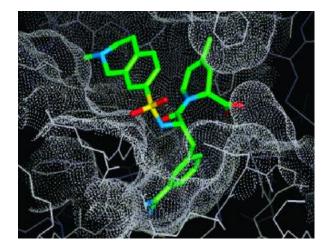
Creation of Technology

Identification of Need

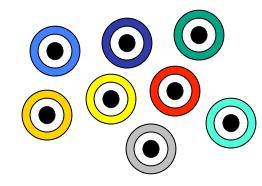


Then...



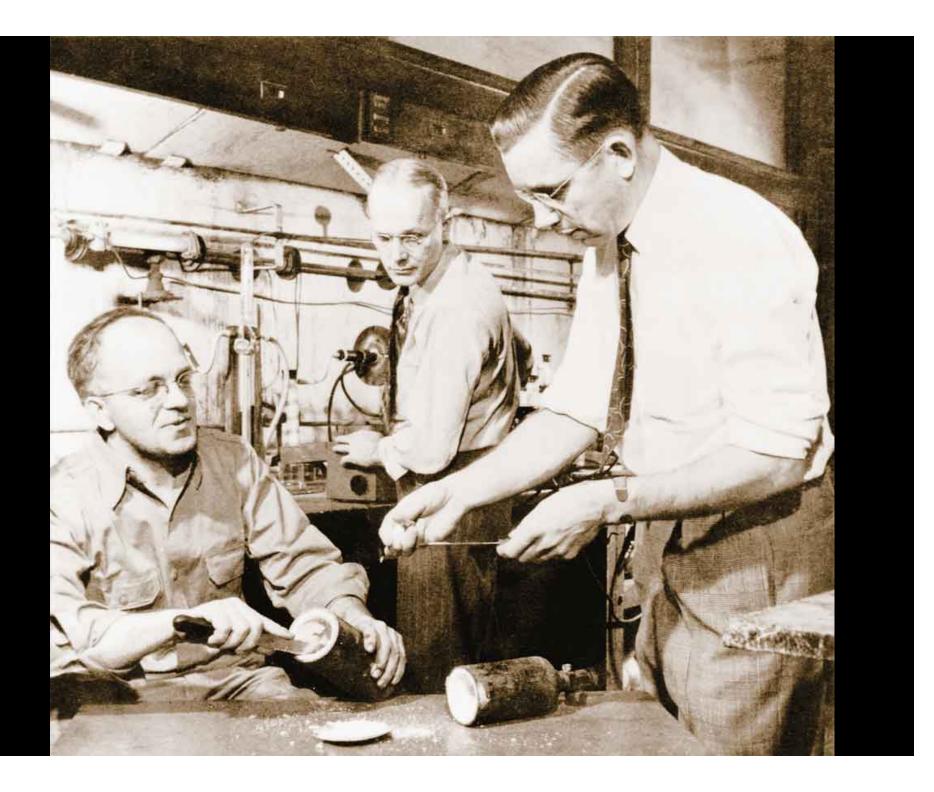


No truly effective methods of synthesizing a new compound based on a desired therapeutic effect.



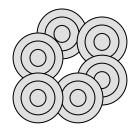


compounds are screened against known targets.



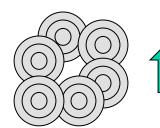


Another flavor of Push



Consensus in scientific/technical community about major opportunities e.g., driverless cars, longevity, space travel, nano-robots

The *Need* is "obvious" but the specific use cases are vague, because there is no user experience.



A solution is *Pushed* into the world by an enthusiast, possibly for his/her own use.

- Market develops slowly.
- Niche applications.
- May be too expensive, unreliable, hard to use.
- Doesn't really hit target.





Sometimes a big market emerges in combination with the right version of the solution.

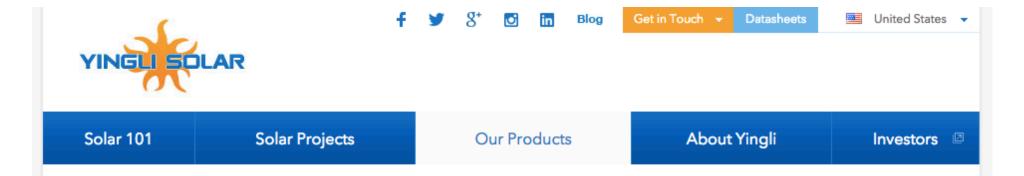




RepRap founded c2009 – becomes Makerbot

Watch *Print the Legend* (2014 Netflix Original) Fascinating documentary of 3D printing industry and Makerbot, among others.





YGE 60 Cell Series

Overview

Multicrystalline YGE 60 Cell Series

YGE-Z 60 Cell Series

YGE-U 1500 Series

YGE-U 72 Cell Series

Monocrystalline

Manufacturing

Projects

Dimensions

64.57in (1640mm) / 38.98in (990mm) / 1.38in (35mm)

Module Type

YL260P-29b, with peak power of 260 W YL255P-29b, with peak power of 255 W YL250P-29b, with peak power of 250 W YL245P-29b, with peak power of 245 W YL240P-29b, with peak power of 240 W

Our signature product, the YGE 60 Cell, is our most versatile module. While compact enough to fit on residential and commercial roofs, it is still economical enough to meet the needs of larger, utility-scale projects.

Levels of Analysis

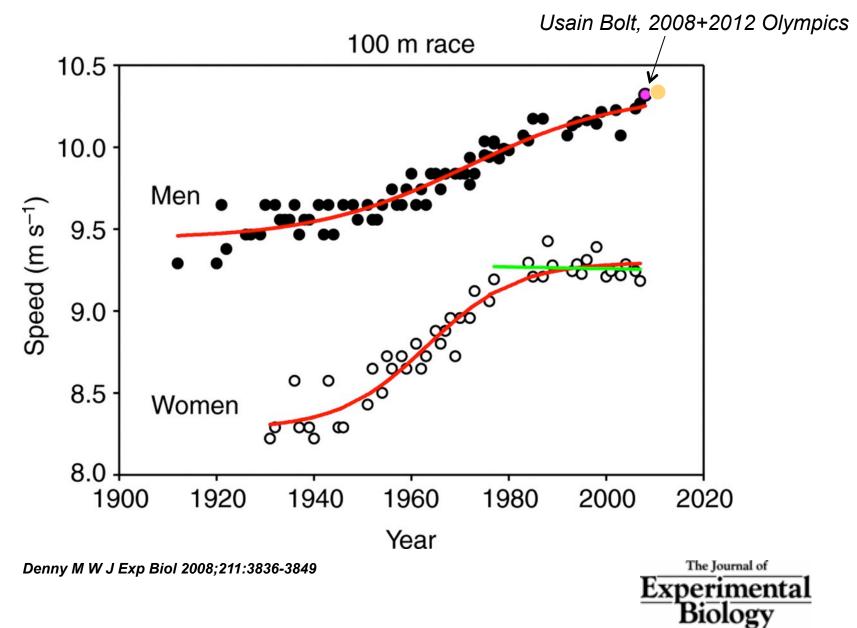
- Sector Energy
- Industry Solar Energy
- Category -- Photovoltaics
- Firm Yingli Solar
- Technology Cystalline Silicon
- Product Yingli YGE60

The first major assignment in this course is a historical analysis of a technology. You will need to pick a technology.

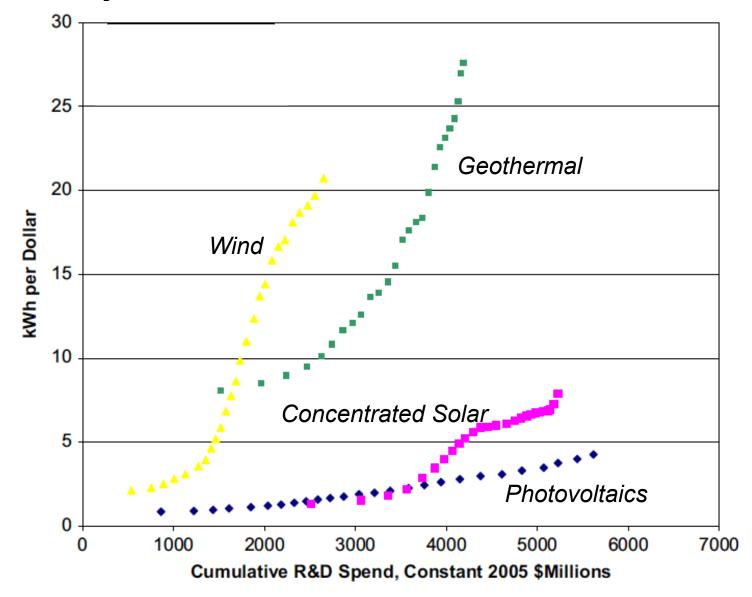
What is a technology that interests you? (Generate 3)

Verify that this technology is appropriately abstract – e.g., photovoltaic solar, not Solar Cities, not energy, etc.

Temporal patterns of annual fastest speeds for humans running 100 m.



Performance Dynamics: S-Curves



Source:

Melissa A. Schilling, Melissa Esmundo, Technology S-curves in renewable energy alternatives: Analysis and implications for industry and government, *Energy Policy*, 2009.

Microprocessor Transistor Counts 1971-2011 & Moore's Law

