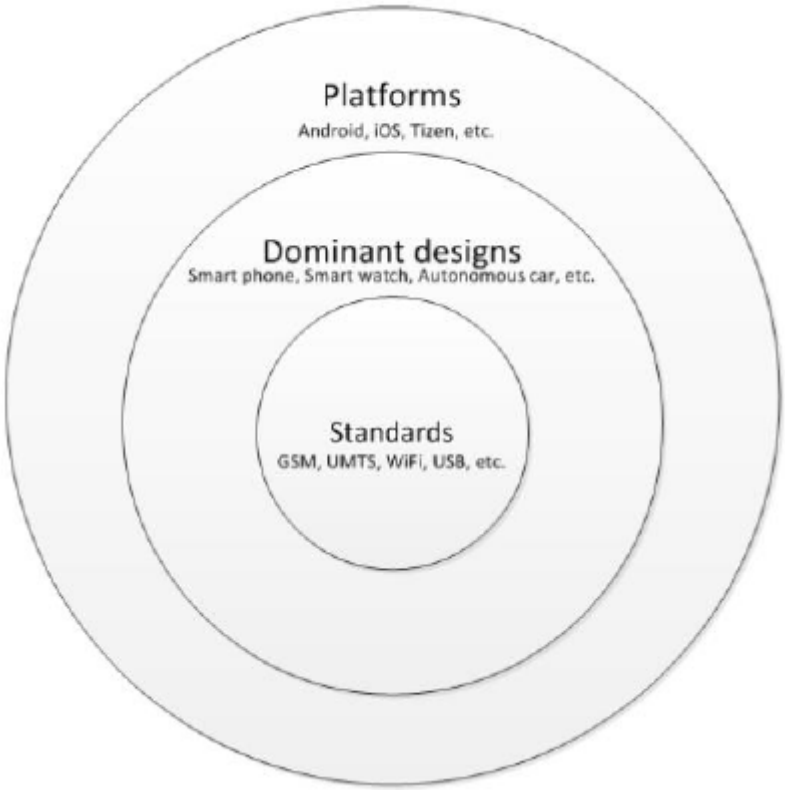
Lecture 1

Level of system / How to select common standard?:

- technological specifications: define compatibility, quality, safety or measurements
- dominant design: a single architecture that establishes dominance in a product class
- platform: a technological system that facilitates interaction between a demand and supply network

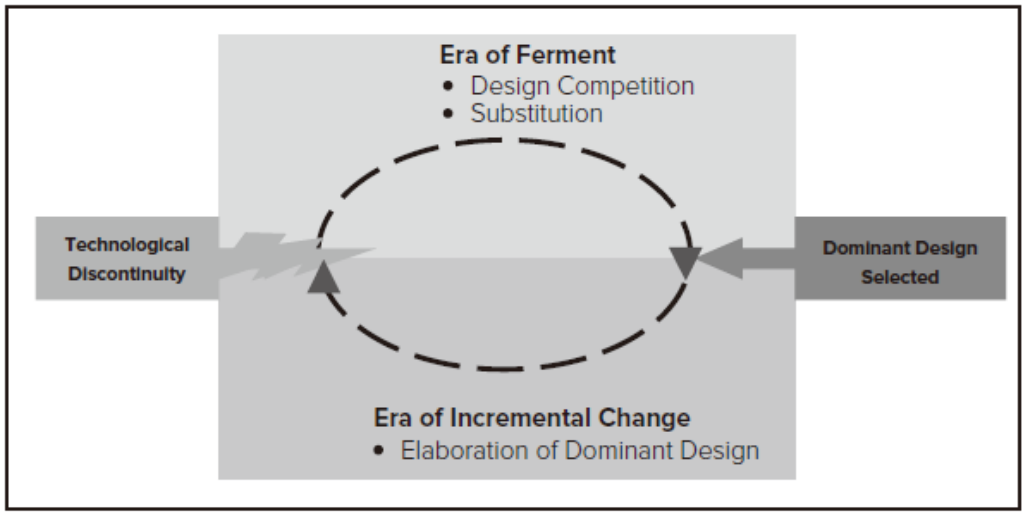


Academic disciplines that focus on standardization

- Evolutionary economics (starting +/- 1975)

  Main idea: Standard selection cannot be explained or predicted as there will always occur random events that cannot be explained beforehand

  - **Technological discontinuities**: A technology that fulfills a similar market need by building on an entirely new knowledge base.
  - **incremental innovation**: An innovation that makes a relatively minor change from (or adjustment to) existing practices.
  - **dominant design**: A product design that is adopted by the majority of producers.
  - **radical innovation**: An innovation that is very new and different from prior solutions.



- Industrial economics / network economics (starting +/- 1985)

  Main idea: when more products use common standards, these products increase in value (increasing returns to adoption)

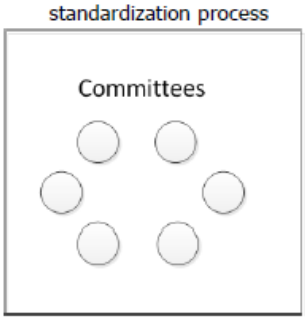
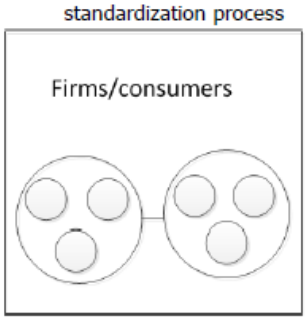
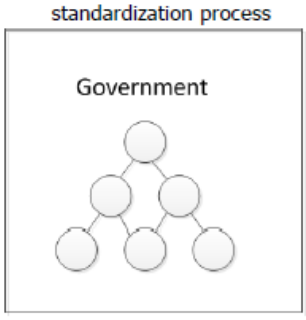
  - **Network effects**
  - **Increasing returns to adoption**: the more a technology is adopted, the more valuable it becomes.
- Strategic management of technologies (starting +/- 1990s)

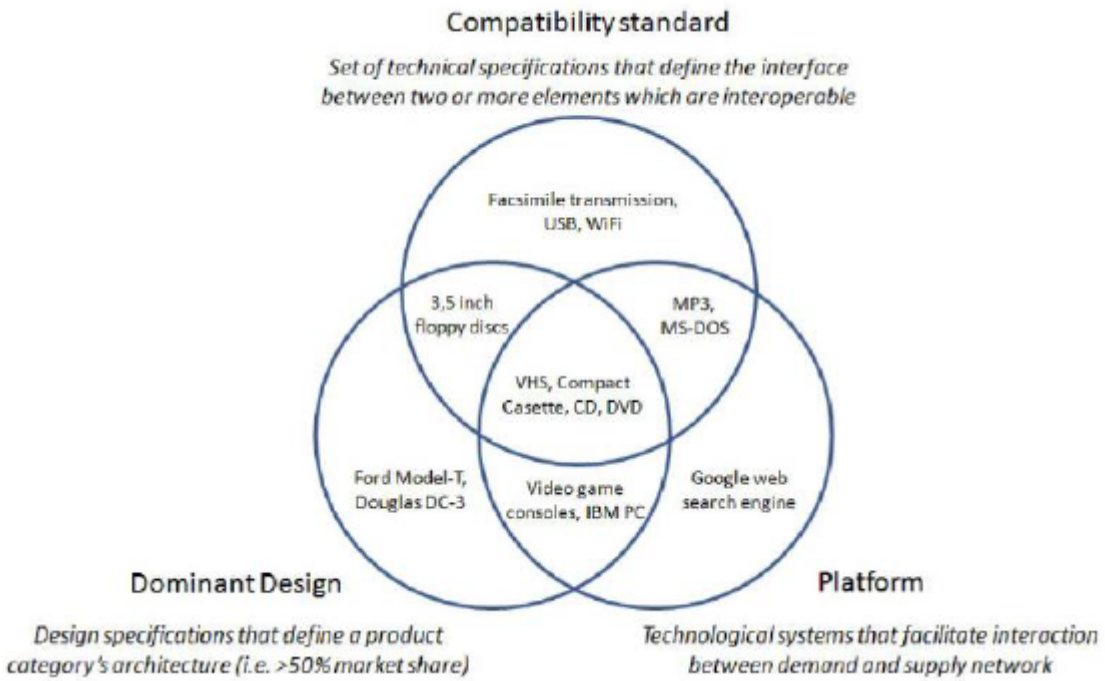
  Main idea: standard selection is influenced by installed base and factors for increasing it. Therefore, the process of standard selection can be modelled, chance events are precursors for factors for standard selection

  - **installed base**: The number of users of a particular technology
  - factors for standard selection
- Platform economics (starting +/- 2000s)

  Main idea: To achieve standard selection, the two sides of the market need to be cared for

  - **two-sided markets**
  - indirect network effects
  - complementary goods
- Standardization and technology management (starting +/- 1990s)

	Committee-based standardization process	Market-based standardization process	Government-based standardization process
			
Coordination mechanism	Cooperation	Competition	Hierarchy
Outcome	Consensus	Dominance	Enforcement
Type of standards	De jure technical specifications (safety, security, compatibility), e.g. ISO 9001	De facto technical specifications (WiFi), dominant designs (Ford model T), platforms (VHS)	De jure technical specifications (measurement), e.g. Metre



Factors for standard selection

- External environment
  - Network externalities: when the value of a good to a user increases with the number of other users of the same or similar good.
  - **Path dependencies**: 1) When end results depend greatly on the events that took place leading up to the outcome. It is often impossible to reproduce the results that occur in such a situation.

    2) relatively small historical events may have a great impact on the final outcome

3) wiki: the set of decisions one faces for any given circumstance is limited by the decisions one has made in the past or by the events that one has experienced, even though past circumstances may no longer be relevant.

e.g. VHS beat Betamax

- Current installed base
- Previous installed base
- Geographical context

- Technological characteristics
  - Technological superiority
    - e.g. keyboard typewriter QWERY was insuperior to DVORAK

      but QWERTY became dominant due to: 1) time to entry 2) switching costs 3) marketing
  - Standard compatibility
  - Availability of complementary goods
  - Standard flexibility, values
  - Variety of complementary goods
- Complementary assets
  - learning orientation: learn from prior experience/mistakes

    e.g. phiilps learn from CD, not fight with sony, cooperate instead -> settle alliance
  - financial resource:
  - reputation and credibility: company with high reputation is likely to win

    e.g. apple
  - firm's commitment
- Competitive strategies
  - Appropriability strategy: The degree to which a firm can capture the rents from its innovation is termed appropriability e.g. license
  - Penetration pricing
  - Marketing, pre-anouncements
  - Timing of entry
- Network characteristics
  - Network diversity: num of industry
  - Network size: installed base
  - Network structure: density of different size of people
  - Relationships with complementers: availability, involve firm in network,
- Committees
  - Technical complexity of the specification
  - Duration
  - Incentives for consensus building
  - Number of participants: more people in committee-> quicker take to make a decision

- Government
    - Commitment
    - Enforcement

Lecture 3: Sources and Strategies of Innovation

Technological innovation: creation of new knowledge applicable to practical problems

Innovation is an erratic and risky process: out of 3000 ideas only 1 successful product emerges

Technology clusters and knowledge spillovers

Firms that are located in a technology cluster

- benefits incoming spillovers > costs of outgoing spillover

agglomeration economies: The benefits firms reap by locating in close geographical proximity to each other.

- Close to specialized suppliers
- Close to specialized workers
- Knowledge spillovers

Technology clusters: Regional clusters of firms that have a connection to a common technology, and may engage in buyer, supplier, and complementor relationships, as well as research collaboration.

industrial district

Knowledge spillover

- due to complex and tacit knowledge in highly educated workers
- Tacit knowledge transfers are higher when workers are close to each other

Tacit knowledge: Knowledge that cannot be readily codified (documented in written form).

Complex knowledge: Knowledge that has many underlying components, or many interdependencies between those components, or both.

Appropriability

Protect the innovations developed by the firm against outgoing knowledge spillovers

Appropriability: degree to which innovating firm or individual can capture rents from the innovation

why protection?

- give inventors or inventing firms sufficient appropriability

- they receive incentive to continue innovating, which is relevant for 1) innovating firm 2) society

How to protect?

- Patents: for invention (to = 20 years)
- Trademarks on marks or designs (to = 10 years with continuous opportunity to extension with 10 years)
- Copyrights to works of authorship (to = 70 years after death of author).

Advantage & Disadvantage

- Advantage for firm
    - It gives an innovator a temporary monopoly position in order to reap sufficient benefits/profits that can be used to invest in new innovation development
- Advantage for society
    - To stimulate innovative behavior of individuals and firms in order to encourage economic growth.
- Disadvantage for firm
    - Protection reduces diffusion of the technology and reduces rapid adoption and use
- Disadvantage for society
    - A monopoly position leads to prices that are higher than when competition would be allowed.
    - Social return on investment lower

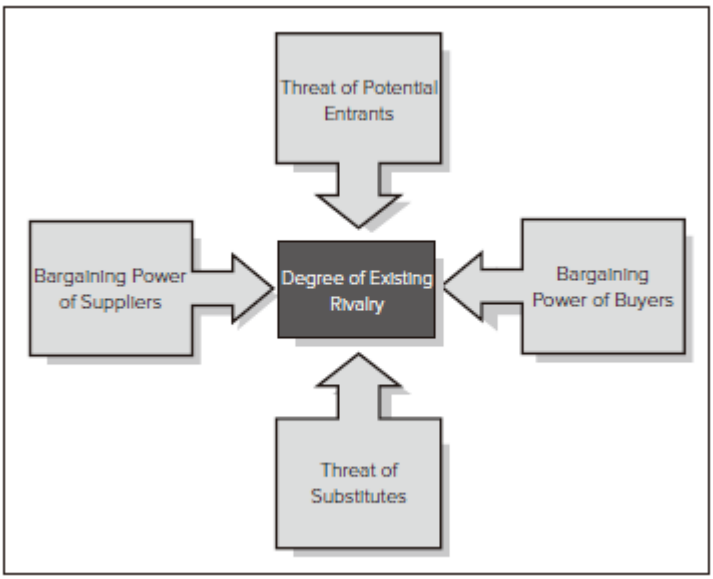
Strategic direction

Strategy formulation: aim to come to a strategy that leads to sustained competitive advantage and hence high return on equity (RoE)

Sustainable competitive advantage: a firm has a lasting strategic advantage over it's competitors and hence is expected to show a better performance (productivity or profits)

Tools:

- **Porter's Five-Forces Analysis**: framework to explore the factors that affect the profits of a typical firm in the industry along two dimensions: vertical chain and market competition
    - weakness: Porter sees all other firms (competitors, suppliers, buyers) as threats to profitability and fail to include the collaborative potential in an industry.



- **Value Net Analysis**: extending Porter's five forces analysis by paying attention to profit enhancing factors: Coopetition = a mixture of competition and cooperation
    - improvement: interaction among firms can also enhance profits, opportunities
    - consists of suppliers, customers, competitors and complementors
        - competitiors: Although competitors are often seen as parties to fight over market share with, it is actually perfectly possible to collaborate with as well. On the supplier side, competitors could combine forces when purchasing similar raw materials.
            - Both companies had strong positions in different geographical markets which would help with international expansion.
        - complemenors:

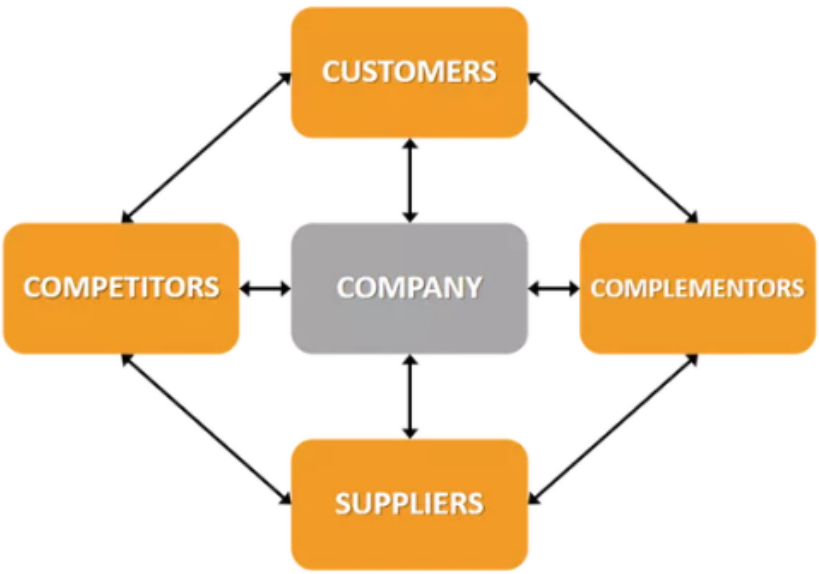
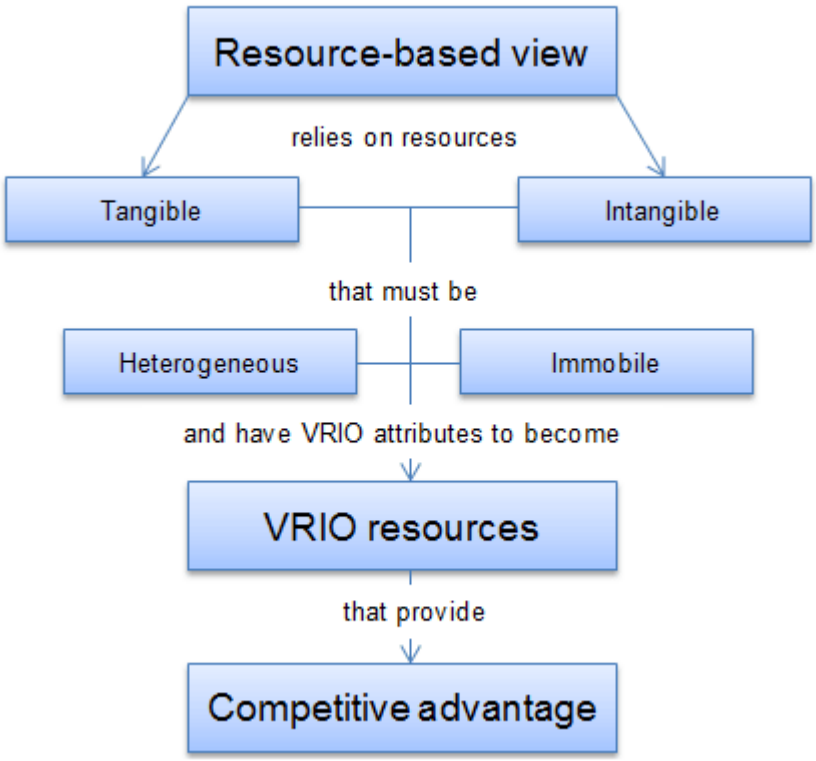


Figure 1: Value Net Model

- Resource Based View:a model that sees resources as key to superior firm performance. If a resource exhibits VRIO attributes, the resource enables the firm to gain and sustain competitive advantage.



  - Assumptions:
    - Resource heterogeneity: skills, capabilities and other resources that organizations possess differ from one company to another.
    - Resource immobility: resources are not mobile and do not move from company to company, at least in short-run.
  - VRIO framework:
    - valuable: Resources are valuable if they help organizations to increase the value offered to the customers.
    - rare: Resources that can only be acquired by one or few companies are considered rare.
    - imperfectly imitable: costly to imitate (historical conditions, tacit complex knowledge, etc.)
    - Non-substitutability or equivalent resources: no equivalent resource or capability that could be used by a competitor, for example a good and specific Organisation
- Lavir RBV
  - initiative: Inter-firm collaboration not taken into account in RBV, but has become more relevant in practice due to 1)internationalization/globalization 2)increased complexity of technological innovation
  - Introducing inter-firm alliances is likely to violate the VRIN conditions or the resource-position barriers they erect in order to secure rents.

Lecture 4

Structural changes in world economy leads to changing external business environment in last two decades.

External Environment:

- Technological changes: ICT-, nano technology, bio-engineering
- Economic changes: globalization, international trade- and capital flows
    - Economic power shift from West to East: new markets

General-purpose technologies: technologies that can affect an entire economy(usually at a national or global level)

- Decline in prices: relative prices decline and quality increase
- Ability to spawn innovations: GPTs can be a platform for innovations and inventions

Future Challenges for Innovation Strategy

- declining efficiency of innovation processes
    - Erooms' Law: drug discovery is becoming slower and more expensive over time, despite improvements in technology
    - Moore's Law: the number of transistors in a dense integrated circuit doubles about every two years.
    - Standardization and routinization of R&D -> bureaucratic R&D departments: 1)Too expensive and resource consuming 2)
- needs of marginalized and poor groups in the world.
- the squeeze between increasing demand for public sector spending aimed at addressing the EU Grand Challenges(innovation to solve health and development problems) and public sector budget constraints.

Increased complexity of the external environment due to

- Fast changing technology
    - Declining incomes of middle classes in USA and Europe
    - Less homogeneous markets: less scale economies
- Increased globalization
    - Emerging markets (China, India, etc.) lead to more innovations due to rising middle class (opposite to decline middle class in USA and Europe).
    - Emerging markets increase competition for Western firms particularly for consumers in emerging economies: frugal innovations important

Frugal innovation: the process of reducing the complexity and cost of a goods and its production.

re-designing products without luxury attributes in order to supply the Bottom-of-Pyramid (less than 2,- a day) as well as rising lower middle classes(between 2,- and 10,- a day)

Innovations Classification

- Cost Innovations: same functionality at lower cost
- Good-Enough Innovations: tailored functionality at lower costs
- Real Frugal Innovations: new functionality at low costs
- Reverse Innovations: selling low-cost innovations originally developed for emerging markets, elsewhere

Lecture 5

New Product Development

- Important criteria
    - Corporate and maximize customer fit
    - Minimize development cycle time
    - Controlling cost, size of investment
- Important issues
    - Size of the margin and rate of return
    - Competitive threat/ are ahead Proprietary
    - Experienced champion

Ideas versus opprtunity

Idea

- remain
- are free
- do not need clients to exist
- can be the basis of a business opportunity

Opprtunity

- need to be valuable
- need to solve a problem
- need work
- require a fit
- are temporal
- Opportunities: ideas that can be implemented

Entrepreneurship

- Kirznerian: New ventures provide products or services that are very nearly imitations of existing offerings, reproduced with minor variations (Kirzner, 1973).
- Schumpeterian: New ventures offer products or services that are truly novel and that represent new and different combinations of resources (Schumpeter, 1934).

Information asymmetry: one party has more or better information than the other.

- knowledge, experience
- access to networks, contacts

Dynamism in the economy: source of information asymmetry

- Technology development (expert skills, research findings)
- Changing customer preferences (new habits)
- Changing demographics (aging population, urbanization)

Opportunity recognition

- identifying an information asymmetry: sensing or perceiving market needs and/ or under employed resources
- closing the information asymmetry: recognizing a fit between needs and resources
- exploiting the opportunity: creating a fit through a business concept

Lecture 6

Planning for business vs improvising

Planning for business

- benefits
    - Planning improves subsequent human action
    - Integration and alignment of goals
    - Instrumental and forces to rethink issues
    - Provides insight in necessary skills, resources
    - Framework for actions, schedule and milestones
- paradox
    - Entrepreneurship requires considerable thought, preparation and planning, yet it is a basically unplannable event
    - For creativity and innovativeness to prosper, rigor and discipline must accompany the process.
    - Entrepreneurship requires a bias toward action and a sense of urgency, but also demands patience and perseverance.
- Often it takes years before the actions in a business plan are executed

Improvising

no time between the decision (composition) and the execution of an action. The entrepreneur executes directly the decision he has made.

Improvisational competencies

- ability to respond quickly, come with solution in the process.
- Role of self efficacy (Hmieleski and Corbett, 2008)
- Belief one can do
    - increases the likelihood one will undertake improvisational actions
    - increases the likelihood of higher levels of performance
    - increases the likelihood of higher levels of satisfaction

Causation vs Effectuation

causation: Effect is given

- *the client chooses a menu in advance and the chef prepares this menu by looking for the right ingredients and following the recipes to make the dishes.*
- when effects are given and focus is on selection of a **possible** set of resources
- environment is largely predictable and that research, analysis and planning lead to rational decision processes and optimal outcomes
- traits
    - Rationale analyses
    - Static and lineair development
    - Multiple options but predictable
    - Focus on predicting future rather than controlling it
    - Risk is focussed on expected returns
    - Existing markets

effectuation: Only some resources and tools are given

- *The client would not ask for a specific menu, but he asks the chef to make something with the ingredients available. The chef chooses one of the many different meals he is able to make with the available ingredients*
- when possible effects can be created given a certain set of resources
- uncertainty of the entrepreneurial environment in which the future is unpredictable and goals are not clearly known.
- traits
    - Outcome is dependent on entrepreneur's traits
    - Dynamic and non-lineair developments
    - Focus on controlling future rather than predicting it
    - Focus is on affordable losses
    - Emergent markets

strategy vs entrepreneurship

strategy: mainly concerned with effective implementation

Entrepreneurship: mainly concerned with opportunities and locus of individual action

• Strategic focus	• Entrepreneur focus
– Top-down	– Bottom up
– Learn and apply	– Learn and unlearn
– Transaction	– Transformation
– Resource view	– Knowledge view
– Stabililty, continuity	– Change, adapt

exploitation vs exploration

NPD Team Diversity

- Pessimistic view: Team members that are more diverse have different experiences, different beliefs, and their different perspectives cause them to "see different environments"
    - It introduces social divisions
    - Different viewpoints and communication makes communication difficult
    - Less willingness to reach consensus
    - Limits the smooth flow of activity and quick development
- Opportunistic view: Team members that are more diverse have different experiences, different beliefs, and their different perspectives cause them to "see different environments"
    - Augments to the discussion among team members
    - Improves decision quality
    - Improves the scope for identifying opportunities

Diversity moderates the relationship between an entrepreneurial/ explorative attitude and firm performance

- Low diversity provides consensus and benefits the status quo in organizations, it enhances the speed of incremental innovations
- High diversity improves discussion making quality and questions the status quo, it will positively affect the opportunity based management practices of entrepreneurial management

Team classification

- Functional teams where members remain in their departments, spending little time on a common project
- Lightweight team has a project manager managing the members in their respective organisations, who spend little time on the project
- Heavyweight teams spend considerable more time on the project and have a more senior project manager
- Autonomous teams are more at arm's length and operate in a distinct organisation

Social networks

- bonding ties
    - Connecting the people within existing networks
    - Same information, same experience, same cognitions, same language
    - Communication benefits
    - Fast development
    - But little new information, less creativity

- Bridging ties
    - Connecting with people in networks that are disconnected from other networks
    - Information benefits
    - Time benefits
    - Referral and scope benefits for better evaluation
    - Negotiation benefit
- values
    - They help you identify ***opportunities*** to be creative
    - They help you ***capture value*** from an opportunity

Open vs closed innovation approach

closed innovation

- Attract the best and brightest scientists
- Develop and manufacture yourself
- Market and distribute yourself
- Take profits and reinvest yourself (circle of innovation)
- Control your own IP and protect it from others
- High R&D investments

open innovation

- Commercialization of own ideas as well as from other firms
- Bring inhouse ideas outside the current business
- No lock up of IP but use in licensing, joint ventures and corporate ventures
- Porous boundaries of the firm