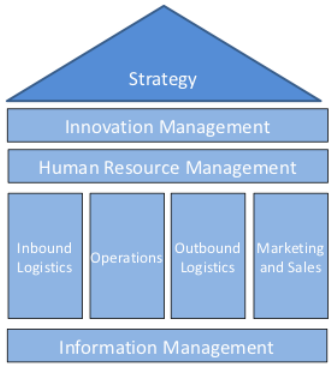
Discovering Management (HS17) Resume

Introduction:



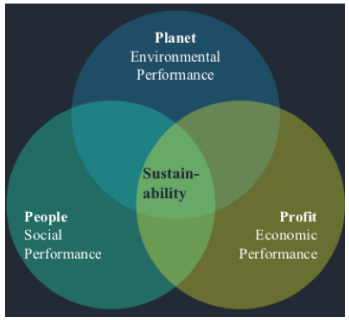
Corporate Sustainability

Learning Objectives:
- Understand concept of corporate sustainability
- Assess motivations of companies to respond to sustainability challenges
- Critique actions of firms responding to sustainability challenges

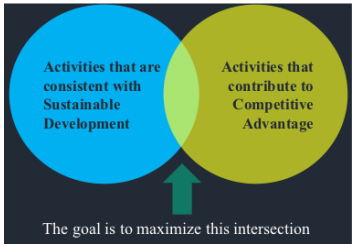
- Sometimes culture is included as fourth sphere

- Social issues are very important (like human rights, labor conditions etc.)

- We focus on sustainability challenges in environmental domain



Definition of corporate sustainability:
Corporate sustainability is a new management paradigm under which firms achieve competitive advantage through business activities that are consistent with sustainable development.

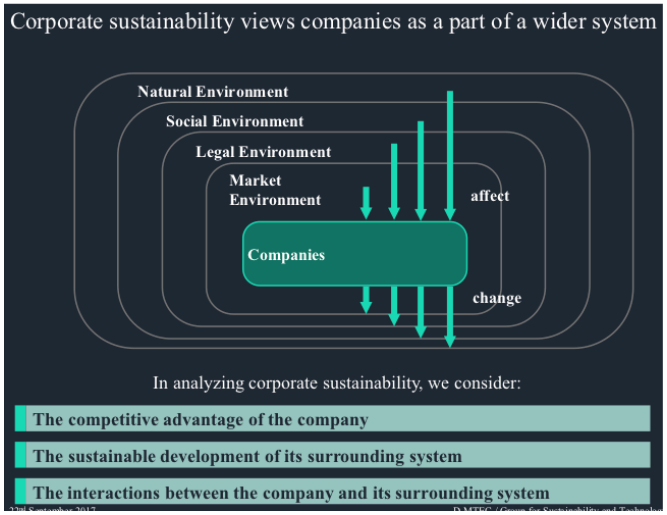


Similar concepts:

	Idea	Example
Corporate Governance	Prevent abuse of power within the organization to protect shareholders	Prevention of accounting fraud, corruption
Corporate Citizenship	Company engages in protection and support of social, civil and political rights	Support of gay rights (e.g. in Tennessee anti-gay laws)
Corporate Philanthropy	Funding initiatives that contribute to health, education, or protection of the environment outside the business	Melinda Gates Foundation funds cancer research
Corporate Social Responsibility	Voluntary activities that contribute to health, education, protection of the environment	Offer fathers extra holiday for parental leave

There can be a large overlap between corporate sustainability and these concepts; they could be part corporate sustainability as well.

Key difference: degree to which the activity is related to core business.



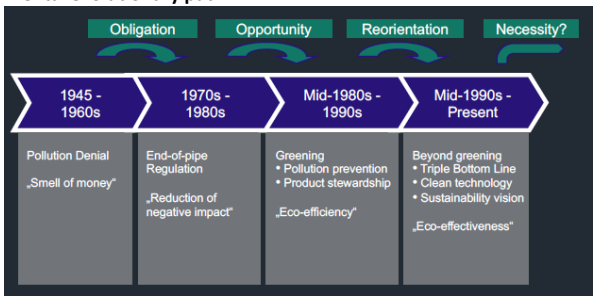
Firms:
- **Reduce risk or shape their markets** ("Deep Water Horizon", Tesla's electric vehicle)
- **Meet or influence laws** (PG&E vs. Brockovich, Global Climate Coalition (GCC))
- **Comply with or shape social norms** (Vattenfall construction of coal plant, Sustainable Palm Oil Roundtable by MIGROS)
- **Secure or extend access to natural resources** (Depletion of fish resources → MSC, BASF Polymers instead of fossil fuels)

	Market perspective	Legal perspective	Social Perspective	Ecological perspective
Motivation	Obtain and keep compt.advantage	Comply with and influence legal framework	Obtain and increase social legitimacy	Retain access to natural resource base
Reactive strategy (threat-driven)	Reduce business risk	Comply with legislation	Comply with social norms	Secure available resource base
Proactive strategy (opportunity-driven)	Shape market (cost leadership, product differentiation)	Contribute to legal framework	Shape social norms	Extend usable resource base

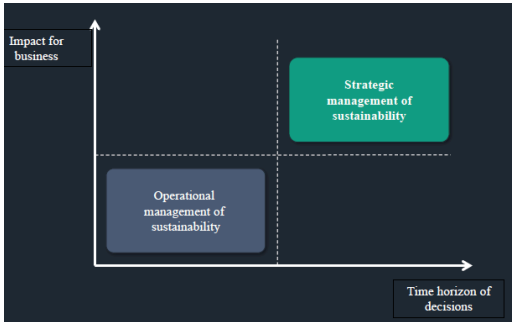
Shareholder theory (Milton Freidman):
- Managers have a duty to maximize shareholder value
- Firms engaging in social development will waste wealth, ultimately negatively affecting society in the long-run. Social development is best in the hand of governments.

Stakeholder theory (Edward Freeman):
- Managers have duty to balance shareholders (financial) interest against other stakeholders' interests.
- If firm creates value for its stakeholders, it will create value for its shareholders.

Corporate environmental evolutionary path:



Operational and strategic management of sustainability:

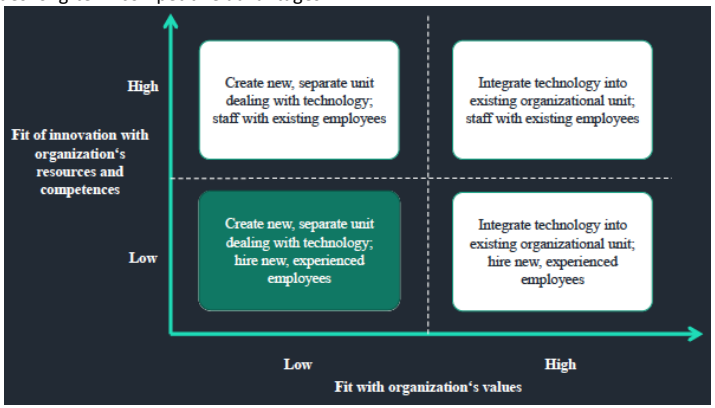


Operational management of sustainability:
Efficiency is simplest form of creating value from sustainability
- Efficiency $r = \frac{P}{C}$ P: Product output (value) C: amount of input (cost)
- Can be achieved through: value adding, cost reduction

Eco-Efficiency: focuses specifically on more efficient use of natural resources.
Definition: *Delivery of competitively priced goods and services that satisfy human needs and bring quality of life while progressively reducing ecological impacts and resource intensity, through the life-cycle, to a level at least equal with the Earth's estimated carrying capacity*

Exemplary approaches:
- Reducing material and energy intensity of goods and services
- Reducing toxic dispersion
- Enhancing material recyclability
- Extending product durability

Strategic management of sustainability:
- Sustainability is a source for competitive advantage
- How strategic sustainability contributes to competitive advantage:
  - Creates difficult-to-imitate gains (technical solutions provide efficiency gains that are easy to imitate)
  - Contributes to reputation
  - Develops new competences
  - Provides long-term competitive advantages



Incumbent strategies from different perspectives:
- Going from existing product to new product with purpose represents technological but also social/ organizational challenges for firms
- Incumbents are likely to resist change due to internal factors (resources, competences, values) and this can lead to big losses
- External influences such as public policy, pressure from customers/ NGOs are crucial to encourage change

Rethinking business from sustainability perspective
Examples:
- Rethinking value of waste: innovative recycling (example: Terracycle), using food waste to brew beer
- Rethinking meaning of mobility: car sharing, e-bikes, urban design changing work patterns to reduce need to travel

Key take-aways:

1. Corporate sustainability: What sets corporate sustainability apart from other related concepts is the importance of integrating sustainability into core business activities
2. Motivation to act: There are market, legal, social and ecological pressures on firms to respond to many sustainability challenges. But there are a range of reactive to proactive ways of dealing with these pressures
3. Operational and strategic approaches: Companies may change their organization and strategy in an incremental or radical approach. The more they integrate corporate sustainability into their business model, the higher the benefits. There are, however, organizational challenges for incumbents and start-ups alike.

Innovation

Why innovation matters:

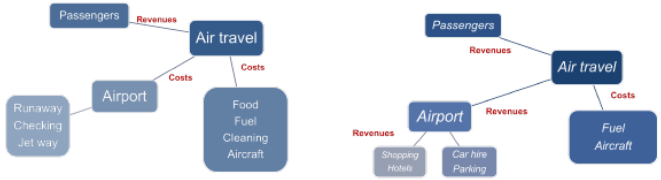
- Patent expiry
- New products can spur extraordinary growth
- Speed with which new products pervades society affects the way we interact, work and think
- New intelligent and innovative technology can provide better service than humans and solve problems more efficient
- Innovation changes the world around us
- Innovation can make or break firm performance
  - New products less than 5 years old account for 30% of profits and in high performing firms they account for nearly half of all sales
  - Firms that do not innovate may perish (e.g. Kodak)
- Innovation is important engine of economic growth
- Innovation strongly tied to reputation of today's firms

Definitions:

1) Innovations are qualitatively new products or processes that differ significantly [] from what existed before.
2) A new way of doing things that is commercialized
3) The what's possible meets the what's needed

Business model innovation

- **Business model**:
- the "way of doing business" that a firm has chosen: its entire system for creating and delivery value to customers and earning a profit from it.



Winners and losers of innovation

Competency-destroying innovation:
(rendering firms' competences obsolete)

- Piston to jet engine
- Vinyl records to compact disks
- Analog radio to Digital Radio
- Vacuum tubes to transistors

Competency-enhancing innovation:
(building on firms' existing knowledge base)

- Jet to turbofan
- CDs to DVDs
- LSI to VLSI semiconductors
- Mechanical to electric typewriters

Key learning points:

- Some firms suffer from "core rigidities": core competencies on which success was build lose relevance through changing markets and competing technologies. Complacency and inertia lead to firms failing to respond on time (example: Nokia)
- Very difficult for firms to develop technologies that "destroy" the competencies related to their existing technologies (example: not entering digital, online music market)
- Firms may battle to become dominant standard in new industry. Early entry is sometimes (But not always) an advantage for standard setting

Creativity

Goals:

- Understand nature of creative work and inherent tension creativity provides for the management of R&D
- Describe the formal mechanisms firms have put in place to select R&D projects
- Identify various ways through which organizations can manage the creativity of their staff

Nature of creative work:

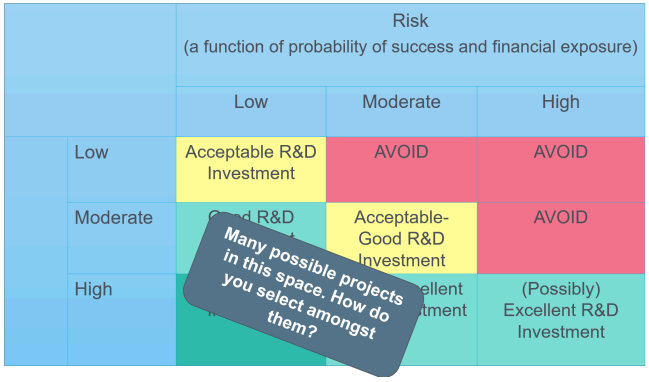
- Iterative search
- Invention by analogy
- Invention by inspiration
- Invention as recombination
- Serendipity (Entdeckung/ Zufall)
- Science base of invention
- Scepticism against the novel (If at first idea is not absurd, There is no hope for it.)

Key learning points creative work:

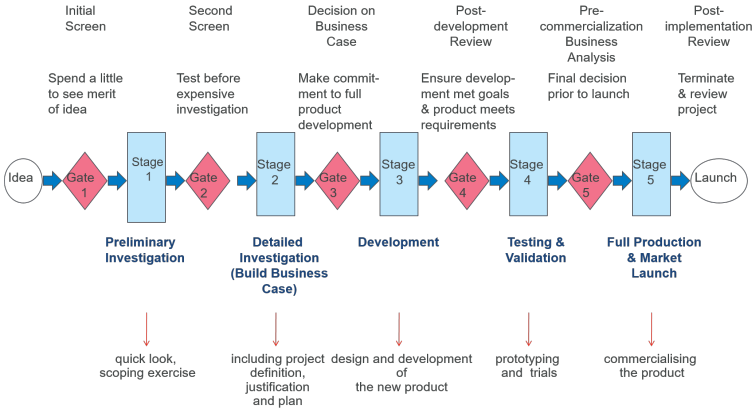
- Invention is an iterative search process for novel and useful products, processes, services, designs or technologies.
- The outcomes of the search process are inherently uncertain.
- Creative processes do not start with a blank sheet. They are most often the result of a recombination of existing elements of knowledge or build on prior knowledge for inspiration.
- Creativity often involves a change of perspective: looking at problems from unusual, unexpected angles (which is often easier for relative outsiders).
- Innovative outcomes can be the result of unplanned and serendipitous events (of which only 'prepared minds' see the value) or of systemic search efforts for example based on scientific knowledge.

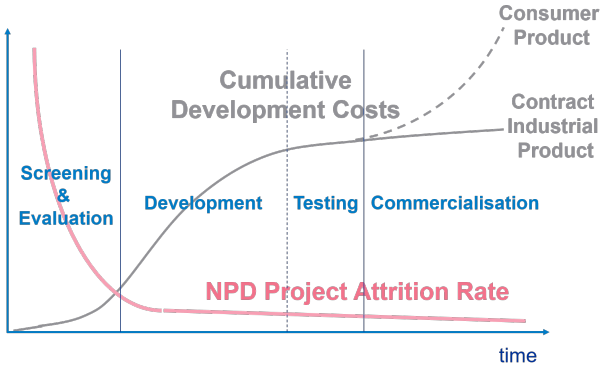
Project selection

Risk-Reward matrix



Stage-gate Model





Typically <1/10 concepts are introduced as products

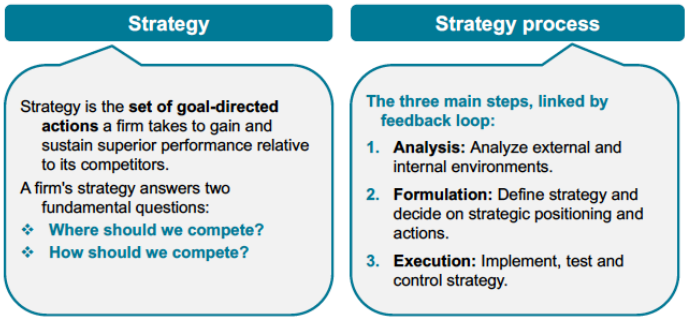
Key learning points:
- Stage-gate models can be used to select among alternative projects and take stop-or-go decisions whilst projects progress
- Stage-gate models help to keep the costs of R&D under control and guide the allocation of resources to projects that best fit the organizations competencies and strategies.
  - Subsequent stages involve increasing costs and increasingly senior managers
- A rigid application of stage-gate models may carry the risk of the tyranny of measurement:
  - High-risk or unconventional R&D projects are 'killed' before they have had the chance to show their promise
- Technology portfolios are a means for structuring and visualizing the risk and reward of current and potential R&D projects and are a prominent help to discussion and decision processes of project selection.

Managing creativity
Key learning points
- Developing innovations in large organizations is difficult, as these may go against established routines and cannibalize existing assets.

- The adoption of formal structures and systems - project management, stage-gates – may help allocate resources and shape the delivery of R&D.
- Yet, formal rules and systems may not allow individuals the flexibility they require to develop innovations.
- Creativity is fostered when individuals have the freedom and autonomy on their work, but this freedom must be balanced with a degree of accountability to make sure individuals' creative efforts stay aligned with company objectives.
- Individuals may engage in bootlegging activity in order to explore new ideas in relative freedom and delay assessment of embryonic ideas. They may even continue working in secret on prior rejected ideas.

Strategy

Learning Goals:
- Define strategy and introduce the building blocks of business strategy.
- Explain the concept of competitive advantage.
- Evaluate how a firm creates competitive advantage.
- Provide a basic discussion of the strategy process.
- Discuss the factors that affect successful strategy formulation and execution.

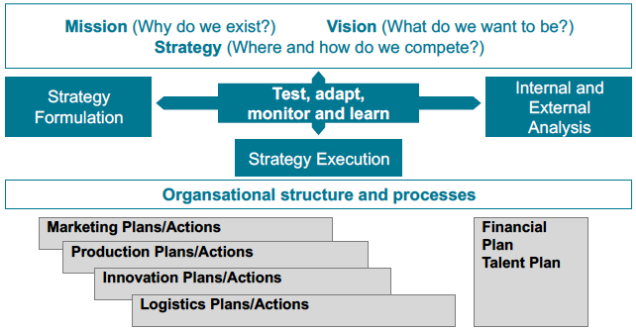


- Strategy has often been revealed after the fact, by looking at successful and unsuccessful strategic moves by firms
  - The strategy discipline (practitioners, consultants, academics) have sought to find "rules of conduct" that can predict successful strategic moves.
  - Strategy research is based on statistical analysis of many firms, and single cases of successful and less successful firms.

Managers need strategy in order to position their firms relative to its competitors

Basic questions asked in strategy field:
- Why do some firms financially outperform their competitors over some period of time?
- What strategy do we need in order to act on the opportunities and counter threats in the environment?
- What strategy do we need in order to build strengths and counter weaknesses of our firm?

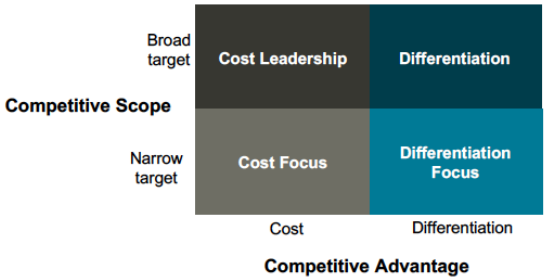
Strategic management in an organisation



Value Proposition:
- What value the firm offers to which customers, at what relative price?
- Why customers should by product/ service; how it satisfies their needs
- What is the underlying competitive advantage of the firm (low cost/ differentiation)

Competing to be the best or competing to be unique? → Mistake in strategy: Compete with rivals on same dimensions

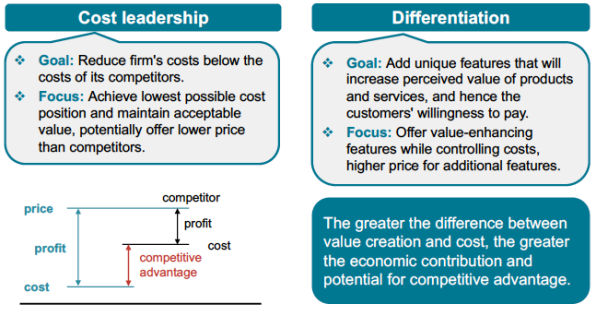
Strategic positioning:



Competitive scope: broad market or niche, which industry to compete in.

Competitive advantage: Situating a frim relative to its competitors

Competitive Advantage



Cost Leadership: usually comes from unique combination of different activities that other companies cannot copy easily or not at all. (Economies of scale, Size, Preferential access to factors of production, Technology, Lean and low-cost organization, Operating efficiency)

Economies of Scale: company produces more of a good → get more efficient at process → cost of production falls as output increases

Sources: Spreading of fixed costs, R&D, Efficient use of inventories, Increased productivity: specialization and division of labour

Relation to firm size: When there are economies of scale in functions, larger firms up to a certain point have a cost advantage over smaller firms. (for manufacturing, marketing, sales or administration)

Preferential access to factors of production:
A firm may have differential access to similar factors of production at lower costs than competitors.
Factors of production cover a range of inputs used by the firm in doing business:
- Raw materials
- Land
- Labour
- Capital
- Data

A firm with a high production volume may use its market share to obtain discounts on factors of production.

Technological Advantage:
- Technological advantages in production can be independent of economies of scale. They ensue from investment in own research and development of technology, or the purchase and superior exploitation of technology.
- Typically, this results from specific proprietary manufacturing technologies, technological innovation protected by trade secret or patent.
- Example: Ford's assembly line used new technologies and processes to produce cars cheaper.

Sources of Differentiation Advantage: Product differentiation always hinges on the customers' perception of the firm's product or service
- **Product features and innovation:**

Characteristics that allow for differentiation: Quality, Design, Colour, Style, Trademarks, Patented features
→ These characteristics match the preferences of certain customers
- **Links between functions and complexity:**

Differentiate a product by linking different functions and making it more complex in features and delivery: Sales with after sales service, sales with distribution, sales with financing, Product development with sales/ financing
- **Timing:**
  - First mover invests heavily on R&D and advertising
    - Incentives:
      - Customer loyalty
      - Market share difficult for competitors to capture
    - Disincentives:
      - Difficult to estimate returns earned from introduction of product innovation
      - Investment in R&D reduces slack available for further innovation

    A first mover allocates funds for product innovation and development, aggressive advertising, and advanced research and development.

- Second mover responds to first mover's competitive actions, typically through imitation of product features
- Late mover responds after considerable time has elapses after first mover's action and second mover's response

- **Location and presence:**

The firm can be located close to: Suppliers, Distributors and retailers, Customers, Presence online
→ Physical location and virtual presence can be a source of product differentiation for a firm

- **Product Mix:**

Mix of products or services offered by firm can be a source of product differentiation. This holds when products and services are technologically linked or when a single set of customers buys several of the firm's products and services.

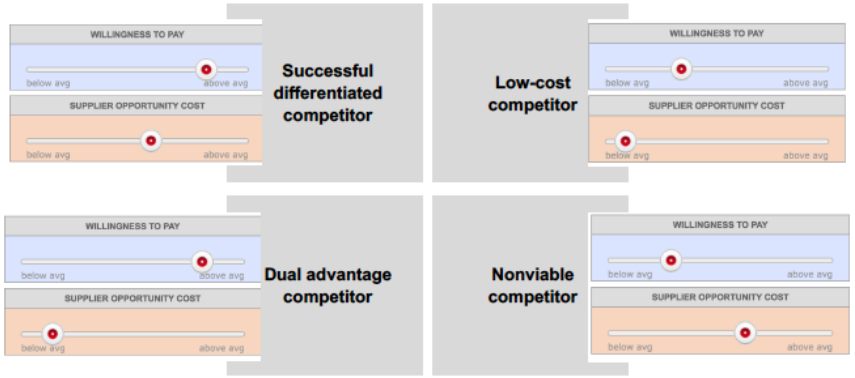
- **Links with other Firms:**

Firm can collude with other firms in offering a mix of products and services. This is similar to "linkages between functions", but includes the functions, products, and services of other firms as well.

- **Brand Reputation:**

  Consistent pattern of firm behaviour:
  - Reputation with customers
  - Reputation with suppliers
  - Brand name
  - Perceptions of product quality, durability and reliability
- The Firm and product related reputation may remain relatively stable despite a gradual reduction of quality
- "Optimal reputation cheating" describes a level of reputation where the firm can reduce product quality without damaging that level of reputation
  - Can maximize firm's economic performance
  - In practice: can have disastrous consequences for the firm

Types of Competitive Advantage Within a Specific Segment



Forces that push towards rethinking of strategic management

- Structural change
- Deregulation
- Scarcity of expertise
- Mergers transforming industries
- Environmental concerns
- New industry substitutes
- Rapidly changing customer expectations
- Rate of innovations
- Increased entrepreneurial activity
- Global competition

Many firms fit in more than one environment with different businesses:

1. Classic, stable environments; Managers can analyse and plan (such as household appliances)
2. Entrepreneurial environments: Experiment, more creativity needed, envisioning things that don't exist yet
3. New ecosystems: Prediction difficult, influence and shape the ecosystem, collaborate and co-evolve (Alibaba, software ecosystems)
4. Transforming environments: Companies need to reinvent or renew themselves. Primary goal is to survive, then transition to new approach

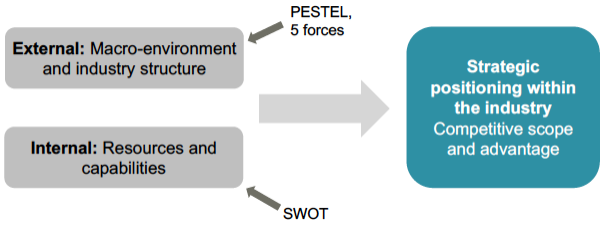
Realized strategy: mixture of intended and emergent strategies

A good strategy:

- Provides a clear sense of a firm's goals and how it will achieve those goals.
- Deals with a high-stake challenge.
- Builds on the analysis of the internal and external environment.
- Defines the scope of competition and the strategic position.
- Makes decisions on what not to do.
- Includes coherent actions focusing on the key challenge throughout the value chain.
- Allows for continuous upgrading of core competencies and integration of bottom-up initiatives.
- Needs continuity of a strategic direction over time, but it also allows for flexibility and innovation.

Strategic analysis and positioning

External and Internal Analysis: Needs to consider the environment and industry structure and what firm resources and capabilities are required to compete in the industry.



PESTEL: PESTEL framework offers systematic way for analysing environmental factors their influence in industry, strategic group and firm

Political:
- Government pressures
- Subsidies & Incentives
- Differences in countries, states

Economic:
- Grow rates
- Interest rates
- Employment levels
- Currency exchange

Sociocultural:
- Sociocultural
- Norms, culture, values
- Demographics
- Lifestyle changes

Ecological:
- Global warming
- Sustainability
- Pollution

Technological:
- Innovation
- Diffusion
- R&D

Legal:
- Court system
- Legislation
- Hiring laws

Porter's Five Forces: Industry analysis

The Porter's Five Forces framework structures the analysis of the competition within an industry by assuming there are five competitive forces.

Potential entrants:	**Suppliers:**	**Substitutes:**	**Buyers:**
Threat of new entrants	Bargaining power of suppliers	Threat of substitute products or services	Bargaining power of buyers

→ **Industry competitors:** Rivalry among existing firms

SWOT analysis: explores key relationships between environment and firm resources and capabilities compared to competitors

Synthesis after analysis: Generate strategic options for different combinations of internal and external factors

	HELPFUL	HARMFUL
INTERNAL	Strengths	Weaknesses
EXTERNAL	Opportunities	Threats

Strategy process: Strategy formulation

Strategy formulation: Step in strategy process of weighing alternatives, developing a set of goals and expectations against which performance can be measured.

The output is a set of choices that position a firm in an industry: What is our business? How do we compete? Who are our target customers?

Strategy statement:

- Clear definition what makes the firm distinctive and its competitive advantage
- Every employee can understand how their daily activities can contribute to success.
- Communicated to external stakeholders such as investors, suppliers, customers, the public.

Strategy execution:

- Part of process concerned with carrying out the strategy – turning the integrated set of choices into action and do the test
- Continuous alignment of tasks, structures, processes, capabilities and culture.

Approaches to execution:

- Not one framework for executing a strategy
- Case studies and examples are essential tools for exploring this subject
- Ideas developed in the conference room meet the harsh realities of the competitive marketplace
- The dynamic shifts in customer needs, technologies, and competitors' strategies require organizations to experiment continually with new business models, customer value propositions, and technologies and hence adapt their strategy execution

Building blocks of strategy execution:

Critical tasks	**Formal organization**	**Culture**	**Skills and competencies**
Core tasks and supporting business processes to add value for the customer	Metrics, rewards, structure through which critical tasks are performed	Collective behaviours, attitudes, and actions of organization. Fuelling or hindering execution? Aligned with strategy?	Competences to execute critical tasks

Common Execution Pitfalls:

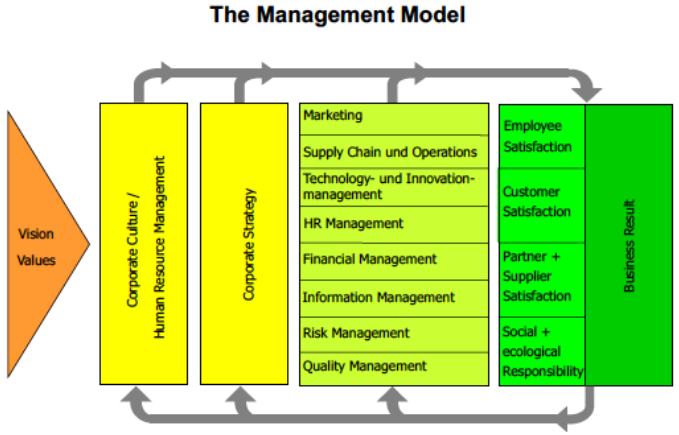
Inappropriate structures, resources, processes:

- Top-down process
- Overwhelming plan with overly ambitious nr. Of actions
- No measurement of progress metrics
- Lack of resources allocated to critical tasks

Inappropriate elements related to people factors:

- Leaders not walking the talk, not communicating changes, not establishing sense of urgency
- Lack of ownership
- Lack of motivation and alignment of workforce
- Resistance to change, focus on maintaining status quo of earlier success
- Exclusive focus on future, complete abandoning of core business

Marketing



Foundations

Why do firms need Marketing / Marketing Research?

- Often misunderstood: customer orientation does not necessarily mean that companies do exactly what customers want and/or say
  - Customer survey is one form of marketing research and is typically used for minor adaptions or improvements in customer service
  - Organizations that believe they have to agree with everything the customers say will often fail
- Successful innovation always addresses customer needs, although customers are often not able to articulate what they need
  - Marketing research discovers latent needs (from qualitative methods to large databases)

Value and Value Co-Creation

Traditional view: Utility is embedded in a tangible product in the production process (factory)

Modern marketing theory: value is uniquely and phenomenologically created and determined by the beneficiary (= the user, customer, ….)

→ Firms do not create value, they only make value propositions

- Value is only generated from and through customer; "Putting the product to use" is the process by which value is realized
- Users (customers) have to make use of their resources and skills to realize value

Forms and ways of doing marketing research

Exploratory
Mostly qualitative research, unspecific question, searching for new trends and developments, latent customer needs, future trends etc.
- More recently: searching for unknown pattern in large databases

Descriptive
- Classical surveys
- Secondary data, more recently data mining, deep learning etc.
- Target pregnancy

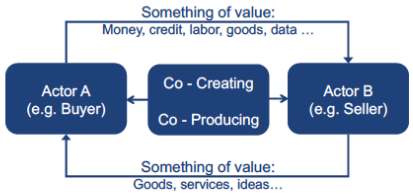
Experimental
- Classical lab studies
- More recently: marketing experimentation (marketing version of fast prototyping; always trying different things)

Marketing – What is it and what not?
- Marketing equals (hard) selling!
- Marketing equals promotion and/ or advertising!
- "Good" Marketing means betraying people! You only need marketing when your products do not sell by themselves!
- Marketing is only "blabla"! Choose marketing if you do not know maths!

Conclusion
Marketing is fundamentally concerned with the firms' relationships to customers!
- The customers' needs and wishes are THE driving force not only behind marketing, but also behind the firm in general!
- Meeting customer wants and needs better than the competition is a firms' most critical success factor, and a central marketing task!
- All areas of the firm, especially its leadership, need to "live and think marketing".
- For solving managerial questions, it is essential to acquire and extend marketing knowledge and marketing information.

Definitions of Marketing:
Marketing is regarded as an 'activity' instead of a 'function' and positions marketing as a broader activity in a company/ organization, and not just a department. The newdefinition also positions marketing as providing long-term value rather than narrowly as an exchange of money (short-term) for the benefit of the shareholder/ organization"
"Marketing is the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers,clients, partners, and society at large"

Marketing is about exchange and relationship



Obviously, such exchange will only take place when both parties agree that they can derive value from a transaction with the counterpart.

Dual Character: Marketing is both a function (department) and a mind-set, thatshould be "lived and breathed" by the entire organization, foremost the topmanagement.

Marketing's Dual Character

Marketing as a Leadership Philosophy ("Strategic Management/ Marketing"):
Customer-, competition- and market-focused philosophy of organizations guiding the activities of all members.

Marketing as a Managerial Function ("Marketing Management"):
Creating, communicating, and delivering value to customers and managing customer relationships in ways that benefit the organization and its stakeholders.

The Marketing Orientation:
Assumption: Achieving organizational goals depends on determining the needs and wants of target markets and delivering the desired products, services and solutions more effectively and efficiently than competitors do
- There are good reasons to believe that in free market-based economies, market(ing) orientation is superior to alternative orientations

The Four "Ps" of Marketing Mix

7 P's:
- Product
- Price
- Promotion
- Place
- People
- Process
- Physical Facilities

Relationship Management Basics
(Are the Four (or Seven) Ps Still a Valid Concept?)
- Developed with classical good manufacturer in mind
- Mass marketing via mass media, one way (from firm to consumer)
- Consumer good firms still very often organized around the four Ps, but has the 4P concept appeal to…

→ Service providers? Internet companies and internet marketing? (promotion vs. place) Managing customers over time? One-to-one marketing? Customers as active marketplace participants? "Free" services (Gooogle, Facebook, Youtube, online communities, news websites, …) Non-profit organizations?

Definition of Relationship Management: The process of creating, maintaining, and enhancing strong relationships with customers and other stakeholders (i.e. distributors, dealers, suppliers)

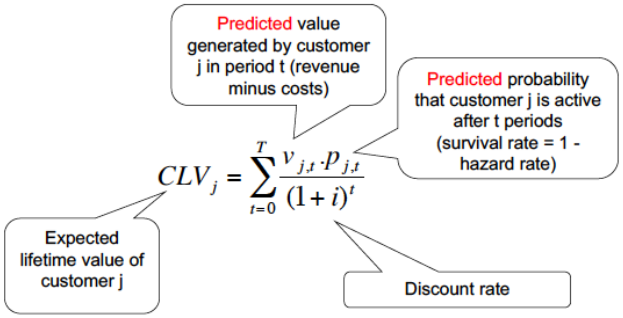
Why place an emphasis on Relationship Management?
- Customer relationships are most firms' most valuable assets
- Per customer profits can be increased over time

3Rs as opposed to 4Ps
- Recruitment ("Kundengewinnung")
- Retention ("Kundenbindung")
- Recovery ("Kundenrückgewinnung")

Why it is worth the effort to retain customers?
Retaining customers is five times more profitable than acquiring new ones, may be too optimistic but it is widely accepted that long-term customer relationships are more profitable than short-term relationships.

Nowadays firms can be highly profitable and obtain high market capitalization without possessing production plants or expensive infrastructure of equal value.
Strong brand names as well as all other marketing assets, subgoals and activities such as advertising, innovations etc. only make sense when they:
- Help acquiring new profitable customers and/or help extending existing customer relationships
- Help prolonging existing relationships

CLV Model



Considerations in CLV:

1. Relationship length: Duration
2. Relationship breadth: Cross-Buying, Value Added Services
3. Relationship depth: Frequency, Value (e.g., Up-Buying, Price Premiums)

Components of CLV:

Further components, hard to measure and predict:
- Customer word-of-mouth value
- Information value
- Cooperation value
- Reference value

Customer Costs:
- Service and support costs
- Complaint behavior
- Acquisition costs

Short-run reactions to consumer/customer need studies:
- (Re)Positioning of existing products
- Adaptation of communications (highlight "trendy" features, e.g., environmental friendly production)
- Adapting easy-to-change product features (add service features, add products, e.g., merchandise for Royal wedding…)

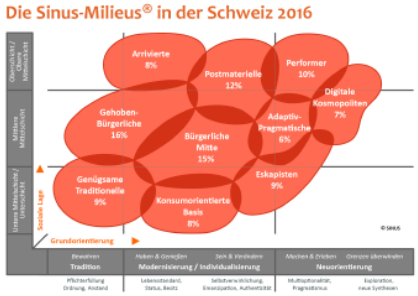
Long-run reactions to consumer/customer need studies:
- Change or adapt company strategy (e.g. Audi: from producer of cars for elderly people to producer of sporty cars)
- New products (e.g., products for LOHAS consumers, products for an aging society)
- New business fields (e.g., Nokia, Mannesmann, from heavy industry to telecommunications)
- Change business model (e.g., from products to services; from selling products to selling solutions, e.g., XEROX, IBM)

Various methods have been developed to understand what consumers wish and need → qualitative market research
- Focus groups (more short-term, relevant for testing new products in early stages)
- In-depth interviews (more short-term, relevant for developing new product ideas)
- Delphi method (more long-term, relevant for understanding long-term changes, often technology-induced)
- Weak-signal research (more long-term, relevant for predictions about uncertain future developments)

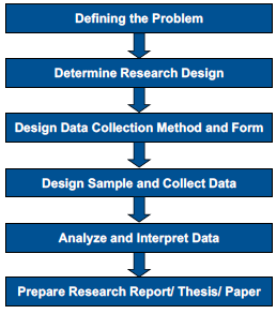
Within these qualitative research methods, diverse techniques are applied

- Critical incidents
- Laddering (based on means-end analysis)
- Brainstorming
- Free association
- Collages
- "Planet-game" (e.g. "Imagine you would live on a "Emmi" planet. How would such a planet look like?")

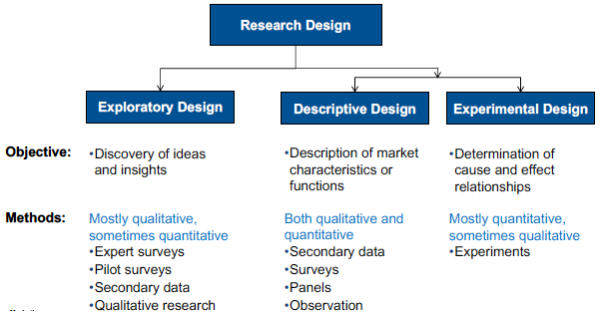
- Usually qualitative research is followed by quantitative research → validating and quantifying the findings from the qualitative research
- Frequently goal of quantitative research is deriving segmentation of consumers
- Popular segmentation of consumers developed by Sinus Sociovision: Consumers grouped in terms of social status and basic values (example of USA)



Research Designs



Marketing (and any other empirical) researchers choose between three potential research designs



Exploratory: typically small sample, no statistical tests, goal: generate first insights, deepen understanding of problem, clarify issues from quantitative research

Descriptive: Representative sampling, infer from sample onto population, goal: describe the population as it is, include large set of variables

Experimental: Manipulation of independent variable in controlled setting, goal: measure causal effect of independent on dependent variable,very restricted set of variables (max 2-3, with 2-3 levels)

Exploratory Designs

In most cases, exploratory designs involve qualitative methods:
- Focus groups/ group discussions
- In-depth interviews
- Problem-centered interviews
- Observations
- Text analysis
- Application of projective techniques (TAT, word association test, sentencecompletion test, third person techniques…)

"...central premise is that the use of quantitative and qualitative approaches in combination provides a better understanding of research problems than either approach alone."

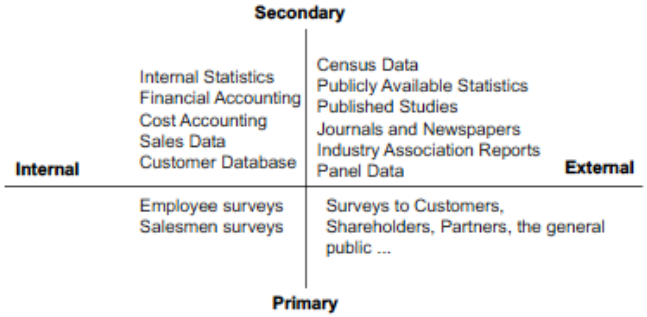
Descriptive Designs

- Research that simply describes, but does not directly link outcomes to particular causes
- Information is typically useful although not causal
  - Example: "70% of our customers who opt-in to our email newsletter say that they at least occasionally read the email"
  - "95 % of online consumers are satisfied with their online shopping experiences"
- The majority of empirical data come from descriptive studies (e.g., statistics in news magazines, industry reports, income distributions, political preferences, attitudes towards innovative consumer products etc.)

Why use descriptive research?

- To describe the characteristics of relevant groups, such as consumers, salespeople, organizations or market areas.
- To estimate the percentage of units in a specified population exhibiting a certain behavior.
- To determine the perceptions of product characteristics, firm regulations,state laws, etc.
- To understand the attitudes or the behavior of people, students, employees.
- To determine the degree to which variables are associated.
- To make specific predictions.

Source of descriptive data:

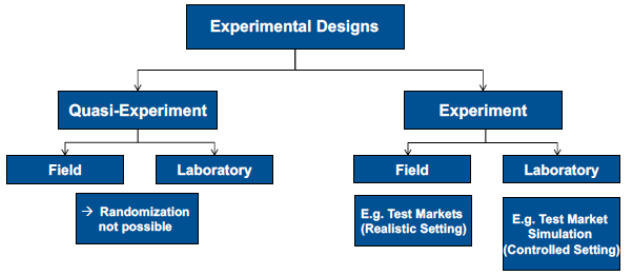


6 rules to help you develop better questions:

1) Avoid complexity. Use simple, audience-specific language if possible.
2) Avoid leading and loaded questions. Use neutral questions.
3) Avoid ambiguity. Be as specific and precise as possible.
4) Avoid double-barreled questions. Ask about one topic at a time.
5) Avoid making assumptions. Ask, don't assume.
6) Avoid burdensome questions. Use 'top-of-mind questions'.

Experimental Designs:

- Experiments → used to infer causal relationships ("X causes Y")
  - Causality – 3 conditions: X and Y must occur/vary together (1), time order: the causing event cannot occur after the effect (2), absence of other possible causing factors (3)
- Important terms:
  - Independent variable(s) (IV) – this variable is manipulated in an experiment
  - Dependent variable(s) (DV) – this variable is (presumably) affected by the variation of the IV
  - Extraneous variables - these variables are all variables other than the IV that (possibly) affect the DV
- Experiment: An experiment is formed when the researcher manipulates one or more independent variables and measures their effect on one or more dependent variables, while controlling for the effect of extraneous variables.



- Experimental research is best suited for gathering causal information – and at times also been used for exploring consumer behavior
- Main characteristics: Experimental manipulation, Randomization across treatment groups.
- Depending on the setting of the experiment, one may differentiate
  - Laboratory experiments (high reliability, i.e. minimization of the presence of confounding variables and confidence in the stableness of the construct).
  - Field experiments (high external validity, i.e. generalizability and stability in different contexts).

Market Research

In most cases, exploratory designs involve qualitative methods

	Qualitative Research	**Quantitative Research**
Objective	To gain a qualitative understanding of the underlying reasons and motivations	To quantify the data and generalize the results from the sample to the population of interest
Sample	Small number of non-representative cases (theoretical sampling)	Large number of representative cases (statistical sampling)
Data Collection	Unstructured	Structured
Data Analysis	Non-Statistical	Statistical
Outcome	Develop an initial understanding	Recommend a final course of action
Common Research Methods	Focus Groups, In-Depth Interviews, Delphi Method, Weak Signal Research	Data collection: Primary source (questionnaires, experiments), Secondary sources (internal statistics, panels, published surveys, etc. Data analysis: T-test, ANOVA, Regression, Factor analysis, Cluster analysis

Recommended courses for more detailed discussion of research methods:

- Empirical Methods in Management
- Market Analytics

Take Home Messages

- The basic research process includes defining the problem, determine research design, design data collection method and form, design sample and collect data, analyze and interpret data, prepare research report.
- Research designs: exploratory, descriptive and experimental.
  - Exploratory research design generates first insight, deepen understanding of a problem, and clarifies issues from quantitative research – no statistical tests.
  - Descriptive research design describes the population as it is, includes large set of variables – statistical tests

  - Cross-sectional design (Single vs. Multiple cross-sectional design) vs. longitudinal design: at one specific point in time vs. over long periods of time
- Experimental research design measures causal effect of independent on dependent variables – statistical tests
  - Quasi-experiment vs. experiment: both can be field or laboratory, but the former lacks random assignment of treatment or control group
  - A/B Testing: Method used in a randomized experiment with two variants, A and B, which are the control and variation in the controlled experiment
- Qualitative market research: Focus group, in-depth interviews (characteristics, laddering), Delphi method, weak signal research
- Quantitative market research: Questionnaire design process, data analysis
  - Objectivity, reliability, and construct validity

Business Models and Information Management

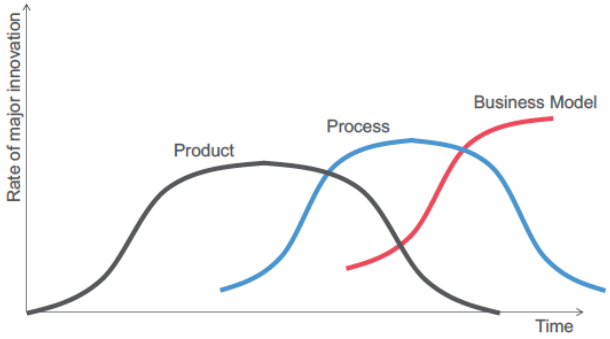
Overall goal	Leveraging IT	Managing IT
Organizational representative	CEO	CIO
Subject topics	- Business value of IT - IT-based business model innovation - Process & product innovation - Strategic information systems - IT-System types and trends, and its business impact - Basic topics such as integration, transaction costs, network economy, disruptive innovation	- IT Governance - IT Project Portfolio Management - IT-Business Alignment Infrastructure - IS-Selection - IT & Business-Architecture - Cost & budget management Software development

Information technology: integration of computer with telecommunication equipment for collecting, retrieving, manipulating and storing data (hardware, software, databases, networks).

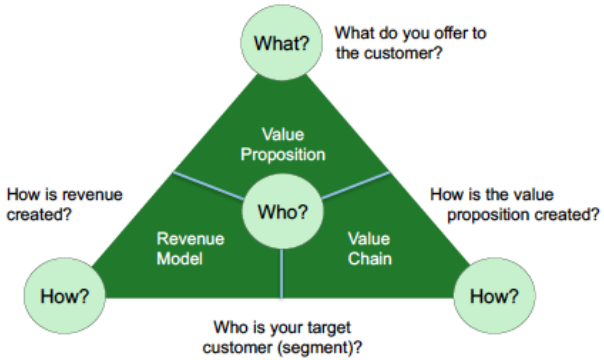
Information system: set of coordinated network of components, which act together towards producing, distributing and or processing information.

Information technology is a subset of information systems. Information systems consist of people, processes, machines and information technology.

Leveraging IT – Business Model Innovation



Business Model:
- Articulates value proposition (i.e. value created for users by an offering based on technology)
- Identifies a market segment and specify the revenue generation mechanism (i.e. users to whom technology is useful and for what purpose)
- Details the revenue mechanism(s) by which the firm will be paid for the offering
- Defines the structure of the value chain required to create and distribute the offering and complementary assets needed to support position in the chain
- Estimates the cost structure and profit potential (given value proposition and value chain structure)
- Describes the position of the firm within the value network linking suppliers and customers (incl. identifying potential complementors and competitors)
- Formulates the competitive strategy by which the innovating firm will gain and hold advantage over rivals



Four strategies of how business model innovating firms use patterns
CREATE → TRANSFER → COMBINE → LEVERAGE

- Subscription: customer pays regular fee most commonly on a monthly or an annual basis to have access to product/service

Role of IT in Business Model Innovation
IT is key to many of today's business model patterns
BMP (Business Model Patterns) Digitalization
Definition:
- This pattern relies on the ability to turn existing products or service into digital variants, and thus offer advantages over tangible products, e.g. easier and faster distribution
- Ideally the digitization of a product or service is realized without harnessing the value proposition which is offered to the customer. In other words: efficiency and multiplication by means of digitization does not reduce the perceived customer value

Examples: Hotmail, Napster, Wikipedia, Facebook, Dropbox, Netflix, Next Issue Media, …

Hidden revenue
Definition: The logic that user is responsible for the income of the business is abandoned. Instead, main source of revenue comes from a third party, which cross-finances whatever free or low-priced offering attracts the users. A very common case of this model is financing through advertisement, where attracted customers are of value to the advertisers who fund the offering. This concept facilitates the idea of 'separation between revenue and customer'
Examples: Google, Facebook, Spotify, Zattoo, …

Two-sided market

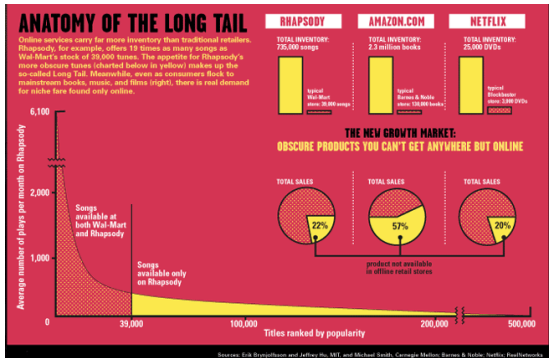
Definition: A two-sided market facilitates interactions between multiple interdependent groups of customers. Value of the platform increases as more groups or as more individual members of each group are using it. two sides usually come from disparate groups e.g. businesses and private interest groups.
Examples: Amazon Store, eBay, Google, Facebook, Elance, Zattoo, Groupon, …

E-commerce

Definition: Traditional products or services are delivered through online channels only, thus removing costs associated with running a physical branch infrastructure. Customers benefit from higher availability and convenience, while the company is able to integrate its sales and distribution with other internal processes.
Examples: Dell, Amazon Store, Dollar Shave Club, …

Long tail

Definition: Instead of concentrating on blockbusters, the main bulk of revenues is generated through a 'long tail' of niche products. Individually, these neither demand high volumes, nor allow for ahigh margin. If A vast variety of these products are offered in sufficient amounts, the profits from resultant small sales can add up to a significant amount
Examples: Apple iPod/iTunes, YouTube, mymuesli, Amazon Store



Affiliation

Definition: The focus lies in supporting others to successfully sell products and directly benefit from successful transactions. Affiliates usually profit from some kind of pay-per-sale or pay-per-display compensation. The company on the other hand is able to gain access to a more diverse potential customer base without additional active sales or marketing efforts
Examples: Amazon Store, CDnow, Pinterest, …

Freemium

Definition: The basic version of an offering is given away for free in the hope of eventually persuading the customers to pay for the premium version. The free offering is able to attract the highest volume of customers possible for the company. The generally smaller volume of paying 'premium customers' generate the revenue, which also cross-finances the free offering.
Examples: Hotmail, Survey-Monkey, Skype, Spotify, Dropbox, …

User Designed

Definition:

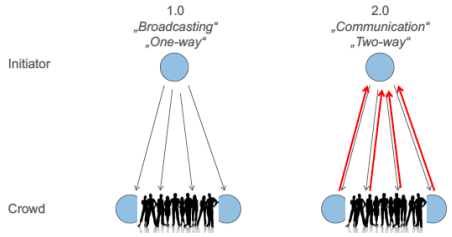
- Customer is both the manufacturer and the consumer.
- Example: online platform that provides customer with the necessary support in order to design and merchandise the product, e.g., product design software, manufacturing services, or an online shop to sell the product.
- Customer benefits from the potential to realize entrepreneurial ideas without having to provide the required infrastructure. Revenue is then generated as part of the actual sales.

Example: Amazone Kindle, Apple iPhone/AppStore, Quirky, …

Crowd Sourcing

Definition: The solution of a task or problem is adopted by an anonymous crowd, typically via the Internet. Contributors receive a small reward or have the chance to win a prize if their solution is chosen for production or sale. Customer interaction and inclusion can foster a positive relationship with a company, and subsequently increase sales and revenue.
Example: Protector & Gamble, Cisco, MyFab, …

Web 2.0



Why people love it: We are social creatures, we want to share, tell, review, contribute, comment, self-display, compete and match, prove true, ask friends

Technology finally allows us to do what we love most

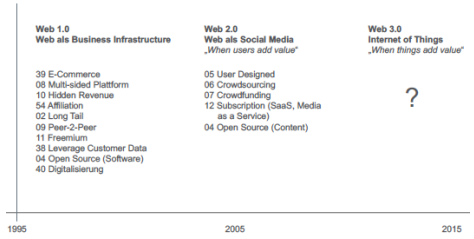
Leverage Customer Data

Definition: New value is created by collecting customer data and preparing it in beneficial ways for internal usage or interested third-parties. Revenues are generated by either selling this data directly to others or leveraging it for own purposes, i.e., to increase the effectiveness of advertising.
Examples: Google, Facebook, Twitter, …

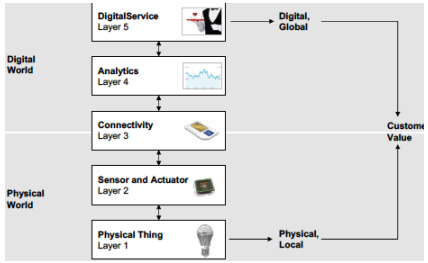
Which features did IT enable in many of the BMP?

1. Integration of users and customers
   - IT enables companies to outsource tasks to customers
   - BMP examples are User Designed, Crowdsourcing, Crowdfunding, ECommerce, Open Source (Content), Peer-2-Peer, Mass customization
2. Run time services / digital contact to customer after sales
   - IT enables companies to maintain the relationship after sales via IT-based services
   - Examples are Rent Instead of Buy, Subscription, Freemium, Razor & Blade, Add on, Leverage Customer Data, Performance-based Contracting
3. Core competency analytics: collect and analyze customer data, and measure behavior
   - The target-oriented collection and analyses of transaction and usage data becomes a core competency in digital industries for product and pricing decisions.
   - Examples are Subscription, Flat Rate, Freemium, Pay per Use, Add on, Performance-based Contracting, Guaranteed Availability

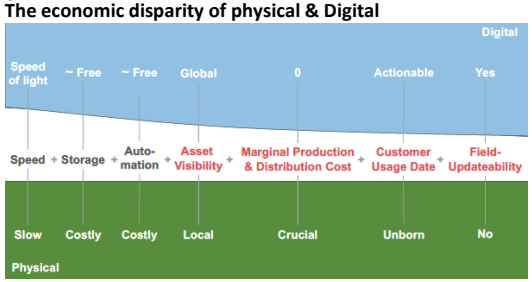
Which technology waves did enable new business model patterns?



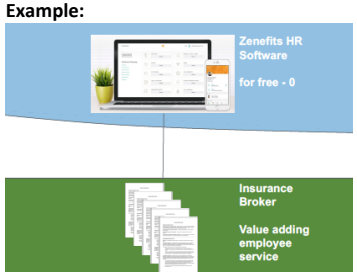
Web 3.0 Value Stack:



The economic disparity of physical & Digital



Example:



Lines of Thinking

- Software eats the (physical) world. Every physical object & function that can be replaced via digital object & function will be replaced
- Which objects and processes are being digitized?
- What is the advantage of this digitization in terms of speed, accuracy, cost and new functionality?
- Which media breaks are eliminated?

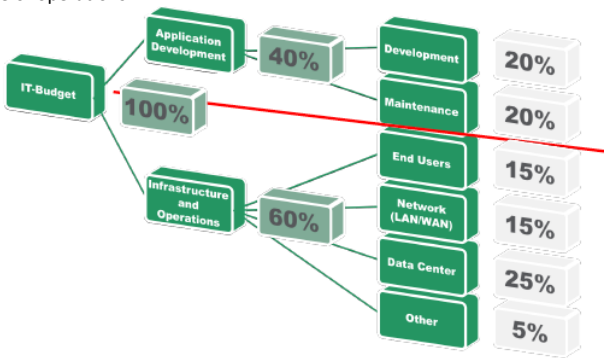
Managing IT – Tasks and Major Challenges

Perception of IT by the business units of a company

"necessary evil"	Avoid IT, because it cannot be controlled
"support, no partner"	The corporate management should provide IT with the direction
"IT is everything!"	IT-Specialists should supervise the alignment of IT
"business units are better in IT"	Each business unit should control its own IT
"equal partners"	Control over IT should be divided between business units and IT-Specialists

Challenges:

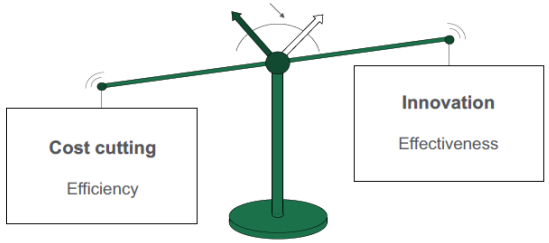
1) Legacy systems: They must be compatible with modern systems
   Legacy systems are historically grown information systems that do not conform with the technological state-of-the-art and are operated beyond the end of their originally intended life span.
2) Interfaces (with legacy systems): The number of interfaces can be a challenge
   Number of interfaces between systems is calculated by $\frac{n(n-1)}{2} \sim n^2$
3) The dominance of operations



4) ICT breakdown: Costs for broken down ICT can be enormous
   Reasons for breakdowns: Force majeure, organizational flaws, human failure, technical fault, willful intent
   Costs during breakdowns:
   - Lost employee productivity = cost per hour x duration
   - Lost IT productivity = cost per hour x duration
   - Lost revenue = revenue per hour x duration

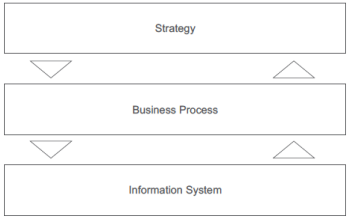
   Costs after breakdowns:
   - Image loss and overtime
   - Missed appointments, contractual penalties

5) Cost cutting vs. innovation

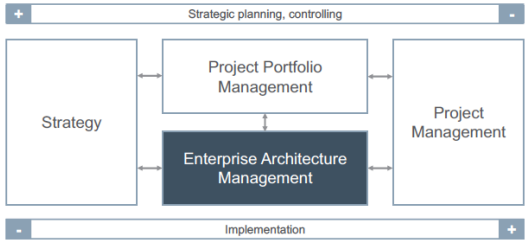


Keep the business-IT-stack aligned, Run the IT

Business-IT-stack



Enterprise Architecture is about aligning strategy, processes and IT



Production and Operations Management

Learning Goals:

- Understand what drives productivity
- Explain how operations management contributes to strategy
- Use SIPOC model
- Use the concept of 4M
- Explain the difference between ETO, MTO, ATO, and MTS
- Explain Customer-Order Decoupling Point (CODP)
- Explain Postponement vs Speculation

"Productivity isn't everything, but in the long run it is almost everything"
"A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker"

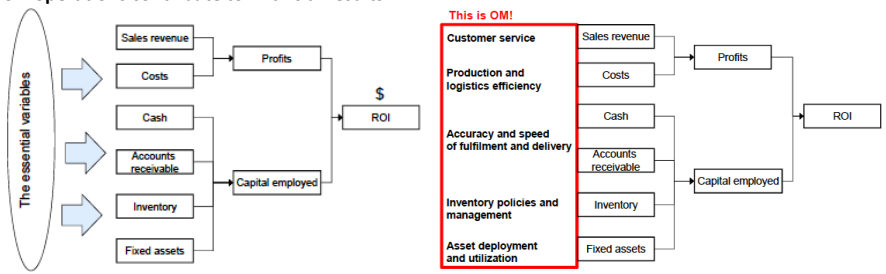
What is Production and Operations Management (POM)

- POM is at the heart of any business

- POM covers the business processes that transform input into output and deliver products and services to customers.
- POM is concerned with the productivity of technology, people, and processes.
- POM is a generic research field. It is not only important in the manufacturing sector
- (The largest portion of assets and employees in most organizations are engaged in operations function)

Usual misconception: "Operations has nothing to do with strategy. Operations is the acting part of the organization. It is concerned with the operational and tactical levels"

How operations contribute to financial results



Competitive Capabilities

(original 4):

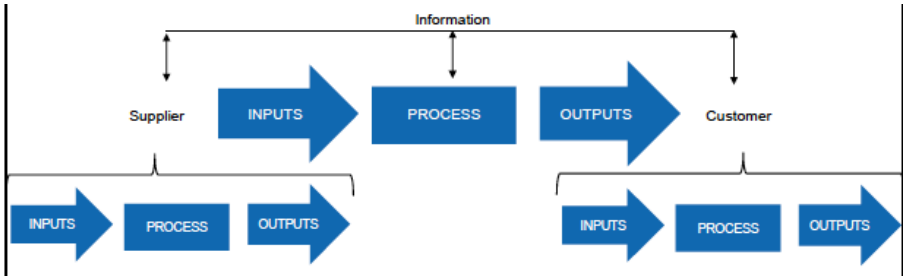
- Cost
- Quality
- Delivery
- Flexibility
- Dependability
- Speed
- Service
- Innovation
- Personalization
- Safety
- Environment
- Responsibility

Different priorities require different ops. Strategies!

Resources (4M)

- Man
- Machine
- Material
- Method

SIPOC



"If you can't describe what you are doing as a process, you don't know what you're doing"

Inputs: Suppliers' products & services ("raw materials)

Outputs: Products and services

Types of processes

- **Continuous**
  - Products or services are made continuously and highly standardized (Water, beer, electricity)
- **Assembly Lines**
  - Deliver discrete products, are efficient at high volumes (Cars, army induction)
- **Batch**
  - Batches (or 'lots') of alike work produced together; a variety of outputs is delivered (Furniture, tutorials)
- **Job Shop**
  - A very adaptable and highly skilled work cell that may deliver an entire product (Machine components, specialized surgeries)
- **Project**
  - Used for large, unique products and services (Large sporting events, bridges)

Engineer-to-Order (ETO)

Products and services are created from the drawing board meeting customer requirements

Make-to-Order (MTO)

Individual customers are identified during production, each order is made to a particular customer specification

Assemble-to-order (ATO)

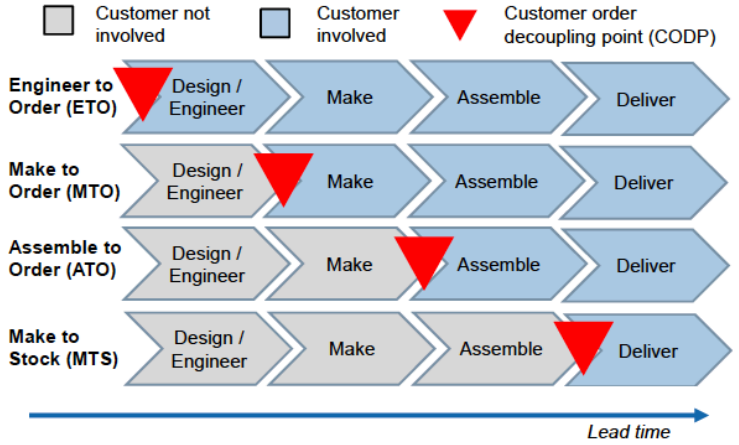
Builds sub-assemblies in advance of demand, and then puts them together to make the final product when a specific customer order is received

Make-to-Stock (MTS)

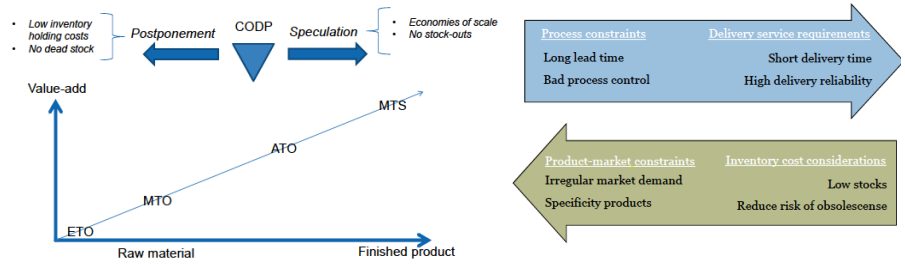
Making standard items that are put into inventory, which can then be used immediately to fulfil customer demand

Customer Order Decoupling Point (CODP)

CODP separates order-driven activates from forecast-driven activities



Postponement vs speculation



Structural vs Infrastructural Decision Areas

Structural Decision Areas

1. Facilities: location, size, focus, layout, …
2. Capacity: ability to meet demand
3. Process technology
4. Supply network: make-or-buy, network configuration

Infrastructural Decision Areas

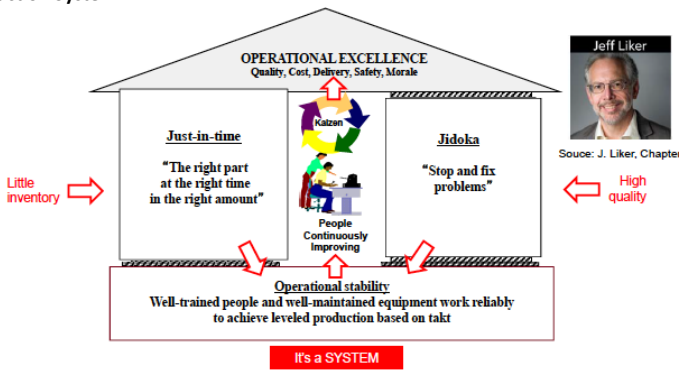
1. Planning and control
2. Quality
3. Work organization
4. Human resources
5. New product development
6. Performance measurement

Operation managers make decisions in these 10 areas

Introduction to LEAN

Lean production: Lean "uses less of everything compared with mass production – half the human effort, half the manufacturing space, half the investment in tools, …, half the needed inventory on site … to produce faster and without defects …"

Toyota Production System:



Lean from an engineering perspective

Human Resource Management (HRM)

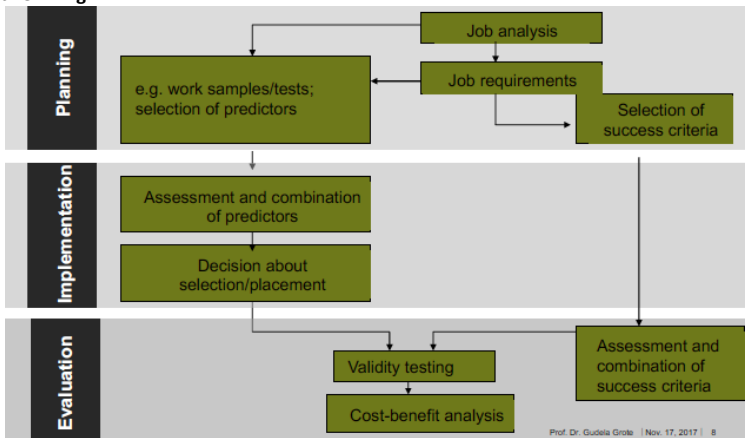
Definition: HRM concerns the policies, practices and systems that influence employees' behavior, attitudes, and performance.
Goal: HRM aims at applying human resources within organizations such that people succeed and organizational performance improves.

Effects of HRM:

- HRM-practices (especially job design and selection/ appraisal/training) better predict company performance than R&D, QM, strategy and technology
- Empowerment better predicts company performance than technology-based management practices in the short- and long-term
- HRM-practices as cause and effect of company performance

Characteristics of HRM in successful companies

1) **Selective hiring**



- Personality dispositions
  - Cognitive ability tests ~ .51
  - General personality tests ~ .38
  - Graphology ~ .02
- Behavioral simulation
  - Work samples ~ .54
  - Assessment center ~ .37
- Biographical focus
  - CV/biodata ~ .35
  - References ~ .26
  - Structured interview ~ .51
  - Unstructured interview ~ .38

2) **Extensive training**
Systematic furthering of personal aptitude in relation to individual expectations and organizational requirements: education/ training, counselling/ coaching, management by objectives, team development, job design

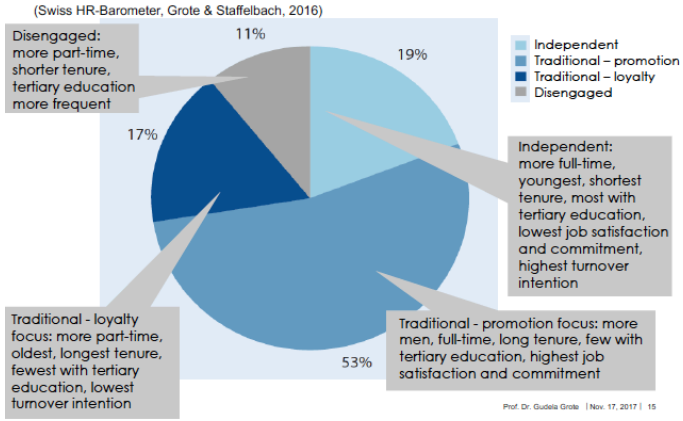
Basic assumptions in personnel development:

- Dynamic relationship between person and work: person and work change continuously, requiring also continuous adaptation
- Adaptation can happen from the perspective of „fit human to task" and/or „fit task to human"
  - Define possible career paths: e.g., management versus technical career
  - Identify individual

Types of career orientations

	Independent career orientation	Loyalty-focused career orientation	Promotion-focused career orientation	Disengaged career orientation
Boundaryless dimension	high	low	low	high
Protean dimension	high	low	high	high
Advancement dimension	high	low	high	low

Career orientations in Switzerland



3) Self-managed teams and decentralization

- Teams: several people who work together over a period of time to reach common goals and who share a sense of belonging together
- Self-regulation: individual and collective autonomy in order to coordinate work processes and to cope with process variances and uncertainties locally

Prerequisites for good team work

Common task	Group composition	Team processes
- Complexity higher than individual competencies - Clear performance criteria - Collective decision competence - Positive goal coupling	- Adequate group size - Different perspectives on the task - Shared language	- Development of group rules - Support for team development (from, storm, norm, perform) - Handling conflicts between individual and collective autonomy - Explicit moderation of critical team meetings

4) Reduction of status differences

Changing context for leadership

Past: "How do I lead a company?"
Today: "How do we lead a company?"
Future: "How does a company lead itself?"

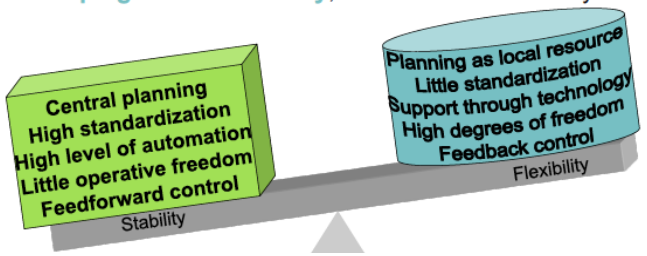
"Boundaryless, flattened, flexible, project-based and team-based organizations that employ temporary, externalized and remote workers, whose tasks are more intellectual and less routine

and cannot be controlled and coordinated by structure or direct supervision, need mechanisms of coordination through shared meaning systems and a shared sense of purpose."

Holacracy: new "social technology" for governing and operating an organization—one that authentically distributes authority, and embeds flexibility and self-organization into the rules and processes through which the organization structures itself and goes about its business.

Management of uncertainty as strategic and operational leadership function

- Balance between
  minimizing uncertainty, which creates stability, and
  coping with uncertainty, which creates flexibility



Leadership portfolios: In order to match different situational demands with adequate leadership behaviors, leaders must develop portfolios of styles and behaviors and understand when to use which behavior.
Shared leadership: Leadership involves different tasks that can be taken on by different team members and may shift between team members.

5) High compensation contingent on organizational performance

Pay is: money, compensation, reward, incentive, recognition
→ Procedural and distributive justice of pay systems at least as important as absolute amount of own pay.
A lot of employees change workplace because of salary.

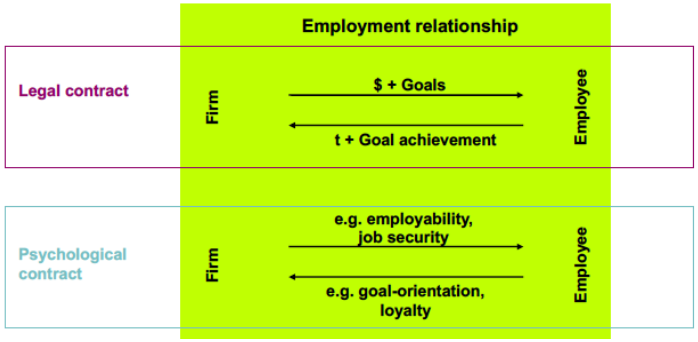
Performance-related pay

- A part of the overall pay is determined on the basis of individual/group/company performance.
- Increasing use
  - in the US more than in Europe
  - for managers more than for non-managerial employees
  - in larger companies more than in smaller companies
- Critical voices become louder:
  - Is the rewarded behavior the desired behavior?
  - Danger of reducing intrinsic motivation
  - Conflict between individual and team performance
- Pay schemes related to organizational performance tend to avoid these problems

6) Sharing information

7) Employment security

Social exchange defined by legal and psychological contracts



New World of work: new psychological contract?

Traditional contract	New contract
Job security / Life-long employment	Flexibility / Accepting insecurity
Internal promotion	Internal development
Specialization	Goal / Performance orientation
Loyalty/ Identification	Employability / Focus on own competencies

Using psychological contract to handle employment uncertainties

- Communicate and match reciprocal expectations and offers
- Support employability through training, job design, and systematic career management
- Distribute risks between organization and employee according to individual coping capabilities

HRM-practices as expression of organizational culture

- Organizational culture implies:
  - Assumptions about human nature (e.g., motivation, trust versus control)
  - Images of organizations (e.g., brain, machine, family)
  - Assumptions about how organizations work best (e.g., centralization vs. decentralization)

→ These assumptions strongly influence choices of HRM practices beyond and possibly even against empirical evidence.

Diversity

- Demographic diversity: differences in observable attributes such as age, gender, ethnicity
- Psychological diversity: differences in underlying attributes such as abilities, personality, attitudes, values

Growing relevance of diversity in organizations

- Demographic change (e.g. problems in recruiting personnel)
- Globalization of business (e.g. international supply chain relationships and mergers/acquisitions)
- Increasing service orientation (e.g. responding to special needs in regional markets and of particular target groups)
- New concepts of organization (e.g. increasing mix of functions/professions in work teams)

→ Diversity management: Increasing heterogeneity in the organization in order to increase team and organizational performance

Diversity of knowledge

- Team decisions assumed to be better than individual decisions due to more knowledge and different perspectives
- However, team research shows
  - Team decisions are rarely better than individual decisions
  - Available knowledge pool is rarely fully used

Inadequate information sharing in teams

Shared information (=information known to all group members) is mentioned more frequently than unshared information (=information known only to individual group members) in group discussions

Possible reasons

- Stochastic: the more people have a particular piece of information the more likely it is that it gets mentioned
- Information assessment: we assess information more positively that concurs with our own judgment
- Social comparison: Shared information is seen as more exact and important
- Groupthink: Information exchange aimed at consensus building
- Ownership bias: we trust our own knowledge more than others' knowledge

Reasons for silence are dependent on status and role

- Fear of damaging relationships
- Feelings of futility
- Fear of punishment
- Perceived conflict efficiency versus safety
-

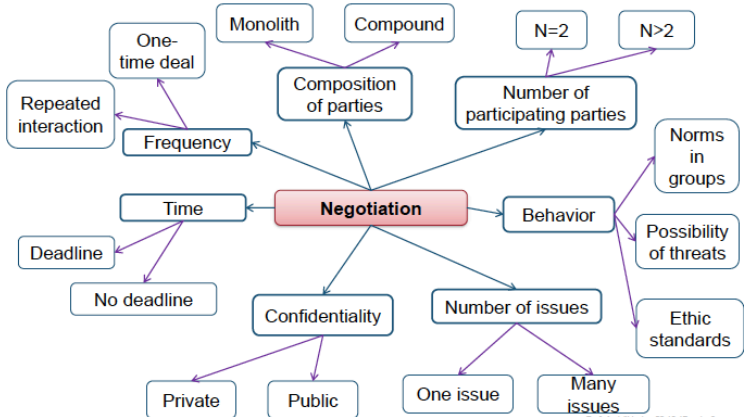
Introduction to Negotiation

What is negotiation?

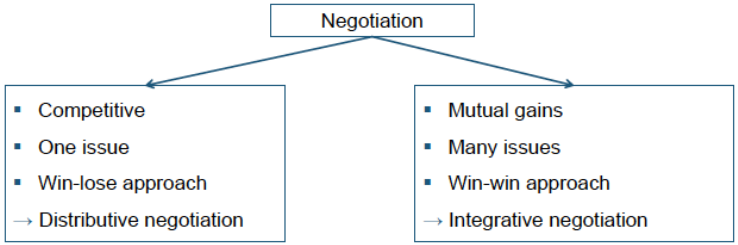
"By negotiation we mean exchanges between parties designed to reconcile their differences and produce a settlement."

"Like it or not, but you are a negotiator. Negotiation is a fact of life. Everyone negotiates something every day."

Taxonomy

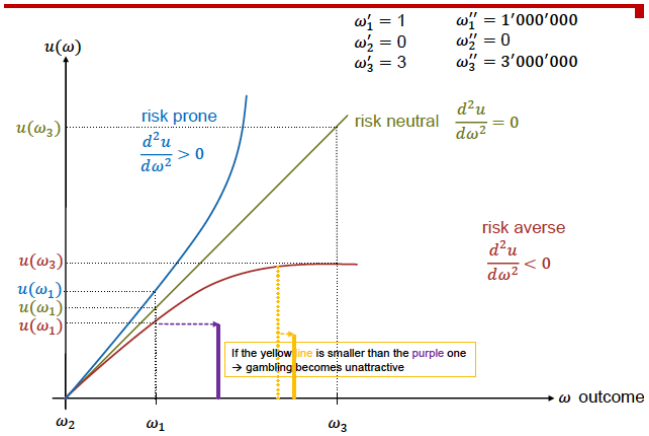


Distributive vs. integrative negotiation



Distributive negotiation: usually involves a single issue – a "fixed-pie" – in which one person gains at the expense of the other. For example, haggling over the price of a rug in a bazaar is a distributive negotiation.	**Integrative Negotiation:** the outcomes available are no longer a "fixed-pie" divided among all parties. An agreement can be found that is better for both parties than what they would have reached through distributive negotiation.

Risk



Rationality

Definition often used: As individual is rational under certainty if his preferences for outcomes $\omega \in \Omega$ satisfy the following conditions:

1) Completeness: Either $\omega_1 \succcurlyeq \omega_2$ or $\omega_2 \succcurlyeq \omega_1$
2) Transitivity: If $\omega_1 \succcurlyeq \omega_2$ and $\omega_2 \succcurlyeq \omega_3$, then $\omega_1 \succcurlyeq \omega_3$

An individual is rational under uncertainty if his preferences for lotteries satisfy the following conditions:

1) Completeness: Either $\lambda_1 \succcurlyeq \lambda_2$ or $\lambda_2 \succcurlyeq \lambda_1$
2) Transitivity: If $\lambda_1 \succcurlyeq \lambda_2$ and $\lambda_2 \succcurlyeq \lambda_3$, then $\lambda_1 \succcurlyeq \lambda_3$

3) Monotonicity: If $\lambda_1 \succ \lambda_2$ and $q_1 > q_2$, then $q_1\,\lambda_1 + (1-q_1)\lambda_2 \succ q_2\lambda_1 + (1-q_2)\lambda_2$
4) Continuity: If $\lambda_1 \succcurlyeq \lambda_2$ and $\lambda_2 \succcurlyeq \lambda_3$, then there exists a probability q such that $\lambda_2 \sim q\,\lambda_1 + (1-q)\lambda_3$
5) Independence: If $\lambda_1 \succ \lambda_2$, then $q\,\lambda_1 + (1-q)\lambda_3 \succ q\lambda_2 + (1-q)\lambda_3$

→ not very useful in practice

Other Definition:

Behaving rationally means:

- The negotiation objectives are based on comprehensive motivations
- The measures to achieve these objectives are consistent and do not violate generally acceptable conventions/ customs

Behaving irrationally means:

- Contradiction in the arguments; no transitivity in the preferences
- Deviation from the negotiation objectives (e.g. maximizing the utility function) due to factors irrelevant for the problem solving

Negotiation parties representing a big group, e.g. a state or a company, will be considered as behaving rationally if

- The negotiation is conducted/monitored by professional persons of the negotiation party
- Of which a couple of persons (i.e. more than 5 persons) are not directly participating in the negotiation but work in a sort of "back-office" / "headoffice" functions
- Where the work culture permits an internal objective/critical discussion.

Negotiation theories

Harvard method:

(1) People: Separate the people from the problem
(2) Interests: Focus on interests, not positions
(3) Options: Invent multiple options looking for mutual gains before deciding what to do
(4) Criteria: Insist that the result be based on some objective standard

Game theory:

- Analysis of strategic decision-making and conflict of interests among the players
- Result of the decision-making depends on the other players' decisions
- Strictly formalized by means of mathematical models
- Founder of the game theory: John von Neumann, ETH graduate (1926)

Prisoners' Dilemma

(Name proposed by: Albert Tucker in 1950)

Situation in words

Two partners in a crime are imprisoned in two separate prison cells. They are both offered the same deal:

- If one of them confesses – and the other doesn't – he will be set free (**0 years** in prison), the other will serve **3 years** in prison
- If both confess, each of them serves **2 years** in prison
- If both don't confess, both of them will only serve **1 year** in prison

Game in the normal form

P1 \ P2	Don't confess	Confess
Don't confess	-1 , -1	-3 , 0
Confess	0 , -3	-2 , -2

Solution:


John F
(1928

Theoretical concept

We call a strategy a_i', is a best response for Player i to some strategy combination of the other players, denoted by a_{-i}, if

$$\pi_i(a_i', a_{-i}) \geq \pi_i(a_i, a_{-i}), \quad \text{for } \forall a_i \in A_i. *$$

Meaning: "Given the strategies of the other players, decide what maximizes your payoff (π)!"

The action profile $a^* = (a_1^*, \cdots, a_i^*, \cdots a_N^*)$ is a Nash Equilibrium in pure strategies of a game with N players if and only if every player's action is a best response to the other player's actions.

Remark: In static games there is no difference between terms 'strategy' and 'action'. However, in dynamic game this is be changed.

Nash Equilibrium in the prisoners' dilemma:

P1 \ P2	don't confess	confess
don't confess	-1, -1	-3, 0
confess	0, -3	-2, -2

Nash Equilibrium
None of the players has an incentive to change his strategy unilaterally

"confess" is a so called dominant strategy

Optimality considerations:

Observe:
If both prisoners would chose "don't confess", both would be better off

We call an outcome Pareto Optimal (named after Vilfredo Pareto) if there is no other outcome that increases payoff to one player without decreasing payoff to another player.

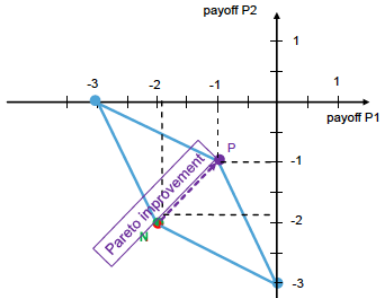
P1 \ P2	don't confess	confess
don't confess	-1, -1	-3, 0
confess	0, -3	-2, -2

None of the players can improve his situation without hurting the other

Nash Equilibrium

Graphical representation of the prisoners' (Pareto ≠ Nash):

P1 \ P2	don't confess	confess
don't confess	-1, -1 Pareto	-3 , 0
confess	0 , -3	-2 , -2 Nash* *Pareto-inferior



Example 3:
Chicken Game

Situation in words

Two drivers drive towards each other on a collision course: one must swerve, or both may die in the crash, but if one driver swerves and the other does not, the one who swerved will be called a "chicken".

Game in the normal form

P1 \ P2	Don't swerve	Swerve
Don't swerve	1 , 1	4 , 2 Nash
Swerve	2 , 4 Nash	3 , 3

Contrary to the prisoner's dilemma (exp 2), here there are 2 Nash equilibria: None of the players has an incentive to change his strategy unilaterally

Both are Pareto optimal: None of the players can improve his situation without hurting the other

Negotiation engineering

Definition: We understand as Negotiation Engineering the decomposition and formalization of the negotiation problem, where the heuristic application of mathematical methods facilitates the process of reaching agreement.
(Negotiation: "A formal discussion between people who are trying to reach an agreement)
(Engineering: "The application of science and mathematics by which the properties of matter […] are made useful to people")

Engineering method: "The strategy for causing the best change in a poorly understood or uncertain situation within the available resources"

Characteristics:
- Solution oriented
- Looking for an answer (not the answer)
- in relation to existing constraints
- valuating different options

Mathematical language

Heuristic techniques:
- Rule of thumb
- Strategy
- Trick
- Simplification
- Or any other method that reduces the time needed to solve a problem
- Trial and error (iterative process)

Characteristics of Negotiation Engineering

- Application of engineering reasoning to negotiation
- Based on four principles
  - Decomposition
    - Division in sub and sub-sub problems
    - Reduction of complexity
    - Allows identifying underlying key problems
  - Formalization
    - Translation of critical sub-problem into mathematical language
    - Thereby: reduction to the most formal structure of the problem
  - Mathematical method
    - If the problem is stated in mathematical language one can access a variety of existing mathematical tools: Game theory, Mathematical optimization, statistics, etc.
  - Heuristics
    - Application in a heuristic way (cf. heuristic techniques)
    - Experience-based techniques
    - Learning and discovering
    - Not guaranteed to be optimal
    - But good enough for the given situation

Case Studies (look at slides 42 – 78)

Negotiation process

Phases of negotiation

1. Recognize/ identify the problem
2. Explore negotiation possibilities
3. Get a mandate
4. Negotiate within your mandate. If you have to change the mandate, you should be sure, that it is final.
5. Initial, if practice
6. Signing
7. Approval, if necessary
8. Entry into force
9. Open the champagne

Preparation for negotiation

- Explore the situation well: Get the maximum of information on:
  - The problem
  - The other side's position
  - Your possibilities
- Mandate-drafting is decisive:
  - Draft it yourself, if possible
  - Mandate should be ambitious, but reasonable/realistic so that later adaptions do not become necessary
- For each round of negotiation prepare:
  - 3 main questions:
    - What do you want to achieve?
    - How do you want to proceed?
    - Which follow-up?
  - Additional preparations:
    - Organization of your team (who speaks?)
    - Where?

    - Style of the negotiation?
    - Protocol
    - Communications and press information

All in all:

- Always goal oriented and objective
- Intellectually skeptical and distrustful
- Creative
- Polite

Conclusion

ETH-NECOM Recommendations

1. Before asking for, accepting, or refusing a negotiation, make a thorough analysis. Refusing one can be an unfriendly act and/or signal that there is no room for concessions.
   There are players who perceive the start of negotiation already as a concession (although this is not true in rational/friendly environments).
2. Negotiate in good faith, create confidence, while remaining critical. Be polite, but be insistent. Do not play games, do not use dirty tricks. If the other does it show that you do not agree.
3. Stick to a coherent line of argumentation and stick to your engagement in the negotiation. Do not change argumentation unless new, objective elements appear.
4. Proceed carefully in the negotiation:
   a. Do not disclose your red lines ("resistance points", "reservation prices"). In case you think the indication of a red line (true or pretended) is useful for tactical reasons, take into account that in the event of not respecting it at a later stage you could lose credibility.
   b. Do not burn bridges - maybe you will have to change your position.
5. Demands / Counter Demands:
   a. Have to be well founded, and
   b. Should be based on your own realistic assessment of the possibilities of the other side (evidently, this assessment does not need to coincide with the offers made by the other side).
6. Negotiation Engineering: Identify the difficult elements of the negotiation. Split the complex negotiation problem into sub-problems. Define the parameters / variables of the sub-problem. Use objective criteria, mathematical models and quantitative methods.
7. When there are several issues on the table, link them together, if the added value for the negotiation of the more controversial issues is larger than the potential negative / delaying effect for the negotiation of the less controversial issue.
8. If you have a bigger interest in a negotiated solution than the other side, make proposals that solve the problem of the other side (while evidently fulfilling your own requirements). If your proposals are rejected for comprehensible reasons, make new proposals.
9. Proceed in phases.
   Fix (orally or written) the intermediate result. Make clear that you do not intend to backpedal (and that you expect the other side not to do it either), but do not give up your pledge before you are sure to get the counterpart. Accordingly, make it also clear that "nothing is agreed until everything is agreed".

Final remarks

- Engineering/mathematics can be a useful tool to produce solutions in difficult negotiation situations. This concept encourages
  - accurate analysis
  - identification and modelling of the essential factors
  - objective negotiation/discussion on defined parameters

    - “one knows about what one has to talk now”
- However, according to my own experience there are only few practitioners in negotiating who apply theoretical methods.

Why?

- Probably because those who negotiate do not know these methods and those who would know them do not negotiate.
- Therefore we encourage all efforts to bridge the gap between theory and practice.