

Innovation is increasingly about teamwork and the creative combination of different disciplines and perspectives.

There is correlation between people management and business performance.

Components of the innovative organization:

1. Shared vision, leadership and the will to innovate
2. Appropriate structure
3. Key individuals
4. Effective team working
5. High-involvement innovation
6. Creative climate
7. External focus

3.1 Shared vision, leadership and the will to innovate

Innovation is essentially about learning and change and is often disruptive, risky and costly. We have become used to seeing core competences as a source of strength within the organization, but the downside is that mindset can block the organization from changing mind.

There need to be long-term commitment to major project, as opposed to seeking short-term returns. One way of dealing with slowly emerging returns is to focus not only on returns on investment but also on other considerations like future *market penetration* and *growth* or the *strategic benefits* which might accrue to having a more flexible or responsive production system.

- Top management acceptance of risk is important

One of the most important roles that leaders play is to create the climate for innovation. Leadership has some direct influence on the differences found in performance of businesses. Expertise and cognitive-processing skills are key components of creative leadership.

- This combination is critical for the evaluation of others' ideas.

At higher levels of management the problems to be solved are more likely to be ill-defined, demanding leaders to conceptualize more.

Environmental uncertainty: not only build confidence, but solve problems and make appropriate strategic decisions.

Research environment: the perception of leader's technical skills is the single best predictor of research group performance.

Transformational leadership: Greater impact on performance in research environment than administrative, although both have a positive effect.

Transactional leadership: positive effect in administrative and negative in research environment.

3.2 Appropriate organization structure

Innovation is becoming a corporate-wide task, involving production, marketing, etc. This provides strong pressure for widespread organizational change towards more organic models.

→ *GE moves from rigid and mechanistic structure to a looser and decentralized form*

Mechanistic
Mature industries

Organic
Fast-growing industries

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Rapid product innovation and improved customer responsiveness are being achieved through extensive organizational change programs involving:

- Parallel working
- Early involvement of different functional specialists
- Closer market links
- User involvement

Size, age and company strategy → influence structure

There is no single 'best' structure, but successful organizations tend to be those which develop the most suitable 'fit' between structure and operating contingencies.

- | | |
|-----------------------|----------------------------|
| ▪ Simple structure | ▪ Professional bureaucracy |
| ▪ Machine bureaucracy | ▪ Adhocracy |
| ▪ Divisionalized form | ▪ Mission-oriented |

→ Table 3.2, page 111

3.3 Key individuals

To prevent the failure of a promising invention, is a key individual who is prepared to **champion** its cause and to provide some energy to help it through the organizational system.

Roles of key players: (*champion model*)

1. Source of critical technical knowledge (inventor/team leader)
2. Organizational sponsor (pull strings, often board member)

Heavyweight project managers are deeply involved and have the organizational power to make sure things come together. Lightweight project managers have more distant involvement.

Negative champions – project assassins – negative influence on outcome of innovation project.

3.4 High involvement in innovation

→ *Quality miracle – Japanese manufacturing – kaizen – continuous improvement – Toyota*

High involvement innovation (HII) → business performance ↑ → turnover per employee ↑
→ employees become receptive (*vatbaar*) to change itself

- Not a quick fix but a major strategic commitment
- Misnomer, concentration still on shop-floor activities
- Most HII takes place on an 'in-line' basis

The five-stage high-involvement innovation model

→ page 122

- | | |
|---------|---|
| Stage 1 | “Unconscious HII” Little HII, no formal attempt |
| Stage 2 | First attempt to mobilize HII, establishing the habit of HII |
| Stage 3 | Coupling HII habit to strategic goals, makes an impact |
| Stage 4 | Empowerment, requires understanding, commitment, training. |
| Stage 5 | Everyone is fully involved in experimenting, improving, sharing and creating. |

3.5 Effective team working

Groups have more to offer than individuals in terms of both fluency of idea generation and in flexibility of solutions developed. → teambuilding is critical of project success

- Bridging boundaries within the organization in dealing with inter-organizational issues
- Enable achieving the kind of decentralized and agile operating structure

Key elements: clear task and objectives, effective leadership, balance of roles that match with individual styles, effective conflict resolutions, continuing connection with external organization.

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Effective teamwork

- | | |
|-------------------------------------|-------------------------------------|
| 1. Clear, common and elevating goal | 7. External support and recognition |
| 2. Results-driven structure | Principled leadership |
| 3. Competent team members | 8. Appropriate use of the team |
| 4. Unified commitment | 9. Participation in decision making |
| 5. Collaborative climate | 10. Team spirit |
| 6. Standards of excellence | 11. Embracing appropriate change |

Challenges

- | | |
|-------------------------------------|---|
| 1. Group versus team (how to treat) | 4. Support structures and systems |
| 2. Ends versus means | 5. Assumed competence (not assume, train) |
| 3. Structured freedom (be clear) | |

3.6 Creative climate

Creativity is an attribute which everyone possesses.

Stifle creativity: unsupporting accounting practices, unfocused innovative activity, formal vehicles for change, top-down dictated, limited tools, poor communication.

Building a creative climate involves systematic development of organizational structures, communication policies and procedures, reward and recognition systems, training policy, accounting and measurement systems and deployment of strategy.

→ *3M gives employees 15% of their time for innovation, if they back it up = intrapreneurship*

Innovation Energy is the *power behind productive change* and is the confluence of three forces:

1. Attitude

Innovation teams need a majority of people with the right attitude and others need to be at least neutral. Money rarely motivates or affects attitude. Motivation arises when people feel good about what they're doing and they feel good being a part of it. A crisis will fire up people about a company's bold vision. Also: connect senior management with real people, their consumers.

2. A group's behavioral dynamic

Suspend judgment and replace it with what we call *greenhousing* – building ideas collaboratively. The most useful innovation behaviors are: freshness (trying new stuff out), greenhousing, realness (quickly making an idea into the form a customer will buy it as), bravery (guts to disagree) and signaling (helping a group navigate between creative-analytical behavior).

Story telling:

- Most effective way to help turn behavior into habits by articulate what's okay
- More powerful than any mission statement or set of values

3. Support an organization provides

Force people into the shared space the 'heart'. This breaks down barriers and prevents people from only fraternizing with people in their immediate teams.

Climate versus culture

Climate: recurring patterns of behavior, attitudes and feelings that characterize life in the organization.

Culture refers to the deeper and more enduring values, norms and beliefs within an organization.

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Climate	Culture
Look at individuals and their shared perceptions	Look at entire organization
Social psychology	Anthropology
Normative, not looking for different but better things	Descriptive, assumptions are not better/worse than another
Quantitative research	Qualitative research
More easily observable and influenced	

Trust and openness

Strong level of trust

- + Ideas and opinions arise (motivate employees to contribute)
- + More efficient decision making
- + Influence effectiveness of an organization through structuring and mobilizing
- Lack of questioning each other → mistakes → less productive outcomes
- Cliques

Bases of organizational trust:

- | | |
|--|---|
| <ul style="list-style-type: none"> ▪ Contractual ▪ Goodwill ▪ Institutional | <ul style="list-style-type: none"> ▪ Network ▪ Competence ▪ Commitment |
|--|---|

Challenge and involvement

Too low: apathetic about work, not interested in development.

Too high: burn out because there's too much of a stretch

Building and maintaining a challenging climate involves systematic development or organizational structures, communication policies and procedures, reward and recognition systems, training policy, accounting and measurement systems and deployment of strategy.

- Intellectual stimulation is one of the most underdeveloped components of leadership.
- Much of employee involvement in innovation focuses on incremental change

Support and space for ideas

Idea time is the amount of time people can (and do) use for elaborating new ideas.

Low: time pressure makes thinking outside the instructions and planned routines impossible.

High: boredom, slow decision making, bureaucratic

Organizational slack identifies the difference between resources currently needed and the total resources available. Too much: static inefficiency. When innovation and change is needed, slack can act as a dynamic shock absorber, and allows scope for experimentation.

- Appropriate level of organizational slack is associated with superior performance

Conflict and debate

Level of conflict too high: dislike, hate. Level of conflict too low: low motivation, deadlines not met.

Maintain a level of constructive conflict consistent with the need for diversity and a range of different preferences and styles of creative problem solving.

Debate focuses on issues and ideas. It involves the productive use and respect for diversity of perspectives and points of view. Where debates are missing, people follow authoritarian patterns without questioning. When the debate level is low, people moan and complain about the way things are.

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Risk taking

In risk-avoiding climates, there is a hesitant mentality and low-energy jobs. When there's too much risk taking, there are too many ideas floating around, but few are sanctioned.

Strategies for dealing with risk: failure mode and effects analysis (FMEA), potential problem analysis (PPA) and fault tree analysis (FTA). The goal is to help identify risks and payoffs, key uncertainties, decision points and future opportunities that might be created.

Freedom

The independence in behavior exerted by the people in the organization
 Much freedom: autonomy, initiative, unbalanced concern, going off in their own directions
 Little freedom: guidelines and roles, demonstrate little initiative

3.7 Boundary spanning

In many companies, the focus is on technology. This does not mean that customer focus is irrelevant: the issue here is one of building relationships which enable clear and regular communication, providing inputs for problem solving and shared innovation.

Benefits of networking:

Powerful solution to resource problems	A way forward for industrial development
Increase market share	Collaborative learning experiences (SCL)
Reducing time and costs of development	

Networks are emergent property: the whole is greater than the sum of the parts.

The network culture has to be right, the following elements help build this:

- Key individuals
- Facilitation - support
- Key organizational roles

3.8 Beyond the steady stage

Organizations have to deal with innovation in the *steady state* (doing what they do, but better), but also under *discontinuous* (do different) conditions.

Those organizations that are able to thrive and exploit innovative opportunities under these conditions are agile, fast moving and tolerant of high levels of using their agility to probe, learn and reconfigure in search of the dominant design which will eventually emerge.

- Established organizations run the risk of being too slow

Components of the innovative organization under discontinuous conditions

Shared vision, leadership and the will to innovate	Appropriate structure
Key individuals	Effective team working
Continuing and stretching individual development	External focus
Extensive communication	Creative climate
High involvement in innovation	Learning organization

→ Table 3.8, page 154

7.2 Meeting the challenge of uncertainty

Innovation management tries to turn the uncertainty into a calculated risk.

- Requires knowledge about the architecture: components and how put together?

Decision making is often shaper by emotional forces as well as limited facts and figures.

7.3 The funnel of uncertainty

Knowledge converts uncertainty to risk. In innovation management the challenge is to invest in acquiring early knowledge – through technological R&D, market research, competitor analysis, trend spotting etc. – to get early information to feed decision making.

Innovation funnel: a roadmap which helps us make decisions about resource commitment



Each step involves committing more resources, but this only takes place if the risk/reward assessment justifies it. Move from uncertainty to increasingly well-calculated risk management.

7.4 Decision making for incremental innovation

Since this involves comparing something new with something that already exists we can set up criteria and measure against these.

Incremental innovation is important in *high involvement systems*. But how will we manage the large amount of ideas from employees? – **Policy deployment** (inzetten)

- Creation of a clear and coherent strategy for business
- Deployment of it through a cascade process which builds understanding and ownership of the goals and sub goals.

7.5 Building the business case

Radical innovation projects have higher risk and so the business case needs to be more strongly made & mobilize both emotional and factual components to secure buy-in from decision makers.

- Tools: advanced computer modeling, rapid prototyping, simulation techniques

7.6 Building coalitions

Innovation problems arise from multifunctional nature of development and the lack of shared perspective on the product being developed and the marketplace.

Formal supplier involvement programs are important. Their expertise can save you costs. It secures acceptance and also obtains improved quality process design.

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7.7 Spreading the risk – building a portfolio

Portfolio management provides a coherent basis on which to judge which projects should be undertaken, and to ensure a good balance across the portfolio risk and potential rewards.

- helps with both the “do what we do better” and the “do different” agenda.

Without portfolio management there may be no limit to projects taken on; lack of strategic focus in project mix; weak or ambiguous selection criteria and weak decision criteria.

7.8 Decision making at the edge

Established incumbents often face challenges. Incumbent decision-making and underlying reward and reinforcement systems strongly favor the status quo, working with existing customers and suppliers. This makes it easy for new entrants to colonize new market space.

Selection and framing

- viewing the world in different ways and changing the ways they make selection decisions.

Discontinuous innovation presents challenges which do not fit the existing model and require a *reframing* – something that existing incumbents find hard to do.

Cognitive dissonance – interpret new situations to match their established world views.

Self-imposed barriers caused by inability to reframe which pose problems for established players. Their strategic resource allocation mechanisms are effective within a framework, but break down when a challenge comes from outside the box.

The problem of reframing provides clues as to where and how alternative routines might be developed to support decision making around selection under high uncertainty.

Wait and see – deal with early-stage uncertainty.

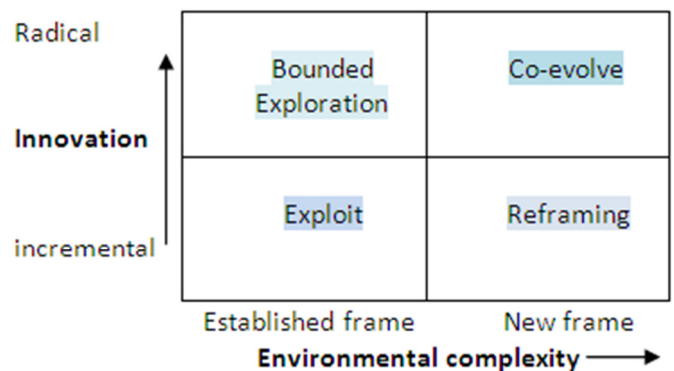
Fast-second – exploiting innovation opportunities more successfully than early entrants

→ *Microsoft*

7.9 Mapping the selection space

Tools to help with uncertainty decision making

1. building alternative futures
2. prototyping
3. probe and learn
4. alternative measurement/evaluation criteria
5. mobilize networks of support
6. alternative decision-making pathways
7. deploy alternative funding structures
8. mobilizing entrepreneurship
9. alternative/dedicated implementation structures



11.1 Creating value through innovation

There is a weak relationship between innovation and performance. Decide between 2 strategies:

1. Innovation leadership
2. Innovation followership

Late entrant firms appear to pursue one of two very different strategies.

1. Based on competencies other than R&D and new product development
2. Focus on major new product development projects in an effort to compete with pioneer.
 - A pioneer strategy appears more successful in markets where the purchasing frequency is high, or distribution important.

Intellectual property rights (IPR) have only a minor role to play in the creation/capture of value from innovation because:

1. The propensity to use and enforce, IPR varies by sector. → *strong in pharmaceuticals*
2. High variation in innovation and performance within the same sectors and within similar IPR regimes indicates that other, firm-level factors are also at work.

IPR has a negative effect on a strategy of long-term value creation, and that lead time, secrecy and the tacitness of knowledge are more strongly associated with creating value. Only a limited level of IPR is desirable to *encourage risk taking and innovation*, and that a broader repertoire of strategies is necessary to create and capture the economic and social benefits of innovation.

11.2 Innovation and firm performance

Difficulties in constructing a model of effects of innovation:

1. Relationship between inputs-outputs is much weaker than at the industry level
2. Reporting behavior of firms may change in respect of any variable monitored to be used
3. Objective of indicators may be to influence financial markets and lending behavior
4. Financial markets will concern themselves only with the gain appropriable by the firm itself

Product R&D is less productive than *process* R&D.

Explanatory factors: scale, technological opportunity and management

- The scale of R&D effort is important only in chemicals and pharmaceuticals
- Large firms tend to innovate more because they have a higher incentive to do so

A major problem with measuring inputs and outputs is: how do we take account of the 'spillover' of innovation benefits or information to other firms or industries.

New patents – below-average performance over time

- Face high costs and uncertainty associated with emerging technology

Older patents – outperform the average over time

- Face more limited opportunity to exploit these commercially

The P/E (price/earnings) ratio may be a better indicator of (future) innovation performance.

Profitability declines as the market evolves over time for a number of reasons:

1. Product and service differentiation tend to be reduced
2. Competition tends to shift to price and rates of return fall
3. Capital intensity tends to increase, driving returns down even further

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11.3 Exploiting knowledge and intellectual property

Organizations can acquire knowledge by experience (least effective), experimentation or acquisition. A more active approach involves scanning the internal/external environments: *Searching, filtering and evaluating potential opportunities from outside the organization.*

Identifying and codifying knowledge

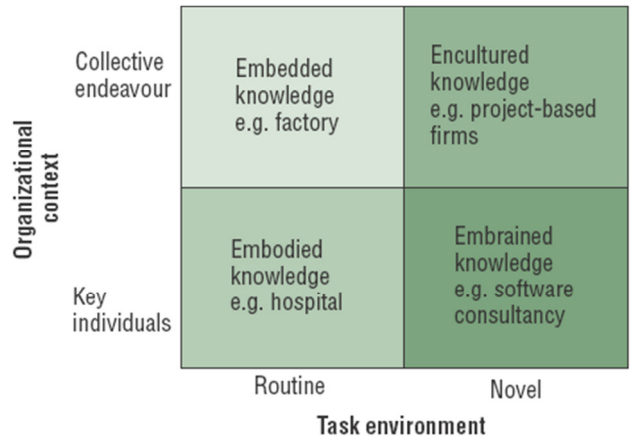
- Data Set of discrete raw observations
 - Information Data that has been organized, grouped or categorized into some pattern
 - Knowledge Information that has been contextualized
1. Explicit knowledge, which can be codified
 2. Tacit/implicit knowledge, which is personal, experiential, hard to formalize

Learning *how* is more relevant where speed or quality is critical, but learning *why* will be necessary to apply skills and know-how in new situations.

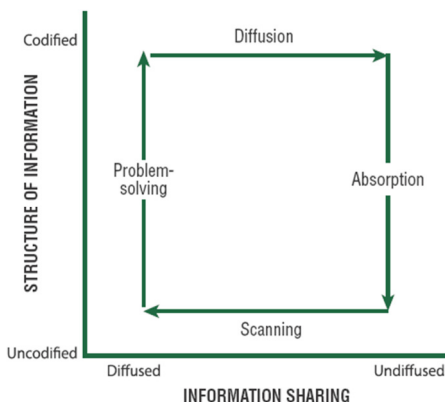
Embrained knowledge	Conceptual skills and cognitive abilities
Embodied knowledge	Action oriented, partly explicit
Encultured knowledge	Achieving shared understanding and meaning
Embed knowledge	Systematic routines and processes
Encodes knowledge	Represented by symbols and signs
Commodified knowledge	Embodied in outputs of an organization e.g. product/service

Transformation of individual knowledge into organizational knowledge involves 4 cycles:

1. Socialization Tacit → tacit knowledge
2. Externalization Tacit → explicit knowledge
(boundary objectives are critical here)
3. Combination Explicit → explicit knowledge
4. Internalization Explicit → tacit knowledge



Codifying knowledge involves taking information that human agents carry in their heads and find hard to articulate, and structuring it in such a way that its complexity is reduced.



C-space (culture space) enables an organization to map its resources and key linkages between them on to the C-space. And acts as an elicitation (*opwekking*) device to facilitate a discussion about the meaning and action required in terms of core competencies and knowledge resources.

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Storing and retrieving knowledge

Problems: codifying tacit knowledge, retrieve and reuse relevant knowledge.

There are 2 *common approaches* to knowledge management:

1. Based on **investment** in IT, based on groupware and intranet technologies
2. **People and process** based, encourage staff to identify, store and share information

Collective attributes: intangible, positional, functional, cultural (page 548)

Sharing and distributing knowledge

- Converting data and information to knowledge → identifying patterns
- Converting text to knowledge → synthesis, comparison, analysis
- Converting individual to group knowledge → supportive culture, incentives
- Connecting people to knowledge → seminars, software agents
- Connecting knowledge to people → intranets, agent systems
- Connecting people to people → networks
- Connecting knowledge to knowledge → common projects

If the conflict is too high, you may see information hoarding, open aggression. If conflict is too low, individuals may lack motivation or interest, meetings are one-way, rather than debate.

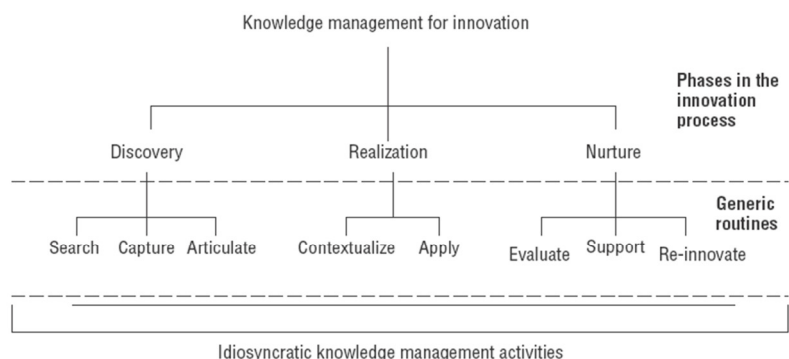
Mechanisms to help knowledge transfer between different communities of practice:

1. Organizational translator - mediate, heavyweight product managers
2. Knowledge broker - participate in different communities, rather than mediate
3. Boundary object or practice - shared document quality manual, something of interest

Knowledge management implementation strategies			
Strategy	Characteristics	Requirements	Risks
Ripple	Bottom-up, kaizen <i>Quality management</i>	Process tools, sustained motivation	Isolation from technical excellence
Integration	Of functional knowledge <i>Product development</i>	Early involvement, overlapping phases	Conformity, coordination burden
Embedding	Coupling systems, products, service <i>ERP</i>	Motivation, rewards, common information	Loss of autonomy, system complexity
Bridge	Novel combination existing competencies <i>Architectural innovations</i>	Common language and objectives	High control needs, technical feasibility, market failure
Transfer	Exploiting existing knowledge <i>related diversification</i>	New market knowledge	Inappropriate technology, customer support and service

Converting knowledge into innovation

Innovation rarely involves dealing with a single technology or market but rather a bundle of knowledge. Successful innovation management required that we can get hold of an use knowledge about the architecture of an innovations – how components can be put together.



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Exploiting intellectual property

IPR may provide some legal rights, but secrecy is often a more effective alternative.

Patents require certain legal tests to be satisfied

- Novelty
- Inventive step
- Industrial application (must be capable of being applied to a machine, product)
- Patentable subject (discoveries and formulae cannot be patented, software-Europe)
- Clear and complete disclosure

Highly cited patents are of much greater importance than patents which are never cited.

They can set off a stream of follow-on inventions.

Indicators of patents:

- Number of patents
- Cites per patent
- Current impact index (CII)
- Technology strength (TS)
- Technology cycle time (TCT) – speed of invention
- Science Linkage (SL) – how leading edge the technology is
- Science Strength (SS) – how much the patent applies basis science

Efficiency: how well companies translate technological and commercial inputs into new products, processes and businesses.

Effectiveness in the sense of how successful such innovations are in the market and their contribution to financial performance.

Copyright is concerned with the expression of ideas, and not the ideas themselves. They provide limited legal rights for certain types of material for a specific term.

Patent strategies:

- | | |
|---------------|--|
| 1. Offensive | multiple patents to prevent or limit competition |
| 2. Defensive | specific for key technologies |
| 3. Financial | to optimize income |
| 4. Bargaining | to promote strategic alliances |
| 5. Reputation | |

Design rights are similar to copyright protection, but mainly apply to three-dimensional articles. Excludes integral and functional features, such as spare parts.

- Cheaper and easier than patent protection, but more limited in scope

Licensing IPR

+ reach larger market, establish standards, gain access, exploit

Common methods: going market rate, 25% rule, return on investment, profit sharing

Increase in patent activity by changing in government funding, intellectual property law and technological opportunity

11.4 Broader economic and social benefits

Global standards and position in international value chains can constrain the ability of firms based in emerging economies to upgrade their capabilities and appropriate greater value, but they also present ways in which these firms can innovate to overcome these hurdles.

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Different routes to upgrading through innovation:

- Process upgrading
- Product upgrading
- Capability upgrading
- Inter-sectoral upgrading

Firms in emerging economies face a reverse product-process innovation life cycle.

Dominant design:

- locus from innovation shifts from product to process
- radical → incremental improvements

Emerging economies

- begins with incremental process innovations, produce existing product lower cost/quality

Innovation and social change

Social innovation:

- Aim to create social change and value, rather than commercial innovation/financial value
 - Involves business-, public- and third-sector organizations to achieve this aim
- *poverty relief, community development, health, welfare, education, sustainability*

Social entrepreneurs share most of the characteristics of entrepreneurs but are different in:

- Motives and aims - independence and health, + social means and ends
- Timeframe - short-term growth, longer term harvesting venture + long-term change
- Resources - reliance firm and management + network stakeholders & resources

The feasibility will be influenced by characteristics such as background and personality.

Innovation and sustainability

The most conventional approach to innovation and sustainability focuses on how to influence the development and application of innovations through regulation and control.

Formal policies are used in an attempt to direct innovation by using systems of regulations, targets, incentives and usually punishments for non-compliance. → slow and incremental

Innovation as solution environmental issues:

Cleaner products, more efficient processes, alternative technologies, new services, systems innovations.

