

Diffusion and innovation: some concepts of change

STIPPS Project

Definitions of Innovation

Definitions vary, three examples are given here: innovation is ...

- a process that can be cultivated and harnessed
- described in terms of its application and whether or not it creates something new
- described in terms of its driver, what causes it — either the market or a mission

Diffusion of innovation

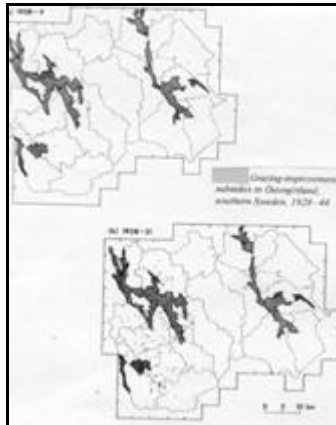
- the process by which an *innovation* is *communicated* through certain *channels* over *time* among the members of a *social system*
 - *communication* - a process in which participants create and share information one another in order to reach a mutual understanding
- a kind of social change
 - the process by which alteration occurs in the structure and function of a social system
- planned and spontaneous spread of new ideas

Diffusion of Innovation Theory An Overview

- people adopt innovations at different rates
- attributes of the innovation affect adoption rate
- organizational characteristics affect innovativeness

Stages in deciding to adopt an innovation

- **Knowledge:** awareness, comprehension
- **Persuasion:** formation of attitude
- **Decision:** trial, followed by adoption or rejection
- **Implementation:** actual use
- **Confirmation:** continued use



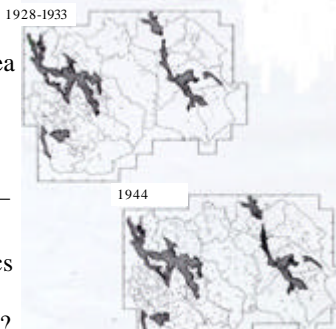
Example:

- South Sweden
- innovation = grazing improvement
- studied characteristics
- modelled diffusion

Torsten Hägerstrand (1953), *Innovation diffusion as a Spatial Process*, University of Chicago Press, USA (translated 1967)

Example

- shows spread of idea over time
- distance affected change
- channels of spread – lake, soils, roads
- people characteristics important – what makes an innovator?



Hägerstrand T (1953), *Innovation diffusion as a Spatial Process*, University of Chicago Press, USA (translated 1967)

Innovation Example: TV sets

Percentage households with TV sets 1953



Innovation Example: TV sets

Percentage households with TV sets 1956



Serendipity and Innovation

Some questions about chance and innovation

- is an innovator at the right place at the right time?
- is an innovator specially driven (by some ability to perceive what others do not)?
- is everyone drawn to the first tale of innovation and the Innovator takes advantage of it?
- could anyone become an Innovator?
- could innovation happen purely through random events?
- **YOUR THOUGHTS?**

What causes innovation?

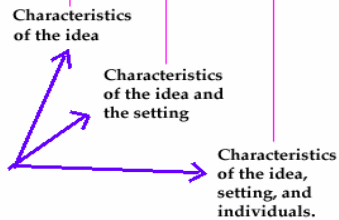
- revolutionary events create opportunities for innovation, they occur without human intervention
- the real innovation occurs when the 'experiencer' of the event puts the pieces together and understands how that the 'new' situation can radically change the way things work
- **a combination of**
 - accident, recognition and follow up**links serendipity and innovation**

3 critical components for reaching creative potential

- **IQ** - intellectual ability, analysis, superior thought
- **EQ** emotional/empathetic ability in relating to others and understanding their needs
- **OQ** "obsessiveness," the drive to spend time to develop the objective
- everyone has a capacity in each area

How to Effectively Innovate?

$$\text{Effectiveness} = \text{Quality} \times \text{Feasibility} \times \text{Acceptability}$$



Attributes of the innovation

an Innovation should:

- provide a relative advantage
- be compatible
- increase complexity
- be trialable – can be tested
- be observable

Relative advantage

Such as:

- economic profitability
- low initial cost
- decrease in discomfort
- savings in time or effort
- social prestige (only for innovators, early adopters, and early majority)
- good predictor of rate of adoption

Compatibility

- compatibility with values and beliefs
- with perceived need
- with previously introduced/adopted ideas
- consistency may speed up adoption, slow down adoption, or cause new methods to be inappropriately applied
- a mediocre predictor of adoption

Complexity

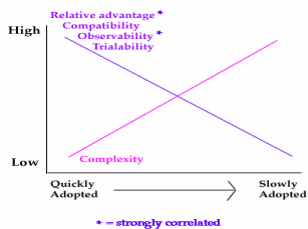
- leads to difficulty in understanding
- also results in difficulty in implementation and
- thus, it has negative relationship with adoption (i.e. more complex – less adoption)

Trialability

- experimentation on limited basis before final commitment
- "installment plan" or phased approach
- especially important to earlier adopters
- positively correlated with adoption rate

Observability

- visible results
- positively correlated with adoption rate



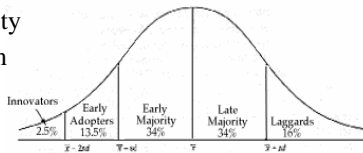
Example: Cell Phones

- **Relative advantage:** time savings (2 hrs/week); portability; emergency use; status symbol.
- **Compatibility:** connects to existing network of phone users.
- **Complexity:** easy - works like a regular phone
- **Observability:** highly observable; public use emphasized status value to potential users
- **Trialability:** can easily borrow a friend's to try out.

Summary

Organizational characteristics affect the level of innovativeness, such as:

- Size
- Interconnectivity
- Slack in system
- Centralisation
- Formalisation



Some reflections

- What characteristics does Science education exhibit? Is it an innovative discipline?
- How about teachers in schools?
- What features determine this?
- Do you think teachers think that an innovation is necessary? Why?

Changers

Change Agents

- an individual who influences an innovation-decision
- use opinion leaders in diffusion campaigns
- often professionals with a university degree in a technical field
- **Who are the potential change agents?**