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Chapter 1: Elements of Diffusion

- Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system.
- The messages are concerned with new ideas.
- Communication is a process in which participants create and share information with one another in order to reach a mutual understanding.
  - By communicating, individuals exchange in a two-way process in which one individual seeks to transfer a message to another in order to achieve certain effects
  - Information exchanges happens more than once – cyclical
- Diffusion is a special type of communication in which the messages are about new ideas.
- Newness means that some degree on uncertainty exists
- Uncertainty is the degree to which an number of alternatives are perceive with respect to the occurrence of an event and the relative probability of these alternatives.
  - Uncertainty implies a lack of predictability, of structure, of information.
- Information is a difference in a matter or energy that affects uncertainty in a situation where a choice exists among a set of alternatives
  - Matter-energy: inked lines on paper, sound waves, electrical current
- A technological innovation embodies information and thus reduces uncertainty about the cause-effect relationships in problem solving.
  - Adoption of residential solar heating reduces the uncertainty about future increases in the cost of fuel.
- Diffusion is a social change – the process by which alteration occurs in the structure and function of a social system.
  - New ideas lead to certain consequences and social change occurs.
- The heart of the diffusion process consists of interpersonal network exchanges and social modeling between those individuals who have already adopted an innovation and those who are then influenced to do so. Diffusion is fundamentally a social process.
- Beneficial innovations may take centuries to be adopted or may not be adopted at all.
- Four Main Elements in the Diffusion of Innovations
  - The Innovation
    - An idea, practice, or object that is perceived as new by an individual or other unit of adoption. If the idea seems new, it is an innovation.
    - Newness may be expressed in terms of knowledge, persuasion, or decision to adopt.
    - Important research questions addressed
      - How the early adopters differ from late adopters of an innovation
      - How the perceived attributes of an innovation, such as its relative advantage or compatibility affect its rate of adoption
      - Why the S-shaped diffusion cure takes-off at about 10 to 25 percent adoption, when interpersonal networks become activated so that a critical mass of adopters begins using an innovation.
      - Not every innovation is desirable to all individuals or groups.
    - Technology transfer is the communication of information (Eveland, 1986).
      - Technology may be entirely information
      - Technology almost always represents a mixture of hardware (the tool) and software (information about the tool) aspects.
      - A technological innovation creates uncertainty about its expected consequences, as well as representing an opportunity for reduced uncertainty representing the possible ability of the innovation to solve a problem.

        - One information-seeking activities have reduced uncertainty
        - Two types of information with respect to a technological innovation
        - Software information embodied in a technology and serves to reduce uncertainty about the cause-effect relationships in achieving the desired outcome. Questions asked are What is the innovation, How does it work, and Why does it work?
        - Innovation-evaluation information – the individual wants to know what are an innovation's consequences and what will be its advantages and disadvantages be in the individual's situation.
    - Technology Clusters
        - A cluster consists of one or more distinguishable elements of technology that are perceived as being closely interrelated.
        - Sets of innovations may diffuse at about the same time in a system and are interdependent.
        - Beware of innovation research that treats similar innovations as independent innovations.
    - Characteristics of Innovations
        - Relative advantage: the degree to which an innovations is perceived as better than the idea it supersedes. Measured in terms of economics, social prestige, convenience, and satisfaction. The greater the perceived relative advantage of an innovations, the more rapid its rate of adoption will be.
        - Compatibility: the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and the needs of potential adopters. Incompatible ideas will not be adopted as rapidly as compatible innovations.
        - Complexity: the degree to which an innovation is perceived as difficult to understand and use. Most members readily understand some innovations; others are more complicated and will be adopted more slowly. New ideas that are simple to understand will be adopted more rapidly than innovations that require the adopter to develop new skills and understandings.
        - Trialability: the degree to which an innovation may be experimented with on a limited basis. An innovation that can be tested represents less uncertainty to the individual who is considering it for adoption.
        - Observability: the degree to which the results of an innovation are visible to others. The easier it is for individuals to see the results on an innovation, the more likely they are to adopt it.
    - Re-invention: the degree to which an innovation is changed or modified by a user in the process of adoption and implementation. Or the degree to which an individual's use of an innovation departs from the mainline version of the innovation that was originally promoted by the change agent.
- Communication Channels
    - The means by which messages get from one individual to another.
    - Mass Media channels
        - Often the most rapid and efficient means to inform an audience – creates awareness and knowledge
        - Radio, television, newspaper
    - Interpersonal channels
        - Involves face-to-face exchange between two or more individuals
    - Most individuals do not evaluate an innovation on the basis of scientific studies of its consequences. Not entirely irrelevant especially to very first adopters. Most people depend mainly on subjective evaluations conveyed to them from individuals like themselves who have previously adopted the innovations
    - Diffusion is a very social process. The heart of diffusion process consists of the modeling and imitation by potential adopters of their network partners who have adopted previously.

- More effective communication occurs when two or more individuals belong to the same groups, live or work near each other, and share the same interests (homophilous).
- But participants in innovation adoption are very different (heterophilous).

- Time
  - In the innovation-decision process by which an individual passes from first knowledge of an innovation through its adoption or rejection.
  - In the innovativeness of an innovation. The relative earliness/lateness with which an innovation is adopted.
  - In an innovation's rate of adoption in a system, usually measured in the number of members of a system that adopt the innovation in a given period of time.
  - Innovation-decision process has five steps
    - Knowledge – learns of innovation's existence and gains some understanding of how it functions. Seeks primarily software information
    - Persuasion – an individual forms a favorable or unfavorable attitude toward the innovation
    - Decision – an individual engages in activities that lead to a choice to adopt or reject the innovation
    - Implementation – occurs when an individual puts the innovation to use
    - Confirmation – occurs when an individual seeks reinforcement of an innovation-decision that has already been made – may reverse the decision if exposed to conflicting messages about the innovation. Discontinuance – decision to reject a previously accepted innovation.
  - Innovativeness and Adopter categories
    - Innovators, early adopters, early majority, late majority, laggards.
  - Rate of adoption
    - S shaped curve
- Social System
  - A set of inter-related units that engage in joint problem solving to accomplish a goal.
  - Members can be individuals, informal groups, organizations, and/or subsystems.
  - Social systems set the boundaries as to what innovations are accepted or rejected
    - Social structures influence how and what information is disseminated
    - Knowledge of the social structure is important to consider when studying diffusion.
    - Information can be distributed through formal or informal communication structures
  - Social Norms
    - The established behavior patterns for the members of a social system.
    - Define a range of tolerable behavior and serve as a guide or a standard for the members' behavior in a social system.
    - Tell people what is expected of them.
  - Opinion Leaders and Change Agents
    - Leadership is the degree to which an individual is able to influence other individuals' attitudes or overt behavior informally in a desired way with relative frequency.
    - Leadership is earned and maintained by the individual's technical competence, social accessibility, and conformity to the system's norms.
    - Systems have leaders who support and leaders who oppose change.
    - Opinion leaders are:
      - Exposed to more external communication
      - Have somewhat higher social status
      - Are more innovative
    - Change agent

        - An individual who influences clients' innovation decisions in a direction deemed desirable by a change agency.
        - Agents represent agencies – groups interested in managing change.
        - Opinion leaders work for change agents
    - Types of Innovation-Decisions
        - Optional innovation-decision – choices to adopt or reject an innovation are made by an individual independent of the decisions of other members of the system.
        - Collective innovation-decisions – choices to adopt or reject an innovation are made by consensus among the members of a system. All units of the system must conform to the system's decision once it is made.
        - Authority innovation-decisions – choices to adopt or reject an innovation are made by relatively few individuals in a system who possess power, status, or technical expertise. Individual has little or no influence; he or she simply implements the decision.
        - Collective and authority decision types are much more common than optional.
        - Authority decisions have the fastest rate of adoption, but can be circumvented during their implementation.
        - Optional decisions can be made most rapidly than collective.
        - Contingent innovation decision type – fourth type – choices to adopt or reject can be made only after a prior innovation-decision.
    - Consequences of innovations
        - Desirable versus undesirable
        - Direct versus indirect
        - Anticipated versus unanticipated
        - Change agents can anticipate and predict an innovation's form and perhaps its function but not its meaning for the client.

Chapter 2: A History of Diffusion Research

- Eight main types of diffusion research
    - Earliness of knowing about innovations
    - Rate of adoption of different innovations in a social system
    - Innovativeness
    - Opinion leadership
    - Diffusion networks
    - Rate of adoption in different social systems
    - Communication channel use
    - Consequences of innovation

Chapter 3: Contributions and Criticisms of Diffusion Research

- Appeal of the Diffusion Model
    - The model is relevant for many disciplines
    - Results of diffusion research can be used
    - Results from diffusion research allows scholars to the theorize about more general activities
- Criticism
    - The Pro-Innovation Bias
        - The implication that an innovation should be diffused and adopted by all members of a social system, that is should be diffused more rapidly, and that the innovation should be neither re-invented nor rejected.
        - Bias leads to
            - Ignoring the study of ignorance about innovations
            - Underemphasize the rejection or discontinuance of innovations

        - Overlook re-invention
        - Fail to study anti-diffusion programs to prevent the diffusion of "bad" innovations
    - Reasons for pro-innovation bias
        - Many innovations studied have a high relative advantage
        - The act of innovating has positive connotations
        - Research is often funded by change agents who have a vested interest in promoting innovation
        - Successful innovation leaves a rate of adoption that can be measured.
        - Re-invention obscures the innovation
        - Researchers prefer to study innovations with a rapid rate of adoption
    - Bias has lead to us
        - Knowing more about diffusion of rapidly spreading innovations than slowly diffusing innovations
        - Knowing more about continued use than discontinuance
        - Knowing more about adoption than rejection
        - Knowing more about successful innovations than failures
    - Overcoming the bias
        - Collect data at various times during the innovations process – data usually collected afterwards
        - Researchers should be more questioning of, and careful about, how they select their innovations to study. Look at variants of the innovation that have failed to be adopted
        - Rejection, discontinuance, and re-inventions occur and should be studied.
        - Researchers should investigate the broader context in which an innovation diffuses.
        - Increase our understanding of the motivations for adopting an innovation. Attempt to see the innovation through the user's eyes.
- The Individual-Blame Bias
    - A tendency for diffusion research to side with the change agencies that promote innovations rather than with the individuals who are potential adopters.
    - Individuals are blamed for not adopting the innovation rather than individuals being seen as members of a system that is blocking adoption of the innovation.
    - Late adopters and laggards are seen as not following the expert's advice and adopting the innovation. These groups are stereotyped as traditional, uneducated, and/or resistant to change. That can become a self-fulfilling prophecy.
    - Reasons for individual-blame
        - Researchers accept the problem definition brought to them by the sponsors of the research
        - Researchers may feel it is impossible to change system-blame factors.
        - Individuals are more accessible to the researcher than are systems so the individual is used as the unit of analysis instead of the system.
    - Overcoming individual-blame bias
        - Seek alternative to individuals as the unit of analysis
        - Keep an eye open for causes of a social problem. Guard against accepting the change agent's view of the world
        - Involve all participants including potential adopters
        - Closely examine the social and communication structures
- The Recall Problem
    - Users have a difficult time reconstructing past history with innovations
    - Alternative methods
        - Field experiments
        - Longitudinal panel studies

        - Use of archival records
        - Case studies of the innovation process with data from multiple respondents (each used to cross check the other)
    - Cross sectional (one time point) studies have difficulty describing why things happen
- The Issue of Equality in the Diffusion of Innovation
    - Diffusion of innovation widens the socioeconomic gap between higher and lower status segments of a system

Chapter 4: The Generation of Innovations

- The Innovation-Development Process
    - Consists of all the decisions and activities, and their impacts, that occur from recognition of a need or problem, through research, development, and commercialization of an innovation, through diffusion and adoption of the innovation by users, to is consequences.
    - Steps
        - Recognizing a Problem or Need
        - Basic and Applied Research
            - Creating the new idea
        - Development
            - The process of putting the new idea in a form that is expected to meet the needs of an audience of potential adopters, developing the technology.
            - Technology transfer – the exchange of technological information between R&D workers who create a technological innovation and the users of the new idea.
                - Levels of technology transfer
                    - Knowledge – receptor knows about the innovation via a mass communication message
                    - Use – receptor has put the innovation into use
                    - Commercialization – the receptor had put the innovation up for sale in the marketplace
        - Commercialization
            - The production, manufacturing, packaging, marketing, and distribution of a product that embodies an innovation. Conversion of the idea from research into a product or service for sale in the marketplace.
        - Diffusion and Adoption
            - Gatekeeping
                - Controlling the flow of messages through a communication channel
                - Controlling whether or not an innovation should be diffused to an audience
        - Consequences
            - The changes that occur to an individual or to a social system as a result of the adoption or rejection of an innovation.
    - Socioeconomic status
        - Highly related to degree of change agent contact, in turn related to degree of innovativeness.
- The Agricultural Extension Model
    - The most successful model for securing users' adoption of agricultural research results

Chapter 5: The Innovation-Decision Process

- Five stage process
    - Knowledge occurs when an individual is exposed to an innovation's existence and gains some understanding of how it functions.
    - Persuasion occurs when an individual forms a favorable or unfavorable attitude toward the innovation.
    - Decision occurs when an individual engages in activities that lead to a choice to adopt or reject the innovation.

    - Implementation occurs when an individual puts an innovation into use.
    - Confirmation occurs when an individual seeks reinforcement of an innovation-decision already made, or reverses a previous decision to adopt or reject the innovation if exposed to conflicting messages about the innovation.
- Knowledge Stage
    - Individuals tend to avoid messages that are inconsistent with their pre-existing attitudes – selective exposure
    - Individuals tend to perceive information as relevant if the information conforms to their needs and pre-existing attitudes – selective perception
    - Innovations often create needs. Often needs are present prior to the creation of the innovation.
    - Types of knowledge
        - Awareness-knowledge: information that an innovation exists
        - How-to-knowledge: information necessary to use an innovation properly
        - Principles-knowledge: information dealing with the functioning principles underlying how the innovation works
    - Early versus late knowers of innovation
        - Early have more formal education, have higher socioeconomic status, have more exposure to mass media, have more exposure to interpersonal communication channels, have more change agent contact, have more social participation, are more cosmopolitan than late knowers.
        - Characteristics of early knowers are similar to early innovators.
- Persuasion Stage
    - Individual becomes psychologically involved with the innovation
    - Actively seeks information
    - Individual uses a vicarious trial of the innovation – hypothetical use
    - Individual seeks innovation-evaluation information
        - What are the consequences of use
        - Advantages and disadvantages of use
        - Sought from near-peers – subjective opinions very convincing
        - Sought less often from scientific evaluations
    - Development of a favorable attitude toward an innovation does not always lead to adoption. External factors may intervene.
        - Knowledge-attitude-practice (KAP) gap may exist.
        - Communication channel may not be adequate to turn good thoughts into action
        - Innovations that are preventive in nature have a characteristic long gap. The probability of the outcome occurring is low so the innovation is not readily adopted.
        - Some innovations are adopted after a cue-to-action (a scare or near miss).
- Decision Stage
    - Innovations are adopted or rejected
    - A partial trial of the innovation is an effective method to encourage adoption
        - Having others try the innovation than becoming change agents is useful
        - Partial trials may also result in rejection or discontinuance
    - Two types of rejection
        - Active rejection – consider the adoption of the innovation then decides to reject it
        - Passive rejection – individual never really considers the innovation
- Implementation Stage
    - Individuals want to know: where innovation can be obtained, how is innovation used, how does the innovation work, what problems are associated with its use and how can the problems be solved.
    - Active information seeking takes place at this stage
    - Change agent acts as technical assistant
    - Problems at this stage occur more often for organization than for individual.

        - Adopter can be different sets/types of people, some who were not directly involved in the decision stage
    - Stage ends when the innovation becomes routine or institutionalized
    - Re-invention occurs at this stage – the degree to which an innovation is changed or modified by a user in the process of adoption and implementation
        - Re-invention is most likely to occur when the adopters are in an organization.
        - Re-invention has benefits:
            - Quality can be improved,
            - Changes may be necessary to make the innovation work for certain individuals and in certain conditions,
            - Unexpected problems in implementation can be overcome when the innovation can be easily modified
        - Re-invention may occur due to:
            - Lack of full knowledge about the innovation
            - Little direct contact between change agent and the user
            - Innovation is relatively complex and difficult to understand: users adapt to their level
            - Innovations involving abstract concepts or that is a tool is likely to be re-invented to suit the needs of individual users (software for example)
            - Innovations that are designed to solve a wide range of users' problems are likely to be reinvented – two problems may not match exactly
            - Local issues may necessitate modification
            - Change agent may encourage users to modify the innovation
- Confirmation Stage
    - Information is sought after implementation to reinforce the decision to adopt or reverse the decision if exposed to conflicting messages.
    - Individual looks to avoid a state of dissonance: state of mental disequilibria after a decision is made. Individual seeks additional information or interpersonal contact
    - Discontinuance rates are very high for innovations
        - Types
            - Replacement discontinuance: a better idea is found
            - Disenchantment discontinuance: Rejection of an idea as a result of dissatisfaction with its performance.
        - Later adopters are more likely to have discontinuance.
- Alternative hierarchy based on the effects of communication on behavior
    - Precontemplation: where an individual is aware tat a problem exist and begins to think about overcoming it.
    - Contemplation: where an individual is aware that a problem exists and is seriously thinking about overcoming it, but has not yet made a commitment to take action.
    - Preparation: the stage at which an individual intends to take action in the immediate future, but has not yet done so.
    - Action: when the individual changes behavior or the environment in order to overcome the problem.
    - Maintenance: the stage at which an individual consolidates and continues the behavior change that was made previously
- Categorizing Communication Channels
    - Mass media channels are relatively more important at the knowledge stage and interpersonal channels are relatively more important at the persuasion stage.
    - Cosmopolitan channels are relatively more important at the knowledge stage, and local channels are relatively more important at the persuasion stage.
    - Mass media channels are relatively more important than interpersonal channels for early adopters than for later adopters
        - Early adopters are more venturesome – mass media stimulate that characteristic

    - Cosmopolitan channels are relatively more important than local channels for early adopters than for late adopters.
        - Early adopters are more in tune with external communication channels
- The Innovation-Decision Period
    - Length of time required for an individual or organization to pass through the innovation-decision process.
    - Change agents wish to speed up the process
    - Innovators are such because:
        - They use more technically accurate sources and channels about innovations, such as direct contact with scientists
        - Have higher credibility in these sources that the average individual
        - May possess superior mental abilities
        - May be able to conceptual abstract ideas better than the average individual
        - May be able to see application of innovation to own situation better and quicker than the average individual

Chapter 6: Attributes of Innovations and Their Rate of Adoption

- Relatively little diffusion research has focused on how the properties of the innovation affect their rate of adoption. The reactions can be modified by the way in which an innovation is named, positioned, and how it is related to existing beliefs.
    - Most research as looked at people differences in innovativeness (the adopter categories).
- Explaining the Rate of Adoption
    - Rate of adoption – the relative speed with which members of a social system adopt an innovation. Measured as the number of individuals who adopt a new idea in a specified period of time. Rate is the numerical indicator of the steepness of the adoption curve.
    - From 49 to 87 percent of the variance in the rate of adoption is explained by five attributes
        - Relative advantage
        - Compatibility
        - Complexity
        - Trialability
        - Observability
    - Other variables affecting the rate of adoption:
        - The type of innovation-decision (Optional/Collective/Authority)
        - The nature of communication channels diffusing the innovation (mass media or interpersonal)
        - The nature of the social system (norms/degree of network interconnectedness)
        - The extent of change agents' promotion efforts
- A subjective evaluation of an innovation, derived from individuals' personal experiences and perceptions and conveyed by interpersonal networks, drives the diffusion process.
- An individuals' perception of the innovation, not the attributes classified by experts or change agents, affect its rate of adoption.
- The five attributes may not be the most important attributes for a particular set of respondents. Find main attributes prior to measuring for the list of five but the five will usually be present.
- Relative Advantage: the degree to which an innovation is perceived as being better than the idea it supersedes.
    - Expressed as economic profitability, social prestige, decrease in discomfort, low initial cost, time savings, savings in effort, and immediacy of rewards, or other benefits.
    - Economic factors and the rate of adoption
        - When the price of an innovation decreases dramatically during its diffusion process, a rapid rate of adoption is encouraged.
    - Status aspects of innovations and over-adoption
        - Social status increases by adopting the innovation.

        - Particularly true in the adoption of clothing fashions.
        - Very true of fads: a relatively unimportant aspect of culture, which diffuses rapidly, mainly for status reasons, and then is rapidly discontinued.
        - Status motivations seem more important for innovators, early adopters, and early majority.
        - Respondents may be reluctant to admit they adopted for status reasons.
        - Over-adoption – adoption of an innovation by an individual when expects feel that he or she should have rejected the adoption
            - Occurs because of insufficient knowledge about the innovation
            - Inability to predict the consequences of use
            - Status enhancing properties of the innovation
            - May happen when one aspect of the innovation is so attractive to an individual that is overrules all other aspects of the innovation.
    - Relative advantage is one of the best predictors of adoption
        - It best indicates the benefits and costs of adoption
    - Preventive innovations are slow to be adopted because they have relatively low relative advantage – a delayed reward for adoption
        - Look at Stanford Heart Disease Prevention Program literature – example of a communications campaign
    - Change agents offer incentives or rewards to clients to speed up the rate of adoption.
        - Incentives may be paid to the person who adopts the innovation or to one who spread the word about the innovation
        - Payments may be made to the individual or to their social system
        - Incentive may be used to reward a desired behavior change or withheld until a desired behavior change is adopted.
        - Incentive may be monetary or non-monetary
        - Incentives may be given immediately at the time of adoption or awarded at a later time.
        - Incentives work best on groups less likely to adopt.
        - The quality of an adoption decision is lower when an incentive is used – adopter more likely to discontinue an innovation induced by an incentive.
- Compatibility: the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters.
        - Innovations conflicting with the values of the adopter will be adopted very slowly.
        - Innovations incompatible with previously adopted innovations will be adopted very slowly if at all.
            - Old ideas are used to judge new ideas. The new ideas will have a greater degree of uncertainly associated with it – less likely to be adopted
            - Perceived compatibility of the new idea with pervious experience led adopters to incorrectly utilize the innovation.
            - The more compatible an idea is with the old, the less change occurs when the new idea is adopted.
            - Innovation negativism – bad experiences with innovation can prevent adoption of subsequent innovations.
            - Innovations that fail to meet the needs of potential adopters will not be adopted readily. Work needs to be done to discover the needs of potential adopters.
            - Change agents must be careful not to create artificial needs, which benefit the agent's agenda but not the potential adopters.
            - Compatibility is positively correlated with adoption
            - Promoting technology clusters may be an effective way of increasing compatibility – treating new ideas as a whole rather than separate idea.
            - Innovations should be given names that are compatible with cultural norms, it has the desired meaning for the intended audience.

        - Innovations should be positioned to maximize adoption. Positioning research can identify niches and target groups.
        - Potential adopters should not be viewed as blank slates (empty vessels fallacy). Potential adopters might have relevant experience in the area, which needs to be addressed before change agents encourage adoption. This often happens because change agents see a high relative advantage to adoption.
- Complexity: the degree to which an innovation is perceived as relatively difficult to understand and use.
    - The complexity of an innovation, as perceived by members of a social system, is negatively related to it rate of adoption.
- Trialability: the degree to which an innovation may be experimented with on a limited basis
    - New ideas that can be tried piecemeal are generally adopted more rapidly than innovations that are not.
    - Early adopters perceive trialability as more important than later adopters. Early adopters have no peers who have already tried the innovation.
    - An effective way to encourage adoption by laggards
- Observability: the degree to which the results of an innovation are visible to others.
    - Ideas that can easily be observed and communicated to others will be adopted more quickly than ideas that are more difficult to see and communicate.

Chapter 7: Innovativeness and Adopter Categories

- Individuals do not adopt at the same rate.
- Innovativeness: the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a system.
- The adoption of innovations usually follows a normal, bell-shaped curve when plotted over time on a frequency basis.
- If the cumulative number of adopters is plotted, the result is an S-shaped curve.
    - Curve rises slowly at first, accelerates to a maximum until half of the individuals in the system have adopted, then increase at a gradually slower rate as fewer and fewer remaining individuals adopt the innovation.
- The curve is normal because of the reduced number of errors made in learning about the innovation – learning curve.
- The S-shaped curve rises rapidly once interpersonal networks become activated in spreading subjective evaluations of the innovation from peer to peer.
- Innovators: Venturesome
    - Very interested in new ideas
    - More cosmopolite social relationships
    - Substantial financial resources to overcome possible losses from unprofitable innovations.
    - Able to understand and apply complex technical knowledge
    - Desire for the rash, daring, and risky
    - Willing to accept occasional setback when a new idea proves unsuccessful
    - Imports innovations from outside the social boundary
    - Plays the role of the gatekeeper in the flow of new ideas into a system
- Early Adopters: Respect
    - More integrated into the local system than are innovators
    - Are localites, not cosmopolites
    - Greatest degree of opinion leadership in the most systems
    - Potential adopters look to early adopters for advice and information about the innovation
    - Sought after by change agents
    - Not perceived as being too far ahead of the average person
    - Serve as a role model for other members of the social system
    - To continue position of respect, rational decisions about new innovations must be made
- Early Majority: Deliberate

    - Adopt just before the average member of a system
    - Interacts with peers, but seldom hold position of opinion leadership
    - Connect early adopters to later majority
    - Deliberate for some time before deciding to accept or reject the innovation
- Late Majority: Skeptical
    - Adopt new ideas just after the average member of a system
    - Adoption may be economical necessity or result of increasing network pressure from peers.
    - Innovations are approached with skepticism and caution.
    - Weight of system norms must definitely favor the innovation before late majority will accept it.
    - Pressure from peers necessary for motivation
    - Have relatively scarce resources – most uncertainty must be removed before adoption takes place
- Laggards: Traditional
    - Last in a social system to adopt an innovation
    - Hold almost no opinion leadership
    - Most localite – near isolates in the social system
    - Point of reference is the past
    - Suspicious of change agents and innovations
    - Interact primarily with others who have traditional values
    - Resistance to innovation is entirely rational – limited resources so they must be absolutely certain a new idea will not fail
- Socioeconomic Characteristics
    - Earlier adopters are not different from later adopters in age.
    - Earlier adopters have more years of formal education than later adopters.
    - Earlier adopters have higher social status than later adopters.
    - Earlier adopters have a greater degree of upward social mobility than later adopters.
    - Earlier adopters have larger units (farms, schools, companies, etc.) than later adopters.
    - New ideas are costly to adopt and require large outlays for financial and social capital.
- Personality Characteristics
    - Earlier adopters have greater empathy than later adopters.
    - Earlier adopters maybe less dogmatic than later adopters.
    - Earlier adopters have a greater ability to deal with abstractions than do later adopters.
    - Earlier adopters have greater rationality than later adopters.
    - Earlier adopters have greater intelligence than later adopters
    - Earlier adopters have a more favorable attitude toward change than later adopters
    - Earlier adopters are better able to cope with uncertainty and risk than later adopters.
    - Earlier adopters have a more favorable attitude toward science than later adopters.
    - Earlier adopters are less fatalistic than later adopters.
    - Earlier adopters have higher aspirations (for formal education, occupations, and so on) than later adopters.
- Communication Behavior
    - Earlier adopters have more social participation than later adopters.
    - Earlier adopters are more highly interconnected through interpersonal networks in their social system than later adopters.
    - Earlier adopters are more cosmopolite than later adopters.
    - Earlier adopters have more change agent contact than later adopters.
    - Earlier adopters have greater exposure to mass media communication channels than later adopters.
    - Earlier adopters have greater exposure to interpersonal communication channels than later adopters.
    - Earlier adopters seek information about innovations more actively than later adopters.

    - Earlier adopters have greater knowledge of innovations than later adopters.
    - Earlier adopters have a higher degree of opinion leadership than later adopters.
- The individuals in a system who most need the benefits of a new idea are generally the last to adopt an innovation. People who first adopt an innovations often least need the benefits offered by the innovation. One consequence is a widening of the socioeconomic and information gaps with the system.
    - Change agents need to pursue the segments of the system that most need the innovation (lowest SES).

Chapter 8: Diffusion Networks

- Models of Mass Communication Flows
    - Hypodermic Needle Model
        - The mass media had direct, immediate, and powerful effects on a mass audience.
        - Media in the 1940's and 1950's were perceived as a powerful influence on behavior change.
        - Omnipotent media (Katz and Lazarsfeld, 1955).
        - Evidence:
            - Role of Hearst newspapers in arousing public support for the Spanish-American War
            - The power of Nazi leader Joseph Goebbles' propaganda apparatus during WWII.
            - The influence of Madison Avenue advertising on consumer and voting behavior in the U.S.
        - More sophisticated research methods cast doubt on hypodermic needle model.
        - Based primarily on intuitive theorizing from unique historical events. Was too simple and mechanistic and too gross to give an accurate account of mass media effects.
    - Two-Step Flow Model
        - Developed from a study of the 1940 presidential election in Erie County, Ohio (Lasarzfeld and others, 1944)
        - People appeared to be much more influenced in their political decisions by face-to-face contact with other people than by the mass media directly.
        - Ideas flow from the media to opinion leaders and from these to the less active sections of the population.
        - The media transmit information. The opinion leaders spread interpersonal influence.
        - Communication messages flow from a source, via mass channels, to opinion leaders, who in turn pass them on to followers.
        - Focused attention on the interface between mass media channels and interpersonal communication.
        - Mass media are primarily knowledge creators. Pass along knowledge of an idea.
        - Brought a focus on opinion leadership.
    - Homophily - Heterophily in Communication Networks
        - Homophily: the degree to which pairs of individuals who communicate are similar in beliefs, education, social status, and the like.
            - Labeled by Lazarsfeld and Merton 1964.
            - Communication is more effective when source and receiver share common meanings, beliefs, and mutual understandings. Communication will be more effective because individuals feel more comfortable interacting with others like themselves.
            - Differences in technical competence, social status, beliefs, and language lead to mistaken meanings, thereby causing messages to be distorted or to go unheeded.
        - Heterophily: the degree to which pairs of individuals who communicate are dissimilar in beliefs, education, social status, and the like.
            - Heterophily networks links often connect sets of socially dissimilar individuals in a system
            - See Granovetter's theory of the strength of weak ties

        - Heterophilous links of low proximity (low degree of overlap in two personal communication networks) play a crucial role in the flow of information about innovation.
    - Homophily as a barrier to diffusion
        - New ideas enter a system through higher status levels. Individuals at these levels rarely interact with individuals at lower levels. New ideas spread horizontally, slowing down the rate of adoption.
        - Change agents should work with different sets of opinion leaders at the various levels in a system
        - Interpersonal diffusion networks are mostly homophilous.
            - Innovators seldom converse with laggards
        - When interpersonal diffusion networks are heterophilous, followers seek opinion leaders of higher socioeconomic status.
        - When interpersonal diffusion networks are heterophilous, followers seek opinion leaders with more formal education.
        - When interpersonal diffusion networks are heterophilous, followers seek opinion leaders with a greater degree mass media exposure.
        - When interpersonal diffusion networks are heterophilous, followers seek opinion leaders who are more cosmopolite.
        - When interpersonal diffusion networks are heterophilous, followers seek opinion leaders with greater change agent contact.
        - General tendency from above to seek opinion leader with greater technical competence.
    - Four main methods of measuring opinion leadership and diffusion network links.
        - Sociometric: asking respondents whom they sought (or hypothetically might ask) for information or advice about a given topic, such as a particular innovation.
            - Highly valid measure
            - Need to ask a large number of respondents
            - Usually ask for three, four, or five names/positions
            - Often a roster is used and respondents mark person
            - Data analysis is complex
            - Not applicable for small samples or populations
            - Ask: Who is your leader?
            - Most popular method
        - Key Informants: ask individuals who are especially knowledgeable about the network in the system
            - Cost and time savings
            - Each informant must be thoroughly knowledgeable about the system.
            - Ask: Who are the leaders in this system?
        - Self-designated method: ask respondent to indicate the tendency for others to regard them as influential
            - Ask: Do you think people come to you for information or advice more often than to others?
            - Depends upon the self-reporting accuracy
            - Appropriate when asking a random sample of people
        - Observation: measuring opinion leadership by identifying and recording the communication behavior in the system.
            - Works best in a very small system.
            - May be a very obtrusive data gathering technique.
            - Individuals may act differently when they are aware that they are being observed.
            - Seldom used to measure diffusion networks and opinion leadership.
- Characteristics of Opinion Leaders
    - Have greater exposure to mass media than followers

        - More cosmopolite
        - Greater change agent contact
        - Greater social participation
        - Higher socioeconomic status
        - Are more innovative
        - When a social system's norms favor change, opinion leaders are more innovative, but when norms do not favor change, opinion leaders are not especially innovative.
            - Opinion leaders highly conform to these norms
            - Reason why innovators make poor opinion leaders
        - The interconnectedness of an individual in a social system is positively related to the individual's innovativeness.
- Diffusion Networks
    - The heart of the diffusion process is modeling and imitation by potential adopters of their near-peers' experiences who have previously adopted a new idea. The nature of the networks helps one better understand fully the diffusion process.
    - Attempts are often made to identify the first innovator and trace the path of innovation through the interpersonal network.
    - Analysis of the network is accomplished by examining the distance on member of the system is from another member and the number and direction of the links between members.
    - Individuals tend to be links to others who are close to them in physical distance and who are relatively homophilous in social characteristics.
        - If individuals wish to improve their reception of information, break out of the comfort of close links to form a more heterophilous and spatially distant network
- Critical Mass in the Adoption of Interactive Innovations
    - Occurs at the point which enough individuals have adopted an innovation so that the innovation's further rate of adoption becomes self-sustaining
    - Adoption of an interactive innovation brings benefits to those who have recently adopted the innovation and to those who adopted some time ago (these individuals now gain contact with later adopters)
    - For adoption of Internet technologies – Look for Gurbaxani 1990.
    - Individual's decision to adopt an interactive technology depends in part on their expectations regarding others' future adoption – will many adopt the innovation so that it will provide benefits.
        - Later adopters NOT adopting the innovation may influence early adopters. Early adopters may discontinue use of the innovation if critical mass does not occur.
    - Threshold – the number of other individuals who must engage in an activity before a given individual will join that activity. People have their own threshold.
    - Strategies for Getting to Critical Mass
        - Target top officials in an organizations hierarchy for initial adoption of the interactive innovation.
        - Shape individual's perception of the innovation to view the innovation as very desirable.
        - Introduce the innovation to groups who are likely to adopt en mass.
        - Provide incentive for adoption.
- Social Learning Theory
    - An individual learns from another by means of observational modeling; one observes another persons behavior and then does something similar.
    - Modeling allows the learner to adapt the observed behavior without having a direct experience.
    - Learning can take place from in person observation or via the mass media.
    - Diffusion theory and social learning theory both examine how people change behavior
        - Diffusion theory operates at a more aggregate level than social learning theory.
        - Unlike diffusion theory, time is rarely a variable in social learning theory research.

- Both theories recognize the concept of re-invention
- Both theories emphasize interpersonal information exchange as the basis for behavior change.

Chapter 9: The Change Agent

- The change agent is an individual who influences clients' innovation-decisions in a direction deemed desirable by the change agency.
  - Seeks to secure the adoption of new ideas, but may also act to slow the diffusion process and prevent adoption of certain innovations with undesirable effects.
- The long-range goal of many change agents is to create conditions in which clients' can help themselves by adopting innovations on their own.
- Change agents are the link between the innovation and the client.
- Change agents must manage information about the innovation as to prevent information overload.
- Seven roles of change agents
  - To develop a need for change – help clients become aware of a need to change
  - To establish an information-exchange relationship – develop a rapport with clients
  - To diagnose problems – determine why existing alternative do not meet the clients' needs.
  - To create intent in the client to change
  - To translate the intent to action
  - To stabilize adoption and prevent discontinuance
  - To achieve a terminal relationship – develop self-renewing behavior on the part of the client – clients become their own change agents.
- Change agent success is positively related to
  - The amount of effort the change agent makes in contacting clients.
    - Timing important to a lesser degree.
  - How well the agent understands the client's point-of-view.
  - The degree to how well a diffusion program meets the clients' needs.
  - Developing empathy with clients
  - Homophily with the clients
    - Choose change agents who share similar beliefs, attitudes, etc with clients
  - Having a high level of credibility with clients
  - Is able to work through opinion leaders
- Communication campaigns
  - Need to avoid selective exposure – the tendency of individuals to attend to messages that are consistent with an individual's prior attitudes and experiences
    - Overcome by:
      - Conducting research on the intended audience
      - Setting specific goals
      - Segmenting the audience accurately
      - Designing the campaign to trigger interpersonal network communication among members of the intended audience
  - Entertainment-educational campaigns can be very effective
- Change agent contact is positively related to:
  - Higher social status
  - Greater social participation
  - Higher formal education
  - Cosmopoliteness among clients
- Opinion leadership – the degree to which individuals can informally influence other individuals' attitudes or overt behavior in a desired way with relative frequency.
  - It is useful to have opinion leaders demonstrate the innovation under field conditions to demonstrate the effectiveness of the innovation.

    - Opinion leaders can also demonstrate the innovation to persuade others to use it.
- Centralized and Decentralized Diffusion Systems
    - Centralized systems are based on a one-way model of communication
        - Overall control of decisions by national government or technical subject-matter experts
        - Top-down diffusion from experts to local users of innovation
        - Innovations come from formal R&D conducted by technical subject-matter experts
        - Decisions about what should be diffused are made top-down
        - An innovation centered approach; technology-push, emphasis on needs created by having the technology available.
        - Low degree of local adaptation and re-invention
    - Decentralized systems use a convergence model of communication, in which participants create and share information with one another to reach a mutual understanding.
        - Users run their own information diffusion systems – Wide sharing of power
        - Peer to peer diffusion through horizontal networks
        - Innovations come from experimentation by nonexperts, who are often users
        - Local units decide which innovations should diffuse on the basis of their informal evaluation of the innovations
        - A problem-centered approach; technology pull; created by locally perceived needs and problems
        - A high degree of adaptation and re-invention as innovations diffuse among adopters.
        - Best when users have high technical skills and are highly educated
        - More likely to fit closely with users' needs and problems
        - Users feel a greater sense of control – able to participate in key decisions

Chapter 10: Innovation in Organizations

- An organization is a stable system of individuals who work together to achieve common goals through a hierarchy of ranks and a division of labor.
- Individual behavior is relatively stable and predictable
    - Through authority structure and assigned roles
- Types of Innovation-decisions
    - Optional
    - Collective
    - Authority
    - Contingent – choice to adopt or reject can be made only after prior innovation-decision
- Larger organizations are more innovative
    - Larger organizations have more resources to try new things and can absorb failures easier
- Organizations with leaders committed to change show more innovation
- Decentralized, simple, informal, highly interconnected organizations with a high degree of uncommitted resources tend to be more innovative.
- Organizations that are open to external influence/learning from outside the organization tend to be more innovative.
- Innovation process in an organization
    - Initiation Stage: All information gathering, conceptualizing, and planning for the adoption of an innovation
        - Agenda setting: General organizational problems that may create a perceived need for innovation
            - A performance gap, the difference between actual and planned performance, can trigger the innovation process.
            - The development of an innovation often sparks individuals within an organization to start the process to acquire the innovation even though no previous need was present.
            - Organizations also can engage in "corporate intelligence" gathering to see what innovations the competitors have adopted or rejected.

        - Matching: Fitting a problem from the organization's agenda with an innovation
            - A reality test for the innovation – determine the feasibility of the innovation within the organization
    - Implementation Stage: All events, actions, and decisions involved in putting an innovation into use.
        - Redefining/Restructuring: The innovation is modified and re-invented to fit the organization, and organizational structures are altered.
            - Human interaction with the innovation will often lead to useful adaptations
            - Issues of technical, financial, and social uncertainty caused by the innovation are addressed at this stage.
        - Clarifying: The relationship between the organization and the innovation is defined more clearly.
        - Routinizing: The innovation becomes an ongoing element in the organization's activities and loses its identity.
- Innovations must have champions within the organization to be successfully adopted.

Chapter 11: Consequences of Innovations

- Consequences are the changes that occur to an individual or to a social system as a result of adoption or rejection of an innovation
- Invention and diffusion are a means to an end: consequences.
- Question asked: What are the effects of adoption innovations?
- Why are there so few studies on consequences?
    - Change agencies, who sponsor diffusion research, overemphasize adoption and assume the consequences of innovation-decisions will be positive.
    - Usual research methods are less appropriate for the investigation of innovation consequences.
        - Extended observation and in-depth case studies are best for consequential investigation – difficult and intrusive methods
    - Consequences are difficult to manage
- Model of studying consequences of innovation
    - Correlates (antecedents of innovation)
        - Socioeconomic characteristics
        - Personality variables
        - Communication behavior
    - Indicators of innovativeness
        - Relative earliness of adopting new ideas
    - Consequences of Innovation
        - Functional, direct, or manifest consequences
            - Increased production or effectiveness
                - Windfall profits from lower per unit costs and payoffs from efficiencies
            - Higher income
            - More leisure
            - Others
        - Dysfunctional, Indirect, or latent consequences
            - Greater expense
                - Windfall losses
            - Need for more capital
            - Less equitable distribution of income land, or other resources
            - Others
    - The effects of an innovation usually cannot be managed to separate the desirable from the undesirable consequences
    - Indirect effects may happen during the second generation of users
    - Consequences can be anticipated and unanticipated

    - The undesirable, indirect and unanticipated consequences of an innovation usually go together, as do desirable, direct, and anticipated consequences.
- Form, Function, and Meaning of an Innovation
    - Form: the directly observable physical appearance and substance of an innovation
    - Function: the contribution made by an innovation to the way of life of members of a social system.
    - Meaning: the subjective and frequently unconscious perception of an innovation by members of a social system.
    - Change agents more easily anticipate the form and function of an innovation for their clients than the innovation's meaning.
    - The goal of a change agent is to achieve a dynamic equilibrium: when the rate of change in a social system is commensurate with the system's ability to cope with it.
        - Stable equilibrium: when there is almost no change in the structure or functioning of a social system
        - Disequilibria: when the rate of change is too rapid to permit a social system to adjust.
- Equality in the consequences of innovations – wide socioeconomic gaps are caused by:
    - Innovators and early adopters have favorable attitudes toward new ideas and are more likely to search actively for innovations. Also, possess the available resources to adopt higher-cost innovations.
    - Professional change agents concentrate their client contacts on innovators and early adopters in the hopes that the opinion leaders among these groups will diffuse the idea.
    - By adopting earlier, innovators and early adopters reap windfall profits widening the socioeconomic gap.
    - Communication effects gap: see Tichenor and others – higher SES benefit at a higher rate from communication messages
    - Consequences of diffusion of innovations widen socioeconomic gaps
        - Between earlier and later innovators
        - Between audience segments previously high and low in socioeconomic status
        - Between adopter and nonadopter
    - How an innovation is introduced determines the degree to which it causes unequal consequences.
        - The structure of the social system partially determines the equality of an innovation's consequences – the more equal the system the more equal the consequences.
    - Strategies for narrowing gaps
        - Enable low SES to catch up by presenting high SES groups with redundant messages – repetition will assist low SES in adsorbing the information
        - Trail communication messages to lower SES groups
        - Use communication channels frequented by low SES groups (TV not print)
        - Organize low SES into small groups to speed diffusion
        - Concentrate change agent contact on later adopter groups
        - Select change agents from low SES groups
        - Identify and work with opinion leaders in the low SES groups
        - Establish diffusion agencies that only work with low SES groups
        - Recommend and design innovations with low SES groups in mind

Elfreda A. Chatman
Diffusion Theory: A Review and Test of a Conceptual Model in Information Diffusion
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- Diffusion theory examines the ways people of various socioeconomic levels become aware, use, and diffuse new information
- Study tests diffusion theory with information as the innovation
- Knowledge about information diffusion may assist in planning services and developing effective use of the services
- First Model of Diffusion Theory: Elements of Diffusion
  - Conceptualized as the patterned communication process as social imitation or duplication of something new by members of a community
  - Rogers – Four elements
    - Innovation
    - Communication from one individual to another
    - Social structure
    - Time
- Second Model of Diffusion Theory: Attributes of the Innovation
  - Attributes explain the characteristics of an innovation which may influence acceptance or rejection
  - Attributes
    - Relative advantage
    - Compatibly
    - Complexity
    - Trial ability
    - Observe ability
- Third Model of Diffusion Theory: Stages of Adoption
  - Explains the process of decision making by which acceptance or rejection occurs
  - Stages
    - Awareness
    - Interest
    - Evaluation
    - Adoption
    - Or Awareness/Trial/Acceptance
- Information as the Innovation
  - Innovation means information
  - Chatman extended the definition of information to include ordinary (plausible) information. Innovations usually refers to new information
- Information diffusion as such is not identified in the literature
  - Researchers have looked at rumor
- Assumption is that for information, some elements of the diffusion model will be more important than others
- Research examined the relevance of diffusion theory in examining the diffusion of job information
- Findings
  - Elements of Diffusion
    - Time played a key role
      - There is a link between early awareness of information and its usefulness
    - Social Structure: Information diffused by the theory of the strength of weak-ties
      - People found personal referrals were the most important source of information about jobs
      - People who said they were late hearers of news about jobs were not part of a personal referral system

- Attributes of Innovations Model
  - Relative advantage, compatibility, complexity, and trial ability were applicable
  - Relative advantage
    - People did not share information because it would lessen their chance of getting the job
  - Compatibility
    - The information was compatible with the concept and aims of the information source
    - Information diffused because it made sense
  - Complexity
    - Not an issue
    - The perceived difficulty involved in acting upon the information was not a factor
  - Trial ability
    - Essentially verification of information accuracy
  - Observe ability
    - Not studied – difficult to observe when persons received the information distribution vehicles (bulletin boards)
- Stages of Adoption
  - Awareness of sources of information was important
  - Trial – applying for the job
  - Adoption – accepting a job
- Conclusions
  - The nature of the innovation, job information, affected its diffusion through the communication channels in the social structure
  - Relative advantage not only refers to risk of the innovation, but also the risk to the individual from diffusing the information
  - Stages of adoption apply to information diffusion
  - Freshness of information was a factor in its diffusion
  - The use of the information is restricted to the effects the information may have