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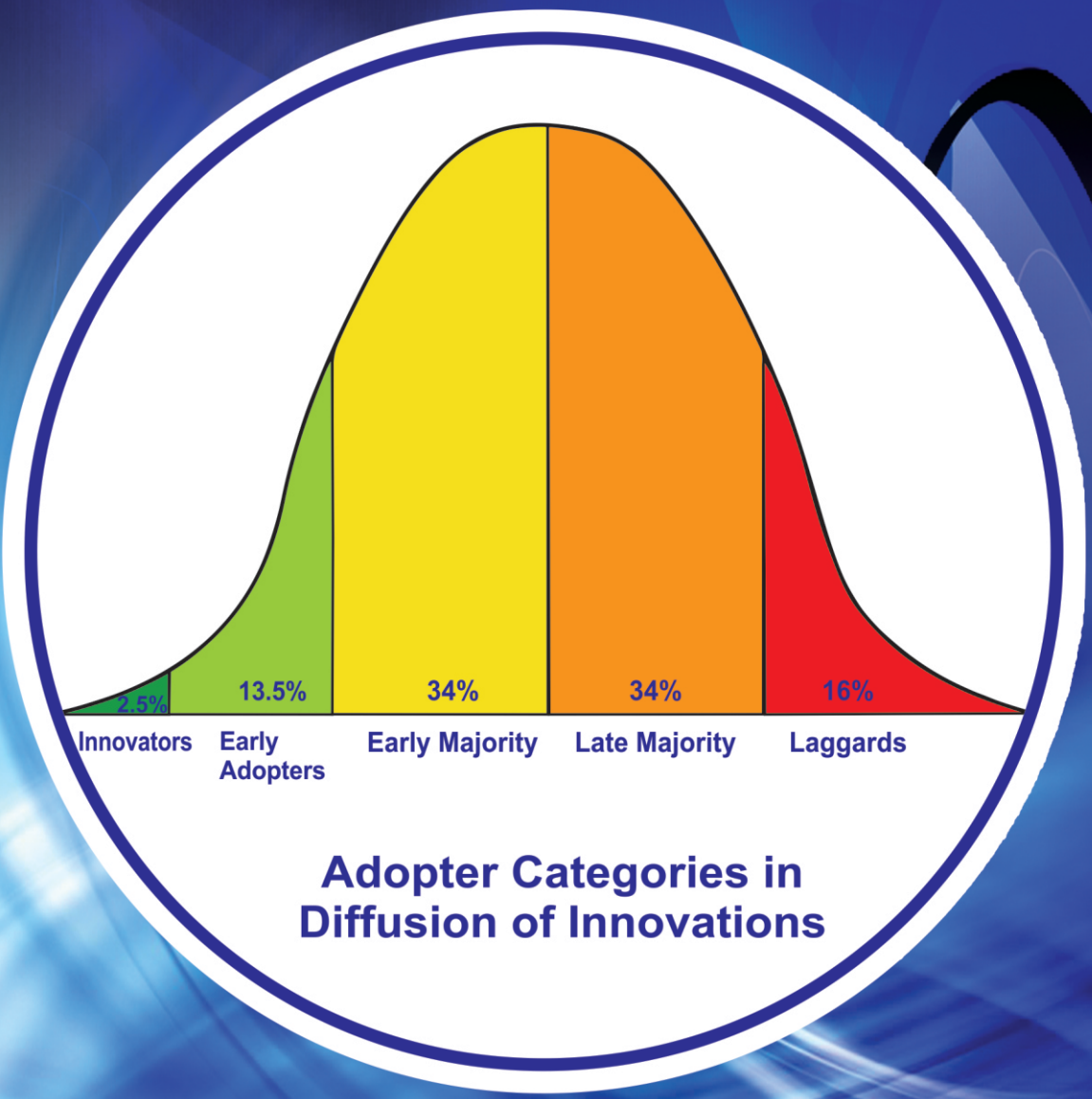

Adopter Categories in Diffusion of Innovations

Innovation, Innovativeness and Adopter Categories 6

''शिक्षा मानव को बन्धनों से मुक्त करती है और आज के युग में तो यह लोकतन्त्र की भावना का आधार भी है। जन्म तथा अन्य कारणों से उत्पन्न जाति एवं वर्गगत विषमताओं को दूर करते हुए मनुष्य को इन सबसे ऊपर उठाती है।''

– इन्दिरा गाँधी

''Education is a liberating force, and in our age it is also a democratising force, cutting across the barriers of caste and class, smoothing out inequalities imposed by birth and other circumstances.''

– Indira Gandhi

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Block

6

INNOVATION, INNOVATIVENESS AND ADOPTER CATEGORIES

PROGRAMME DESIGN COMMITTEE

Prof. Amita Shah
Gujarat Institute of Development Research
Ahmedabad

Prof. S. K. Bhati
Jamia Millia Islamia University, New Delhi

Prof. J. S. Gandhi (Rtd)
Jawaharlal Nehru University, New Delhi

Prof. Gopal Krishnan (Rtd)
Punjab University, Chandigarh

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Madras Institute of Development Studies Chennai.

Prof. Kumar B. Das
Utkal University, Bhubaneswar

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A.N.Sinha Institute of Social Sciences, Patna

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Prof. Ramashray Roy (Rtd)
Centre for Study of Developing Societies
New Delhi

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Prof. B. K. Pattanaik, IGNOU, New Delhi

Dr. Nehal A. Farooquee, IGNOU, New Delhi

Dr. P. V. K. Sasidhar, IGNOU, New Delhi

PROGRAMME DESIGN COMMITTEE (Revised)

Late Prof. T S Papola(Rtd)
Institute of Studies in Industrial Development
New Delhi

Prof. S. Janakrajan (Rtd)
Madras Institute of Development Studies Chennai.

Prof. S. K. Bhati
Jamia Millia Islamia University, New Delhi

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Institute of Human Development, New Delhi

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Jawaharlal Nehru University, New Delhi

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Prof. P. V. K. Sasidhar, IGNOU, New Delhi

Dr. Pradeep Kumar, IGNOU, New Delhi

Dr. Nisha Varghese, IGNOU, New Delhi

Dr. Grace Don Nemching, IGNOU, New Delhi

COURSE PREPARATION TEAM

Unit Writers:

Prof. Vijayabhinandana
Agricultural College,
Bapatla (Unit 1)

Dr. Debasish Saha & Prof. P.V.K. Sasidhar
IGNOU, New Delhi (Unit 2)

Dr. V. Sailaja
S.V. Agricultural College, Tirupati
(Units 3 & 4)

Editors:

Prof. S.V.N.Rao, RAGACOVAS,
Puducherry (Content & Language Editor)

Prof. P.V.K. Sasidhar, IGNOU, New Delhi

Prof. B. K. Pattanaik, IGNOU, New Delhi

Prof. Nehal A. Farooquee, IGNOU, New Delhi

Course Coordinator: Prof. P.V.K.Sasidhar, E-mail : pvksasidhar@ignou.ac.in

Programme Coordinators : Prof. P.V.K. Sasidhar, Prof. B.K. Pattanaik, Prof. Nehal A. Farooquee

PRODUCTION TEAM

Mr. S. Burman
Dy. Registrar (Publication)
MPDD, IGNOU, New Delhi

Mr. K.N. Mohanan
Asst. Registrar (Publication)
MPDD, IGNOU, New Delhi

Mr. Babu Lal Rewadia
Section Officer (Publication)
MPDD, IGNOU, New Delhi

February, 2019

ISBN : 978-93-88498-77-7

Printed and published on behalf of the Indira Gandhi National Open University, New Delhi by the Registrar, MPDD, IGNOU, New Delhi.

Laser Typeset by Tessa Media & Computers, C-206, A.F.E.-II, Okhla, New Delhi.
Printed at : Raj Printers, A-9, Sector B-2, Tronica City, Loni (Gzb.)

BLOCK 6 INNOVATION, INNOVATIVENESS AND ADOPTER CATEGORIES

An innovation is an idea, practice or object that is perceived as new by an individual or by other unit of adoption. Innovations come from research and developmental organizations as well as from people / communities also. Innovations are governed by certain attributes and innovation's intrinsic quality is not important for adoption and diffusion but the people's perception towards an innovation in terms of attributes is more important for us. These attributes influence innovation's rate of adoption. All the people do not adopt the innovations at same time - some take little time to adopt and others take longer time and this is explained by Innovativeness and based on this, the people are classified into different adopter categories. Therefore, Block 4 is intended for the purpose of: knowing the innovation and perceived attributes of innovation; innovativeness and adopter categories; opinion leaders and their influence in diffusion of innovations and; consequences of innovations.

Unit 1 on '**Attributes of Innovation'** discusses meaning and importance of various attributes of innovation viz., relative advantage, compatibility, complexity, trialability and observability (communicability). It also discusses the relationship between attributes and rate of adoption.

Unit 2 on **'Innovativeness and Adopter Categories'** focus is on the meaning of innovativeness and classification and characteristics of adopter categories based on innovativeness.

Unit 3 on **'Opinion Leaders and Diffusion Networks'** discusses the concept of opinion leadership, methods of measuring opinion leadership, types and characteristics of opinion leaders. It also explains the meaning of diffusion networks and importance of critical mass in diffusion process.

Unit 4 on **'Consequences of Innovations'** discusses the concept and three types of consequences of innovations viz., desirable versus undesirable consequences, direct versus indirect consequences, and anticipated versus unanticipated consequences. Further, it also explains the dynamic equilibrium and equality in the consequences of innovations.

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UNIT 1 ATTRIBUTES OF INNOVATION

Structure

1.1 INTRODUCTION

One of the most important functions of development professionals is to bridge the gulf between the research and development organizations and the people / communities in the process of development. In other words, successful communication is the main job of the extension and development worker. An extension worker's job is not only informing the people about developmental ideas, programmes or practices, but also to ensure practical application of them at the cutting edge. Extension worker's efficiency can be measured (i) by the speed or quickness with which the gulf between what is known and what is done by the people is bridged (ii) by the number of new practices or innovations adopted and (iii) also by the number of people or communities that adopt the new practices or innovations. In the discharge of important functions, the extension workers are faced with some questions and one among them is why some innovations are adopted quickly and with little apparent efforts, while others are accepted after few years of effort put forth by the extension agencies? The diffusion researchers had indicated that innovations do have certain attributes and these would make difference in rate of adoption. This unit identifies attributes of innovations and how these influence or predict the rate of adoption of innovations.

After studying this unit, you would be able to:

- Explain the meaning of attributes of innovation and discuss its importance in diffusion
- Discuss about five attributes of innovation
- Describe the relationship between attributes of innovation and rate of adoption

1.2 MEANING AND IMPORTANCE OF ATTRIBUTES OF INNOVATION

An innovation is an idea perceived as new by an individual. Attributes are qualities, characteristics or traits possessed by an object. An innovation has some qualities or characteristics. It is not the intrinsic quality, but the quality or character of the innovation as people / communities see them is important for extension. The characteristics of an innovation, inherent or as perceived by its potential adopters influence the rate of its diffusion in a social system. The perception of the characteristics of an innovation may in fact be widely different from its "actual" or inherent characteristics.

Much diffusion research has studied "people" differences in innovativeness (that is determining the characteristics of the different adopter categories). Mush less effort has been devoted to adopting "innovation" differences that is, in investigating how the perceived properties of innovations affect their rate of adoption although the imbalance between people versus innovation differences in diffusion research may be disappearing in recent years. Diffusion researchers in the past tended to regard all innovations as equivalent units from the viewpoint of their analysis. In fact, each innovation is unique in terms of its diffusion. For that reason please go through the case study, on the attributes of innovation that affect its rate of adoption, presented in the Box.

Attributes of Innovation vs. Rate of Adoption by Farmers

Let us discuss further the attributes of innovation that affect its rate of adoption with the help of a case study conducted in West Bengal on four different innovations. The diffusion rates of four of the innovations in six villages of West Bengal State have been shown in Table 1.1. The variation in the diffusion rate of the innovations was explained in terms of six traits or attributes viz., (1) utility or the importance of the need fulfilled by an innovation, (2) communicability or the ease with which the usefulness of the practice can be communicated; (3) the immediacy of the result after the application of the innovation; (4) complexity of the innovation, (5) cost involved in use and application of the innovation and (6) ideation involved in the use of the innovation, that is, whether the extent to which each component of the innovation contributes to the desired result.

Table 1.1: Percent of farmers who adopted innovations

Village	Innovations			
	Plant Protection Chemicals	Chemical Fertilizers	Improved Jute Seeds	Rice Cultivation in Japanese Method
A	95.2.	92.8	16.7	7.2
B	95.2.	82.1	46.4	3.6
C	83.3	89.4	13.6	9.1
D	81.9	68.1	23.8	2.5
E	83.3	72.2	13.3	2.4
F	80.3	59.1	29.9	0.7

Source: Bose, S.P. and Dasgupta, S. (1962). The Adoption Process. Calcutta: Dept. of Agriculture, Govt. of West Bengal.

From the Table 1.1, we can come to an understanding that plant protection chemicals and the Japanese method of rice cultivation represented the two extremes of the innovation characteristics that affected their diffusion rates. Plant protection chemicals were characterized by all the attributes, which contributed to their rapid diffusion. In case of a pest attack, the farmer can easily see what threatens his crop, and the perceived need to resist the pest attack stimulates him into action. The utility of plant protection chemicals is easily communicable and demonstrable. The farmer can see that by dusting and spraying chemicals, he can bring the pest attack under control and save the crop. The result of the application is immediate and obvious to the farmer. The use of plant protection chemicals require little skill and the operations involved are simple and straight forward. The cost of using plant protection chemicals is within the means of most farmers. Finally, no ideation is involved in the application of the practice from the appearance of the pest up to the time it is destroyed. In other words, the whole process is "simple, direct and inexpensive"

The Japanese method of rice cultivation on the other hand, is characterized by traits or attributes which slow down the diffusion rate of an innovation. The utility of the innovation, in terms of the need it fulfills is not clear and obvious to the farmer. The practice includes a series of operations such as special treatment of the seeds before sowing, raising the seed bed in the recommended manner, heavy and careful manuring of the field, special care in uprooting seedlings for transplantation, transplanting of seedlings in properly spaced straight rows, and careful and repeated weeding of the rice field after transplantation. The operations involved are too numerous and complex to be easily communicable and demonstrable to farmers. It is difficult for farmers to understand and appreciate the contribution of each operation to the yield of the crop. The entire process is too complex to understand easily, the results of its application are not immediate, and the cost involved in its use is not always within the means of an average farmer. The two innovations were thus almost diametrically opposite in utility, communicability, immediacy, complexity, cost, and ideation which resulted in a rapid diffusion rate for one and an extremely slow diffusion rate for the other. This illustration gives a clear picture on the importance of studying the attributes of innovation and their influence on the rate of adoption. Extension officer can predict the diffusion rates or rate of adoption of innovations with the information on perceived attributes of innovation. Therefore, he or she has to constantly pursue with the farmers how they look towards innovations.

1.2.1 Rate of Adoption and Attributes of Innovation

Rate of adoption is the relative speed with which an innovation is adopted by members of a social system. It is generally measured as the number of individuals who adopt a new idea in a specified period, such as a year. The perceived attributes of an innovation are one important explanation of the rate of adoption of an innovation. Most of the variance in the rate of adoption of innovations, from 49 to 87 per cent is explained by six attributes (Rogers, 1995):

i) Relative advantage

ii) Compatibility

iii) Complexity

iv) Trialability and

v) Observability

vi) Predictability

The other variables that affect an innovation's rates of adoption are:

i) Type of innovation decision

ii) Nature of communication channels diffusing the innovation at various stages in the innovation-decision process

iii) Nature of the social system in which the innovation is diffusing, and

iv) Extent of change agent promotion efforts in diffusing the innovation.

Most of the Indian studies have used the five attributes stated by Rogers (1995). Therefore, they are described here under for your understanding.

Activity 1: Visit any village nearby, select any developmental innovation and ask people the characteristics of that innovation. Compare them with those given in the above section and write your observations.

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Check Your Progress 1

Note: a) Use the spaces given below for your answers.

b) Check your answers with those given at the end of the unit.

1) Write the meaning of innovation?

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2) What do you mean by attributes of innovation?

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3) How do you understand the term rate of adoption?

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4) Name the attributes of innovation.

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1.3 RELATIVE ADVANTAGE

Relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes. The nature of innovation determines what specific type of relative advantage (economic, social and the like) is more important to adopters, although the characteristics of the potential adopters may also affect the relative advantage. In other words, the relative advantage may have number of dimensions. The innovations that have more relative advantage are likely to be adopted quickly.

Examples of Relative Advantage in Agriculture

- A new technology which gives more yield or income or saves time, labour and cost or has less risk than the existing one has more relative advantage.
- Multiple use of an innovation may be a form of relative advantage. For example, an equipment or material, which may be used for a number of activities, has more advantage than an equipment or material that can be used for a single purpose.
- The advantage of location for specific enterprises in specific areas may provide some relative advantage. For example, Kadiyam in Andhra Pradesh is having more favourable climate for horticultural nurseries.

1.3.1 Factors of Relative Advantage

- **Economic Factors:** When the price of new product decreases so dramatically during its diffusion process, a rapid rate of adoption is encouraged.

  Example: When Bt. cotton seed price was reduced, lot of farmers purchased.

  Similar case was observed in case of cellular phones also.

- **Social Factors:** In some cases, economic profitability might be expected to be less crucial in explaining the rate of adoption. In such cases, other non-economic dimensions of relative advantage, such as social prestige and social

approval, are expected to explain rate of adoption, as would such other attributes of innovations as compatibility with sociocultural values. This is very much prevalent in our Indian conditions.

Example : Even when the price of beef to be halved in India, majority Hindus would not begin eating cows.

The sub- factors / dimensions of relative advantage include:

i) Degree of economic profitability

ii) Low initial cost

iii) Decrease in discomfort

iv) Social prestige

v) Savings in time and effort, and

vi) Immediacy of the reward.

Nevertheless, there are many innovations which do not run so counter to cultural and social norms, and in these cases the rate of adoption is likely to be more rapid if the innovation is more economically or socially profitable.

Diffusion scholars have found relative advantage to be one of the best predictor of an innovation's rate of adoption. Relative advantage indicates the benefits and the costs resulting from adoption of an innovation. We may summarize this discussion of relative advantage that the relative advantage of a new idea, as perceived by members of a social system, is positively related to its rate of adoption. That means, the greater the relative advantage of an innovation, the more rapid its rate of adoption will be.

Activity 2: Select any developmental innovation which has replaced earlier one in any near by village and ask people about its relative advantages. Write your observations.

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Check Your Progress 2

Note: a) Use the spaces given below for your answers.

b) Check your answers with those given at the end of the unit.

1) What do you mean by relative advantage?

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2) Name the sub- factors / dimensions of relative advantage.

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1.4 COMPATIBILITY

Compatibility is the degree to which an innovation is perceived consistent with the existing values, past experiences and needs of the receivers. An idea that is not compatible with the salient characteristics of a social system will not be adopted so rapidly as an idea that is compatible. Compatibility ensures greater security and less risk to the receiver and makes the new idea more meaningful. An innovation may be compatible with:

i) Socio-cultural values and beliefs

ii) Previously introduced ideas

iii) Client needs for innovations.

1.4.1 Physical and Cultural Compatibility

Physical compatibility refers to the degree to which a new idea or practice is consistent with existing practices relating to economic activities.

Example 1: The mould board plough was found physically incompatible by many farmers because their bullocks were not strong enough to pull the ploughs that dug deep into soil.

Example 2: High yielding varieties of wheat have been found to be physically incompatible with their farming situation by farmers who do not have irrigation facilities or the capital to invest.

Cultural compatibility refers to the degree to which an innovation is consistent with the existing values, beliefs, habits and tradition in a social system. Innovations with obvious economic advantage are often rejected because they are found by farmers to be socially disadvantageous. The social advantage of an innovation is often measured in terms of its cultural compatibility.

Example 1: The lack of cultural compatibility contributed to the failure of piggery farming in many villages.

Compatibility is positively correlated with rate of adoption.

Miracle Rice Vs Cultural Compatibility

Miracle varieties of rice developed by International Rice Research Institute (IRRI) in the Philippines, have tripled a farmer's rice yields. The IRRI miracle rice varieties spread rapidly throughout Asia, causing the so-called Green Revolution. But IRRI had bred only the miracle rice varieties for high yields and resistance to pests. No attention had been given to the taste of the rice.

The research studies on diffusion of miracle rice in South India found that the new varieties did not taste "right" to the villagers who adopted the new seed. They sold the harvest from the IRRI rice varieties in the market, while continuing to plant some of the traditional rice seed for their family's consumption. The "miracle rice" sells for a price about 20 per cent lower than the local varieties. Initially it was felt that "with triple rice yields, people will soon learn to like the taste of IRRI rice!" But even after 40 years, South Indian farmers and consumers still prefer BPT (Sonamasuri) variety of rice. In recent years, the IRRI finally introduced consumer taste as a trait at par with high yield in their rice breeding programme.

1.4.2 Compatibility with Previously Introduced Ideas / Names

An innovation may be compatible not only with deeply embedded cultural values but also with previously adopted ideas. Compatibility of an innovation with a preceding idea can either speed up or retard its rate of adoption. Old ideas are the main mental tools that individuals utilize to assess new ideas and give them meaning. Individuals cannot deal with an innovation except on the basis of familiarity. Previous practice provides a standard against which an innovation can be interpreted thus decreasing its uncertainty.

Example: Vermi-compost application for horticultural crops can be quoted as one of the successful examples of fast spreader innovation. Farmers used to apply a lot of compost and FYM to the crops and in the similar way vermin-compost is not a new one and is similar with past experience and further all waste material can be used and also the quality of product has got relative advantage and hence its usage has become a regular practice by the farmers.

Also it is recommended that a receiver-oriented, empirical approach to naming an innovation is to be practiced, so that the word symbol for a new idea has the desired meaning for the intended audience. Please go through the following boxes which describe how compatibility with past ideas / names matter in the adoption of innovation.

Compatibility vs. Innovation Negativism

Innovation negativism is the degree to which an innovation's failure conditions a potential adopter to reject future innovations. A negative experience with one innovation can damn the adoption of future innovations which can be an undesirable aspect of compatibility. When one idea fails, potential adopters are conditioned to view all future innovations with apprehension. For this reason, change agents should begin their efforts with an innovation that has a high degree of relative advantage, so that they can build on this initial success with innovations that are compatible with the pioneering new idea.

Example: National Family Planning campaign in India began with promotion of the intra-uterine device (IUD), a method that was widely discontinued in the 1960s. Family planning in North India has never been able to recover from this disastrous failure. (Rogers, 1973).

A new IUD, the "Copper T," was introduced in South Korea some years ago without careful consideration of an appropriate Korean name,. The letter "T" does not exist in the Korean alphabets and copper is considered a very base metal with a very unfavorable connotation.

Compatibility of Tractors With Past Experience in Punjab

Compatibility with a previously introduced idea can cause over adoption or mis-adoption. An illustration comes from the introduction of tractors in the Punjab, a prosperous farming area in North India. Tractor gave social prestige to the owner much as had the bullocks that the tractor replaced as a means of farm power and as transportation to market towns. Punjabi farmers however, did not carry out the basic maintenance of the tractors, such as cleaning the air filters and replacing the oil filter. As a result, a new tractor typically broke down after a year or two of use, with the farmer often failing to repair it. A foreign consultant made up a tractor maintenance chart and had it translated into Punjabi language. The chart was printed in five colours and distributed by agricultural extension workers to all farmers who had tractors. Still the tractors broke down due to lack of proper maintenance. Then a salesman who had previously sold blankets to farmers for covering their bullocks in cold weather came to Punjab. Within a few days, tractors were observed with a blanket covering the hood. The foreign expert warned farmers that the blanket could cause the tractor engine to overheat. Nevertheless, within ten days, virtually every tractor had a blanket covering its hood. To Punjabi farmers, it made sense to keep their source of farm power warm during winter weather. But cleaning the air filter and the oil filter on their tractor was not compatible with their previous experience of caring their bullocks. In this case past experience had negative consequences (Source: Carter, 1994).

1.4.3 Compatibility with Felt Needs

One indication of the compatibility of an innovation is the degree to which it meets felt need. Change agents seek to determine the needs of their clients and then recommends innovations that fulfill these needs. Potential adopters may not recognize that they have a need for an innovation until they become aware of the new idea or its consequences. Change agents may seek to generate needs among their clients, but this must be done carefully or else the felt needs upon which a diffusion campaign is based may be a reflection only of the change agent's needs, rather than those of clients. Thus, one dimension of compatibility is the degree to which an innovation is perceived as meeting the needs of the client system. When felt needs are met, a faster rate of adoption usually occur.

1.4.4 Indigenous Knowledge System

The basic notion of the compatibility attribute is that a new idea is perceived in relationship to existing practices that are already familiar to the individual change agent and others who introduce an innovation often commit an "empty vessels fallacy" by assuming that potential adopters are blank slates who lack any relevant experience with which to associate the new idea. The empty vessels fallacy denies that compatibility is important. In the past decade, the empty vessels fallacy has been overcome in agriculture, health, and family planning by analysis of indigenous knowledge systems. Scholars often anthropologists, probe the traditional experience of individuals in developing nations in order to understand how these indigenous knowledge systems can serve as mental bridge when introducing innovations.

Check Your Progress 3

Note: a) Use the spaces given below for your answers.

b) Check your answers with those given at the end of the unit.

1) Write the meaning of compatibility.

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1.5 COMPLEXITY

Complexity is the degree to which an innovation is perceived as relatively difficult to understand and use. Any new idea may be classified on the complexity – simplicity continuum. Some innovations are clear in their meaning to potential adopters others are not. Diffusion of an innovation, which is too complex to communicate and to apply, is slow. As has been described, the relative simplicity of plant protection chemicals in terms of their use and application enabled them to be diffused rapidly in the village of Baraset region of West Bengal. It took them only ten years to be used by at least four-fifths of the farmers in the Baraset villages. On the other hand, the Japanese method of rice cultivation, a much more complex innovation, was adopted by a rather insignificant proportion of farmers in the same villages even though the innovations of both types were introduced in the region at the same time.

Generally speaking, the more complex a practice and the more change it requires in the existing operations, the more slowly it will be adopted.

The following classification of practices in the form of their complexity, roughly represents the decreasing order of speed with which acceptance may be expected to occur.

a) *A simple change*: A change in materials and equipment only, without a change in techniques or operations. *Example:* New variety of seed.

b) *Improved practice*: Change in existing operation with or without a change in materials or equipment. *Example:* Change in rotation of crops.

c) *Innovation:* Change involving new technique or operations. *Example:* Contour cropping.

d) *Change in total enterprise*: *Example:* From crop to livestock.

Complex technologies often require complementary adoption. For example, adoption of high yielding technologies requires adoption of balanced nutrition practices, appropriate protection technology and better management methods, to get the best results. Complex technologies, because of their complicated and intricate nature, require consistent training and communication support for the clientele, for their adoption and continued use.

The complexity of an innovation, as perceived by members of a social system, is negatively related to its rate of adoption. That means higher the complexity of the technology; lower the rate of adoption in transfer of technology.

Activity 3: Select any developmental innovation which has replaced earlier one in any near by village and ask people about its degree of complexity. Write your observations.

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1.6 TRIALABILITY

Trialability (also referred to divisibility) is the degree to which an innovation may be experimented with on a limited basis before deciding to adopt. New ideas that can be tried on the installment plan will generally be adopted more rapidly than innovations that are not divisible. Trialability of an innovation is important for its diffusion for several reasons. The feeling of insecurity associated with the adoption of something new and previously unknown is greatly minimized if it can be tried out on a small scale. The result of the trial, if successful, not only minimizes the risk and insecurity, it also gives the farmer an opportunity to evaluate the innovation in terms of its feasibility and applicability to his own situation.

Example: Adoption of new seeds and fertilizers are more, compared to new farm machinery, simply because seeds and fertilizers can be purchased in small units and can be tried. Whereas, purchase of a farm machinery, requires large investment and cannot be tried in parts.

The trialabiltiy of an innovation is positively related to its rate of adoption. Transfer of technology is faster with the technologies that can be demonstrable on small-scale basis i.e. on trial basis.

1.7 OBSERVABILITY

Observability is the degree to which the results of an innovation are visible/ observable, demonstrable and communicable to people. The results of some ideas are easily observed and communicated to others, whereas some innovations are difficult to describe to others.

Example: Disease control has two aspects – preventive and curative. Preventive innovations in disease control are generally less costly than the curative innovations, but the results of preventive innovations are not so obvious, compared to those of the curative innovations. That is why technologies like treatment of seeds, preventive vaccinations etc. have been less adopted. Treatment of seed potato has however, very high rate of diffusion, because preventing diseases in high investment crop brings higher return, i.e. has high relative advantage. The problem of lack of observability may, however, be overcome by strengthening extension efforts like training, communication etc. that can enlarge one's vision and reasoning. Observability is sometimes referred as communicability.

The observability of an innovation is positively related to its rate of adoption. The visible impact of an innovation facilitates its diffusion in the social system.

1.8 PREDICTABILITY

Predictability has also been perceived as an attribute of innovations. Predictability refers to the degree or certainty of receiving expected benefits from the adoption of an innovation. Subsistence farmers are often very cautious when making adoption decisions, because crop failure or substantial reduction in output due to failure of agricultural innovations to achieve expected production goals, can result in loss of meager landholdings and starvation of the family. Under such conditions, farmers are reluctant to adopt any technology or technique which introduces a higher level of uncertainty into the operation of the farm enterprise.

Correlation of Attributes with Rate of Adoption

It may be generalized that the attributes of relative advantage, compatibility, trialability, observability and predictability of an innovation, as perceived by the members of a social system are positively related to its rate of adoption. The complexity of an innovation as perceived by the members of a social system is negatively related to its rate of adoption.

Check Your Progress 4

Note: a) Use the spaces given below for your answers.

b) Check your answers with those given at the end of the unit.

1) Differentiate between complexity and compatibility of innovation.

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2) Write what you mean by trilability of innovation.

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3) Compare the relationship between attributes of an innovation and its rate of adoption.

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1.9 LET US SUM UP

In social system, all people (adopter units) do not adopt innovation at a time. Some innovations are immediately accepted and adopted and some take more time. This rate of adoption is influenced by the attributes of innovation. Attributes are the characteristics or qualities or traits of an innovation. The characteristics possessed by an innovation or intrinsic quality of the innovation is not important for our extension, but how people perceive attributes towards innovation is important that influences the adoption rate of innovations. The attributes viz. relative advantage, compatibility, complexity, trialability, observability, and predictability are discussed in this unit along with their relationship with rate of adoption.

1.10 KEYWORDS

Innovation : An Innovation is an idea, practice or object that is perceived as new by an individual or other unit of adoption.

Rate of Adoption : Rate of adoption is the relative speed with which an innovation is adopted by members of a social system.

Attributes : Attributes are qualities, characteristics or traits possessed by an object.

Relative Advantage : Relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes.

Over adoption : Over adoption is the adoption of an innovation by an individual when experts feel that he or she should reject.

Rationality : Rationality, defined as the use of the most effective means to reach a given goal, is not easily measured in the case of many innovations.

Compatibility : Compatibility is the degree to which an innovation is perceived consistent with the existing values, past experiences and needs of the receivers.

Complexity : Complexity is the degree to which an innovation is perceived as relatively difficult to understand and use.

Trialability : Trialability (divisibility) is the degree to which an innovation may be experimented with on a limited basis before deciding to adopt.

Observability : Observability is the degree to which the results of an innovation are visible/observable, demonstrable and communicable to farmers.

Predictability : Predictability refers to the degree of certainty of receiving expected benefits from the adoption of an innovation.

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1.11 CHECK YOUR PROGRESS – POSSIBLE ANSWERS

Check Your Progress 1

1) An innovation is an idea, practice or object that is perceived as new by an individual or other unit of adoption.

2) Attributes are qualities, characteristics or traits possessed by innovation.

3) Rate of adoption is the relative speed with which an innovation is adopted by members of a social system.

4) Relative Advantage, Compatibility, Complexity, Trialability, Observability, Predictability.

Check Your Progress 2

1) Relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes.

2) The sub-dimensions are: degree of economic profitability ; low initial cost; decrease in discomfort; social prestige; savings in time and effort, and immediacy of the reward.

Check Your Progress 3

1) Complexity: Complexity is the degree to which an innovation is perceived as relatively difficult to understand and use. Where as, compatibility is the degree to which an innovation is perceived consistent with the existing values, past experiences and needs of the receivers.

2) Trialability (divisibility) is the degree to which an innovation may be experimented with on a limited basis before deciding to adopt.

3) The attributes of relative advantage, compatibility, trialability, observability and predictability of an innovation are positively related to its rate of adoption. The complexity of an innovation as perceived by the members of a social system is negatively related to its rate of adoption.

UNIT 2 INNOVATIVENESS AND ADOPTER CATEGORIES

Structure

2.1 INTRODUCTION

All individuals in a social system do not adopt an innovation at the same time. Rather, they adopt in an over-time sequence, so that individuals can be classified into adopter categories on the basis of when they first began using a new idea. We could describe each individual adopter in system in terms of his or her time of adoption, but this would be very tedious. It is much more efficient to use adopter categories, the classification of members of a system on the basis of their innovativeness. Each adopter category consists of individuals with a similar degree of innovativeness. So adopter categories are a means of convenience in describing the members of a system. In this unit, we discuss a standard method for categorizing adopters and characteristics of different adopter categories.

After studying this unit, you should be able to:

- discuss the concept of innovativeness as a basis for adopter categorization
- categorize adopters and describe their characteristics

2.2 INNOVATIVENESS

Titles of adopter categories were once about as numerous as diffusion researchers themselves. The inability of researchers in the early days of diffusion research to agree on common semantic ground in assigning terminology led to this plethora of adopter descriptions. The most innovative individuals were termed "progressists," "high-triers," "experimental," "lighthouses," "advance scouts," and "ultraadopters." The least innovative individuals were called "drones," "parochials," and "diehards." This disarray of adopter categories and methods of categorization emphasized the need for standardization. Fortunately, one method of adopter categorization, based upon the S-shaped curve of adoption, gained a dominant position in the early 1960s (Rogers, 1962).

Innovativeness

The criterion for adopter categorization is innovativeness. Innovativeness is the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system. Innovativeness is a relative dimension, in that an individual has more or less of this variable than others in a system. Innovativeness is a continuous variable, and partitioning it into discrete categories is a conceptual device, much like dividing the continuum of social status into upper, middle, and lower classes. Such classification is a simplification that aids the understanding of human behavior, although it loses some information as a result of grouping individuals.

2.2.1 The S-shaped Curve of Adoption and Normality

The time element of the diffusion process allows us to classify adopter categories and to draw diffusion curves. The adoption of an innovation 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 (Fig. 2.1).

The S-shaped adopter distribution rises slowly at first, when there are only a few adopters in each time period. The curve than accelerates to a maximum until half of the individuals in the system has adopted. Then it decreases at a gradually slower rate as fewer and fewer remaining individuals adopt the innovation.

Why the S-shaped curve is normal?

Many human traits are normally distributed, where the trait is a physical characteristic, such as weight or height, or a behavioral trait, such as intelligence or the learning of new information. Hence, a variable such as the degree of innovativeness is also expected to do be normally distributed. If a social system is substituted for the individual in the learning curve, it seems reasonable to expect that experience with the innovation is gained as each successive member in the social system.

We expect a normal adopter distribution for an innovation because of the cumulatively increasing influences upon an individual to adopt or reject an innovation, resulting from the activation of peer networks about the innovation in a system. This influence results from the increasing rate of knowledge and adoption or rejection of the innovation in the system. We know that the adoption of a new idea result from information exchange through interpersonal networks. If the first adopter of an innovation discusses it with two other members of the system, each of these two adopters passes the new idea along to two peers, and so forth, the resulting distribution follows a binomial expansion, a mathematical function that follows a normal shape when plotted over a series of successive generation. The S- shaped diffusion curve begins to level off after half of the individuals in a social system have adopted, because each new adopter finds it increasingly difficult to tell the new idea to a peer who has not yet adopted.

The S-shaped curve of diffusion "takes off" once interpersonal networks become activated in spreading individuals' subjective evaluations of an innovation from peer to peer in a system. The part of the diffusion curve from about 10 percent adoption to 20 percent adoption is the heart of the diffusion process. After that point, it is often impossible to stop the further diffusion of a new idea, even if one wished to do so.

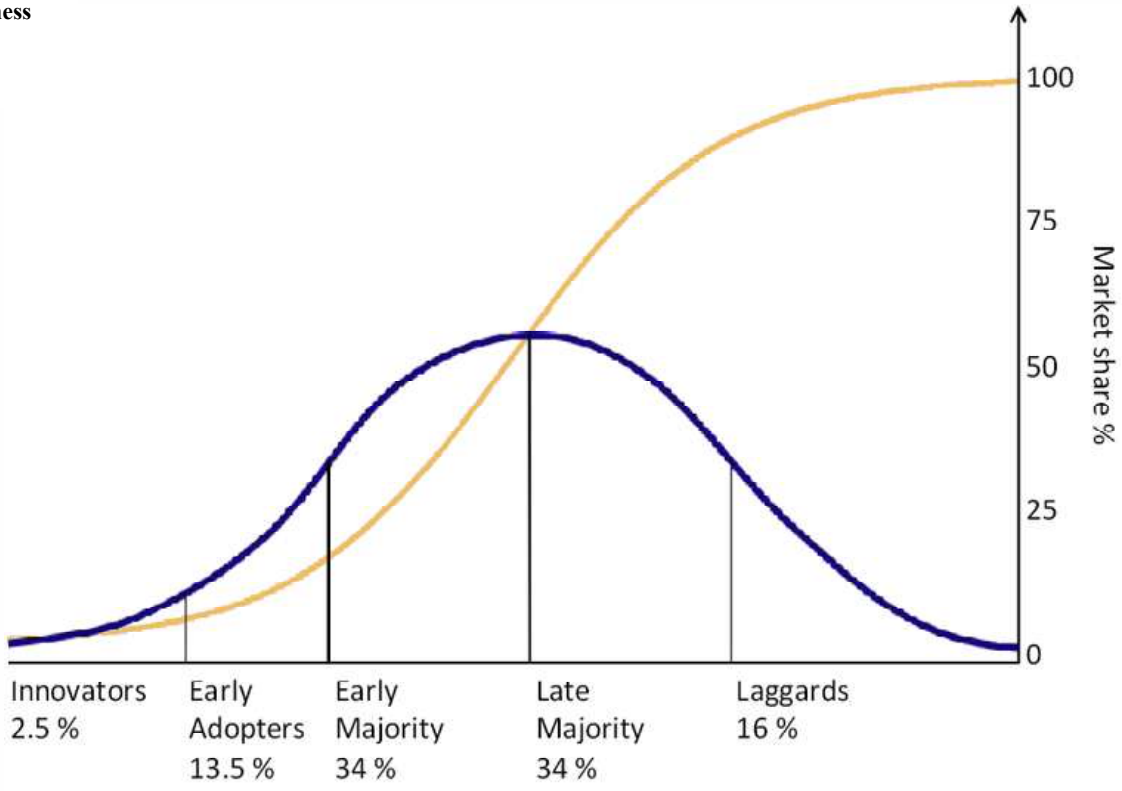

Fig. 2.1 S-shaped curve

Fig. 2.1 also states that adopter distributions follow a bell shaped curve over time and approach normality. A variety of different mathematical formulae have been proposed to fit the shape of adopter distributions. This research shows that S-shaped diffusion curves are essentially normal, a conclusion that is very useful for classifying adopter categories. The S-curve must be remembered, is innovation-specific and system-specific, describing the diffusion of a particular new idea among the member units of a specific system.

Check Your Progress 1

Note: a) Use the spaces given below for your answers.

b) Check your answers with those given at the end of the unit.

1) What do you mean by innovativeness?

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2) Why the S-shaped curve of diffusion is normal?

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2.3 ADOPTER CATEGORIZATION

Anyone seeking to standardize adopter categories must decide on:

a) The number of adopter categories

b) The portion of members of a system to include in each category, and

c) The methods, statistical or otherwise, of defining the adopter categories.

Ideally, a set of categories should be

a) Exhaustive, including all the units of study

b) Mutually exclusive, by excluding a unit of study that appears in one category from also appearing in any other category, and

c) Derived from a single classificatory principle.

We have previously discussed that S-shaped adopter distribution closely approach normality. The normal frequency distribution has several characteristics that are useful in classifying adopters. One characteristic or parameter is the mean or average, of the individuals in the system. Another parameter of distribution is its standard deviation, a measure of variation or dispersion about the mean. The standard deviation indicates the average amount of variance from the mean for sample individuals.

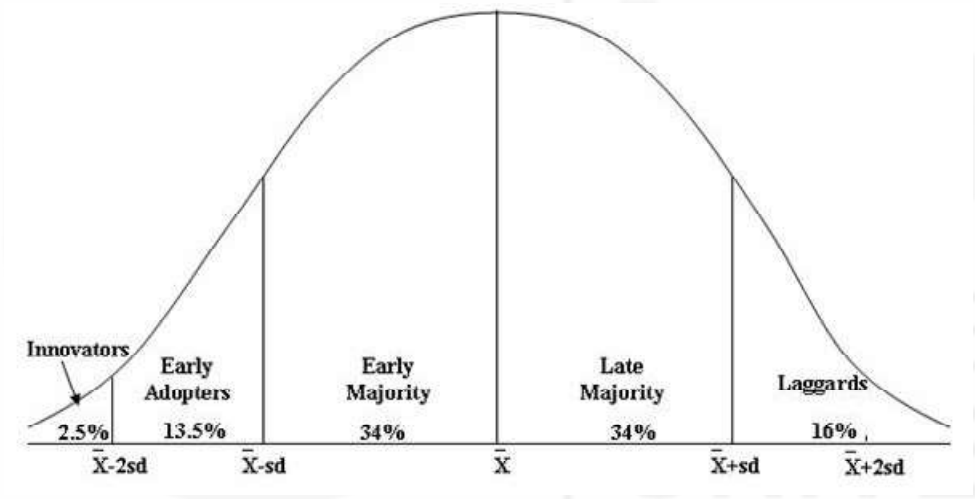

Fig. 2.2: Adopter categories

These two statistics, the mean ($\bar{\chi}$) and the standard deviation (sd), are used to divide a normal adopter distribution into five categories. Vertical lines are drawn to mark off the standard deviations on either side of the mean so that the normal curve is divided and categorized with a standardized percentage of respondents in each category. Fig. 2.2 shows the normal frequency distribution divided into five adopter categories:

i) Innovators

ii) Early adopters

iii) Early majority

iv) Late majority, and

v) Laggards.

These five adopter categories and the approximate percentage of individuals included in each are located on the normal adopter distribution in the Fig. 2.2. The area lying to the left of the mean time of adoption (of an innovation) minus two standard deviations includes the first 2.5 percent of the individuals in a system to adopt an innovation, the innovators. The next 13.5 percent are included in the area between the mean minus one standard deviation and the mean minus two standard deviations; they are labeled early adopters. The next 34 percent of the adopters, called the early majority, are included in the area between the mean data of adoption and the mean minus one standard deviation. Between the mean and one standard deviation to the right of the mean are the next 34 percent to adopt the new idea, the late majority. The last 16 percent to adopt are called laggards.

This adopter classification system is not symmetrical, in that there are three adopter categories to the left of the mean and only two to the right. One solution would be to break laggards into two categories, such as early and late laggards, but laggards seem to form a fairly homogeneous category. Similarly, innovators and early adopters could be combined into a single category to achieve symmetry, but their quite different characteristics suggest that they are two distinct adopter categories.

One difficulty / lacunae with this method of adopter classification is incomplete adoption, which occurs for innovations that have not reached 100 percent use. The problem of incomplete adoption or non adoption can be avoided when a series of innovations are combined into a composite innovativeness scale.

Innovativeness as a criterion for adopter categorization fulfills each of the three principles of categorization suggested previously. The five adopter categories are exhaustive (except for non adopters), mutually exclusive, and derived from one classification principle. The method of adopter categorization just describe is the most widely used in diffusion research today. It is essentially the only method of adopter categorization.

Check Your Progress 2

Note: a) Use the spaces given below for your answers.

b) Check your answers with those given at the end of the unit.

1) Name the five adopter categories

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2) What is the lacunae with the method of classifying adopters into five categories and how can we overcome it?

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2.4 ADOPTER CATEGORIES OF IDEAL TYPES

The five adopter categories set forth in this section are ideal types, concepts based on observations of reality that are designed to make comparisons possible. Ideal types are not simply an average of all observations about an adopter category. Exceptions to the ideal types can be found. Ideal types are based on abstractions from empirical investigations.

2.4.1 Innovators: Venturesome

Venturesome-ness is almost an obsession with innovators. Their interest in new ideas leads them out of a local circle of peer networks and into more cosmopolite social relationships. Communication patterns and friendships among a clique of innovators are common, even though these individuals may be quite geographically distanced. Being an innovator has several prerequisites. Control of substantial financial resources is helpful in absorbing the possible losses from an unprofitable innovation. The ability to understand and apply complex technical knowledge is also needed.

The salient value of the innovator is venturesome-ness, due to a desire for the rash, the daring, and the risky. The innovator must also be willing to accept an occasional setback when a new idea proves unsuccessful, as inevitably happens. While an innovator may not be respected by other members of a local system, the innovator plays an important role in the diffusion process; that of launching the new idea in the system by importing the innovation from outside of the system's boundaries. Thus, the innovator plays a gate-keeping role in the flow of new ideas into a system.

2.4.2 Early Adopters: Respect

Early adopters are a more integrated part of the local social system than are innovators. Whereas innovators are cosmopolites, early adopters are localites. This adopter category, more than any other, has the highest degree of adoption leadership in most systems. Potential adopters look to early adopters for advice and information about an innovation. The early adopter is considered by many to be "the individual to check with" before adopting a new idea. This adopter category is generally sought by change agents as a local missionary for speeding the diffusion process. Because early adopters are not too far ahead of the average individual in innovativeness, they serve as a role model for many other members of a social system. Early adopters help trigger the critical mass when they adopt an innovation.

The early adopter is respected by his or her peers, and is the embodiment of successful, discrete use of new ideas. The early adopter knows that to continue to earn this esteem of colleagues and to maintain a central position in the communication networks of the system; he or she must make judicious innovation-decisions. The early adopter decreases uncertainty about a new idea by adopting it, and then conveying a subjective evaluation of the innovation to near peers through interpersonal networks. In one sense, early adopters put their stamp of approval on a new idea by adopting it.

2.4.3 Early Majority: Deliberate

The early majority adopt new ideas just before the average member of a system. The early majority interacts frequently with their peers but seldom hold positions of opinion leadership in a system. The early majority's unique location between the very early and the relatively late to adopt makes them an important link in the diffusion process. They provide interconnectedness in the system's interpersonal networks. The early majority are one of the most numerous adopter categories, making up one third of all member of a system.

The early majority may deliberate for some time before completely adopting a new idea. Their innovation –decision period is relatively longer than that of the innovators and the early adopters. 'Be not the first by which the new is tried, nor the last to lay the old aside,' fits the thinking of the early majority. They follow with deliberate willingness in adopting innovations but seldom lead.

2.4.4 Late Majority: Skeptical

The late majority adopt new ideas just after the average member of a system. Like the early majority, the late majority make up one third of the members of a system. Adoption may be both an economic necessity for the late majority and the result of increasing peer pressures. Innovations are approached with a skeptical and cautious air, and the late majority do not adopt until most others in their system have already done so. The weight of system norms must definitely favor an innovation before the late majorities are convinced to adopt. The pressure of peers is necessary to motivate adoption. Their relatively scarce resources mean that most of the uncertainty about a new idea must be removed before the late majority feel that it is safe to adopt.

2.4.5 Laggards: Traditional

Laggards are the last in a social system to adopt an innovation. They possess almost no opinion leadership. Laggards are the most localite of all adopter categories in their outlook. Many are near isolates in the social networks of their system. The point of reference for the laggard is the past. Decisions are often made in terms of what has been done previously and these individuals interact primarily with others who also have relatively traditional values. Laggards tend to be suspicious of innovations and of change agents. Their innovation-decision process is relatively lengthy, with adoption and use lagging far behind awareness-knowledge of a new idea. Resistance to innovations on the part of laggards may be entirely rational from the laggards' viewpoint, as their resources are limited and they must be certain that a new idea will not fail before they can adopt. The laggard's precarious economic position forces the individual to be extremely cautious in adopting innovations.

"Laggard" might sound like a bad name. This title of the adopter category carries an invidious distinction (in much the same way that "lower class" is a negative nomenclature). Laggard is a bad name because most nonlaggards have a strong pro-innovation bias. Diffusion scholars who use adopter categories in their research do not mean any particular disrespect by the term "laggard". Indeed, if they used any other term instead of laggards, such as "late adopter," it would soon have a similar negative connotation. But it is a mistake to imply that laggards are somehow at fault for being relatively late to adopt. System blame may more accurately describe the reality of the laggards' situation.

2.5 CHARACTERISTICS OF ADOPTER CATEGORIES

A voluminous research literature has accumulated about variables related to innovativeness. Here we summarize this diffusion research in a series of generalizations under three headings; (1) socioeconomic status, (2) personality values, and (3) communication behaviour.

2.5.1 Socioeconomic Status

- Earlier adopters are no different from later adopters in age. About half of many diffusion studies on this subject show no relationship, a few found that earlier adopters are younger, and some indicate they are older.

- Earlier adopters have more years of formal education than the later adopters.

- Earlier adopters have higher social status than the later adopters. Status is indicated by such variables as income, level of living, possession of wealth, occupational prestige, self-perceived identification with a social class, and the like.

- Earlier adopters have a greater degree of upward social mobility than the later adopters. Evidence suggests that earlier adopters are not only of higher status but are on the move in the direction of still higher levels of social status. In fact, they may be using the adaptation of innovations as one means of getting there.

- Earlier adopters have large-sized units (farms, school, companies and so on) than the later adopters.

The social characteristics of earlier adopters mark them as more educated, of higher social status, wealthier and have large-sized units. Socioeconomic status and innovativeness appear to go hand in hand. Do innovators innovate because they are richer, or are they richer because they innovate? This cause-and-effect question cannot be answered solely on the basis of available cross-sectional data. But there are understandable reasons why social status and innovativeness vary together. Some new ideas are costly to adopt and require large initial outlays of capital. Only the wealthy units in a system may be able to adopt these innovations. Greatest profits usually go to the first to adopt; therefore, the innovator gains a financial advantage through relatively early adoption of the innovation. The innovators become richer and the laggards become relatively poorer as a result of this process.

Because the innovator is the first to adopt, risks must be taken that can be avoided by later adopters who do not wish to cope with the high degree of uncertainty concerning the innovation when it is first introduced into a system. Certain of the innovator's new ideas inevitably are likely to fail. He/she must be wealthy enough to absorb the loss from these occasional failures. Although wealth and innovativeness are highly related, economic factors do not offer a complete explanation of innovativeness. For example, although agricultural innovators tend to be wealthy, there are many rich farmers who are not innovators.

2.5.2 Personality Variables

Personality variables associated with innovativeness have not yet received much research attention, in part because of difficulties in measuring personality dimensions in diffusion surveys. The generalizations are:

- Earlier adopters have greater empathy than the later adopters. Empathy is the ability of individual to project himself or herself into the role of another person. This ability is an important quality for an innovator, who must be able to think counterfactually, to be particularly imaginative, and to take the roles of heterophilous other individuals in order to exchange information effectively with them. To a certain extent, the innovator must be able to project into the role of individual outside of his or her local system (as the innovator is the first to adopt in the locale system): innovators in other system, change agent and scientist and R&D workers.
- Earlier adopters may have a greater ability to deal with abstractions than the later adopters. Dogmatism is the degree to which an individual has a relatively closed belief system that is a set of beliefs which are strongly held.
- Earlier adopters have a greater ability to deal with abstractions than the later adopters.
- Earlier adopters have a greater rationality than the later adopters. Rationality is use of the most effective means to reach a given end.
- Earlier adopters have more intelligence than the later adopters.
- Earlier adopters have a more favorable attitude towards change than the later adopters.
- Earlier adopters are better able to cope with uncertainty and risk than are later adopters.
- Earlier adopters have a more favorable attitude towards science than the later adopters. Because innovations are often the product of scientific research, it is logical that innovators are more favorably inclined toward science.
- Earlier adopters are less fatalistic than are later adopters. Fatalism is the degree to which an individual perceives a lake of ability to control his/her future. An individual is more likely to adopt an innovation if he/she has more self-efficiency and believes that he/she control, rather than thinking that the future is determined by fate**.**
- Earlier adopters have higher aspirations (for formal education, higher status, occupations, and so on) than do later adopters.

2.5.3 Communication Behaviour

The generalizations are:

- Earlier adopters have more social participation than the later adopters.
- Earlier adopters are more highly interconnected through interpersonal networks in their social system than are later adopters. Connectedness is the degree to which an individual is linked to others.

- Earlier adopters have more cosmopolite than are later adopters. Innovators' interpersonal networks are more likely to be outside, rather than within, their system. They travel widely and are involved in matters beyond the boundaries of their local system.
- Earlier adopters have more contact with change agents than the later adopters.
- Earlier adopters have greater exposure to mass media communication channels than the later adopters.
- Earlier adopters have grater exposure to inter-personal communication channels than do later adopter.
- Earlier adopters seek information about innovations more actively than the later adopters.
- Earlier adopters have greater knowledge of innovations than the later adopters.
- Earlier adopters have a higher degree of opinion leadership than do later adopters. Although innovativeness and opinion leadership are positively related, the degree to which these two variables are related depends in part on the norms of the social system. In a system with norms favorable to change, opinion leaders are more innovative.

Check Your Progress 3

Note: a) Use the spaces given below for your answers.

b) Check your answers with those given at the end of the unit.

1) Name the dominant attributes of each category of adopters.

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2) Write the important characteristics of the following adopter categories

i) Innovators:

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ii) Early adopters:

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iii) Early majority:

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iv) Late majority:

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v) Laggards:

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2.6 LET US SUM UP

Adopter categories are the classifications of members of a system on the basis of innovativess, the degree to which an individual or other unit of adaptation is relatively earlier in adopting new ideas than other members of a system. Adopter distributions tend to follow an S-shaped curve over time and to approach normality. The continuum of innovativeness can be partitioned into five adopter categories (innovators, early adopter, early majority, late majority and laggards) on the basis of two characteristics of a normal distribution, the mean and the standard deviation. The dominant attributes of each category are: Innovators-venturesome; early adopters-respect; early majority-deliberate; late majority skeptical; and laggards-traditional. The important differences among the different categories of adopters are discussed in terms of socioeconomic status, personality variables and communication behaviour.

2.7 KEYWORDS

Innovativeness : Innovativeness is the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system.

S-shaped Curve of Adoption and Normality : The adoption of an innovation 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.

Innovators (2.5%) : Innovators are the first individuals to adopt an innovation, who are willing to take risks, youngest

in age, have the highest social class, have great financial lucidity, very social and have closest contact to scientific sources and interaction with other innovators.

Early Adopters (13.5%) : This is the second fastest category of individuals who adopt an innovation. These individuals have the highest degree of opinion leadership among the other adopter categories.

Early Majority (34%) : Individuals in this category adopt an innovation after a varying degree of time. This time of adoption is significantly longer than the innovators and early adopters.

Late Majority (34%) : Individuals in this category will adopt an innovation after the average member of the society. These individuals approach an innovation with a high degree of skepticism and after the majority of society has adopted the innovation.

Laggards (16%) : Individuals in this category are the last to adopt an innovation. Unlike some of the previous categories, individuals in this category show little to no opinion leadership.

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2.9 CHECK YOUR PROGRESS – POSSIBLE ANSWERS

Check Your Progress 1

1) The criterion for adopter categorization is innovativeness. Innovativeness is the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system.

2) The S-shaped adopter distribution rises slowly at first, when there are only a few adopters in each time period. The curve than accelerates to a maximum until half of the individuals in the system has adopted. Then it decreases at a gradually slower rate as fewer and fewer remaining individuals adopt the innovation. Hence, a variable such as the degree of innovativeness is also expected to be normally distributed.

Check Your Progress 2

1) The five adopter categories are : Innovators ; Early adopters; Early majority; Late majority, and; Laggards.

2) One difficulty / lacunae with this method of adopter classification is incomplete adoption, which occurs for innovations that have not reached 100 percent use. The problem of incomplete adoption or non adoption can be avoided when a series of innovations are combined into a composite innovativeness scale.

Check Your Progress 3

1) The dominant attributes of each category are: Innovators-venturesome; early adopters-respect; early majority-deliberate; late majority skeptical; and laggards- traditional.

2) i) **Innovators:** Venturesome-ness is almost an obsession with innovators. Their interest in new ideas leads them out of a local circle of peer networks and into more cosmopolite social relationships. Communication patterns and friendships among a clique of innovators are common, even though these individuals may be quite geographically distanced. Innovator plays a gate-keeping role in the flow of new ideas into a system.

   ii) **Early Adopters:** Early adopters are a more integrated part of the local social system than are innovators. Whereas innovators are cosmopolites, early adopters are localites. This adopter category, more than any other, has the highest degree of adoption leadership in most systems. Potential adopters look to early adopters for advice and information about an innovation. The early adopter is considered by many to be "the individual to check with" before adopting a new idea. This adopter category is generally sought by change agents as a local missionary for speeding the diffusion process.

   iii) **Early Majority:** The early majority adopt new ideas just before the average member of a system. The early majority interacts frequently

with their peers but seldom hold positions of opinion leadership in a system. The early majority's unique location between the very early and the relatively late to adopt makes them an important link in the diffusion process. They provide interconnectedness in the system's interpersonal networks. The early majority are one of the most numerous adopter categories, making up one third of all member of a system. The early majority may be deliberate for some time before completely adopting a new idea. Their innovation –decision period is relatively longer than that of the innovators and the early adopters. 'Be not the first by which the new is tried, nor the last to lay the old aside,' fits the thinking of the early majority.

iv) **Late Majority:** The late majority adopt new ideas just after the average member of a system. Like the early majority, the late majority make up one third of the members of a system. Adoption may be both an economic necessity for the late majority and the result of increasing peer pressures. Innovations are approached with a skeptical and cautious air, and the late majority do not adopt until most others in their system have already done so.

v) **Laggards:** Laggards are the last in a social system to adopt an innovation. They possess almost no opinion leadership. Laggards are the most localite of all adopter categories in their outlook. Many are near isolates in the social networks of their system. The point of reference for the laggard is the past. Decisions are often made in terms of what has been done previously and these individuals interact primarily with others who also have relatively traditional values. Laggards tend to be suspicious of innovations and of change agents. Their innovation-decision process is relatively lengthy, with adoption and use lagging far behind awareness-knowledge of a new idea.

UNIT 3 OPINION LEADERS AND DIFFUSION NETWORKS

Structure

3.1 INTRODUCTION

The term 'opinion leaders' is used to refer to individuals who are influential in approving or disapproving new ideas. A variety of terms were used by many social scientists other than opinion leaders such as key communicators, informal leaders, adoption leaders, fashion leaders, consumption leaders, local influential, tastemakers, style setters, sparkplugs, gatekeepers etc. Opinion leaders are those individuals from whom others seek advice and information. They play an important role in the diffusion and adoption of innovations. It is impossible to ignore opinion leaders in studying the spread of ideas. The central idea of this unit is how interpersonal communication through opinion leaders drives the diffusion process by creating a critical mass of adopters.

After studying this unit, you should be able to:

- Explain the meaning and concept of opinion leaders, diffusion networks and critical mass.
- Discuss the methods of measuring opinion leadership with advantages and disadvantages.
- Describe the characteristics of opinion leaders.

3.2 OPINION LEADERS AND COMMUNICATION MODELS

Opinion leadership is the degree to which an individual is able to informally influence other individuals' attitudes or overt behavior in a desired way with relative frequency. Opinion leaders are individuals who lead in influencing others' opinions. The behavior of opinion leaders is important in determining the rate of adoption of an innovation in a system. In fact, the diffusion curve is S shaped because once opinion leaders adopt and begin telling others about an innovation, the number of adopters per unit of time takes off in an exponential curve.

The 'hypodermic needle model' postulated that the mass media had direct, immediate, and powerful effects on a mass audience. The mass media were perceived as a strong influence on behavior change. The hypodermic needle model was based primarily on intuitive theorizing from unique historical events and was too simple, too mechanistic, and too gross to give an accurate account of media effects. It ignored the role of opinion leaders.

In the 'two step flow model', ideas often flow from radio and print to opinion leaders and from these to the less active sections of the population. The first step, from media sources to opinion leaders, is mainly a transfer of *information,* whereas the second step, from opinion leaders to their followers, also involves the spread of interpersonal *influence*. This two step flow *hypothesis* suggested that communication messages flow from a source, via mass media channels, to opinion leaders, who in turn pass them on to followers. This model has been widely tested in diffusion of innovations studies, and found generally to provide useful understandings of the flow of communication.

Activity 1 : Visit a near by village or community and enquire about influential leaders in that village or community. Write your observations.

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Check Your Progress 1

Note: a) Use the spaces given below for your answers.

b) Check your answers with those given at the end of the unit.

1) What do you mean by an opinion leader?

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2) Name any four synonymous names used to denote opinion leaders.

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3.3 METHODS OF MEASURING OPINION LEADERSHIP

The four main methods of measuring opinion leadership are:

i) Sociometric method

ii) Informant's rating method

iii) Self-designating method

iv) Observation method

3.3.1 Sociometric Method

The Sociometric method consists of asking respondents whom they sought (or hypothetically might seek) for information or advice about a given topic, such as a particular innovation. Opinion leaders are those members of a system who receive the greatest number of Sociometric choices (and thus who are involved in the largest number of network links). Undoubtedly, the Sociometric technique is a highly valid measure of opinion leadership, as it is measured through the perceptions of followers. It necessitates, however, interrogating a large number of respondents in order to locate a small number of opinion leaders. The Sociometric method is most applicable when all (or most) members of a social system provide network data, rather than when a small sample of the total population is contacted.

It is usual to specify the number of Sociometric network partners to be named by a respondent:

Example: Who are the three (or four or five) other women in this village with whom you have discussed family planning methods?

Such limited choice questioning leads a respondent to name only the strongest network partners. It is, however, possible that others with whom a respondent converses less often may exchange information with the respondent that is more crucial in the diffusion process. Another approach is to conduct a "roster study," in which each respondent is presented with a list of all the other members of the system and asked whether he or she talks with each of them and how often. The roster technique has the advantage of measuring "weak" as well as "strong" links.

Advantages: Sociometric questions are easy to administer and are adaptable to different types of settings and issues and have highest validity.

Limitations: Analysis of Sociometric data can be complex. Requires a large number of respondents to locate a small number of opinion leaders. Not applicable to sample designs where only a portion of the social system is interviewed.

3.3.2 Informant's Rating Method

An alternative to using Sociometric to identify opinion leaders is to ask key informants who are especially knowledgeable about the networks in a system. Often a handful of informants can identify the opinion leaders in a system with a precision that is almost as accurate as Sociometric techniques, particularly when the system is small and the informants are well informed. The opinion leaders

can be identified by asking key informants (religious leaders, town officials, school administrators, and other long time residents) to nominate individuals whom other people sought out for information and advice. The opinion leaders were individuals nominated by two or more of the key informants.

Advantage: A cost saving and timesaving method as compared to the Sociometric method.

Limitation: Each informant must be thoroughly familiar with the system.

3.3.3 Self-designating Method

The self designating method asks respondents to indicate the degree to which others in the system regard them as influential. Individuals select themselves to be peer leaders.

Example: A typical self designating question is "Do you think people come to you for information or advice more often than to others?"

The self designating method depends upon the accuracy with which respondents can identify and report their images. This measure of opinion leadership is especially appropriate when interrogating a random sample of respondents in a system, a sampling design that precludes effective use of Sociometric methods.

Advantage: Measures the individuals' perceptions of her/his opinion leadership, which influence her/his behavior.

Limitation: Dependent upon the accuracy with which respondents can identify and report their self-images.

3.3.4 Observation Method

Opinion leadership can be measured by observation, in which an investigator identifies and records the communication behavior in a system. One advantage of observation is that the data usually have a high degree of validity. If network links are appropriately observed, there is no doubt about whether or not they occur. Observation works best in a very small system, where the observer can actually see and record interpersonal interactions as they occur. Unfortunately, in such small systems observation may be a very obtrusive data gathering technique. Because the members of a system know they are being observed, they may act differently. Further, an observer may need to be very patient if the diffusion network behavior that he or she wants to observe occurs only rarely. In practice, observation has been used infrequently to measure diffusion networks and opinion leadership.

Advantage: High validity

Limitation: Obtrusive; works best in a very small system and may require much patience by the observer.

The choice of any one of the four methods (Sociometric, key informants, self designating, and observation) can be based on convenience, as all four are about equally valid. A comparative summary of the above four methods is given bellow.

Methods of Measuring Opinion Leadership and Diffusion Networks				
Method	**Description**	**Questions Asked**	**Advantages**	**Limitations**
Sociometric method	Ask system members to whom they go for advice and information about an idea	Who is your leader?	Questions are easy to administer and are adaptable to different types of settings and issues; highest validity	Analysis of Sociometric data can be complex. Requires a large number of respondents to locate a small number of opinion leaders. Not applicable to sample designs where only a portion of the social system is interviewed.
Informants' ratings	Ask subjectively selected key informants in a system to designate opinion leaders	Who are leaders in this system?	A cost-saving and timesaving method as compared to the sociometric method	Each informant must be thoroughly familiar with the system.
Self-designating method	Ask each respondent a series of questions to determine the degree to which he/she perceives himself/herself to be an opinion leader	Are you a leader in this system?	Measures the individual's perceptions if her/his opinion leadership, which influence her/his behaviour	Dependent upon the accuracy with which respondents can identify and report their self-images.
Observation	Identify and record communication network links as they occur	None	High validity	Obtrusive; works best in a very small system and may require much patience by the observer.

Further, studies of the opinion leaders in a system generally find a high degree of stability over time. However, over a period of decades the opinion leaders in a system must inevitably change, even in a relatively stable community or organization. In general, however, opinion leadership structures are stable in the relatively short term. In a typical distribution of opinion leadership in a social system, a few individuals receive a great deal of opinion leadership, while most individuals have none or very little opinion leadership is a matter of degree. The most influential opinion leaders are key targets for the efforts of change agents in development campaigns.

Activity 2: Visit a near by village or community and try to identify the opinion leaders by all the four methods described above. Write your observations.

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Check Your Progress 2

Note: a) Use the spaces given below for your answers.

b) Check your answers with those given at the end of the unit.

1) Name the four methods of measuring opinion leadership.

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2) Write one advantages and one disadvantage of any two methods of measuring opinion leadership.

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3.4 TYPES OF OPINION LEADERSHIP

Is there one set of all purpose opinion leaders in a system, or are there different opinion leaders for different issues? In principle there are two types of opinion leaders:

a) Polymorphic opinion leaders

b) Monomorphic opinion leaders

Polymorphism is the degree to which an individual acts as an opinion leader for a variety of topics. The opposite, monomorphism, is the degree to which an individual acts as an opinion leader for only a single topic. The degree of polymorphic, opinion leadership in a given social system seems to vary with such factors as the diversity of the topics on which opinion leadership is measured, whether system norms are innovative or not, and so on.

Example: Village leaders in developing countries are frequently opinion leaders for health, agricultural, and educational ideas, as well as political and moral issues.

3.5 CHARACTERISTICS OF OPINION LEADERS

The characteristics of opinion leaders can be described under the following major heads.

External Communication

i) **Opinion leaders have greater exposure to mass media than their followers:** Opinion leaders gain their perceived competency by serving as an avenue for the entrance of new ideas into their system. The external linkage may be provided via mass media channels, by an opinion leader's cosmopoliteness, or by an opinion leader's greater contact with change agents.

ii) **Opinion leaders are more cosmopolite than their followers:** An eminent sociologist of communication networks, Professor Ron Burt, described opinion leaders as "people on the edge": opinion leaders have a certain degree of cosmopoliteness in that they bring new ideas from outside their social group to its members. They "carry information across the boundaries between groups". Opinion leaders gain part of their perceived expertise regarding innovations by their greater contact across their system's boundaries.

iii) **Opinion leaders have greater contact with change agents than their followers:** As explained previously, change agents try to utilize opinion leaders to leverage diffusion activities; thus, not surprisingly, opinion leaders often have greater contact with change agents than do their followers.

Accessibility

- **Opinion leaders have greater social participation than their followers:** In order for opinion leaders to spread messages about an innovation, they must have extensive interpersonal network links with their followers. Opinion leaders must be socially accessible. One indicator of such accessibility is social participation. Face to face communication about new ideas may occur at meetings of formal organizations and through informal discussions.

Socio-economic Status

- We expect that a follower typically seeks an opinion leader of some what higher socioeconomic status. So opinion leaders, on the average, are of higher status than their followers.

Innovativeness

- If opinion leaders are to be recognized by their peers as competent and trustworthy experts about innovations, the opinion leaders should adopt new ideas before their followers. There is strong empirical support for generalization that opinion leaders are more innovative than their followers. However, opinion leaders are not necessarily innovators. Sometimes they are, but usually they are not. What explains this apparently contradictory finding? We must consider the effect of system norms on the innovativeness of opinion leaders, because the degree to which opinion leaders are innovative depends in large part on their followers.

3.5.1 Innovativeness, Opinion Leadership, and System Norms

How can opinion leaders conform to system norms and at the same time lead in the adoption of new ideas? The answer is expressed as "When a social system's norms favor change, opinion leaders are more innovative, but when the system's norms do not favor change, opinion leaders are not especially innovative". In systems with more traditional norms, the opinion leaders are usually a separate set of individuals from the innovators. The innovators are perceived with suspicion and often with disrespect by the members of such systems, who do not trust the innovators' sense of judgment about new ideas. So the system's norms determine whether or not opinion leaders are innovators.

A general tendency of change agents is that they select individuals as opinion leaders who are too innovative. Change agents work through opinion leaders in order to close the heterophily gap between themselves and their clients .But if opinion leaders are very much more innovative than the average client, the heterophily that formerly existed between the change agent and his or her clients now exists between opinion leaders and followers. Innovators are inappropriate opinion leaders in systems with traditional norms: they are too elite and too change oriented. The innovator is an unrealistic model for the average individual. The norms of the system determine the adopter category in which opinion leaders in a system are found.

Sometimes change agents identify potentially effective opinion leaders among their clients, but then they concentrate their contacts on these leaders to such a degree that they become innovators and lose their former followers. The interpersonal relationships between opinion leaders and their followers hang in a delicate balance. If an opinion leader becomes too innovative, or adopts a new idea too quickly, followers may begin to doubt his or her judgment. One role of the opinion leader in a social system is to help reduce uncertainty about an innovation for his or her followers. To fulfill this role, an opinion leader must demonstrate prudent judgment in decisions about adopting new ideas. So the opinion leader must continually look over his or her shoulder and consider where the rest of the system is at regarding new ideas.

Activity 3: Analyze the outcome of Activity 2 and write your observations on Polymorphic / Monomorphic opinion leadership prevailing in that village / community.

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3.6 DIFFUSION NETWORKS AND CRITICAL MASS

We agree that the heart of the diffusion process is the modeling and imitation by potential adopters of their near peers' experiences with the new idea. In deciding whether or not to adopt an innovation, individual depend mainly on the

communicated experience of others much like themselves who have already adopted a new idea. These subjective evaluations of an innovation flow mainly through interpersonal networks. So we must understand the nature of networks in order to understand the diffusion process.

3.6.1 Diffusion Networks

Networks provide a certain degree of structure and stability in the predictability of human behavior. A diffusion network consists of interconnected individuals who are linked by patterned flows of information. An individual's network links are important determinants of his or her adoption of innovations. The network interconnectedness of an individual in a social system is positively related to the individual's innovativeness.

Network Influence in Diffusion of Family Planning Extension Innovations

Strong evidence for the importance of network influences on individuals in the diffusion of innovations comes from investigations of family planning adoption in villages of developing countries. For example, Rogers and Kincaid *(1981)* studied the diffusion of several different family planning innovations in twenty five Korean villages. They found that certain of the villages were "Pill villages," others were "IUD villages," and one was a "Vasectomy village." In one "Pill village," all of the adopters of family planning methods were using oral contraceptive pills. Similarly, in other villages of study, all contraceptive adopters were using the same family planning method. Certainly such amazing homogeneity in the choice of contraceptives could hardly have occurred by chance. Each of the Korean villages had been the target of the same national family planning programme, in which a standard "cafeteria" of several contraceptive methods was promoted throughout the country. In the "IUD village," for example, certain opinion leaders first adopted a particular family planning method, the IUD, and their experiences were then shared with fellow villagers via interpersonal networks. At one point, a dozen women in this village decided to adopt the IUD and all traveled together to a health clinic to get 1UDs inserted. The result, after several years of further diffusion in the village, was a tendency of every adopter in that village to use the same method of family planning. These findings suggest that in Korea, the diffusion of family planning occurs mainly within villages, even though the government program was aimed at the national population.

3.6.2 Critical Mass

The concept of the critical mass is fundamental to understanding a wide range of human behavior because an individual's actions often depend on a perception of how many other individuals are behaving in a particular way. Even if all the individuals in a large group are rational and self interested, and would gain if, as a group, they acted to achieve their common interest or objective, they would still not voluntarily act to achieve that common or group interest. This seeming irrationality of individuals in a social system attracted scholarly attention to the study of collective action by communication scholars, sociologists, social psychologists, economists, and scholars of public opinion. Why is individual behavior in a system so seemingly illogical? The basic reason is that each individual acts in ways that are rational in pursuing *individual* goals without fully considering that he or she might be disadvantaging the system at the *collective* level.

The Critical Mass in the Diffusion of Innovations

A crucial concept in understanding the social nature of the diffusion process is the "critical mass," the point after which further diffusion becomes self sustaining. The notion of the critical mass originally came from scholars of social movements, and in recent years has been advanced by communication scholars. The rate of adoption of interactive media such as e mail, telephones, fax, and teleconferencing often displays a distinctive quality that we here call the critical mass. The critical mass occurs at the point at which enough individuals in a system adopted an innovation so that the innovation's further rate of adoption becomes self sustaining. The interactive quality of new communication technologies creates confidence among the adopters in a system. An interactive innovation is of little use to an adopting individual unless other individuals with the adopter wish to communicate also adopted. Thus, a critical mass of individuals must adopt an interactive communication technology it has much utility for the average individual in the system. With each additional adopter, the utility of an interactive communication technology increases for all adopters.

Check Your Progress 3

Note: a) Use the spaces given below for your answers.

b) Check your answers with those given at the end of the unit.

1) How can opinion leaders conform to system norms and at the same time lead in the adoption of new ideas?

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2) Write the main characteristics of opinion leaders.

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3) Write the importance of diffusion networks and critical mass in diffusion of innovation.

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3.7 LET US SUM UP

In this unit we started by looking at the meaning of opinion leadership and its relation to communication models and understood that opinion leaders are the individuals who are influential in approving or disapproving new ideas. We discussed the four methods of measuring opinion leadership viz., sociometric method, informant's rating method, self-designating method and observation method along with their important advantages and disadvantages. Later we studied the two types of opinion leaders viz., monomorphic and polymorphic opinion leaders. We also studied important characteristics of opinion leaders and the concepts of diffusion networks and critical mass along with their application in diffusion of innovations.

3.8 KEY WORDS

Opinion Leadership : It is the degree to which an individual is able to informally influence other individuals' attitudes or overt behavior in a desired way with relative frequency.

Personal Influence : It is communication involving a direct face- to-face exchange between the communicator and the receiver which results in changed behavior or attitudes on the part of the receiver.

Homophily : It is the degree to which pair of individuals who communicate are similar.

Heterophily : It is the degree to which pairs of individuals who interact are different in certain attributes.

Innovativeness : It is the degree to which an individual (or other unit of adoption) is relatively earlier in adopting new ideas than other members of a social system.

Communication Proximity: It is the degree to which two linked individuals in a network have personal communication networks that overlap.

A personal Communication Network : It consists of the individuals who are linked by patterned communication flows to a given individual.

Interactivity : It is the degree to which participants in a communication process can exchange roles in, and have control over, their mutual discourse.

Threshold : It is the number of other individuals who must be engaged in an activity before a given individual will join that activity.

3.9 REFERENCES / SELECTED READINGS

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3.10 CHECK YOUR PROGRESS – POSSIBLE ANSWERS

Check Your Progress 1

1) Opinion leader is the individual who is able informally to influence other individuals' attitudes or overt behavior in a desired way with relative frequency. Opinion leaders are individuals who lead in influencing others' opinions.

2) Synonyms used to denote opinion leaders are: key communicators; informal leaders; adoption leaders; fashion leaders; consumption leaders; local influential; tastemakers; style setters; sparkplugs; gatekeepers etc.

Check Your Progress 2

1) The four methods of measuring opinion leadership are: Sociometric method; Informant's rating method; Self-designating method and; Observation method.

2) a) Sociometric method**:**

Advantages: Sociometric questions are easy to administer and are adaptable to different types of settings and issues and have highest validity.

Limitations: Analysis of Sociometric data can be complex. Requires a large number of respondents to locate a small number of opinion leaders. Not applicable to sample designs where only a portion of the social system is interviewed.

b) Informant's Rating Method

Advantages: A cost saving and timesaving method as compared to the Sociometric method.

Limitation: Each informant must be thoroughly familiar with the system.

Check Your Progress 3

1) When a social system's norms favor change, opinion leaders are more innovative, but when the system's norms do not favor change, opinion leaders are not especially innovative". In systems with more traditional norms, the opinion leaders are usually a separate set of individuals from the innovators. The innovators are perceived with suspicion and often with disrespect by the members of such systems, who do not trust the innovators' sense of judgment about new ideas. So the system's norms determine whether or not opinion leaders are innovators.

2) The main characteristics of opinion leaders are: opinion leaders have greater exposure to mass media than their followers; opinion leaders are more cosmopolite than their followers; opinion leaders have greater contact with change agents than their followers, and ; opinion leaders have greater social participation than their followers

3) *Diffusion Networks:* Networks provide a certain degree of structure and stability in the predictability of human behavior. A diffusion network consists of interconnected individuals who are linked by patterned flows of information. An individual's network links are important determinants of his or her adoption of innovations. The network interconnectedness of an individual in a social system is positively related to the individual's innovativeness.

Critical Mass: A crucial concept in understanding the social nature of the diffusion process is the "critical mass," the point after which further diffusion becomes self sustaining. The critical mass occurs at the point at which enough individuals in a system adopted an innovation so that the innovation's further rate of adoption becomes self sustaining.

UNIT 4 CONSEQUENCES OF INNOVATIONS

Structure

4.1 INTRODUCTION

Consequences are the changes that occur in an individual or a social system as a result of the adoption or rejection of an innovation. In spite of the importance of consequences, they have received relatively little attention by diffusion researchers. Change agents too generally give little attention to consequences. They often assume that adoption of a given innovation will produce mainly beneficial results for adopters. This assumption is one expression of the pro innovation bias. Change agents should recognize their responsibility for the consequences of innovations that they introduce. Ideally, they should be able to predict the advantages and disadvantages of an innovation before introducing it to their clients. This is seldom done, and often it cannot be done.

After studying this unit, you should be able to:

- Explain the meaning and concept of consequences of innovation
- Distinguish between various types of consequences of innovations
- Describe the dynamic equilibrium and equality in the consequences of innovations

4.2 CONSEQUENCES OF INNOVATIONS

Consequences are the changes that occur to an individual or to a social system as a result of the adoption or rejection of an innovation. Although obviously important, the consequences of innovations have received inadequate attention by change agents and by diffusion researchers. Consequences have not been studied adequately because:

a) Change agencies have overemphasized adoption per se, assuming that an innovation's consequences will be positive

b) Usual survey research methods may be inappropriate for investigating consequences, and

c) Consequences are often difficult to measure.

One step towards an improved understanding of the consequences of innovations is to classify them in a taxonomy. Consequences are not uni-dimensional. They can take many forms and are expressed in various ways. We find it useful to analyze three dimensions of consequences:

a) Desirable versus undesirable consequences

b) Direct versus indirect consequences, and

c) Anticipated versus unanticipated consequences.

4.2.1 Desirable versus Undesirable Consequences

Desirable consequences are the functional effects of an innovation for an individual or for a social system. Undesirable consequences are the dysfunctional effects of an innovation to an individual or to a social system. The determination of whether consequences are functional or dysfunctional depends on how the innovation affects the adopters. An innovation can cause consequences for individuals other than its adopters. For instance, rejecters of a new idea may be affected because an innovation benefits the other members of the system who adopt it, widening the socio-economic gap between adopters and rejecters. Everyone in a system usually is touched by the consequences of a technological innovation, whether they are adopters or rejecters.

Example: Internet, which advantages certain individuals and disadvantages others through the digital divide.

An innovation may be functional for a system but not functional for certain individuals in the system. The adoption of miracle varieties of rice and wheat in India and other nations in recent decades led to the Green Revolution. The resulting higher crop yields and farm incomes were important benefits for farmers, as were the lower consumer food prices for society. The Green Revolution also led to a reduction in the number of farmers, migration to urban slums and higher unemployment rates. Although many individuals profited, the Green Revolution led to unequal conditions for the system as a whole. So whether the consequences are desirable or undesirable depends on whether one takes certain individuals, or the entire system, as a point of reference. We may conclude with generalization that the effects of an innovation usually cannot be managed so as to separate the desirable from the undesirable consequences.

Windfall Profits / Loss

By being the first in the field, innovators frequently secure a kind of economic gain called windfall profits. Windfall profits are a special advantage earned by the first adopters of a new idea in a system. Their unit costs are usually lower, and their additions to total production have little effect on the selling price of the product. But when all members of a system adopt a new idea, total production increases, and the price of the product or service eventually drops. An innovator must take risks in order to earn windfall profits. Not all new ideas turn out successfully, and occasionally the innovator gets his or her fingers burned. Adoption of a non-economic or unsuccessful innovation can result in "windfall losses" for the first individuals to adopt. An example of windfall losses occurred in the diffusion of pocket calculators. The first model, sold in 1971, measured three by five inches, cost $249 and could only add, subtract, multiply and divide. Within a year, the price of a four function calculator dropped to $100; in another year the price was only $50; and within a decade the calculator cost less than $10. Its size shrank to the thickness of a credit card. In this case, later adopters gained a windfall benefit by waiting to adopt.

4.2.2 Direct versus Indirect Consequences

A change in one part of a system often initiates a chain reaction of indirect consequences stemming from the direct consequences of an innovation. Direct consequences are the changes to an individual or a social system that occur in immediate response to adoption of an innovation. Indirect consequences are the changes to an individual or a social system that occur as a result of the direct consequences of an innovation. These are the consequences of consequences.

Wet Rice Farming in Madagascar - Direct versus Indirect Consequences

An illustration of the direct and indirect consequences of an innovation is provided by an anthropological study of the adoption of wet rice farming by a tribe in Madagascar (Linton and Kardiner, 1952). The nomadic tribe had cultivated rice by dryland methods. After each harvest, they would move to a different location in a kind of slash and burn agriculture. Then, they changed to wetland (irrigated) rice farming. A pattern of land ownership developed, social status differences appeared, the nuclear family replaced the extended clan, and tribal government changed. The consequences of the technological innovation were both direct and far reaching, in that several generations of indirect consequences from wet rice growing spread from the more direct results.

ORT: The Consequences of Consequences in Family Health Extension

Until the 1980s, an estimated 5 million young children died each year from diarrhoea related causes, representing about 30 percent of all infant deaths in the world. In babies, diarrhoea can cause a 10 percent loss of body weight, which, in a matter of hours, can lead to the baby's death due to dehydration. The most promising breakthrough in the struggle to prevent deaths due to infant diarrhoea occurred when a young medical doctor in Bangladesh invented Oral Rehydration Therapy (ORT). Despite its elegant scientific name, the recipe for ORT is remarkably simple: add one bottle cap of salt and eight bottle caps of sugar to three soft drink bottles of clean water. Salt and sugar are available in every peasant household in the Third World. ORT is an electrolyte mixture that functions to rehydrate the body (that is, to return water to the body so that a baby does not die from dehydration) and provide lost salt. The sugar provides quick energy to help the body recover from dehydration. ORT is a lifesaver, but it can also be dangerous. If the ratio of salt to sugar is accidentally reversed, the baby may die. If clean water is not used, the baby gets diarrhoea again. ORT does not cure the bacteria that cause diarrhoea. ORT only prevents the progression from diarrhoea to dehydration to death. By the mid 1990s, almost every developing nation in Latin America, Africa, and Asia had launched an effective ORT campaign. Integrated child survival campaigns typically emphasize ORT along with breast feeding, immunization of children, improving the quality of drinking water, and better personal sanitation.

Implications : As ORT diffused widely in Third World countries during the late 1980s and early 1990s, the rate of infant mortality dropped and the populations of these nations climbed. How schooling, housing, and jobs to be provided for the millions of infants whose lives were saved by ORT? One answer was a faster rate of adoption of family planning methods. But in many of the poorest countries where the ORT campaigns had been highly successful,

national family planning programmes were relatively ineffective. The beneficial consequences of the rapid adoption of one innovation led to the worsening of another social problem i.e., population. The diffusion of ORT suggests that the indirect consequences of an innovation are often especially difficult to plan for, and manage, as they are often unanticipated.

4.2.3 Anticipated versus Unanticipated Consequences

Anticipated consequences are changes due to an innovation that are recognized and intended by the members of a social system.

Unanticipated consequences are changes due to an innovation that are neither intended nor recognized by the members of a social system. No innovation comes without strings attached. The more technologically advanced an innovation, the more likely its introduction will produce many consequences, both anticipated and latent. A system is like a bowl of marbles: move any one of its elements, and the positions of all the others inevitably change also.

Unanticipated consequences represent a lack of understanding of how an innovation functions, and of the internal and external forces at work in a social system. Awareness of a new idea creates uncertainty about how the innovation will actually function for an individual or other adopting unit in a system. This uncertainty motivates active information seeking about the innovation, especially through interpersonal peer networks. Individuals particularly seek to reduce uncertainty concerning an innovation's expected consequences. Such uncertainty can be decreased to the point where an individual feels well informed enough to adopt the new idea. But uncertainty about an innovation's consequences can never be completely removed.

An adopter is often able to obtain adequate information from peers about the desirable, direct, and anticipated consequences of an innovation. But the unanticipated consequences are, by definition, unknown by individuals at the time of adoption of the innovation. Such unforeseen impacts of a new idea represent innovation evaluation information that cannot be obtained by an individual from other members of his or her system.

In addition to the desirable/undesirable, direct/indirect, and anticipated/unanticipated aspects of the consequences of innovation (discussed earlier), one might classify consequences as to whether they increase or decrease equality among the members of a social system. We may conclude this discussion of the three classifications of consequences with a generalization that the undesirable, indirect, and unanticipated consequences of an innovation usually go together, as do the desirable, direct, and anticipated consequences.

Activity 1: Visit any extension and development agency nearby and enquire about their experiences with consequences of any development innovations. Write your observations.

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Activity 2: Read the following case and answer the questions given at the end.

Case of DDT - The Mosquito Killer

Dichlorodiphenyltrichloroethane (DDT) was one of the important health innovations of the past century, saving the lives of millions of people by protecting them against malaria carrying mosquitoes. This chemical was discovered by a Swiss chemist, Paul Muller, in the late 1930s, while he was looking for a means to protect woolens against moths. Later, in 1948, Muller was awarded the Nobel Prize for his discovery. But for many years, practical uses for DDT were not found. Early in World War II in the Pacific, malaria transmitted by mosquitoes was handicapping the fighting ability of U.S. military personnel. Only about a century ago, it was determined that the malaria parasite was carried by mosquitoes, who infected humans by biting them to suck blood.

In 1943, DDT was being tested at an Army laboratory in Orlando, Florida. One of two duck ponds was doused with DDT, and all the mosquito larvae in this lake promptly died. But a week later, mysteriously, the larvae in the other duck pond, several miles distant, also died. Ducks from the treated pond had visited the second pond, and DDT residue on the their feathers was enough to kill the mosquito larvae. Clearly, here was a very powerful insecticide - DDT was rushed into use in the Pacific War.

DDT also proved to be the perfect killer of the *Anopheles* mosquito, the main carrier of malaria. In the 1940s, malaria was a major public health problem worldwide. In India alone, 75 million people were infected with malaria, and the disease killed 800,000 people each year. Malaria was found throughout Europe, Asia, the Caribbean, and the American South. Leading the DDT attack on mosquitos was Dr. Fred Soper, who had his doctorate from the Johns Hopkins School of Public Health and worked for the Rockefeller Foundation, then leading efforts to improve health around the world.

With all success behind him, Soper set out to eradicate malaria carrying mosquitos worldwide. In league with other malariologists, he convinced the World Health Organization (WHO) to establish a Global Malaria Eradication Programme, with the goal of killing mosquitos in every nation. In India, malaria fatalities dropped to zero by the early 1960s. Millions, perhaps, tens of millions, of lives were saved by Soper's DDT sprayers. Perhaps no other man made drug or chemical has saved more lives.

Soon, however, problems arose in Soper's war on the mosquito. In the late 1940s, a malariologist observed a healthy mosquito flying around a room that had been heavily sprayed with DDT. How this incredible event could have happened? DDT attacks a mosquito's nervous system, sending it into a lurching, twitching spasm before it dies. But due to random genetic mutation, a few mosquitoes in every large population are resistant to DDT. Perhaps the insecticide does not bind to the mosquito's nerve endings because the mosquito has a thicker skin. Resistant mosquitoes then continue to breed, while other mosquitoes are killed by DDT, and soon entire new generations are DDT resistant. Another type of protection from the DDT spraying of walls and ceilings occurred among a type of mosquitoes in the Solomon Islands. These

mosquitoes did not flight on the walls or ceilings of homes; instead, they flew in through a window, bit a human, and then flew back out.

The development of DDT resistant mosquitoes came as a great shock to Soper and his fellows. After some years, countries that had been enthusiastic allies of Soper began to cancel their eradication campaigns. In 1969, WHO dropped its Global Eradication Programme. Soper toured Asia, and was appalled at what he observed. Everywhere mosquitoes, and malaria, were on the increase. Soper blamed these defeats on a lack of discipline in the DDT spraying campaigns. Some labeled him a "disease fascist." Soper advocated heavier and heavier doses of DDT, but in areas with the heaviest spraying, the resistant mosquitoes especially flourished. Soper's dream of a world free of malaria was rapidly unraveling. Then Rachel Carson's bombshell book *Silent spring* was published in 1962, arguing that DDT was being used without concern for its environmental consequences. The U.S. Environmental Protection Agency banned the general use of DDT in the United States in 1972.

Fred Soper was an absolutist, a fanatic, who believed that DDT spraying was the way to prevent malaria. He scoffed at experts who argued that draining the breeding areas of the mosquitos should accompany the spraying and that DDT should be used sparingly and as only one of several tools in a malaria eradication campaign. Standing ramrod straight and always dressed in a suit, Fred Soper learned the hard way that even dramatically effective technological innovations can have perverse consequences. When Soper died in 1975, he was viewed as an enemy by environmentalists. But to the many millions of people whose lives had been saved by his actions, Soper was a hero.

(Source : Gladwell, 2001).

Questions

1) What are the direct and indirect consequences in the above case?

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2) What are the implications of this case for diffusion researchers?

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Check Your Progress 1

Note: a) Use the spaces given below for your answers.

b) Check your answers with those given at the end of the unit.

1) What do you mean by consequences of innovations?

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2) Name the various types of consequences.

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4.3 DYNAMIC EQUILIBRIUM AND GAPS

What rate of change allows a system to achieve the maximum benefits of an innovation and yet not produce disequilibrium in the social system? Three types of equilibrium are possible in a system:

- Stable equilibrium
- Dynamic equilibrium
- Disequilibrium

Stable equilibrium : It occurs when there is almost no change in the structure or functioning of a social system. An example of stable equilibrium is a completely isolated and traditional system in which the rate of change is almost zero.

Dynamic equilibrium : It occurs when the rate of change in a social system occurs at a rate that is commensurate with the system's ability to cope with it. Change occurs in a system in dynamic equilibrium, but it occurs at a rate that allows the system to adapt to it.

Disequilibrium : It occurs when the rate of change is too rapid to permit a social system to adjust. An analogy is traffic circle with one too many cars on it; the circulation of vehicles slows down until eventually all movement stops. The social disorganization that accompanies disequilibrium makes it a painful and inefficient way for change to occur in a system.

Gauging the optimum rate of change in a system is difficult. The long range goal of most change agents is to produce a condition of dynamic equilibrium in their client system. Innovations should be introduced into the system at a deliberate rate that allows for careful balancing of the system's ability to adjust to the changes.

4.3.1 Equality in the Consequences of Innovations

One of the ways in which change agents shape the consequences of an innovation is who they work with most closely. If a change agent were to contact the poorer and less educated individuals in a social system, rather than the socio-economic elites (as is usually the case), the benefits from the development innovations that are so introduced would be more equal. Usually, however, change agents have most contacts with the better educated, higher status individuals in a system, and thus tend to widen socio-economic gaps through the innovations that they introduce.

The diffusion of innovations generally causes wider socioeconomic gaps within an audience because:

b) Innovators and early adopters have favorable attitudes toward new ideas and more actively search for innovations. They also possess more resources and thus can adopt higher cost innovations that later adopters cannot afford.

c) Professional change agents concentrate their client contacts on innovators and early adopters in hopes that the opinion leaders among these earlier adopting categories will then pass along the new ideas they have learned to their followers. But most interpersonal network links connect individuals who are similar in adopter category and socioeconomic status. So innovations generally trickle across, rather than down, in the interpersonal communication networks of a system.

d) By adopting innovations relatively sooner than others in their system, innovators and early adopters achieve windfall profits, thereby widening the socioeconomic gap between these earlier adopting categories versus later adopting categories. Thus the earlier adopters get richer, and the later adopters' economic gain is comparatively less.

The diffusion of innovations usually decreases the degree of equality in a social system. But this tendency toward gap widening need not occur, if special strategies are followed to narrow gaps.

4.3.2 The Communication Effects Gap

The two questions that diffusion researchers attempted are

i) What are the effects of a communication activity to diffuse an innovation?

ii) Has the communication activity to diffuse an innovation had a greater or different, effect on certain individuals, rather than on others?

These effects are measured as the average change in the knowledge, attitudes, or overt behavior (that is, adoption) regarding an innovation by a set of individuals. The researchers seeks to ascertain the equality of effects of communication, not just how much effect occurred on the average (or in the aggregate). A useful research paradigm for studying gaps was that data should be gathered at two or more points in time, both before and after a diffusion intervention. The measure of effects should be not just the average amount of behavior change in the audience (the first dimension) but whether gaps in socioeconomic status and/or in knowledge of information increased or decreased (this is the second dimension of effects).

In essence, the core issue is that we should look at who in an audience was affected most and who least. This analytic approach looked for differential effects, rather than just for average effects or aggregate effects on the entire audience. Scholars began to investigate the degree to which a diffusion program widened or narrowed gaps among the members of a system as consequences of innovations.

4.3.3 Gap - Widening Consequences of the Diffusion of Innovations

The consequences of the diffusion of innovations usually widen the socioeconomic gap between the earlier and later adopting categories in a system. A second, related conclusion is: the consequences of the diffusion of innovation usually widen the socioeconomic gap between the audience segments previously high and low in socioeconomic status.

4.3.4 Social Structure and the Equality of Consequences

How an innovation is introduced determines, in part, the degree to which it causes unequal consequences.

Example: Evidence for this point comes from an investigation of the impacts of adopting irrigation wells by villagers in Bangladesh and in Pakistan (Gotsch, 1972). In each country, an irrigation well cost about the same amount and provided water for 50 to 80 acres of farmland. The introduction of Green Revolution wheat and rice varieties created a need for irrigation in both nations. But the equality of the consequences of an identical innovation was quite different in Pakistan from those in Bangladesh, mainly because of the different social organization that accompanied the new technology. In Pakistan, 70 percent of the irrigation wells were purchased by farmers with 25 acres or more (considered very large farms). Only 4 percent of the villagers with farms of less than 13 acres adopted. When the irrigation water was accompanied by the use of fertilizers and other agricultural chemicals, a farmer typically could increase his net farm income by about 45 percent. So the irrigation wells in Pakistan made the rich richer and the poor farmers relatively poorer.

However in Bangladesh, average farm size was only 1 or 2 acres, not Large enough to justify private ownership of irrigation well. So village cooperatives typically purchased a pump and well and provided irrigation water to everyone who belonged to the co operative. Incomes were doubled because farmers could raise a winter crop during the season when rainfall was scarce. In Bangladesh, the rate of adoption of the wells was slower than in Pakistan because the innovation decision was collective rather than individual optional in nature. But the consequences of the innovation were distributed much more equally than they were in Pakistan, where an initially high degree of social stratification concentrated the impacts of the irrigation wells on the richer farmers.

The social structure, in which the innovation of pump well irrigation was introduced in Bangladesh and Pakistan, rather than the innovation itself, determined the distribution of its socioeconomic impacts. This investigation, along with others, suggests generalization that a system's social structure partly determines the equality versus inequality of an innovation's consequences. When a system's structure is already very unequal, it is likely that when an innovation is introduced (especially if it is a relatively high cost innovation), its consequences will lead to even greater inequality in the form of wider socioeconomic gaps.

Social structural factors are not necessarily static barriers or facilitators of the adoption of innovations and their consequences. A rural development agency in Bangladesh had organized the village cooperatives just before the introduction of irrigation wells, for exactly the purpose that they served: to enable small farmers, through banding together, to adopt relatively high cost innovations such as tractors and irrigation wells. Here we see again the potential power of organizing for social change that a set of individuals, once organized in groups, can express a collective efficacy in achieving group actions that they could not attain as relatively powerless individuals.

4.3.5 Strategies for Narrowing Gaps

As described in the above example, innovations do not inevitably widen socioeconomic gaps within a system. But such gap widening inequality will usually occur unless a change agency devotes special efforts to prevent it. What strategies can be used by change agencies for gap narrowing? Here are list of some possible strategies, organized under the major reasons why socioeconomic gaps ordinarily widen as a consequence of innovations.

a) 'Ups' Have Greater Access to Information, Creating Awareness of Innovations, Than Do 'Downs.'

- Messages that are redundant or that are of less interest and/or benefit to the higher socioeconomic sub-audience should be provided. This strategy enables the lower socioeconomic sub-audience to catch up.
- Communication messages should be tailored especially for the lower socioeconomic sub-audience in terms of their particular characteristics, such as formal education, beliefs, communication habits, and the like.

  Example: More line drawings, photographs, and other visual aids are often needed because the "downs" have lower levels of formal education.
- Communication channels that get through to 'downs' should be utilized so that access is not a barrier to gaining awareness knowledge of innovations.

  Example : In developing nations, many downs" are not literate, so print media are useless and radio / TV may be more helpful.
- 'Downs' should be organized into small groups in which they can learn about innovations and discuss them. This approach helps to gain self efficacy and collective efficacy, a belief that they have control over their environment.
- Change agent contact should be shifted from the innovators and early adopters to the late majority and laggards. Later adopting categories tend to place less credibility in professional change agents, and they seldom actively seek information from them, as they place greater trust in interpersonal peer networks. But when change agents directly contact late majority and laggards, and if the innovations are appropriate to their needs, the response has often been encouraging.

b) 'Ups' Have Greater Access to Innovation Evaluation Information from Peers than Do 'Downs'

- Trickle down theory suggests that 'downs' rapidly learn of the 'ups' personal experience with an innovation and follow suit. In many systems,

however, 'ups' talk primarily to 'ups' and 'downs' to 'downs' (Roling et al., 1976). This problem can be overcome by the following means.

- Opinion leaders among the disadvantaged individuals in a system should be identified and change agent contact should be concentrated on them, to activate their peer networks about an innovation.
- Change agent aides should be selected from among the 'downs' who can contact their homophilous peers about innovations.
- Groups should be formed among the 'downs' to provide them with leadership and social reinforcement in their innovation decision making. Such small groups give the 'downs' greater economic, political, and social strength (as in the example of the Bangladesh village cooperatives that adopted irrigation pump wells).

C) 'Ups' Possess Greater Slack Resources for Adopting Innovations Than 'Downs.'

- 'Ups' can usually adopt innovations much more easily than 'downs,' particularly if these new ideas are expensive and technologically complex, and if they provide economies of scale. What strategies can overcome these gap widening tendencies?
- Appropriate innovations for 'downs' should be recommended. R&D activities should be directed at the problems of the lower socioeconomic members of a system to create these innovations.
- A social organization should be created to allow 'downs' to command the resources needed to adopt certain high cost innovations (as in the example of the Bangladesh village cooperatives that adopted irrigation pump wells).
- A means through which 'downs' can participate in the planning and execution of diffusion programmes including setting priorities as to which innovations will be diffused, should be provided.
- Special diffusion agencies should be established to work for 'downs' thus enabling change agents to meet the particular needs of the lower socioeconomic audience.

Check Your Progress 2

Note: a) Use the spaces given below for your answers.

b) Check your answers with those given at the end of the unit.

1) What are the three types of equilibriums possible in a system?

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2) Why diffusion of innovations generally causes wider socioeconomic gaps among social system?

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4.4 LET US SUM UP

In this unit, we discussed the meaning and concept of innovations. The consequences are classified as (1) desirable versus undesirable, (2) direct versus indirect, and (3) anticipated versus unanticipated. Many innovations cause both positive and negative consequences, and it is thus erroneous to assume that the desirable impacts can be achieved without also experiencing undesirable effects. We conclude that the effects of an innovation usually cannot be managed so as to separate the desirable from the undesirable consequences. Direct consequences are the changes to an individual or a system that occur in immediate response to an innovation. Indirect consequences are the changes to an individual or a system that occur as a result of the direct consequences of an innovation. They are the consequences of the consequences of an innovation. Anticipated consequences are changes due to an innovation that are recognized and intended by the members of a system. Unanticipated consequences are changes due to an innovation that are neither intended nor recognized by the members of a system. We also discussed that stable equilibrium occurs when almost no change is occuring in the structure or functioning of a social system. Dynamic equilibrium occurs when the rate of change in a social system is commensurate with the system's ability to cope with it. Disequilibrium occurs when the rate of change is too rapid to permit the system to adjust. Change agents generally wish to achieve a rate of change that leads to dynamic equilibrium, and to avoid disequilibrium. In the last part of the unit we discussed that when a system's structure is already very unequal, the consequences of an innovation lead to even greater inequality in the form of wider socioeconomic gaps. We also discussed the strategies that could be followed in order to narrow gaps.

4.5 KEYWORDS

Innovation : An idea, practice, or object that is perceived as new by an individual or other unit of adoption.

Windfall profits : Positive consequences of an innovation may occur for certain members of a system at the expense of others. By the time laggards adopt a new idea, they are often forced to do so by economic pressures. By being the first in the field, innovators frequently secure a kind of economic gain called windfall profits.

Social System : A set of interrelated units involved in joint problem solving to accomplish a common goal.

Principles Knowledge : It is the information dealing with the functioning principles underlying how an innovation works.

D**igital Divide** : It is the gap that exists between individuals advantaged by the Internet and those individuals relatively disadvantaged by the Internet.

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4.7 CHECK YOUR PROGRESS – POSSIBLE ANSWERS

Check Your Progress 1

1) Consequences are the changes that occur an individual or a social system as a result of the adoption or rejection of an innovation.

2) The three types of consequences are: Desirable versus undesirable consequences; Direct versus indirect consequences, and Anticipated versus unanticipated consequences.

Check Your Progress 2

1) The three types of equilibriums possible in a system are: Stable equilibrium; Dynamic equilibrium and; Disequilibrium.

2) The diffusion of innovations generally causes wider socioeconomic gaps within an audience because: (a) Innovators and early adopters have favorable attitudes toward new ideas and more actively search for innovations; (b) Professional change agents concentrate their client contacts on innovators and early adopters in hopes that the opinion leaders among these earlier adopting categories will then pass along the new ideas they have learned to their followers. (c) By adopting innovations relatively sooner than others in their system, innovators and early adopters achieve windfall profits, thereby widening the socioeconomic gap.

MDV-108: DEVELOPMENT COMMUNICATION AND EXTENSION

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MPDD/IGNOU/P.O. 1K/February, 2019

ISBN : 978-93-88498-77-7