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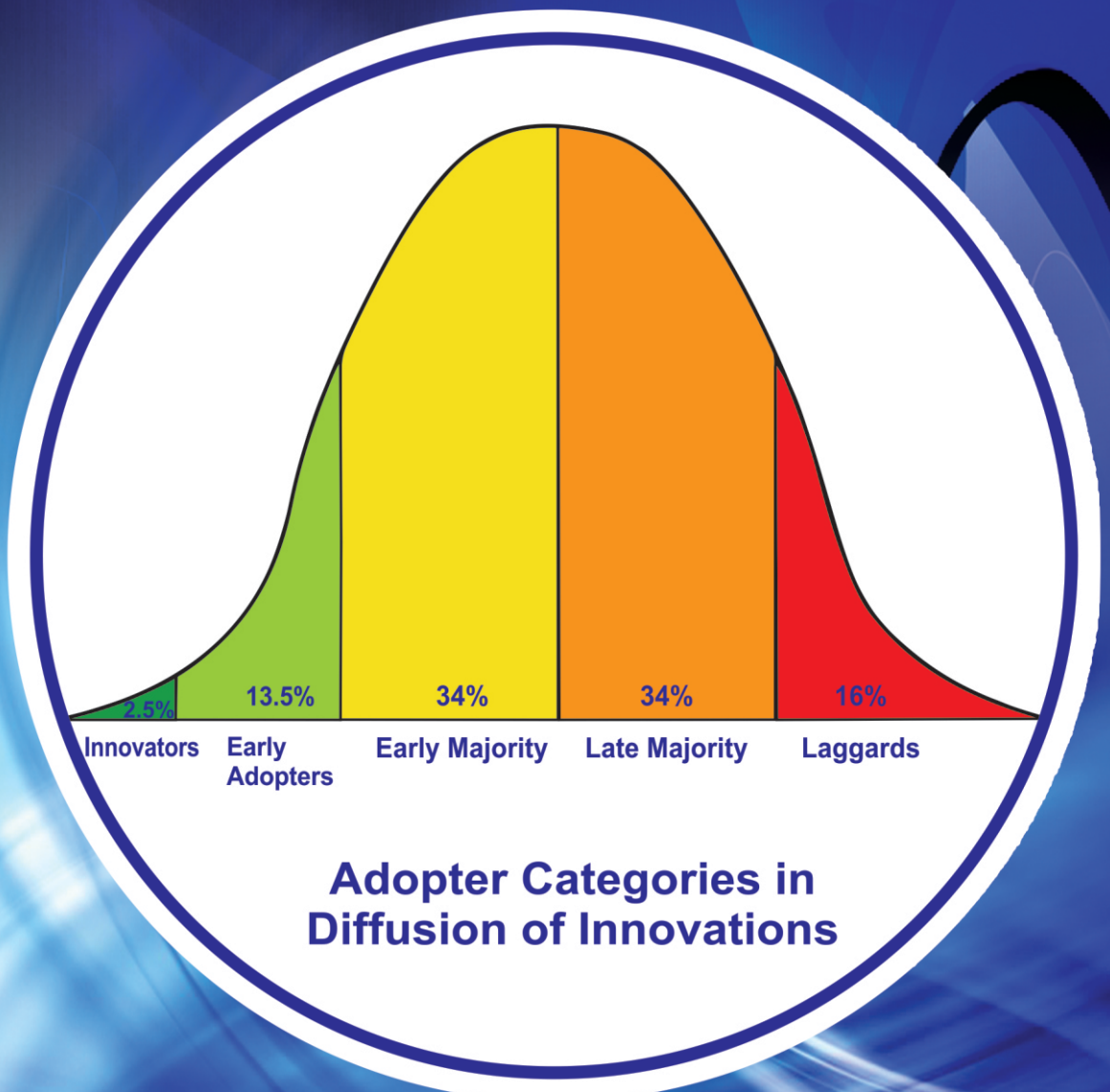
School of Extension and Development Studies

MDV – 108
Development Communication and Extension



Adopter Categories in Diffusion of Innovations

Diffusion of Innovations for Development 5

''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

Indira Gandhi National Open University
School of Extension and Development Studies

MDV-108
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Block

5

DIFFUSION OF INNOVATIONS FOR DEVELOPMENT

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BLOCK 5 DIFFUSION OF INNOVATIONS FOR DEVELOPMENT

Dear Learner,

One or more of the following questions often pose challenge to development workers:

- There is lag between what is known and what is done for development by most people. Why?
- Where do most people get their new developmental ideas?
- In some areas, people seem to accept new developmental ideas quickly and in others, nearly all the people are slow to take to new things. Why?
- Some developmental programmes are more popular and readily accepted by people, while some are a big failure. Why?
- Some people accept new developmental ideas and put them into practice faster than others. Why?
- Some new developmental ideas and practices are accepted quickly and with little apparent efforts, while others are accepted only after years of effort put forth by development agencies. Why?

Understanding of the Block 5 on 'Diffusion of Innovations for Development' shall help the development workers like you to answer the above questions and accelerate the adoption of the innovations for development.

Unit 1 on **'Diffusion of Innovations: An Overview'** discusses meaning of diffusion of development innovations and adoption. It also discusses the elements in the diffusion of innovations viz., innovation, communication channel, time and social system.

Unit 2 on **'Innovation Process for Development'** focus is on Innovation Development Process – meaning, concept and steps - recognizing need, research, development, commercialization, diffusion & adoption and consequences (With examples / case studies). Innovation Decision Process – knowledge, persuasion, decision, implementation and confirmation stages (With examples / case studies).

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UNIT 1 DIFFUSION OF INNOVATIONS: AN OVERVIEW

Structure

1.1 INTRODUCTION

Dear Learner,

In the Block 3 of this course, we discussed that development is a widely participatory process of directed social change in a society, intended to bring about both social and material advancement for the majority of the people in the social system. We also discussed that, such widespread behaviour change could only be attained by effective utilization of communication for development. One among the difficult tasks in development work is communicating new developmental ideas for widespread adoption even when they have understandable advantages to the social system. A common problem for many development workers is how to speed up the rate of diffusion of developmental ideas / innovations. So in this unit, we discussed an overview of how innovations are diffused and what are the elements in the diffusion of innovations with suitable examples.

After studying this unit you should be able to:

- Explain the concept and meaning of diffusion of innovations and adoption.
- Describe the elements in the diffusion of innovations.

1.2 DIFFUSION - ADOPTION PROCESS

Diffusion of Innovations is a theory that seeks to explain how, why, and at what rate new developmental ideas, practices and technology spread through the social system. The concept was first studied by the French sociologist Gabriel Tarde (1890) and by German and Austrian anthropologists such as Friedrich Ratzel and Leo Frobenius. Its basic epidemiological or internal-influence form was formulated by H. Earl Pemberton, who provided examples of institutional diffusion such as postage stamps and compulsory school laws. In 1962 Everett Rogers, a professor of Rural Sociology published a book 'Diffusion of Innovations'. In the book, Rogers synthesized research from over 508 diffusion studies and proposed a theory for the adoption of innovations among individuals and organizations.

1.2.1 Diffusion

Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system. From the fist unit of block 3 under this course, we learnt that, communication is the act of getting a development worker (sender) and people (receiver) tuned together for a particular message or a series of messages related to development work. Here both the sender and receiver should reach a mutual understanding so as to call communication as a two way process.

Diffusion is a special type of communication, in that the messages are concerned with new ideas. It is this 'newness' of the idea in the message content of communication that gives diffusion its special character. The diffusion of innovations is essentially a social process in which subjectively perceived information about a new idea is communicated. The new idea means that some degree of uncertainty is involved in diffusion. However, a technology based innovation or need based developmental idea / practice embodies information that reduces uncertainty about cause – effect relationship in solving a developmental problem. Diffusion of innovations also brings in social change – defined as the process by which alteration occurs in the structure and function of a social system. When new ideas are invented, diffused, and adopted or rejected leads to certain consequences which bring in social change.

1.2.2 Diffusion Process

Diffusion of innovations refers to the spread of the developmental innovations through a population, and is simply the result of a host of individual adoption decisions (Fig. 1.1). If individual adoption decisions are, to an extent, predictable, then the larger diffusion process is also predictable. It follows a pattern, and that element of predictability has substantial implications. Therefore as per Rogers, diffusion process is "the spread of a new idea from its source of invention or creation to its ultimate use of adopters". The diffusion of innovations is essentially a social process in which subjectively perceived information about a new idea is communicated.

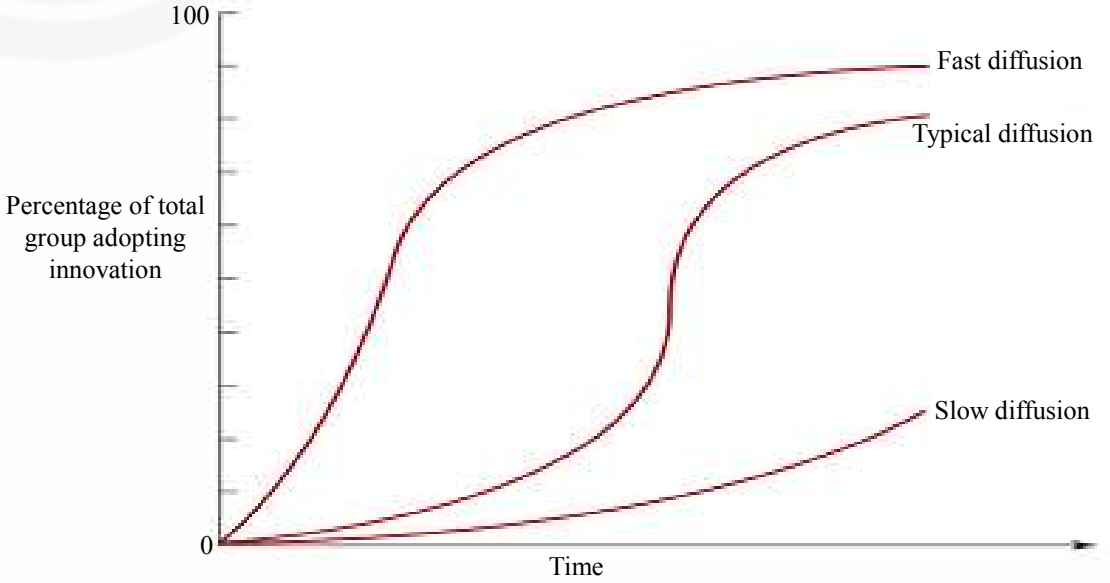

Fig. 1.1 The diffusion process

1.2.3 Adoption and Adoption Process

Adoption is a decision to make full use of an innovation as the best course of action available. An innovation diffuses within a social system through its adoption by individuals and groups. The decision to adopt an innovation, however, "is not normally a single, instantaneous act", it involves as a process. The "adoption process" is a decision-making process goes through a number of mental stages before making a final decision to adopt an innovation. In their pioneering work of diffusion of hybrid corn seed in two Iowa's communities in the United States, Ryan and Gross (1943) first drew attention to the existence of a sequence of stages in the process of adoption:

- awareness of the existence of an innovation
- conviction of its usefulness
- acceptance in the sense of willingness to try the innovations
- complete adoption

Please refer unit 2 of this block for detailed discussion on these stages.

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 diffusion and diffusion process.

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2) What do you mean by adoption of innovation?

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3) What is adoption process?

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1.3 ELEMENTS IN THE DIFFUSION OF INNOVATIONS

In the above section we defined diffusion as the process by which an *innovation* is *communicated through certain channels* over *time* among the members of a *social system.* Thus the four main elements that influence the spread of a new idea are:

i) Innovation

ii) Communication channels

iii) Time, and

iv) Social system.

Key Elements in Diffusion Process	
Element	**Meaning**
Innovation	Rogers defines an innovation as an idea, practice, or object that is perceived as new by an individual or other unit of adoption.
Communication channel	A communication channel is the means by which messages get from one individual to another.
Time	The innovation-decision period is the length of time required to pass through the innovation-decision process.
Social system	A social system is defined as a set of interrelated units that are engaged in joint problem solving to accomplish a common goal.

1.3.1 Innovation

An innovation is an idea, practice, or object that is perceived as new or an improvement over the existing one by the individual or members of a social system. If the idea seems new, it is an innovation. As the innovation may represent a slight modification of, or a significant departure from, the existing idea or practice. The 'idea' constitutes the central element of an innovation which often manifests itself in a material or behavioural form.

Examples for Material Form : Improved transport system like Metro, improved agricultural implements, high-yielding and disease resistant seeds, bio-fertilizers, pesticides and herbicides.

Examples for Behavioral Form: Improved cultural practices.

An innovation do not diffuse at the same rate. An innovation which represents only a slight modification of an existing idea or practice will obviously diffuse at a faster rate than the one which represents a significant departure from it.

Some of the important attributes of an innovation which influence the rate of adoption are:

i) Relative advantage

ii) Compatibility

iii) Complexity

iv) Trialability

v) Observability.

These traits are a matter of perception to the users rather than being inherent qualities of an innovation. The perceived qualities of an innovation vary for individual and social system as a whole. However, in general innovations that are perceived by individuals as having greater relative advantage, compatibility, trialability and observability and less complexity will be adopted more rapidly than other innovations. These five qualities are the most important characteristics of innovations in explaining the rate of adoption.

Please refer Unit 1 of Block 6 of this course for a detailed discussion on attributes of innovation.

Types of Innovations

There are three main types of innovations that are diffused in different ways:

Continuous Innovation: This type of innovation is a simple changing or improving of an already existing product where the adopter still uses the product in the same fashion as they had before.

Example of a continuous innovation: Automobile industry as it continues to change and develop models / variants.

Dynamically Continuous Innovation: Here the innovation can either be a creation of a new product or a radical change to an existing one. Here the consumption patterns of people are altered some.

Example: Compact discs.

Discontinuous Innovation: This is a totally new product in the market. This is the big idea innovation. In this situation, because the product has never been seen before, there are total changes to consumers buying and using patterns.

Most of the new ideas are technological innovations and we often use the word "innovation" and "technology" as synonyms. A technology is a design for instrumental action that reduces the uncertainty in the cause-effect relationships involved in advising and desired outcome". A technology usually has two components:

i) A hardware aspect, consisting of the tool that embodies the technology as a material or physical object, and

ii) A software aspect, consisting of the information base for the tool.

Example: Computer hardware consisting of semiconductors, transistors, electrical connections, and the metal frame to protect these electronic components. The software consisting of the coded commands, instructions, and other information aspects of the tool that allow us to use to extend human capabilities in solving certain problems.

Some innovations only have a software component, which means they have a relatively lower degree of observability and thus a slower rate of innovation and their spread is relatively difficult to trace. Even through the software component of a technology is often not so easy to observe, we should not forget that technology always represents a mixture of hardware and software aspects.

Technology / developmental innovations are a means of uncertainty reduction that is made possible by information about the cause-effect relationships on which the technology /developmental innovations are based. A technological / developmental innovation has at least some degree of benefit for its potential adopters. This advantage provides the motivation that impels force an individuals to exert effort in order to learn about the innovation. This learning reduce the uncertainty and leads to a decision concerning adoption or rejection. Thus, the innovation decision process is essentially an information – seeking and information – processing activity in which the individual is motivated to reduce uncertainly about the advantages and disadvantages of the innovation.

1.3.2 Communication Channels

A communication channel is the means by which messages get from one individual to another.

Examples: Mass media channels, Interpersonal channels.

Mass media channels are all those means of transmitting messages that involve a mass medium such as radio, television, newspapers and so on, which enable a source of one or a few individuals to reach an audience of many.

Interpersonal channels involve a face-to-face exchange between two or more individuals. Interpersonal channels are more effective in persuading an individual to accept a new idea, especially if the interpersonal channel links two or more individuals who are similar in socio-economic status, and education.

Communication Model Vs Elements of Diffusion

According to Rogers (1996), diffusion refers to "the process by which an innovation is communicated through certain channels over time among the members of a social system. An Innovation is an idea, practice or object perceived as new by an individual or other unit of adoption. The diffusion of innovations involves both mass media and interpersonal communication channels. That is, by sharing communication channels such as interpersonal communication or mass communication, people can get information of an innovation and perceive its innovation as useful. Lasswell (1948) presented a well-known model of communication that is analyzed as five parts, S-M-C-R-E (Sender-Message-Channel-Receiver-Effect). Rogers (1995) mentioned, "this S-M-C-R-E communication model corresponds closely to the elements of diffusion". Specifically:

i) Sender can be inventors or opinion leaders

ii) Message can be a new idea or product

iii) Channels can be interpersonal or mass communication

iv) Receivers can be members of a social system, and

v) Effect can be individual's adoption or social change.

Most individuals do not evaluate an innovation on the basis of scientific studies of its consequences, although such objective evaluations are not entirely irrelevant, especially to the very first individuals who adopt. Instead most people depend mainly on subjective evaluation of an innovation, conveyed to them from individuals like themselves who have previously adopted the innovations. This dependence on the experience of near peers indicates that diffusion is a social process and the heart of diffusion process consists of the modeling and imitation by potential adopters of their network partners who have adopted previously. More effective communication occurs when two or more individuals belong to the same groups, live or work near each other, and share the same interests. More effective communication occurs in such homophilous condition in terms of knowledge gain, attitude formation and overt behaviour change.

One of the most distinctive problems in the diffusion of innovations is that the participants are usually quite heterophilous. This difference frequently leads to ineffective communication as the participants do not talk the same language. In fact, when two individuals are identical regarding their technical grasp of an innovation, no diffusion can occur as there is no new information to exchange. The very nature of diffusion demands that at least some degree of heterophily be present between two participants.

Heterophily and Homophily Vis – a Vis Communication Channels

Homophily is the degree to which pairs of individuals who interact are similar in certain attributes, such as beliefs, education, social status, and the like. When given the choice, individuals usually choose to interact with someone similar to him or herself. Furthermore, homophilous individuals engage in more effective communication because their similarities lead to greater knowledge gain as well as attitude or behavior change. However, most participants in the diffusion of innovations are heterophilous, meaning they speak different languages, so to speak. The problem is that diffusion requires a certain degree of heterophily; if two individuals are identical, no diffusion occurs because no new information can be exchanged. Therefore, an ideal situation would involve two individuals who are homophilous in every way, except in knowledge of the innovation.

1.3.3 Time

Time which is the is the 3rd element in diffusion process is involved in:

i) Innovation – decision process

ii) Innovativeness, and

iii) Rate of adoption of innovation

Innovation-Decision Process : It is the mental process through which as individual or other decision making unit passes from first knowledge of an innovation to forming an attitude towards the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision.

We conceptualize five stages in this process viz.,

i) Knowledge

ii) Persuasion

iii) Decision

iv) Implementation, and

v) Confirmation

Please refer unit 2 of this block for a detailed discussion on the above stages.

An individual seeks information at various stages in the innovation – decision process in order to decrease uncertainty about innovation's expected consequences. The decision stage leads to adoption, a decision to make full use of an innovation as the best course of action available, or to rejection, a decision not to adopt an innovation.

Types of Innovation-Decisions

Two factors determine what type a particular decision is:

i) Whether the decision is made freely and implemented voluntarily,

ii) Who makes the decision.Based on these considerations, three types of innovation-decisions have been identified within diffusion of innovations.

Type	Meaning
Optional Innovation-Decision	This decision is made by an individual who is in some way distinguished from others in a social system
Collective Innovation-Decision	This decision is made collectively by all individuals of a social system.
Authority Innovation-Decision	This decision is made for the entire social system by few individuals in positions of influence or power.

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. Based on innovativeness, the adopters can be classified into five categories viz.,

i) Innovators

ii) Early adopters

iii) Early majority

iv) Late majority, and

v) Laggards.

Please refer unit 2 under block 6 of this course for a detailed discussion on the adopter categories and their characteristics.

Rate of Adoption: It is the relative speed with which an innovation is adopted by members of a social system. The rate of adoption is usually measured by the length of time required for a certain percentage of the members of a system to adopt an innovation. It is a system perspective rather than an individual as a unit of analysis. There are differences in the rate of adoption for the same innovation in different social systems.

1.3.4 Social System

A social system is defined as a set of interrelated units that are engaged in joint problem solving to accomplish a common goal. The members or units can be individuals, informal groups, organizations, or sub systems. The sharing of common objective binds the system together.

Diffusion occurs within a social system. The social structure of the system influence how and what information is disseminated. Knowledge of social structure is important to consider while studying diffusion.

Example 1 : A village as a social system is made up of a variety of individuals and groups with distinctive roles, norms and goals all of which, at least in ideal terms, functionally relate to each other to attain its major goals and objectives. The structure of a social system constitutes a set of boundaries within which innovation diffuse. The differences in the adoption of innovations at the village level can often to explained in terms of their differences in structural characteristics. The degree to which a village is structurally homogeneous or heterogeneous, unitary or highly stratified, affects the rate of diffusion of innovations within its boundaries. The information can be distributed through formal (Government) and informed communication structures (peers, groups etc.).

Example 2 : In a village 'A' the rate of adoption of an innovation was 57 percent and only 26 percent in village B. This indicates that social and communication structures of these two villages are quite different 'regarding the diffusion of innovation, even though these innovations had promoted equally in both villages by Government agency. We can predict that in village 'A' the friends, neighbours are more likely to encouraging others to adopt since they themselves have adopted, and the village leaders in village 'A' are specially committed to adoption of an innovation, while in village 'B' they are not. This example shows how a system's structure can effect the diffusion and adoption of innovations, over and above the effect of such variables as the individual characteristics of the members of the system. Also individual innovativeness is affected by individuals' characteristics and by the nature of the social system in which individuals are members.

Diffusion of a Medical Drug Among Doctors

According to Rogers, the diffusion theory became more widely accepted after Coleman et al. (1966) conducted a study on the diffusion of Tetracycline, a new medical drug, in 1966. The drug company who invented this successful new drug wanted to investigate the effectiveness of their Tetracycline advertisements, which were placed in medical journals. The company asked three professors at Columbia University to find out how physicians adopted the new innovation and how mass communication influenced this adoption process. They conducted a survey to gather accurate and reliable data. Different with previous diffusion research that relied on respondents' recall of how they adopted new technology, this study gathered data both from physicians' responses and pharmacies' prescription. In addition to this, Coleman et al., (1966) asked their respondents to list their interpersonal connections in order to investigate the effect of interpersonal network links with the new drug adoption. The result shows that the percentage of adoption of the new drug

followed an S-shaped curve, but that the rate of tetracycline adoption was faster than the rate of adoption of other innovations. The researchers also found that doctors who are cosmopolite were likely to adopt the new drug. One of the most important findings was that doctors who had more interpersonal networks adopted the new medical drug more quickly than those that did not. This meant that interpersonal communication channels with peers had a strong influence on the adoption process. Rogers noted that this Columbia University study is "one of the most influential diffusion studies in showing that the diffusion of an innovation is essentially a social process that occurs through interpersonal networks". In fact, Rogers mentioned that the Columbia University Drug Study made a contribution to identify the importance of social networks in the diffusion process.

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 elements of diffusion process

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2) What do you mean by social system?

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3) Knowledge of social structure is important to consider while studying diffusion. Do you agree with this statement? Support your answer.

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4) How heterophily or homophily influence diffusion of innovation?

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1.4 LET US SUM UP

A common constraint for many development workers is how to speed up the rate of diffusion of developmental ideas / innovations. So in this unit, we discussed an overview of how innovations are diffused and what are the elements in the diffusion of innovations with suitable examples. We started with a brief history on the research on the diffusion of innovations and understood that it is a theory that seeks to explain how, why, and at what rate new developmental ideas, practices and technology spread through the social system. The concept of diffusion process is discussed and concluded that it is essentially a social process in which subjectively perceived information about a new idea is communicated. Later we conversed about adoption process and understood it as a decision-making process which goes through a number of mental stages before making a final decision to adopt an innovation. Later with examples the four main elements that influence the spread of a new idea are discussed viz., innovation, communication channels, time, and social system.

1.5 KEYWORDS

Diffusion of Innovations Theory : It is a theory that seeks to explain how, why, and at what rate new developmental ideas, practices and technology spread through the social system.

Diffusion : Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system.

Diffusion Process : Diffusion process is the spread of a new idea from its source of invention or creation to its ultimate use of adopters.

Adoption : It is a decision to make full use of an innovation as the best course of action available.

Adoption Process : It is a decision-making process goes through a number of mental stages before making a final decision to adopt an innovation.

Elements in Diffusion of Innovations : The four main elements that influence the spread of a new idea are: innovation; communication channels; time, and; social system.

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

Communication channel : A communication channel is the means by which messages get from one individual to another.

Time : The innovation-decision period is the length of time required to pass through the innovation-decision process.

Social System : A social system is defined as a set of interrelated

units that are engaged in joint problem solving to accomplish a common goal.

Homophily : It is the degree to which pairs of individuals who interact are similar in certain attributes, such as beliefs, education, social status, and the like.

Innovation-Decision Process : It is the mental process through which as individual or other decision making unit passes from first knowledge of an innovation to forming an attitude towards the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision.

Optional Innovation- Decision: This decision is made by an individual who is in some way distinguished from others in a social system

Collective Innovation-Decision: This decision is made collectively by all individuals of a social system.

Authority Innovation-Decision: This decision is made for the entire social system by few individuals in positions of influence or power.

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1.7 CHECK YOUR PROGRESS – POSSIBLE ANSWERS

Check Your Progress 1

1) Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system. Diffusion process is the spread of a new idea from its source of invention or creation to its ultimate use of adopters.

2) Adoption is a decision to make full use of an innovation as the best course of action available.

3) The adoption process is a decision-making process goes through a number of mental stages (awareness of the existence of an innovation ; conviction of its usefulness; acceptance in the sense of willingness to try the innovations and ; complete adoption) before making a final decision to adopt an innovation.

Check Your Progress 2

1) The four elements of diffusion process are: innovation; communication channels; time, and; social system.

2) A social system is defined as a set of interrelated units that are engaged in joint problem solving to accomplish a common goal.

3) The social structure of the system influence how and what information is disseminated. The structure of a social system constitutes a set of boundaries within which innovation diffuse. The differences in the adoption of innovations at the village level can often to explained in terms of their differences in structural characteristics. The degree to which a village is structurally homogeneous or heterogeneous, unitary or highly stratified, affects the rate of diffusion of innovations within its boundaries.

   Homophily is the degree to which pairs of individuals who interact are similar in certain attributes, such as beliefs, education, social status, and the like. When given the choice, individuals usually choose to interact with someone similar to him or herself. Furthermore, homophilous individuals engage in more effective communication because their similarities lead to greater knowledge gain as well as attitude or behavior change. However, most participants in the diffusion of innovations are heterophilous, meaning they speak different languages, so to speak. The problem is that diffusion requires a certain degree of heterophily; if two individuals are identical, no diffusion occurs because no new information can be exchanged. Therefore, an ideal situation would involve two individuals who are homophilous in every way, except in knowledge of the innovation.

UNIT 2 INNOVATION PROCESS FOR DEVELOPMENT

Structure

2.1 INTRODUCTION

Dear Learner,

In the previous unit we discussed the innovation as an idea, practice, or object that is perceived as new or an improvement over the existing one by the individual or members of a social system. As a student of development studies, the following questions may come into your mind.

- Where do development innovations come from?
- What are the factors influencing their origin?
- How does their origin influence later their diffusion and consequences?

In the unit 2 of block 6 under this course, we discussed that adoption of an innovation usually follows a normal, S shaped curve when plotted over time on a frequency basis. Past research studies on diffusion and adoption of innovations have typically began at the point left hand tail of the S shaped curve, i.e., with the very first adopters of any innovation. However, decisions and events occurring previous to this point lead to development of an innovation. Therefore, those decisions and events have strong influence on the diffusion and adoption of innovations.

After studying this unit you should be able to:

- Explain the concept and meaning of innovation development and decision processes.
- Describe the innovation - decision process model

2.2 INNOVATION DEVELOPMENT PROCESS

The innovation development process consist of all the decisions, activities, and their impacts that occur from recognition of a need or a problem, through research, development, and commercialization of an innovation, through diffusion and adoption of the innovation by users, to its consequences. From this definition we can identify the following six main stages in the innovation – development process.

i) Need / problem recognition

ii) Basic / applied research

iii) Development

iv) Commercialization

v) Diffusion and adoption

vi) Consequences

These six stages are somewhat arbitrary in that they don't always occur in exactly the order shown above, and some stages may be skipped in the case of certain innovations.

2.2.1 Need / Problem Recognition

Need / problem recognition is usually the first stage in the innovation development process. Identification of need / problem stimulates research and development activities to solve the problem and address the need.

Efforts to promote change through extension and development programmes are successful only to the extent they are focused on the important needs of the people and are effective in helping people meet these needs. In extension and development programmes, people adopt the developmental innovation only when they think that the innovation is valuable to them in meeting personal, family, group or community needs which they themselves recognize. The element of need and need identification therefore, should be the fundamental concern in innovation development process. In short people concern themselves with extension and development innovations only on the basis of needs as they see them, not planners view them. Hence, a clear understanding of the nature and role of people's developmental needs is essential in innovation development process.

2.2.2 Basic / Applied Research

Most of the innovations that have been studied in diffusion research have been technological innovations. Therefore, the term 'technology' is often used as a synonym for innovation. Most technological innovations are created by scientific research as well as interplay of research and practical problems. The knowledge base for technology usually derives from basic research. Scientific knowledge is put into practice as an innovation that will solve a perceived need / problem. Applied researchers are the main users of basic research. Thus an innovation / invention may result from a sequence of (a) basic research, followed by (b) applied research, leading to (c) development.

Basic vs. Applied Research

Basic Research : Original investigations for the advancement of scientific knowledge and that don't have a specific objective of applying this knowledge to practical problems.

Applied Research: It consists of scientific investigations that are intended to solve practical problems.

Lead Users: Innovations are not always developed by researchers or manufacturers. In some fields lead users develop innovations and then convince

the manufacturing company to produce and sell the innovation, often after a lead user has created a prototype of the innovations. Typically the lead user develops the innovation before the beginning of the S shaped diffusion curve.

In development work also, innovation(s) occurs as community talk, when information is exchanged about needs / problems and possible indigenous solutions to them.

2.2.3 Development

The research & development (R&D) are always closely related and usually research precedes development. But in the context of innovation development process, we argue that conceptually research and development are two distinct phases. Development of an innovation is the process of putting a new idea in a form that is expected to meet the needs of the potential adopters. This phase usually occurs after research as part of creation of an innovation. The developer of innovations must anticipate the problems of potential adopters in adopting the innovation. In addition several other internal and external factors including government policies may all affect the success of an innovation. Information exchange about an innovation is thus, a crucial component affecting the innovation development process. R&D workers devote much effort to obtaining and using information which includes:

a) Data about the performance of the innovation they are creating and marketing

b) Inputs they are using into the innovation

c) Information about similar innovations evolving

d) Existing government policies that affect both innovation's development and its diffusion

e) Constraints of adopters in using the innovation to solve their problems

From the above discussion we may conclude that, innovation development process is mostly driven by the exchange of technical information in the face of a high degree of uncertainty.

Activity 1: Read the following case study on factors shaping the innovation and answer the question.

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The Social Shaping of Technology

Every household refrigerator has a motor that drives a compressor that condenses a liquid, releasing heat into the surrounding environment that the liquid had previously absorbed inside the refrigerator when the liquid vaporized. A superior alternative is the gas refrigerator, in which the ammonia refrigerant is vaporized by heating it with a gas flame. Later, the refrigerant dissolves in water, thus cooling the refrigerator box. The gas refrigerator has

no moving parts and hence is unlikely to breakdown. It also does not make any noise. By about 1930, prototype refrigerators of both types were developed, and one might expect that the gas refrigerator would have captured the market because of its overwhelming advantages. It did not.

The main reason was the extensive R&D investment in the electric refrigerator by General Electric, General Motors, Kelvinator, and Westing House. These corporations decided that larger profits could be made from the electric refrigerator, so they poured huge amounts of R&D funding into electric refrigerator and aggressively promoted this product. Several smaller companies that marketed gas refrigerators could not compete with their larger opponents. So the good technology available to the consumers was shaped by considerations of corporate profitability rather than by consumer choice in the market place. As a result, the product that diffused was the refrigerator with a hum (Source: Cowan, 1985).

Implications for Development

Technological determinism is the belief that technology causes changes in society. This viewpoint implies that technology is somehow autonomous (that is outside of society). Obviously, it is not. An opposite viewpoint, called social determinism or the social construction of technology, argues that technology is shaped by social factors. Technology is a product of society, and is influenced by the norms and values of the social system. In the above case, the technology selected was one that offered the greatest profits to the corporate companies rather than most advantages to the consumers. So in this case, economic factors such as potential profitability shaped the technological innovation that was diffused to the public.

Many developmental innovations / programmes are shaped by various factors, often beyond the needs / problems of the community.

Question: "Diffusion researchers sometimes devote disproportionate attention to the effects of technology on society, and ignore the more fundamental question of what shapes technology in the first place". Do you agree with this statement after reading the above case? Support your answer.

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2.2.4 Commercialization

Commercialization is the production, manufacturing, packaging, marketing, and distribution of a product that embodies an innovation. Commercialization is the conversion of an idea from research into a product or service for sale in the market place.

Many innovations result from research activities. However, all innovations don't come from R&D. They may instead arise from practice or by lead users as discussed in section 2.2.2 above.

Sometimes two are more technologies are packed together to facilitate their diffusion because they have a functional interrelatedness, or at least they are so perceived by potential adopters. A technology cluster or innovation package consists of one or more distinguishable elements of technology that are perceived as being interrelated closely. The basic argument in favor of clustering innovations in a package is that more rapid diffusion results.

2.2.5 Diffusion and Adoption

One of the most crucial choices in the entire innovation development process is the decision to begin diffusing an innovation to potential adopters. On the one hand, there is usually pressure to approve an innovation for diffusion as soon as possible, especially when the social problem or need that it seeks to solve has a high priority. On the other hand, a change agent reputation and credibility in the eyes of its clients rests on only recommending innovations that will have beneficial consequences for adopters. R&D workers become very cautious when it comes time to translate their scientific findings into practice.

Innovation gate keeping – controlling whether or not an innovation is diffused to potential adopters – can occur in a variety of ways.

Examples : Quality control units - in Medical diffusion

On-farm trails - in Agriculture & allied research diffusion

Content & Language editing – in distance learning material development

2.2.6 Consequences

Consequences are the changes that occur in an individual or a social system as a result of the adoption or rejection of an innovation (Please refer Unit 4 under Block 6 in this course for more discussion on consequences of innovations). This is the final phase in the innovation – development process.

We may conclude that, the six stages in the innovation development process occur in the linear sequence in which they were discussed. However, in many cases they may not take place in that sequence or some phases may be skipped. However, the knowledge about these stages is useful for understanding where innovations come from.

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) Name the six stages in innovation development process.

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2) What is the difference between basic and applied research?

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3) What do you mean by lead users?

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2.3 INNOVATION - DECISION PROCESS

According to Rogers, the innovation -decision process is the process through which an individual or other decision making unit passes from gaining initial knowledge of an innovation , to forming an attitude toward the innovation, to making a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision. This process consists of a series of choices and actions over time through which an individual or a system evaluates a new idea and decides whether or not to incorporate the innovation into ongoing practice.

Uncertainty and Newness of Innovation

The uncertainty and perceived newness associated with new innovation / idea are the distinctive aspects of innovation decision making compared to other types of decision making

2.3.1 Stages in Adoption Process

Ryan and Gross (1943) first drew attention to the existence of a sequence of stages in the process of adoption viz.,

i) 'Awareness' of the existence of an innovation

ii) 'Conviction' of usefulness

iii) 'Acceptance' in the sense of willingness to try the innovation, and

iv) 'Complete adoption'

According to Wilkening (1953) adoption of an innovation is a process composed of learning, deciding, and acting over a period of time. That means the adoption of specific practices is not the result of a single decision to act but series of actions and thought decisions. He identified four adoption stages:

i) Awareness

ii) Obtaining information

iii) Conviction and trial, and

iv) Adoption

It indicates that initial knowledge of a practice, its mental acceptance as a good idea, its use on a trial basis and finally its full adoption. Wilkening's first two stages were later extended into three and the resulting five stages identified by the North Central Rural Sociology Sub Committee for the study of Diffusion of Farm practices (1955) are widely accepted and received world wide attention. The five stages of adoption process are :

i) Awareness

ii) Interest

iii) Evaluation

iv) Trial

v) Adoption

Stages

Awareness - the individual is exposed to the innovation but lacks complete information about it

Interest - the individual becomes interested in the new idea and seeks additional information about it

Evaluation - individual mentally applies the innovation to his present and anticipated future situation, and then decides whether or not to try it

Trial - the individual makes full use of the innovation

Adoption - the individual decides to continue the full use of the innovation

Let us briefly discus about these five stages.

Awareness Stage

This is the starting stage wherein the individual comes to know the existence of the new idea but (s)he doesn't have full information about the idea. At this stage individual is aware of the idea, but lacks detailed information about it.

Example : Individuals may know MGNREGA only the name and may not know what MGNREGA is, its role in rural employment generation and development.

Interest Stage

The individual develops interest in the innovation / idea / practice and seeks additional information about it either from extension officer or from fellow

community members or from any source, which he feels credible. That means the individuals at the interest stage acquires more information about an innovation or idea. They wants to know, what the innovation/idea is, how it works and what its potentialities are.

Evaluation Stage

The individual here makes mental application of the new idea in the present and anticipated future situations and decides whether or not to try it. The individual at this stage judges the utility of the innovation. (S)he makes an assessment whether the idea is applicable to own situation and if applied what would be the result.

Example: Individual after acquiring more information about MGNREGA at the interest stage, (s)he mentally judge MGNREGA's contribution to his / her employment and livelihood security.

Trial Stage

At the first instance, people may not take up any new idea / an innovation right away on a large scale because (s)he doesn't want to take risk even though the potential of the idea has been proved. They actually applies the new idea on a small scale in order to determine its utility or feasibility or applicability in own situation. Even though, people takes a decision to try the idea by virtue of its plus points or merits, generally the effectiveness of the idea is tested by taking it on a small scale.

Adoption Stage

Being satisfied with the performance of the new idea tested on small scale in their own situation, the people uses the new idea continuously on a full scale. Trial may be considered as the practical evaluation of an innovation. Based on feedback from trial, people take final decision and applies the innovation in a scale appropriate to own situation on a continued basis.

The above five stages of adoption are dynamic and not static. The same five stages do not occur with all the adopters and sequence is not always the same. Some times one stage appears more than once. In some cases some stages are so short as to be imperceptible, and in other cases some stages seem to be skipped. If the people have confidence in the extension and development worker and their recommendation, they may jump from evaluation to adoption stage. There are no clear-cut differences and some times the whole process is capsule and looks like a unit act.

2.3.2 Adoption Period

The time taken to pass from the awareness of an innovation to its adoption is called the "adoption period". The major aim of extension and development workers is to shorten the length of the adoption period of an individual so that an innovation will diffuse rapidly within a social system. They try to attain this goal by making individuals aware of the innovation as quickly as possible and persuading them to move rapidly through the stages of the adoption process and adopt the innovations.

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 stages in adoption process.

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2) The five stages of adoption are dynamic and not static. Do you agree with this statement? Support your answer.

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3) Name the two distinctive aspects of innovation decision making compared to a normal decision making.

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4) What do you understand by the term 'adoption period'?

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2.4 INNOVATION - DECISION PROCESS MODEL

The conceptualization of the five stages in adoption process has been highly favored by diffusion researchers in the past. But the limitations of this model are:

i) It implies that process always ends in adoption decisions, whereas in reality rejection may also be a likely outcome. Therefore, a term more general than "adoption process" is needed that allows for either adoption or rejection.

ii) The five stages described above do not always occur in the specified order, and some of them may be skipped, especially the trial stage. Evaluation actually occurs throughout the process, rather than just at one of the five stages.

iii) The process seldom ends with adoption, as further information seeking may occur to confirm or reinforce the decision, or the individual may later switch from adoption to rejection (discontinuance).

Rogers has come up with a model of Innovation-Decision Process (Fig. 2.1) to overcome the above limitations.

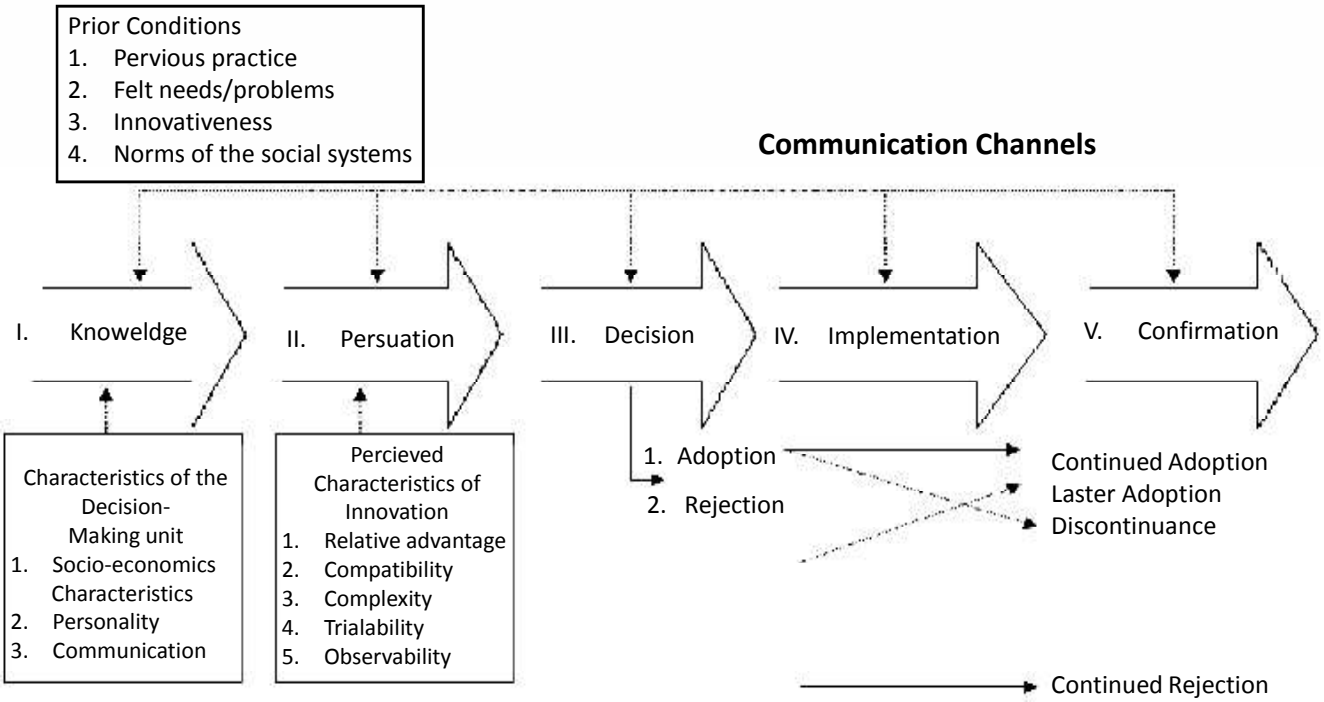

Fig.2.1:Innovation-Decision Process Model with Five Stages (Source : Rogers, 2003)

The model consists of essentially the five functions / stages viz.,

i) Knowledge

ii) Persuasion

iii) Decision

iv) Implementation

v) Confirmation

The model contains three major divisions viz.,

i) Antecedents

ii) Process

iii) Consequences

Antecedents are those variables present in the situation prior to the introduction of an innovation which consist of:

i) Personality characteristics of individuals, like general attitude toward change

ii) Social characteristics of individuals, like cosmopoliteness

iii) Strength of individual's perceived need for the innovation.

Communication sources and channels provide stimuli to the individual during the innovation-decision process. The typical individual gains initial knowledge of the innovation mainly from cosmopolite and mass media channels. At the persuasion function, the individual forms his perception the innovation from more localite and interpersonal channels. An innovation may be adopted at the decision stage in the process and be used continuously or rejected at a later date (a discontinuation).

Discontinuance may be due to the innovation's replacement by an improved idea or to disenchantment (disappointment) with the innovation. The new idea may be rejected at the end of the process but adopted at a later date due to changes in how the individual perceives the innovation. Continued information seeking often occurs throughout the confirmation function, because the individual seeks to reinforce his decision. Sometimes, however, contradictory (to the innovation-decision) messages reach the individual, and this leads to discontinuance or later adoption.

2.4.1 Knowledge Stage

Innovation-decision process begins with knowledge stage, which commences when the individual is exposed to the innovation's existence and gains some understanding of how it functions. Knowledge function is mainly cognitive or knowing. Knowledge seeking is initiated by an individual and is greatly influenced by one's predispositions.

Selective Exposure vs. Selective Perception

Individuals tend to expose themselves to ideas which are in accord with their interests, needs, or existing attitudes. The tendency is called 'selective exposure'. Hassinger (1959) argues that individuals will seldom expose themselves to messages about an innovation unless they first feel a need for the innovation, and that even if such individuals are exposed to such innovation messages, there will be little effect of such exposures unless the individual perceives the innovation as relevant to his needs and as consistent with his existing attitudes and beliefs. This tendency is called 'selective perception'.

Example : We are all exposed daily to hundreds of mass media messages about new products. But few of these only register on our minds.

Selective exposure and selective perception act as tight shutters on the windows of our minds in the case of innovation messages, because such ideas are new. We can scarcely have consistent and favourable attitudes and beliefs about ideas which we have not previously encountered. There is, then, much in the ideas of selective exposure and selective perception to support Hassinger's viewpoint that need for an innovation must usually precede awareness-knowledge.

A need is a state of dissatisfaction or frustration that occurs when one's desires outweigh one's actualities. An individual may develop a need when he learnt that an improved method, an innovation, exists. Therefore, innovations can lead to needs, as well as vice versa. Some change agents use this approach to change by creating needs among their clients through pointing out the desirable

consequences of new idea. Thus, knowledge of innovations can create motivation for their adoption.

Example : A farmer is used to practice low yielding crop varieties for years. After hearing to the hybrid varieties and their high yielding potential, the farmer would feel it as a need for his situation to adopt it.

A need can motivate an individual to seek information about an innovation and the knowledge of a innovation may develop the need. Questions such as 'what is the innovation?' 'How does it work?' and 'Why does it work?' are the main concerns of an individual about an innovation.

Types of Knowledge

There are three types of knowledge related to innovation viz.,

i) Awareness-knowledge

ii) How-to-knowledge

iii) Principles' knowledge

Awareness-knowledge : Awareness-knowledge - is information that an innovation exists which motivates an individual to seek 'how-to-knowledge and 'principles' knowledge. This type of information-seeking is concentrated at the knowledge stage, but it may also occur at the persuasion and decision stages.

How-to-knowledge : How-to knowledge consists of information necessary to use an innovation properly. The adopter must understand what quantity of an innovation to secure, how to use it correctly, and so on. In the case of innovations that are relatively more complex, the amount of how-to knowledge needed for proper adoption is much greater than in the case of less complex ideas. When an adequate level of how-to knowledge is not obtained prior to the trial and adoption of an innovation, rejection and discontinuance are likely to result.

Principles' knowledge : Principles-knowledge consists of information dealing with the functioning principles underlying how the innovation works.

Examples : Functioning of vaccinations; Functioning of fertilizer and its relation to plant biology

Extension Worker vs Types of Knowledge

It is usually possible to adopt an innovation without principle-knowledge, but the danger of misusing the new idea is greater, and discontinuance may result. The competence of individuals to decide whether or not to adopt an innovation is facilitated by principles know-how. If a problem occurs in an individual's use of an innovation, principles-knowledge may be essential in solving it. Most of the extension and development workers seem to concentrate their efforts on creating awareness knowledge, although this goal can be achieved more efficiently by mass media channels. Extension workers /change agents could perhaps play their most distinctive and important role in the innovation-decision process if they concentrate on "how-to-knowledge, which is probably most essential to clients at the trial and decision function in the process. Most extension workers perceive that creation of principle-knowledge is outside the purview of their responsibilities and is a more

appropriate task for formal schooling and general education. It is admittedly difficult for extension workers to teach basic understanding of principles. But, when such understanding is lacking, the change agent's long-run task remains very difficult.

Knowledge about Innovation vs. Attitude

Knowing about an innovation is often quite a different matter from using the idea. Most individuals know about many innovations which they have not adopted. Why? One reason is because the individual knows about the new idea but does not regard it as relevant to his situation, as potentially useful. Therefore, attitudes toward an innovation frequently intervene between the knowledge and decision functions. In other words, the individual's attitudes or beliefs about the innovation have much to say about his passage through the decision process. Consideration of a new idea does not pass beyond the knowledge function if the individual does not define the information as relevant to him or if he does not seek sufficient knowledge to become adequately informed so that persuasion can take place.

2.4.2 Persuasion Stage

The individual forms a favourable or unfavourable attitude towards the innovation at the persuasion stage in the innovation-decision process. Whereas the mental activity at the knowledge stage was mainly cognitive (or knowing), the main type of thinking at the persuasion stage is affective (or feeling). At the persuasion stage the individual becomes more psychologically involved with the innovation and actively seeks information about the idea. Personality of individual as well as the norms of the social system may affect information seeking behaviour and its interpretation. Thus, selective perception is important in determining the receiver's communication behaviour at the attitude formation stage. At the persuasion stage, a general perception of the innovation is developed. Such perceived attributes of an innovation as its relative advantage, compatibility, and complexity are especially important at this stage.

In developing a favourable or unfavourable attitude toward the innovation, the individual may mentally apply the new idea to present or anticipated future situation before deciding whether or not to try it. This might be thought of as a vicarious trial. The ability to think hypothetically and counter-factually and to project into the future, is an important mental capacity at the persuasion stage where forward planning is involved.

Types of Attitudes

Like three levels of knowledge about an innovation, there are at least two levels of attitudes:

i) Specific attitude toward the innovation

ii) General attitude toward change.

Specific attitude toward the innovation is our main concern at the persuasion stage in the innovation-decision process. It consists essentially of a favourable or unfavourable belief in the usefulness of the new idea for the users. Such a specific attitude, however, has carryover from one innovation to another. A previous positive experience with the adoption of innovation creates favourable

attitude to change that facilitates the development of a favourable evaluation of the next innovation considered by an individual. On the contrary, a negative experience from an innovation that is perceived

as a failure leads to resistance to future new ideas. Extension workers should therefore begin their activities in a particular client system with an innovation that possesses a high degree of relative advantage, that is compatible with existing beliefs, and that has a very high likelihood of success. This will help create a general, positive set toward change and paves the way for later ideas that may be introduced.

Persuasion vs. Attitude

The main outcome of the persuasion function in the decision process is either a favourable or unfavourable attitude toward the innovation. It is assumed that such persuasion will lead to a subsequent change in overt behaviour (i.e. adoption or rejection) consistent with the attitude held. But there is little evidence that attitude and overt behaviour are always consistent, and we know of many cases in which attitudes and actions are quite disparate.

Example: Individuals in urban areas may have positive attitude towards mass transport system, but they may resort to individual vehicles in practice.

Hence, attitudes and actions are different. We should remember that formation of a favourable or unfavourable attitude toward an innovation does not always lead directly or immediately to an adoption or rejection decision. Nevertheless, there is a tendency in this direction, that is, for attitudes and behaviour to become more consistent.

2.4.3 Decision Stage

Individual engages in activities which lead to a choice to adopt or reject the innovation at the decision stage in innovation-decision process.

Choices at Each Stage of Innovation Decision Process

The entire innovation-decision process is a series of choices at each stage.

Knowledge Stage : The individual must decide which innovation messages to attend to and which ones to disregard.

Persuasion Stage : The individual must decide to seek certain messages and to ignore others.

Decision Stage : The individual must decide between two alternatives, to adopt or reject a new idea.

This decision involves an immediate consideration of whether or not to try the innovation, if it is trialable. Most individuals will not adopt an innovtion without trying it first on a pilot basis to determine its utility in their own situation. The small-scale trial is often part of the decision to adopt, and is important as a means to decrease the perceived risk of the innovation for the adopter. In some cases innovation cannot be divided for trial, and so it must be adopted or rejected in total. Innovations, which can be divided for trial use, are generally adopted more rapidly. If the innovation has a certain degree of relative advantage in the trial stage, then individual move to an adoption decision.

2.4.4 Implementation Stage

Implementation occurs when an individual or other decision making unit puts an innovation into use. At this stage the individual is generally concerned with where to get the innovation, how to use it and what operational problems will be faced and how these could be solved. Implementation may involve changes in management of the enterprise and/or modification in the innovation, to suit more closely to the specific needs of the particular person who adopts it.

Re-invention vs. Social Construction

Re-invention often occurs at the implementation stage. Re-invention is the degree to which an innovation is changed or modified by a user in the process of its adoption and implementation. Re-invention often is beneficial to the adopters of an innovation. It reduce mistakes and encourage customization of the innovation to fit it more appropriately to local situations or changing conditions. As a result of re-invention, an innovation may be more appropriate in matching an adopter's preexisting problems and more responsive to new problems that arise during the innovation-decision process.

Recognition of the existence of re-invention brings into focus a different view of adoption behaviour – instead of simply accepting or rejecting an innovation as a fixed idea, potential adopters on many occasions are active participants in the adoption and diffusion process, to give their own unique meaning to the innovation as it is applied in their local context. Adoption of an innovation is thus a process of social construction.

2.4.5 Confirmation Stage

A decision to adopt or reject is not the terminal stage in the innovation-decision process. Human mind is in a dynamic state and an individual constantly evaluates the situation. If the individual perceives that the innovation is consistently giving satisfactory or unsatisfactory results the person may continue to adopt or reject the innovation as the case may be.

Rejection of an Innovation

Rejection is decision not to adopt an innovation. This may be of two types:

Active rejection : When an individual rejects after adopting the innovation including even its trial is called active rejection

Passive rejection : A simple non- adoption is called passive rejection.

At the confirmation function the individual seeks reinforcement for the innovation-decision made, but may reverse the previous decision if exposed to conflicting message about the innovation. The confirmation stage continues after the decision to adopt or reject for an indefinite period in time. Throughout the confirmation function the individual seeks to avoid a state of internal disequilibrium or dissonance or to reduce it if it occurs.

Dissonance : It is an uncomfortable state of mind that the individual seeks to reduce or eliminate. When an individual feels dissonant, he will ordinarily be motivated to reduce this condition by changing his knowledge, attitude, or actions. In the case of innovative behaviour, this may occur in the following three methods of dissonance reduction:

i) When the individual becomes aware of a felt need or problem and seeks information about some means such as an innovation to meet this need. Hence, a receiver's knowledge of a need for innovation can motivate information-seeking activity about the innovation. This occurs at the knowledge stage in the innovation-decision process.

ii) When individual becomes aware of a new idea for which he has a favourable regard, then the individual is motivated to adopt the innovation by the dissonance between what he believes and what he is doing. This behaviour occurs at the decision stage in the innovation-decision process.

iii) After the innovation-decision to adoption, the individual may secure further information which persuades him that he should not have adopted. This dissonance may be reduced by discontinuing the innovation. Or if he originally decided to reject the innovation, the individual may become exposed to pro-innovation messages, causing a state of dissonance which can be reduced by adoption. These types of behaviour (discontinuance or later adoption) occur during the confirmation function in the innovation-decision process.

These three methods of dissonance reduction consist of changing behaviour so that attitudes and actions are more in line.

Selective Exposure vs. Dissonance

Individuals frequently try to avoid becoming dissonant by seeking only that information which they expect will support or confirm a decision already made. This is an illustration of selective exposure. During the confirmation stage the individual wants supportive messages that will prevent dissonance from occurring. The adoption of the confirmation function to the innovation-decision process suggests a new role for the extension worker. Whereas development workers have in the past primarily been interested in achieving adoption decision, the new model gives them the additional responsibility for providing supporting messages to individuals who have previously adopted. Probably one of the reasons for the relatively high rate of discontinuance of some innovations is that extension workers assume that once adoption is secured, it will continue. But without continued effort there is no assurance against discontinuance, because negative messages about an innovation exist in more client systems.

Discontinuance : Discontinuance is a decision to reject as innovation after having previously adopted it. Discontinuance also may take three forms.

i) *Replacement discontinuance* : It is a decision to reject an idea in order to adopt a better idea that supersedes.

Example: Hybrid variety over normal variety.

ii) *Disenchantment discontinuance*: It is a decision to reject an idea as a result of dissatisfaction with the performance.

Example : Crop varieties generally deteriorate after number of years. They are then replaced by superior varieties, if available, or may not be cultivated at all.

iii) *Forced Discontinuance* : Individuals are forced to discontinue the existing practices because of Government Policies.

Example : The Government has banned the use of chemicals like D.D.T. and B.H.C.

Other Important Concepts in Innovation - Decision Process

Over Adoption : If people continue to adopt an innovation, rather vigorously, when extension workers feel that it should not be so done is over adoption. Over adoption produces negative effect and may cause distortion or deterioration of the related systems. Inadequate knowledge about an innovation and inability to predict its consequences generally leads to over adoption.

Example 1. Indiscriminate sinking of shallow tube wells in a limited area, which may result in lowering of the water table, ultimately making the irrigation system ineffective.

Example 2: Excessive use of pesticides.

As a change agent, your role is to prevent the excessive adoption of the innovation by providing adequate knowledge about the innovation through training and communication.

Active Adoption : It is the process by which the individual who takes up an innovation influences others to do so.

Example : An individual not only adopts a particular method of family planning, but also but also influences others to do the practice

Passive Adoption : If the individual who adopts the practice do not influence the other individuals to do the practice, the innovation is confined to the individual who has adopted.

In the active adoption, diffusion effect is more compared to passive adoption.

Innovation – Decision Period : It is the length of time required to pass through the innovation – decision process. The time elapsing from awareness-knowledge of an innovation to decision for an individual is measured in days, months, or years. This period is thus a gestation period in which a new idea is fermenting in the individual's mind. Earlier adopters have a shorter innovation – decision period than later adopter

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) Why Rogers has come up with a model of Innovation-Decision Process?

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2) Name the stages in Innovation – Decision Process.

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3) What are the three types of knowledge related to innovation? How they play their role in the functioning of extension workers.

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4) What do you mean by active and passive rejections?

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5) Name the three forms of discontinuance of innovation.

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2.5 LET US SUM UP

We started with the following questions to understand this unit:

- Where do development innovations come from?
- What are the factors influencing their origin?
- How does their origin influence later their diffusion and consequences?

In this unit, we have tried to answer these questions by understanding that, decisions and events occurring previous to innovation development have strong influence on the diffusion and adoption of innovations. At the outset, we discussed the innovation development process and understood that, it consist of six main stages viz., need / problem recognition; basic / applied research; development;

commercialization; diffusion and adoption and; consequences. Later we discussed the innovation -decision process as the process through which an individual or other decision making unit passes from gaining initial knowledge of an innovation , to forming an attitude toward the innovation, to making a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision. At the end we also discussed the Roger's model of innovation-decision process.

2.6 KEYWORDS

Innovation Development Process : It consists of all the decisions, activities, and their impacts that occur from recognition of a need or a problem, through research, development, and commercialization of an innovation, through diffusion and adoption of the innovation by users, to its consequences.

Basic Research : Original investigations for the advancement of scientific knowledge and that don't have a specific objective of applying this knowledge to practical problems.

Applied Research : It consists of scientific investigations that are intended to solve practical problems

Consequences : Consequences are the changes that occur in an individual or a social system as a result of the adoption or rejection of an innovation. This is the final phase in the innovation – development process.

Innovation-decision Process: It is the process through which an individual or other decision making unit passes from gaining initial knowledge of an innovation, to forming an attitude toward the innovation, to making a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision.

Awareness Stage : In this stage, the individual is exposed to the innovation but lacks complete information about it.

Interest Stage : In this stage, the individual becomes interested in the new idea and seeks additional information about it.

Evaluation Stage : In this stage, the individual mentally applies the innovation to his present and anticipated future situation, and then decides whether or not to try it.

Trial Stage : In this stage, the individual makes full use of the innovation.

Adoption Stage : In this stage, the individual decides to continue the full use of the innovation.

Adoption Period : The time taken to pass from the awareness of an innovation to its adoption is called the adoption period.

Awareness-knowledge : Awareness-knowledge - is information that an innovation exists which motivates an individual to seek 'how-to-knowledge and 'principles' knowledge.

How-to-knowledge : How-to knowledge consists of information necessary to use an innovation properly.

Principles' knowledge : Principles-knowledge consists of information dealing with the functioning principles underlying how the innovation works.

Re-invention : It is the degree to which an innovation is changed or modified by a user in the process of its adoption and implementation.

Rejection : It is the decision not to adopt an innovation.

Active rejection : When an individual rejects after adopting the innovation including even its trial is called active rejection.

Passive rejection : A simple non- adoption is called passive rejection.

Dissonance : It is an uncomfortable state of mind that the individual seeks to reduce or eliminate in the adoption process.

Discontinuance : Discontinuance is a decision to reject as innovation after having previously adopted it.

Replacement Discontinuance: It is a decision to reject an idea in order to adopt a better idea that supersedes.

Disenchantment Discontinuance: It is a decision to reject an idea as a result of dissatisfaction with the performance.

Forced Discontinuance : Individuals are forced to discontinue the existing practices because of Government Policies.

Over Adoption : If people continue to adopt an innovation, rather vigorously, when extension workers feel that it should not be so done is over adoption.

Active Adoption : It is the process by which the individual who takes up an innovation influences others to do so.

Passive Adoption : If the individual who adopts the practice do not influence the other individuals to do the practice, the innovation is confined to the individual who has adopted.

Innovation – Decision Period: It is the length of time required to pass through the innovation – decision process.

2.7 REFERENCES / SELECTED READINGS

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2.8 CHECK YOUR PROGRESS – POSSIBLE ANSWERS

Check Your Progress 1

1) The six stages in innovation development process are : need / problem recognition; basic / applied research; development; commercialization; diffusion and adoption, and; consequences.

2) Basic research is the original investigations for the advancement of scientific knowledge and that don't have a specific objective of applying this knowledge to practical problems. Whereas, applied research consists of scientific investigations that are intended to solve practical problems.

3) Lead users develop innovations and then convince the manufacturing company to produce and sell the innovation, often after a lead user has

created a prototype of the innovations. Typically the lead user develops the innovation before the beginning of the S shaped diffusion curve.

Check Your Progress 2

1) The five stages in adoption process are : awareness; interest; evaluation; trial, and ; adoption stages.

2) Yes. I agree with the statement that, the five stages of adoption are dynamic and not static. The same five stages do not occur with all the adopters and sequence is not always the same. Sometimes one stage appears more than once. In some cases some stages are so short as to be imperceptible, and in other cases some stages seem to be skipped. If the people have confidence in the extension and development worker and their recommendation, they may jump from evaluation to adoption stage. There are no clear-cut differences and sometimes the whole process is capsule and looks like a unit act.

3) The uncertainty and perceived newness associated with new innovation / idea are the distinctive aspects of innovation decision making compared to other types of decision making.

4) The time taken to pass from the awareness of an innovation to its adoption is called the adoption period.

Check Your Progress 3

1) Rogers has come up with a model of Innovation-Decision Process to address the following limitations in the five stages of adoption process. (i) It implies that process always ends in adoption decisions, whereas in reality rejection may also be a likely outcome. Therefore, a term more general than "adoption process" is needed that allows for either adoption or rejection (ii) The five stages described in the adoption process do not always occur in the specified order, and some of them may be skipped, especially the trial stage (ii) The process seldom ends with adoption, as further information seeking may occur to confirm or reinforce the decision, or the individual may later switch from adoption to rejection (discontinuance).

2) The stages in Innovation – Decision Process are: Knowledge; Persuasion; Decision; Implementation, and; Confirmation stages.

3) The three types of knowledge related to innovation are: awareness-knowledge; how-to-knowledge, and ; principles' knowledge. Extension workers /change agents could perhaps play their most distinctive and important role in the innovation-decision process if they concentrate on "how-to-knowledge, which is probably most essential to clients at the trial and decision function in the process. Most extension workers perceive that creation of principle-knowledge is outside the purview of their responsibilities and is a more appropriate task for formal schooling and general education. It is admittedly difficult for extension workers to teach basic understanding of principles. But, when such understanding is lacking, the change agent's long-run task remains very difficult.

4) When an individual rejects after adopting the innovation including even its trial is called active rejection. Whereas, a simple non- adoption is called passive rejection.

5) The three forms of discontinuance of innovation are: replacement discontinuance ; disenchantment discontinuance, and; forced discontinuance.

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