CHAPTER II

REVIEW OF LITERATURE
Section A

Development Communication

1.1 Introduction

The importance of telecommunication has increased over the last decade. New technologies enable more advanced networks and a range of new and very valuable services, including Internet. It is acknowledged that internet services can help people to coordinate their lives. It creates new opportunities to coordinate business and to interact in society. Very interesting applications in this respect are distance education and health services. People and regions without access to the information infrastructure that has emerged, are considered to suffer economic and social disadvantage. This is reflected in the term 'digital divide', the divide between people with and without access to information infrastructure, which can be seen as a symptom of existing economic and social divides.

It is observed in Work Bank Report (2002) that “Increasing access to information infrastructure will reduce poverty, enable better delivery of utility services, and create new sources of income and employment.” Access to information infrastructure has become a high priority policy objective for governments and the aid community.

In Sri Lanka the level of access to telecommunications is relatively low, although the telecommunications sector has demonstrated significant growth in recent years. The fixed tele density (number of fixed phones per 100 inhabitants) for 2002 is calculated at 4.7. Statistics show that the distribution of
telecommunications facilities over the country is highly uneven. It is estimated that around 66% of the fixed telephone connections are in greater Colombo. This area, consisting of the western province is the largest urban agglomeration of Sri Lanka, with around 5 million inhabitants. Even taken into account that this is more than a quarter of the 19 million population, it follows that in the areas outside greater Colombo are much lower on telecommunication facilities than inside greater Colombo. Especially the North, East and South provinces lack telecom infrastructure and facilities. This can partly be contributed to the civil unrest related to the Liberation Tigers of Tamil Eelam (LTTE) movement. No investment in new facilities has been made in war-affected areas, and in some cases existing facilities have been destroyed. Since late-2001 however, the security situation has shown significant improvement; peace talks have resulted in a Memorandum of Understanding between the Sri Lankan government and the LTTE.

A number of policy actions aimed at increasing access to telecommunications has been initiated by the Government of Sri Lanka (henceforth GOSL). In the year 2000 two small-scale subsidy programs were established, aimed respectively at increasing access to payphones in rural areas and at installing telephones at rural post offices. More recently, from 2002 onwards, the GOSL has developed a large scale program called e-Sri Lanka. This program is based on the identification of Information and Communication technologies as one of the major drivers of national integration and economic growth. One of the four pillars of this initiative is to increase rollout of telecommunications
infrastructure to underserved areas and creation of public access to this infrastructure by means of telecenters.

1.2 Meaning of Communication:

The word "communication" has come from Latin language. The Latin word "munis" which means the person who is doing something. The word "communis" which means being mixed with people and the word "communication" means making something common, addressing to and sharing the thoughts. The word communication consists of peaking, discussing, addressing and so on.

Some of the definitions of communication are discussed below:

1. The oldest meaning of the word, in English can be summarized as the passing of ideas, information, and attitudes from person to person. But later communication came also to mean a line or channel from place to place.¹

2. "Communication is word used to refer to a multitude of activities in which people engage, such as talking, touching, writing, looking etc."²

3. "Communication is the process by which two or more people exchange ideas, facts, feeling or impressions in ways that each gains a common understanding of the meaning, intent, and use of messages."³

¹ Communications – Raymond William – P17.
² New dimensions an introduction to human communication Linda costigen Lederman P3.
³ New dimensions an introduction to human communication Linda costigen Lederman P3.
4. "Communication is a process which increases commonality and also requires elements of commonality for it to occur at all various factors contribute to bringing about the commonality, the shared symbolic environment and a social relationship among those who participate in communication are the pre-requisites for communication" (Denis Maquel - 1969)\(^4\)

5. "Communication is the process by which message are transferred from a source to a receiver" (Rogers and shoemaker - 1971)

6. "Communication is the process of sending and receiving messages through channels which establish common meaning between a source and a receiver" (BAN and Hawkins - 1988)

7. "Good communication does not mean only giving orders but creating understanding. It aims at imparting knowledge as well as helping people gain a clear view of the meaning of knowledge. Thus communication is the social process"\(^5\)

8. Communication is a social process\(^6\)

9. "Communication is anything that conveys meaning that carries a message from one person to another" (Brooker - 1949)

10. "Communication is the discriminatory response of an organism to stimulus." (STEVENS - 1992)

### 1.3 Development Communication

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\(^4\) Text book of Mass communication and Mass media – Uma Joshi – P1

\(^5\) Ibid. P2

\(^6\) Mass Communication – Theory and Practice – Uma Narula - P1
Development communication is the communication for the development process in the country. Most probably the birthplace of development communication is in developing countries.

Nora Quebral defined development communication as “the art and science of human communication applied to the speedy transformation of a country from poverty to a dynamic state of economic growth that makes possible greater economic and social equality and the longer fulfilment of the human potential”

“The development communication is a process that persuades to bring people from poverty to property, to bring about economic development, to spread social equality and to get the real advantages of inborn abilities of people”

1.4 Western Ideas About the Development Communication

Five scientists should be studied for western ideas of the development communication.

1. Willbur Schramm
2. Daniel Lerner
3. Everett M. Rogers
4. Lucien Pye
5. Itiyel de Soula Poul

1) According to Willbur Schramm, “Mass media can be taken in to use as a technique for communication to confirm the ideas of nationality, to bring the national ambitions to the maximum level, to develop the new skills in the traditional societies, to persuade
people in to political activities and to comprehend people about development targets planed by the government.

2) **According to Daniel Lerner** that the literacy comes in to being because of urbanization, and the use of Mass media because of literacy and through these there is peoples participations to politics and there empathy.

3) **According to Everette. M. Rogers** the Mass media can be used very clearly to acknowledge people about the development of the country, to spread new inventions, to prepare the national agenda for the country and to discuss openly the problems of development that come out.

   He further mentions about the connection between Mass communication and education, as the connection between Mass communication and interpersonal communication, are very important for the development communication in a country.

4) **Lucien Pye's idea** is about the development communication is that the services done by Mass media are very tremendous to put forward personal concepts established on common concept.

5) According to **Ityiel de soul a Poul** Mass media is very important for the social modernization and to persuade the people for the political activities.

   The basic feature of western ideas of development is the use of Mass Media for the development of a country. But this can be made justifiable only in the countries where there is a use of
improved Mass media, which is especially in western countries. The main reason for this is that there is very improved structure of Mass Media and well built communication technology. Therefore, when communicating any message pertaining to the development, Mass media in western countries can take into use communication and use the traditional media also. This situation is most outstanding when discussing about India, Sri Lanka and China. In the development model of China, interpersonal and group communication features can be clearly seen.

1.5 In India Laxman Rao followed the interpersonal communication and group communication for the development communication. He also has drawn his attention towards the use of traditional media of the country. This situation is visible in Sri Lanka. Varied information and the necessities of the people were creatively and successfully discussed through folklore materials, folk dramas and puppet performances. In the world, with the development of communication technology, the spread of mass media came in to high level. The ideas of western communication scientists were that all the electronic and print media should be taken in to use for the socio - economic development of the people. Prof. Willbur Schramm can be introduced as the one pioneer who took major place among these communication scientists. The book “Mass Media and national development” written by him 1964 was a great support for this. He insisted on the thought that the Mass media should be used for the development and this thought will spread in developed countries, gradually.
The conference on development communication held in Singapore in November 1986 was a very important one. In this conference Dr. A. T. Ariyaratne explained communication development in the following words:

“The Development Communication is not a seller of a product manufactured in the World Bank, or such a product of development management society, the function and the responsibility of the development communicator is paving the way for the people and the government to know how people think about the development. A very rigid attention should be drawn towards the concepts, ideas, ambitions and experience of people who enjoy the minimum resources and facilities of the society”

In this chapter an analytical framework for the analysis of innovative subsidy schemes is introduced. In addition we formulate expectations on what will be critical success factors, judging from the available literature and theory.
Section B

Review of Literature

2.1 Introduction

This section explores the literature that is relevant for the study of innovative subsidy schemes. Two streams of literature will be considered, namely the 'universal service' literature and the 'output-based aid' literature. Both streams of literature are immediately relevant to the subject of this research since they focus on policy efforts aimed at increasing access to infrastructure services. Although they focus on the same problem, they provide a different perspective and highlight different aspects. Paragraph 2.1 reviews the universal service literature, 2.2 reviews the output-based aid literature, 2.3 reflects on both reviews and draws a conclusion on how the respective streams of literature are related.

2.1.1 Universal service literature

Section 2.1.1.1 starts with a definition of 'universal service policy' and a short discussion of the problems and issues that are central to the universal service literature. Section 2.1.1.2 summarizes the guidelines for government policy that are put forward in the universal service literature.

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8 This review is mainly based on Intven (2000) and Wellenius (2000) who make similar points, which only vary in the aspects they highlight. So when is referred to 'the' universal service literature these two articles are meant.
2.1.1.1 Central problem and focus in U.S. literature

Universal service refers to the policy objective of giving all members of society access to public services that are considered to be essential for living. In the telecommunications sector 'The overriding objectives of universality policies are to expand and maintain availability of affordable telecommunications services to the public' (Intven 2000: 1).

Universal service policy is based on recognition of the value of basic telecommunications services to society. The criteria for such a policy are (Wellenius 2000): (a) The value of the service is demonstrated by the market. (b.) People deprived of access to those infrastructures are considered to suffer serious economic and social disadvantage. (c.) The cost of extending the service to unserved regions / populations is acceptable.

The universal service literature focuses on the characteristics of this policy. It discusses the rationale of universal service and optimal mechanisms to achieve universal service. This includes question such as: What services should be universally accessible, who is responsible for providing those services, at what costs etc.

A central issue in the present discussion is how universal service should be achieved in a liberalized environment. The privatization of state-owned providers and liberalization of the market changes the ways open to the government to achieve universal service: Before privatization universal service was pursued through hierarchical control over the state-owned provider, now, in a liberalized market, other means to achieve universal service must be employed.
2.1.1.2 Subsidy guidelines put forward in U.S. literature

A first guideline for achieving universal service in a liberalized environment is to focus on regulation. Regulation consists of establishing and enforcing general rules of behaviour for telecom operators. The underlying purpose of regulation is to prevent anti-competitive practices and ensure fair competition. This should lead to optimal market performance from a social welfare perspective. In practice regulation concerns rules for entry to the market, proper interconnection between networks and access for operators to essential factors of production such as frequencies, rights of way etc.

According to both Wellenius (2000) and Intven (2000) there is widespread demand for telecom services. According to Wellenius even rural populations in developing countries are willing to spend a certain percentage (1.3%-1.5%) of their income on telecommunications. Another important characteristic of the telecom market is the continuous improvements in network technologies and available services. One example is the advent of all kinds of wireless technologies, which have hugely decreased the price of services in rural areas.

Based on these features it is emphasized that the market has large potential in itself to provide universal service purely on commercial terms. Given this market potential, a first priority for policy makers should be to facilitate market development through proper regulation. Especially Wellenius (2000) takes this viewpoint. He states that a universal access strategy should focus on removing the obstacles that prevent the market from working well.
However, it is also acknowledged that some areas will not be served by the market simply because they are not commercially attractive for any telecom operator. If it is clear that no private investment will come to certain areas, the government can intervene by means of a subsidy. According to Intven (2000), the appropriate criteria to evaluate such subsidies are (a.) economic efficiency and (b.) competition neutrality. Economic efficiency is concerned with welfare loss as a consequence of distortion of prices. Competition neutrality is concerned with fair (non-discriminatory) treatment of competing operators. A subsidy should not place one operator in advantage compared to another operator. These two criteria could be summarized as ‘market distortion’. Thus, the main criterion for a subsidy scheme is the amount of negative side effects it generates in form of market distortion.

In the universal service literature a number of guidelines are given for the design of subsidies, based on above-mentioned criteria. The following issues are put forward by Intven (2000):

1. **Method of financing a subsidy.** Collecting funds should be done in an efficient and competitively neutral manner.

2. **Degree of separation between collecting funds and disbursing funds.** Without separation of collection and disbursement a subsidy is not transparent and it is not clear who pays for the subsidy and who receives. This is for instance the case with subsidies that are internal to an operator, such as cross-subsidies. According to present insights such implicit subsidies cannot be maintained in a liberalized market because of potential anti-competitive use. To minimize that risk subsidies
should be explicit, such that it is transparent who receives subsidy and for what exact universal service efforts.

3. **The mechanism of assigning universal service obligations.** This mechanism should not favour one operator above the other, i.e. should be competitively neutral. One solution to achieve this is by using the market mechanism. Any operator can bid on universal service projects that are eligible for subsidy; the operator that bids for the smallest subsidy is assigned the project.

4. **The degree of differentiation to specific beneficiaries.** In order to be efficient a subsidy should only benefit people that really need it. One example of bad targeting is cross subsidizing between international and local telephony. With such a subsidy all users receive the subsidy regardless of need.

5. **The amount of subsidy.** An efficient subsidy is limited to the amount that makes a universal service program commercially feasible. Often a significant part can be financed by user fees. To estimate the right amount models for costs and revenues can be used. An alternative is to use the market mechanism as a discovery process, i.e. through a competitive tender the minimum required subsidy emerges.

To summarize: Universal service is a sector specific policy that analyses the various approaches that are used to achieve affordable access to a basic level of telecom services. Two different approaches are there: regulation and subsidies. The literature does provide guidelines for government policy in a liberalized environment. Important in this respect are the characteristics of the telecommunications market which observers the there is widespread demand for technological and commercial
innovation in the supply of telecom services. Given these characteristics, in the U.S. literature it is stressed that a successful government policy should focus on regulation. In that sense the U.S. literature provides a measure for the rationale of a subsidy scheme. A subsidy is justified only when the designated policy objective cannot be achieved through improved regulation. The second guideline is that if a government engages in subsidizing measures efforts should be taken to minimize interference with the market process. Creating optimal conditions for market functioning is the central principle in the universal service literature. The objective of ensuring optimal market functioning is the objective of regulation. Therefore we conclude that the universal service literature provides a regulatory perspective on subsidies.

2.2 Critical Success Factors and Theoretical Background of Universal Service Literature

This paragraph analyses the theoretical background of the guidelines for government policy put forward in the universal service literature. Based on that analysis a number of critical success factors are formulated for subsidy schemes. In the literature review it was concluded that two general guidelines are put forward with regard to government policy in a liberalized telecom sector. The first guideline is to give priority to regulation and the second guideline is to minimize market distortion resulting from the subsidy. Section 2.2.1 analyses the theoretical background of the ‘regulation guideline’, which will result in two requirements on the rationale of a subsidy scheme. Section 2.2.2 analyzes the theoretical background of the ‘market distortion
2.2.1 Theoretical background of regulation guideline

The importance of regulatory measures as a means of increasing access to telecommunications is especially stressed by Wellenius (2000). The definition of such measures is 'removing obstacles that prevent the market from working well' (Wellenius 2000: 1) and 'removing impediments to effective working of the market' (Wellenius 2000: 6). This corresponds to the definition of regulation given in the previous section as 'government intervention in the market aimed at reducing imperfections in competition'. Wellenius (2000) states that improved regulatory measures can be a successful strategy of achieving universal service particularly in unserved (rural) areas. These areas are often thought to be uneconomic, which is in many cases not true. Wellenius (2000) presents four arguments for the statement that many unserved areas are not necessarily unfeasible for commercial operators.

First, free entry and exit to the market would increase the supply of telecom services in unserved areas. This statement is based on empirical observations on the demand and willingness to pay for telecommunications in unserved areas, and on empirical observations on low-cost technologies and small-scale business models that have emerged. This market potential would be

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mobilized by allowing free entry to the market. Barriers to entry and exit is a term from market theory. According to market theory eliminating such barriers favors the emergence of a competitive market, which can increase the supply of the good in case. This argument is applied to the market for telecom services in unserved areas, which is supported by empirical observations.

Second, elimination of price regulation would increase supply of telecom services in unserved areas. Especially the geographical price averaging between rural and urban areas is relevant, since such price averaging leads to prices below costs in rural areas. Prices below costs are commercially unattractive. The argument that distortion of price mechanism in a market affects the level of supply is an argument based on market theory.

Third, cost reflective interconnection would increase the supply of telecom services in unserved areas. This argument is similar to the second argument: if prices of interconnecting calls to rural areas are priced below cost, it is commercially unattractive. This is another instance of price distortion affecting the level of supply.

Fourth, better spectrum management would increase the supply of telecom services in unserved areas. Empirical observations learn that many of the low-cost innovative technologies that are suited for rural areas are based on wireless technology. Any wireless standard needs frequency spectrum to operate and is an essential factor of production. Enabling (non-discriminatory) access to factors of production is a means of decreasing barriers to entry. The statement that decreasing barriers to entry will improve market outcomes is again based on insights from market theory.
It can be seen that the framework used by Wellenius (2000) to support his arguments is market theory (although this is not made explicit). A central feature of his framework is the assumption (based on empirical observations) of continuing commercial and technological dynamics in the telecommunications market. The assumption of a dynamic market leads to the focus on market imperfections instead of market failure.

In the previous section it is stated that the presence of positive external effects, an instance of market failure, in the telecom market is a legitimate rationale for subsidies. The problem is that such effects are described within a static analysis of the market. This is the key difference with the framework of Wellenius (2000). His framework is based on the assumption of a dynamic market. Since the market is dynamic it is expected that the conditions shaping market behaviour, which are affected by regulation, have more impact on market outcomes than taxes or subsidies. Mobilizing the market potential and facilitating market growth by creating optimal regulatory conditions thus should be more successful in achieving the desired policy results.

These arguments question the rationale of government subsidies in the telecom market. It is clear that in assessing the rationale the dynamic nature of the telecom market is an important factor. The technological trends in the telecom sector are assessed based on a review of literature on telecommunications systems. It is concluded that a number of wireless technologies are in development, which are suitable for unsaved rural areas.

Based on the analysis, two requirements for a legitimate rationale of subsidy schemes in the telecom sector can be formulated.
First, for any subsidy scheme there is the policy dilemma between internal and external governance. In practice this means that considering a subsidy requires an evaluation of possible regulatory measures that can improve network rollout. Such an assessment should be based on a framework for assessing regulation. In short: *The rationale of a subsidy should incorporate an assessment of the regulatory framework.*

Second, due to the dynamic nature of the telecom market the necessity of a subsidy is less clear. As a result from technological developments previously unserved areas can become commercially feasible to supply. A subsidy is only justified when it is clear that no private investment will be made in the designated area. This should be assessed based on a framework that predicts technological and commercial developments in the market. In short: *The rationale of a subsidy should incorporate an assessment of future market developments.*

To summarize: The policy guideline to give priority to regulation is based on insights from market theory and empirical observations on the nature of the telecommunications market. Based on such a framework two requirements for the rationale of a subsidy are defined: first, no subsidy if regulatory measures can be taken that would contribute to the desired policy results, and second, no subsidy if it is likely that an area is commercially feasible to supply, or will be commercially feasible in the near future.
2.2.2 Theoretical background of market distortion guideline

In the literature review it became clear that particularly Intven\(^\text{10}\) (2000) introduces criteria and guidelines for the design of subsidy schemes. This section analyzes the framework that is used to derive these criteria and guidelines.

Intven (2000) introduces two criteria for subsidy schemes: economic efficiency and competition neutrality. Economic efficiency is related to the method of financing and the size of the subsidy.

Economic efficiency is a term from market theory that is a measure for the amount of welfare loss as a consequence of distorted prices.

For competition neutrality Intven (2000) refers to the WTO Regulation Reference Paper. In this paper the main objective of regulation is defined as to ‘prevent anti-competitive practices in telecommunications’. In section 2.1.3 it is stated that the structure of telecommunications market is considered to have imperfections, which can lead to market power and anti-competitive behavior. In that section regulation is defined based on the definition of market imperfections in market theory: as government intervention in the market aimed at reducing imperfections. Similarly, the criterion that a subsidy should be designed in such a way that it does not favour certain operators above others and that cannot be used for anti-competitive practices, is also derived from market theory.

following requirement for efficient implementation of a subsidy scheme is formulated:

"It is critical that a subsidy scheme is designed such that the extent of market distortion is minimized."

Contrary to the first two requirements, which relate to the rationale of a subsidy, this requirement relates to implementation. The five guidelines for the design of subsidies (Intven 2000) that were described in the literature review are practical measures aimed at satisfying this requirement. These guidelines relate to fair spreading of the burden of universal service among operators, equal access to subsidies for all operators, and minimizing the amount of subsidy through sharp targeting to specific beneficiaries. These five guidelines offer a framework that can be used to evaluate the design of a specific subsidy.

To summarize: The policy guideline to minimize market distortion of a subsidy is based on insights from market theory. Based on a market theory framework the requirement to a subsidy to minimize market distortion is defined as a critical success factor. The universal service literature provides five practical measures that would limit market distortion, which can be used to evaluate a specific subsidy scheme.

2.3 Critical Success Factors and Theoretical Background of O.B.A. Literature

This section analyses the theoretical background of the guidelines for government policy put forward in the output-based aid literature and evaluates whether these can be defined as critical success factors. Section 2.3.1 analyses the theoretical background
of the output-based aid literature. Section 2.3.2 introduces agency theory. Based on that theory two critical success factors are formulated.

2.3.1 Theoretical Background of Output-Based Aid

In the review of the articles from the 'output-based aid book' (Brook and Smith 2001) is became clear that the subject of o.b.a. is contracting out of public services to private third parties. The general guidelines are that the expected performance in such a contract should be specified in outputs and that public financing should be directed to the delivery of those outputs. The application of these principles is different for each case. So a range of issues and experiences from practice are put forward in the o.b.a. literature.

In the o.b.a.-book no explicit theoretical framework is presented for the explanation of success / failure of subsidy schemes. The issues and suggestions in the checklist also are not derived from an explicit theoretical framework.

Brook and Petrie\(^1\) (2001) do refer to Shirley and Walsh\(^2\) (2000) for the explanation of the failure of state-ownership. The arguments of Shirley and Walsh (2000) are based on a review of ownership literature. It is not clear whether Brook and Petrie (2001) propose that this same literature is relevant for the

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discussion of contracting out to the private sector. Shepherd\textsuperscript{13} (2002) uses an explicit contracting framework to analyze the effectiveness of various aid-contracts employed by the World Bank. He uses this framework to compare the output-based aid-contract with traditional input-based contracts. He does not use this framework to come to critical success factors for the implementation of o.b.a. schemes. For implementation he refers to Brook and Petrie (2001).

Based on these considerations we conclude that the o.b.a. literature— to the extend reviewed—is mainly a discussion of best practice. It does not present specific critical success factors. Instead, it presents a broad range of questions and issues that come up when the general output-based principles are applied to a specific situation. The output-based aid principles have relevance to a broad range of public services. For instance health care and road maintenance, electricity, water, telecom etc. Not all of the issues presented are therefore relevant to subsidy schemes in the telecom sector. And some issues that have specific importance for the telecom sector are excluded. The features that are for instance excluded are the constraints to subsidy schemes that are imposed due to the dynamic nature of the telecom market, which are discussed in the previous section.

Because the output-based aid literature provides no explicit theoretical framework for the explanation of success or failure of subsidy schemes, in the following a specific framework is introduced that is considered appropriate for that purpose. This

framework is agency theory. Agency theory is exceptionally suitable for the analysis of behaviour in a contractual relationship, where an agent takes decisions or performs a task for a principal. It is assumed that this model can explain typical problems that can emerge in the planning and operation of innovative subsidy schemes. This model will be discussed in the next section.

2.3.2 Agency theory

This section discusses agency theory. In section 2.3.2.1 a principal-agent relationship is defined: consisting of assumptions on the behaviour and distribution of information between two parties. In section 2.3.2.2 the relationship emerging from a subsidy scheme is translated into principal-agent terms. In section 2.3.2.3, two specific aspects of a subsidy relationship are discussed, making use of two different branches of agency theory: positive agency theory and the theory of principal and agent. In Section 2.3.2.4 the attracting responses of principal and agent are discussed. The analysis of these aspects leads to the formulation of two critical success factors for subsidy schemes.

2.3.2.1 Definition of a principal-agent relationship

The principal-agent model refers to a relationship where one person (the agent) takes decisions on behalf of another person (the principal). The efforts made by the agent affect his own utility as well as the utility of the principal. The agent gets a reward from the principal and in performing his task he has some freedom of
action. The following assumptions are made concerning this relation\textsuperscript{14} (Neelen 1993):

1. There is some form of contract between the two parties. The concept of contract is broader than contracts enforceable by law; it covers all relationships where agreement is reached between two parties for the delivery of a certain good or service.

2. For a given institutional setting, both principal and agent maximize their utility. It is also assumed that principal and agent have different utility functions.

3. The principal cannot perfectly observe the activities and level of effort of the agent. In addition it is assumed that there are external factors influencing the results of agents activities. Therefore the principal also cannot judge the level of efforts based on the results.

4. Contrary to neoclassical economics, transaction costs are assumed to exist.

It can be seen that due to above assumptions there is information asymmetry and a conflict of interest between principal and agent. The effort that the agent puts into his task is beneficial to the principal but a disutility to himself. At the same time the agent has more and better information on his actual level of effort, which enables him to act opportunistically. This is demonstrated in two typical problems.

First and most important is the ‘hidden action’, which is also known as moral hazard. This refers to the agent’s opportunity to put in less effort than promised (‘shirking’) or engage in ‘on the job consumption’. Then the agent exploits the information asymmetry to promote his own interest instead of the principal’s interest.

The second problem is the ‘hidden information’, also known as adverse selection. This refers to the difficulty for the principal of selecting one agent out of a number of agents. This is because of the private information agents have about their skills and interests, which is difficult to observe for the principal.

When the agent does not act in the interest of the principal this causes costs. The principal will try to minimize these agency costs. This can be done in a more or less efficient way which creates an economic problem.

2.3.2.2 Translation of a Subsidy Scheme in Principal Agent Terms

For the translation of a subsidy to principal agent terms policy literature provides relevant insights. A policy instrument is defined as an instrument aimed at influencing processes in society consistent with a certain policy objective\(^{15}\) (De Bruijn and Ten Heuvelhof 1997). A subsidy is a particular policy instrument aimed at influencing the behavior of parties outside government

\(^{15}\) De Bruijn, J.A., E.F. ten Heuvelhof (1997) Incentives H. 5 in Sturinginstrumenten voor de overheid, over complexe netwerken en een tweede generatie sturingsinstrumenten. Stenfert Kroese
consistent with a certain policy objective. An important feature of subsidies is their voluntary nature (De Bruijn and Ten Heuvelhof 1997). The parties targeted by the subsidy are free to decide whether they apply for the subsidy or not. Thus, they are free not to change their current behavior. However, once they apply for the subsidy they will have to comply with the conditions that are imposed. And the government disbursing the subsidy will monitor and if necessary enforce the compliance with those conditions. Given this situation a subsidy program can be separated in two distinct phases (De Bruijn and Ten Heuvelhof 1997):

1. **The phase ex-ante the application for a subsidy.** The government will attempt to design a subsidy in such a way (amount, structure etc.) that it has a chance of generating a response at the designated parties. It is critical that a subsidy is attractive since the parties are free to decide whether they apply for it.

2. **The phase ex-post the application for a subsidy.** The voluntary nature of the subsidy has disappeared because the recipient has accepted the desired change of behavior. The government will establish control to ensure that the recipient demonstrates the behavior that corresponds to the policy objective of the subsidy program.

In the following these two phases will be addressed as distinct principal agent problems. It is assumed that the second phase corresponds with a problem of monitoring and bonding. The principal wants to prevent shirking by the agent in a specific p-a relationship. This will be elaborated based on the positive theory of agency. With regard to the phase ex-ante the application for subsidy it is assumed that this corresponds with a problem of
optimal contract design. The principal wants to attract an agent at minimum cost, which is achieved through the optimal contract.

2.3.2.3 Positive Theory of Agency; Monitoring and Bonding

The positive theory of agency studies existing forms of organization. Based on the principal-agent model this theory explains the existence of these forms on efficiency grounds\(^\text{16}\) (Schreuder and Douma 2002). Critical features of an organization are the distribution of ownership and the distribution of decision rights. It is assumed that some distributions are more efficient than others. Generally speaking the owners of an organization will try to influence the decisions (which are delegated to an agent) affecting the value of that organization. A central concept in this respect is monitoring and bonding. Monitoring consists of activities employed by the principal to ensure that the agent acts in his interest, i.e. to prevent shirking. Bonding consists of activities employed by the agent to demonstrate that he does not deviate from the principal’s interest.

Monitoring and bonding cause costs for the principal, which are part of the agency costs. Thus, the principal will evaluate whether these activities efficiently limit shirking by the agent. Shirking leads to another form of agency costs, that is residual loss. This is the difference between optimal behaviour from the principal’s perspective and actual behaviour of the agent.

Most writers acknowledge that monitoring and bonding are not fundamentally different (Neelen 1993; Schreuder and Douma 2002). Following Neelen (1993), agency costs can be defined in a similar way as quality costs:

1. **Costs of prevention.** The principal faces costs to find information necessary to establish rules and directives that ensure that the agent acts in principal's interest and does not engage in non-productive behavior.

2. **Costs of inspection / monitoring.** The principal faces costs to make sure that the agent actually keeps to the rules and directives.

3. **Residual loss.** The costs that exist because not all shirking could be prevented.

The challenge for the principal is to design efficient prevention and monitoring structures that reduce the residual loss. He will try to structure the agency relation in such a way that the sum of agency costs will be minimized. The fundamental trade-off is between high prevention and monitoring costs (in case of detailed directives) and high residual loss (in case of incomplete and/or unreliable directives).

Based on the assumptions on a principal-agent relationship we expect that the behaviour of the subsidy recipient possibly diverges from the policy objectives of the subsidy scheme. The government is confronted with imperfect monitoring and faces agency costs. This leads to the following requirement for effective implementation of a subsidy scheme: *To avoid loss of policy effectiveness (residual loss) government should define clear rules and directives for the subsidy recipient that correspond to the policy objectives of the subsidy scheme. In addition, investment in*
monitoring of these directives is required. If the government succeeds in designing efficient monitoring structures that limit shirking, it can reduce the sum of agency costs.

2.3.2.4 Theory of Principal and Agent; Attracting Response

The theory of principal and agent focuses on the design of an optimal reward structure (Schreuder and Douma 2002). It is assumed that an agent performs a task for a principal and that his output is determined by his level of effort and an external factor. A central question is to what extend the principal can give the agent financial incentives to act in his interest. Financial incentives consist of a reward structure that is dependent on the performance (level of output) of an agent.

Some more selected literature is as under:

- AGRICULTURAL EXTENSION, RURAL DEVELOPMENT AND THE FOOD SECURITY CHALLENGE... SUSTAINABLE DEVELOPMENT DEPARTMENT. This is a discussion paper on the role that ICTs potentially have to play in rural areas of the developing world. Its stated aim is to look beyond the current ‘digital divide’ debate which focuses on information disparities to assess the potential role of ICTs in the context of current rural development paradigms. The first section considers some alternative approaches that are being pioneered to harness ICTs for development goals including private sector, public sector and NGO-based initiatives. This leads on to a discussion of changing approaches to technology transfer drawing on lessons from agricultural extension experience to
illustrate how ICTs could be harnessed for rural development.

The concept of building partnerships at the community level based around information exchange is explored in the second section, using ICTs to improve systems for the exchange of information sources that already exist locally and also providing established information intermediaries with the facilities to enhance their capacity for information sharing. The paper looks at how simple and 'off the shelf technologies, rather than large scale expensive infrastructure, could have greater role in future rural development strategies through the integration of available technologies and the diverse institutional and knowledge landscapes that exist in developing countries.

The paper concludes that there are numerous, well established barriers to improving information exchange. Knowledge capture, the high cost of information access and infrastructure constraints all affect the equitable distribution of information in rural areas.

However, technological advances in ICTs have reduced the cost and increased the quantity and speed of information transfer dramatically. This is set to continue and the technologies are already being designed to accommodate a wide range of user choices.

To pursue 'universal access' and one size fits all applications to 'bridge the digital divide' is to ignore the real potential of ICTs to be used locally, in order to enable those individuals and institutions that are the priorities of rural development strategies to access the information that is relevant to their own multi-dimensional livelihoods. The need for a concerted
effort to build knowledge partnerships and to engage the private sector and technology drivers in the pursuit of rural development goals is paramount if ICTs are to have a role in future strategies.\(^{17}\)

- **GORDEON A. GOW (MA).** "New Approaches in Disaster Communication: towards a Global Communication Life Line Infrastructure\(^{18}\). This thesis examines the impact of computer-mediated networking on disaster communications. The international counter-disaster community is considering computer-mediated networking (i.e., the Internet) as a powerful tool for improving disaster communications. Central to this trend is a belief that expanded communications capabilities can improve disaster management practice around the world. Current applications in computer-mediated networking are discussed, and a network perspective on disaster communications is developed. Computer-mediated networking also challenges traditional approaches to disaster communications strategies.

More specifically, new opportunities for self-organizing approaches have become possible with the Internet. This thesis develops a network perspective by introducing complex systems theory to examine and augment an alternative communications model. This model is more congruent with self-organization on distributed networks than the traditional approach, and may be applicable in the future development of global disaster


\(^{18}\) Gordon A. Gow (MA) New Approaches in Disaster Communication: towards a Global Communication Life Line Infrastructure, Graduate Programme in Communications Studies, University of Calgary, June, 1997
communications networks. The Global Emergency Management Information Network Initiative (GEMINI) is examined as a prototype network.

- **Smith, A. D. M. (2003)** Evolving Communication through the Inference of Meaning¹⁹. The thesis addresses the problem of how successful communication systems can emerge between agents who do not have innate or explicitly transferable meanings, cannot read the minds of their interlocutors, and are not provided with any feedback about the communication process.

The author develops a solution by focusing on the role of meanings within the framework of language evolution, and on communication through the repeated inference of meaning. Much recent work on the evolution of language has concentrated on the emergence of compositional syntax as the crucial event which marked the genesis of language; all the experimental models which purport to demonstrate the emergence of syntax. However it rely on models of communication in which the signals are redundant and which contain pre-defined, structured meaning systems which provide an explicit blueprint against which the syntactic structure is built. Moreover, the vast majority of such meaning systems are truly semantic in name only, lacking even the basic semantic characteristics of sense and reference, and the agents must rely on mind-reading or feedback (or both) in order to learn how to communicate. By contrast, at the heart of this thesis is a solution to

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the signal redundancy paradox based on the inference of meaning and the disambiguation of potential referents through exposure in multiple contexts.

The author describes computational models of meaning creation in which agents independently develop individual conceptual structures based on their own experiences of the environment, and show through experimental simulations that the agents can use their own individual meanings to communicate with each other about items in their environment. He demonstrates that the development of successful communication depends to a large extent on the synchronisation of the agents' conceptual structures, and that such synchronisation is significantly more likely to occur when the agents use an intelligent meaning creation strategy which can exploit the structure in the information in the environment.

- HARINDRANATH, G (Hari) (1997), India's Information Technology Industry: Adapting to Globalisation and Policy Change in the 1990s, despite the shift towards more market-oriented economic strategies, there is a continuing need for state policy to play the role of a nurturer of high technology industries in many countries. This is especially true of the information technology (IT) industry, characterised by rapid technological change, necessity of economies of scale, research inputs, and the constant upgrading of skills.

This thesis examines the impact of state policy liberalisation and globalisation on India's IT firms, and the means by which they are responding to policy changes in the 1990s. India's IT industry has experienced a variety of policy interventions, from
protectionism in the 1970s and early 1980s to liberalisation of the economy in the 1990s, thus providing a rich area for research. The study investigates the impact of policy change on both computer hardware and software components of the Indian IT industry by analyzing the legacy of past policies as well as changes in firm-level strategies in the 1990s.

Liberalization and globalization are now being upheld by policy makers as the sole determinants of international competitiveness for the Indian IT industry in the nineties. However, the impact of liberalization and globalization may be both positive and negative; they provide a pathway to continuous technological upgrading, but at the same time threaten the survival of indigenous IT firms and their technological capabilities, built on the basis of import substitution. This thesis argues that liberalization implies a continuing link between government and industry, and that it needs to go hand-in-hand with interventionist measures. The state has a continuing role to play in fostering the IT industry and creating the conditions for international competitiveness, even under liberalized economic conditions. Although Indian IT firms are shown to be adapting to the new policy environment, the industry's future can be better secured by a renewed policy emphasis on developing the domestic industry and market, accompanied by a push for IT consumption as against mere production and export.
ADITYA DEV SOOD. Guide to ICTs for Development
Published in 2002\textsuperscript{20} by the Center for Knowledge Societies in Bangalore (first published in 2001 as A Social Investor's Guide to ICTs for Development) The publication is concerned with the relations between development and technology -- Information and Communications Technologies (ICTs) in particular.

Development is often understood in terms of advocacy, social work, voluntarism, selfless charity and other palliative social services. But perhaps the term is better used to signify the transformation and expansion of a society's infrastructure. Commercial projects become viable when consumers are willing to pay for a product or service at a sustainable cost. In some cases, however, the very existence of this product or service is a precondition to many other kinds of social or economic activities. In such cases, the project not only meets the minimum criteria for financial success, but also provides some additional benefit to its community. It is with regard to this second set of potentialities that arise from the existence of a product or service, which we begin to recognize it as a resource, as infrastructure.

The author recognize Information and Communications Technologies as a new and yet essential form of infrastructure necessary to the process of development. ICTs represent an unprecedented opportunity to make new knowledge, services, and opportunities available in underserved areas. Both urban and rural citizen consumers may benefit from ICTs by receiving: (i)
enhanced access to information and communication across large distances, (ii) improved access to governmental and quasi-governmental resources and services, (iii) new credit and financial services available through palmtops and information kiosks, (iv) new opportunities to design, manufacture and market their products through internet or intranet systems, (v) more and better education through computers or about computers or both, and (vi) superior medical advice, diagnosis or knowledge in their own locality.

In the long term, rural ICT projects could prove to be the most effective means of driving change in rural areas: (a) socially, by ensuring equal access for disprivileged groups, (b) economically: by creating new kinds of work and financial transactions, and (c) politically: by improving the quality, speed, and sensitivity of the state apparatus to the needs of local citizen-consumers. Many important challenges to the viability of rural ICT projects remain, given the limitations of electricity, telephony, net-connectivity, and other kinds of basic infrastructure. Furthermore, it is very likely that in these initial stages, ICTs will asymmetrically benefit landowning elites, relatively disprivileged landless artisanal groups in many rural areas. For this reason, rural ICT projects must be constantly monitored, evaluated, and redesigned, so that they are inclusive in their operation, and progressive in their effects. Social research, economic analysis and demographic surveys are all central to the process of conceptualizing and designing new applications, services, and business models for the rural sector.

This book addresses many of the problems and possibilities of using networked technologies for developmental objectives. The
author lays out views on how best to create digitally-enabled infrastructure in chapters 1 and 2. Chapter 3 describe the social and economic impact of networked technologies on rural societies and various kinds of organizations, based on our own experiences. Chapter 4 discusses statistics and recent trends within the sector, that are based on an analysis of extensive database on this sector. Sections 5, 6, and 7 of this document describe actually existing technologies, projects and resources in South Asia that use or facilitate the use of ICTs for various developmental objectives. This listing is by no means encyclopedic, and is intended only as a guide to the unfolding landscape. Investors and entrepreneurs are invited to think of these resources as an incomplete toolkit, or kit-of-parts, that may be assembled together for new and innovative applications, experiments, and projects. Although the majority of cases discussed here are from India, they may serve as resources for the rest of South Asia, as well as other parts of the developing world.

- **ILHARCO, FERNENDO M. (2002). Information Technology as Ontology: a Phenomenological Investigation into Information Technology and Strategy In-the-World** This dissertation offers a phenomenological approach to the comprehension of Information Technology (IT) and Strategy, and of the relationships between these two phenomena.

The author argues that in order to thoughtfully understand the manifold connections between IT and Strategy, their contradictions, shortcomings, and possibilities; one has to rely on the essence of each of these phenomena.
The rationale of this approach implies the need to make explicit the ontological assumptions on which the investigation relies. An essential uncovering of that which IT and Strategy are, can only take place as long as we lay a bare primary position on the nature of that. Martin Heidegger's being and Time and, to a lesser extent, the theory of autopoiesis are the foundations of this investigation. We claim that these theories are paradigmatically consistent and show relevant complementarities, namely in what concerns are the issues of action, information, and knowledge. The matching of these two theories provide the ontological and epistemological grounds of the investigation. Within this fundamental setting the author argue that IT and Strategy will only essentially show up as long as they are accessed in-the-world in which they are what they are.

The research applies the phenomenological method of investigation in its original form as developed by Edmund Husserl. However the author extends the Husserlian formulation in a last phase by using the arguments of Heidegger on the opening up of possible concealed meanings of phenomena. The method sets the boundaries of the research. IT and strategy are phenomenological analysed not as empirical objects, events, or state of affairs, but as intentional objects of consciousness. These are formally indicated from the outset of the investigation as the ITness of IT and the Strategyness of Strategy.

The central conclusions of the investigation are: (1) IT is an ontological phenomenon, substantively penetrating the being-in-the-world we, ourselves, are; and, (2) Strategy, essentially
choosing to choose, has been unfolding throughout History guided by the concealed meaning of a striving for an authentic identity.

These essential notions uncover a complex set of relationships between the two phenomena. Those relationships are thus described and characterised. The author also shows that although phenomenology is not empirical its results have many important implications for the empirical world.

2.4 The Relationship Between the Development Communication and the Rural Development

Development Communication is a wider subject stream in the world. With the globalization, it has got tremendous place. The basic responsibility of the process of development in a country is in the hands of the government and the people of the country. But the complete life is given to the process of responsibility between the government and people by development communication. Thus, development communication is so essential for the purpose of making the development process active. As we have earlier discussed, development communication has got its birth from developing and undeveloped countries. It is merely a thing that is born on necessity. In undeveloped as well as developing countries more responsibility of the development is given to the public. The majority of general public is in rural area.

Generally in every country rural is not subject to industrialization. It is seen that great effort is made to fulfil the reality of the development in undeveloped and developing countries. That effort is made in to reality by development communication. Therefore, rural development can not be spoken of
without taking of development communication. Rural development is the foundation of the development of a country. Accordingly, through the fulfilment of rural development the whole development of country can be made firm. The pioneers of the rural development are the rural folk. But from country to country, culture to culture aides, attitudes, thoughts, ambitions of the people are different. In the development of the rural areas it is important to understand the rural people. Without understanding them properly we can’t communicate with them. Therefore, target audience communication is essential.

Rural people are a kind of community. They are either most probably blood relations, or those who are known to one another. They clearly understand the abilities and inabilities of one another. In such a mass of community the oneness, the unity and the familiarity can be seen. In a development process of a country what is more important is to understand the people with these characteristics and to make development messages that are most suitable to them. In a development process of a country many rural communities can be seen as a passive audience. It is really a big obstacle for the development process. Therefore these communities should be made active audience. The complete responsibility of this process is given over to a process of development communication. It is not so much of easy task, because of the illiteracy and various behaviour patterns of these people. Therefore on such occasions attentions should be completely drawn towards irradiating of illiteracy. It also dose not become an easy task because of lack of infrastructure that are necessary for the education in the rural society. According to many educationists mass media takes a great place While educating and
irradiating illiteracy. But the most serious problem is that there is no widespread of mass media and its usage. Therefore the spread of mass media should made compulsory in rural areas. But the problem that arises is that the literacy that is necessary for this is not there in rural people. Here the special fact that is seen is that with increase of the spread of mass media, there is increase of usage and the literacy. This is a special fact that is focused by communication scientists and educationists. There for we should not come in to a unanimous decision that the usage of mass media is the only way for the development of a country. Experiments about communication ways and means is essential. At the some time, practical work and tests should be drawn towards that matter. However much the development communication is improved. Inter personal communication and group communication can not be put aside. At the same time attention should be drawn towards the traditional communication systems and its scientific development.

It is clear that the rural development of a country directly influences a development of country. In its fulfilments development communication receives an important place. It is clear that there is an inseparable relationship between the development communication and the rural development.

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