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A learning IT policy

– proposal for an evaluation

itps SWEDISH INSTITUTE FOR GROWTH POLICY STUDIES

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Foreword

In its directives, the Swedish Institute for Growth Policy Studies, ITPS, has been commissioned to ensure that different components of the policy for economic growth are evaluated. As part of this general assignment, the Government Approval Document for 2002 contained the explicit assignment that ITPS should submit a proposal for the evaluation of the Government's IT policy no later than September 30. This report is ITPS' proposal for an evaluation of the IT policy.

The report contains a proposal for the improvement, in the short term, of the data on which a possible IT bill in 2004 can be based, and a long-term plan for creating new knowledge on how IT use can be increased, as well as its effectiveness as a policy instrument for the improvement of goal fulfilment in different policy areas.

Anders Wiberg, Aurora Pelli, Lars Bager-Sjögren and Kurt Lundgren, who was project leader, have participated in the work of producing a proposal. Hans-Olof Hagén, who also participated in the project, was responsible for the work. ITPS has had extensive contacts with the ministry of Industry and other parts of the Government Offices, members of staff at the Swedish Parliament, and various experts working at government agencies, universities and in the IT sector.

We would like to express our gratitude to all those people who have made themselves available for interviews and provided information for the project.

Stockholm, September 2002

Sture Öberg
Director-General

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Summary

In its Government Approval Document, ITPS was given the assignment of drawing up a plan for the implementation of an evaluation of the IT policy.

"In the light of Parliament's Communication, 1999/2000:256, the Institute for Growth Policy Studies shall draw up a proposal for a broad evaluation of developments in the IT field and the effects of the IT policy on the goal of an information society for all. The Institute shall make an assessment of the relevant effects that should be described in the evaluation and present its proposal no later than September 30, 2002."

The result of the work done by ITPS is presented in this report: "A learning IT policy – proposal for an evaluation".

IT technology is developed in close interaction with society, very rapidly, and often in a complex and unpredictable manner. IT is also a technology that has entered into practically all policy areas that have been given priority and is to be found everywhere in society. This creates great demands, not only on the design of the policy but also on how evaluations should be organised. The requests made in respect of the content of evaluations and follow-ups of the IT policy that are expressed, for example, in the deliberations of the Parliamentary Committee on Transport and Communications on the most recent IT bill, also cover many, often different, aspects. Four fundamental ideas have provided guidance for the formulation of this proposal.

Firstly, ITPS has interpreted the objective of "an information society for all" as the strategically overriding goal that governs the other levels in the IT policy and the selection of the areas that should be given priority in the evaluation work.

Secondly, ITPS has had the ambition of establishing the evaluation as a process in which the policy is motivated and described in terms which make it possible to evaluate, in which indicators are created for the goals of the policy, in which the results are the subject of both self-evaluation and external evaluation, and in which the results of these evaluations form the basis for the formulation of the policy for the next period. This ambition is also reflected in the title of this report – *A learning IT policy*.

Thirdly, ITPS has tried to solve the task of proposing an evaluation that shall cover different sectors, and remain fully comprehensive, by dividing the work into five separate themes that are nonetheless related to and dependent on each other.

Finally, ITPS proposes that the evaluation work is performed with two time perspectives: one short-term and one long-term. The *short-term* perspective aims at creating data for a possible new IT policy decision in the year 2004. The inputs proposed here are development of indicators, statistics and databases; knowledge reviews and "meta evaluations" in the areas in which evaluation work has already been started; different analyses; and a comparative international study of the Swedish IT policy carried out by an international research group of good repute. It is proposed that ITPS is given the assignment of purchasing the necessary services and coordinating the work. The *long-term* evaluation work has the aim of developing understanding of cause and effect relationships between results achieved and policy measures implemented and of analysing the long-term effects of IT development. These tasks should primarily be performed by the research community and coordinated by different financiers of research programmes.

The report is in two parts. Part A is a description and analysis of the background to the proposal and Part B is the actual proposal.

Chapter A1 – "The IT policy" – contains a definition and description of the IT policy as it has been interpreted by ITPS.

Chapter A2 – "The effects of IT on society" – touches on some of the aspects of IT that are relevant for an evaluation of the IT policy and also constitutes, together with Chapter B5 – "IT development" – an initial approach for an analysis of IT development that was requested in the assignment given to ITPS.

Chapter A3 – "Evaluating the IT policy" – contains a report on the points of view expressed by the Parliamentary Committee on Transport and Communications on the follow-up and evaluation of the IT policy as well as a report on the discussions on the design of the policy in connection with the transition to management by objectives and results. This presentation is concluded with the concept of "*a learning IT policy*".

Chapter A4 – "The structure of the evaluation" – contains a presentation of, and reasons for, the selection of themes and time perspectives that ITPS has made for the evaluation work.

The chapters in Part B follow the five themes.

Chapter B1 – "An information society for all" – contains an analysis and discussion of the problems associated with the strategic objective of the IT policy and takes up the work of creating indicators, statistics and databases that will make it possible for the evaluations to follow how the development of "an information society for all" is proceeding in Sweden.

Chapter B2 – "The IT policy instruments" – contains proposals in the areas concerned, questions and types of evaluations that touch upon the contributions made by different policy measures to developing the Swedish IT policy instruments: confidence, skills and accessibility.

Chapter B3 – "Policy areas and areas of IT use" – contains proposals on issues and evaluation projects that take up the effects of the IT policy on the outcome in different fields. The fields given priority are economic growth, welfare, democracy, a sustainable society, and the public sector as the pioneer in IT use.

Chapter B4 – "The IT policy" – directs interest towards the IT policy itself, particularly two aspects: firstly the achievement of "a learning IT policy and secondly an analysis of the Swedish IT policy in a comparative international perspective.

Chapter B5 – "IT development" contains the proposals made by ITPS on the studies and analyses that should be established to enable IT development to be evaluated in a manner that is of interest to the IT policy. In particular here technical developments are linked to important trends for users and the IT policy.

A1 The IT policy

A.1.1. What is the IT policy?

Today the concept of IT is used in such a broad and generalised way in most sectors that its meaning is imprecise and often difficult to interpret. As the technology has been developed, its focus has probably shifted. This is most apparent in respect of communication aspects during the last five years. Correspondingly, the concept of an IT policy has had a varying emphasis and, over time, has been perceived in different ways by decision-makers and the general public.

In the context of this proposal, ITPS defines the "IT policy" as the objectives and measures that have primarily been expressed in the Government's bills on IT (*Measures to extend and develop the use of information technology*. Government bill 1995/96:125 and *An information society for all*. Government bill 1999/2000:86). To a large extent, the latter bill adopted the objectives and perspectives of the former. Therefore the wording of the latter bill could reflect the objectives against which an evaluation could be made. When we discuss the "IT bill" below, we are referring to the latter bill.

In addition to what has been said in the IT bills, the Government's IT policy can also be regarded as including decisions made by the Government that have not been part of the IT policy but have nonetheless been of importance for the issues that are brought up in the policy. The Government's decision to introduce on a tax deduction for the acquisition of home computers for employees can constitute an example of an "ad hoc policy" of this type, which can often fit into the structure laid down in the IT bills. Furthermore, other decisions with the same focus, for example those expressed in government approval documents to agencies, could also be described as falling under the IT policy.

A.1.2. The IT policy as formulated in the Government's IT bill 1999/2000

In brief, the ideas behind the Government's latest IT bill can be described in the following way (see Figure 1):

The strategic objective of the IT policy is that Sweden shall be the first country to succeed in implementing an *information society for all*. The Government and Parliament decide on a number of actions to be taken. They can be directed towards what we designate below as the *IT policy instruments* – confidence, skills and accessibility – which, in turn, exert an influence on the outcome in the policy areas concerned.

In addition to exerting an influence on the three IT-related instruments, the IT policy also includes a number of measures that are primarily directed towards the public sector itself and towards the IT industry. These measures also have the aim of exerting an influence on the use of IT.

The interpretation that ITPS has made of the IT policy is that the desired effects lie *on three levels*. The policy measures that have the aim of building up the IT policy instruments constitute *the first level. The second level* consists of how the IT policy instruments influence the *use of IT*. It is assumed that a good and broad use of IT will the affect the outcome in a number of general policy areas such as growth, democracy, welfare, diversity, environment and security, which can be described as the policy's *third level*.

In other words, there is a duality in the IT bill where the description of the IT policy and its objectives is concerned. The goal of the IT policy partly consists of developing the IT policy instruments. This makes a "good and broad use of IT" possible. How IT is subsequently used *within* different policy areas can then be said to come under these policy areas, i.e. education, health, industry etc. And partly the IT policy can be described as "successful" only when the use of IT has the effect that society can achieve the general policy goals in a better way than without the use of IT. It is clear that the latter aspect is emphasised more in the IT bill of 1999/2000 than in the bill of 1996. In other words, the second bill extends the perspective of the IT policy and thus also indirectly the IT concept itself, by taking up the benefits in the form of services, knowledge etc, that the IT policy is intended to result in.

The IT policy, as expressed in the IT bills, can also be seen as a collection of measures and objectives that have two different origins. The first category of objectives and measures could be described as the real IT policy and is formulated and financed within the framework of the IT bill. The second category consists of measures that concern the use of IT in different policy areas that have been drafted and even financed by other ministries. The reason why these types of measures have been included in the IT bill is probably the Government's aim of providing a coordinated picture of its views on IT and its use in different areas. This division largely coincides with the division of the objectives of the IT policy in the different levels mentioned above.

A2 The influence of IT on society

The IT bill describes information technology as a motor in the ongoing development of society that has been designated "the digital revolution" or "the IT revolution" (p. 13). Information technology represents a new basic technology, in exactly the same way as electricity and the petrol engine once were, which changes conditions for entrepreneurship, working life, culture and education.

A.2.1. A revolutionary technology?

The IT bill is thus linked to the picture of the role of IT in society that has emerged among researchers, politicians and participants in the public debate on social problems. According to many researchers, information technology constitutes the "technical paradigm" of our era. A paradigm of this type is characterised by the technology that forms the foundation of technical, economic and social development during a certain era. The researchers working with this perspective are of the opinion that it was possible to differentiate five, technical-economic paradigms during the era of industrialism. The first paradigm was based on mechanisation and the textile industry, the second on steam power and railways, the third on electricity and heavy industry, and the fourth on mass production and the automobile industry. The fifth technical-economic paradigm is that in existence today, which is based on computer technology, micro-electronics and telecommunication, i.e. what we call information technology.

But there are also other researchers that are of the opinion that the parallels between IT and the technologies mentioned above lead our thoughts on the wrong track. Instead, IT should be regarded as a continuation of the innovations which, like parchment or the printing press, exert an influence on the creation and dissemination of new knowledge in society. Are there then any grounds to maintain that information technology is the technical paradigm of our time or to describe our era merely from the perspective of information technology? Naturally, it is not possible to give clear-cut answers to questions of this type. The answers largely depend on the problems that are examined and analysed. On the other hand, it is possible to have a discussion from a historical technical perspective on whether a certain technical development could be described as revolutionary and the criteria that should be in place to use this concept.

A technological revolution is characterised on the other hand by a number of innovations that complement each other. When these innovations achieve their breakthrough on the market, they are mutually strengthened and this makes the development of new products or services possible. Furthermore, technical breakthroughs require a certain type of social development which can act as a springboard for them. There must be a demand for the products and all areas of society must be ready to "take care of" the innovations. The quantity of technical innovations can, in turn, reshape the social institutions. For example, electricity affected social life in almost all aspects: cities and city life were changed, as were family relations, cultural patterns and attitudes. As a criterion for a revolutionary technology, certain debaters would also require that it is used together with other technologies of importance for the era and is also used to develop these technologies.

It is not difficult to find arguments that show that information technology fulfils all of these criteria and certainly also a number of requirements not included here. Research in-

to the effects of IT on society has also been both extensive and intensive. In the light of this, it is striking that we are only able to give extremely general answers to the question of whether IT exerts an influence on different aspects of society, for example on economic growth or welfare. An illustrative example of this is the discussion among social scientists on the so-called *Solow paradox*.

A.2.2. The Solow paradox

This paradox refers to a statement made by an economist, Robert Solow, who made the observation at the end of the 1980s – when computers started to be used on a large scale in the USA – that "We see computers everywhere – except in productivity statistics". This observation was the starting point of a long and often bitter debate among economists, a debate that is still taking place today. The recent economic slowdown has once again brought the Solow paradox to life and a number of explanations have been presented.

One interpretation is that IT constitutes far too small a part of the economy to make it a factor that has a clear effect on developments at the macro level. *Another interpretation* is that effects exist, but are invisible in the statistics due to the fact that that the wrong effects are being measured or that the statistics underestimate the real rate of growth. *A third interpretation* is that the paradox is at fault – studies show that IT can have *extremely large effects* on productivity, given that investments in IT are combined with changes in work organisation, development of knowledge, new reward systems etc. *A fourth possibility* is that the major effects of IT lie before us, which can be compared with the spread of electricity in society and the economy. The economic effects first became apparent in the 1920s, after new infrastructure and institutions had been developed and knowledge had been acquired of how electricity should be exploited. *A fifth interpretation* has been formulated by an American economist, Robert Gordon. According to Gordon, IT has existed for several decades but, despite this, there has been no obvious increase in the rate of productivity growth. According to Gordon, IT is only *a little more of the same* in relation to electricity and is far too complex and sophisticated a technology to have a great effect on society and the economy.

All these standpoints have been presented by researchers of good repute, the results have been presented in the most prestigious scientific journals, and the discussion has continued for over a decade without any agreement being reached. The results presented can appear to be incompatible with each other, but it is also possible to interpret the different results in such a way that they illustrate different aspects of IT.

Under certain circumstances IT leads to a clear increase in productivity, but it is also true that IT is a complex tool and in no way does its use automatically lead economies into a new era characterised by a long-term, higher rate of increase in productivity.

The influence of IT on institutions and society is more complex and sophisticated than the effects of "old" electricity. In many forecasts of IT development, its interaction with institutional development has often been overlooked, or the difference between data and knowledge, which has a silent and uncodified dimension, has not been taken into consideration.

Investments in IT can, particularly if they are combined with other changes, lead to clear increases in productivity. At the same time there is also the notion that IT can add an "extra" dimension "on top of" a historically normal increase in productivity. At present it is difficult to find convincing support for this notion. Perhaps, in the modern economy, IT is the technology that can be used to achieve the "normal" rate of growth in productivity. Perhaps, under certain circumstances, it can even lead to increases above this level.

A.2.3. Uncertainty and complexity

Serious *miscalculations* of future IT developments and how these are expected to affect social progress in various respects are a constant feature in history. As early as in the mid 1940s, miscalculations were made of the future market for computers: It was estimated that the future demand for computers would amount to a handful. Another example of a similar miscalculation was the underestimation made at the beginning of the 1990s of the demand for mobile telephones at the millennium. In recent years, major investments have failed and the readiness of consumers to rapidly accept different services associated with the "mobile Internet" has been seriously overestimated.

Most assessments of the influence of technology on society assume that it has its effects on the society that exists at that point in time, with given institutional conditions. This can be described as a *direct effect* of a technical change on society. The major effect of a new technology is the *indirect effect* that arises after the various institutional conditions have adjusted to the technical change and vice versa. Sometimes institutional development strengthens a technical innovation, in other cases it can counteract an innovation. It is difficult to judge whether the technology in an innovation will function as intended. There is also uncertainty as to whether its future development can be financed, how standards will be developed, what the market situation will be like when it is introduced, and whether supplementary innovations will be developed. Above all, it is difficult to judge in advance how a new product will be received by its planned customers. Or will the product, when it is ready to be introduced on the market, have been overtaken by an even more advanced technology? Or have the products that already exist and are established on the market undergone considerable improvements in the meantime? All this makes it extremely difficult to forecast the future and to point out the future winners. And, not least, where its decisions on infrastructure are concerned, Parliament, for example, must make decisions that set the framework of what will be possible to implement in the future for a long time to come.

A.3 Evaluating the IT policy

One major point of departure of the proposal made by ITPS for the evaluation of the IT policy is the considerations of the Parliamentary Committee on Transport and Communications relating to the IT bill, which are taken up below in section A.3.1. In the discussion on the increasing use made of management by results and objectives in the government administration, points of view have been presented which, in the opinion of ITPS, are of great relevance for the formulation of the IT policy. These points of view are summarised in section A.3.2.

A.3.1 The Parliamentary Committee on Transport and Communications

In both the IT bill and in the deliberations of the Parliamentary Committee on Transport and Communications on the bill, the question of follow-ups and evaluations is raised. In the bill it is emphasised that follow-ups and evaluations in the IT field are difficult, since, among other things, the IT policy is put into effect and developed in a complicated form of interaction between government and the market. The Government also comments on the reports made to Parliament. Experience shows that a compulsory annual report is not the most suitable method for this purpose. The IT policy brings up many new and often technically complicated issues and encroaches upon all policy areas, which makes it extremely difficult to give concrete and exhaustive information on each area in annual reports.

The Parliamentary Committee on Transport and Communications points out that the trend towards the introduction of management by objectives and results makes it necessary for Parliament to spend more time on following up decisions made. The Committee also states that many decisions, not least in the IT field, have long-term consequences since decision-making must be large based on strategic assessments and forecasts for the future. These forecasts can then be reconciled against reality, which changes rapidly. Furthermore, the Committee states that the effects of the IT decision made in 1996 are positive in many fields but that it is difficult to assess causes and effects. The Committee states that the in-depth information submitted on special areas for follow-up and evaluation purposes is to be preferred. Furthermore, the Committee emphasises the development of relevant indicators in the IT field and states that the policy goals should be further developed and concretised.

The Committee finds it important that a strategy is formulated for the information on results that should be submitted and for the points in time at which follow-ups should be made, as well as how these follow-ups should be performed. The Committee states that there is also a need of *a coordinated, cross-sector follow-up*. Finally, the Committee points out the importance of following up the expansion of the IT infrastructure and making reports on this to Parliament. This applies to both the pace of IT infrastructure development and its costs.

To sum up, the interpretation made by ITPS of the points of view of the Parliamentary Committee on Transport and Communications is that the Committee would like to have better *information* on, and follow-up of, developments in the IT field through the creation of different *indicators* of IT development. Furthermore, the possibility of making evalua-

tions and clarification of causes and effects are regarded as important for future decision-making purposes and the Committee also draws attention to the problems that the complexity and rapid pace of developments in the field result in for decision-makers and for the formulation of the policy.

A3.2. Management by objectives and results

The considerations of the Parliamentary Committee on Transport and Communications should be seen against the background of the trend towards management by objectives and results (*see Financial management for efficiency and transparency*, Ministry of Finance 2000:63) of central government activities that has its origins in the proposals made in the supplementary budget bill of 1988. The underlying reasons for this trend were demands that development and expansion must take place within existing budget frameworks and that the scope and importance of central government activities required continuous improvement to and development of the content and quality of activities. This focus of the policy has led, above all, to a reduction in the detailed controls of government agencies. It has also had the effect that the main emphasis has shifted from resource allocation and financing to operational results, i.e. output and effects.

This policy focus means that Parliament and the Government determine the objectives, focus and framework of activities and that government agencies are responsible for decisions on the implementation of activities under certain given conditions. This delegation also has the effect that requirements in respect of reports and analyses are strengthened and that the focus of the process is shifted from budgeting to the follow-up and evaluation of the results of activities. Furthermore, this model requires a well-developed formal and informal dialogue between both government agencies and the Government and between the Government and Parliament. Financial management in central government includes both *management by results* and *financial management*. Management by results means that objectives are formulated that form the basis of the assessment of results and of decisions on future actions. Financial management refers to the imposition of restrictions, for example in the form of appropriations for activities.

Experience gained indicates that the method has resulted in gradual improvements but that it has some shortcomings. The link between management by objectives and financial management has been weak and most emphasis has been placed on the financial side. To sum up, experience gained of the new system shows many problems, for example

- Lack of a holistic perspective and transparency at different decision-making levels.
- Unclear links between performance management and financial management.
- Insufficient knowledge of effects and goal fulfilment.
- Unclear goals for central government activities, as well as unclear links between goals at different levels.
- Shortcomings in respect of the quality of information on results, as well as assessments of this information.

In the work of improving controls, several areas have been pointed out in which improvements should be achieved. Controls of operations place considerable demands on the formulation of the objectives. The objectives specify what should be achieved by the activity

in question. The requirement that it should be possible to follow-up objectives can be met by having both quantitative and qualitative goals.

Parliament has also emphasised the importance of making goals measurable and possible to follow-up to enable them to be compared with their costs. They should also be expressed in such a way that they can constitute points of departure for political priorities and discussions. This means, in turn, that the goals shall follow the so-called SMART criteria. Under these criteria a political measure should be s*pecific, measurable, accurate, realistic and timebound*. One example of a specific goal is the political goal that, in the year 2000, open unemployment would amount to 4 per cent of the labour force.

A3.3. A learning IT policy

The discussions on performance management and the SMART criteria bring to the fore a number of issues that are relevant to the IT policy and its formulation. Several of these have been taken up by the Parliamentary Committee on Transport and Communications. The IT policy has the aim of creating the three policy instruments and that the use of IT shall then lead to a greater degree of goal fulfilment in a number of given policy areas and areas of IT use. This means that the IT policy has major elements of a description of policy areas and areas of IT use in different fields in which the ministry responsible for coordination, the Ministry of Industry, Employment and Communications, has limited influence where the formulation of goals and follow-ups is concerned. The IT policy functions rather like a "crosspiece" over these widely different policy areas, which make clarity and transparency essential in the formulation of the IT policy. There is therefore a risk that the problems mentioned above in respect of management by results – lack of a holistic perspective, unclear links between management by results and financial management, the relationship between effects and goal fulfilment etc – will have a negative effect on an area such as the IT policy.

The possibility of evaluating and following up the IT policy is determined primarily by the complexity associated with IT. The most important factor here is how the policy is formulated and presented. The decisive factor for the possibility to make evaluations is, in the first place, the extent to which the policy goals are formulated in terms that are possible to follow up. Accordingly, the possibility of evaluating and assessing the results is facilitated if the goals are clearly formulated and if the reasons for the choice of goals and actions to be taken are presented.

In the light of this, one dilemma for the IT policy is naturally how goals can be formulated in an environment that is characterised by complexity and rapid change.

Assume that Parliament or the Government arrives at a decision that has highly concrete and measurable goals, for example that, before the end of a certain year, a certain proportion of the municipalities in the country shall have access to networks with a certain capacity. Assume thereafter that, for technical reasons, it proves to be impossible or wrong to implement the decision. Naturally it should not be implemented, but the question that then arises instead is how the decision should have been formulated at the start of the process. Requirements in respect of flexibility and the possibility of making evaluations can then be thought to be in conflict with each other. In this situation there would appear to be good reason to maintain that the policy should have the character of *policy frameworks*. On the other hand it can be maintained that it should not merely be possible

to justify all decisions that involve the use of taxpayers' money, the decisions should also be formulated in such a way that it is possible to evaluate them after the event.

A set goal does not always mean that it is achieved. There can be several reasons for this. The goal may be formulated unrealistically; inappropriate strategies to achieve the goal may have been chosen; it may have been difficult to exert controls over the process; or circumstances in the external environment may have changed. If clear goals have been formulated, the difference between goals and results will be visible and can therefore be analysed. In other words, a situation has been created in which it is possible to *learn* something. In this context, *feedback* between the effects and the preparatory work on decisions that cover the next period will be of decisive importance for the effectiveness of the policy and the possibility to evaluate it. Perceived effects are used in the process to formulate more precise goals, better precision can be achieved in the cost estimates, and possibly a clearer picture of the most suitable parties to implement different tasks will be obtained. However, if the policy has not been formulated in terms that make evaluations possible, it will not be possible at all to build in learning mechanisms of this type into the policy process.

One method that is often used, not least in the IT policy field, is that the policy goals of Parliament and the Government are formulated in a general manner and that these rather abstract goals are broken down by government agencies at lower levels, or by municipalities and county councils, to enable more concrete sub-goals to be formulated. When the effects of the implementation of the policy start to become visible, these can then be used as a basis for achieving greater precision in the policy decision-making process. Also here, feedback and follow-up of the results achieved are of decisive importance for the effectiveness of the policy.

On the basis of these observations, ITPS is of the opinion that the most important objective of this proposal is to create the requisite data for "a learning IT policy". With this concept ITPS means an IT policy that is gradually changed in such a way that the preparatory work on the policy is based on effects of the previous policy and that the policy is formulated in such a way that makes evaluations possible (See Figure 2 for an illustration of how ITPS sees the learning process and the measures that should be taken to support it). At the same time, the formulation of the policy should give consideration to the need of flexibility and the difficulties of describing the causal links between measures taken and their effects. Other factors in the concept are that goals and strategies should be well motivated, and that proposed decisions should be of good quality and have been the subject of critical assessments from different perspectives and areas of knowledge.

The analysis of the focus of evaluations determines both the evaluation methods and the selection of areas that the ITPS proposes are given attention in the evaluation process. This also means that, in the first place, ITPS chooses to regard the IT policy from the perspective of members of Parliament, i.e. the representatives of the general public.

A3.4. Some difficulties in evaluating IT

What conclusions can we draw from earlier attempts made by social scientists to answer the question of what IT means to society? On the basis of the perspective presented here, ITPS would underline the effects of the following factors on the possibility of evaluating the IT policy.

1) The rapid pace of developments leads to rapid changes in conditions for the policy.
2) The interaction between technology and institutional change, the time it takes to establish a new infrastructure, and the time it takes for the parties concerned to learn the new technology have the effect that the introduction of new technology is often associated with considerable *shifts in time*. This leads to difficulties in determining the relationship between the actions taken and the effects of the actions.
3) The effects of IT on the economy, welfare or democracy are not merely a consequence of the technology itself. There is a great deal that indicates that investments in IT supplement other types of investments and this makes it difficult to distinguish the changes and adjustments that can be related to IT development and those that would have happened in any case
4) Where identifying the effects of the IT policy is concerned, we can see that we will have problems in all the three levels that we have discussed above. The problem is that the results achieved at all levels influence the measures taken in other policy areas and the actions taken by other parties, by economic cycles, demographic trends and so on. This does not merely apply to the results in the different areas of use. Above all, the three IT policy instruments (confidence, skills and accessibility) are influenced by the actions taken by enterprises, by price changes, by international standards, by actions taken by parties such as sector organisations, individual county councils, property owners or international bodies.

An evaluation of a policy area is based on an assessment of the effects of the policy. Let us compare two situations, with and without policy measures (see Figure 3). In the first case no policy measures are put into effect. The result (R_u) is a product of market forces, of technical advances and so on. In the other case certain measures are taken that can also have an effect on, for example, the behaviour of actors on the market. The actions of a market actor can supplement the policy measures, but the contributions of market actors can also be weakened by policy measures. The result in this case (R_m) can be seen, while the situation in which no policy measures are taken is a hypothetical situation. The effect of the policy is in this case the difference in results between the situations with or without policy measures respectively, i.e. $R_m - R_u$.

In view of the difficulties in determining causes and effects and the long delays that exist between measures taken and their effects, it can appear to be far too ambitious a task to evaluate the IT policy. It should be admitted from the outset that evaluations of this type are not an exact science. Instead the evaluations should be regarded as a process through which the evaluators gradually develop methods to assess effects and create indicators for this purpose, while the decision-makers learn to formulate the policy in terms which permit follow-up and evaluation, i.e. a learning IT policy is created. The complexity that characterises the IT field can, in the opinion of ITPS, not be taken as an excuse for not initiating a process towards a learning policy of this type, but rather intensifies the requirements on the policy in this respect.

A4 The structure of the evaluation

We have now discussed the IT policy, its objectives and its structure from different perspectives. How can a structure for evaluations conceivably be designed, given ITPS' assignment in the Government approval document, the report of the Parliamentary Committee on Transport and Communications, and our own views on formulating a policy in such a way that makes evaluation possible? What should we do to ensure that it is an evaluation of the IT policy that is made and not a general social analysis.

We have perceived the creation of "an information society for all" as the strategic goal. This gives a general direction to the policy, i.e. it has the aim that IT should be used in a way that benefits the citizens and that it is possible for everyone to use IT. This means that the goal is long-term but, through the commitment to reach this goal before other countries, a flexible goal has been established for the position Sweden should adopt during the course of the process. This formulation also links the IT policy to the citizens and the general political goals.

From the perspective of the policy, the stage of development of the information society we are in at the moment is characterised by ambitions to make a good and broad use of IT possible. The major financial investments are being made in technical infrastructure, and it is therefore of special interest to analyse these investments. This is not least important on the basis of our assumption that the infrastructure work is only at an initial stage and will therefore also have further considerable importance in the foreseeable future.

In our review of the IT policy we have also wished to point out the importance of seeing the interaction between infrastructure and the development of services and it is therefore important in our opinion to link together these two aspects where evaluations are concerned. The major, long-term areas of IT use should be given priority and special importance should be attached to those areas for which central government and other parts of the public sector have the overriding responsibility. The health and education sectors would then be important areas of IT use in which experience exists to base evaluations on. Skills is also an IT policy instrument that is important, has been the subject of considerable financial investments, and has generated experience that makes it possible to assess the effects of the policy.

Demands have been made that the evaluations should both cover special fields and provide an integrated analysis of development that covers all sectors.

In our opinion, interaction between, for example, infrastructure and service/applications also intensifies the need of an integrated and coherent analysis.

A.4.1 Themes for evaluation

On the basis of our assignment in the Government approval document, the documents produced by Parliament and our own review of the IT policy, we would include the following components in the evaluation (see Figure 4):

1. "An information society for all"

We have understood "an information society for all" to be the strategic goal of the IT policy and therefore consider it natural that this goal is also a central theme in the evaluation work. Here the breakdown of the strategic objective into sub-goals that are possible to

evaluate is an important task. We also need to develop statistics and indicators of relevance for comparative international analyses. This theme would also develop the information that is needed for the evaluation work in its entirety so that data and other information can be used by all themes.

2. The IT policy instruments

An analysis of the IT policy instruments: confidence, skills and accessibility, and of how the policy actions taken have contributed to these instruments constitutes a natural area for evaluation. Those parts of the Government's IT bill that required financial inputs on the part of central government were primarily in respect of the technical infrastructure. The resources provided by government constitute merely a fraction of the total costs of the infrastructure, but there are reasons to assume that the use of these funds, as well as the rules and processes selected for the implementation of the policy, are of great significance for forming the foundation of the Swedish information society.

Skills is an important instrument for the realisation of the vision of "an information society for all". One important task in the evaluations will be to analyse the extent to which the IT instruments have been created for "all", or whether they have been directed towards certain groups, for example people active on the labour market.

Confidence is an instrument that is difficult get a grip on, but electronic trade and the measures aimed at the public sector are important and are areas that can be evaluated.

3. The policy and the areas of IT use

Here an evaluation will be made of the effects of the use of IT in the policy areas that have been defined as being of prime importance for the IT policy.

Here the criteria for evaluation are not merely whether the tools have been created and are being used, but also the extent to which they are being used to achieve better goal fulfilment in the different policy areas.

4. The IT policy

An important focus of the evaluation is the IT policy itself. Two perspectives have been given to the IT policy: the IT policy as a learning policy and the Swedish IT policy in a comparative international perspective.

5. IT trends

An analysis and evaluation will be made of IT trends in accordance with the directives contained in the Government approval document. The aim of this theme is to provide background material and to try and identify the major features in order to make it easier for different interested parties "to see the forest and not just the trees" in IT trends.

How then do the proposed themes relate to each other (see Figure 4)?

Two themes focus on the IT policy itself: Theme 1 and Theme 4. Theme 1 makes it possible to evaluate and follow up the IT policy with the aid of analyses and the development of indicators, statistics and databases. Theme 4 has the aim of assessing and developing the content and design of the IT policy, partly in a comparative international perspective and partly in accordance with the perspectives we outlined under the heading "a learning IT policy".

Themes 2, 3 and 5 contain the real follow-up and evaluation stages: analyses of the effects of the measures directed towards the IT policy instruments and the policy and the areas of IT use, as well as analyses of long-term IT trends.

Another way of classifying the different themes is to regard Theme 2 and Theme 3 as "drainpipes" that have the aim of analysing the effects of the IT policy against different levels in the IT policy, while Themes 1 and 5 could be described as "crosspieces" that "cut across" different policy areas and areas of IT use and which have the aim of producing analyses that cover all sectors and an understanding of the whole picture. Here, in Theme 1, the user perspective is predominant and, in Theme 5, the analysis of relevant technical developments for IT use. In this perspective Theme 4 can be seen as the theme that synthesises the relevant conclusions for the content and design of the IT policy.

A.4.2. Time perspective

Where the evaluation work is concerned, we can see that there is a need for different types of inputs that have both short-term and long-term perspectives. A short-term evaluation/follow-up could have a time perspective of one year – which in practice would mean 2003. If an evaluation of this type was made in 2002, the pressure on the long-term perspective would be reduced and this could extend over five years in order to have the time to establish networks, analyse causes and effects and build up evaluation expertise over a long period of time. The short-term perspective could also be justified on the basis on the "political policy life cycle" which now appears to be four years in view of the interval between the two Government bills presented hitherto. The IT Commission's mandate also extends to the end of May 2003 and therefore its participation could be assured in an evaluation perspective that covered the calendar year of 2003. The evaluation of those areas that, for example require analyses of causes and effects could then have a longer time perspective and would permit academic bodies to be included in the work.

Measures taken in connection with "a learning IT policy" with a focus on 2004 naturally have a very short time perspective and this work must be started as soon as possible. The analyses that have a more long-term nature have the same time perspective as normal research projects, i.e. about three years. Preliminary results can naturally be provided in reports submitted prior to the political decision on IT that will be taken in 2004. The time perspective of analyses of relationships between causes and effects can vary. Areas that are well prepared or have high priority can be reported on in 2003, while complex or less well prepared policy areas can be given the longer time perspective.

The original commission given to ITPS was based on proposals for an evaluation that could be started in 2003. In the light of the possibility of establishing an evaluation with different time perspectives and the need of creating the right conditions for drawing up the IT policy at the political level in 2004, a more or less immediate start in 2002 has been discussed.

In principle, requests and demands can be categorised into two main classes, each with its special focus, skills requirements and time perspective.

	Focus	Skills required	Time perspective
Main class 1	IT policy 2004	Overview "Down-to-earth"	Autumn 2002 – autumn 2003
Main class 2	Under-Standing Long-term build up of expertise	Analytical, academic	1.7.2003 – 1.7.2006

In the first main class, the main task is to contribute to providing information, analyses and evaluation support prior to a new IT policy decision, with a focus on the year 2004. The work involved can be of the following types:

- evaluations and "meta evaluations", i.e. analyses of causes and effects in areas where this is possible,
- measures for improving information, for statistics and the development of indicators,
- analyses of causes and effects in support of the development of policies and processes,
- analyses directed towards the IT policy as such,
- reviews of knowledge in areas where there is no information for evaluation purposes.

The evaluation that can be made in the long-term can be said to have two purposes:

- to study and analyse the long-term effects of the influence of IT on society, to follow developments in the IT field and to distinguish relevant development lines for the IT policy,
- to evaluate the effects of the IT policy, i.e. to survey the relationship between the causes and effects of the results achieved in different policy areas and the IT policy.

Analyses of causes and effects and other inputs to achieve a long-term build up of knowledge of the effects of IT on society shall naturally be made in the long term perspective while, as far as possible, analyses that have the aim of achieving "a learning IT policy" shall be performed so that they can influence the formulation of the policy in 2004. Different studies of effects can be made in both the short-term and long-term perspectives, depending among other things on how important the area is in 2004 and the extent to which serious evaluation work can be implemented in 2003, which depends to a great extent on existing data.

Corresponding time perspectives should be set for the development of the evaluation methods themselves and the indicators and other data needed. Some information is easy to produce today. This applies, for example, to information on the dissemination of the technology and the use of Internet etc. On the other hand, there is a lack of information, for example, on information resources and production of services. The evaluation strategy must be adapted to the statistics that exist, while efforts to improve the data on services relevant to IT should be started early, in cooperation with other organisations that commission and produce statistics.

A4.3. Inputs

We take Figure 3 as our point of departure for a discussion on the inputs which, in the opinion of ITPS, are needed for evaluations and follow-ups of the IT policy.

The Government submits its proposals for an IT policy to Parliament. Parliament approves this policy and lays down more or less specific *goals for activities* as well as financial restrictions for these activities. These fairly general goals are then broken down into *sub-goals* and made specific by government agencies and/or regional or municipal bodies.

The *results* can then be evaluated in a number of different ways. Ideally all actors that use resources and are responsible for the implementation of the policy have the responsibility for making their own evaluations, which we can refer to as *self-evaluations*, of effects and costs. These self-evaluations can then be fed back directly into the preparation process for the policy decision for the next period or can constitute material for an evaluation by external evaluators who make a *meta evaluation* of activities. This can consist of making statements or comments, possibly in the form of an examination of existing evaluations, and of trying to capture an holistic picture of effects and costs from reading and analysing evaluations of this type from several fields. Seminars, workshops, round table talks and hearings can be used when there is a short period of time available for producing data for assessments.

In areas of which no self-evaluations are made, external evaluators can initiate their own assessments or, if there is no material for this purpose, surveys of available knowledge can be initiated.

Today, the responsibility for evaluating the effects of the IT policy rests with each ministry, but ideally there should always be self-evaluations of activities to start from and one ambition of the Government Offices should be to make it possible for the parties concerned to make self-evaluations of the type described above. When, in addition, the responsibility for implementing the policy lies at regional or municipal level, which is the case, for example, where accessibility is concerned, communications between the Government Offices and the local bodies are of great importance for developing the feedback mechanisms that are so important for the effectiveness of the policy. This is one of the reasons why we also propose extended and voluntary cooperation between different government agencies on the one side and the Swedish Association of Local Authorities and the Federation of Swedish County Councils on the other.

However, a number of studies of the effects of a policy that has already been approved and implemented are not the only method of creating a learning IT policy. To create appropriate conditions for the formulation of an effective IT policy, statistics and indicators are also needed, as has been pointed out by the Parliamentary Committee on Transport and Communications. To develop a learning IT policy there is also a need of analyses of the possibilities of goal fulfilment in different areas and of the factors that influence the degree of goal fulfilment in different policy areas. In our informal contacts with different actors, we have also found a strong need to improve the quality of analyses of the long-term effects of IT developments.

A4.4. Implementation

The theme "an information society for all" can be organised by extending the group of government agencies that have been given the responsibility for IT statistics, i.e. ITPS, Statistics Sweden and the Swedish Institute for Transport and Communication Analysis. This group could be strengthened by the Swedish Association of Local Authorities and the Federation of Swedish County Councils, and possibly also by participants from the National Post and Telecom Agency and from the Government Offices.

The inputs under the theme "IT policy" are, in the short-term perspective, an analysis of the Swedish IT policy in a comparative international perspective and a number of seminars on the theme "a learning IT policy". One agency, for example ITPS, could be commissioned to purchase the international study and organise the seminars.

Likewise, ITPS could be commissioned and given resources to make procurements for the other inputs that are proposed within the framework of the short-term perspective. Knowledge surveys and analyses should be performed at universities or at the government agencies concerned. Meta evaluations should be purchased from, in the first place, researchers and/or consultants. A reference group should be linked to the project that has participants who are either experts in the subject or have experience of policy evaluation from the university world or government agencies. A panel of this type could also make an assessment of Swedish IT development in its entirety, i.e. point out its weak and strong sides on the basis of existing knowledge and data.

The inputs for the long-term perspective that have been discussed above require strong contributions from the research world. It is natural then to incorporate most of these programmes into the existing model for the management and control of research programmes. Suitable organisations would be, for example, the Swedish Agency for Innovation Systems and the Swedish Council for Working Life and Social Research. There are also a number of other research financiers with whom joint programmes could be discussed in respect of the initiation of a number of research projects into the use of IT and its importance in different areas. ITPS proposes that the Government Offices invite possible interested parties to a discussion of this matter. In certain cases, for example, the research councils' programmes in the IT field could be linked to the evaluations. In all likelihood it will not be possible to find the right type of expertise in all areas in Sweden, and therefore foreign researchers and experts must be engaged. As long as the IT Commission is in existence (its mandate expires on May 31, 2003), it can be a suitable partner in cooperation for ITPS in building up this network, despite its involvement in the IT policy.

B1 "An information society for all"

The interpretation made by ITPS of the IT policy is that the creation of "an information society for all" constitutes the strategic goal and the core of the IT policy. It is therefore also natural that "an information society for all" constitutes a theme, and is even the central theme, in the evaluation work.

B1.1. Background

The Government's strategic goal for its IT policy is expressed in its bill on IT (1999/2000):

> "The goal of the IT policy is that Sweden shall be the first country to have an information society for all." (page 1)

> "Sweden shall have the ambition to be the first nation to have an information society for all, which means, in this context, broad IT skills in society and a strong confidence in the technology, with the goal of succeeding in this before other countries.... The formulation of the goal is based on the conviction that the focus on breadth is the only tenable basis for Sweden to hold its own in international competition in the long term." (page 24).

B1.2. Evaluation issues

With the goal of creating "an information society for all" as the point of departure, it is strategic task to interpret this goal in such a way that makes follow-up and evaluation possible.

The problem with the concept of "an information society for all" is naturally its content. There are many countries that have formulated the objective of their IT policy in the same way as Sweden, i.e. there are many countries that claim to be first in creating "an information society for all". It is also difficult to imagine that one individual country can be the first to achieve the goal in every respect. Accordingly, it is important to formulate those aspects of an "an information society for all" that are particularly important and, when this has been done, to develop indicators for these aspects.

The IT policy of the EU, as well as that of many other European countries, emphasises, like Sweden, that the information society shall be "for all". How should this ambition be interpreted? Is it an opportunity that is offered to the citizens or do the legislators regard "IT skills" as having the same importance as being able to read or write, i.e. that it is more or less a civil right and obligation for the individual to acquire some basic IT knowledge?

The fact that the IT policy is directed to "all" naturally has a special meaning. "All" means all people in Sweden, not just those who are gainfully employed or are participating in educational programmes. This has consequences for the evaluation of different measures. Have the programmes for access and knowledge primarily strengthened the use of IT among those who are already active in working life or in education programmes, while the development of the IT policy tools for other groups in society have been neglected?

There appears to be an implicit conception in both the Swedish and international IT policies that broad IT use can contribute to reducing differences between individuals in different welfare respects. It is even possible that IT is used most by those people who al-

ready have most in other respects, so that the digital differences consolidate those that already exist. One hypothesis is that, with the aid of IT, individuals can be informed more efficiently about the social or commercial services that are available in society. This can contribute to increasing differences between the citizens but does not necessarily mean that some citizens will be in a worse position than before. However, if the introduction of IT-based social services has the effect that established social services take second place, those who do not have access to IT could experience a deterioration.

When interpreted in this way, the emphasis on "for all" is given a deeper political meaning where equality in the distribution of resources is concerned. If everyone acquires skills and has access to IT, can this broad use of IT possibly also contribute to reducing the welfare gaps between the citizens?

If "an information society for all" is defined as the basic objective of the IT policy, a yardstick has been created for the assessment of different secondary goals. In what ways have the three IT policy instruments, confidence, skills and accessibility, contributed to creating an information society for all? If the instruments, for example skills, are designed to facilitate the use of IT at schools and in working life, what happens to the groups that are not included there, i.e. those outside the labour market, the elderly and so on? Where IT use is concerned, what is the importance of age, profession, income, where one lives in the country, gender, origins or functional disabilities etc?

If a policy area is to be evaluated, the policy should both state what is to be done and the period of time within which the result should be achieved. The wording of the Government's IT bill does not specify a time frame. Instead it states that Sweden shall have the ambition to be the first nation to have an information society for all. This means broad IT skills in society and strong confidence in the technology, with the goal of *achieving this before other countries*. (our italics) This means that there is a flexible borderline in which the goal for each period is related to the situation in what we could describe as other leading IT nations. In a wider perspective, this means that goal fulfilment can be checked by comparing different indicators for IT use in other leading IT nations with the Swedish indicators. This means, in turn, that the indicators that measure the maturity of the Swedish information society should also be, as far as possible, comparable internationally.

In a long-term evaluation it is an advantage to have, as a point of departure, a proper description of IT use as well as information on how the IT policy instruments (confidence, skills and accessibility) have developed. The task in this theme is therefore to lay the foundations, as early as possible, for the production of good IT statistics and good indicators on IT use that make it possible to describe how the process of creating "an information society for all" is proceeding.

But the theme also has important tasks in the long-term evaluation work. The planning of follow-ups and evaluations in the other themes should be planned together with "an information society for all" to enable the work on statistics and indicators to be made efficient and to create links between different themes and projects.

ITPS proposes that, within the theme of "IT development and the information society", a study of developments is initiated which is based on a perspective that originates from a number of local communities (B5.2). The aim of this is to create a holistic view of the effects of IT on society.

The work in the theme should also be organised in such a way that it permits the collection of data which can form the basis of an assessment of how the different IT policy instruments influence IT use and policy areas (section B3 below).

B.1.3. Tasks in the short-term perspective

ITPS proposes that, before the policy decision is made in 2004, an exhaustive and pedagogical report on indicators, statistics and databases that describe the most relevant aspects of "an information society for all" should be presented. The perspective should be that, in 2003, data should be collected and databases established for indicators that are assessed to be of importance for describing the pace of development of different aspects of the information society. In areas in which important data is lacking, a new study should be planned, based on questionnaires and possibly interviews. Focus should be placed on IT use that can be derived from "an information society for all". The study should be comparable with the studies made in 2000 by Statistics Sweden and the Swedish Institute for Transport and Communication Analysis on IT use in the home and at work. The preliminary opinion of ITPS is that access to data that describe accessibility in various respects is relatively good but that more information on actual use is needed.

In the spring of 2002 ITPS went through existing statistics and databases. There is a great deal of statistics available, both at national level (Statistics Sweden, Swedish Institute for Transport and Communication Analysis, the IT Commission, the Swedish Association of Local Authorities and the Federation of Swedish County Councils) and at national level (OECD, Eurostat). Eurostat has also identified more than 20 indicators of IT use that can be used for international benchmarking. At the same time, questions relating to IT use are being discussed in the new Labour Force Surveys. There are also programmes of international cooperation for the development of new indicators. ITPS considers that the first step which should be taken is that all relevant statistics should be collected, analysed and presented in a coordinated and pedagogical manner. ITPS, Statistics Sweden and the Swedish Institute for Transport and Communication Analysis have all worked with different aspects of IT statistics. A certain amount of informal cooperation has been established and, in the light of the planned follow-up and evaluation work, this cooperation should be strengthened and extended to include the Swedish Association of Local Authorities and the Federation of Swedish County Councils. This will have the effect that the work on indicators, data and statistics will also include the development of infrastructure and IT use in the municipalities.

A further advantage of supporting cooperation between the above-mentioned organisations is that it also creates an extended interface between the central government, municipal government and county council sectors. The interest of the Swedish Association of Local Authorities and the Federation of Swedish County Councils in, and interfaces with, advanced IT users in the public sector and local trade and industry can be of importance for the evaluation of other policy areas of relevance for IT policy. The theme "an information society for all" would then, in the short-term perspective, have the following tasks:

- to compile existing statistics of relevance for making an assessment of how the development of "an information society for all" is proceeding and to present this in an easily accessible and pedagogical way, for example by creating a portal with links to different databases,
- to analyse the indicators and data that are not available today but are needed for the new policy decision in 2004 and should therefore be collected in 2003. This can, for example, refer to more indicators on IT use or collection of data on the factors that hinder or promote good and broad IT use,
- to analyse the information needed for the long-term work of following up and evaluating the IT policy, for example indicators of confidence, knowledge and accessibility.

The planning of a number of interviews with local parties should also be considered in the proposed groups. This will make it possible to obtain a holistic picture of IT development and IT use. What aspects of IT use can be considered to be of particularly great importance for welfare policies, economic growth or democracy? What measures have been important for the promotion of good and wide IT development and what form has been given to the recipe for successful broadband development? If the IT policy is only evaluated for individual policy areas, the holistic perspective can be lost and therefore the possibilities of making a study of this type should be examined in the group mentioned above.

B2 The IT policy instruments

Many of the IT policy measures have the aim of creating what ITPS have called in this proposal "the IT policy instruments", i.e. confidence, skills and accessibility. The borderlines between these three areas are not absolute. There are skills aspects in accessibility as well as in confidence, and vice versa. From the evaluation point of view, two perspectives are opened up, based on the IT instruments: the effectiveness of the policy measures in creating confidence, skills and accessibility and the effectiveness of these instruments in creating good and broad IT use in different sectors of society. In this section ITPS presents measures that have the aim of creating the different policy instruments that should and can be evaluated.

B2.1. Accessibility

The Government's IT bill lays down many objectives and a number of guidelines for the IT policy. The most costly measures are, to a great extent, limited to accessibility in general and the extension of broadband in particular. Where the mobile infrastructure is concerned, it can be worth recalling that mobile traffic is largely transported through fixed networks. There is therefore reason to give special attention to an examination of the broadband policy and the measures that have been approved under this heading. However, accessibility covers more areas than the fixed broadband networks. The mobile infrastructure is also important and the UMTS licences have been the subject of a lively discussion during recent years.

However, in order to be able to use the physical infrastructure, it is also necessary that a number of other factors are in place. Accessibility also has a financial side and the use of both fixed and mobile networks are influenced to a great extent by their costs. These can be influenced by government through a number of measures such as the competition policy, safeguarding the openness of the networks, taxation, standardisation work and so on.

The "soft infrastructure", i.e. information and services, can be regarded as a necessary complement to the technical infrastructure and constitutes a bridge to IT use. The relationship between services and technical infrastructure can be described as a "hen or egg" problem, in which the moving forward of positions in parallel is probably a prerequisite for broad IT use. The IT policy, as expressed in the Government's IT bill, has an emphasis on the technical infrastructure where accessibility is concerned, while the IT Commission has emphasised the importance of information and broad services in two recent reports (*Soft Infrastructure, Report 46/2002, Broadband services – a new stage in the IT policy, Official Report 2002:51*).

B2.1.1. Background

The development of broadband is one of the aspects of the IT policy that has been discussed most, and judgements on the outcome vary a great deal depending on the point of departure or criteria used. ITPS is of the opinion that the objectives and strategies chosen to achieve the goals as expressed in the IT bill should be evaluated. The bill says the following:

> "Households and enterprises in all parts of Sweden should have access to IT infrastructure with high transmission capacity within the next few years. This shall be achieved in the first place through market forces. However, central government has the overriding responsibility for ensuring that this infrastructure is available throughout the country. Competition, low prices and rapid development will be promoted if it is possible for a large number of operators and IT enterprises to use the networks. Neutrality in respect of competition and diversity shall be promoted on the networks through government interventions and rules." (page 70)

Proposals associated with financial undertakings included:

- support for regional and local telecommunication networks in areas that are not supplied with IT infrastructure by the market
- tax reductions for natural persons and legal entities for broadband connections, and
- a base network with a high degree of accessibility for all municipalities in the country.

The IT bill (p. 199) also takes up the issue of land based digital TV. On the other hand, no consideration is given to the question of how the extension of this network relates to infrastructure with high transmission capacity that the bill takes up under the heading of "accessibility".

After Parliament reached its decision on infrastructure, a national IT programme was drawn up within the framework of the Government Commission on Broadband (Official Reports 2000:68 and 200:111), and ordinances in respect of this came into effect on July 1, 2001. Among other things, the ordinance lays down that if support is to be provided for networks that link places together and area networks, it is necessary for the municipality concerned to have an approved IT infrastructure programme and for the municipality to finance five per cent of the programmes for which it is entitled to receive support. In addition to the national IT infrastructure programme, there are other forms of support for developing infrastructure such as grants from the EU's structural funds, funds from the Government's programme for IT in schools, regional development grants and so on.

The National Post and Telecom Agency has been commissioned by the Government to monitor the development of accessibility to IT infrastructure with a "high transmission capacity". This work was presented in the report "IT infrastructure in Sweden, 2001 – Is the goal of accessibility being achieved?" (PTSER 2002:5). The National Post and Telecom Agency states that only a small amount of time has passed since the guidelines were finalised, that the work is time-consuming, and that government support has only therefore been used "to a limited extent".

In August 2000, the Swedish National Grid was commissioned by the Government to construct an optoelectronic network with high transmission capacity between all municipalities. The goal was to connect all main centres in the municipalities no later than December 2002. In this respect the Government's formulations of the goals of its infrastructure policy were very well defined and clear-cut. When the report was submitted, the assessment was made that some 70 places would not be connected at the given point in time. However, the development of infrastructure is continuing and, in the OECD's meas-

urement of access to broadband, Sweden advanced from fourth to third place between December 2000 and June 2001.

Among the factors that hinder the rapid development of broadband, the National Post and Telecom Agency gives prominence to the lack of financial resources in the municipalities, unclear rules for government support, and the reluctance of households to pay for broadband. The objectives of the IT policy are said to be "good, but not realistic" and if the objective concerning accessibility shall remain in force, the government should, in the opinion of the National Post and Telecom Agency, assume greater responsibility (p 18).

In "Follow-up of the Government's IT policy – a description of government programmes in the IT field in 2000 and an evaluation of results and effects", the Ministry of Industry, Employment and Communications states that, in the IT bill, the Government intended that support to the municipalities for the construction of telecommunication networks should cover the period to the end of 2004. Now the Ministry of Industry, Employment and Communications is of the opinion that conditions for the rapid development of broadband have changed since the bill was presented in March 2000. The interest of parties on the market has diminished considerably, the formal conditions were not in place until the summer of 2001, and many municipalities are still only in a preparatory stage in their planning processes. As a consequence of this, the period during which support will be provided has been extended to the end of 2005.

The Swedish IT policy has, deliberately or not, followed an iterative process. The IT bill formulated some goals that were not particularly clear but which were later made concrete, for example through the assignment given to the Swedish National Grid and decisions on local planning processes proposed by the Government Commission on Broadband. The requirements in respect of municipal co-financing were also changed during the course of the process since the initial response of the municipalities was extremely weak. Now it appears as if the process is making better progress, but it is difficult on the basis of available information to assess whether this is due to more generous government undertakings or to the fact that the municipalities have now made more progress in their planning of the local infrastructure.

A longer implementation time would give the municipalities more time to plan the work, it would mean a lessening of the strain on the municipalities' finances and would be less costly since the development of infrastructure would not be limited to one and the same short period of time. But it also means that progress will be slower, which is of significance for the objective of being before other countries.

The mobile telecommunications structure is also an important element in the infrastructure policy. The National Post and Telecom Agency was commissioned by the Government to issue a number of licences for the new UMTS networks, the so-called 3G licences. The Agency then arranged a procurement in the form of a "beauty contest" in which different operators were invited to submit proposals in respect of coverage and the number of base stations they undertook to build. On the basis of their offers, four operators were selected and it caused a certain amount of consternation that Telia, which considered that it was possible to build a considerably smaller number of base stations than its competitors, was not awarded a licence. According to the conditions for licences, it is possible for the holders to reduce their network costs by cooperating in the development of infrastructure, up to a limit of 70 per cent. After the licences were issued, a cooperation

pact was established between Telia and Tele2, as well as between Vodafone, Hutchinson and Orange. There was also a considerable amount of discussion on the Swedish decision to use a tender procedure instead of an auction. In the countries that have used auctions, the operators have had to pay for the licences and to assume responsibility for considerable investments in masts.

Also the economic consequences of the so-called 3G networks have had a significance that has gone much further than the issue of how the licences were issued. The different operators shall get back the funds they have invested in licences and establishment expenses on different markets. Meanwhile, neither orders for systems nor telephones have been forthcoming to the desired extent and, above all, the development of services based on 3G has proceeded extremely slowly. The enterprises that have invested in 3G are of the opinion that the delay is mainly due to the economic situation. The critics are of the opinion that the services the technology can carry and that are not covered by GSM or GPRS are not sufficient to pay for the large investments.

It is difficult to say what is true or not today, but it is a fact that, at present, the market is very weak and this has had an extremely negative effect on both the operators and their suppliers, which include Ericsson and Nokia.

B2.1.2. Evaluation issues

Where making assessments of the complex infrastructure issues is concerned, it is also important to adopt a holistic approach. Was the line of action chosen by the Government sensible in principle? Should the Government have assumed responsibility for the rapid and vigorous development of broadband over the entire country or should it have assigned the development of broadband to an even greater extent to market forces? Or is it wrong to offer government funds at all for the development of broadband that has obviously not been requested locally in many places?

Events that have occurred after the selection of the fundamental course of action had been made should also be discussed. Have government subsidies and the lack of clarity in respect of these subsidies had the effect that the municipalities have ended up in a “wait and see” situation in which undertakings have not been made in the hope that central government or other parties would bear the costs in the final analysis?

How have the governmental rules led to competition on the networks and supported the municipalities and local parties in their complex work on local infrastructure plans? Have guidelines and demands for government support contributed to freedom of choice for the end users, to a rational local infrastructure based on local cooperation, to subjecting operators to competition, and to the possibility of obtaining breadth in the supply of services to end users through one and the same infrastructure?

The proportion of the financing demanded of the municipalities has functioned as a policy variable that has the subject of a trial and error process. In addition, the proposed planning process consumes a certain amount of time. What does the fact that hitherto only a few municipalities have applied for government support mean? Is the support given to local parties too small? Is it necessary to develop a local cooperation culture among parties that have not previously worked with each other in order to establish the local infrastructure? Is the support directed towards the “right” parties? Is there a “standardised vision” that regional and local parties could use for support in their planning work? From

what we can see today, what reasons are there that indicate that another model for infrastructure development would have given a more efficient outcome from the economic point of view?

The Swedish Association of Municipal Housing Companies and the Swedish Property Federation are pursuing the line that local access networks that are not tied to a specific operator should be developed where the "base" of the IT infrastructure is controlled by the property owners and other local forces and where the end users can freely select their operators. This standpoint is partly connected to newer economic models where the character of "collective good" does not necessarily lead to government interference, but where the parties that are expected to derive the greatest benefit from the production of the good agree on joint financing. The EU Commissioner for Industry and the Information Society, Erkki Liikanen, often emphasises in his speeches the importance of local cooperation to share the costs of the local infrastructure.

In consideration of the fact that the great difficulties in establishing an IT infrastructure lie at the local levels and that the results of the government policy are achieved at the local level, it is important that the work done on the regional and municipal plans is evaluated and that forms for feedback between central government and the municipalities is established in this respect. Can the municipal plans be compared with each other and do they reflect the Government's intentions with its IT policy? The establishment of a bridge of this type is an important element in achieving a "learning IT policy".

The issue of accessibility raises a number of important questions that are of great interest from the evaluation point of view. A first question concerns the method selected for the development of infrastructure, i.e. relying in the first place on the market. This standpoint has been the subject of discussion and the National Post and Telecom Agency also indicates in its reflections that government undertakings must perhaps be increased in order to achieve the goals of the IT policy goals. Were the objectives realistic or were they influenced by the prevailing "spirit of the time" when the bill was drawn up?

Furthermore, the question of which definition of broadband should be used as a requirement for government support should be analysed. Should ADSL solutions also be accepted or is it reasonable to assume that the market is capable of establishing this technology, which is based on using existing copper cables to households? Can the services requested by society be carried by ADSL or do they require broadband in the form of fibre?

B2.1.3. Issues in the short-term perspective

ITPS considers that two measures should be taken in the short-term perspective:

- In view of the fact that work on the local infrastructure plans is taking place during the autumn of 2002, it is important that this work is followed up in the light of the wording of the IT bill on diversity and neutrality in respect of competition where the networks are concerned. It is of special importance that the local networks are developed in a cost-efficient way and that openness and competition are guaranteed. Is the work proceeding according to the intentions expressed in the bill? How does the ordinance in question (2000:1469) reflect this ambition and how is the ordinance being interpreted in the local procurement processes? A follow-up of how the local networks are being planned in consideration of diversity and neutrality in respect of

competition should be made specially, in order to be included in the material for a meta evaluation together with other material, for example the follow-ups made by the National Post and Telecom Agency. In this connection, the issue of what is justified in government support for the ADSL development (see Fm 2002:1 on changes to the above-mentioned ordinance) should be described. Are there strong reasons, for example of a regional policy character, for supporting ADSL, or can and should this technology stand or fall on the market's terms?

- An economic analysis should be made of the possibilities of achieving the infrastructure described in the IT bill during a reasonable period of time and with the methods of financing that are described in the bill. In the discussion on IT infrastructure, its character of a collective good has often been taken as a pretext for financing by government tax revenue. Another possibility is that those parties that have most to gain from the development of the infrastructure could forgo part of their profits in order to cover the fixed costs of the development together with other parties in the same situation. Instead of the government alone being responsible for these costs, the way would thus be opened up for local negotiations. The infrastructure at town and district level could be controlled by property owners, possibly in an alliance with other forces that have an interest in maintaining openness and competition on the network. The possibility of establishing an open network that would open up the way for competition and dynamic development where services are concerned, and which also would be primarily financed by market forces, should be given a theoretical and empirical analysis.

Is it possible to achieve local networks that would have the character of a "public good" with financing that is primarily established on the market? An analysis of accessibility on the basis of the "hen and egg" perspective in order to identify the weak points in the use of IT from the accessibility perspective is also an issue that also needs to be analysed in the short-term perspective.

Where accessibility is concerned, it is also important to make an analysis of the issue of the digital land-based TV network. Is it a complement to the broadband network that is discussed in section 5.5 of the IT bill or is it, in relation to this, an "unnecessary" infrastructure?

B2.2. Skills

IT skills are mentioned in the IT bill as one of the Government's priority areas for the promotion of a "good and broad" use of IT. The Government also emphasises the importance of broad and specialised IT skills as a prerequisite for Sweden to be a leading IT nation. The PC reform of 1998 is usually included under skills but could also be considered to be part of accessibility.

B2.2.1. Background

In order to develop IT skills, the following measures were proposed:

- in the Budget Bill of 2001, an extension of "IT in school" up to and including 2002 was announced, directed towards some 13 000 teachers,
- an increase of 89 000 places at universities over a six-year period, with an emphasis on science and technology,
- allocation of new funds for permanent places at the Royal Institute of Technology for, among other things, the development of the IT university in Kista,
- the establishment of a skills centre for Internet technology at the Royal Institute of Technology,
- the establishment of an industrial research institute in silicon technology,
- the allocation of SEK 30 million in support of a national programme to improve IT skills in small-scale enterprises.

A number of measures have been taken within the framework of the national programme for "IT in schools" which is directed towards teachers. The National Agency for Education is evaluating the reform itself at the same time as the Knowledge Foundation's various programmes are being evaluated. The Government also presented a bill on the importance of the new technology for teacher training in which, among other things, it is proposed that a national centre for teaching aids is established.

At the same time the IT bill states that universities and university colleges should have a specific strategy and plan of action for their IT work. In 2001 the Swedish Net University was also established.

In the Government's follow up of the IT policy, it is stated that "IT in Schools" is considered to be a project that contributes to improving teaching and developing new roles for students and teachers. Furthermore, the Government considers that there is a shortage of some types of IT specialists and that the greatest shortage refers to persons with a long university education and experience of working life.

In a decision made in 2001, the Government commissioned the National Agency for Education to promote the development and implementation of the national IT policy in schools. The National Agency for Education has also been given an assignment relating to "soft" infrastructure.

B2.2.2. Evaluation issues

Where evaluating the measures taken in the "skills" section is concerned, it is suitable, as a first step, to relate the programmes to the strategic goal of the IT policy, i.e. to create an information society for all. Where skills are concerned, does the IT policy cover the different aspects of the IT concept and all population categories, or does it focus on certain sub-areas and categories?

IT in schools

In the schools field, a number of evaluations have been made or have been started. The "IT in Schools" programme is being evaluated by the Ministry of Education and the Knowledge Foundation's programmes have been evaluated in two very critical reports. The basis of the criticism is that IT has not contributed to developing the pedagogical work of the schools and that the research council concerned has had ineffective forms of cost control. The technology component has not been sufficient. Instead, shortcomings in information, development of teaching aids and utilisation have diminished the outcome. On the other hand, the students have learned to use IT, to surf the Internet and so on. Does this mean that assessments of "IT in Schools" depend on whether their criteria have originated from the goals of the education policy or from the more limited goals of the IT policy, i.e. to improve knowledge in the use of IT? Also in the schools field, the comparison with the situation in other advanced IT nations is a suitable criterion.

Diversity and adaptability in the education system

Has the Swedish higher education system succeeded in adapting the programmes it offers to meet the market's needs of qualified IT specialists. In the Government's assessment in the IT bill (p. 63), it is stated that all universities and university colleges should have a strategy and an action plan for their IT work. The work of developing distance courses and making them available via the Internet must be speeded up and the proportion of those trained in different IT programmes should also increase as well as the proportion of female graduates in this field. Data from the USA and other countries indicate that the proportion of women has tended to decline. This is due to the exclusion of women from primary school as well as their selection of educational programmes at secondary school and university, whether they complete these programmes, their selection of profession and whether they continue to work in the sector in question.

Government can naturally exert an influence on all stages in this chain but, above all, government can exert an influence on the education system. Therefore, in the opinion of ITPS, in an analysis of the adaptation of the higher education system to market requirements, the issue of diversity should be given attention, i.e. how the education programmes and universities have succeeded in attracting students, in respect of both gender and ethnic background, religion etc, who are representative of the composition of all students in the year in question. Where the education of different IT specialists is concerned, the Government considers that there are a number of shortcomings but also feels that the universities have been sensitive to market requirements. Shortcomings in the availability of well-educated IT specialists have also been one of the most common criticisms advanced by the IT industry. At different seminars arranged by ITPS, criticism has also been directed towards the situation that, in their education programmes, specialists in IT have not been given training in business administration and training in developing business strategies and business models. It is obvious that there are many different conceptions on how the Swedish universities have adjusted to developments. It is quite clear that the number of university places has increased but the question is whether this increase has been sufficient, whether the increase has taken place in the "right" areas, and so on.

PC reform

Purchases of PCs are based on two types of contracts. The first is an agreement between the employer and employees in which the employer purchases the computers and then lends them on favourable terms to the employees. The other is based on a decision of Parliament in 1997 (Bill 1996/97:173) that employees should not be taxed for this type of purchase. According to most observers, this reform is considered to be one of the most important reasons for the rapid spread of PCs in Swedish homes that took place at the end of the 1990s. However, the National Tax Board was critical of the reform and, in its comments on the draft bill, the IT Commission maintained that it would rather see reforms that did not exclude those who were outside the labour market. The IT Commission has been given the assignment of making an evaluation of the reform and has adopted a critical attitude towards its effectiveness. The size of the reform and its focus on one section of the population make it important that it is subjected to an evaluation in this context also.

In general, the PC reform is considered to be a great success. On the basis of information obtained from various sources, the number of computer purchases made since the reform was introduced is estimated at between 800 000 and 900 000. If, in addition, every computer is used by 2 to 3 people, the number of people affected by the reform is considerable.

Is there any reason to give special subsidies, for example via taxation, to support the purchases of computers made by individuals? One such reason can be that the possession of a PC can have positive external effects, "network effects" or "spillover effects" on the benefits that could be enjoyed by others by acquiring a computer. If every individual made his/her own assessment of costs and benefits respectively, this would result in a sub-optimal solution in relation to optimal solution from the point of view of the economy. Behind the reform there is also a labour market policy assessment based on the assumption that access to a computer leads to improved IT skills and thereby also a greater degree of employability. But this does not necessarily mean that PCs are the optimal method of increasing the use of computers.

The reform is aimed at those who are members of the labour force and not "to all". All general reforms of this type are associated with a *dead weight loss*, i.e. they are utilised to a great extent by other groups than the direct target group. However, at the same time this can be a necessary step in the initiation of a dynamic process that, over time, also reaches the groups given highest priority. Or are there other policy measures that could lead more rapidly to the goal at a lower cost, for example general tax deductions for the purchase of computers, support for the broadband connections of property owners, inclusion of a computer in social benefit norms, etc?

IT in working life

ITPS proposes that a review and evaluation of IT use and knowledge of IT in working life is made. This area has links to both the growth goal of the IT policy and the more general objective of creating "an information society for all". In the latter perspective, the PC reform is not least of interest since it is assumed to have effects that links up the use of IT at home with its use at work. In the Government bill, IT use in working life is given two dimensions: knowledge of the use of IT and the use of IT in distance education programmes

as a method of creating opportunities for life-long learning in working life. The most obvious measure in this area in the IT bill is an emphasis on improving IT skills in small-scale enterprises.

No measures are proposed in the IT bill in the area of "IT-supported distance education". After the bill was tabled, the government agency for distance education was wound up and the Swedish Net University was established. One important aspect in this context is the role of the universities in the life-long learning process through the creation of a flexible further education system.

Also in IT use in working life, there is a lack of precise objectives. This once again has the effect that the comparison with other leading IT nations can constitute a suitable norm. Also here a comparative international analysis should be made, based on the two aspects mentioned above: IT use in working life and the ways IT is being used as a tool for life-long learning among those active on the labour market.

IT skills for groups outside the labour market and education system

The objective of creating "an information society for all" also means that it is important that knowledge programmes are not limited to those groups that are part of the labour force or participating in education programmes. Elderly people and the functionally disabled are examples of other groups. The issue is how different groups acquire their IT skills. To what extent do they acquire IT skills and through what channels? Does this take place through specially targeted programmes, for example the Swedish SeniorNet or is knowledge spread in other ways, for example by relatives, neighbours or civil society organisations?

B2.2.3. Issues in the short-term perspective

In the opinion of ITPS, there is a large amount of material available in the area in the form of evaluations made by government agencies and other assessments that could constitute the basis for meta evaluations or knowledge reviews.

"IT in schools" is an important area in which material for meta evaluation purposes should be available. The disadvantage from the evaluation point of view is the lack of specifically formulated objectives. However, the comparison with IT use in other advanced nations can constitute a relevant gauge. This also means that the evaluation should be made in a comparative international perspective. The Nordic countries and England should be good subjects for comparison purposes.

A knowledge review should be made of how the work on the universities' IT strategies is proceeding, and how the development of the Swedish Net University should be linked to the development of the courses offered by the universities and university colleges. Here special attention should be given to how the universities are working with programmes of distance education that are directed towards people active on the labour market. Together with the theme "an information society for all", indicators should be developed both on the work of the universities and on the development of distance education. Sweden's progress in these respect should be compared with that made in other countries.

A meta evaluation of the PC reform is also an urgent task in the short-term perspective and basic material should exist in the IT Commission's earlier evaluations.

B2.3. Confidence

Of the three IT policy instruments (skills, confidence and accessibility), "confidence" is undoubtedly the one that is most difficult where the development of indicators to analyse its causes and effects is concerned. From the government point of view, creating confidence is a question of creating laws and rules (nationally and internationally), creating standardisation and providing information. The last aspect has the effect that this area also touches upon skills aspects. The uncertainty felt by people and obstacles to computer use can relate to matters concerning integrity and finance.

B2.3.1. Background

In its IT bill, the Government emphasises that the use and development of IT may not be restricted by shortcomings in the legislation that reduce the willingness to invest in and develop IT. Protection of patents and security are pointed out as two areas in which legislation is of importance. On December 21, 2000, the Government commissioned the National Tax Board to have the coordinatory responsibility in the initial phase for administration and for certificates for electronic identification and electronic signatures in the government administration. An evaluation of this activity shall be submitted to the Government no later than March 1, 2003. Furthermore, the Agency for Administrative Development has signed a framework agreement with a number of suppliers for the provision of electronic certificates for identification and signature in the public sector. The aspects that refer to confidence from the perspectives of security, stability and administration of .se domains are processed by the IT Commission.

B2.3.2. Evaluation issues

Three areas are given priority in the IT bill: protection against information operations, a safe Internet and electronic signatures and other security techniques. Most of the measures described are of the type that they can hardly have any demonstrable effects on the IT use that will be measured here.

In the opinion of ITPS, one important aspect of the rules is the Internet's "openness".

B2.3.3. Issues in the short-term perspective

One area that falls under "confidence" that is possible to evaluate in the short-term perspective are the effects of the measures for electronic identification and signature in the public sector. These issues are closely linked to the 24-hour agency.

Considerable hopes have been attached to the capacity of electronic trade to achieve increases in productivity, growth and a more efficient public sector. Even if rapid progress is being made in some sectors, for example *business to business*, all in all progress has not been as rapid as was hoped some years ago. A number of measures were also taken in connection with the IT bill, often directed towards the public sector itself, but it has not been possible to see the effects of these measures. In the IT bill, electronic trade is often linked to confidence. At the same time confidence is the IT policy instrument which is most difficult to get a grip on. A number of measures have the aim of regulation while others are intended to increase the knowledge of parties concerned. There is no empirical support that shows that it is a lack of confidence in the technology that is the foremost

bottleneck to the development of electronic trade. Therefore, to support the new IT policy decision, one important ingredient is an analysis of the factors that develop or hinder different types of electronic trade. (See further section B.3.1.)

B3 Policy and areas of IT use

The IT bill contains a number of general political objectives, policy areas of importance for the IT policy, and a number of areas of IT use. To a certain extent these overlap each other and for some policy areas there are no links to policy measures. ITPS therefore chooses to group policies and areas of application together in its proposal in the following way:

- Growth (under this heading we take up the IT sector itself, employment, electronic trade and regional development)
- Welfare (above all the health and medical services)
- Democracy
- A sustainable society
- The public sector as the pioneer of IT use

ITPS notes here that neither the education sector nor culture has been designated a policy area or an area of IT use. Where schools are concerned, this can be explained by the fact that the IT policy instrument "skills" takes up education issues. However, in this context, "skills" means skills in the use of IT and not the use of IT to acquire other knowledge.

B3.1. IT and growth

In the IT bill a number of policy areas are given in which the IT policy can be expected to exert an influence on growth:

"The IT industry's" competitiveness. The emphasis of the IT policy lies on IT use, but the IT sector and its competitiveness are also taken up. It can be questioned whether the IT sector should be taken up in the research policy, IT policy or the general industrial policy. One possible link to the IT policy could be an analysis of the measures that could be taken to permit the activities run by IT companies active in Sweden to be linked to a good and broad use of IT in the country. However, this link is not made but, regardless of where the IT sector belongs from a policy perspective, its development is naturally of great interest for a country such as Sweden with its relatively large IT sector from the international point of view.

During the period after the bill, the computer and telecommunications industry in Sweden and the rest of the world has suffered from considerable difficulties. During the period, Ericsson, for example, has lost 90 per cent of its value on the stock market. The fact the demand for products related to 3G, i.e. the third generation mobile telecommunications system, did not emerge as rapidly as some actors had expected, is an important aspect of the difficulties of Swedish industry. Government policy during this period is naturally of great interest. Is there a government ambition to use a *pick the winners strategy* in the IT sector, or has the industrial policy and research policy been neutral where technology is concerned in these respects? How have government research funds channelled through the IT policy been used? Have they primarily had a producer perspective or a user perspective? In what way are the measures linked to the IT policy in its entirety?

The statements made on the IT sector are interesting for several reasons. In the bill, for example, some export goals are given for the IT sector. On the basis of references to goals

established by the National Board for Industrial and Technical Development, the Invest in Sweden Agency and the Knowledge Foundation, an extension and a concentration of efforts in certain clusters is mentioned, but nothing is said about the content of this concentration of efforts and there are even fewer lines of argument in respect of the government's role in relation to research foundations and industry in these clusters.

The reverses of recent years experienced by the computer and telecommunications sectors and the considerable reduction in Ericsson's activities in Sweden should be the subject of reflection in all parts of industry as well as in politics. How have the measures taken in respect of the IT sector contributed to reducing Sweden's dependence on a few major companies and the selection of technology made by these companies?

Regional development. At least in the short-term perspective it is obviously far too optimistic to expect that effects of decisions made in connection with the IT bill of 2000 should have had demonstrable effects that are visible in 2003. Even if the time perspective were to be extended by a further three-year period, it would nonetheless appear to be doubtful whether effects would be seen. One possibility is to compare regions that have access to efficient high capacity networks with regions that do not (regardless of whether or not this has been achieved with the aid of government funds) and how this affects the costs of companies and their opportunities to have efficient data communication and thereby factors such as market growth and the establishment of new enterprises.

Electronic trade. Electronic trade is regarded by the Government as an important means to increase growth. However, the Government considers that the development of electronic trade should primarily be pursued by market forces and regulation should only be used when sector standards and agreements are not considered sufficient. With the aid of international cooperation and in interaction with trade and industry and other parties concerned, it is the ambition of government to have effective rules, coordination of public sector activities, and an accessible and secure infrastructure.

What can be evaluated in this area is, in the first place, how electronic trade is developing in the public sector. In fact, electronic trade is developing rapidly but not as rapidly as many people expected a few years ago. What can be done here to support the development of the IT policy is not, in the first place, traditional evaluation work but rather analysis of the factors that promote and hinder the development of electronic trade. A review of current knowledge that reflects the research situation should be completed and presented in 2003.

Small and medium-size enterprises. The IT bill emphasised the importance of developing IT skills in small enterprises. In purely general terms it would appear to be important that Swedish industry reduces its dependence on a few major companies. At the same time there are clear indications that it is the major companies that have the resources to use IT for the development of their businesses. An overall assessment of the use of IT and the effects of the IT policy on the competitiveness and development potential of small and large companies is therefore an important task.

B3.2. Welfare and IT

The effects of IT on welfare is an area that has not been described and discussed in the same way as the importance of IT for the economy and growth. Here there is a need to create an integrated picture.

Intuitively it would appear to be the case that a considerable welfare effects have already been achieved in, for example, medicine, health, and the care services. For example, IT has been a necessary element in biotechnological development, and it would not have been possible to develop medical instruments as they have been developed without IT. To what extent is IT being used to make it possible for elderly people to be cared for in their own homes instead of in nursing homes?

However, at the same time we must be open to the negative effects that can be the result of IT. IT can also contribute to classifying the citizens where their possibilities of using the technology to achieve their individual welfare objectives are concerned. The question is then whether considerable differences arise in these possibilities.

In the IT bill it is also emphasised that a greater emphasis on IT support can develop and renew the medical services. In the opinion of the Government, a national action plan should be created for the development and renewal of the medical services, in which the use of IT in the services should be included.

In view of demographic trends, ITPS makes the assessment that it is an extremely important task to evaluate measures taken in the care services. The IT bill also emphasises the need of an analysis of the present situation in regard of the development of telemedicine in Sweden, including evaluations made. The Government makes the assessment that it is essential to specify the possibilities of extending the use of telemedicine on a national basis.

ITPS finds it important that experience gained and evaluations made are summarised prior to 2004. Furthermore, an evaluation should be made in the long-term by the Federation of Swedish County Councils and the Swedish Association of Local Authorities and the National Board of Health and Welfare of the local (municipal and county council) initiatives that have been initiated in both traditional telemedicine and in the municipal care services for the elderly and the home-help services.

Since 1997 the Vårdal Foundation for Health Care Sciences and Allergy Research, together with the Knowledge Foundation and the county council sector, have run a programme amounting to some SEK 120 million. These funds have been distributed to more than one hundred projects. The second stage of the programme is now being implemented. Its focus is on care in the home and care of the elderly.

The effects of these programmes should naturally be evaluated. Also, in this area, the evaluation should be linked to the IT policy measures. Here the results achieved in municipalities, county councils or regions can be linked to the IT policy instruments of accessibility and skills. For this reason, forms of cooperation should be established between those making this evaluation and, for example, the group that is cooperating on the development of IT indicators (i.e. ITPS, Statistics Sweden, the Swedish Institute for Transport and Communication Analysis, the Federation of Swedish County Councils and the Swedish Association of Local Authorities). Has a good use of IT in, for example, care of the elderly been facilitated by the infrastructure policy or is it only initiatives taken by the care sector itself that have created interesting projects?

A review of current knowledge should be made that is based on a compilation of existing research reports, of the programme “Care In Time – Strategies and measures to extend the use of telemedicine and care services over long distances” (Ministry of Health and Social Affairs, Official Report 2002:3), and a number of interviews should be included to ac-

quire basic material prior to a possible IT policy decision in 2004. Coordinators and financiers in this field can be either the Vårdal Foundation or the Swedish Council for Working Life and Social Research, or both organisations.

B3.3. Democracy

IT is usually ascribed the capacity to contribute to deepening democracy and increasing the control of the citizens. However, the Government states that our practical knowledge of what is called digital democracy, cyber democracy or tele-democracy is modest and that knowledge can only be acquired through practical trials. Trials of this type should be established on a relatively large scale (municipal districts or large housing areas), extend over a long period of time (4–5 years), have a wide spectrum of possibilities and have a bottom-up perspective.

In March 2002, the Ministry of Justice also appointed a working group on IT and democracy with the task of monitoring and promoting the development of democratic processes with the aid of IT.

Measures in this field have barely had the time to have had any effects at local level. The Government Commission on Democracy took up issues relating to citizens' panels and practical support, for example in the form of IT, for elected representatives. A situation report and analysis of experience gained hitherto in the form of a review of knowledge should be completed in 2003.

The concept of "electronic voting" is often heard in the public debate and it is probably the case that other aspects of the effects of IT on democracy and the possibilities available to citizens for participation are at least equally interesting. A compilation could be made of government agency reports on their measures on the web or of visits by citizens, participation in dialogues, statements of opinion etc in this respect.

The possibilities available to citizens to organise themselves and establish contacts with like-minded citizens is also an important consequence of IT development, but these possibilities are also being used by criminal forces. We note that the Government has formed a working group that has been given the task of monitoring and promoting the development of democratic process with the aid of IT.

B3.4. A sustainable society

There are several conceivable mechanisms through which IT could support the political vision of a sustainable society. The IT bill emphasises the use of IT to promote ecologically sustainable development. It also states that IT can contribute to reducing the negative effects of transport on the environment and health. Possibly also the structural development of the industrial society with an increasing element of services and formation of knowledge would make ecologically sustainable development possible. The IT bill also proposed that a special delegation should be formed to survey how IT applications could be used to reduce negative effects on the environment and promote sustainable development. A group of this type has also been appointed in the Ministry for the Environment.

In other words, the political measures that have been taken are not so extensive. However, a first step in the work could be that a survey is made of the mechanisms through which IT development affects the environment and how political decisions can affect these mechanisms.

B3.5. Government as the pioneer in IT use

In the opinion of the Government, the state should be a model for the active use of information technology in its own activities and in cooperation with companies and the citizens. It is therefore considered important to rapidly establish common security systems for the government administration that include systems for handling electronic signatures. Furthermore the development of the so-called 24-hour agency should be stimulated.

Two purposes would be served if the government administration had advanced use of IT. Firstly, the measures taken should naturally lead to a more efficient government administration and better service for the citizens. Secondly, the use of IT by central government can also be seen as an important instrument for the realisation of the ambitions of the IT policy to create confidence, skills and accessibility. Here central government can be a model, can develop skills or create standards that are then given wider use in society.

However, at the same time as government IT use constitutes a special area of IT use, it also has the aim of influencing growth, democracy, welfare and a sustainable society.

The Swedish Agency for Administrative Development is responsible for monitoring and stimulating rationalisation and IT use in the government administration. Accordingly data for a meta evaluation should exist.

B4 The IT policy in an international comparison perspective

We have identified the IT policy itself as a central theme in the evaluation work. Two related aspects of the IT policy have been taken up: the IT policy in a comparative international perspective and "a learning IT policy". The analysis of the concept "a learning IT policy" should be made with the year 2004 in mind. Here it is essential that the international perspective should enter the picture as early as possible in the evaluation work. This does not merely apply to comparable international indicators on the use of IT, which were discussed below under the section "An information society for all", but also to analysing questions such as how the IT policy is formulated, what goals have been established, what strategies have been selected, and how control mechanisms have been developed. A comparison between the IT policies of several countries can provide information, not only on how goals have been formulated but also on the strategies that have been selected to achieve these goals. The formulations in *eEurope* appear to have had a considerable impact in the descriptions made by most EU member states (as well as Norway) of their national IT strategies. Not least, interesting differences can be noted, for example in how policies have been formulated in terms of goals or processes.

In 2003 it should be possible to make an analysis and comparison of IT policies in different countries. In the short-term perspective it should also be possible to develop forms of cooperation with other international institutes or research groups that have been engaged in evaluations of the IT policies of various countries, for example SPRU in Sussex, England. As early as in 2002 it should be possible to organise a procurement, for example through ITPS, in which an international research institute is given the assignment of analysing goals and instruments in the Swedish IT policy from a comparative international perspective.

In 2003 seminars should also be arranged on the theme "a learning IT policy" to which the agencies involved in the IT policy, the National Post and Telecom Agency, the Association of Local Authorities and the Federation of Swedish County Councils and the researchers and others involved in the evaluation work would be invited.

B5 IT developments

The assignment received by ITPS also includes describing IT developments. The request for a description of IT developments probably lies in the fact that decision-makers at different levels need information on the technical background to support their considerations. The rapidity of the technical developments has been pointed out by the Parliamentary Committee on Transport and Communications as a problem for decision-makers. The request for a well-organised analysis of IT developments is therefore understandable.

The Parliamentary Committee on Transport and Communications also emphasises the need of sector-wide and coordinated analyses. Since IT has the generic character it has, it is important that the evaluation work does not become submerged in individual issues but that it is possible to "see the wood for the trees".

At the same time there is, not least from political quarters, a preference for including in "IT development" an analysis of how IT will change society in the long term and what demands the "information society" will place on individuals, companies, organisations and, above all, on politics.

However, in view of what we have written above on uncertainty and complexity, this is no easy task. Nor is the concept of "IT development" an unambiguous or focused concept. Instead it includes a number of different types of technologies and areas of use. An order placed for an analysis of this type must therefore be linked very closely to the other evaluation work so that the work can focus on matters that are relevant for the areas of use given priority.

Our interpretation of the assignment involves breaking it down into evaluating "IT development" in two parts:

- an analysis of the long-term development of IT use
- an analysis of how the overall effects of IT development affect society.

B5.1. An analysis of the long-term development of IT

In both scientific and popular science literature, IT has been primarily described from the perspective of the producers and the major entrepreneurs. In Sweden, IT accounts in general for more than five per cent of value added and employment. This is a respectable figure but it also means that 95 per cent of the economy belongs to the sectors that use IT. Without doubt, the future development of the IT sector will depend on how IT is spread to, absorbed, used and developed by companies, individuals and the public sector.

IT development can be described in many ways. One way is to describe it in technical terms such as progress from mainframe computers, via PCs to the large range of both fixed and portable terminals on offer today. The arrival of new areas of use can be described in the same way, from automation via manipulation and processing of data to communication of data. The mobile phase of development and the ever larger transmission capacities also make a completely different type of interactivity possible than was the case just a few years ago.

The convergence between data communication and telecommunication was one of the most important driving forces behind the rapid developments of the last decade. The Internet was opened up for commercial applications in the mid 1990s and its development has, as everyone knows, exceeded the most optimistic expectations. At the same time, mobile

telephony was developed rapidly and considerable hopes were placed on the solutions that would use the packaged transmission methods of data communication for mobile telecommunication.

But, as everyone now knows, some data communication sectors and the traditional telecommunications industry have been affected by considerable difficulties during recent years. Many representatives of the sector assert that these problems are merely or mainly due to the prevailing state of the economy. But there can also be other explanations, such as the new competitive situation that arose after deregulation in the telecommunications sector or the intensification of competition between the traditional telecommunications industry and the new "datacommunications" industry. It can also be the case that technical progress has also made it necessary and possible for the *users* to play an ever-increasing role in technical developments and that major parties in the sectors concerned have difficulties in adapting to the new situation. However, the difficulties experienced by many of the traditional companies should invite a certain degree of humility and reflection.

It is clear, however, that the investments in IT, from software and hardware to infrastructure, continue to increase both in absolute and relative terms. IT is constantly finding new applications at the same time as the old applications are being extended. It is reasonable to assume that new applications are more sophisticated in their interaction with human skills than they were previously.

This perspective could also be included in the IT policy in Sweden and in the different levels of objectives described in the IT bill. We would then be able to distinguish three stages in the development of the "information society". The first stage would be a period in which the production of IT is emphasised. This does not mean that IT use is neglected but the processes are characterised by a situation in which it is the technical solutions that look for their customers and areas of application. The second stage would be characterised by an emphasis on accessibility and opportunity to use IT. The third and more mature stage of IT development would be characterised by a situation in which individuals, companies and government agencies use IT as an efficient aid to achieve the goals of their lives and activities. Perhaps we are now in a period that is characterised by the transition to this third stage.

An analysis of IT development from the user perspective is associated with the emphasis of the IT policy on IT use and gives a valuable background to the level of ambition the government may have in respect of future IT use. A study with this focus should be commissioned. The major features in how depth and breadth in IT use have changed over time and analysis of the factors – economic, technical, cultural and social – that have furthered or hindered this process would be the main content in this contribution. One possible approach is to analyse IT development on the basis of a dichotomy between *technology push* and *demand pull*. In an empirical section the study could also describe the development of how areas of use have been expanded, deepened and broadened over time. Not least advanced international IT developments should be followed. What technical developments have already proved to be, or are expected to be, important for electronic trade, education, in the care services or culture? The research reports that take up IT use in, for example, the care services, education or electronic trade can be summarised and discussed. With the aid of its attachés, ITPS can contribute to reports and analyses on developments in the USA and Japan.

B5.2. An analysis of how IT development in its entirety affects the development of society

In the above we have taken up IT in society, partly from a supply perspective (skills, confidence and accessibility), and partly from a demand perspective (areas of use). The problem with these approaches is that the holistic perspective can be lost. Studies of a number of local communities (three communities in a pilot study) on the basis of available statistics, questionnaires and interviews with local experts could describe here the relationship between actions taken and results and provide a holistic picture of the influence IT is exerting on these communities. This project should be planned by ITPS, the Swedish Institute for Transport and Communication Analysis, Statistics Sweden, the Swedish Association of Local Authorities and the Federation of Swedish County Councils, i.e. the organisations that, it has been proposed, will collaborate with each other in Theme 1: "An information society for all".

In a perspective of this type, the local use of IT can be linked to the three policy instruments as a basis for an assessment of how effective they have been in respect of IT use and the extent to which the IT policy has had an effect in this connection.

A study of this type should not be restricted to a study of the effect of IT on economy and welfare that we have taken up above but should also include factors such as life styles, the ways used by people to organise their networks, for example from the integration perspective, new approaches to the integration of work and leisure time, how IT affects the way we live, and so on.

Final points of view

In this proposal for an evaluation of the IT policy, the point of departure for ITPS has been the demands and requests expressed in the Government Approval Document and in the decisions of Parliament on the follow-up of the IT policy. These points of view have been summarised and developed by ITPS and are presented here under the designation "a learning IT policy". It can be difficult to make analyses of effects in the IT policy area but this is no reason not to make evaluations. On the contrary, there is reason to assert that evaluations are particularly important in complex policy areas and that adjustment to complexity takes place by developing the form of learning process described by ITPS.

The ambition of ITPS with this proposal has also been to create themes and formulate issues that involve in-depth consideration in clearly defined sectors and that can also provide holistic pictures and a coherent analysis. The construction of the different themes also makes it possible for different types of parties and experts to participate in the evaluation process.

One important element in the proposal is the invitation to the research community to participate in the evaluation work. This offers an opportunity to illustrate the IT issues from perspectives that are found in different scientific disciplines, which will provide better decision-making data for the politicians and create an opportunity for a broader social discussion on the role IT is playing in society and on government responsibilities where the development of IT is concerned.

Cooperation between research councils and researchers from different disciplines on IT and the IT policy of the type outlined above could constitute an important element in strengthening Sweden's position as a leading IT nation. Two important side-effects of cooperation of this type could be that it would provide a base for a discussion on whether it is possible to broaden the IT policy, and that the policy can be described and discussed from several perspectives with the participation of representatives of different schools of thought.

Figures

Figure 1

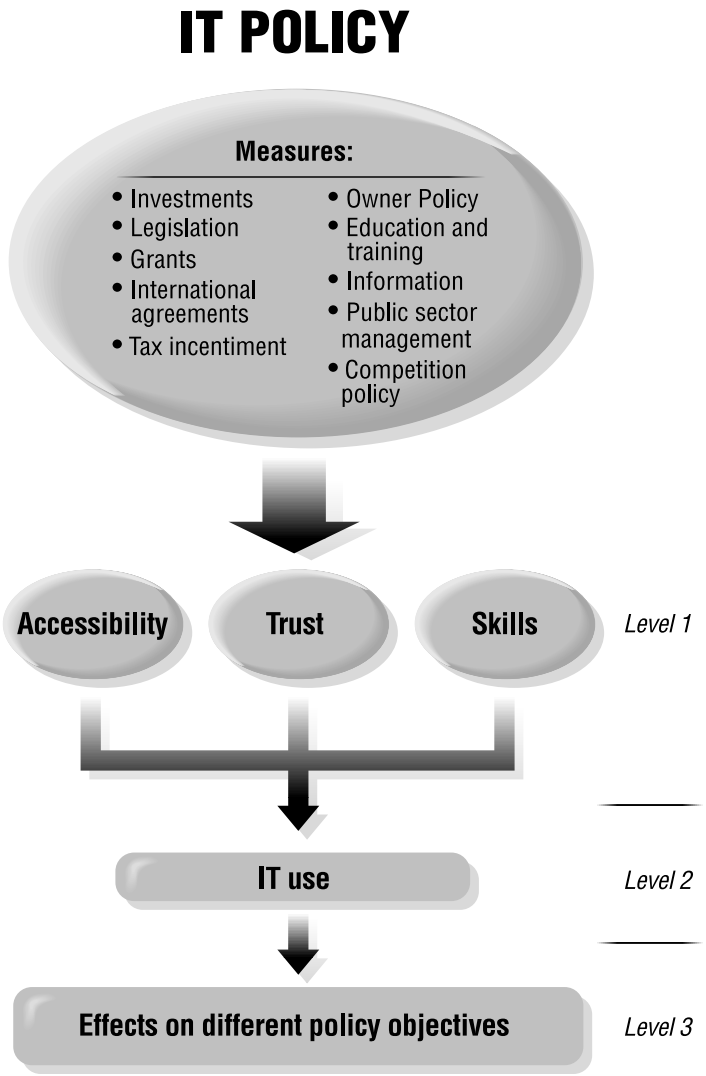


Figure 2

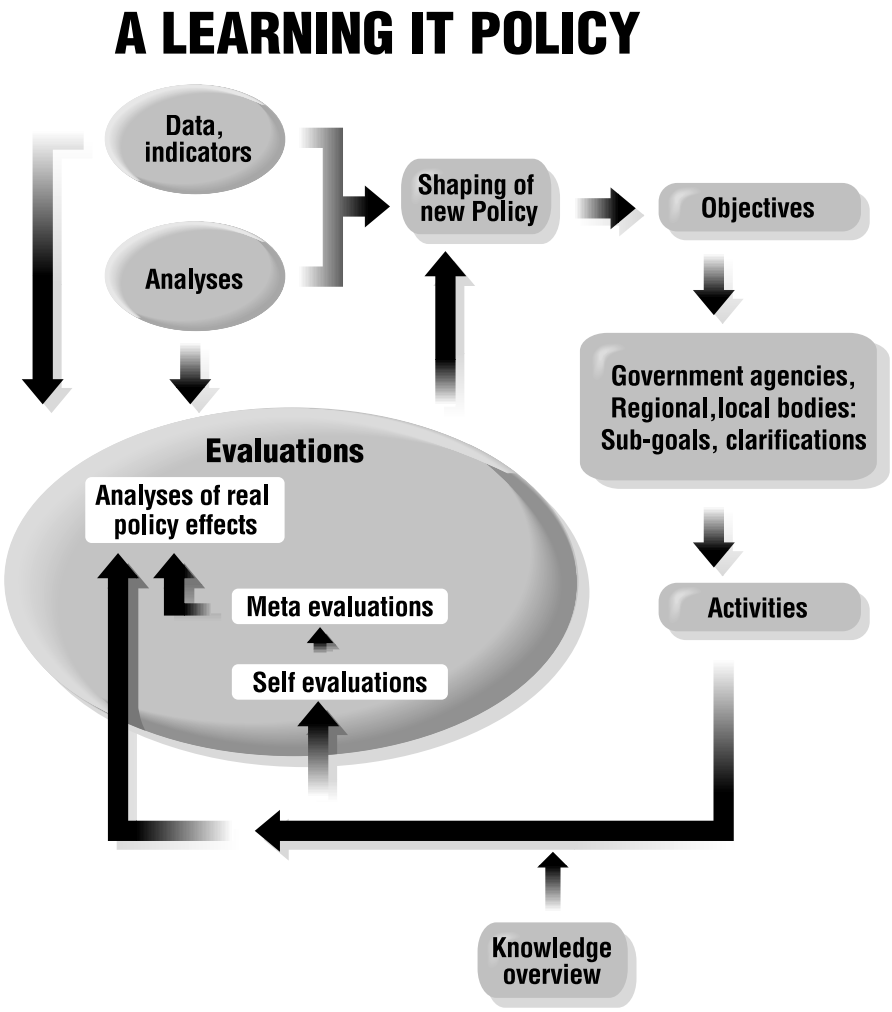
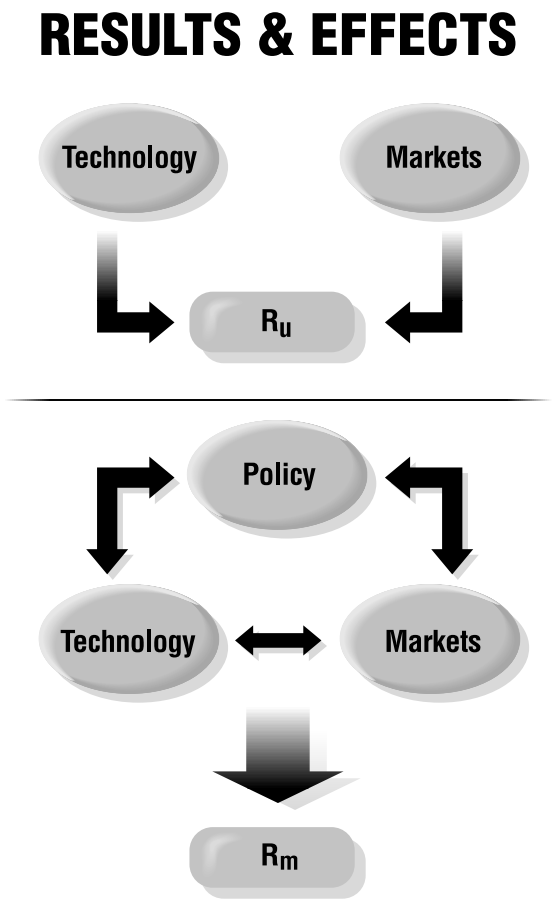

A LEARNING IT POLICY
Data, indicators
Analyses
Shaping of new Policy
Objectives
Government agencies, Regional,local bodies: Sub-goals, clarifications
Activities
Evaluations
Analyses of real policy effects
Meta evaluations
Self evaluations
Knowledge overview

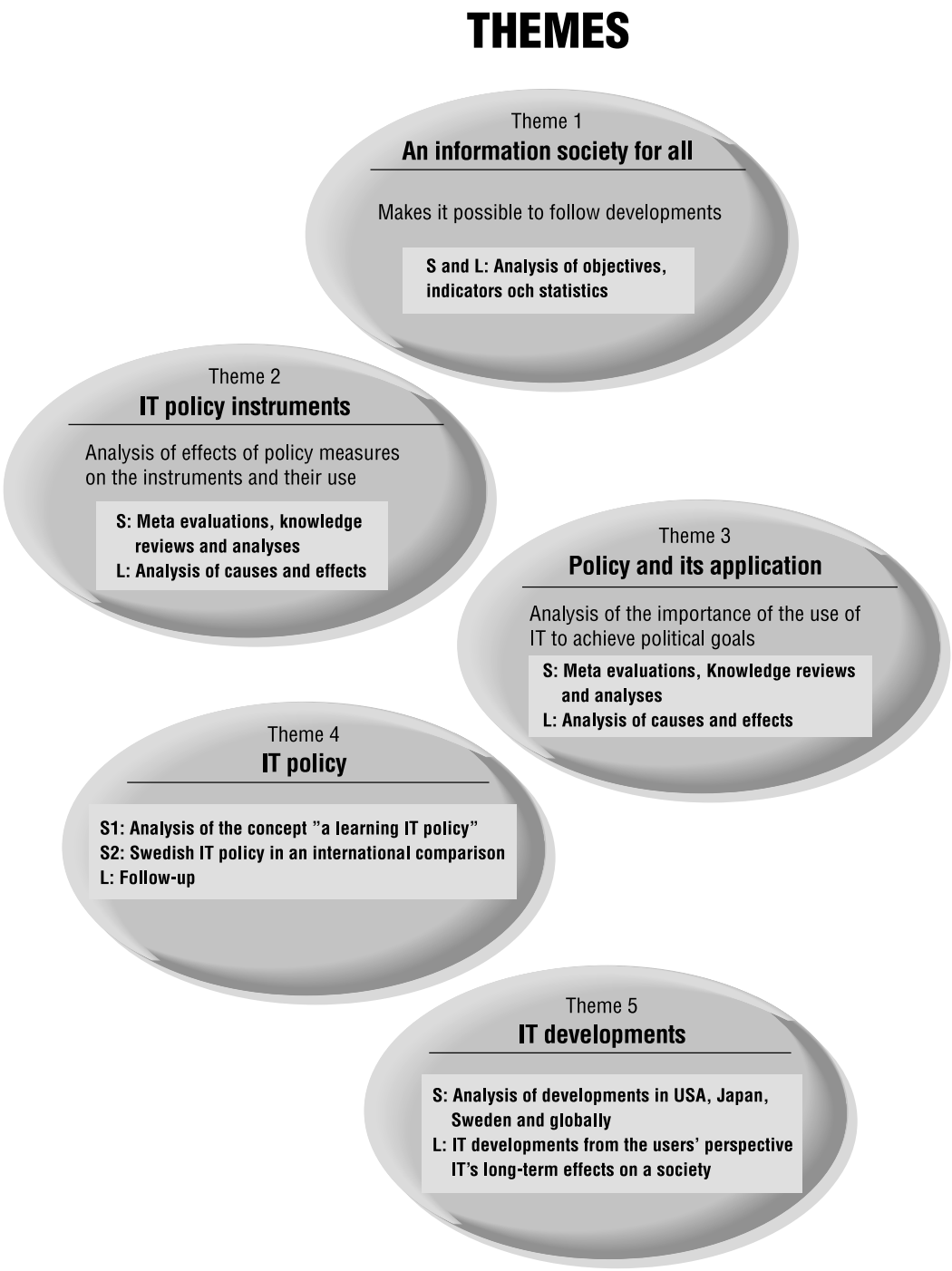
Figure 3



R_u = Results with no policy R_m = Results with a policy

Effects = R_m - R_u

Figure 4


THEMES
Theme 1
An information society for all
Makes it possible to follow developments
S and L: Analysis of objectives, indicators och statistics
Theme 2
IT policy instruments
Analysis of effects of policy measures on the instruments and their use
S: Meta evaluations, knowledge reviews and analyses
L: Analysis of causes and effects
Theme 3
Policy and its application
Analysis of the importance of the use of IT to achieve political goals
S: Meta evaluations, Knowledge reviews and analyses
L: Analysis of causes and effects
Theme 4
IT policy
S1: Analysis of the concept ”a learning IT policy”
S2: Swedish IT policy in an international comparison
L: Follow-up
Theme 5
IT developments
S: Analysis of developments in USA, Japan, Sweden and globally
L: IT developments from the users’ perspective
IT’s long-term effects on a society

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