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1. INTRODUCTION

1.1 *Creation of the commission*

On 12 January 1990 by order of the Minister of Education and Science and the Minister of Economic Affairs (acting in collaboration with the Minister of Justice) a temporary Advisory Commission on Information Technology and the Law was established.

1.2 *Composition*

Chairman of the commission was:

Prof. mr.H Franken, holder of the chair in the Introduction to Jurisprudence and Computer law at the University of Leiden and professor of Juridical Computer Science at the University of Groningen,

Appointed to act as members of the commission were:

Prof. Dr. J.C. Arnbak, professor of Tele-information technique at the Technical University of Delft,

Prof. mr. J.M.A. Berkvens, departmental director at the Rabobank Netherlands, and also extraordinary professor of Computer Science and the Law at the Catholic University of Nijmegen,

Prof. drs. B.K. Brussard, professor of Organisation of Information Provision at the Technical University of Delft,

Prof. Dr. A.W. Koers, professor of Juridical Computer Science at the University of Utrecht,

Prof. mr. Dr. I.Th.M. Snellen, professor of Public Administration at the Erasmus University in Rotterdam.

The secretariat of the commission was formed by mr. J.E.J. Prins and mr. A.H.J. Schmidt, both of whom are employed in the Department of Law and Computer Science within the University of Leiden. Mr. Schmidt drafted the report.

1.3 *Reasoning*

The reason the commission was set up was that the Minister of Education and Science had agreed in Parliament¹ to carry out an investigation in order to acquire a structured overview of the socially relevant problems and questions which arise from developments in information technology (from here on indicated by the letters IT) and the jurisprudential research which results from these developments. Much research has already been undertaken into the social consequences of IT, but not into its jurisprudential aspects. The main question examined by the research in question is then:

What questions arise from the further integration of IT in society in the medium-to-long term, which need to be answered by jurisprudence?

The commission should, in its activities, bear in mind other earlier studies which have touched on some aspects of this field. In this instance the VSNU report and the reports, made to the Minister of Justice in respect of copyrights, computer

¹ See: Science Budget 1990.

criminality and privacy protection spring to mind². It is the duty of the commission to provide an overview of the juridical and technical problems which will arise in the coming ten years and to indicate where further research is necessary. The commission has furthermore been asked to research the precise nature of the present problems in research in the Netherlands in the field of IT and the law. Moreover the opportunities for improving the existing research structure have to be inventoried. Attention must also be paid to establishing priorities for research plans in the long term, whereby the link between the research and the demand from society must be considered. Finally consideration must be given to ways of improving the (international) coordination of research, in connection with the existing stimulatory instruments³.

1.4 Procedure

It is difficult to make an inventory of the problems in society which arise from the opportunities offered by and threats emanating from the developments in IT. The commission has no procedure available on which to base predictions which would have any degree of certainty. Therefore the commission has worked principally in an analytical fashion, whereby optimal use was made of the expertise of the commission members⁴. The commission recognises and acknowledges the contributions made in discussions by Prof. mr. E.J. Dommering, professor of computer law at the University of Amsterdam, Dr.F. de Graaf, secretary of the Commission on Information Policy of the Council of Central Employers Organisations, Mr. A.W. Kasperen, acting director of the Institute for Computer Science and the Law at the Free University of Amsterdam, mr. F. Kuitenbrouwer, editor of the N.R.C./Handelsblad and mr. A.W. Nauta, head of Judicial Affairs of PTT Telecom.

1.5 Lay-out

The commission started its analysis by defining the problems (chapter 2). Initially preliminary questions are addressed such as: does the present legal system have sufficient influence on the application of IT and on the IT developments themself-

² H. Franken, A.W. Koers and G.P. Vandenbergh, *Advice with respect to the Law and Computer Science* (Advies inzake Recht en Informatica), Advisory report to the deliberations on the subject of Jurisprudence VSNU (Association of Dutch Universities), 1989, *Information techniques and Criminal Law* (Informatietechniek & Strafrecht), Report of the Commission on Computer Criminality, The Hague 1987, Interdepartmental workgroup on Piracy, *Piracy of products, protected by industrial property laws* (Piraterij van producten, beschermd door de industriële eigendom), (final report), The Hague 1985 *Privacy and registration of personal details* (Privacy en persoonsregistratie), Final report of the government commission into protection of privacy in connection with registration of personal details, The Hague 1976.

³ See the explanation given for the decision to create the commission

⁴ In addition to supplementary literature studies the commission also made use of an ad hoc investigation carried out by TNO (Dutch Organisation for Applied Scientific Research). Furthermore information and advice was sought from national and international organisations

ves? Thereafter the influence of the developments in IT on the professional juridical activity is indicated as a problem area.

In order to answer these and other questions the IT developments and methods are classified and mapped out. The classification is based upon, amongst other things, an investigation carried out at the commission's request by TNO (chapter 3).

In chapter 4 an analysis is reported which deals with the expected use that the community will make of IT developments. The commission has then related known and expected problems to the reasons for the increase in IT use.

In chapter 5 the consequences for society of developments in IT use are further expanded with regard to three sectors: the public sector, the private sector and the midfield organisations.

Chapter 6 forms the turning point of the report, in this chapter the transition is made from the descriptive to the standardising view. The values and the interests which deserve attention are indicated. The spotlight focuses on the juridical approach to the developments in IT. On this point attention is paid to both conditional aspects which are of importance to IT developments as well as to the protection of values and interests with respect to the use and application of IT. At the end of this chapter the preliminary questions are addressed.

In relation to what has just been stated, the relevant legal research topics are identified in chapter 7. An indication is given in this chapter of whether or not attention will be given to these themes and if so, where. In chapter 8, in conclusion, priorities are named and several recommendations are made about the structure of research projects.

2. PROBLEM DEFINITION

2.1 *Knowledge is power*

The urgency of an inventory of juridical questions as a result of IT developments is becoming increasingly evident. Knowledge is power, and in a society in which social justice is sought for, then power has to be regulated. Knowledge and information are related terms.

2.1.1 *Knowledge and information, some terms*

Knowledge is a term which is difficult to define exactly. It is assumed that knowledge is a combination of factual knowledge, knowledge acquired through experience and opinions⁵, and that knowledge does not exist independently of the human conscience.

Outside the context of IT, knowledge and information are partly synonymous. The term information is used here for what seems to be knowledge but can be detached from the individual human conscience, such as the information which is contained in an encyclopedia on a bookshelf.

Within the context of IT there is also the need to give a name to that which is drawn from human knowledge, but which is realised within a computer, separately from the human conscience. The term information has become an established term for this. The usual meaning of the term information in IT is, in fact, more expansive than that meant by pointing to the contents of an encyclopedia. Information within the context of IT means the mechanical counterpart of *active* human knowledge. The use of the term information has expanded immensely within the IT context (such as information system, information technology, information processing), but this does not mean that the meaning of the word is easy to define precisely. In other words it is still not possible to provide an exact linguistic definition of the term information.

For practical purposes information can be seen in terms of knowledge which is, according to certain conventions, established in *symbols* in one or other medium *together with those conventions* (which may also be defined in a medium). These conventions can also be further distinguished as syntactic *encoding conventions* and semantic conventions. Whenever we omit the *interpretation conventions* then we are no longer talking about information but about *representations* (symbols with encoding agreements). Representations can be divided into *data*, which are processed or produced and *programs*, the instructions according to which data are processed and produced.

The framework of terminology which has been chosen offers the opportunity to talk about elements in IT in an objective style. The commission considered this essential to enable formulation (and feasibility) of regulatory proposals with respect to IT use and developments.

⁵

A.Ollongren and H.J.van den Herik: *Philosophy of computer science*, Leiden, 1989.

2.1.2 *The information society*

The developments in information technology lead at this point in time to a break in the way and the extent to which information can be registered. This is also true of the processing, transfer and duplication of information and access to it. There is a change taking place in society in the balance of power which raise questions about the relationship between the principle of free flow of information and the possibilities of regulating or limiting the access to information. Because of the enormous increase in IT the economic significance of information has become clearer, just as the significance of information has for the administration. In this connection the use of the term *information society* is understandable, although every community derives its structure in part from the information order.

2.1.3. *Regulatory questions*

The regulation of the balance of power as above is not problem free. It is even probable that traditional juridical concepts are inadequate, and as such lose their significance. Thus civil law depends heavily on categorising its topics in goods and rights; it is not clear whether information fits into one of these categories. The regulation of related interests is, in any case, laid down in special legislation (privacy, intellectual property) which make use of abstract definitions when categorising. Comparable developments also occur in criminal law⁶. Within the sphere of administrative law the question can be posed of whether the traditional organisation structures and administrative procedures are sufficiently flexible to make effective use of the possibilities offered by IT (for instance with respect to the openness of government). In constitutional law the IT developments also have consequences which raise questions with regard to the traditional concepts (for example as a result of designations such as "experimental legislation", "trial and error legislation"). The legislator is also becoming aware of the need to timetable the introduction of laws and to relate them to the development of the information systems which will be needed to carry them out.

2.2 *Basis for research*

As a result of the developments in IT the area of tension between the principle of the "free flow of information" and the protection of personal, economic and/or governmental interests associated with information has gained a much greater significance than before. Under the influence of IT developments shifts occur both in the market and the power balance. It is therefore necessary to carry out goal-directed jurisprudential research into the need for and the feasibility of effective regulatory instruments.

2.3 *Regulatory instruments*

By regulatory instruments in this context are meant not only laws and government directives, but also rules which are developed and used in the private sector (such as codes of conduct and agreed precision criteria). The effectiveness of

⁶ Arnhem Court 27 October 1983 NJ 84, 80.

regulatory instruments is, of course, closely related to the feasibility of such regulations and supposes that there are sufficient opportunities of being able to maintain them. It should in no way be excluded that IT applications will contribute to the possibility of maintaining them.

2.4 Analysis of the questions

Whenever the law is seen as a system of instruments through which a community attempts to create and maintain a just social order, then the original main question (what are the questions which the effects of IT in the community raise in the medium-to-long term and which should be answered through jurisprudence?) can be paraphrased to ask whether the jurisprudential field of instruments is adequate to be able to regulate the consequences of IT in the community.

IT plays, in fact, two different roles. On the one hand the *use* of IT leads to changes in society which might possibly require controls to be altered. On the other hand the *developments* in IT are themselves driven by society: for example, by economic and judicial influences. The practical feasibility of influencing the development of IT by means of the Dutch legislature and regulations should obviously not be overestimated.

The main question can then be split into two parts, (a) do the present juridical instruments allow sufficient possibilities for influencing the application of IT? and (b) do the present juridical instruments proffer sufficient opportunities for influencing IT developments themselves in a desired direction based on juridical considerations?

In order to be able to answer these questions we will first inventory the expected IT developments. Thereafter we look at the role of these developments in society, assuming that the juridical activity will not change for some time. It is expected that the deficiencies (such as there are already) of the present regulatory system will be brought to light in this fashion. Using these as a basis, important research fields can then be identified.

When we view IT as an aid to information processing, whilst realising that the legal activity depends on the processing of information, then IT can be an effective aid in the legal activity. Getting IT developments started, which will provide effective juridical instruments, is another interesting aspect of the problem definition in this investigation.

2.5 Setting the questions

Before identifying particular research fields and assigning a priority to them, three preliminary questions must be dealt with:

- (1) Do the present juridical instruments offer opportunities for any possible, desirable influencing of the IT developments in a chosen direction?
- (2) Do the present juridical instruments provide any opportunity of possibly influencing, as might be desirable, the changes in society which are caused by the application of IT?
- (3) Do the IT developments and application possibilities give rise to alterations in the juridical instruments?

Depending on the way these questions are answered then the main question of the investigation can be posed thus:

- (4) What are the questions which arise from the effects of IT in society in the medium-to-long term, and which answers should come from jurisprudence and the juridical instruments?

3. TECHNOLOGICAL DEVELOPMENTS

3.1 Introduction

Providing an answer to the demand for an overview of the juridical issues which will arise within the coming ten years as a result of the use of IT, is of necessity based on extrapolation from the present expectations for the short-to-medium term. The making of an inventory of future developments is, generally, a precarious venture.

Our attention in this chapter is not yet drawn to the social significance of developments (or of existing techniques), but to describing the *possibilities* which may be expected in the medium-to-long term.

The commission has based their inventory of the IT developments and methods on an investigation which was carried out on their behalf by TNO. Furthermore they made use of the "technology forecast" from a NOTA investigation⁷. In this chapter their most important findings are reported. First of all a number of core terms are defined. The BIOS document⁸ was adhered to as closely as possible when creating the definitions.

3.2 Terminology

In the report INFORMATION TECHNOLOGY AND THE LAW what is meant by the term *information technology* (IT) is: the knowledge and the use of technical aids (in general equipment and software) directed towards providing information. By *information system* is meant: all of those means by which information provision in a particular area and in a particular organisational context is realised. This whole can be split into five components: (1) apparatus, (2) software, (3) people, (4) guidelines/procedures, (5) data collections. By *information provision* the commission means: the whole process, from the original question setting or recording of information to finally having the information available. Characteristic tasks in this process are: the input process (including the identification of the user), the storage, transfer, processing and presentation of the information, including the authorization of the actual use. In this report what is meant by *IT use* is the use of information (in the sense of 2.1.1.); the *IT products* include, in this context, not only the apparatus, the software, the user guidelines and data collection which belong to information systems, but also the services thereby created and the methodologies necessary to develop information systems.

In the provision of information a role is played by an *information holder*, which is responsible for the processing and maintenance of the information. What is

⁷ The NOTA investigation mentioned is set down in: *Computersation in the public administration* (Informatisering in het openbaar bestuur), the final report of an research project, carried out by the Dept of Public Administration and Computer Science Law at the Catholic University of Brabant which was published by NOTA (Netherlands Organisation for Technological Aspects research) in 1989

⁸ Policy report on information provision in the public sector (Beleidsnota Informatievoorziening Openbare Sector) Handelingen '87-88, 20 644 nr 2.

meant here by *maintaining an information collection* is: ensuring the availability, the exclusivity, the consistency and the integrity of the information collection. Moreover in the process of providing information there is also an *information supplier*, which is responsible for presenting, or not presenting as the case may be, the information to the *information receiver*, who is in turn responsible for the request for and the receipt of the information. Finally there can be no information provision without an *information producer* having turned knowledge into information. The relationships between information holder, -supplier and -receiver and -producer may be typified in terms of competencies, obligations and prohibitions.

3.2.1 *Information relationships*

In the process of providing information, the information receiver and the information supplier have a direct relationship. This relationship is called an information relationship. Because there is, in actual fact, no information transfer in the case of confidentiality (if there is a prohibition on the giving and/or receiving of information), information relationships in this chapter will be typified by combinations of obligations and competencies, or by a simple information prohibition.

Whenever the information supplier has the authority to offer the information, whilst the information receiver has the authority to ask for the information and receive it, then there is an information relationship which is characterised by *free information exchange*. Such a relationship exists between authors and editors of scientific journals.

Whenever the information receiver has the duty to receive the information, whilst the information supplier has the authority to provide the information (but also to refuse the information) then there is *receiver dependency*. This type of information relationship occurs in the Public Prosecutor's Office in connection with complaints offences.

Whenever the information supplier has the duty to offer information as requested, whilst the information receiver has the authority to ask for this information the information relationship is characterised by *offer dependency*. This situation occurs when, for instance, an extract from the births register is required.

A *requirement to provide information* exists, whenever the information supplier is required to provide the information requested, whilst the information receiver is required to receive the information. This duty to provide information exists between a train passenger and the conductor, between an industrial insurance board and an unemployed person but also between a client and banker (size of payments and the identification of the addressee).

There is an *information prohibition* or a *secrecy duty* whenever the information supplier is prohibited from supplying the information receiver with the information requested. Information prohibitions are never absolute, but are relative to the role in society of the information receiver and -supplier.

3.2.2 *Costs of information*

The differing information relationships can be further qualified in terms of the reciprocation which is offered by the information receiver for the production of information by the information supplier. This reciprocation creates the material

conditions according to which information provision can take place. Information provision take place *for the market price*, it may also occur *for the cost price*, for a *forfeit* amount or *for nothing*. There is, in particular, a need for regulation if monopoly positions exist.

3.2.3 A typology of information

In addition to the distinction of various functions, of various types of information relationships and of various types of compensation, a distinction according to the nature of the information also plays a role in describing the social implications of IT developments. First of all the commission distinguishes information which has to do with individual persons, affairs or situations (*empirical information*) from information which is concerned with products of the human mind (*intellectual information*). Empirical information can be further subdivided into *personal information* which is based on data concerning individual persons and *information on goods*. Empirical information can be processed in such a way that no data about individual people or goods can be derived from it. Such *aggregated information* is considered to belong to the category of intellectual information.

This extension of the chosen terminology now also provides the opportunity of speaking in *functional* terms about social activities in connection with IT. The commission also considers this to be necessary for the formulation with regard to (the feasibility of) regulatory proposals which are concerned with IT use and developments.

3.3 IT, core and applications

Following the example of Miles et al. (1990)⁹ the TNO investigation distinguishes a *core* of IT, which contains a 'heart', consisting of integrated circuits (ICs, in particular processors and memories) and related active components. Within the core the 'heart' is surrounded by a ring of peripheral equipment, telecommunications apparatus and services. The core produces generically usable "apparatus" (computers, transmission links and switching equipment), generically usable system software (operating systems, compilers, communication protocols) and the associated services (computer services and communication services). The majority of the resources with which applications of IT may be realised are part of the core.

All other products and services in which IT plays a role are deemed to belong to the field of the *application* of IT. Applications are characterised by the input of generic resources provided by the IT sector for specific tasks in a specific organisational or technical context. In short: all information systems are IT applications, from word processors and data base management systems to process control, robots and expert systems.

⁹ Ian Miles and contributors: *Mapping and measuring the Information Economy*, Library and Information Research report 77, British Library Board, 1990.

3.4 Developments in the IT core

In the IT core a distinction is made between generically usable equipment, communication infrastructures, system software and the services associated with it. Recent developments and those which can be expected are dealt with by category in the following.

3.4.1 Developments with respect to equipment

An importance trend in equipment development lies in the spectacular and constant improvement in the price-performance ratio of microprocessors and memory chips. The costs per circuit have thus dropped by a factor of a thousand between 1960 and 1990. In the same period the costs per bit dropped by a factor of ten thousand and the time needed to perform an instruction has fallen by a factor of ten million. Whilst there are theoretical limits, this trend will continue in the medium-to-long term, partially due the use of parallel processing.

3.4.2 Developments with respect to the infrastructure for communications

The most obvious facet of the changes in the field of the equipment is the rise of the personal computer, the fax machine and other equipment in the field of office automation. Less noticeable, but no less important are the numerous intelligent software interfaces and protocols which allow very varied equipment to communicate with each other through (data) communication networks. This enhances the effectiveness of computers, peripheral equipment and process controls significantly. This has all led to the explosive growth of telecommunication services being offered and in the number of networks for company communication (LANs, WANs). The connection of these networks to the public telecommunication infrastructure and the resulting extra traffic in the systems has already led, in several places, to stagnation in the classic telephone network.

This close interweaving of technical and users' aspects results in the communications infrastructure being a complex entity. Planners and controllers of networks are being confronted with very diverse traffic, varying from very narrow band (Electronic Mail) to very wide band (HDTV), circuit linked and package linked data, point-to-multipoint traffic, one-way and two-way traffic, traffic with extremely high or less high demands on the reliability of the connection, to name but a few of the variants. Simply setting the tariffs for the various types of traffic takes on the dimensions of a science. To prevent far too expensive solutions being chosen for many types of traffic there will, in the coming decennia, have to be a variety of networks kept in existence, which will make the problems of standardisation and introduction (input) more complicated and will mean that the users have to make difficult choices.

An optimal infrastructure is determined, on the one hand by the users' habits and patterns of need as defined by social and business economics and on the other hand by the state of the technology. Thus the optimal infrastructure in a highly populated area will be different to that in an area of low population. The choice of transmission media is related to this: the higher the user density the more efficient the fibre optic networks become, whilst the costs of cable-less (radio and satellite) connections are much less dependent on user density. Given the many uncertainties in the development of the information requirements on the one hand

and the technological, economic and ergonomic possibilities (also for the input and output of the information) on the other hand, it is impractical to establish a definitive net architecture at this point in time. The "Integrated Services Digital Network" (ISDN) is, in the light of this, only a first step along the way which should lead, in the coming century in the view of the European Commission, to an integrated, broad band optical telecommunications network (Integrated Broadband Communications Network). A consistent development of this may be at odds with the dismantling of the telecommunication monopolies in the member states, this latter fact being exacerbated by satellite communications which have no state boundary.

3.4.3 System software

The development of system software proceeds ostensibly in a different fashion to that of equipment. Operating systems are becoming increasingly more and more complex, whilst the number of instructions that they contain is increasing - which is not say that the tasks which they fulfil also increase in the same way. Part of the complexity is due to ease of use. The historical development of 'programming languages' (machine code - assemblers - higher programming languages - fourth generation) illustrates this point. In each successive generation programming becomes simpler and provides more insight, but the number of steps to get to the final, necessary machine instructions is increasing. In other words: each successive software generation requires more memory capacity. It should be noted here that a number of questions, which arise from developments in apparatus and are directed at system software, have not yet been resolved in a satisfactory manner. One of these questions concerns the efficient use of parallel linked processors. In this field improvements are expected within the next ten years.

Another part of the complexity is due to the attempt to let heterogeneous apparatus and software communicate with each other. The so-called "Open System" architecture, which tries to establish standards for operating systems, graphic interfaces and communications protocols, belongs in this respect to an important development in the IT core.

The developments in the field of the production of output requires a comparable capacity expansion. Thus there are, for instance, 200 - 600 times as many data needed for the build-up of a graphic colour screen as are needed for a black-and-white ASCII screen.

3.4.4 Services

Technical and economic developments lead to the convergence of both technical and organisational systems which were previously very strictly separated. Computer technology, telephony and broadcasting are growing closer to each other, whereby the options available in the technical and organisational fields have expanded. The processes involved in choosing are more complicated here, because there is no longer only talk of the extension of existing systems but also of competition between them.

The centre of gravity moves: with the introduction of information systems the accent comes to rest more and more on the organisational questions rather than the technical. As a result a stronger emphasis comes to lie on the 'social condi-

ons for the application of IT'. This means both the removal of obstructions to the application of IT as well as the creation of good conditions for both technological and social-organisational innovation.

The developments of standards (and the application of them) is one of the ways in which the significance of social conditions for the application of IT is shown to its best advantage. General and public standardisation of interfaces and communication protocols is, on the one hand, a necessary precondition for fair competition because IT products are then comparable. On the other hand, standardisation of interfaces by individual companies in a one-sided enforcement can lead to unfair competition. Likewise there is a link between the nature of the standardisation and the degree of regulation. This can be illustrated through the developments in telecommunication. The liberalisation which has taken place in many countries makes standardisation more difficult and at the same time more necessary for the 'interconnectivity'. Insight into these links is urgently needed to determine the government's attitude with respect to standardisation. In this respect technological and (innovative) economical aspects play a role in addition to the juridical aspects. From the point-of-view of technological developments and innovative economics attempts are being made in Europe to increase the cooperation between companies. With respect to the policy on competition it has been suggested that limits should be set to the cooperation, because this will, in the long term, have undesirable effects on economic development due to the creation of new monopolies or oligopolies.

The way in which the services linked with the IT core will develop, in particular telecommunications and broadcasting, is highly dependent on the politics which will be pursued with regard to standards. The commission will not attempt to make predictions in this field. They will limit themselves to noting that its final recommendations for research will hopefully make a contribution to these developments.

3.5 Developments in IT applications

The best that can be achieved when distinguishing the core and applications of IT can only be a random picture. Some components of applications appear to be of such a general applicability, that they are in the course of time absorbed into the core. The 'mouse' with accompanying control software is one example of this. An inventory of the present developments in IT applications reflects a little of the IT core of tomorrow.

Applications are in all sorts and sizes, and in many fields. To be able to keep an inventory of the developments surveyable a link is sought with the tasks which were earlier distinguished in information systems. All information systems are, after all, IT applications. Because not all IT applications are, in fact, information systems, attention will also be paid to the developments in this category which fall outside the scope of the information systems (section 3.5.7).

3.5.1 Input processing

By input processing is meant the function which receives signals from the user (or from the immediate environment) and turns them into an encoded form suitable for processing by the information system without loss of meaning. The

available techniques are being used in increasing wider applications (for instance keyboards for punching in PIN-codes, the use of barcodes, the use of magnetised cards or the use of signals, produced by measurement equipment). In particular applications which are based on the digitalization of graphic images (FAX) have expanded enormously.

Research concerned with input processing is, at present, especially concentrated in the fields of writing recognition, speech recognition, the processing of natural language, the recognition of two-dimensional images (visual pattern recognition) and the visual interpretation of not necessarily static objects (amongst which the information system itself) in three-dimensional spaces. In general it is realised that these are stubborn research problems for which, broadly speaking, solutions will not be found within a reasonable period of time. At present there are, however, already attractive economic solutions available for limited fields (robots in production environments, the processing of hand written bank-giro amounts). It is plausible that the number and scope of the fields for which technical solutions will be available in ten years' time will have expanded.

3.5.1.1 The identification of the user

Not all stored representations should be accessible for everyone, take for example, representations of a medical nature. It is just as undesirable that any one person should be able to alter stored data, such as his own bank balance. In this context there is an exclusivity of information. The realization of exclusivity is based on the possibility of making it (im)possible for individual users to read or write on certain, well defined information units (see also subsection 3.5.6).

In the automated part of an information system IT applications are used to preserve exclusivity. One of the functions which stands at the foundation of the perfect exclusivity of information must be capable of individually recognising a user. It is obvious that the user identification task of an information system is one of the limited fields in which the developments, which were summarised in the previous sections, will be successful within the foreseeable future.

3.5.2. Storage of representations

The function which deals with the storage of representations in a information system is, in this context, the activity which stores representations which was previously stored and/or processed and keeps it available for future use. Representations can be split here into *data* (which are processed) and *programs* (in which the processing is specified). This distinction has consequences for the manner in which representations can be effectively stored and made accessible.

3.5.2.1. The storage of data

At present the most frequently used method of storage and retrieval of *data* is based on the division into indexed tables which can be linked to one another. The present research into representation techniques is aimed at a method of storage and access which is more related to the meaning of the information (also designated as semantic). This is concerned with forms of pattern recognition which will, in particular, be used internally, that is to say within the automated part of

information systems. These representation techniques are of great importance in preserving the integrity of data collections.

It is improbable that the problems concerning the semantic storage and access of data, broadly speaking, will be resolved satisfactorily in the foreseeable future. It may be assumed however that success will be achieved rapidly in some limited areas. The extent to which the developments concerning neural networks will play a role in this cannot be predicted. The results which have been achieved with these networks up to the present do not, in any way, exclude a part in computerised pattern recognition.

3.5.2.2 *The storage of programs*

Programs (and program components) should also be suitable for storage, retrieval and combination with each other. Investigation into methods of recycling and integration of program (components) is in full swing, in particular because important investments are involved in the maintenance of software.

The practical and theoretical questions which arise from the preservation of the integrity of software collections, are greater and of a different order to those occurring in data collections. Whilst research into techniques (like, for instance, the so-called object orientated programming) is proceeding at full tilt and there is certainly a chance of a breakthrough, there are no general solutions expected in the coming ten years in this field. However some consideration can be given to substantial solutions for sub-sectors becoming available. The developments concerning the computerised support of system design and building (the so-called CASE tools) spring to mind in this respect.

3.5.3. *Information transfer*

By transfer of information in this context is meant: making information accessible to other systems or system components. This transfer uses a medium for transport, so that in most instances the information has to be encoded for transport (by the sender) and then decoded (by the receiver). *Information transfer is often a matter of multiplication*, because the information is not lost to the sender *through* the transfer. (Information which is lost *when* transferred is called volatile).

Most technical and infrastructural aspects of information transfer belong to the IT core. The most important applications in this field are also inspired by infrastructural needs.

Word processors will serve here as an example. These are information systems, in which the transfer between a text stored in memory and a print unit form an essential step on the way to an acceptable end result. At present most of the print units have their own control language designed by the manufacturer. The result of this is, that successful word processors are more or less forced to make translation tables available for each type of print unit, so that the user can keep using the print units he already has available. Research is being carried out in this context into encoding procedures for information which will make the transfer of texts and graphic images uniform. Postscript and X-Windows offer such a uniform encoding at the present moment. It is assumed that in the medium-to-long term

such applications for the transfer of graphic information will be adopted as *de facto standards* in the IT core.

Together with the improved infrastructure for communications this would mean that in the medium-to-long term it would be normal, for example in Amsterdam, to be using interactive applications of which the data and the programs are spread over computers in Manchester, Moscow, Perth and San Paulo. In other words: the opportunities for *distributed information processing* will increase substantially in the near future.

3.5.4. *Information processing*

All forms of calculations and reasoning which occur within information systems are understood here to belong to information processing. At an extremely primitive level of understanding these possibilities are fixed in a set repertoire of operations¹⁰ which can be considered to belong to the IT core and which have not gained in theoretical expression since 1936¹¹. As can be deduced from the developments in the IT core, this repertoire scarcely induces limitations to the complexity and abstraction in which languages can be developed in order to specify processes.

Within the sphere of applications the endeavour is to have the specification of processes even closer to the terminology which is used by experts at the concrete applications level (users). Forerunners in this field are the statistical packages which in the seventies opened the way for users to specify models in their own terminology. These models were then used by the information system for processing.

With the introduction of expert systems in the seventies, techniques for the conceptual specification of processes based on uncertain and vague information became available. It is expected that in the coming ten years the possibilities in this field will be expanded appreciably.

3.5.5 *The presentation of information*

By presentation of information is meant the function which gives signals to the user (or to the immediate environment) of the information system with the aim that these signals will be understood without loss of meaning by the user. The research fields which play a role in this area with respect to the expected developments are also closely linked to what was said about input processing.

Research in this field is aimed at the generation of natural language in sound and picture and on the presentation of three-dimensional, complex objects from various viewpoints. Applications in the fields of computer aided design and manufacture (CAD/CAM) make use of these techniques. Furthermore they also play an important role in simulations. The techniques are also used in the film industry and in computer-supported education (CSE).

¹⁰ Such as: reading, writing, comparison and mathematical processing of symbols.

¹¹ A.M. Turing (1936), On computable numbers, with an application to the Entscheidungsproblem, Proceedings of the London Mathematical Society, ser. 2, vol. 42 pp 230-265.

3.5.6. Authorization

The authorization of the offering and/of use of separate program components and data collections is the necessary complement to the user's identification for the preservation of the exclusivity of information. Whenever an automated authorization task is activated an internal record of authorizations of users is consulted.

These authorizations are, looked at technically, concerned with the reading and/or writing of information. In principle there can be four different combinations of authorizations (reading and writing; only reading; only writing; neither reading nor writing). The record mentioned above is maintained to permit the activation of these various authorizations in relationships between individual users and individual information collections.

It is precisely this record which makes the monitoring of exclusivity vulnerable. It is worth noting that this vulnerability seems particularly to be the result of the possibilities which the products of the core offer¹². In that light the innovations are not really expected in the field of applications but rather in the area of the IT core (especially operating systems). It seems probable that the problems around, i.e., the computer viruses will, in this respect, form a powerful impulse for these developments.

3.5.7. Development of IT applications outside information systems

At the start of this section it was suggested that there is a smooth line between IT core and applications. In the first instance attention was drawn to the applications, which because of their generic use were included in the core. A reverse movement is also discernable. The functionality of components of the core which were, in principle, developed for generic use (such as processor and memory ICs) can be applied to specific uses. In this form a shift from the core to the application also occurs. Numerous appliances have already been equipped with elements from the IT core. Usually it is the replacement and improvement of the original mechanical control (washing machines, brake systems, watches, fuel injection, medical equipment), sometimes whole computers are 'built in' (monitoring systems in transport vehicles, some robots, process control, and the so-called 'smart card').

The developments in this field have been in progress for some time. It seems probable that they will continue even more rapidly in the coming ten years.

3.6 Summary

In the next ten years the capacity of the equipment as well as that of the communication infrastructure will continue to increase. The most important developments in the field of system software will probably be directed at improving the communication possibilities between applications of dissimilar types which run on equipment originating from different manufacturers, at improving the use of parallel processors and at improving the preservation of the exclusivity of information.

¹² In most computers the link between company system and hardware is not complete, because hardware in general is designed to make control by different company systems possible.

In the field of applications much improved techniques for input processing (amongst which is user identification) will become available. Furthermore the trend in the direction of improved specification techniques for storage, search and processing functions will lead to practical, applicable results. Finally the use of elements from the IT core in appliances and production equipment will increase in the coming years.

4. DEVELOPMENTS IN THE USE OF INFORMATION

4.1. *The information society*

Information has always been significant. The social significance of information ('knowledge is power') is of old linked with the administration. It is by no means accidental that in the US the government is called the 'administration'. This name dates from before the time that computers were available to support information processing.

The practical possibilities which have since arisen through developments in IT, have increased and emphasised the social significance of information. Information collections have been formed along the lines of, for example, attempts to create policy which is more objective. This has taken place both in the business world as well as in (lower) governmental systems. On the one hand, one may ask whether there is, in actual fact, a real need to examine all the information which has been gathered and on the other hand, information technology itself has been increasingly used for processing it. In this respect the information society is already a fact.

In this chapter attention will be paid to the expected social use of information in the next ten years.

4.2 *Lay-out of this chapter*

The actual use of IT is, in relation to the IT opportunities which have become available, rising faster than might have been expected on the basis of the increased functionality. There is evidently a social climate in which the use of IT applications has been able to develop. When considering this climate the most important impulses for IT production and for the use of IT (section 4.3) will be examined first. In the following scheme the traditional influences, which are reducing or have already diminished, and which have inhibited IT production or IT use, will then be dealt with (sections 4.4 - 4.8). Section 4.9 will provide a summary.

4.3. *Increasing confidence in IT applications*

The demand for applications is based, in addition to the autonomous need for information, on the confidence of the community in IT. This confidence is not without conditions. There is, therefore, not only a eye for the reliability of IT applications, but also for their vulnerability.

It is probable that confidence is based on the esteem placed on previous results and future expectations. The factors which play a role in the deliberations define the future role of IT in society. Whenever the question has to be answered of whether or not, and if so which, thresholds for IT development should be raised or lowered, then the social confidence in IT will be taken as a starting point. It is the function of the law in this respect to make the creation of socially reliable relationships possible. The most important factors which play a role in the social confidence in IT are listed below.

4.3.1. *Reliability and vulnerability of the IT core*

The products of the IT core at present enjoy great reliability. It begs the question as to whether this reliability will continue to be justifiable. Whilst in principle there are techniques available to *demonstrate* mathematically the reliability of ICs, of operating systems and of compilers¹³, in practice little comes of them. Because the assumption is made, when applications are being developed, that the elements used from the IT core are accurate, there are important questions which arise especially in connection with the emergence of safety-critical systems. Despite a number of spectacular accidents (unsuccessful launches, medical equipment) the social confidence in the reliability of the IT core cannot be easily shaken and maybe due to a general belief in progress.

The reliability of the IT core is largely founded on the precision with which information can be stored digitally. Electromagnetic principles are used for the "permanent" storage of large information collections. To a certain extent these information collections are therefore vulnerable. It is possible to destroy large information collections maliciously. A whole range of security methods has been developed to guard against this sort of terrorism, and also against the risks of other calamities (natural disasters).

The vulnerability of the IT core when it is attacked by vandals has been demonstrated recently with the emergence of viruses. Usually these are programs which via the operating systems, sneak into the information systems and attack at unpredictable times causing damage. Often it takes the form of criminal behaviour which is still viewed by the perpetrators and by part of the community as an expression of 'sportsmanship and ingenuity'. A further increase in the spread of viruses forms a serious threat to the social confidence in IT, especially because the viruses can cause major damage.

4.3.2. *Integrity and inconsistency*

When a faultless IT core is presumed, then a computer, viewed from a primitive semantic point-of-view, can make no mistakes. A computer simply carries out what it is commanded to do. But many information systems behave now and again in a fashion which is experienced by the user as faulty. When these faults are not based on mistakes made by the user when performing input operations, they point to system behaviour which was not expected by the user because the system manufacturer described it in a different fashion. The term used here is *inconsistency*¹⁴. As soon as a system is clear of inconsistencies then there is a *consistent* system. The data collections which these systems have available are called *sound*.

Consistent systems behave as the manufacturer has described in his system specification. These specifications become, in the design of information systems,

¹³ An important contribution to these techniques was made by E.W. Dijkstra. This may be concerned here with proofs at a primitive semantic level.

¹⁴ The term is not used here in the formal syntactic sense but in the related semantic sense. See for example: J. van Eijck and E. Thijssen, *Logic for humanities and computer science* (Logica voor alfa's en informatica), Academic Service 1989, p. 186.

increasingly more technically specialised, and are therefore more difficult for the user or customer (who is not trained in IT) to understand. Because it is of great importance that legitimate agreements can be made between, on the one hand, customers and users and, on the other hand, manufacturers and suppliers of IT applications then a system specification which is comprehensible to the layman will have an important social role. Such a specification is called the *conceptual model*¹⁵ of an application.

Problems arise regularly around the development of information systems. The problems in which the government is involved notably draw public attention¹⁶. There are various possible causes for such problems. Sometimes the conceptual model is altered too often by the manufacturer, sometimes there are misunderstandings between the customer and the manufacturer, sometimes the manufacturer is over-optimistic with regard to his prospects, sometimes there are organisational obstacles and often it is a combination of these causes.

In general there is great confidence in the ability to automate processes and in the use of new techniques (artificial intelligence or AI). Occasionally the trust goes too far. One classic example is the request in 1986 by a Dutch MP for a program which would explain to laymen, the reforms in Social Security, immediately after they were discussed in parliament¹⁷. In a great, many cases the confidence appears to be justified. The expectation is not that the trust placed by the community in IT will be undermined on the basis of the inconsistency of a few information systems. If there are failures, incidental causes can usually be demonstrated, whilst large numbers of applications seem to be useful and consistent.

With respect to the safety-critical information systems the demand arise for *quality criteria*. This demand is, however, a consequence of the establishment of consistency and different in nature (political, ethical, economic and such like). When a system behaves according to the conceptual model the question remains whether the conceptual model is good enough. The *availability* of such a model appears to be indispensable for the decision-making process. It is around this particular problem that the discussion about the certification of software has come into being.

4.3.3. *Transparency of applications*

The confidence in IT applications is, in part, based upon the expectation that the precise operation of them will be evident, and can be made comprehensible for the user. When the complexity of information systems increases then this transparency as it was intended, can no longer be complete. It does not need to

¹⁵ This term, which has arisen in the literature about methods for the design of information systems is also now being used in legislation (for instance in the Council Decision in the field of Information Security (C 277 M 5-11-90)).

¹⁶ For instance: the automation of the police, Rekenkamer 1989. Also: the wrangling surrounding the adjustments of the automated handling of student grants.

¹⁷ Drs. L. Groenman in a letter to the Volkskrant of 5 November 1986. Software manufacturers wisely waited with their reactions to this request until jurisprudence provided clarification on a number of points.

be, whenever the reliability of equipment and system software can be treated as a fact. In this light the transparency of applications is highly related to their consistency: an application is transparent whenever the technical solutions create the conceptual model in a self-evident fashion for the user. In this respect transparency is just as important for the *ease of use* of IT applications. As a result of this development the transparency of IT applications is based to an increasing extent on so-called 'black box' models which imply a functional description. Whatever happens within the black box remains opaque to the user.

4.3.4. *Flexibility and rigidity of applications*

The confidence in IT applications is, to some extent, based on the expectation that existing applications will be easily adapted to new user requirements. Whilst this confidence is generally justified - at least when the technical realization employs the available techniques - this is still not always the case. The theoretical problems which were indicated earlier in maintenance and integration of program components (subsection 3.5.2.2.) may have a role to play here. Viewed practically the difficulties arise because software can be so extensive and complex, such that even for programmers it can be incomprehensible. The transparency problem is also important in this respect, but now it affects the relationship between software and programmer.

A number of automation problems within government are related to this problem, in particular the change to the computerised execution of the student grant scheme. The legislator needs to bear in mind when making decisions with the possible need to make changes in IT applications to be able to carry out the implementation. Thus the date on which the Dutch Statute preserving the Administrative Settlement of Traffic Offences came into force depended on the situation in the district courts in the field of data processing automation.

From the example above a harmonisation problem can be generalised to legislative processes (and in particular the process concerned with the creation of formal laws) and the development of information systems. The Minister of the Interior has ordered an investigation into this problem to be carried out at the Erasmus University, Rotterdam.

4.3.5. *Individualising applications*

When confidence in IT exists, then applications can be designed and deemed to be acceptable which are extraordinarily complex. Such applications may come into existence when individual circumstances are taken into account. In itself this opportunity induces confidence in IT, because this will prevent only those processes which are simplified and which operate abstractly being computerised.

The ability to individualise applications is really at cross-purposes to transparency. This is not only true of IT applications, but also of the administrative regulation making. Now it can be brought in to help with the implementation of such regulations. It is expected that this will improve the transparency of rules (or of the IT application itself). Complicated processes are not made less complex by automation. In relation to statutory regulations the question arises as to what extent the complexity can be raised without the confidence in the issuing of rules being lost. In contrast there is the point that further individualisation can only be

kept verifiable and manageable through the application of IT. IT can only fulfil this role with any degree of authority, when the IT tools used (core and applications) are, at least, consistent.

When IT applications are used for the support and/or administration of decision making processes, the further individualisation has an (mostly a limiting) influence on the freedom to make decisions for the decision maker. In this light the creation of an acceptable balance between the individualisation of applications and keeping the scope for policy making open is important for the confidence held in such advisory and administrative systems.

4.3.6. Accessibility and (partial) confidentiality of information

An important ground for the confidence shown by the community in IT lies in the opportunities for distinguishing accessibility to information. Privacy-sensitive information should only be accessible to authorised users, public information should be as accessible as possible.

As has been indicated earlier by the exclusivity of information IT offers the possibility of regulating the access to information. However there are still issues concerned with the complete reliability of these possibilities. They do, nevertheless, offer a high degree of exclusivity when they are carefully applied. The use of the protection opportunities is in actual fact dependant on the care within the organisation around information systems. The control possibilities for a supervisory body are limited, as was stated earlier. The social problems which are involved here, are known (privacy, software protection).

4.4 Lowered thresholds for IT use

The economic brakes on IT use have been significantly eased off. The results of this are discussed in section 4.5. An important threshold which has been lowered, and which in the near future will practically disappear is concerned with the physical distance between IT users (section 4.6). A threshold of a totally different nature which threatens to fall away is that of external control (section 4.7).

4.5. Economic thresholds are lowered

With the decreasing cost of IT use, economic thresholds, which formed a natural brake on (an excessive) information production and processing, have, for the most part disappeared. At the present time a critical point has been reached: it is economically justifiable to computerise the medium- and small-sized company; the introduction of the personal computer has started an even further reaching automation in progress. These economic changes have, more especially, consequences for the archiving, multiplication as well as the processing and combining of information collections.

4.5.1. Archiving

Placing information in archives has become so cheap, that there are hardly any economic restraints which prevent information, once it has been registered, from being kept for re-use. (Thus the juridical data banks in the Netherlands are based on the information collections which were created within the framework of the computerised composing of printing work).

These possibilities existed, of course, before the time that the IT society came into existence. The costs which were involved in the maintenance and consultation of such administrations however bore no relationship to the expected yield. The types of information use mentioned above, occurred occasionally, if at all, so that the reason for creating regulations was often missing.

4.5.2. Multiplication

The multiplication of information which is laid down in one form or another in a computer has become inexpensive. As was previously noted, many types of information transfer within IT imply multiplication. The widespread habit of selling software, which officially costs thousands of guilders to purchase, through the informal circuit for a few tens of guilders is already well known. Both the legislators and the manufacturers are busily engaged in creating barriers against it.

4.5.3. Processing and combination

The processing, evaluation and combination of information with the aid of IT has also become less costly. This stimulates the demand for the creation and usage of data profiles for persons and organisations. Banks could archive the expenditure patterns of their clients to be able to consult them later, for instance for marketing purposes, and telecommunications companies (the example is from H.P.Bull¹⁸) could construct individual relation-networks from the registration of telephone calls¹⁹. Moreover the economic impulse to have decisions prepared, or taken by computers on the basis of explicit procedures is enlarged. Many of such decisions are taken on the basis of previously recorded information, so that hence it has become financially more attractive to combine information files and allow decisions to be taken by computer. It begs the question as to whether the statutory regulations which are concerned with this material work sufficiently well to act as a restraint.

The balance which has to be struck between, on the one hand, the interest which is concerned with direct human intervention in decision-making (for instance: responsibility, the role of commonsense and general knowledge of society in weighing up interests) and, on the other hand, the interests of electronic decision-making (for instance: costs, security and accuracy) falls regularly in the direction of automation - both for the government (Lex Mulder²⁰, sensors for the automatic detection of slippery road surfaces, SDI) and for the business world (credit facilities, the 'automatic pilot', anti-theft security). The rise in AI techniques leads at this point to important social questions in the field of liability. Can non-consultation of an medical expert system lead to the professional liability of a doctor? When can one deviate from prescriptions formulated by an medical expert system? May a computer scientist create a medical expert system which

¹⁸ H.P.Bull *The fundamental problems of the right to information* (De fundamentele problemen van het informatierecht), Zwolle, (1985).

¹⁹ Here the technical possibilities are indicated, not actual situations

²⁰ Administrative law on the maintenance of traffic regulations Stb 1989.

will be consulted by laymen? Of perhaps even more significance in this respect are the systems which on the basis of AI techniques without human intervention, affect their environment. Some of these applications jeopardise safety, because faults can lead to life-threatening situations. As automatic controls become more complex and at the same time more generally applied (flight control, nuclear power stations) the question arises of whether such systems should be allowed (should a state place important components of its defensive destructive power in the control of IT?), and if the answer is yes, then what are the quality requirements which have to be met? The use of robots in brain operations is one example of an application whereby these questions will shortly become current. These examples illustrate that when considering the interests mentioned above the questions which have a role to play are concerned with the quality and the security of the electronic decision-making.

Comparable questions arise concerning the use of decision support systems based on AI techniques in legal and administrative practice (automated settlement of the deferment of military service and the automated provision of advice concerning maintenance allowances and of decisions in the area of social security, for instance). Here too, a balance must be struck between, on the one side, the interests involved in the direct human intervention in juridical decision-making (for example: individualisation, legal precedent) and on the other side, the interests involved in electronic decision-making (for example: legal security (*stare decisis*), costs, capacity).

4.5.4. Presentation and transfer of information

The presentation and transfer of information which can be achieved by information systems at present available have become simpler and cheaper. It is true especially for selections made from, and aggregating processing of traditional information files. The lowering of thresholds has consequences for the manner in which, for the conditions by which and for the degree to which information is presented and transferred. Issues which matter here, reflect for instance on the actual significance of a concept such as the openness of government, but also on the degree to which the private sector can be forced by the government to provide information.

4.5.5. Development and maintenance of software

Not all economic thresholds have been lowered. In particular, the drop in costs, in the field of software development and program maintenance, has been considerably less than in information archiving and in the use of applications. (This problem was to a certain extent indicated in subsection 3.5.2.2.). The costs of program development and maintenance can, in part, be ascribed to the problems which exist in the re-use and integration of program components which were developed earlier. Development methods are to an increasing extent supported by IT applications. Thus there are program generators available for various fields. It is expected that price reduction will become more important in the future. Furthermore it should be pointed out here that the increasing social use of IT has meant an expansion in the market for standard software, so that the development

costs of software in these instances can be spread amongst a larger number of users.

4.6. Improved infrastructure: communications standards and training courses

Physical distances are of decreasing significance as a result of the highly improved communications infrastructure. This influences the working practices within national and international organisations (distributed information processing), and also has consequences for the competitiveness and/or cooperation between organisations. The opportunities which are offered here will lead to a worldwide availability of information collections and IT applications. The number of possible choices in the field of differentiation and/or integration of information processing is increasing rapidly.

This development makes organisational issues a current topic. The division of responsibilities and rights becomes more difficult, as does the related internal and external control. Questions which seemed simple, like: where was the information prepared and by whom? become increasingly difficult to answer.

There is also in another sense a certain degree of *boundaries becoming blurred*. Information is in this view "shared" by organisations which are independent of each other. Because of this, internal information systems of different organisations become interwoven and responsibilities are blurred. Distributed systems make use, for instance, of facilities, standards of usage and services established by third parties (e.g. telecommunications companies). Whenever faults occur the question of who is/are responsible is more difficult to answer.

The global availability of information supposes not only a greatly improved communication infrastructure, but also the use of communications standards. The standards on the whole originate in the free market by general assent (*de facto standards* like TCP/IP and X-Windows). They may also be set by the government (*administrative standards* like the registration of financial transactions according to EC guidelines).

For the development of IT use, attention should be given to better training in IT, as well as to an improved communication infrastructure. Whilst it is not the task of the commission to make recommendations on this subject, it is of the opinion that, the continued absence of structural training in IT within education, will have undesirable social consequences.

4.7. IT production; regulation and stimulation

The actual use of IT has not only increased as a result of the disappearance of thresholds. There is apparently sufficient stimulus from the community to produce IT. The supply of IT is based in our economy on the creativity of trade and industry linked to the opportunity of making a profit. This latter opportunity is in part founded on the demand from and stimulation by the government (for example defense traditionally plays an important role in the United States).

The possibility of making a profit depends in part on the legal provisions for (a) individualising work achievements to products and marketing them and for (b) having the intellectual property rights on the IT products respected, and this should all take place in a healthy juridical climate suitable for competitiveness.

The questions which arise here are important. The problem concerning the blurring of boundaries has been mentioned already. The problems with software pirating and reverse engineering also deserve a mention. These problems now have the attention of (inter)national legislators and are subject to the influence of commercial policy relationships. Thus the Dutch law concerned with chips arose from a threatened IT embargo in the United States.

To stimulate creativity the government can both at national and European level provide and (for instance, through selection) guide financial support for research programs. The support is especially of importance looked at from the point-of-view of international competitiveness. In such a rapidly renewing and growing branch of industry research plays an essential role. Given the relatively limited size of the branch, which is mainly service industry, in the Netherlands there is not only an indirect social interest in the attainment and maintenance of a leading market position in this branch of industry, but also a direct interest in the application of IT by the mostly self servicing private and public users organisations. The position of the Netherlands in this sphere of influence is certainly not that of market leader. In the list (on turnover) of European software manufacturers in 1989 the highest placed Dutch company occupies fourteenth position²¹, whereby it should be noted that their production was nearly all software which had been contracted and therefore was not intended for the open market.

The commission considers it probable that in the coming years a further exploration of potential market sectors will lead to an expansion of the social application possibilities of IT (and of IT use).

4.8. *Monitoring*

The influence of legal regulations on a favourable climate for IT use and development is in part dependent on the feasibility of monitoring compliance. The IT developments themselves cause the monitoring of use of information to be exceptionally difficult. Thus the chances of keeping information in archives secret, of transferring it or destroying it have increased greatly in the last few years.

In IT information is often stored in information carriers in binary form. These carriers are usually made of electro-magnetically sensitive material (tapes, disks), so that the destruction of the stored information can be carried out almost instantly. In this respect information files, even if they are suitable for permanent archiving, have become in one sense *volatile* in nature. Mutatis mutandis, the same is true of the transfer of information collections through the available communications infrastructures. Similar considerations are valid for the selective availability of information. It is, for instance, not easy to establish whether only a part of the relevant information was made available for monitoring.

To be able to attach any significance to symbols (in casu: to that which has been written on the carriers) the encoding conventions and the interpretation conventions must be known. It is technically relatively simple to deviate from the general encoding conventions. It is just as simple to alter the encoding of important files.

²¹ Computer World, 19 October 1990.

This means that the opportunities of keeping information secret from a monitoring body are much increased when compared with earlier. The monitoring body has become dependant, for the acquisition of information, even if it has binary written carriers, on the availability of the encoding methods and interpretation conventions used. It is not certain that the person, or the body being monitored, will be willing to make these methods and conventions known.

For the monitoring of compliance to regulations, use will be made of IT. In this respect a further increase in the development and use of IT applications can also be expected.

4.9. Summary

In this chapter several factors are examined which play a role in the (expected) development of IT use. The development of IT use was therefore first related to the confidence of the community in IT products (based in part on considerations concerning the *reliability* of the IT core, the *integrity*, *consistency* and *quality* of applications, the *transparency* and the *ease of use*, the *complexity* and the *possibilities for individualising*, the maintenance of *exclusivity*, the *flexibility* and the *rigidity*, and finally the *vulnerability* of IT applications.

Given the assumption of a continuing price reduction the increase in IT has, with respect to the content, been outlined on the basis of the different phases in the process of providing information. Then the role played by a more suitable infrastructure is indicated (global *availability* of applications, *de facto standards*, *administrative standards*, *IT education*). Thereafter factors which indirectly influence IT use (protection of *intellectual property*, regulation of *competition*, stimulation by *contracting out* the production of IT applications and by contracting out *research projects*, possibilities for *monitoring*) are viewed from the standpoint of regulation and control for the benefit of a healthy IT industrial climate.

5. IMPLICATIONS FOR SOCIETY

5.1. Introduction

It is probable that the developments in IT use outlined in the previous chapter will have implications for the various sectors in society. In this chapter a number of possible consequences of (future) IT use are described per sector. The commission distinguishes in this respect three sectors: the private sector (which includes individual citizens and trade and industry, section 5.3), the midfield organisations (including the pressure groups, 5.4.) and the public sector (including government and local government, section 5.5.). Before proceeding to looking at each sector IT applications will be broadly categorised. Taking the sectors one at a time the inventory of the social consequences of IT use will be related to (a) changes in the internal organisation, (b) changes in the external organisation and (c) changes in specific tasks of organisational units. This will be summarised in section 5.6.

5.2. Typology of systems

On the basis of experience at local council level (mostly large cities) in the sixties and seventies three types of information systems are distinguished more and more in the public sector as a whole: *object systems*, *sector systems* and *control systems*. The commission will use this typology, both within the public sector and outside it. The typology mentioned covers a large part of the applications which are established. In addition there is an increasing number of applications which support professional work. For these systems the commission has reserved the remainder category: *professional systems*.

5.2.1. Object systems

Object systems are those information systems which are nation-wide. These systems register and release information concerning well-defined object types (like persons, land vehicles and boats). Object systems are, generally, public registers. They describe community aspects, separately from defined applications. Object systems form a primary source with an infrastructural significance which is not only of interest to the government but also to the private sector and the midfield organisations. The aim of these systems is amongst other things to promote the orderly process of judicial matters, including the private sector. Object systems nevertheless mainly support governmental information processes. They form the basis for a large number of sector systems. It is characteristic of object systems that they are, in many cases, antiquated and that organisation and control are very differently arranged administratively. The organisation of these systems is based on the oldest laws which are concerned exclusively with the provision of information.

In general object systems are controlled and maintained by the public sector. The possibility exists that object systems will also arise in the private sector. For instance one might think in this context of jurisprudence collections and of the development of certain videotext systems to the extent that they acquire infrastructural significance (for instance: computerised telephone books, train timetables, and dictionaries).

5.2.2. *Sector systems*

Information systems which are particular to a defined field of care or service (such as education, health care and power supply) are called *sector systems*. Whilst the sectors vary greatly from each other, the systems which the organisational units within a sector need (with both vertical and horizontal provision of information) are very uniform. The legislation and regulation of information transfer in the sectors is, with the exception of the transfer of money, still unremarkable.

Sector systems are controlled and maintained in all three sectors of society mentioned above. In the private sector there are, for example, automated credit registers in the banking industry, automated claim registers in the insurance industry, computerised jurisprudence collections for legal practices and videotext systems for various fields of information provision. The public sector and the midfield care organisations have registration systems for the benefit of education, taxation, criminal investigation and social security.

5.2.3. *Control systems*

Control systems regulate, in particular, internal personal, financial and documentary information supply. More generally, control systems are information systems for the internal control of organisational units. Control systems are operated and maintained in all sectors of society.

5.2.4. *Professional systems*

IT applications do not only exist in the field of administrations and the (routine) performance of production processes such as in the process industry, manufacturing with the aid of robots and the provision of services, but also in activities performed by "professionals" which are carried out on the individual's own responsibility with computer support. To distinguish these applications from object, sector and control systems the commission has placed them in a remainder category and given it the name of 'professional systems'. This places the emphasis on the property of these systems which is that they are able to support certain professional work and/or groups.

Professional systems are also used in both the private and the public sector, although for the present they are mostly used in the private sector. The general tendency is to enlarge the power of professional systems by combining them with each other and by combining them with object, sector and control systems. Moreover a development has been set in progress, with the introduction of knowledge or expert systems, to make professional knowledge and experience accessible with the help of IT for the consumers of knowledge.

5.3 *The private sector*

By the private sector is meant all organisations, both profit-making and non-profit making, which do not occupy an extraordinary position in relation to the government as well as the individual citizens.

5.3.1 *Consequences for the internal organisation*

In general the *implementation* of IT use has consequences for the internal organisation. In administratively oriented service companies and in production processes which are suitable for automation, the introduction of IT use can lead to reorganisation and sometimes even to a reduction in the number of jobs. Given the degree to which and the manner in which IT use has been assimilated into the private sector, neither the fears which were raised in the seventies about a technocratic administrative reform strengthened by IT use nor the fear that IT use would result in mass unemployment seem to be well-founded.

Whenever the size of a company permits and no outside IT servicing is used, the responsibility for purchasing, developing, controlling and keeping equipment, software and data available is often put in the hands of an *organisational unit* (by which is meant one person or one part of an organisation with its own administrative competence). The considerations concerned in whether to contract out or not, or whether to acquire or develop, maintain and have accessible one's own IT applications, are complex. It is not only costs and benefits which have to be considered here, or the trust which the customer has in the professional qualities of internally and externally provided services, but also the continuity which can be expected from the services proffered, the degree to which the organisation will become vitally dependant on them and the importance which is attached within the company to the maintenance of know-how in the field of IT.

Given the growth in the amount of standard software being offered it can be expected that the market share for the internal development of tailor-made software within medium and small sized companies will drop in favour of standard software. As a result of the often greater transparency and the greater ease of use of standard software the deployment of separate organisational units who negotiate the use of IT will also reduce. These same reasons may lead to the tasks of organisational units being altered. So it seems that the previously, generally accepted principle of having book-keeping accounts and the making of payments, as organisationally divided responsibilities within the sphere of EDP auditing and accountancy, is likely to change as a result of the opportunities offered by IT. In general it will not only be in financial systems that function divisions, which were established for organisational reasons, will have to be redefined and classified when IT is applied. The development and use of professional systems in combination with control systems can be used both for centralisation of administration as well as for administrative decentralisation. The experiences with failing computerisation projects in the seventies (the 'software crisis') have demonstrated that centralisation of administration through computerisation has practical limits. Developments in the direction of an effective balance between centralisation and decentralisation of administration will be enhanced when there is more attention paid within higher education to training (which will be at a higher level than is usual nowadays within the field of IT).

More information which is relevant for policy making is becoming more rapidly available, among other things, because of the falling price of all elements in information provision, in combination with the supply of relevant standard software. A rationally operating company takes account of such information,

which can lead to a higher frequency of policy changes and adaptations and an enlargement of the middle management concerned with policy preparation. Another aspect which deserves attention as a result of IT developments (accessability and communication infrastructure) is the increasing opportunity for "tele-working". This is when the employee "works" at different organisational units from one location using telecommunications. Whilst the possibility of tele-working is within the bounds of reality within the near future, technically speaking, predictions cannot be made about how this method of working will develop. The extent to which tele-working poses problems with respect to the usual forms of legal status regulations (contracts) is uncertain. Effective control, for instance, seems impossible without access to sensitive personal information. It is noteworthy, that the Ministry of Transport and Public Works is already engaged in researching the effects of tele-working on the capacity of the road network and public transport²².

5.3.2. Consequences for the external relations

The fact that the communications infrastructure offers more possibilities, together with the far-reaching computerisation of society, influences the external relations between organisational units in the private sector. In the first instance one is concerned here with the way in which payments are made and the manner in which streams of goods are controlled (purchase, transport, distribution). The automated planning, operation and/or settlement of these processes have consequences for the mutual dependency of companies. This dependency denotes the significance of cooperation between companies in the field of IT for communication, even when they regard each other otherwise as competition. The dependence in question here might lead to the rise of *de facto* standards, and therefore to more joint policy decisions. In this way a growing mutual dependency, which in part affects the organisational independence (blurring of boundaries) can lead to new organisational forms for cooperation within civil law which, for example, may lead to questions arising in the fields of competition and the protection of personal information.

The growing dependence mentioned, together with the increasing prospects for professional systems could lead to changes in industrial columns such as those heralded by the payment possibilities with the PC and by the appearance of 'direct writers' in addition to the insurance brokerage. In connection with these EDI developments the blurring of boundaries also leads to problems in the realm of evidential law. International electronic information streams have come into being from the opportunities offered by IT for the global availability of information. Examples of such internationally operating applications are mostly in the field of EDI: reservations systems, financial systems, traffic and transport systems and electronic mail. Internationally a growing mutual dependence may also arise, which the organisational independence partially affects (blurring of boundaries), and which can lead to new organisational forms for cooperation within civil law

²² See the Report on Telematic Traffic and Transport (Nota Telematic Verkeer en Vervoer), Handelingen 89-90, nr 21 449-2

which in turn, for example, may lead to questions arising in the fields of competition and the protection of personal information.

In the relationship with the public sector, which has information with an infra-structural significance available, there is still vagueness at present about the question of whether this information will be made available to the private sector on demand and for payment.

As information supplier the private sector is usually placed in a dependant position in relation to the public sector. The public sector lays a growing claim on the capacity of the private sector in the form of obligations to provide information for the benefit of its administration. This concerns both information about production processes as well as information about persons. Although the question can be asked whether there is such a thing as the privacy of a corporate body, the problem of exclusivity also plays a role in these instances. Within trade and industry there is uncertainty about what the public sector does with sensitive company information and they are not satisfied with the exclusive treatment of this information. Mutatis mutandis the same is true of individual citizens. For an improvement in the relationship of trust, in this respect, between public and private sector the IT organisation of the public sector should be more transparent. The problems outlined above with respect to the relationships between the public and the private sector are comparable to the problems involved in the relationship between the individual citizen - company or government. The individual citizen (employee) is often unsure of just how carefully companies and government treat sensitive personal information. An answer to these questions is of more importance for the confidence in the trade and business world and the government than for the confidence in IT.

The possibility of having information commonly available, independently of the place where citizens live or work will, in combination with an increasingly easier use of IT applications, have important repercussions for the relationships between individual citizens. Cultural differences which are now mostly linked to the regional degree of urbanisation will continue to decrease. Depending on the success enjoyed by the development of translating IT applications this effect will also occur internationally.

5.3.3. A specific task: the production of IT

Given the fact that the private sector is engaged in the development and presentation of goods and services, the development and presentation of IT applications deserve special attention here. The IT manufacturing sector should be able to be kept busy, with some continuity, with the manufacture and supply of consistent, reliable applications and elements from the IT core which protect exclusivity. The use of (components of) the IT core, interfaces and applications can lead to customer dependence on the IT producer who not only takes account of the costs and the quality of IT use, but who moreover considers the risks which any discontinuity of supply and production can bring.

This increasing dependence on IT makes a stable, social commerce in IT products a necessary condition for the well-being of this branch of industry in which expansion is certainly not yet completed. The present regulations with respect to the protection of intellectual property are either too cumbersome and too costly

(patent), or too ineffectual (software piracy). In addition several aspects concerned with the protection of intellectual property jeopardise the continuity of the availability of applications (reverse engineering).

The elements from the IT core should be subject to the most stringent consistency and quality controls which can be established and enforced, precisely because other applications are dependant on their quality. The same is true with respect to systems which can jeopardise safety. In particular in these fields a further development of administrative standards is significant.

For the other IT applications a general production liability regulation would contribute to a stable social climate. Nevertheless, the development of the industry is based on the possibility of developing and distributing of new risky applications. In that light an important role for the IT producing industry is played by subtle regulations concerned with the product liability with respect to experimental applications.

The increasing tendency to combine applications and information collections leads to blurring of boundaries in the field of liability and intellectual property. Effective regulations which make these problems manageable are needed to create a suitable climate for the production and supply of IT applications.

Non-profitable IT applications

It does not look like the limits for possible developments have been reached. It is obvious that until now the applications that were developed were mostly those for which the private sector thought there would probably be a good market. In that field much was developed and is already available. This is less probable in respect of IT applications which are possibly desirable to society but which are not attractive to the industry (for instance because of the financial risks involved in the development). For this report those applications which can supplement the juridical instruments are of importance here, as well as several applications in the field of international information provision. It is likely that the stimulus for the realisation of these applications will have to come from the public sector.

Juridical applications

Whilst the existing object, sector and control systems together with several professional systems (jurisprudence data banks) form a good basis for an efficient juridical IT use, the commission cannot rid itself of the impression that the IT possibilities already available are only partially used in an appropriate manner in the juridical instruments. There are several reasons for this. Failures in the past (for example in the development of professional systems for the police²³) are probably linked with the organisational complexity of the public sector (see section 5.5), with the underestimation of the degree of difficulty and the intrinsic instability of the material which is to be computerised (legislative and policy changes), together with the over-estimation of IT knowledge and possibilities by internal development departments and sometimes also by external suppliers.

²³ See for instance the report from the Auditor's Office (Rekenkamer) in 1989 about the computerisation of the police force.

The degree of difficulty and the intrinsic instability of the material to be computerised is for the deployment of IT into the juridical instruments partially a consequence of the unpredictable processes which lead to changes in policy and legislation, partially the consequence of the impossibility of isolating parts of the law. Juridical regulations show a coherence which is not always obvious (general principles, the partly varying meanings which homonymous terms, such as 'commensurate work', have acquired in different regulations). In other words: the coherence in the regulatory system is to an important extent implicit²⁴.

The combination of application processes which are difficult to predict and an implicit taxonomy makes the juridical regulatory system, which is expanding rapidly especially in the (international) field of administrative law, increasingly inaccessible - for lawyers as well. That has consequences, both for the social effect of regulations, for the quality of the implementation, for the quality of the administration of the law and also for the quality of new changes in the regulatory system. A downwards spiral has, in this respect, been set in motion with respect to accessibility which the present efforts in the field of harmonisation of legislation cannot contain.

The commission has the suspicion that the existing juridical instruments are insufficient to be able to solve the problems which have been outlined. Additions to these instruments should be considered, using IT applications. Given that the parts of the juridical regulatory system are closely intertwined with each other, then a substantial efficacy can only be expected after very large sections of the regulatory system are available in the form of reliable information collections which can be further shaped for these applications.

The descriptive modelling of the entire regulatory system together with the accompanying jurisprudence and the maintenance of such a information collection seem not to be the only necessary conditions for the effective deployment of IT applications in the preparation for and the harmonisation of legislation. Such an information collection would be of significance to applications which open up that juridical knowledge to laymen and lawyers, and would probably form a basis for the international harmonisation of regulatory systems.

No immediate economic justification can be provided for the creation, maintenance and making available of the information collection outlined above. Nevertheless the implementation of it is of great significance to society.

International information provision

World-wide availability should (in certain conditions) help to bridge national and international cultural differences and could help to reduce the traditional information deficiency in third world countries and thinly populated areas.

The conditions above have already been discussed in part but in a haphazard fashion. They are initially concerned with the expansion of and the making available of the international communications infrastructure (satellite capacity) to those areas which are (still) not commercially interesting. Furthermore the ease of

²⁴ See for example P.W. Brouwer, *Links in the Law* (Samenhang in recht) Rechtswetenschappelijke Reeks, Groningen 1990.

utilization of IT applications is an important condition for the actual use of the available information provision systems. In addition the development of translation programs is one of the conditions, just as the development and provision of computer supported education. Neglecting these conditions will lead to an increase in the economic and cultural differences. The stimulation of research and development programs through the public sector will be significant in giving direction.

5.4 Mid-field organisations

The following organisations are considered to belong to the *caring* mid-field organisations: the private organisations and sectors which are financed through the general fund or according to government stipulations and which perform constitutional duties of the government with respect to the tasks of a welfare state (mainly the so-called *regulated* sectors like education, social and health care, social security, pension funds). Those groups which are counted as the *interest-protection* groups in the mid-field organisations are the interest groups which attempt to influence a part or aspect of government policy, without striving to achieve a position of power as part of the government.

The organisation of IT use in caring mid-field organisations is comparable with that in the public sector (sub-section 5.5.1.). The IT organisation of interest-protection mid-field organisations is comparable to that in the private sector.

5.4.1. Consequences for the internal organisation

The caring mid-field organisations have such an extraordinary relationship (financial and administrative dependence) with the public sector, that they can, in many ways, be viewed as organisational units which belong to the public sector. With respect to IT use, the commission considered that the social implications which have been indicated internally for the IT using public sector (in sub-section 5.5.1.) are fully applicable to the caring mid-field organisations.

The interest-protection mid-field organisations should be considered to belong to the private sector, whenever they do not have a special relationship with the public sector such that their functioning is mainly dependant on the provision of information by the public sector.

5.4.2. Consequences for the external relationships

Now that, in particular, the costs involved in providing information have dropped, an improvement in the relationship, with respect to information, between the public sector and the interest-protection mid-field organisations should be possible.

By having an improved communications infrastructure it is also possible for interest-protection mid-field organisations to work more closely, especially at the international level. Seen in this light the commission expects that the significance of interest-protection mid-field organisations in providing the legislators and administration with information from the community will increase. Given the increasing complexity, both of the material to be regulated, and of the (international) legislative and administrative processes themselves, interest-protection mid-

field organisations play an increasingly significant role in the preparation of democratic decision making.

For the same reasons (cost reduction, infrastructure) the cooperative relationship of the caring mid-field sector with the public sector can be increasingly used for detailed control by the public sector. Depending on the way in which the supervisory function of the public sector develops in a more or less detailed fashion then the organisational units of the caring mid-field sector will retain or not as the case may be, their organisational identity.

5.4.3. Consequences for several specific tasks

The interest-protection mid-field organisations might be able to play a more important, intermediary role than has been the case until now, given a satisfactorily regulated information relationship with the public sector, with regard to informal and efficient sector control on IT use by the public sector. In this respect, interest-protection mid-field organisations themselves can play a positive role with respect to the social confidence needed for the IT-using public sector.

5.5. The public sector

Those bodies which are included in the public sector are: all public bodies (principally the state, province and council) with the services, companies and institutions which come under them. Neither the legal form nor the sort of activity, but the question of whether the government can be tackled about the objectives and the effectiveness of the application of IT determines their inclusion.

Present organisation of IT use in the public sector

"The responsibility for questions pertaining to policy and for the provision of information linked to them would, according to government opinion, be better coordinated per sub-sector especially as far as the so-called system control is concerned" states the BIOS report²⁵. Whilst the government attaches great value to the administrative autonomy of the various bodies in the public sector, it considers that a certain degree of general co-ordination is also necessary. Co-ordination is, in particular, necessary where the provision of information oversteps the boundaries of the organisational units, where the advantages of scale and/or quality can be achieved through a joint approach, and where a policy of stimulation can create favourable developments for the whole of the public administration (for instance: data communications facilities within the public sector).

The public sector consists traditionally of a large number of organisational units. The administrative autonomy is nurtured by these units and respected by the government. The demand from Parliament that the powers of the co-ordinating minister should be increased is not sufficient reason for the government to extend such powers. In the new Order on the Provision of Information in the Civil

²⁵ Policy report on information provision in the public sector (Beleidsnota Informatievoorziening Openbare Sector (BIOS)) Handelings 1987-1988, 20 644 nr. 2.

Service (IVR-1990²⁶) responsibilities are divided amongst ministers, the principles of the policy on the provision of information are established and several specific subjects are raised which are linked to the general co-ordinating task of the Minister of the Interior. In the final report from the CCOI "Provision of information for administrative innovation" policy recommendations are made for the nineties.

The government, as a whole, uses a very large amount of information. There is an increasing need for regulation which is mostly laid down in separate chapters and sections of specific laws. Regulation is also concerned with system control, whereby functional decentralisation is the basic principle. There is no attempt here to regulate the technical details.

5.5.1. Consequences for the internal organisation

Because of the great social significance of the public sector the existence of an efficient internal communications infrastructure and a general internal availability, controlled by a high quality regulation of the exclusivity of information, can dramatically raise the efficiency of the public sector in the future.

On the basis of the existing and expected IT possibilities (applications and communications infrastructure) the situation in which the information of individual organisational units will be generally available, even within the public sector will be predictable. This potential general availability bears, among other things, consequences for the mutual relationships between the organisational units within the public sector and demands regulation in constitutional and administrative law. This regulation should, in the opinion of the commission, serve to support an effective administration linked with ministerial responsibility²⁷, but should also serve to make it possible to have an appropriate stream of information from the bodies carrying out the implementation to the policy-making bodies. In the IVR-1990 an important impulse is given, in the commission's view, to regulation. It is, nevertheless, questionable as to what extent (and especially: for how much longer) the internal information relationships within the public sector can be regulated to an important degree by making use of principles like those set out in article 4 of the IVR-1990.

These principles establish that (a) the empirical information collected should be based as much as possible on direct observation (art. 3, sect. 1), (b) that the provision of empirical information should be carried out where possible from a basic administration or object system (art. 3, sect. 3), (c) that obtaining information and processing of information should be separated at an administrative level which is as low as possible (art. 3, sect. 4), (d) that the creation of links between

²⁶ This decision is enacted as IVR-1990, Stb 1990.

²⁷ This is based nowadays partly on a complex network of advisory bodies, in which, among others, the Administrative Consultative Commission on the provision of Governmental Information (Bestuurlijke Overlegcommissie Overheidsinformatievoorziening (BOCO)), the Central Commission on the provision of Governmental Information (Centrale Commissie Overheidsinformatievoorziening (CCOI)), the Association of Dutch Local Councils (Vereniging van Nederlandse Gemeenten (VNG)) and the Inter-provincial Consultations (Interprovinciaal Overleg (IPO)) and the Advisory Commission for the Civil Service (Adviescommissie Rijksdienst) all play a role.

various collections with empirical information should occur for formally allocated tasks on the basis of clear written rules (art. 3, sect. 5) and (e) that plural data collection and storage should be avoided as much as possible (art. 3, sect. 6).

These principles form an stimulus for the regulation of IT use within the public sector. The execution will depend heavily on the quality of the "transparent procedures" and the "clear regulations" which are referred to in sections 2 and 5 of article 3 IVR-1990. The regulations mentioned would serve to clarify the information relationships within the government which were summarised earlier. In the present situation the commission cannot escape from the impression that the principles laid down in the IVR-1990 are the result of a compromise reached with some difficulty between departments and other organisational units who were intent on maintaining their own competencies. In particular an *individually regulated* reciprocal provision of information at implementation level (art. 3, sect. 5) supposes very extensive regulations, because the public sector has innumerable organisational units such as these. It is probably impossible to avoid regulations of a general nature. This is even more true, when working towards collection and storage of empirical information in a single form (art. 3, sect. 6). This would mean that the organisational unit carrying out the work would have to approach all other organisational units carrying out work to find out what was known, before starting to collect, establish and process empirical data. In this respect the sixth and fifth principles appear to be only infrequently implementable together in practice. IT use has consequences for the autonomy of the mutual relationships between the organisational units of the government. This is not only apparent from the developments in the council basic administrations (GBA), from the implementation of the Schengen Agreement, from the registration of property values and from the implementation of the Lex Mulder. In the light of international developments it can be expected that within the foreseeable future the combination of sector information collections by the government for the benefit of a rational performance of tasks within administrative law can be expected to become a point for discussion within Dutch politics.

In other words: IT use within the public sector carries implications for constitutional and administrative law. The question which deserves attention is how much of the realization of these implications can be left to the public sector itself without further public discussion. The annual report on the provision of information 1990²⁸ shows that the government and parliament are aware of this. Furthermore this annual report shows that the Minister of the Interior is paying the necessary attention to his co-ordinating task in the field of information provision.

Within the public sector the final control is partially in the hands of the parliament. With increasing computerisation of the public sector, the regulation of information relationships between organisational units within the public sector and the chambers of the Dutch Parliament also deserves special attention. The same is true of individual members of parliament and members of other representative organisations with supervisory authority derived from constitutional law.

²⁸ Annual report on the provision of information 1990, (Jaaroverzicht informatievoorziening 1990) Tweede Kamer, vergaderjaar 1990-91, 22 049, nrs 1 and 2, 19 March 1991.

By improving the availability of information about the administration amongst the members of parliament will not only the supervisory authority be better performed. The political decision-making process will itself have greater adroitness. In the year 1991, despite fine developments having been initiated, there is still not an organisation which is sufficiently effective and well co-ordinated for the use of IT within the public sector. It is however the case that independent organisations have been established round object systems and round sector systems. Moreover it is true to say that the reciprocal co-ordination with respect to the use of IT does not diverge in any noteworthy manner from the general co-ordination between organisational units of various departments and directorates which carry out the work. The internal organisational changes within the public sector in respect of IT use are a little behind the developments in the private sector. The present organisation of the use of IT in the public sector consequently still does not offer fruitful ground for an optimal use of the IT possibilities available. In some sections of the public sector the lag in structural use of IT are remarkable (members of parliament, the judicial branch, secondary education). A proper development in these areas is in part dependant on the way in which the desired organisational independence can be effectively realised from the constitutional law angle, without losing the possibilities offered by co-ordinated use of IT. It is in particular on this point that IT has an *indirect* influence on important social developments. In the commission's opinion this is concerned with aspects which will increasingly contribute in the future to the confidence of the community in the public sector as a whole.

5.5.2. Consequences for the external relationships

The consequences of developments for the external information relationships with the private sectors and the mid-field organisations were discussed earlier (information services by the public sector, information duties in the private sectors, organisational blurring of boundaries in the caring mid-field organisations).

The public nature of administrative information is one aspect which places the public sector in a somewhat extraordinary position in the IT market, especially whenever the IT manufacturer is thus put in the position of knowing in advance what money is available for investment. In the course of contract discussions with the private sector involved in IT manufacturing the public sector can find itself in the position of "sitting duck". Partly in reaction to this the situation occurs in which the ratification of contract agreements by competent officials only takes place at a very late stage. The phased decision-making which usually happens within the private sector is difficult to achieve in the present constitutional practice in which individual members of parliament will only commit themselves after being "fully" informed. This can lead to problems when, in order to be able to achieve a good (enforcable) bill, investments have to be made at an earlier stage. Balanced and exclusively appropriate information provided to the members of parliament in the future *with the help of IT* is one of the possibilities for improving this situation.

The extent to which the private IT sector is involved by the governmental information facilities also causes special relationships to arise between the public and private sector. The delimitation of the public and private tasks (such as the

report from the CCOI also remarked on) also deserves attention. The necessity of juridical conditions for a stable social traffic is important here (see sub-section 5.3.3.) In some cases privatisation will lead to the creation of caring mid-field organisations as well as to more independent service industries.

An increase in IT use for communication can only be achieved by the utilization of a good communications infrastructure and good communications services. The public sector occupies, with regard to the setting up and making available of such a structure, a guiding and stimulatory role which sometimes carries direct responsibility. Given the situation that some infrastructural facilities and services are only economically feasible when realised by organisations in an monopoly position (for instance: international monetary transactions, the provision of information using object systems) it is to be expected that special relationships will arise between the public sector and such organisations. Because infrastructural IT facilities for communications generally have an international component, the treatment of this material leads to complex international relationships between organisational units from various sectors (both public and private). It might be expected that because a global communications infrastructure for IT applications becomes available, then a number of regulatory problems (for example in respect of the division of satellite capacity, and also with regard to the exclusivity of data, with respect to relationships which have to do with competitiveness, and with respect to administrative standards) will have to be dealt with at international level (and are in part already being handled at this level). It seems probable that new (international) organisational forms and cooperative relationships will develop in this connection in which the public sector, the private sector and the midfield organisations will play a part.

5.5.3. *Consequences for several specific tasks*

With respect to the *executory* task of the public sector the use of administrative IT applications is already established. With the increasing number of possible applications of IT use it is expected that more and more "standard" decisions will be made by IT applications (tax assessments, child allowance, student grants, social security payments). Because using IT will make it easier to decide, there is a chance that the public sector will give in to the tendency to spread its competency and to make decisions in more areas than was previously the case.

An important *executory* task of the public sector (in part together with the caring mid-field sector) is concerned with the re-distribution of income through taxation legislation, social insurance, the other social security regulations and numerous additional subsidy regulations. Because of the complexity of the mutual relationships between these regulations and between the *executory* organisations concerned, together with a relatively weak social attitude to paying taxes and a partially improper administrative practice with respect to the Disablement Insurance Act (WAO)²⁹ which has grown historically, the chances and the possibilities of misusing these regulations increases. It is entirely plausible that because of the

²⁹ L.J.M. Aarts and Ph.R. de Jong, *Economic Aspects of Disability Behavior*, diss. Rotterdam, 1990.

present economic pressure in connection with international developments, a rationalisation of the administrative practice will occur. IT offers opportunities in this (for example linkage of sectoral files and the realization of taxation of income earned abroad) which have until now seemed politically to be beyond the sphere of feasibility.

The public sector needs, in connection with the developments in IT, to ensure that a climate exists in which not only the social use of IT, at least stays in step internationally, but also in which the IT use in companies and the scientific IT research can compete internationally. To achieve this some improvement in IT education seems necessary, as well as the establishment of stimulating research and development programs (possibly internationally). In particular the stimulation of IT research and development is of importance to society in those fields in which the public sector itself lags behind in computerisation in relation to the available possibilities.

For the task of the administration of justice within the public sector, automation of enforcement results in the judge increasingly being the first point of address for discussion about decisions. With more far-reaching computerisation of enforcement this can lead to an important increase in the number of disputes which have to be decided by a judge. With reference to the expected rationalisation of the enforcement practice then the judge will have to make *de facto* policy decisions more often. As soon as a judge has made a judgement in an individual ruling which in that individual case leads to compulsory change in the enforcement policy, then an enforcement practice which does not take account of this change (like recently, for example, the 'equal treatment' within the framework of the General Widows and Orphans Law) will not only lead to unnecessary litigation, but moreover damages confidence in the public sector.

The legislative task of the public sector is in various aspects influenced by the increasing possibilities which IT use offers. The problem of adjusting the introduction of legislation to the state of IT at the time of the implementation has been discussed earlier. In this connection it might be expected that the IT possibilities also influence the content of legislation in the sense that regulations can be formulated in such a way that IT can be used for their implementation. Furthermore IT applications can be used for the analysis of the future effects of an proposed regulation.

In the literature it is sometimes recommended that, in those cases where the need for regulation is evident, but the actual effects of the proposed regulation are unknown, "experimental" legislation³⁰ should be used. The commission feels that this terminology is unfortunate, on the one hand because the effects are not known precisely with any single form of regulation, on the other hand because the recommendation of creating regulations indiscriminately *with a view to adjustment* on the basis of results observed in the community can hardly be reconciled with the principles of fair legislation. The commission recognises that

³⁰ B.R. Ziegler-Jung, Information technology, legislative concepts and Technology Assessment (Informatietechnologie, wetgevingsconcepten en Technology Assessment), *Computerrecht*, 1990/4, pp 181-185.

there may be situations, in which legislation with respect to the development of quantities which are unknown at the time of legislation (for example in the sphere of bio-technology) should be recommended. It is the commission's opinion however that it is not experimental regulations which should be given attention but rather the regulated experiment. In the field of IT this consideration is of importance to the extent that it concerns products from the core and/or systems which may be safety hazards.

As a result of IT developments in a global communications infrastructure, together with the use of the infrastructure for EDI, the need will arise for administrative standards in order to ensure that the way in which information is classified for the benefit of information provision is appropriate.

5.6. Summary

The (further) computerisation of organisational units in the coming ten years has consequences for the internal organisation, for the external relationships and for the execution of specific tasks.

If the possibilities which exist were to be used then the changes would be greatest in the internal organisation in the public sector, because there is room for it in a number of areas (execution, administration of the law and legislation). These changes affect, among other things, constitutional and administrative law. With the increasing availability of standard software, changes will occur in all three sectors in the organisational units which are entrusted with developing IT applications. Moreover IT developments offer the opportunity of both a more centralised as well as a more decentralised administrative structure. The realisation of these possibilities in to a balanced division of administrative competencies deserves full attention.

There have been considerable changes in the external relationships in all sectors (especially through the reduction in costs and the improved communications infrastructure, in combination with communication standards). The possibilities for communications and the provision of information are increasing. The use of these possibilities creates mutual dependencies which leads to new organisational forms. The opportunities for control are reducing on the one hand (blurring of boundaries, organisational complexity) and on the other hand increasing (computerised administrations). With a detailed and intensive use of administrative control opportunities a process is set in motion which alters the competency relationships between organisational units (caring mid-field organisations). The process of fusion and internationalization is already well established in the private sector, whilst the public sector is undergoing a similar process within the framework of the EC. IT plays an important role in this process. As a result of this, new organisational forms for co-operation and co-ordination come into being both in the private and the public sector. Moreover new forms for co-operation arise between the public and the private sector. It is to be expected that in connection with these complex co-operative relationships the position of interest-protection mid-field organisations will grow in significance, especially with respect to the provision of information for the benefit of policy forming and legislative processes.

The changes will extend to the way in which specific tasks are accomplished. For the private sector the development of the way in which IT services and applications will be offered is dependant on the creation of a stable social intercourse in IT applications. Interest protecting mid-field organisations might fulfil an informative role for the benefit of the control on the use of IT in the public sector. In the public sector the preparation of decisions will, increasingly and in more fields, be carried out with the use of IT and will be left to IT applications. This can lead to an extension of the competency of the public sector. Probably the executive practice will be rationalised using IT, whereby sector information collections being linked together is not excluded. This will lead to an increase in the work load for the judiciary and to a de facto shift from individual decisions in administrative law to policy decisions. The legislation will alter to fit the IT possibilities of the moment. Furthermore the legislator will (also at an international level) have to concern himself with a stable social climate which encourages use and development of IT applications.

For the development of effective IT applications which will supplement the juridical instruments at essential points, the development, maintenance and availability of an information collection which covers the entire regulatory system (including jurisprudence) is necessary. For the moment there is no directly attributable economic advantage in the creation of such a collection.

Making available, or not as the case may be, - even in those places where it is not at present economically justified - infrastructural facilities, user-friendly and multi-lingual applications in the field of information provision and education will lead, respectively to a reduction or increase in the existing economic and cultural differences like those that exist between rich and poor countries and between highly populated and sparsely populated areas.

6. THE EFFICACY OF THE JURIDICAL INSTRUMENTS

6.1 *Introduction*

In the previous chapters a description was given of the expected developments in, respectively, the IT possibilities, IT use and the social effects of it. In the chapter ahead the social problems, which are linked to IT developments from a standardisation point-of-view, are reviewed and the preliminary questions from section 2.5. are considered. The first two questions raised there are concerned with the *effectiveness* of the juridical instruments with respect to influencing IT production and services and also with influencing the social consequences of IT use. The third question is concerned with the possible need for *adjustment* of the existing juridical instruments.

Before making judgements about the effectiveness of the existing juridical instruments there is an explanation of what is included in these instruments and which criteria of effectiveness are used (section 6.2). Next the two effectiveness questions are examined (section 6.3). The inventories from the previous chapters are used here .

Criteria are also needed for statements about the need to alter the available juridical instruments. These criteria (which are based on generally accepted juridical values and interests) are discussed in section 6.4. Next the question of whether research into the possibilities for adjustment of the juridical instruments is desirable is discussed in section 6.5. The question of whether IT can contribute to the improvement of the juridical instruments is also examined at this point. Section 6.6 contains a summary.

6.2. *Effectiveness criteria for the juridical instruments*

The commission considered as juridical instruments all the juridical resources for maintaining social order, which the government and the civilian have available to them. That means that the totality of the valid legislation is counted as belonging to the juridical instruments. This includes, in addition to laws, also contractual regulatory facilities, administrative instruments and case law.

Whenever the behaviour with respect to IT can be qualified as acceptable or not within the limits set by the existing law, then there are *effective juridical instruments* concerned with IT use and production. In this definition the social acceptability of the juridical framework determines the effectiveness of the juridical instruments. This juridical framework dates from the time before IT became common property. It is very likely that the existing law with respect to IT will not be generally accepted. In that case the guidance of the juridical instruments can fall short (for instance: the implementation of the Law on the Registration of Personal Data, which possibly has mostly curbed the social distress). It is just as possible that the existing law is obscure with respect to various aspects of IT production and use. In that last case any possible discrepancies between the law and the social use cannot be established. In both cases (due to lack of support and because of obscurity) the commission considers the juridical instruments to be either not effective or less effective.

6.3 *The effectiveness of the juridical instruments for IT*

IT production and use are developing. Linked to this, the social practices around IT production and use are also in motion. The effectiveness of the existing juridical instruments is thus also determined by the ability to guide the social use in a desired direction.

With respect to the *production of IT* the commission considers the ability to stimulate or to curb to be of importance with regard to the effectiveness question. With respect to the *social consequences of IT use* the commission regards the ability to regulate information being made available and being kept secret as being central.

6.3.1 *Do the present juridical instruments provide means for influencing the production of IT in a desired direction?*

In the light of the first preliminary question the analysis is directed towards the influence of the available juridical instruments on the fulfilment of the conditions for IT production. The conditions inventoried in the fourth chapter are taken as a starting point. They are divided into three categories (economic expediency, social confidence in IT and infrastructural conditions) and are discussed by category.

Economic expediency of IT production and services

By economic expediency here is meant that IT production and services are, in economic terms, advantageous for the producer. Conditions for the economically expedient development of IT are (a) a market for IT products and services and (b) a climate in which creativity is invested in the production of IT.

As far as the economic market for IT products and services is concerned the present juridical instruments are, on the whole, established to create as little as possible disturbing influence on the economic expediency of the social activity in the private sector. Independently of the question of whether or not, and if so, when there *should* be divergence from this starting point, the matter of whether the existing juridical instruments offer sufficient opportunities in that respect can be examined.

With the aid of the available market regulation instruments (for example: fiscal and subsidy regulations) then both general, as well as individual, stimulatory measures can be taken for the *economic expediency* of IT production and for IT use. Restraining measures are usually of a general nature; when they are specific, they are concerned with the subsidising of alternatives.

The juridical instruments for the protection of the conditions through which the economic expediency of IT production can flourish are stated in the regulations and court rulings dealing with the (European) Competition Law. This body of law is *instrumental* in pushing back social developments which would prevent competition being as extensive as possible (for instance: articles 85, 86, 90 of the EEC Treaty).

In those cases where it is preferable to use juridical instruments to make exceptions to the full competitiveness of IT production and services, then use can be made of dispensation regulations or of the possibility of *subsidising* pre-competitive projects (the "megachips" of Philips and Siemens). Moreover attention should

be paid to the fact that governments establish a monopoly position for those products which would not, or would not be generally amenable to realisation within a climate of full competition (telecommunications infrastructure). The public sector, as a major customer of IT products, should, or rather must, take account of the effects of the orders on the market when it places orders.

For the development of IT applications which have a good chance of succeeding economically this requires the investment of creativity in IT production and services. Creativity consists mainly of the re-classification and combination of existing knowledge and insights. The first condition for the investment of creativity is therefore the availability of knowledge. The juridical instruments which contribute directly, from this point-of-view, to the development of creativity consist of the regulation of education and research (dissemination and development of knowledge in the field of IT). For the development of specific IT knowledge subsidies can be used (for the financing of exceptional research projects).

A second condition for the stimulation of investment of creativity in the IT producing sector is an attractive salary. The salary level is, in part, related to the developments in the employment market, partly to the ability to reflect the market value of developed products in the salary of the creator. Copyright and patent law in principle offer possibilities for this. These can be limited by clauses which are included in employment contracts.

The commission is of the opinion that the existing juridical instruments with respect to the influence they exert on the economic climate for IT production can be effective. Only in respect of industrial property can it be said with certainty that the effectiveness although positive in view of the stimulatory impulses resulting from investments, still leaves something to be desired because of, for instance, the long production time and the high costs of it in relationship to the lifespan of the equipment and software. This remark is not only applicable to patent law, but also to copyright law (reverse engineering, software piracy). Speaking more generally this is an issue that encumbers the relationship between the juridical instruments and IT production and use. The speed with which legal decision-making takes place lags behind that of the turnover rate of (generations of) IT products.

Confidence in IT

In the fourth chapter the social confidence in IT is named as a basic condition for a healthy market for IT products and services. The confidence expressed by the community in IT was linked there to the reliability and vulnerability of IT products, with the integrity, the consistency and the quality of IT applications, with the transparency, the flexibility and the ability of applications to be individualized as well as with the precision with which the exclusivity of information is realised.

With the exception of computer crime related to the vulnerability of applications, which can be regulated through the criminal law (which was discussed elsewhere³¹) and the problems of privacy which were also dealt with elsewhere, this category is concerned with interests the regulation of which (through civil law) is mainly entrusted to the participants in the social intercourse themselves. For the regulation of actual measures for minimising the damage which can result from the vulnerability of IT, as well as for the regulation of integrity, consistency, quality, transparency, flexibility and the ability to individualize applications then contract law in principle offers possibilities.

Entirely in line with regulation via private law, there are, here and there, private initiatives being taken to protect the quality of IT production. These can be divided into an approach from the group of people who make a judgement about the product IT ("register computer scientists") and about the quality of the product itself. This leads one to consider the "certification of software".

Within the contractual agreements made between IT suppliers and users the exoneration clause (in which it is established that the supplier accepts no liability towards the other party for the damage which results from the use of the IT product supplied) occupies an important place. For the moment the freedom, which the producer has to formulate the exoneration clause loosely, is not especially limited through case law for IT producers. In this respect there has been no particular impulse from the judiciary which would contribute to the confidence in IT³². The recent regulation of the product liability offers an instrument for the definition of the liability of suppliers of defective applications which have caused third party damage to business or persons. The discussion about the significance of this regulation concerning defective software and defective data collections is still on-going. Moreover the position of administrators of telecommunications infrastructures is interesting, because the monopoly position which they occupy allows them to make ample use of exoneration clauses when offering telecommunication services.

The commission considers that the effectiveness of the existing juridical instruments with respect to influencing the confidence held by the community in IT products should be researched. The criminal law instruments are unsatisfactory as things are at present. With respect to the spread of computer viruses it seems, moreover, to have hardly any influence (in connection with tracing problems). As it looks at the moment effective security measures for critical applications can only be found in certain areas (banks, hospitals). The choice has not yet been made in the Netherlands to have civil, administrative, and even criminal laws which would directly encourage the safeguarding of critical applications³³. This is in contrast to neighbouring countries, where it is proposed that not safeguar-

³¹ Information technique and the criminal law (Informatietechniek & Strafrecht), Report of the commission on computer crime, Staatsuitgeverij, Ministrie van Justitie, 1987.

³² It should be mentioned here that in the RBC-Brinkers case, The District Court of The Hague 8-3-84, confirmed by the Supreme Court on 11-4-86, the professional liability of IT advisors is elaborated on to some extent.

³³ There is only a proposal in the civil law field, namely w.o. 21 551: art 391 sect. 2 Book 2 BW.

ding a critical application would be in itself a punishable offence (Belgium) or where such a punishable offence has already been put into practice (Germany). The effectiveness of the establishment of civil law quality standards for IT products with the accompanying division of liability still leaves something to be desired. This problem will become even more complex in the future (quality and liability of expert systems and in distributed data processing). Given the boom which IT has gone through in the community, the low number of interest conflicts, in this respect, which have been taken to court could indicate the effectiveness of the available juridical instruments. This is also equally true of products which are reckoned to belong to the IT core as it is of IT applications. Because it cannot be assumed that the material is so clearly regulated that conflicts on this basis will remain outside jurisprudence and because there is even less reason to assume that computerisation projects will only, in exceptional cases, lead to problems, the commission has concluded that in practice apparently the preference is for commercial solutions or some form of conciliation of differences, which operate without the judiciary. This means that it is not clear whether the juridical instruments are in this respect effective.

Infrastructural conditions for IT production

Among those facilities with the help of which, IT applications could become generally *available*, the commission includes a communications infrastructure, the accompanying communications standards and corresponding division of capacity. A recent investigation has looked at this material³⁴. From this it appears among other things that the juridical instruments, through which various matters can be regulated, are available, but (also as a result of historical developments) are very complexly constructed and as a result of the present international developments are also under review.

Summarising the commission concluded that the effectiveness of the existing juridical instruments with respect to influencing IT production - both with regard to the core and with regard to the applications of it - show some deficits in various places and therefore need to be investigated.

In particular these are:

- (1) the effectiveness of the regulation of industrial property;
- (2) the effectiveness of the civil, administrative and criminal law instruments for the regulation of facilities concerned with the vulnerability and safeguarding of IT products;
- (3) the effectiveness of the civil law instruments (including case law) for the possibilities for standardisation of quality of IT products and the corresponding assignment of liability.

³⁴ J.C.Ambak, J.J. van Cuilenburg and E.J. Dommering, *Connecting and untangling in Communications* (Verbinding en ontvlechting in de Communicatie), Amsterdam, 1990.

6.3.2. *Do the present legal instruments offer opportunities of influencing the social consequences of IT use in a chosen direction?*

With the discussion of the second preliminary question the attention given to the IT production is moved to the social consequences of IT use. For the analysis which follows use is made of the inventory from chapter five which lists the expected social consequences of IT use. The effectiveness of the existing juridical instruments is, in the first instance, judged on the degree to which making information available can be encouraged or inhibited. When IT is used, it is, after all, mostly the (possibilities of) information relationships which change. Both making information available (openness of government, the 'growth' of knowledge) as well as keeping it secret (privacy, security) ought to be made possible through effective juridical instruments.

Changing relationships within organisations

The changes in operational management and in the internal organisation are part of the social consequences of IT use. The internal organisation should be geared to alterations in tasks and competencies of employees and departments. There may, in addition, be a need for the expansion of, the alteration of or the cutting back (fewer people can do more) on tasks and competencies. The juridical instruments should serve, on the one hand, to make the intended flexibility possible, whilst a reasonable degree of legal certainty must be realisable.

The juridical instruments that are available to provide shape for the mutual balance of power, information and legal relationships within organisations, consist for all sectors, in the first place, of the (collective) labour law, together with the regulations for the prevention of discrimination and for aspects of the protection of privacy. The regulation of authority and delegation also plays a significant role. Whenever problems arise here, it is conceivable that, for instance employees' councils could be given a role in the formulation of requirements of the organisation, the use and the design of the computerised applications. In this context then *within the organisation* influence can be exercised on the handling of problems regarding the use of, for instance, (linked) personnel monitoring systems. The present legal instruments, which influence the use and availability of internal company information related to individuals, are considered by the commission not to be very effective as yet.

An increasing IT use and an increasingly, generally available communications structure could lead, in the future, moreover to structurally changing labour relationships in the scope of 'tele-working'. In this respect not only are consequences foreseen for the mobility of employees (which anyway can be absorbed within the sphere of the public administration) but also for the nature of labour relationships (whereby a shift in the direction of free-lancing can be predicted, through which delegation and liability problems will be even more difficult).

The commission is of the opinion that as the result of IT developments the effectiveness of the available opportunities for the internal management of organisations will, in many respects, be greater rather than less. With regard to the use of registers of personal data (for instance in monitoring systems) there is still no effective instrument available at present. The commission noted that

measures which are aimed at reducing discrimination are, of necessity, linked with the registration of sensitive personal data. The issue of the collective representation of tele-workers is dealt with in the following section.

Changes in the relationships between organisations

The most important cause for changes in mutual relationships between organisations is the increased availability and usability of a finely meshed telecommunication infrastructure. This infrastructure can be used for countless forms of communications (television, electronic post, electronic publishing, electronic payments, party lines and such like).

By EDI (Electronic Data Interchange) the commission means all those forms of electronic information transmission by which, with the help of telecommunications, there are legal consequences established between the information supplier and the information receiver. The commission uses a slightly broader definition than is usual³⁵.

The commission expects that EDI will play an important role in all sectors of society in the coming ten years (for instance: the provision of wages record information about individual employees to the tax authorities). With reference to the present vagueness about the existing (in particular civil) law with respect to IT use, the means by which EDI can be influenced are often sector-specific and consist mostly of (international) administrative or *de facto* standards (EDIFACT). The way in which and the degree to which EDI will be further deployed in the activity *between* organisational units has important social consequences for the mutual balance of power, information and competitiveness relationships. It is telling that liaison problems do not only occur between the private organisations themselves but also between these organisations and the government.

Private sector

The existing juridical instruments are in part aimed at the organisation of contractual relationships and consist of the usual civil law measures (in which notice of default, annulment, damages and agreements about exoneration and secrecy occupy an important place). In combination with the regulations on intellectual property, by which certain interests are on the one hand protected, whilst on the other hand application possibilities are limited, and regulations about privacy, where the degree of specification is still open to discussion, stalemates can arise which affect the continuity of the cooperation based on IT use between organisational units. One can think here of the problems which one would hope to overcome by the use of escrow constructions.

In part the juridical instruments which are concerned with the relationships between organisations have an *institutionalising* character. Looked at nationally it mainly concerns company law and the corresponding regulation of competition, of forms of financing (lease, fiducial transfer of property) and of forms of

³⁵ At the present moment EDI is mostly used to indicate structured automated commercial transactions within existing contractual relationships, which were previously realised in a different fashion.

representation, as well as the regulations of tax assessment and bankruptcy. It should be noted here that through the developments in IT the opportunities for evasion, for example of fiscal and competition regulations have been enlarged, whilst on the other hand the use of IT in monitoring, can restore the balance of power.

The creation of a global communications infrastructure has increased the opportunities for intensive international cooperation between companies (and company branches). Looked at internationally, the tasks, dependencies and competencies in the relationships between company branches alter as a result of IT developments. The *international* juridical instruments for the regulation of the relationships between organisational units are based for the most part on national legislation, including the question of which law will apply. Coordinated regulations are tested in international treaties and make important advances, for instance within the framework of the EC. Moreover attention is already being given to competition law issues, to the protection of industrial property, and to the protection of privacy in connection with international EDI developments.

In the future the need may arise, on the basis of EDI developments, for new institutional forms of cooperation between companies, especially in connection with questions of competition law. (Monopoly forming as a result of entry thresholds (for example air transport reservation systems) and cooperative links which are created more or less of necessity by direct price control: 'natural monopolies' come to mind). Likewise the regulation of EDI requires attention in connection with issues which touch on undesirable discrimination (for instance: the operation of profiles for marketing objectives or for the benefit of credit registers). Partially on the basis of the vagueness of the available juridical instruments with respect to liability questions in connection with EDI (blurring of boundaries), especially whenever data distributed through it play a role, the commission is of the opinion that the available juridical instruments with respect to EDI require further study.

Mid-field organisations

When the developments in IT lead to a significant increase in 'tele-working' and when this increase is accompanied by a shift in labour relationships in the direction of 'free-lancing' this will also have consequences for the external relationships of the interest-protection mid-field organisations. In the circumstances outlined the power of the support which is needed to have collective agreements, the legitimate competencies of employees organisations and the way in which interest-protection mid-field organisations can continue (or should be) fulfilling their social role are all subject to questioning. Answering these questions will certainly be linked to the way in which and the degree to which teleworkers are organised.

With an increasing complex society there is a growing need for expert representation. At the same time decision-makers are still reliant on good information provision, but the information provision process is itself more time-consuming and less transparent. This means that the interest-protection mid-field organisati-

ons fulfil an increasingly important, informative and intermediary task in the representation of groups with the same interests.

In the commission's judgement the existing juridical instruments for the organisation of external relationships of interest-protection mid-field organisations in the developments outlined should be the subject of investigation. The available juridical instruments are, in the opinion of the commission, not (yet) effective enough as far as it concerns information being made openly available to the representative midfield by government and trade and industry. The problems concerning the possible privacy of 'legal persons' on the one hand and on the other hand the openness of government need to be addressed.

Changes for the judiciary

The way in which and the speed with which the judiciary clarifies the vagueness in the existing juridical instruments for the regulation of information relationships is of great importance to the development of IT. The *juridical* instruments with which the judiciary sets to work are concerned with the legislative interpretation and include the law of evidence and procedural law. In the last case one can think of issues concerned with the harmonisation of actual and juridical descriptions (is a program good?) and evidential law questions which have to be solved and about which the existing (and known) law still does not provide any clarity. As a result of this the judiciary needs, to be able to provide the clarity meant above, to have knowledge of IT and of the actual social relationships surrounding IT. The opportunity of consulting experts for clarification of technical problems is included in the juridical instruments. It is possible that, if gaps exist in the judiciary in the field of IT, these can be filled with the help of experts. A future social situation in which IT use has become so normal, that the consultation of IT experts in IT conflicts is (then) comparable to the consultation of driving instructors in traffic offences (nowadays) is conceivable.

For the judiciary the necessary information about the relevant law and the relevant jurisprudence will be increasingly more difficult to find. In addition the workload and the usual time taken for a process make it more difficult to see the judiciary as part of a set of efficient juridical instruments. As was noted earlier it seems as if the judiciary nowadays scarcely fulfils several of its functions (individual problem solving, clarification of the law) or does so in an unacceptably slow tempo, with respect to interest conflicts concerning IT production and services and the consequences of IT use. The relatively high speed with which IT developments are assimilated by society also plays a role.

As a result of this the external relationships of the judiciary have imperceptibly changed. In the sixties and the seventies the social use of IT was limited to a fairly small group of highly specialised affable experts. They were prepared to put up with problems because of the experimental nature of many applications. They were, in general, resolved through fair consultations and with concerted efforts being made by customer and producer. The judge was seldom called upon in computerisation issues. In the eighties IT use developed into a general form of social intercourse. The loss of contact between the judiciary and the issues concerned with IT use and production has however persisted.

The commission is also of the opinion that research into the effectiveness of the judiciary in the field of IT is justified, given that this organisation determines, to an important extent, the effectiveness of the juridical instruments. This research should, accordingly, be carried out in addition to the research into the set of regulations which serve the judge.

Changes for the public administration

Through the increased IT opportunities in the field of administration the government is resorting more and more to the use of IT applications. EDI makes it possible for the government to have, for instance, an extremely detailed control on the caring mid-field organisations (and in some cases likewise on companies and industrial sectors). Administrative standards which are concerned with administration and the transfer of data which has to be made available to the government (fiscal data, fish and manure quotas, data concerned with income redistribution) can contribute to an important degree to the effectiveness of the government.

In the definition of effectiveness which the commission is using the social use and the social acceptance of the law plays a determining role. The freedom of the government to impose administrative standards, linked with the perceived 'marginal benefit' of new information obligations and with the degree of detail with which control can be implemented, in turn, determines the social acceptance of the instruments used. The commission has the impression that the existing regulation leaves something to be desired in this respect. Investigation into improvement of these and similar situations is in the commission's opinion justifiable. An uninhibited development of requirements to provide information imposed by the public administration can slightly overreach what the public will accept. The support for the public administration is put at issue in this way.

The public administration has moreover an important task to fulfil with respect to general public service functions and infrastructural facilities. The problems of coordination with which the government is confronted are continuing to expand as a result of the international developments, but also as a result of the diversification of responsibilities (privatisation of public utilities, decentralisation of governmental power). These problems are reflected in an increasing complexity of the external relationships of organisational units in the public administration (for instance with mid-field organisations). The governmental information is also becoming more complex, more extensive and more difficult to judge for relevance. The administrative issues concerned with establishing, making available, allocating capacity in and monitoring the use of communications infrastructures and electronic media will serve as an example of the problems outlined above.

The commission is of the opinion that, with respect to the executory, coordinating and monitoring practice of the public administration with the help of EDI, important improvements in the effectiveness of the available juridical instruments could be achieved. For the achievement of these improvements research will first of all be needed into the consequences of various variations of those instruments (aspects of privacy, costs). Furthermore consideration should be given to whether or not, and if so to what extent a specific juridical instrument can be constructed

which creates a balanced, socially acceptable degree of requirement to provide information for the benefit of an effective administration. As a result of the lack of such an instrument the information relationships between the public administration and other sectors in society, and also between independent administrative units will be put under pressure.

Changes for the legislator

The most important changes which will occur in the coming years in the external relationships of the Dutch legislator will result, not from IT developments, but from a shifting, more globally oriented, international perspective. Whilst information technology plays a significant role in the communications possibilities which also lie at the basis of the development of this perspective, the commission does not consider the internationalisation issues mentioned above to be part of the consequences of IT. They do however feel that the IT developments can play a supportive role in the realisation of greater international political coordination. The international political developments (cooperation at a European level, restoration of the relationships with Eastern Europe, the emancipation of the third world) pose problems which are politically, but also technically difficult for the legislator to resolve. Within the international field of influence the autonomy of the national legislator is reduced, but he nevertheless continues to attempt to make the national system of regulations more consistent, more comprehensible and *more effective*, whilst the international harmonisation of regulations and policy continues at a rapid pace.

Within this context the changes in the external relationships of the legislator which are a result of IT developments seem to be relatively small. Once again the commission feels that these are mostly information relationships. On the one hand this involves the legislator as information receiver, who, given the amount and complexity of the information needed to create legislation, becomes more and more dependent on information-providing interest factions. The provision of information to members of parliament, also from the government side, is also worthy of attention.

On the other hand the legislator is involved as provider of information, in relation to trade and industry and the executive powers. In many cases the correct implementation of legislation will depend on the state of the IT being used by executors and companies. The introduction of laws will have to be harmonised with that. The degree to which the administration makes practical use of the delegated authority to impose requirements to provide information on the private sector will be extended in such a way by the developments in IT, that within the foreseeable future, the direct parliamentary control on the employment of these powers will not be sufficient. The Lower Chamber must not involve itself in dealing with the nature and content of forms to be filled in, nor with data files to be supplied. The Lower Chamber is also not equipped to supervise the extent to which information collections are exchanged and linked for the benefit of the administration. There is a need for a more general regulation of the information relationships of the legislator (and of the administration). The IVR90 provides a

good start in this respect, although the commission feels that further research into effective juridical instruments in this field is imperative.

Effectiveness of the existing juridical instruments

The commission concludes, in summarising, that the juridical instruments which can influence the results of IT use at different points is not (yet) effective. The following problem areas for legal research were raised for discussion:

- (1) *Internal information relationships.* The establishment and use of computerised administrations raises (for example) questions about the effectiveness of the regulated use of registers of personal data and in particular personnel monitoring systems. In addition the exclusive access to administration systems (transactions, system control) needs attention. The commission considers the existing regulations of representative supervision (for example company law) suitable for further analysis.
- (2) *External information relationships, private sector.* The use of EDI throws a new light on the existing juridical instruments for the regulation of the relationships between organisations. The commission considers the effectiveness of the existing juridical instruments to be an important topic for study, especially in the fields of competitiveness, liability, privacy, discrimination and issues of evidence.
- (3) *External relationships, mid-field.* To be able to fulfil its representative and caring role a reorientation of the regulations with respect to representativeness and an open provision of information between the public sector and the mid-field and the other way round is needed. The effectiveness of the juridical instruments for the creation of this open provision of information forms a topic for investigation.
- (4) *External relationships, the judiciary.* The judiciary cannot act effectively because it seems to be isolated from the social intercourse concerning IT, perhaps not lastly because of a backlog in knowledge linked with a backlog in the use of IT support in its work.
- (5) *External information relationships, administration and legislator.* The external information relationships of the public administration change because of the possibilities offered by EDI. There are still not sufficient effective instruments available for the regulation of the limits which can be set for existing or otherwise realisable reciprocal requirements to provide information between the public administration and the private sector, the mid-field and other organisational units within the public administration. A further regulation of the harmonisation of legislation with respect to the IT facilities needed to implement it deserves some attention.

6.4 Alteration criteria for the legal instruments

The effectiveness of the existing juridical instruments leave something to be desired on some points. However the conclusion that the instruments have to be altered cannot simply be drawn on this point unquestionably. The question of when they should be altered is a normative and presumed criterium for the need for regulation.

An analysis on the basis of constitutional law of criteria for legislation is not what is being discussed here. However a few general juridical values and interests can be summed up which could give a *prima facie* indication of the nature and the urgency of the social problems which ensue from the use of IT. Usually in this connection, the functionality of the democracy and the corresponding balance in the three powers of state (also within international developments) are put forward as calibration points. Moreover there is sometimes abstraction from the representative aspects and attention is limited to the activities of the public sector. An comprehensible and broadly accepted regulatory system, which makes it possible, without being arbitrary, to order the social intercourse as much as is necessary, to make facilities available and to distribute wealth, indeed represents a fundamental juridical value. A judiciary, independent of the legislator and the public administration, which on the basis of the regulatory system and in a personal confrontation with those involved in conflicts can make confident and convincing judicial judgements also represents an important juridical value. Finally an effective government, which defines its policy on the basis of ministerial responsibility and thereafter acts (with a certain degree of freedom), also represents an important legal property.

At the foundation of all these juridical values there is a social practice which will and can direct itself broadly towards the rules, dispensations and court orders of the public sector. The opportunities offered to the legislator to direct the social practice *authoritatively* are limited³⁶. Juridical basic values which play a role in the possibilities for harmonisation between practice and regulation are, in part, related to the principles of equality. Striving for complete competitiveness (equal opportunities within the private sector), attempting to push back discrimination (equal opportunities for natural persons) and for control of information of equal value ('fair play', 'due process') are all counted as being part of the consequence of this. A second principle which is of significance in the social acceptance of legal structures, is the rational reticence of legislators, who take account of what here briefly is called the social marginal benefit of regulations. A minimum requirement of this is that it must be clearly demonstrable to the social practice exactly what the new regulation is good for. The administratively popular term, deregulation³⁷ especially in this sense indicates the continuation of a situation of over-regulation. The pace with which regulations are presented and the detail with which the monitoring is carried out should also take account of the level of

³⁶ See also: the report *View of law making*, (Zicht op wetgeving), offered to the Lower Chamber by the Minister of Justice in a letter on 5 March 1991, kamerstuk 22 008 1-2.

³⁷ Deregulation here in the sense of P.J. Slot, *Regulation and Deregulation* (Regelen en Deregelen) Inaugural lecture. Kluwer 1983.

acceptance and the ability to react within society. The public support for the public sector is an essential juridical value. The correct functioning of democracy depends on it.

From the point-of-view which has been outlined the most important juridical values are partly dependent on a free and effective provision of information. The legislator and the public administration must be well acquainted with the (international) social developments and of each other's activities and possibilities. Furthermore they should carefully formulate their regulations and/or policy intentions in an understandable form and should make them known in an effective fashion, whereby the eligibility for subsidising, the reasonableness and coordination are important points to gauge. The judge has to be well acquainted with the valid substantive law, with the actual situation which is being contested and with the arguments of the opposing parties between whom he has to judge. The parliament should be familiar with the administrative state of affairs to be able to exercise its authority to supervise. Lastly organisations in society ought to be informed in such a way about rules, policy and propositions concerning the public administration, that they should be able to direct their attention to the policy. Moreover it is desirable that they bundle their powers so that they can enter discussions with the public administration in an appropriate fashion regarding the policy proposed and/or the policy being followed.

The exchange of information within the private sector, and also that between the private sector and the public sector, as well as that between the various bodies and the public sector plays an important role in the realisation of juridical values and interests. Developments in the field of IT can enhance this information trade. These same developments make possible an unacceptable pace and extent of detailing of regulation and supervision. The question of whether the existing juridical instruments need to be altered as a result of IT development is closely linked to these possibilities.

6.5 Is alteration of the legal instruments desirable?

On the basis of the juridical values and IT possibilities outlined, the shortfalls in the legal instruments noted in sections 6.2. and 6.3 can be recognised in connection with the question of whether the existing legal instruments require alteration. This question is not so much examined to push for changes in the law, but to identify significant research areas for jurisprudence.

6.5.1. The instruments for IT production

The question of whether the legal instruments for influencing IT production and services require alteration, is still related to the availability and acceptability of a consistent and recognisable system of regulations that the social practice surrounding IT production and services offers for the regulation of the mutual relationships. In the commission's opinion this is not the case in the problem areas mentioned below.

The effectiveness of regulating industrial property with respect to IT products and services shows deficits which are the result of the existing regulations being insufficiently tailored to IT (software and data collections) and, for instance, to screen information. The interpretation of computer files as 'documents' as well as the uncertain status of the ideas behind them (not protected by copyright) make it increasingly clear that the qualification of information files as copyright protected works leads to distorted constructions (for instance in connection with reverse engineering). Internationally the choice has, however, mostly been made for copyright protection. Given the increasing social significance of information files, the financial interests of producers which are to be protected, the social need to combine the files mentioned in distributed information provision systems and the negligible costs involved in the multiplication of information files then systematic research into improving the possibilities for legal protection is urgently needed.

With reference to *regulation in respect of vulnerability and protection of IT products* the existing regulatory system will also be used at present. The dubious status of information as a commodity forms a stumbling block, because the existing regulatory facilities are concerned with commodities. Furthermore tensions exist between the necessity to make information accessible and the desire to limit the vulnerability and to improve the security. Research is needed into effective juridical instruments, which could lower the vulnerability of IT products when used (the connection between system software and equipment, communications protocols and standards, user's identification and authorizations).

The standardisation of quality for IT products deserves, together with *liability standardisation* further investigation. It begs the question as to how far there should be a distinction made between products from the IT core (where further applications are built up) and IT applications. With respect to the applications the question is whether a further distinction is desirable for quality and liability standardisation (for instance: EDI, electronic mail, expert systems, hazardous systems). Further research is needed just as urgently into the significance of information for evidential law in connection with the regulation of liability.

6.5.2. *The instruments for the consequences of IT use.*

The legal instruments available for influencing the social consequences of IT use are still virtually only concerned with the possibility of regulating information relationships within and between organisational units. Information relationships are characterised by a weighing of interests with respect to making, or not making information available in a limited fashion. The problem areas analyzed previously all have a direct and obvious relationship to the juridical values and interests which were mentioned in section 6.4. The commission considers that it is important for the survival of a correctly functioning democratic society, that there should be research into the improvement of the juridical instruments for the regulation of the *internal information relationships within the various sectors* and of the *external relationships (within the private sector, within the public administration, as well as between the private sector, the public sector and the mid-field organisations).*

Because the juridical values and interests outlined are in part based on information provision processes, the question of to what extent improvement of the existing juridical instruments can be achieved by application of IT should also be reviewed in the investigation referred to.

6.6. *Summary*

The existing juridical instruments for influencing IT production show various deficits (industrial property, standardisation of vulnerability and quality and liability standardisation). The existing juridical instruments for influencing the social consequences of IT use can also not be called effective in every aspect. In combination with general juridical values and interests in a correctly functioning democratic organisation in the community, the question can be raised as to whether the juridical instruments need alteration as a result of IT developments. The commission is of the opinion that it is precisely on those points where this question can be emphatically asked that the areas for socially relevant (jurisprudential) research can be indicated. Because a functional democracy is also based upon information provision processes, the commission thinks that the question of whether IT has measures to offer which will strengthen the juridical instruments also deserves some attention.

7. RESEARCH TOPICS

7.1 *Introduction*

The preceding chapters have resulted in the identification of a number of areas in which the effectiveness of the existing juridical instruments could, at the very least, be called doubtful. It is precisely in those areas in which the questions arise which the social effects of IT in the mid-to-long term require to be answered by legal research.

In the preceding analyses there was a distinction made between the issues which are linked to the juridical instruments which influence the IT production on its own, to the instruments which influence the use of IT and to those which are concerned with the strengthening of the juridical instruments with the aid of IT products. The research groups which are involved here are introduced in general terms in section 7.2. In section 7.3 the abstract research groups are further explained separately in terms of the questions posed. Attention is given in section 7.4 to the close-knittedness of research into computer law and legal computer science. The summary follows in section 7.5.

7.2 *Research into information relationships*

In the previous chapters it has become increasingly clear that within the issues which are concerned with the social results of IT use, a central part is played by the different information relationships within and between the organisational units in the various social sectors. When summarising research questions the choice has accordingly been made for an analytical approach which assumes the juridical clarification of information, the information provision processes and of information relationships. Thereafter considerations, with respect to the balancing of interests which arises when the question is posed of whether information should be made available, form the guideline for the assignment of research questions.

From this perspective research is needed in the first instance into the legal status of information within civil law, criminal law, administrative law and constitutional law (7.3.1). It is also necessary to research into the identification of legally relevant moments in information provision processes (7.3.2) and into the legal status of those who are involved in the process of information provision, that is to say into the role expectations and obligations of information receiver, -supplier, -holder and -producer which are used as a basic principle (7.3.3).

Subsequently research is needed into the conditions under which the rights and obligations of the information receiver and supplier need more exactness in connection with the balance of interests concerning whether or not information is made available. Whenever free availability of information is chosen as the basic principle, that the consequences of this (stated in section 6.4) for the protection of juridical values and interests (7.3.4) should be investigated. In addition research is justified into the exceptions to the free availability of information which are necessary to protect the values and interests mentioned (7.3.5).

The problems which are linked to the influencing of IT production itself were distinguished earlier on the basis of the economic appropriateness, the social confidence in IT products and on the basis of infrastructural conditions for the

use of IT products. With the exception of the infrastructural aspects these problems have already been dealt with. In sub-section 7.3.6. the research questions are examined on the basis of organisation, capacity division and use of infrastructures for the use of IT developments.

A separate inventory of research questions into the organisation and development possibilities of IT aids for the legislator, the judiciary and the administration (sub-section 7.3.7.) is the consequence of the earlier division of the questions into preliminary questions.

7.3 Research questions

The following inventory of research questions is the result of the taxonomy followed earlier. That means that for the moment attention will not be paid to the urgency or to the priority of research activities. The assignment of priorities will be dealt with in the next chapter.

7.3.1. The legal status of information

As a result of IT developments the possibilities for storage, releasing, processing, transporting and multiplication of information have increased spectacularly. The same is true of the use of IT and with that for the economic significance of information. It is not certain whether the existing juridical instruments provide a socially acceptable legal status given these much changed circumstances. In that light both the descriptive legal research into the legal status of information within the existing law and the more theoretical research into the merits of possible alternatives deserve attention.

- * *What is the legal status of (elements of) information in the existing law? Is there a legal basis for the further analysis of information in interpretation conventions, encoding conventions, representations, programs and data?*
- * *Is the legal status of (elements of) information homogenous in all the existing divisions of the law (civil, criminal, constitutional and administrative law)? In what respects are there differences? Do these differences alter the coherence of the existing law?*
- * *Is the legal status of (elements of) information homogenous in the various (European) national, legal systems? In what ways are there differences? Do these differences alter the chances for the harmonisation of various (European) legal systems?*
- * *Are there reasons to give (elements of) information a legal status sui generis? To what extent would a sui generis legal status of (elements of) information contribute to, or as the case may be, harm a clear taxonomy in the regulatory system?*
- * *To what extent is a sui generis status of (elements of) information a prerequisite of the harmonisation of various regulatory systems (for instance in the EC)? What is the expected marginal benefit for society of a*

recodification in which (elements of) information is given a sui generis status?

The cluster of jurisprudential research questions given above is part descriptive, part theoretical in nature. The emphasis lies in obtaining a systematic survey of the legal status of (elements of) information in the various legal fields, and also in the international context. These insights are important for the development of techniques for the restructuring and harmonisation of effective regulatory systems in general. Within the framework of European integration such insights are urgently needed. Information is a suitable subject towards which this research can be directed because there is no fixed dogmatic view about it as yet.

7.3.2. Legally relevant aspects of information provision processes and IT production processes

IT developments have given many information provision processes a more formal and recognisable structure than was previously the case. As a result of this agreements must be made about information provision processes and IT production processes and components of them. Following on from these developments, research, of an applications-directed jurisprudential nature, is advisable into the legally relevant components in the information provision process.

- * *Which are the legally relevant aspects of the information provision process? Do these match the division as it exists in practice (input processing, user identification, data storage, information transfer, user's authorization, information processing, the presentation of information)?*
- * *To what extent are these aspects able to distinguish and identify responsibilities in (distributed) information provision processes?*
- * *Which are the juridically relevant aspects of the IT production process? Do these match the divisions which have arisen in practice (for instance: information analysis, conceptual models, formal models, building, validation, acceptance, maintenance)?*
- * *To what extent are these aspects able to distinguish and identify responsibilities in the establishment, supply and use of information systems (assembled from heterogeneous equipment, software and data collections)?*
- * *What are the conditions which the aspects of information provision and IT production processes must meet in order for (elements of) information to be valid as evidence?*

This group of research questions is aimed at identifying socially and legally usable points of contact for agreements in information provision and IT production processes. The research is partly inventorising and descriptive, partly application-directed (depending on the existing opportunities) and partly of a more theoretical nature. The last point is especially important bearing in mind the

expected EDI developments and the corresponding need for electronic means of proof (evidence) and the consequent standardisation and vulnerability questions.

7.3.3 Legally relevant tasks of participants in the information provision process

Information relationships are determined by the possible realization of information provision processes. Various tasks can be distinguished as a result of the introduction of IT in these processes. Research into the rights and obligations of the participants in the information provision process is advisable.

- * *What is the legal status of the various tasks which are fulfilled in the information provision process?*
- * *What are (according to the existing law) the rights, competencies and duties which the information supplier, -receiver, -holder and -producer has of right or can acquire, can refuse and can agree on? To what extent do these rights, competencies and duties fit into the existing taxonomy? What are the most notable international differences? Do these differences alter the chances of harmonisation of various (European) legal systems?*
- * *What are the chances of making legally valid the rights, competencies and duties which the information supplier, -receiver, -holder and producer has of right or can acquire, can refuse and can agree on? To what extent do these opportunities for legal implementation fit into the existing taxonomy of private and public law? What are the most notable international differences? Do these differences alter the chances of harmonisation of various (European) legal systems?*

The research referred to here is involved in creating an inventory and is directed towards applications. It provides a description and an evaluation of the state of the (international) legal taxonomy with respect to information provision processes. This research is of the greatest importance bearing in mind the slight chance that an (international) socially acceptable, more systematic, legal *sui generis* approach to information relationships will be implemented in shortly or even in the medium-to-long term. Research such as this will, therefore, in the medium-to-long term guide the development of the juridical instruments with respect to information relationships. This research concerns the growing collection of known topics such as: computer criminality, protection of individual privacy, competitiveness and industrial property, the problems associated with combination, standardisation of quality, professional and product liability, standardisation of vulnerability, standardisation of security, administrative standards, evidential problems, telecommunications (communications standards, division of capacity, fixing of tariffs, liability, interweaving and disengagement of telecommunications services) media regulation, standardisation of EDI, blurring of boundaries with respect to control and liability, coordination of the provision of information to, from and within the public sector, etc. Likewise all these topics should be viewed from international perspective. Furthermore the commission is of the opinion that the issues, which are the consequence of the computerisation of the information

relationships within and between organisational units in the public and the private sector, should, in the short term, be more expressly involved in this research.

The research into the legal possibilities of implementing the rights, competencies and duties meant here is also of great importance - especially bearing in mind the effectiveness of the juridical instruments in their development. This application-directed research is not only socially urgent, it also forms the essential basis for research, which in the commission's view is just as necessary, into a more systematic (international) legal conduct of information relationships.

7.3.4 The principle of the freedom of information

Investigation into a more systematic legal conduct of information relationships should, in the commission's opinion be based upon the general juridical values and interest which were inventoried earlier. The juridical aspects of information relationships should be systematically linked to this. Such a research program can originate from a presumed general principle with respect to the availability of information, in order to be further refined on the basis of the social objections which that principle, because of its rigidity, would unavoidably evoke.

- * *In which juridical ways can the general availability of information be shaped?*
- * *What would be the advantages and what would be the disadvantages for the general juridical values and interests of the legal system if the basic principle were held to be that making (elements of) information generally available is compulsorily prescribed?*
- * *What would be, in the case of compulsory prescription of making information generally available, the rights, competencies and duties which the information supplier, -receiver, -holder and -producer would have a right to or could acquire, could refuse and could agree on?*
- * *What are the modalities available to the legal measures for the realization of the general availability of information?*
- * *What would be the advantages and what would be the disadvantages for the general juridical values and interests of the legal system, of the various modalities available to the legal measures for the realization of making (elements of) information generally available (this is taken as a hypothetical case)?*

This research is theoretical in nature and is concerned with aspects of both jurisprudence and social science. The availability of information lies at the foundation of important social and juridical values (for instance: the growth of knowledge, freedom of education, freedom of speech, the ability to determine wishes individually, the ability to reach consensus ad idem, the ability to define policy rationally, complete competition, public disclosure and controlability, the ability to implement laws legally).

The availability of information also lies at the foundation of the violation of social and juridical values and interests (such as with respect to the individual privacy, discrimination, with respect to the protection of investments in the establishment and maintenance of information collections or, more generally, with reference to 'misuse' of information).

A broad insight into the advantages and disadvantages with respect to the general juridical values and interests, which are involved with the availability of information and with the ways in which this availability can be implemented, is of essential significance to a systematic jurisprudential approach to the juridical regulatory modalities with respect to information relationships.

7.3.5. Making information available in a limited fashion

The systematic research into the consequences of making information generally available and into the consequences of juridical instruments for implementing this, should have its program supplemented with research into the necessary limitations to making information generally available.

- * *On the basis of which juridical values and interests (can) should the principle of making (elements of) information generally available be breached?*
- * *In which way could the different information relationships which lead to making (elements of) information generally available be implemented in an economically responsible manner?*
- * *To what extent does the requirement of an economic market for IT products lead to limitations in making (elements of) information generally available in information relationships?*
- * *Is it possible to formulate general guidelines as to when it is appropriate for the principle of making information generally available to give way to confidentiality (for instance on the basis of privacy, of autonomy of organisations, of economic inconvenience, or because the information is not yet 'ready' to be made available (rough outlines, drafts and so on) or bearing in mind the security of the information system)?*
- * *Should the nature of the information be involved in the consideration of whether it should be made generally available?*
- * *Should the purpose for which the information will be used be involved when considering whether or not to make it generally available?*
- * *Should the objective for which the information was produced be involved when considering whether or not to make it generally available?*

- * *Should the consideration be further split into the social sectors (public, private mid-field) from which the information supplier and the information receiver come?*
- * *Should the consideration be further split according to the organisational context (within or between organisational units) from which the information supplier and information receiver come?*
- * *Should the quality of the information be involved when considering the principle of making information freely available?*
- * *What consequences arise from limitations placed on making information generally available, which would affect the rights, competencies and duties which the information supplier, -receiver, -holder and -producer has of right or can acquire, can refuse or can agree?*
- * *To what extent is it possible to incorporate into the existing juridical instruments, the general guidelines formulated for considering as to when it is appropriate for the principle of making information generally available to give way to confidentiality?*

The more general and theoretical jurisprudential approach to information relationships on the basis of making information generally available and the limitations which are linked to it on the basis of juridical values and interest, creates the possibility of improving the juridical instruments and of improving the taxonomy projected in them. Following on the theoretical research the extent to which alterations and improvements can be incorporated in the present juridical instruments should be ascertained. In other words the proposed research program should, with reference to the theoretical phase, be aimed at more application-directed issues. These latter points are concerned, in particular, with opportunities for making improvements in the present juridical instruments with the aid of as few alterations as possible. This research would come to occupy an extraordinary position in relation to the legislator, the administration and the judiciary, because techniques for the assimilation and harmonisation of existing regulatory systems and other juridical instruments would also be raised.

7.3.6. Infrastructural facilities: planning, set-up, maintenance, capacity division and usage.

The infrastructure contributes to the social developments in which IT plays a role. Within the term infrastructure the commission includes not only the physical communications infrastructure and the IT training and education (section 4.6), but also the information provision systems and services with infrastructural significance (subsection 5.2.1).

By this is not only meant the introductory computer science education at secondary level, but also the university level computer law and legal computer science, which is becoming even more necessary for a good juridical professional conduct. It is socially important, for instance in the framework of the decision making

within Europe, in this respect to be able to draw on a 'reservoir' of expert lawyers.

In a recent study into future government policy on the public electronic information provision, attention is paid to an administrative issue with respect to planning, set-up, maintenance, capacity division and use of the infrastructure for the benefit of public information provision³⁸. The plan of services and regulations used in this study is adopted here in the formulation of research questions (see the plan).

	Utilities services	Private services
Public law regulations	1	2
Private law regulations	3	4

The four categories indicate issues concerned with the different ways in which infrastructural facilities can be classified according to content (depending on the degree to which the service fulfils a utilities function) in relation to the different regulatory approaches (private and public)

The social issues concerned with planning, set-up, maintenance, capacity division and use of infrastructural facilities are to an important extent political in nature. Whilst jurisprudence plays a role on the sidelines as far as content is concerned, that role (research into the optimal relationship, bearing in mind the juridical values and interests to be protected, between the type of the infrastructural facility and the type of regulation) is of great importance. In the following outline of relevant research programs it is assumed that the distinction between private law regulations and public law regulations as shown in the plan must be characterised as too crude. This is furthermore apparent, in particular in the Dutch situation, from the rest of the observations made in the report quoted

- * *To what extent can the various forms of private, more collective and finally public law regulations be typified, on the basis of existing regulatory modalities with respect to planning, set-up, maintenance, capacity division and use of infrastructural facilities?*
- * *To what extent can the various infrastructural facilities (physical infrastructure, education and information services) be linked, on the basis of the general juridical values and interests, with these regulatory modalities? What relationship does this assignment have with respect to international practices? In what way do the various forms of regulatory modalities relate to each other?*

³⁸ J.C. Ambik, J.J. van Cuijlenburg, I.J. Dommering *Connecting and Untangling in Communications* (Verbinding en Ontvlechting in de Communicatie) Amsterdam, 1990. These authors use the term 'public information provision' in the sense of making information available to the general public.

- * *To what extent can the length of time, needed for legal proceedings within the judiciary, be brought into line with an appropriate settlement of differences in the field of IT (in which products has a relatively short useful life)?*
- * *To what extent can the length of time, needed for legislation, be brought into line with an appropriate regulation in the field of IT (where new products can be generally socially accepted and used in a relatively short time)?*

With these questions an extensive research program has been defined which has constitutional, administrative, jurisprudential and social scientific aspects. In this program an incremental and application-directed route will be followed in the first place which is inventing, and is based on actual problem solving. In addition it seems here that a more theoretical approach should be followed, bearing in mind a later application of the more general theories and insights gained along this route.

7.3.7 IT tools for the juridical instruments

The juridical work depends on information processing. It is also obvious to expect that automated information provision systems will play an important role in legal and administrative practices.

Assuming the juridical work displays a relationship with the social IT use then attention should be paid to IT methods, techniques and applications which make juridical work easier. Methods of developments and usage with respect to issues such as the reliability, exclusivity and vulnerability of information collection come to mind.

The computerisation of the instrumental support of the juridical work in the public sector (systems for the legislator, the public administration and the judiciary) is still not satisfactory. The reasons for the less successful development of IT products for the juridical and administrative practice are in the commission's judgement only occasionally the direct result of mismanagement, but are rather the consequence of the exceptional demands which the juridical and administrative information provision make on the IT products which are wanted. The most important idiosyncrasies of the juridical and administrative information provision seem to consist of (a) the inherent changeability of some legal knowledge (policy creation in the public administration, new jurisprudence), (b) the inherent rigidity of some legal knowledge (such as the result of the unwieldiness of constitutionally regulated competence divisions and decision-making processes), (c) the far-reaching mutual interwovenness of the various fields of juridical knowledge and (d) the open character of juridical knowledge. Attention should be given to research into improvement of the opportunities for developing effective IT applications.

- * *In which respects are the issues concerned with the developments of juridical IT applications distinguished from general computer science problems?*

- * *To what extent can IT techniques be developed, which when used will raise the reliability, the integrity, the consistency, the transparency, the ease of use, the opportunities for individualising and the exclusivity of juridical information collections, whilst lowering the vulnerability of information collections?*
- * *To what extent can recent developments in the fields of general computer science and artificial intelligence be applied to the development of more effective IT applications for the juridical and administrative practice, for instance by contributing to the minimization of the information obligations imposed by the public administration?*
- * *To what extent can recent developments in the fields of general computer science and artificial intelligence be applied in the integration of various IT applications for the legal and administrative practice?*
- * *To what extent can developments in the fields of general computer science and artificial intelligence be stimulated for the development of more effective juridical applications and for the integration of them?*
- * *To what extent can developments in the fields of general computer science and artificial intelligence be used for the integration of different national and international juridical data collections?*

7.4 *Legal computer science and computer law*

The commission at the commencement of its investigation held with the assumption that a useful division to adhere to as far as the practical side is concerned, is that between research questions in the fields of computer law and those of legal computer science (such as is for instance reflected in a number of university research groups). As a result of the preceding analysis of the social consequences of IT use and the corresponding inventory of jurisprudential research questions there is good reason to reconsider this standpoint.

The foundation of the systematic distinction between computer law and legal computer science is, in the commission's opinion, mostly based on the, by now, untenable proposition that for the operation of computer law almost no knowledge of computer science and its environment would be needed, whilst the operation of legal computer science would only require a little knowledge of the law. To support this view the comparison is made between the knowledge needed to drive a car and that needed to design and manufacture a car. In this comparison the practitioner of computer law only needs to know the user's aspects of IT products.

The comparison above has, on closer inspection, several inaccuracies. IT has developed (*mutatis mutandis* in contrast to the automobile industry) in such a way, that the design, implementation and maintenance of information collections and IT applications are performed by the organisations using it. Two movements can be discerned. On the one hand the IT products supplied are increasingly

simpler to 'use', and on the other hand the knowledge needed to be able to apply IT products is increasing within society.

This development is furthered by the general recognition, nowadays, that for the design and implementation of effective IT application a good knowledge of both the material to be automated as well as of the possibilities and techniques for computerisation are needed. Many failed computerisation projects have demonstrated that a division between technological and content expertise, if it is made too strictly, can lead to problems.

Whenever the research projects inventoried earlier are once again reviewed from this, somewhat changed, perspective, then this justifies asking whether the original distinction made when the problems were defined between computer law and legal computer science is not too stringent. The commission is of the opinion that this is the case.

There is much more than superficial knowledge of computer law needed to answer the research questions of computer law. In order that these questions should lead to juridically effective instruments, consideration must be given to the concepts which are developed in the theory of computer science and which are used in practice. A single example: to be able to regulate security effectively (also from the civil law point-of-view) then one has to know what is 'technically' possible and impossible; whenever the 'conceptual model' is to be positioned centrally in the civil law agreements concerning definition and quality of an application which is to be supplied then one has to know what the term means to computer scientists. Whenever a judge has to establish whether the tampering with the content of a 'intermediate file'³⁹ constitutes forgery, he has to know both in juridical terms as well as in the technical sense what the term indicates. For the implementation of juridical applications, a much more thorough knowledge about the law and the way the law functions in society is also needed than was formerly assumed to be the case. An important part of the content of juridical IT applications is not only the subject of negotiations between customer/user and producer, but also the direct result of decision-making processes which are regulated through constitutional law, and which do not take into account (and still cannot take into account) the state of affairs in the field of IT. The reasons for, the limits of and the most frequently found forms of expression of this combination (outlined in sub-section 7.3.7.) of *inherent changeability* and *inherent rigidity* for the various components of the juridical material should be known to legal computer scientists for an effective computerisation with respect to the relevant material.

The commission presumes, that given the present state of affairs the difference in background knowledge (law and computer science) still, in many cases, results in the natural separation of computer law and legal computer science research for the research groups who are involved in it. Its opinion is that the continuation of

³⁹ This remarkable neologism is probably a terminological compromise which arose in the discussion between IT experts and lawyers within the scope of a criminal case.

this situation is not very advisable and it shall, in its proposals for the implementation of the proposed research projects then urge that conditions be created which will stimulate the cooperation between research groups which are specialised in computer law and legal computer science.

7.5 Summary

The research questions which the commission feels are important can be summarised in seven research programs: (1) the legal status of information, (2) the legal aspects of the information provision process, (3) the legal aspects of the IT production process, (4) the legally relevant tasks of participants in the information provision process, (5) the juridical values and interests with respect to making information available generally and in a limited fashion, (6) the juridical aspects of infrastructural facilities for IT use and (7) the IT opportunities for juridical work.

This is still concerned with research programs whereby the juridical opportunities with respect to IT use are linked with the IT opportunities themselves, the latter are, in many cases, linked with the IT opportunities for juridical use. A further analysis of the proposed research programs leads to the proposition that structural cooperation between research groups who are specialised in the fields of computer law and legal computer science is desirable.

8. PRIORITIES AND ORGANISATION

8.1 Introduction

It is part of the task of the commission to make a statement about the prioritization of research into answers to the inventoried research questions. Furthermore the commission has been asked to make proposals about the organisation which is desirable for relevant research programs⁴⁰.

In section 8.2 priorities are assigned to the various research groups. Moreover consideration must be given to the urgency with which juridical conditions have to be fulfilled to be able to guide the social use of IT properly and the degree to which the aforementioned juridical values come into play. In its proposals for organisational forms (section 8.3) the commission firstly examines which organisational forms for research already exist and which of the inventoried research questions can already be dealt within these organisational forms. Following on from that proposals are then made with respect to the remaining research questions.

The commission's remarks on prioritization and organisation are made on the basis that they can be related to the spending of a larger budget than is at present nationally and internationally available. They are of the opinion that the way in which the prioritization of scientific 'directly funded research' is performed is not at present satisfactory. Moreover it should be the case that the prioritization of directly funded research should not be intrinsically influenced by the government. Influencing of research prioritization outside this area should be shaped by the government through the conditions which can be attached to the spending of separate and earmarked research funds (NWO and EC stimulation programs).

8.2 Prioritization of research clusters

In the previous chapter the commission distinguished seven research programs which can be characterised respectively as research into (1) the legal status of information, (2) legally relevant aspects of information provision processes, (3) legally relevant aspects of IT production processes, (4) legally relevant tasks of participants in information provision processes, (5) juridical values and interests with respect to making information available generally and in a limited fashion, (6) juridical values and interests with respect to infrastructural facilities for IT use and development and (7) opportunities for improving the juridical instruments with the aid of IT applications.

It is the commission's opinion that the present time requires that jurisprudential research issues should also be approached *from the international (European) perspective*. In chapter seven each one is mentioned separately: in this chapter this international component is assumed - there is no longer a separate reference to it. With reference to the research questions outlined the international component is however especially relevant. IT production and use are recent phenomena which are internationally orientated. As a result of this there are fairly good

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See the decision to create the commission.

social conditions to be able to set up an international harmonisation of legal regulations. The international harmonisation of national regulatory systems is in itself a highly important subject for jurisprudential research.

All the research programs mentioned can be approached from a point-of-view which is descriptive, which can be problem-guided, application-directed and which is systematic-theoretical. *The commission's opinion in the present circumstances is that all the research programs mentioned should be actively approached from all three points-of-view.* Descriptive research provides indispensable material both for problem-guided, application-directed research as well as for that of systematic-theoretical research; problem-guided application is indispensable in those cases, in which juridical solutions for (new) social problems must be found; systematic-theoretical research is indispensable in those case in which structurally altered social relationships (and the resulting incidental problem-guided applications of the juridical instruments) threaten to disturb the coherence of the law.

The commission also on the whole holds the opinion that the deployment of research capacity for problem-guided, application-directed research is of great importance in connection with the rapid development of IT use. This is just as true for research in the fields of computer science as for those in legal computer science. Given the degree to which the effectiveness of the juridical instruments, as a result of the developments mentioned (but also as a result of the internationalisation of the law at EC level) is brought into the discussion and will be drawn into it to an even greater degree, the commission is furthermore of the opinion that a period has begun in which research capacity should be freed for systematic-theoretical research in the fields of computer law and legal computer science. In support of this train of thought with respect to research prioritization the various research programs are dealt with in succession below.

(1) The legal status of information (7.3.1)

Information (within the meaning of sub-section 2.1.1) has acquired new characteristics as a consequence of IT developments when compared to the past. Information has become easier to individualise, to access, to transfer, to copy, to destroy and to process. In the existing laws this has led to questions arising concerning the legal status of information. With reference to the social significance of information, constructions have been found in which information could be a commodity (theft, vandalism), a right (correct personal details) or a document (forgery, confidentiality of the mail, copyright protection for documents, issues of evidence).

It begs the question as to whether the problem-directed attribution of one or more existing legal qualifications to information in the future will seem to be sufficient socially. Information plays a crucial role in education, in science, in social intercourse (monetary transactions, commercial transactions, information services, the achievement of consensus ad idem, specific company know-how, industrial property), in representation (democracy, interest-protection, association, participation), in the preparation of policy- and decision-making and in the implementation of (and monitoring of) policy (for instance at EC level). The commission cannot rid itself of the impression that there are serious risks to a well-function-

ning democracy if the medium-to-long term approach to the legal status is exclusively problem-guided.

(2) *Legally relevant aspects of information provision processes (7.3.2.)*

Further legal research should be performed into information provision processes and IT production processes for the same reasons as were given for the research program into the legal status of information. The growing social significance of information⁴¹ means that a systematic analysis of the *legally* relevant aspects of information provision and production processes is extremely relevant. In the legal insights which have been developed so far by means of problem-guided research a few doubts have arisen (does the use and storage of information imply the copying and publication of it?).

A systematic legal analysis of information provision processes also lies at the basis of an effective movement of information which is regulated through civil law. There are however still major problems associated with it (especially in distributed information provision processes). The clarification of these problems is necessary for the effectiveness of the juridical instruments with respect to the social information provision (and by that: for an appropriate economic order which makes it possible to have a wide provision of information).

(3) *Legally relevant aspects of IT production processes (7.3.2)*

Systematic jurisprudential research should also be carried out with reference to the relevant legal aspects of IT production processes. There should be research into, for instance, the degree to which a more systematic legal approach to the IT production process (for example, in terms of the legal significance of sector-specific terms such as information analysis, conceptual models, formal models, implementation, validation, acceptance and maintenance) can be linked to the legal interpretations which have already been developed with respect to pre-contractual relationships, to the establishment of quality standards, to liability and exoneration possibilities and to issues concerned with competition and industrial property problems.

The commission holds the opinion that the problem-guided approach in this area of research has led to insufficient clarification with respect to the civil law possibilities for standardisation of quality for IT products. In this respect the commission considers jurisprudential research to be of great importance to society.

(4) *Legally relevant tasks of participants in information provision processes (7.3.3)*

Following on from systematic jurisprudential research into the legal status of information and the legally relevant aspects of information provision and IT production processes, attention should be paid, in the commission's opinion, to the identification of legally relevant tasks of participants in the information

⁴¹ Probably unnecessarily: the term information is still being used here within the meaning given in sub-section 2.1.1.

provision processes. Information and information provision lead to *information relationships*. Because of developments in IT these relationships will soon differ fundamentally from the usual social relationships in which information was exchanged until now. IT developments, with the possibility of distributed information processing, will lead to a social practice in which the will of the individual (and with that the achievement of consensus ad idem) can be achieved in cooperation with and dependant on IT applications (the example of the pincode is only a forerunner). In particular the IT aspects of information relationships should, at least, be able to be regulated in a clear fashion through civil and public laws. The information relationships within and between organisational units depend in the future on this ability (sections 5.3, 5.4 and 5.5) and this is also true of the juridical values and interests (section 6.4).

(5) *Juridical values and interests with respect to making information available generally and in a limited fashion (7.3.4 and 7.3.5)*

The legal status of information, the legal relevance of information provision and IT production processes and the legally relevant roles in information relationships are still not the subjects of substantial, systematic-theoretical, jurisprudential research programs. The same can be said of the systematic jurisprudential treatment of issues with respect to making information available. Within the scope of problem-guided, application-directed research this question is still being posed regularly (mostly implicitly), for example with respect to competition issues, industrial property, media issues, electronic mail, EDI, personal data and statistical (company) information (the question of protection: on the basis of its nature, the use for which it is intended and/or the production objective) the security of information systems, the public nature of administration, the establishment of standards of liability and quality of IT production and such like.

The commission is of the opinion that, as a logical sequel to the systematic research proposed earlier, further research into legal criteria for making information available are urgently needed, bearing in mind a well-organised and consistent regulation of the issue. The regulation of this issue is also of overriding significance for the way in which a well functioning democracy and an appropriate economic order can be achieved in the medium-to-long term.

(6) *Juridical values and interests with respect to infrastructural facilities for IT use and development (7.3.6)*

Infrastructural facilities form the necessary basis of a social climate in which IT services and IT use can develop and prosper. This favourable function depends to an important extent on political decision-making with regard to the regulation of the organisation, the financing, the division of the capacity and the control of the infrastructure as well as with regard to the (competitive) position of the managing organisation in relation to the users of the infrastructure and in relation to other potential managers. Various political movements (also international) think differently about the way in which the regulation of infrastructural facilities should be shaped. The jurisprudentially relevant questions in this connection are concerned, in one respect, with the degree to which consideration is given to the general juridical values and interests among the various regulatory modalities of

the differing public services. The competition and implementation issues which play a role in the possible effectiveness and conditions which affect the effectiveness of international infrastructural developments are also important.

By infrastructural facilities the commission, in this context, does not mean only communication infrastructures. As was remarked on in subsection 5.2.1, information collections can also play an infrastructural role (object systems). In this respect the legal source material (laws, draft laws, orders, and case law) can be taken as an example, which has an infrastructural significance for the development of services of various groups in society, and which can be offered with the aid of knowledge systems.

Because the Netherlands appears to occupy an exceptional position in Europe with respect to the various regulatory modalities (the interest-protection and caring midfield groups are positioned between the private and public law), research into this material, with an eye to our future position in Europe, is, in the commission's opinion, of great social importance.

(7) *Possibilities for improvement of the juridical instruments with the aid of IT applications (7.3.7)*

The proposals with respect to legal research programs aimed at the regulation of IT production and use, will, in many cases, be regarded as independent of the research programs in the field of computer science which are aimed at the acquisition of knowledge, needed for the creation of IT applications for juridical work. For the first type of research the stimulus will come from the perceived discrepancies between the social use and the law. The second type of research attempts to reduce the presumed discrepancies between the possibilities of IT and actual, successful implementation of juridical applications. In each case there will, for the present, have to be an educational contribution from legal computer science in order to provide professional jurists with the computer science knowledge which is deemed necessary on social grounds.

The commission considers that *legal computer science research* is and should be closely interwoven with *computer law research*. The research contributions, traditionally counted as belonging to legal computer science, are intended to contribute to the accessibility, comprehensibility and transparency of the existing law (legal knowledge systems for legislator, administrator, judge, public prosecutor, legal profession, legal petitioners), to the efficiency of the administration and the appropriateness of information relationships in general. In other words, this is concerned with the supply of knowledge and skills, which make it possible to continue to have a well functioning democracy even within the information society. In connection with this there are, as yet unsolved, the remaining specific problems for legal applications (for instance: changeability, mutual interwovenness, the open nature of juridical knowledge).

The commission is of the opinion, bearing in mind the successful implementation of the proposed research, that a structural cooperation between computer law and legal computer science experts is advisable and that the one-sided qualification of the research referred to, as 'legal computer science research' is then also deficient (see section 7.4).

Priorities

The proposed research programs are in the commission's opinion all urgent and tackling them is of major importance to the proper developments of a well functioning democratic and appropriate economic order in our future society which is becoming more and more internationally oriented. This is also equally true of the descriptive, of the problem-guided as well as of the systematic theoretical approach. The descriptive research provided a basis on which the other two research types can build. The problem-guided, application-directed research produces results relatively quickly: these fit into existing categories and as such are relatively easy to implement in the existing juridical instruments. Placing absolute faith in the problem-guided approach, in the commission's opinion, produces great dangers in the medium-to-long term for essential juridical values and interests of society. As a consequence of this the systematic theoretical research is just as necessary *and urgent*, because it is to be expected that the possible desirable implementation of the results in the juridical instruments will be a long drawn-out procedure. The commission holds the opinion that the systematic theoretical research therefore deserves the highest priority, because there is insufficient research being performed in the present state of affairs (see also: section 8.3).

8.3 Organisation

In the Netherlands the organisation of research can be divided on the basis of the degree to which the research fulfils a general public function, set against the degree to which collectiveness is present in financing and management.

The research which is financed and regulated on the basis of private law is, in particular, directed at problem-guided, application-directed issues. Such research is carried out both in the field of computer law (financial transactions, EDI, publishers) and in the field of legal computer science (EDI applications and information service development). Research is also financed and regulated in both fields through the mid-field (TNO, NWO, NOTA). This last form of research is in many cases contracted out to university research groups. The research which is relevant here and which is guided by the mid-field organisations is also mostly application-directed.

The research financed and regulated on the basis of public law can be divided into *application-directed* research which is carried out by or on behalf of ministries (for instance: the strategic long-term research program in the area of information provision in the public sector, with the corresponding expertise centre Consultants of Governmental Automation and accompanying Management Centre: the WODC; and also: research funded by means of tertiary funds and carried out by universities), scientific research tied to education/service in universities and in conditionally financed scientific research which is carried out at universities. The scientific research tied to education/service is in particular descriptive in nature, the conditionally financed research is, in the opinion of the commission, also principally problem-guided and application-directed.

For the more theoretical research programs, aimed at a more distant and systematic treatment of social questions which have arisen and which will continue to arise as a consequence of IT developments, there is evidently nowadays less

room at the universities. Unhampered by the responsibilities of faculties and departments the commission is of the opinion that this space should be created with the aid of extra funding.

In the previous sections the proposed research programs have been divided twice into respectively two and three categories: on the one hand descriptive in addition to problem-guided application-directed and systematic-theoretical; on the other hand computer law in contrast to legal computer science research. These divisions cannot be maintained in the absolute sense: each application-directed research is based on theoretical achievements; each theoretical research program is also aimed at supplying insights which can be applied; descriptive research lies at the foundation of both. Besides; the desired interwovenness of computer law and legal computer science research was discussed earlier. Nevertheless the commission thinks that the categorisation referred to links up well with the mechanism that nowadays defines the relevant university research programs. The divisions also seem to be useful for the discussion of the way in which the university research is usually grouped organisationally at the present time.

With reference to the organisation of scientific education and research in the fields of computer law and legal computer science the commission feels that all law faculties should have basic facilities⁴² which can fulfil the need for education⁴³ and problem-guided, application-directed research. Not every law faculty has these basic facilities as yet.

The commission furthermore is of the opinion that the social development of IT use, as well as the extent and the urgency of the issues allied to it which are posed for jurisprudence make a more emphatic pursuit of coordination and cooperation advisable. The commission has in mind intra- and inter-university cooperation between jurisprudential (computer law, legal computer science, international law) and university computer science research groups. The law already provides opportunities for the institutionalisation of intra- and inter-university cooperative links (working groups, research institutes, research networks).

The commission's opinion is that the present legal research in universities (with its problem-guided approach) fulfils an important research function. However they think that more systematic theoretical research must be done. The commission considers that this research should be stimulated by the government given the significance of this research in the short and medium term for a properly functioning democracy and an appropriate economic order.

⁴² In this sense also: H. Franken, A. W. Koers and G.P. Vandeberghe, Advice with respect to the Law and Computer Science (Advies inzake Recht en Informatica) Advisory report to the deliberations on the subject of jurisprudence VSNU, 1989.

⁴³ To illustrate this need: in 1990 831 students enrolled for an introductory course in legal computer science in which only 100 places were available.

The commission holds the opinion that separate funds should be made available for the execution of the research projects mentioned. When making these funds available there should be an attempt to set conditions for projects which are financed in this way; these conditions would:

- (a) stimulate a coordinated and effective approach to the research projects described;
- (b) stimulate the forms of inter- and intra-university cooperation described;
- (c) stimulate the establishment of the basic facilities mentioned at all Dutch universities.

Problem-guided, application-directed research

As far as the commission can oversee research is being carried out at present in most law faculties in the fields of computer law and legal computer science. With reference to this type of research the stimulation of projects with a high priority (standardisation of quality of IT applications, standardisation of liability in (distributed) information provision processes, standardisation of liability with respect to the vulnerability of information systems and with respect to the security, the design and the development of legal knowledge systems for the benefit of releasing juridical information and for the benefit of administrative policy implementation) can be carried out through secondary funding and in some cases even through tertiary funding.

Descriptive research

Cooperation and coordination of the research projects referred to can be stimulated by the establishment of infrastructural facilities, for example under joint management. By this the commission does not only have an improved communications infrastructure in mind, but also (and in particular) an improved information infrastructure. The central availability of legal sources (kept up-to-date) and of (international) descriptive research results which are thought to be of general interest, can play a significant role here and can greatly increase the quality of the jurisprudential research. The commission's opinion is that in this respect there is a need for a so-called expertise centre and urges that such a centre should still be established for computer law and legal computer science research, for the benefit of the infrastructural information provision (in particular, but not solely).

Systematic-theoretical research

With reference to the realization of the systematic-theoretical research programs with high priority (the legal status of information, the legally relevant aspects of information provision processes and IT production processes, the legally relevant tasks of participants in information provision processes, the juridical values and interests with reference to making information available generally and in a limited fashion, the juridical values and interests with respect to infrastructural facilities for IT use and development and the possibilities for improvement of the juridical instruments with the aid of IT applications) the commission is of the opinion that, given the social significance of such research and taking into consideration the fact that such research programs do not come in to being 'autonomously' in the present circumstances within the universities, an appropriate national program

should be established. The size of this program should make it possible within five years to consider the material in a comprehensive, and mostly inventorising manner for the first time. Assuming a separate financing and organisation of an effective communications and information infrastructure the commission considers that the research referred to, could very well be accommodated in an organisation which would be comparable to the recently described 'research school'. Depending on the results and on the, then current, social situation the decision would then have to be made whether the program referred to should be continued for another five years.

Possibilities for realization

Given the national importance of the proposed research, given the size of the proposed systematic theoretical research programs and given the urgency with which these programs should be started the commission considers that for the realization of them a *national program IT and the law* should be established. Some experience has already been gained administratively and organisationally with national programs (for instance in the field of demography).

The national program could be shaped organisationally by means of a separate foundation or steering committee, which for the purposes of good coordination could be placed under the wing of NWO. The steering committee or foundation would have the task of ensuring the implementation of the whole program which would be phased and coordinated in joint projects, and which would be set up with such conditions as to ensure that the objectives of the national program are fulfilled; moreover the steering committee or foundation would have the duty of acquiring the necessary funding and supervising the expenditure of it.

The national program should be set up and supervised in such a manner that, independent institutes could come into existence in due course. The commission considers, moreover, the establishment of a research school for IT and the law, in which (parts of) the systematic-theoretical research program could be further carried out, to be a good prospect. Furthermore the commission thinks that the national program could contribute to the development of an expertise centre which would fulfil an infrastructural function for jurisprudential research in the field of IT and the Law. The expertise centre should fulfil a central documentation function for relevant (international) research results and research tools (for example: computer programs). Finally the commission considers that the national program could contribute to improving the availability of an information infrastructure in which the (not yet processed or selected) legal sources could be maintained centrally and be made available for research and other social information services.

9. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

9.1 Introduction

In the previous chapters the temporary advisory commission IT and the law has set out its findings with regard to the question:

what are the issues which arise from the effects of IT in society in the medium-to-long term, and to which jurisprudence should provide the answers?

In this closing chapter the commission will attempt to reiterate these findings in concise terms. As a result the subtle distinctions are, of necessity, somewhat lost.

9.2 Summary

The effects of IT in society are the result of (a) the technological development, (b) the development in IT use, (c) the manner in which that use has influenced the economic order and the system of law and (d) the manner in which the system of law has influenced IT use and IT production.

The expected technological development consists mostly of a continuation of the improvement in cost/performance ratio of IT products, of the improved communications facilities and of an enlargement of the practical usefulness of IT applications (chapter 3).

The developments in the use of IT applications consist of a spectacular growth in all fields of application, caused by (1) the lowering of economic thresholds, (2) an improved communications infrastructure (FAX, distributed data processing) and by an increasing social confidence in IT. This confidence however depends on the reliability, the quality, the ability to individualise, the transparency and the exclusivity of developed applications (chapter 4).

The developments in the use of IT influence the economic and legal system in all sectors of society. These influences can be felt in the *information relationships* within and between organisational units, both in the private sector and in the public sector and the mid-field organisations. They influence existing competence divisions and power balances. These will change under the influence of IT use; new forms of representation will be possible (chapter 5).

The *existing* juridical instruments are not able to regulate these developments effectively in all respects. With reference to *IT production* they fall short in respect of the effective standardisation of industrial property, as well as with respect to the standardisation of reliability, security, quality and liability. With reference to the *use of IT* they fall short with respect to the regulation of information relationships. Because the proper functioning of the democratic system of law is based on the effective regulation of information relationships, the opportunities of strengthening the juridical instruments form important jurisprudential issues. This is nowadays even more valid because the internationalisation of economic and legal systems, especially in Europe, is in full swing (chapter 6).

The most important research issues in this connection are concerned with: (1) the legal status of information, (2) legally relevant aspects of information provision processes, (3) legally relevant aspects of IT production processes, (4) legally relevant tasks of participants in information provision processes, (5) juridical values and interests with respect to making information available generally and in a limited fashion, (6) juridical values and interests with respect to infrastructural facilities for IT use and development and (7) opportunities for improving the juridical instruments with the aid of IT applications. These issues should also still be researched in their international context (chapter 7).

The issues referred to, can and must be approached from a point-of-view which is descriptive, which is problem-guided and which is systematic. The descriptive and the systematic research lags behind at present. Only the problem-guided research comes out reasonably well nowadays: this deserves the highest priority anyway. This is also equally valid for descriptive and systematic research because grave danger lurks for the coherence and effectiveness of the law if the present situation continues. The commission suggests that the descriptive and systematic research should be especially stimulated (chapter 8).

9.3 Conclusions

- * *With the aid of the existing juridical instruments the development of IT applications cannot be effectively regulated to a satisfactory degree.*
- * *The changes in IT use cannot be effectively regulated to a satisfactory degree by means of the existing juridical instruments.*
- * *The way in which the legislator fulfils his function with respect to the social IT developments is not sufficiently effective.*
- * *The way in which the judiciary fulfils its function with respect to the social IT developments is not sufficiently effective.*
- * *There is not enough room in the Dutch universities for the more fundamental, systematic research in addition to the problem-guided jurisprudential research.*
- * *Without extra room for fundamental, systematic research the solely problem-guided adaptation of the juridical instruments which is aimed at the effective regulation of the development and use of IT applications in the medium-to-long term will lead to grave dangers arising for the democratic legal system because cumulative ad hoc solutions upset the coherence of the laws.*
- * *Research into more systematic solutions is of national importance and should be regulated nationally.*

- * *The adaptation of the juridical instruments, solely on the basis of problem-guided research, for the effective regulations of the development and the use of IT applications will, without extra room for systematic research, lead to a European structuring of information relationships in which the Dutch contribution will be of marginal significance.*

9.4 Recommendations

In addition to the existing university research the commission recommends that

- * *a national program of IT and the law should be established which has the task of stimulating and coordinating systematic theoretical jurisprudential research;*
- * *conditions should be attached to participation in the national research program, such that cooperation and coordination between the various university research groups (especially in the fields of computer law and legal computer science) will be encouraged;*
- * *the national research program should also be given the task of ensuring that (parts of) the proposed systematic theoretical research program are carried out in a research school;*
- * *the national program would also be given the task of ensuring that an information infrastructure, for the jurisprudential research referred to, would be maintained within an expertise centre which is to be established.*

Finally the commission recommends that

- * *the government should strive at international level to have funds reserved for the proposed research into IT and the law from an international perspective.*