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TEDIS II – EDICON

Final Report – TEDIS Phase II Task F4: Legal Aspects

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1. Introduction

This project contributes to the broad objective of the TEDIS program:

> "to conduct research into legal issues which might inhibit the development of trade EDI and to ensure that regulatory constraints in matters of telecommunications should not hamper the development of trade EDI."

The projects carried out in the TEDIS program have shown that legal constraints and differences throughout the EC Member States (and the EFTA countries) regarding the use of non-paper based systems are serious obstacles to the development of the use of EDI within the European Community (e.g. different legal regimes concerning 'EDIfied' negotiability and cryptography). Concrete EDI projects (outside as well as within the TEDIS program) have shown that technical/organisational constraints may also be severe (e.g. re-organisation, open access, trusted third parties, message standardisation, common business practices, message security). The TEDIS reports have provided many recommendations for measures to be taken in order to remove obstacles for EDI development. The aims of the EDICON project are (1) to consolidate by analysing, validating and digesting these proposals in order to (re)present them in a concise and coherent manner and (2) to provide guidelines to the Community for harmonisation.[1]

EDI development starts with new technical possibilities provided by R&D activities. These are picked up by the trade if business benefits are expected

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(efficiency, reliability) and adequate organisational and infrastructural measures are taken. Thus new trade scenarios come into existence, governed by old law. Persistent success of the new scenarios depends on the security and equity provided by the legal system in case of litigation. New law may be necessary to support this. New law may also be necessary in order to protect against unwanted practices potentially enabled (e.g. issues concerning unfair competition, personal data protection, taxes, environment protection, specific trade restrictions). New law may influence EDI development and provide incentives for new R&D activities.

1.1. *Consolidation*

The main issues at stake in the individual TEDIS reports can be summarised as follows: do the new IT-techniques involved when using EDI meet the traditional functions and capabilities of the traditional means and methods of trade without weakening the legal position of the parties involved? The issues involved are diverse and include: infrastructure; proof of originality and archiving; contract formation; rights transferability and restrictions; authentication of sender; encryption of the documents; security from hostile intent; minimal risk; equity in liability allocation; open access and interconnection; standardisation.

The issues hampering the development of EDI have been addressed in the TEDIS reports from different perspectives (technical, organisational, legal) and at different levels of abstraction (ranging from practical to theoretical). The TEDIS reports also provide inventories of the relevant legal incompatibilities between EC countries (and EFTA countries) as well as proposed solutions.

As a *work program*, the following consolidation sub tasks have been distinguished, adopted and carried out to provide a basis for this final report:

- to compile and analyse the results of the TEDIS projects in order to identify the main technical and organisational issues which currently enhance or inhibit further development of EDI (the results of this sub task are laid down in Appendix I);
- to compile and analyse the results of the TEDIS projects in order to identify the main legal (Community law and country laws) instruments for or obstacles to further EDI development (the results are laid down in Appendix I);
- to compile and describe (i) *apparent success scenarios* for EDI development, (ii) *emerging success scenarios* for EDI development (i.e. the obstacles may be removed by self regulation or non-governmental organisational initiatives in the market), (iii) *potential success scenarios* that may be successfully addressed by EC harmonisation efforts,

including relevant Community law in related areas (e.g. concerning unwanted side effects of EDI) and (iv) apparent failure scenarios, i.e.: *hard problems* that are not likely to be addressed successfully by EC harmonisation efforts (the results are laid down in Appendices II);
- to compile and describe Community (legislative) action considered relevant to the development of EDI (the results are laid down in Appendix III).

1.2. *Guidelines for Harmonisation*

The different perspectives involved in addressing the issues hampering the development of EDI suggest different handles for effective measures to be taken in order to enhance EDI development. Multidisciplinary co-operation between representatives of the different areas involved (like legal, accountancy, technical, organisational) is vital in order to pinpoint the appropriate handles and measures (e.g. self regulation, R&D programs, organisation-building projects and recommendations, directives for removing persistent legal obstacles). Experts from these different areas are invited to discuss a first bid of harmonisation guidelines proposed by the project team.

It has been considered that measures aimed at removing obstacles by R&D efforts have (in principal) the same priority as measures aimed at removing obstacles by organisational, legal and standardisation means but may need different incubation times.

In compliance with subsidiarity considerations, measures aimed at harmonisation will have lower priority, and direct EC law making (e.g. by protocol or treaty) will be considered an ultimum remedium.

As a *work program*, the following sub tasks have been distinguished, adopted and carried out to provide a basis for the guidelines in this final report:
- to provide (from a vantage, theoretical point of view) a first bid of recommendations and priorities for appropriate measures to be presented for discussion in brainstorm session held by international experts (the results are laid down in the Appendices IV and V);
- to rephrase the first bid, respecting the feedback of the Advisory Boards and the Commission; this phase provides the final report (laid down in a preliminary Chapter 2);
- to generate international support through organised discussion of the Pre- liminary report by invited international representatives (in the brainstorm sessions and in the review of the preliminary Report);
- to provide the final report of recommendations (laid down in the final Chapter 2).

A few, mostly self-evident, *principles* have been adopted to guide the search for guidelines:

- The principle of subsidiarity (the combination of necessity and proportionality).
- Obstacles to the development of EDI may be caused *by lack of knowledge.* In those cases the initiation of fundamental research is an adequate Community action.
- Obstacles to the development of EDI may be caused *by lack of (business) experience.* In those cases the initiation of pilot studies is an adequate Community action.
- No regulation nor standardisation efforts should be ventured concerning any functionality in the area of EDI, before fundamental research as well as pilot projects have yielded solutions, that are authoritative in the sense that they are considered *acceptable* to trade practice within the intended user communities.

Several *legitimate aims* of proposed measures have been adopted – all are considered important criteria, used as rules of thumb to evaluate the guidelines for Community harmonisation measures. These criteria are:

- The support of the reduction of transaction costs through the use of EDI in general and those resulting from mutually incompatible and limited scope EDI systems in particular,
- The support of open, public access to EDI service providers for EDI users, in particular SMEs,
- The support of open access to the market for providers of EDI services, in particular for those providers who focus their services to SMEs users,
- The support of free competition among EDI service providers,
- The support of a level playing field (from the perspective of open free competition),
- The support of free exchange of information,
- The support of essential requirements for wide scale adoption of EDI (such as network and systems integrity, data protection).

2. Community Guidelines

First a compendium of the consolidated projects is provided (Section 2.1). Subsequently, a digest of persistent issues and recommendations is given (Sections 2.2 – 2.3). After that, a short list of the potential actors is followed by a short description of the EU action repertory (Sections 2.4 – 2.5). Section 2.6 identifies three dimensions along which future EDI scenarios are qualified in accordance with expected success rate. Finally, in Section 2.7 the Guidelines for harmonisation are provided.

2.1. *Compendium of the Consolidated Projects*

In the EDICON project eleven TEDIS II projects on legal aspects have been included for consolidation. Below they are listed (in chronological order):

Accounting. The project aims at identification of legal constraints and inadequacies for the use of EDI in the domain of accounting. (Report dated November 1992).

Authentication and storage. The objectives of the study are to review the current developments in electronic storage and authentication technologies by focusing on their functionalities in order to increase the level of understanding of the functions they provide (especially from a legal perspective). Report dated: 1993.

Transport. The project aims at the identification of legal constraints and inadequacies for the use of EDI in the transport domain. A survey of experiences with working systems (ADEMAR, Thyssen & Haniel, Dubois and British Airways) is included. (Report dated: July 1993).

EU Model Interchange Agreement. The European Model EDI Agreement is a first step towards harmonisation of the variety, and inconsistencies in quality and conditions of existing interchange agreements. It is expected to achieve (1) coherence, (2) legal transparency and (3) protective balance. Report dated: January 1994.

EDIPAY. The project aims at identification of legal constraints and inadequacies for the use of EDI for payment procedures (Report dated: November 1994).

DEVOTECH. The project aims at identification of legal constraints and inadequacies for the use of EDI for payment on receipt. (Report dated: January 1995).

EDILEG. The project aims at identification of legal constraints and inadequacies for the use of EDI for invoicing. Three pilot projects were conducted (Telecom Eirann/Lake Communications; Northern Telecom Ltd/SGS Thomson Microelectronics Ltd; Edipharm). (Interim Report dated March 1995).

Mandate. The overall objective is to establish the commercially most acceptable electronic alternative to negotiable documents, which also satisfies all requirements of the legal systems prevalent in the member states (Report dated: April 1995).

Protedi. The project aims at identification of technical and legal solutions for the implementation of personal data protection in EDI systems. In the project, several operational EDI systems were used for analysis: ASSURNET and GALILEO (and EDILEX, REDI-1/AECOM and EMEDI). There were two interim reports: (i) in French dated November, 1994 and (ii) in Spanish dated May, 1995.

EDIBoL. The specific aims of the project are to: (a) determine the functional requirements of the electronic Bill of Lading, (b) define technical designs that satisfy the legal and operational requirements,(c) design a working model of the electronic Bill of Lading and a demonstration gaming environment (Report dated: December 1995).

PORTIA. The project evaluates UN/EDIFACT messages from a legal perspective (including the data protection angle). Report dated: 1995.

These projects are not homogeneous. The EDICON team has ventured to fit them in a three-dimensional framework. The dimensions are:

a) *technical/organisational*
This perspective relates to advancements in relevant technology, starting with infra structures, moving upwards analogous to the ISO-OSI model for network communication. Along this dimension questions about encryption and security services, about standardisation of protocols naturally emerge. EDIFACT can be seen as a standard protocol at the application level. This perspective is predominant in the **Authentication** and **PORTIA** projects, as well as in the technical solution of the **Mandate** project and the standardisation perspective taken in the **Protedi** project. They investigate the semantic relations of (1) security techniques and (2) of standard EDI messages with the legal perspective.

b) *trade/organisational*
This perspective relates to standard phases distinguished in trade. We think here of (a) the orientation/marketing phase, (b) the negotiation/contractual phase, (c) the transport/delivery phase, (d) the settlement/payment phase.
Transport and **EDIBoL** fit very much in the transport phase. **Mandate** in transport as well as settlement. **EDIPAY, EDILEG** and **DEVOTECH** are mainly settlement. In all these projects, the trade EDI activities are evaluated against questions of legal validity and legal security.

c) *legal*
The legal perspective starts with bilateral/multilateral agreement and proceeds via standard agreements and general terms or conditions

Table I: Technical and legal perspectives:

Legal / Technical	*(interchange) agreement*	*standard terms/ conditions*	*mandatory trade law*	*mandatory non-trade law*
Infra structure	**EU model IA**			
Data transport	**EU model IA**			
Security services	**EU Model IA** **Transport** **EDIPAY, EDIBoL** **Accounting** **Authentication** **Mandate**	**Transport,** **EDIPAY** **EDIBoL** **Accounting** **Authentication** **Mandate**	**Transport** **EDIPAY** **EDIBoL** **Accounting** **Authentication**	**Protedi** **EDILEG** **DEVOTECH**
Standardisation	**EU Model IA** **Transport** **EDIPAY, EDIBoL** **Accounting** **PORTIA**	**Transport** **EDIPAY** **EDIBoL** **Accounting** **PORTIA**	**Transport** **EDIPAY** **EDIBoL** **Accounting** **PORTIA**	**Protedi** **EDILEG** **DEVOTECH** **PORTIA**

towards mandatory legal requirements of trade law and finally towards mandatory legal requirements of non-trade law (e.g., Tax law, Personal data Protection, Criminal law). The **EU standard Interchange Agreement** is a model agreement (a legal "standard") that aims at supporting as much legal security in EDI as is currently to be procured. **Accounting** and **Protedi** relate mandatory non trade law requirements of different legal systems to EDI practice.

In the projects, the non-legal dimensions are related to the legal dimension. All projects fit naturally in. This is shown in Tables I and II.

From Table I it is inferred, that the TEDIS II projects under consolidation do not cover all issues from the combined technical-legal perspective. The blank cells show that no projects have been carried out investigating terms and mandatory law in relation to infrastructure and communication. In other words: regulatory aspects of telecommunications like the EC ONP and Services Directives have not been addressed in explicit relation to EDI.

Table II: Trade phases and legal perspective

Legal / Trade	*(interchange) agreement*	*standard terms/ conditions*	*mandatory trade law*	*mandatory non-trade law*
Orientation/market	**PORTIA**	**PORTIA**	**PORTIA**	**Protedi** **PORTIA**
Sale/contract	**EU model IA** **PORTIA**	**PORTIA**	**PORTIA**	**Protedi** **PORTIA**
transport	**Transport** **Mandate** **PORTIA**	**Transport** **Mandate**	**Transport** **EDIBoL**	**Protedi** **Transport** **EDIBoL**
settlement/payment	**PORTIA**	**EDIPAY**	**EDIBoL**	**Protedi** **EDILEG** **DEVOTECH** **ACCOUNTING**

From Table II one can infer, that the TEDIS II projects under consolidation do indeed cover all areas of the organisational-legal perspectives. The attempt to locate the consolidation projects in the most natural fitting cell shows that (a) The PORTIA project is a very important and broad project, since it covers many cells, that (b) the Transport, Mandate and EDIBoL projects share a row of Table II and that (c) four projects share the same cell – indicating that this cell identifies important issues. As a matter of fact these issues concern barriers to EDI development through mandatory non-trade law aspects related to the settlement/payment phase (for instance: changing relationships with and between tax authorities); obstacles to electronic invoicing and to self-invoicing are recurring issues here, brought to the fore by several reports.

2.2. *Persistent Issues*

All the projects mentioned have yielded important and detailed results on the legal aspects that hamper EDI developments, as well as detailed recommendations on what to do about it.

Here, the detailed results have been reformulated into broader categories. Those have been subject to expert discussion in brainstorm sessions. Here the broader categories of results and recommendations are given as digested by the project team. We have ordered them along the three dimensions mentioned before.

2.2.1. *Technical/Organisational*

The availability of:

(1) a good telecommunications infrastructure

is a *conditio sine qua non* for the development of EDI. This applies inside Europe as well as outside. Infrastructural backlog areas outside Europe will hamper the development of EDI in Europe, because many EDI systems are truly international by nature. Thus users will only have an optimal benefit from the system if it covers the whole international community.

We further mention the:

(2) advancements in relevant technology

as a persistent issue. The presentation of new technical solutions may support new applications for EDI; at the same time, it may prelude upon legal uncertainties to be expected. At the moment two developments are to be mentioned:

- the development of the Internet (the Information Society, the Electronic Highway – these are not yet included in the TEDIS reports as an issue of merit) as a wide and open infra structure for information and telecommunication services (including security services and possibly open-EDI support) and
- the development of multifunctional smart cards with very sophisticated security and value negotiation services based on cryptographic techniques is in a phase where the research solutions to required functionality (uniqueness, tamper resistance of stored electronic messages as compared to writings on paper documents) are acceptable to the trade.

Both developments mentioned provide many legal and organisational issues that remain unsolved for now. One of these issues is:

(3) interconnectivity of TTPs

and especially the distribution of the function of key-certification authority (KCA) over several TTPs for world-wide asymmetric cryptographic services (as required for authentication and for EDIfied negotiable instruments. Solutions to this issue are a prerequisite for the successful approach of one of the major organisational problems (mentioned below under 5) preventing the development of EDI: the otherwise unavoidable concentration of personal and company data with a central, single TTP, undermining trust.

2.2.2. *Trade/Organisational*

The discussion about the change towards open EDI is a persistent one. Here, inadequacies are more trade/organisational then legal. The opening up of an EDI system works in two directions: towards system integration (for instance across trade phases) and towards open access for system users. The first implies

(4) interoperability across sector-specific EDI systems

Good examples are ports, where systems of harbour authorities, carriers, banks, ship's agents, tax authorities, dangerous cargo authorities and several transport modalities may need to interact.

The second implies that users need not know each other. Neither need they trust each other. As a consequence, security services are being implemented that try to model trust. A persistent practical problem here is that extensive security services may easily lead to

(5) concentrations of sensitive business and/or personal data held by TTPs and/or governmental administrations, while adequate control mechanisms for the use of this information are (thought to be) lacking

This may prevent the development of these systems. It is considered possible that Chinese Wall techniques[2] may help. The implementation will need solutions to the interconnectivity and interoperability issues.

2.2.3. *Legal*

In an old law for new technology situation it is only natural that after a while it will be decided whether the 'old' law should be updated. EDI is the result of new technology. As such, it is regulated by old law – at least for a while. Consequently there is legal uncertainty as to the way 'old' legal systems will react to 'new' problems. Since large risks may be at stake, legal uncertainty is often considered a constraint for the development of EDI:

(6) old/new law for new technology

A quick-and-dirty solution to the problems posed by old law for new technology would be to adapt the law simultaneously with the developments of technology. However, there is hardly ever a *new law for new technology* situation to be achieved. Technology is a moving target – it is continuously renewing itself. What we will be faced with, consequently, is the persistent issue of

(7) technology-specific law-making

And it is suggested that the Community remains alert in order to prevent creating legal uncertainty through legislation that is outdated at the moment that it comes into force.

Very often attempts are made to *mould interchange agreements towards legal conditions that help emulate traditional legal security* (as around the legal conditions for paper based contracting) for electronic alternatives. This approach is beneficiary from a research point of view. Contractual emulation of legal functionality makes clear what the functional issues are. The Mandate project provides a good example. On the other hand, these contractual solutions may need to be rather complex and thus provide a barrier to the development of EDI and certainly to open-EDI. Furthermore, they cannot resolve all the uncertainty, especially not in case of mandatory rules of law.

In the area of moulding interchange agreements one inadequacy is felt very generally. It concerns

(8) differences in member state laws relating to the legal status of EDI messages

In many countries, the evidentiary value of electronic messages is considered inadequate; in many countries and in many situations, paper based contracts and hand written signatures are required. In some other countries, however, the legal system is already anticipating on EDI-evidence. This divergence does not benefit the development of EDI.

Member-state administrative competencies are not easily harmonised over Europe. Administrative bodies are given competence to develop a policy. This may be on any administrative subject. This diffusion of policy-making competence is very much in tune with the principle of subsidiarity. Consequently, explicit reasons have to be provided for harmonisation in this area. Consequently,

(9) the disharmonious diffusion of policy making competence with respect to the execution and/or application of legal rules all over Europe

does present problems to the development of EDI within Europe. We mention for instance: mandatory requirements of form and signatures concerning invoicing, (Value added) Taxes, Customs and Cryptography as possible sources of differences as well as problem areas for EDI.

2.3. *Recommendations from the Consolidations*[3]

The consolidated reports do not present their recommendations in terms of the official legal instruments the EU may revert to (such as regulations, directives, etc.). Since such a translation into appropriate EU instruments was one of the tasks of our study (which is given in section 2.7), we present the findings of the reports here in their original perspective.

Authentication and storage

1. Harmonisation of conditions for legal acceptability of authentication methods include: (i) identification of sender, (ii) identification of receiver, (iii) a link between text, document and signature, (iv) evidence of timing.
2. Future legislation should require complete records of every EDI transaction.
3. Electronic storage must satisfy certain criteria: (i) maintenance of the integrity of the message, (ii) durability, (iii) acceptability, (iv) readability, (v) evidence of timing, (vi) identification of the originator.

PORTIA

1. Reformulate text in EDIFACT directories, avoiding misleading legal interpretation.
2. Work at standardisation of Message Implementation Guidelines (MIG).
3. Use first segment identifying sender to contain the registered number of the organisation.
4. Investigate the feasibility of the inclusion in all available EDIFACT messages of a dedicated segment, which can be used for the conveyance of relevant and necessary legal information.

Transport

1. Modification of the Warchau and CMR conventions, in accordance with Montreal protocol 4. Do not let CNUCED come into force. Modify Hamburg rules.
2. A VAN might play a central role in providing a unique interface to all players in the transport scene. Work towards the need for a minimal set of protocols and messages only, and standard EDI procedures.
3. At supra community level: promote the development of gateways between EDI systems in the transport sector and those of other industry and administrative sectors.
4. Since EDIFACT messages do not support legal information, work towards legal message segment;
5. Complete legal conditions for
   a) dematerialisation of transport contract formation procedure,
   b) dematerialisation of pick-up note and
   c) the dematerialisation of the 'liste de collisage'.

EDIBoL

1. Since in earlier experiments and pilots the role of registries/Trusted Third Parties has often been problematic, a tool should be made available that can be used to simulate different organisational alternatives.
2. Develop an EU Directive prescribing the functional conditions an information carrier must comply with in order to be considered legally equivalent to writing and signed writing (private/authentic deeds).
3. Develop models for inter-operation agreements for Trusted Third Parties that together provide global Bill-of-Lading negotiation services.
4. Develop opinion on administrative and trade EDI interconnection issues.
5. Develop opinion on business data protection issues.

Mandate

For electronic alternatives of negotiable instruments a combined technical – legal solution is proposed.

1. (Short term) legal solution: draft a framework contract in the form of a rule book (referring to ENITERMS) that defines the "club" that has to be entered by participants and
2. make as technical solution use of tamper resistant hardware (e.g., chip-cards) and asymmetric cryptographic techniques for registration and negotiation of electronic alternatives to negotiable instruments (uniqueness).
3. (Long term) legal solution: new regulation by statute/convention.

EDIPAY

1. EU legislative action for:
   - lifting the writing and signature requirement,
   - updating current clearing house rules.
2. EU activities supporting:
   - research into economic/credit risk implications of fragmentation of EDI messages and financial operation message flows
   - the development of Trusted Third Parties providing time stamp services,
   - further research into the necessity of standardisation and formulation of requirements regarding Trusted Third Party-service providers offering services in financial systems.

DEVOTECH

1. The EU should develop a legislative action resulting in the admissibility of electronic self-invoicing.
2. Consideration must be given to establishing a framework of international harmonisation and collaboration between policy making Administrative Authorities of the member states in order to support cross-border EDI relationships.

EDILEG

1. Legislation should be implemented to remove the legal uncertainty over the legal admissibility and evidential value of electronic records.
2. The Data Protection Commissioner should consider issuing a policy statement on the data protection implications of EDI.
3. The EU should consider whether terms, normally in interchange agreements, should be embodied in statutory code (and automatically apply).

4. Urgent consideration must be given to establishing a framework of national harmonisation and collaboration between Revenue Authorities of the member states whereby cross-border EDI relationships can be approved.

Accounting

1. The requirements with respect to the validity of EDI messages should be harmonised in the tax laws and in the accounting laws of the different Member States.
2. The same goes for retention periods.

Protedi

1. The development of codes of conduct regarding the roles and liabilities of EDI service providers, telecom operators and EDI system users.
2. Use for this purpose typical EDI contractual possibilities (interchange agreements, interconnection agreements).
3. Generalise the notion of a (model) contractual relationship between EDI users and their customers, where the latter do not communicate by EDI *per se*.
4. Use the interpretative function of the 'Groupe communautaire'.
5. Adapt EDIFACT messages to allow for a mandatory 'data protection' segment.

In this complete setting, these recommendations show themselves as very diverse and heterogeneous. We cannot use them unprocessed in our recommendations for Community guidelines. To prepare the processing, we first give a table in which the persistent issues are related to these recommendations (Table III).

The survey in Table III shows, that neither a good infra structure, nor technology-specific law-making has been considered an issue worthy of recommendations in one of the projects.

All other persistent issues are addressed and provided with recommendations by the TEDIS II projects. Within the context of the persistent issues, the following trends can be distinguished in these recommendations.

Concerning the interconnection of TTPs and the interoperability of EDI systems, many recommendations are directed at standardisation efforts and several technical/organisational research questions have been formulated. Several suggestions concerning standardisation efforts towards legal message segments have been proposed.

Almost general support for recommendations concerning new law for new technology can be mentioned with regard to aspects of evidence and storage of EDI messages. The same goes for harmonisation using EC Directives in these issues.

Table III: Persistent issues and consolidated recommendations

Persistent issue	***Consolidated recommendations***
(1) a good telecommunications infra structure	
(2) advancements in relevant technology	Mandate(2)
(3) interconnectivity of TTPs	EDIBoL(1, 3, 4) Protedi(1)
(4) inter operability across sector-specific EDI systems	PORTIA(1, 2, 3, 4) Transport(2, 3, 4) EDIBoL(1, 4) Mandate(1) EDIPAY(2 1-2 3) Protedi(2,3,5)
(5) control for sensitive data concentration at TTPs etc	EDIBoL(5) EDILEG(2) Protedi(1,2,3,4)
(6) old/new law for new technology (legal uncertainty)	Authentication(1, 2) Transport(5 1-5 3) EDIPAY(1 1-1 2) DEVOTECH(1) EDILEG(1,3)
(7) technology-specific law making	
(8) differences in member state laws	Authentication(1, 3) Transport(1) EDIBoL(2, 5) Mandate(3) Accounting(1,2)
(9) differences in member state administrative policies	DEVOTECH(2) EDILEG(4) Accounting(1,2)

It should be mentioned that the persistent issues 3–7 and 8–9 are put to the fore independently by several TEDIS project reports, indicating their relevance and urgency.

2.4. *Terminological Intermezzo*

Considering the question what to suggest as Community guidelines with respect to the removal of (legal) constraints hampering the development of EDI, we provide a short terminology.

Again, there are three perspectives. The technical/organisational (e.g., infra structure –, security services providers), the trade/organisational (e.g., the EDI system users) and the legal (e.g., the legislator, the public administration and the judiciary):

(i) from the technical/organisational perspective

The relevant *infra structures* are the one(s) for voice and/or data communications, for mobile communications and for satellite communications. In the near future even existing television cable networks will be used. The market for infra structures is opening up under EU pressure. Players in the field are telecommunication operators (TOs) and National Regulation Authorities (NRAs).

The relevant *security services* are the one(s) for:

- Message origin respectively receipt authenticity,
- Message content integrity,
- Message sequence integrity,
- Message uniqueness,
- Confidentiality of content,
- Non-repudiation of origin respectively of receipt,
- Claim of origin,
- Claim of ownership,
- Fair exchange of values.

These services are to be provided by trusted third parties (TTPs). The key certification authority (KCA) is an important TTP.

The terminology emerging from the *technical/organisational* research community defines trusted third parties (TTPs) as security service providers. Consequently, security services are provided by TTPs. From this perspective an important distinction is made between TTPs that have to be trusted unconditionally (the KCA, for instance) and TTPs that are trusted functionally. Functionally TTPs have only limited authority and provide limited services (like message content integrity).

The trends in infra structures and security services are mainly that they support world wide and mobile communication better and better and that the security services are also considered better and better, mainly due to the availability of cryptographic techniques and matching organisational measures. It should be mentioned that access to the infra structure is opening up as a result of the success of the Internet.

(ii) from the trade/organisational perspective

The EDI system is created by *users* (that is, by the organisations that have independent computers participating in the data interchange). There are different kinds of users (e.g., traders, banks, governments, accounting, chambers of commerce).

EDI-users may decide to buy or hire EDI-services from outside their own organisation. The providers here are referred to as EDI service providers.

The terminology that has emerged in the *technical*/organisational research community has been generalised. The result is, that EDI service providers are often referred to as TTPs. In the context of this report, however, it is considered useful to make a distinction between security service providers (TTPs) and EDI service providers. TTPs provide services that are independent of the trade sector particularities (apart from the level of confidentiality needed). EDI service providers specialise in areas that are trade sector or even EDI network specific. Contrary to the TTP-area, the market for EDI service providers

has not yet matured enough to be able to predict the developments. Also, the growing world wide accessible communication infra structures will have consequences for the way EDI-services will be provided to EDI system users that wish to outsource these services. There are already organisations in existence that are not themselves EDI users, and neither EDI service providers, but still have been established by users to set up and maintain an EDI system for them.

EDI-users may have clients that depend on their services. These clients are not considered to be EDI-users. EDI-users and EDI service providers may participate (or be represented) in national and international (sectional) co-operation initiatives. These initiatives do not have legislative power, but may provide standards to be adopted by the EDI users. We mention the ICC, CMI, BIMCO, UN/EDIFACT, UNCITRAL and ISO.

Successful EDI has until now almost exclusively been restricted to closed EDI systems – that is, to systems where the users do know and trust each other based on the perception of their business relationships as a stable win-win situation – even in those cases where there is an imbalance of power between system users.

The trend, however, seems to be towards open-EDI, that is – to a form of EDI where users are free to enter and leave the system and where users will not have a regular business relationship with each other. Here, users need not know each other, a win-win situation is not self evident – the system user should be (and generally is) aware of the possibility of hostile intent.

This open-EDI can be regarded as a facilitating infrastructure for what has commonly become known as Electronic Commerce. One of its organisational implementations can be inferred from the current developments in digital cash services. The scope of smart cards, being used to pay between clients of banks, can be expanded to initiate and record a whole range of EDI transactions. In that case, users of smart cards can be considered as open EDI system users, with the banks in the role of EDI service providers (instead of EDI system users).

(iii) From the legal perspective

In this exposé of EDI actors the most logical *legal* actors in the EDI field would be the legislators, public administrations and judiciaries as if performing their businesses using EDI and, in doing so, taking up the roles of EDI users, TTPs and EDI service providers. This perspective provides an approach towards *public administration* EDI, as distinguished from *trade* EDI.

Since the TEDIS program is restricted to *trade* EDI (and since *public administration* EDI is in the focus of the IDA program), the legal perspective yields the distinction of actors that may legally influence *trade* EDI systems

– regardless of their own status as EDI-user. Of course, these actors are amongst others legislators, public administrators and judiciaries – they may issue statute law, public policies and case law respectively.

To complicate matters further, the parties mentioned earlier (TOs, NRAs, TTPs, KCAs, EDI-service providers, EDI-users and their clients) are also legal actors because they make *agreements*. There is a diversity of TTP- and EDI-service-provider roles emerging and the terminology describing them is not yet stable. Neither are standard ways established in which legal aspects are best approached using (standard) contracts and terms.

At national and at Community level, there are to be distinguished legislators, public administrators and judiciaries as mentioned.

The trend is towards harmonisation. However, there are many counter-weights. In the European Community, a web of co-operating, interconnecting and possibly interfering powers and competencies is emerging. Many questions concerning the appropriate action have to be answered.

Before a proposal is made, the available action repertory is presented.

2.5. *The EU Action Repertory*[4]

2.5.1. *Action Repertory*

In order to carry out their task and in accordance with the provisions of this Treaty, the European Parliament acting jointly with the Council, the Council and the Commission shall make regulations and issue directives, take decisions, make recommendations or deliver opinions, art. 189 of the EU treaty.

A regulation shall have general application. It shall be binding in its entirety and directly applicable in all Member States. A directive shall be binding, as to the result to be achieved, upon each Member State to which it is addressed, but shall leave to the national authorities the choice of form and methods. A decision shall be binding in its entirety upon those to whom it is addressed. In principle, a decision leaves the national authorities no margin of discretion, unless a decision is meant to offer an authorisation to Member States which leaves them complete freedom. Sometimes decisions are used as an alternative to directives, meaning e.g. to harmonise laws. In that respect the rules on direct effect concerning directives apply here as well. Research Programmes which are initiated by the European Union are always based on Decisions. Recommendations and opinions shall have no binding force.

2.5.1.1. *Subsidiarity.* An important principle to be considered by the European Institutions in the course of designing new legislation is the principle of subsidiarity, which has been laid down in article 3B of the EC Treaty. This article holds the following: *The Community shall act within the limits of the powers conferred upon it by this Treaty and of the objectives assigned to it therein.*

In areas which do not fall within its exclusive competence, the Community shall take action, in accordance with the principle of subsidiarity, only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States and can therefore, by reason of the scale or effects of the proposed action, be better achieved by the Community. Any action by the Community shall not go beyond what is necessary to achieve the objectives of this Treaty. The subsidiarity principle means that regulation of subjects which are not within the Community's exclusive competence have to be necessary (necessity criterion). Furthermore, the regulation of all subjects within the Community's competence must in substance and legally fall within the scope of the Treaty's objectives (proportionality criterion).

As a consequence of the principle the EU institutions have to motivate why measures or policy should be taken or executed at a European level rather then at a lower, national level. The principle of subsidiarity also requires that proposals of a legislative nature need to be motivated expressly concerning the subsidiarity criterion (proportionality, necessity). Questions to be answered in the explanatory memorandum are amongst others: What is the most effective solution if one compares Community and national measures? In what ways may the Commission take action (financial support, Recommendation, Regulation etc.)? Do the objectives of a considered action match with the Community's obligations?

In practice, the principle is then (to be) used by the Member States to counterbalance over ambitious EU legislation in order to maintain or regain the appropriate balance between sovereign and community powers.

2.5.1.2. *Trans-European Networks.* The provisions concerning the trans-European networks (Title XII: articles 129B–129D) are added to EC-Treaty as a consequence of the amendments resulting from the Maastricht Treaty. The planning and stimulation of trans-European networks is regarded as a relevant component of the realisation of the internal market and a framework for measures concerning the opening up of regional and local territories, as well as for the promotion of the economical and social coherence. Trans-European networks are to be established and developed in the areas of transport, telecommunications and energy infrastructures.

According to paragraph 2 of article 129B the Community shall within the framework of a system of open and competitive markets aim at promoting the interconnection and operability of national as well as international access to such networks.

In order to achieve these objectives the Community can make use of guidelines to cover the objectives, priorities and broad lines of measures envisaged and any measures necessary to ensure interoperability of networks, especially in the field of technical standardisation. Moreover, projects of common interest by the Member States, which are identified in the framework of the guidelines, may be financially supported by the Community (all article 129C). The guidelines are to be adopted in accordance with the procedure of article 189B and after consulting the Economic and Social Committee and the Committee of the Regions. Measures shall be taken in accordance with the article 189C procedure and after consulting the Economic and Social Committee and the Committee of the Regions. The approval is required of the Member States, to whose territory guidelines or projects relate (article 129D). The procedures laid down in the articles 189B and 189C are inserted in pursuance of the Maastricht Treaty, whereby article 189C replaces article 149 paragraph 2. Article 189C contains the so-called co-operation procedure, designed to increase the influence of the European Parliament in the legislative process, but not going as far as giving the Parliament co-decisive power. This is different with respect to the procedure laid down in article 189B, which is a so-called co-decisive procedure: the European Parliament has the right of approval in stead of just a right of consultation.

2.5.2. *EU Actions Taken*

The Community has not remained inactive with respect to the development of EDI. Many actions have been taken that are of influence in this respect. In the next Sub Sections, an overview is provided of the actions taken (referred to in small print) and of the issues raised with regard to the development of EDI. In presenting these issues below, the input from the EDICON Brainstorm sessions (see also appendices 4 and 5) has been digested.

2.5.2.1. *Security and Encryption*:

- EC proposal on common IT security evaluation criteria (ITSEC);
- SOG-IS is working on a Green paper in association with the DG XIII;
- SEMPER, an EC funded research project on 'Secure Electronic Marketplace for Europe';
- Recommendation by the Council of Europe concerning problems of criminal procedure law connected with Information Technology

The Recommendation of the Council of Europe provoked an opinion of the Dutch Informatics Society. It shows that there seems to be room for investi-

gation into reasonable alternatives to the Council of Europe recommendation and the proposal, on which the European Commission is working at this moment. Therefore, the European Commission should e.g. fund research projects, rather then prepare and issue legislation, which perhaps may not be the only and most satisfying solution to the dilemma between law enforcement by public authorities and the necessity of security in the business sector.

From the discussions at the EDICON brainstorm meeting derives that companies seem to have little confidence in the government if it comes to establishing a key escrow system. Certainly, the system has to meet criteria such as due process and independent judiciary, but in spite of these guarantees the business sector still seems to have doubts whether the public authorities (and TTPs by working in the governments' interest) can be trusted. Furthermore, it was brought about that the key escrow system would constitute an enormous administrative bother for companies, because they tend to change their keys regularly for security reasons. Therefore, from a business point of view there is a clear 'NO' regarding encryption regulation.

The European Privacy Directives prescribe adequate protection for personal data by means of organisational and technical measures while processed over an information network. However, for reasons of national and public security Member States may restrict security obligations provided for in the Directive. Still, it is questionable whether this provision should allow encryption to be regulated or even prohibited, because encryption is a relevant means for companies to achieve a sufficient level of security.

2.5.2.2. *Privacy*

- Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data, OJ L 281/31, 23.11.95.
- Modified proposal for a Directive of the European Parliament and the Council concerning the protection of personal data and privacy in the context of digital telecommunications network, in particular the integrated services digital network (ISDN), and digital mobile networks, OJ C 200/4, 22.7.94.
- *IDA program*

The directive on the protection of privacy in the telecommunications sector (often referred to as ISDN Directive) does indeed (explicitly) indicate the reason why the general Privacy Directive does not provide a sufficient framework for the regulation of subjects which are still controversial and need further regulation. The reasons are mainly, that the need for a specific directive to complement the rules of the framework directive derives from the increased risks for privacy flowing from the processing of personal data in the telecommunications networks, especially in the 'new' networks.

Consequently, the ISDN directive is positioned in the middle of the tension between the need for reducing technique-dependence of regulation and the

need for harmonisation, since national legislative reactions may proliferate as a reaction to the new techniques.

This poses a quandary: technique-dependent harmonised regulation will hamper the development of EDI because of its inherent volatility, while a wait-and-see attitude towards harmonising legislation will hamper the development of EDI because it will induce the emergence of conflicting national legislation.

In that respect, the general Directive can be seen as a means of framework legislation to be considered along with the more specific (and from the light of the principle of subsidiarity: complementary) directive, together with other more flexible legislative means, such as recommendations or European codes of conduct.

It is mentioned additionally, that technologies may be used to diminish the use of personal data in information systems, thus increasing privacy protection by means of prevention rather then regulation. The role of the European Commission e.g. may lie in the field of promoting these technologies and encouraging the trade sector to apply them.

2.5.2.3. *Intellectual Property Rights (IPR)*

- Council Directive of 14 May 1991 on the legal protection of computer programs (91/250/EEC), OJ L 122/42, 17.5.91.
- Common position (EG)) No. 20/95 adopted by the Council on 10 July 1995 with a view to adopting Directive 96/9/EG of the European Parliament and the Council of 11.3.96 on the legal protection of databases, OJ C 288/14, 30.10.95.
- Council Directive 92/100/EEC of 19 November 1992 on rental right and lending right and on certain rights related to copyright in the field of intellectual property, OJ L 346/61, 27.11.92.
- *CITED Program.*

Several problems occur with regard to IPR's, and particularly copyright, as a consequence of the development of the information highway. Uncertainties exist concerning the authorisation for the use of works in multimedia products and the enforcement of rights by the right holders. To solve these problems encryption techniques, for instance identification tags and encryption codes to prevent alteration of works, can be used. Therefore, the European Commission should expressly sustain these techniques and even promote the – voluntary – use of the codes to copyrighted works.

With respect to copyright and the Internet EDI may play an important role as a clearing mechanism.

2.5.2.4. *EDI, ONP and Services*

- Council Directive 90/387/EEG of 28 June 1990 on the establishment of the internal market for telecommunications services through the implementation of open network provisions (ONP), OJ L 192/1, 24.7.90.
- Council Directive 92/44/EEG of 5 June 1992 on the application of open network provision to leased lines, OJ L 165/27, 19.6.92.

- Proposal for a Directive of the European Parliament and the Council on the application of open network provision (ONP) to voice telephony, OJ C 122/4, 18.5.95.
- Council recommendation of 5 June 1992 on the provision of harmonized integrated services digital network (ISDN) access arrangements and a minimum set of ISDN offerings in accordance with open network provision (ONP) principles (92/383/EEC), OJ L 200/10, 18.7.92.
- Council recommendation of 5 June 1992 on the harmonized provision of a minimum set of packet-switched data services (PSDS) in accordance with open network provision (ONP) principles (92/382/EEC), OJ L 200/1, 18.7.92.
- Proposal for a European Parliament and Council Directive on interconnection in telecommunications with regard to ensuring universal service and interoperability through application of the principles of open network provision (ONP), C 313/7, 24.11.95.
- Communication from the Commission to the Council and the European Parliament – present status and future approach for open access to telecommunications networks and services (open network provision), /* com/94/513final*/.
- Commission Directive (90/388/EEC) of 28 June 1990 on competition in the markets for telecommunications services, OJ L 192/1, 24.7.90.
- Commission Directive 94/46/EC of 13 October 1994 amending directive 88/301/EEC and directive 90/388/EEC in particular with regard to satellite communications.
- Draft Directive amending Commission Directive 90/388/EEG regarding the abolition of restrictions on the use of cable television networks for the provision of telecommunications services, OJ C 76/8, 28.3.95.
- Council Resolution of 7 February 1994 on universal service principles in the telecommunications sector, C 048/1, 16.2.94.
- Communication by the Commission to the European Parliament and the Council on the status and implementation of directive 90/388/EEC on competition in the markets for telecommunications services, /* com/95/113final */.
- Amended proposal for a European Parliament and Council Directive on the mutual recognition of licenses and other national authorizations for telecommunications services, /com/94/41final -cod 438 */.
- Communication from the Commission to the Council , the European Parliament and the economic and social committee – developing universal service for telecommunications in a competitive environment, /* com/93/543final*
- Council Resolution of 17 December 1992 on the assessment of the situation in the community telecommunications sector, OJ C 2/5, 6.1.93.
- Resolution on the Commission's 1992 review of the situation in the telecommunications services sector, C 150/39, 31.5.93.
- Council Resolution of 19 November 1992 on the promotion of Europe-wide co-operation on numbering of telecommunications services, OJ C 318/2, 4.12.92.
- *RACE program*
- *Fourth Framework Program*

With the abolition of the exclusive rights, which the national PTTs had with regard to all the public services, the market for telecommunications services is now open for other providers of services. This development entails competition on the services market between the service providers, which has to lead or has already lead to a more extensive offer of services and to cost reduction. Business sectors that want to introduce EDI into their business administration need these services offered by service providers to 'build' a network for the exchange of EDI messages between the companies. Consequently, they will

benefit from the development or improvement of EDI or other (value added) services.

Since, the installation of EDI brings about high investments, the so-called switching costs, for companies, which might give cause to hesitation concerning the profits to be gained, lower prices for telecommunications services will provide a stimulant to turn the balance in favor of EDI. Thus, the threshold to join an EDI-network will be lower.

As can be derived from the preceding remarks service providers are necessary for the use of EDI. The ONP conditions assure the service providers of access to public networks by subjecting these conditions to principles of objectivity, transparency and equality of access and only allowing restrictions on the basis of essential requirements. In this case the elaboration of ONP conditions in the ONP Directive on leased lines is of particular relevance, since it aims at the availability of a minimum set of leased lines in the European Union, which are technically interoperable and which can be accessible in an open and efficient manner.

The ONP conditions do not apply to closed user groups, so the rules of general competition law will apply concerning access to these closed networks. Concerning these private networks the Commission has already issued regulations on for instance air transport reservation systems.

2.5.2.5. *Multi Modal Transport*

- Council Directive 92/106/EEC of 7 December 1992 on the establishment of common rules for certain types of combined transport of goods between member states.
- Commission Decision of 22 December 1992 concerning the granting of financial support for pilot schemes to promote combined transport (93/45/EEC) the Commission of the European Communities
- *DRIVE program*
- *Fourth Framework Program*

The paper-based document is still incorporated in several regulations concerning multi modal transport and forms an impediment to the development of the use of EDI in the transport sector.

The UNCTAD/ICC rules constitute an improvement in the sense that these rules allow multi modal transport documents expressly to be replaced by EDI messages. However, the rules are not binding insofar they are contrary to mandatory provisions of international conventions or national law.

Therefore, it is still necessary at a European or preferably a world-wide level to adjust or recast existing or design new legislation to allow EDI messages explicitly to be used instead of paper documents. A framework as was put forward in the UNCITRAL document of 12 September 1995 may provide a good example as a starting point.

2.5.2.6. *VAT and Invoicing*

- Sixth Directive of the Council (EEC) 77/388 of 17 May 1977 on the harmonization of the laws of the Member States relating to turnover taxes -Common system of value added tax: uniform basis of assessment, OJ L 145/1, 13.6.77.
- Council Directive (EEC) 91/680 of 16 December 1991 supplementing the common system of value added tax and amending Directive 77/388 with a view to the abolition of fiscal frontiers, OJ L 376/1, 31.12.91.
- Council Directive (EEC) 92/77 of 19 October 1992 supplementing the common system of value added tax and amending Directive 77/388 (mutual adjustment of the VAT tariffs), OJ L 316/1, 31.10.92.
- Council Regulation (EEC) No. 218/92 of January 1992 on administrative co-operation in the field of indirect taxation (VAT), OJ L 24/1, 1.2.92.
- *IDA Program*
- *Fourth Framework Program*

The European Commission should make clear that the use of electronic invoices is explicitly sustained under the several Directives, in order to remove the uncertainty concerning the status of these invoices with respect to i.e. their evidential value, which is still present at the moment. The same conclusion can be drawn with regard to the status of self-invoicing in Europe, for it is allowed in some and prohibited in other Member States.

In order to promote EDI at a European level the co-operation between Revenue Authorities in the Member States has to be regulated by the European Commission. As Council Regulation 218/92 shows there is already co-operation in the field of the information exchange on taxpayers' declarations. The Commission can build upon this Regulation to enlarge the co-operative basis and regulate the mutual recognition of the national Revenue Authorities' competencies and decision-making. Moreover, this Regulation could address the authorization of electronic invoices in intra-Community transport.

2.5.3. *Persistent Issues and Community Actions Taken*

Table IV shows that all but one of the persistent issues in relation with EDI development are at least partially addressed by Community measures. Whether these measures are considered sufficiently complete is analysed in Section 2.7.

2.6. *EDI Scenario Qualification*[5]

As the results of the summary and evaluation of the TEDIS reports, three types of scenarios on EDI development in Europe are of interest

- apparent or emerging success scenarios for EDI where possible obstacles may be removed by self regulation or non-governmental organisational initiatives in the market,

Table IV: Persistent issues and Community Actions Taken

Persistent Issue	*Community actions taken considered relevant in the area of:*
(1) infra structure	• TENs, ONP and Services
(2) technology	• (Research) programs
(3) interconnection of TTPs	• Standardisation efforts • programs
(4) inter operability across sector specific EDI systems	• ONP and services • Standardisation efforts • programs
(5) control for sensitive data concentration at TTPs etc.	• Data Protection, privacy regulation • programs (IDA, TEDIS, INFOSEC) • Encryption opinion
(6) old/new law for new technology	• Data Protection, privacy and IPR regulation • programs (IDA, TEDIS) • Encryption opinion
(7) technology-specific law making	
(8) differences in member state laws	• Concerning liberalisation: ONP and services directives • programs (TEDIS)
(9) differences in member state administrative policies	• Transport and VAT directives • programs (IDA, TEDIS) • The principle of subsidiarity

- potential success scenarios that may be successfully addressed by EC harmonisation efforts, including relevant Community law in related areas (e.g. concerning unwanted side effects of EDI) and
- apparent failure scenarios, i.e.: hard problems that are not likely to be addressed successfully by EC harmonisation efforts at this stage.

The scenario analysis investigated *EDI development scenarios* in Europe from three different angles:

- the development towards open EDI,
- the replacement of paper by electronic documents, and
- the integration of EDI applications within the various phases of the trading cycle.

For each of the research perspectives (i.e., technical, organisational and legal), critical conditions for successful development are specified. This three dimensional analytical structure is used to understand, categorise and examine the issues identified in the TEDIS reports in terms of the natures of the problems. By comparing the identified problem issues with the success conditions, clear patterns appear on which issues and factors can be regarded as either a success scenario, a potential success scenario, or a apparent failure scenario.

2.6.1. *Degree of Openness of EDI*

This refers to the extent to which an EDI user is free to choose any other EDI user to do business with electronically without constraints like geographical limitations or having to have previous business relationships.

2.6.1.1. *Conditions.* The success conditions for an open EDI environment are the following:

Technical conditions

- open connectivity and inter-operability of global telecommunication infrastructures
- availability of needed information technologies (EDI software) for EDI applications
- international standardisation at message, procedure, application, and trade sector levels
- sufficient technical security measures in electronic data interchange
- data protection for the private data transmitted.

Trade/Organisational conditions:

- justification for organisations to adopt open EDI technology based on its cost effectiveness and efficiency
- critical mass of EDI participants thus sufficiently available market and business information which are needed for conducting intended EDI transactions
- business confidence/"trust" on doing EDI transactions with unknown EDI counter parties
- harmonised trade treaties and international conventions regarding the use of EDI documents in the trade practice

Legal and regulatory conditions

- a legally secure environment in which the EDI users operate
- legal provisions for EDI use
  1. legal status of EDI messages
  2. contract formation
  3. liability of involved EDI parties
  4. dispute resolutions
  5. admissibility of electronic evidence
  6. value of electronic evidence
  7. legal procedures for disclosing of electronic evidence
- EU-wide or international harmonised legislation for international open EDI

2.6.1.2. *Potential Success Scenarios and Recommended Actions.* Open EDI needs a certain level of legal security and certainty in order for users to engage in transactions with mutually accepted and predetermined legal consequences. Message developers have not taken this into account. The result is that there is a lack of clarity in the intended legal implications of a number of messages. Moreover, messages may have different legal implications in

different member states. It is therefore recommended that joint efforts of EDI standardisation by experts from technical, business, and legal areas are facilitated to ensure technical modelling can incorporate non-technical aspects of EDI:

- legal implications of EDI message use (e.g. legal status of message)
- accounting and auditing requirements (e.g. time stamps and auditing control procedures)
- at both message level and message exchange procedure/sequence level

Legal equity, security and certainty are often safeguarded in interchange agreements. However, the EU should consider whether terms, normally in interchange agreements, should be embodied in statutory code (and automatically apply).

EU legislative action is also recommended for:

- updating current clearing house rules in the financial sector
- the admissibility of electronic self-invoicing

2.6.1.2. *Apparent Failure Scenarios and Recommended Actions.* Open EDI implies that users need not know each other. Neither need they trust each other. As a consequence, security services are being implemented that try to model trust. Further research should be directed to ways and means of modelling trust in TTPs and into the necessity of standardisation and formulation of requirements regarding TTPs.

The unstructured business information (e.g. general conditions of a contract) which need to be exchanged in electronic transactions have not been adequately incorporated into the current EDI development and practice. The free-text segments of the EDIFACT messages which are currently used to contain unstructured data is unsatisfactory. There are yet no technical solutions for this problem. By its very nature EDI is not meant to handle unstructured information. Research efforts should be directed to ways and means of handling and presenting standard terms and conditions for transaction-based participating in open EDI in a legally valid way. An appropriate area seems the research into secure parallel processing of e-mail and www-services. In these respects the work of the ICC on E-terms and the TEDIC report (Teleport Paris, may 1995) are mentioned, as well as the current work of the UN/EDIFACT-AC 1 group.

2.6.2. *Degree of Paper Replacement*

This refers to the extent to which the EDI application can actually replace the paper documents with electronic alternatives, and such replacement is accepted by the parties involved in EDI applications.

2.6.2.1. *Conditions.* The success conditions for the replacement of paper are the following:

Technical conditions:

- availability and sufficiency of technological solutions to the replacement of all kinds of paper-based business documents by electronic alternatives exchanged in EDI.
- technical solutions for adequate representation of electronic information for legislation, inspection or auditing purposes.

Commercial/Organisational conditions:

- cost-effective thus economic incentives for replacement of paper by electronic formats
- a willingness and readiness to change from traditional (paper-based) ways of working to EDI-based procedures, especially for traditionally non-technical professions such as public administration or legislation. The willingness needed is very wide and regards the whole chain of information processing parties.

Legal/regulatory conditions:

- availability of legal provision for the admissibility of electronic evidence
- availability of legal provision for the value of electronic evidence
- acceptance of electronic format documents which are required for administrative purposes by public bodies (e.g. customs declaration forms, TAX documents, etc.)

2.6.2.2. *Potential Success Scenarios and Recommended Actions.* Currently a lot of legal uncertainty exists over the legal admissibility and evidentiary value of electronic records. In addition, differences exist in member state laws concerning evidentiary value. In many cases paper documents and written signatures are required. This usually is the result of legal requirements but also public administrative bodies (in determining their policies when executing legal rules) have appeared to be reluctant to give up paper based procedures. These obstacles have appeared in various sectors, such as the transport, the financial, and the accounting sector and may seriously hamper the development of international EDI.

It is therefore recommended that a directive will be formulated specifying minimal functional conditions for harmonisation of the legal validity of electronic documents (and the admissibility of their evidentiary value) just like (signed) paper documents. Conditions for legal acceptability of authentication methods should include: (i) Identification of sender, (ii) Identification of

receiver, (iii) a link between text, document and signature, (iv) evidence of timing.

With regard to electronic storage, it is recommended that future legislation requires complete records of every EDI transaction and creates harmonised clarity on the required retention period.

It is, furthermore, necessary to set criteria for judging the integrity and security of an electronic storage system. Such criteria should include: (i) maintenance of the integrity of the message, (ii) durability, (iii) acceptability, (iv) readability, (v) evidence of timing, (vi) identification of the originator.

2.6.2.3. *Apparent Failure Scenarios and Recommended Actions.* There have not been technically mature and practically acceptable solutions for the replacement of negotiable documents. Research and experiments have generated useful experiences, yet more combined technical and organisational effort is needed before electronic negotiable documents can be put in practice.

Here, the interconnection of TTPs is an important issue, especially regarding the distribution of the function of key-certification authority (KCA) over several TTPs for world-wide asymmetric cryptographic services (as required for authentication and for EDIfied negotiable instruments).

Models should be developed for inter-operation agreements for trusted third parties that together provide global negotiation services, and research efforts should be directed to ways and means interoperability between TTPs can be supported by message standards and by message scenario standards.

2.6.3. *Degree/Scale of EDI Integration*

This refers to the extent to which the EDI applications diffuse from initial stand-alone applications to the integration of various related application areas (e.g. from electronic ordering/purchasing only to a complete transaction cycle including transportation, payment, customs, etc.).

2.6.3.1. *Conditions.* The success conditions for large scale integration of EDI are the following.

Technical conditions:

- availability of information technologies (software packages) of EDI systems in various application areas (e.g. purchasing, invoicing, payment, transportation, and customs)
- interoperability among the EDI application systems

Commercial/Organisational conditions:

- critical mass of EDI adoption in each application area
- inter-organisational procedure redesign

Legal and regulatory conditions:

- harmonised legislation and regulations regarding EDI use across sectors
- harmonised legislation and regulations regarding EDI use across countries

2.6.3.2. *Potential Success Scenarios and Recommended Actions.* In order to increase the scale of electronic commerce interoperability across VANs, as well as interoperability across sector-specific EDI systems is needed. Good examples are ports, where systems of harbour authorities, carriers, banks, ship's agents, tax authorities, dangerous cargo authorities and several transport modalities may need to interact.

- The development of a model for the 'inter VAN contract' is advocated.

2.6.3.3. *Apparent Failure Scenarios and Recommended Actions.* Member-state administrative competencies are not easily harmonised. Administrative bodies are given competence to develop a policy. This may be on any administrative subject. This diffusion of policy-making competence is very much in tune with the principle of subsidiarity. Explicit reasons have to be provided for harmonisation in this area. Consequently, the disharmonious diffusion of policy making competence all over Europe does present problems to the integration of EDI systems within Europe. Mandatory requirements of form, (Value added) Taxes, Personal data protection, Customs and Cryptography are mentioned as possible sources of differences as well as problem areas for EDI.

The following actions are recommended:

- research efforts directed to ways and means the EC may develop a framework supporting international harmonisation of public administration based on the identification of essential harmonisation requirements that may have community weight in the subsidiarity based balance of competencies
- an opinion will be expressed supporting awareness on ways and means of harmonisation among administrative bodies in member states - use self invoicing as an example
- an opinion supporting awareness on the unfair competition resulting from lack of harmonisation among administrative bodies in member states.

Table V: Persistent issues and conditions for the development of EDI

Persistent Issue	*Conditions for development of EDI*
(1) infra structure	• Open and global connectivity
(2) technology	• Availability of needed information technologies (EDI software) for EDI applications • Availability of security sustaining techniques • Availability and sufficiency of technological solutions to the replacement of all kinds of paper-based business documents exchanged in EDI with electronic alternatives • Technical solutions for adequate representation of electronic information for legislation, inspection or auditing purposes • Availability of information technologies (software packages) of EDI systems in various application areas (e g purchasing, invoicing, payment, transportation, and customs)
(3) interconnection of TTPs	• International standardisation • inter-organisational procedure redesign
(4) inter operability across sector specific EDI systems	• International standardisation at message, procedure, application, and trade sector levels Interpretability among the EDI application systems • justification for organisations to adopt open EDI technology based on its cost effectiveness and efficiency • critical mass of EDI participants thus sufficiently available market and business information which are needed for conducting intended EDI transactions • Cost-effective thus economic incentives for replacement of paper by electronic formats • Organisational willingness and readiness to change from traditional (paper-based) ways of working to EDI-based procedures, especially for traditionally non-technical professions such as public administration or legislation
(5) No concentration of sensitive data at TTPs etc	• Sufficient security services, • legal framework for data protection for the private data transmitted • business confidence/"trust' on doing EDI transactions with unknown EDI counter parties

(6) old/new law for new technology	• Legal security for EDI users, TTPs and Service Providers
	• Legal provisions (for EDI use) on
	  • legal status of EDI messages
	  • liability of involved EDI parties
	  • dispute resolutions
	  • admissibility of electronic evidence
	  • value of electronic evidence
	• legal procedures for disclosing of electronic evidence

(7) technology specific law making	
(8) differences in member state laws	• Legal security for EDI users, TTPs and Service Providers • Harmonised trade treaties and international conventions regarding the use of EDI documents in the trade practice • Harmonised legislation and regulations regarding EDI use across sectors • Harmonised legislation and regulations regarding EDI use across countries
(9) differences in member state administrative policies	• Acceptance of electronic format documents which are required for administrative purposes by public bodies (e g customs declaration forms, TAX documents, etc) • Admissibility of self invoicing

2.6.4. *Persistent Issues and Conditions*

A summary of the scenario analysis is provided in Table V. There we relate the persistent issues introduced earlier with the conditions as provided in the scenario analysis.

Table V shows that all but one of the persistent issues in relation with EDI development are related to the conditions provided in the scenario analysis. At this stage it can be concluded that so far no analysis in the TEDIS II projects has shed any light on the issue of preventing technology-specific law making.

2.7. *Guidelines for Harmonisation*

Our search for guidelines departs from acceptation of the proposition that the development of EDI is beneficiary to the Community. The principle of subsidiarity urges us not to look at success scenarios for inspiration: success scenarios do not need additional Community support.

Apparent failure scenarios are different. We have distinguished potential success scenarios from outright failure scenarios. Potential success scenarios are well investigated; solutions can be designed. Appropriate action may take any of the forms enumerated earlier. Apparent failure scenarios always refer to situations not yet fully investigated. Appropriate action will be at best the decision to support research.

2.7.1. *A Good Telecommunications Infrastructure*

This persistent issue remains as a reminder. A good telecommunication infrastructure is a *conditio sine qua non* for world wide open-EDI. Although an up-to-date global communication infrastructure has not yet been realised, the issue has not been addressed at the level of recommendations in any one of the consolidated projects. Neither has the issue raised any support in the brain storm sessions.

The reasons may be that European communication infra structures are developing rapidly and prosperously, while the Community has developed adequate action in this area (e.g., regulations and pilot projects on TENs, the ONP and Services Directives).

The EDICON project team nonetheless considers it possible and likely that the global proliferation of communication infra structures at the level of the industrialised worlds may prove invaluable to the development of trade EDI as well as to the support and development of international co-operation by public administrations and -services. *It is recommended that the Community will remain alert on this issue and will facilitate analytical research as well as pilot studies in order to clarify the issues involved.*

2.7.2. *Advancements in Relevant Technology*

Advancements in relevant technology in itself may provide new concepts that have to be assimilated by society. Examples would be (i) the use of tamper resistant hardware, coupled with cryptographic techniques to emulate uniqueness in electronic messaging and (ii) the "loss of territoriality" in the regulatory perspective of activities on international (world wide) communication networks. At the moment the focus of the problems seems to be in the privacy protection –, in the information/intellectual property rights – and in the crime control areas. Apart from privacy protection, these problem areas have not been addressed in the consolidated TEDIS projects.

As an important area of research the automated support of legal functionality in complex and open EDI systems is emerging. In those systems legal functionality (e.g., privacy protection, confidentiality, IPR-billing, record keeping) will only be sustainable by modelling applications that take over the lion's share of the job. Here research has not yet yielded an appropriate level of knowledge (neither concerning the modelling of adequate normative/deontic system parts, nor concerning the standardisation of the representation of legal notions). Since the TEDIS program itself has shown that almost any EDI-like system has important legal functions, *it is recommended that the Community facilitates legal research together with more scientific IT research c.q. IT system development. It is recommended that this line of action is seriously and effectively realised in the fifth framework program.*

2.7.3. *Interconnection of TTPs*

Especially the distribution of the function of key-certification authority (KCA) over several TTPs for world-wide asymmetric cryptographic services (as required for authentication and for EDIfied negotiable instruments) remains an unsolved problem. Solutions to this issue are a prerequisite for the successful approach of one of the major organisational problems (the concentration of sensitive data) preventing the development of EDI.

The issue is repeatedly raised in the consolidated reports. It has also been established in the brain storm sessions. *Consequently, research efforts directed to ways and means how interoperability between KCA-TTPs can be supported (e.g., by message standards, by message scenario standards, by Chinese Wall techniques, by model inter-TTP contracts) is indicated. Concerning the research, efforts directed to ways and means the Internet may be used as an infra structure for open-EDI and the impact thereof for the competitive position of SMEs is mentioned as an important aspect.*

2.7.4. *Interoperability across Sector-Specific EDI Systems*

Interoperability across sector-specific EDI systems is a very important step towards transaction cost reduction. However, it needs serious research before standards can be developed successfully.

This research should amongst others be directed towards ways and means of handling and presenting standard terms and conditions for transaction-based participation in open-EDI in a legally valid way.

It also should be directed to ways and means in which interoperability between EDI systems can be supported by message standards and by message scenario standards – possibly in co-operation with the ISO initiative on open-EDI.

2.7.5. *Prevent Concentrations of Sensitive Data*

A persistent practical problem is that extensive security services may easily lead to concentrations of sensitive business and/or personal data held by TTPs and/or governmental administrations, while adequate control mechanisms for the use of this information are (thought to be) lacking. This may prevent the development of these systems. It is considered possible that Chinese Wall techniques may help. The implementation will need solutions to the interconnectivity and interoperability issues.

It is recommended that the Community facilitates research efforts directed to conditions, ways and means TTPs may support the necessary level of trust between the trade and public administration. This needs a combined technical, organisational and legal approach. Not only theoretical and analytical work is to be done. This type of research questions may especially need the advances of pilot studies and simulations.

It is also recommended that the Community facilitates research efforts and preliminary legislative discussion directed to ways and means business data protection may be realised and regulated. The problem here is not confidentiality by contract. In the information society so many ways and means of acquiring sensitive business data are becoming available to agents that have no contractual relationship with the relevant businesses (e.g., data mining), that legal definition of accepted business data processing is acutely necessary. It is recommended that the Community will issue a green paper on this subject. During the brainstorm sessions it was suggested that in this context minimal criteria and requirements for TTPs should be provided/facilitated by the Community.

2.7.6. *Old/New Law for New Technology*

In an old law for new technology situation it is only natural that after a while it will be decided whether the 'old' law should be updated. EDI is the result of new technology. As such, it is to a considerable extent regulated by old law – at least for a while. Consequently there is legal uncertainty as to the way 'old' legal systems will react to 'new' problems. Since large risks may be at stake, legal uncertainty is often considered a constraint for the development of EDI. Technology is a moving target – it is continuously renewing itself. The best we may be faced with, consequently, is the persistent issue of old/new law for new technology. The consequences are: legal uncertainty. This uncertainty is one of the main driving powers behind the TEDIS programs.

Legal uncertainties will sooner or later be cleared by legislation or case law at a national level. There is no guarantee that these national solutions will be compatible. Consequently, the Community should remain aware of the **timing** *of harmonisation actions. As regards new law for new technology,*

it should be abreast in the international discussion leading up to legislative efforts. It is strongly recommended (also by participants in the brain storm sessions) that the Community makes a better use of possibilities to publish (e.g.) TEDIS research results in this respect.

2.7.7. *Prevent Technology-Specific Law-Making*

The Community will have to remain alert in order to prevent creating legal uncertainty through legislation that is outdated at the moment that it comes into force. This will be the predictable result if legislation is too technology specific.

This issue has not been raised in any of the consolidated reports, no Community action in this respect has been reported and no attention is paid to the issue in the scenario analysis. Nonetheless, to the EDICON research team this issue is an important one. *Legislation and other Community actions may seriously affect the transaction costs of EDI systems. The state-of-the-art in legislation tradition should yield legislation that is up to several years of development in technological research. The issue is considered of ample importance and the Community should consequently facilitate research that addresses the issues implicated.*

2.7.8. *Reduce Differences in Member State Laws*

In many countries, the evidentiary value of electronic messages is considered inadequate; in many countries and in many situations, paper based contracts and hand written signatures are required. In some other countries, however, the legal system is already anticipating on EDI-evidence. This divergence does not benefit the development of EDI. These issues are recognised in almost every TEDIS research project.

Consequently, a directive formulating minimal functional conditions for harmonisation of the legal validity of electronic documents (and their evidential value) just like paper documents is due.

Additionally, an opinion supporting the model law on Electronic Commerce put forward by UNCITRAL is considered appropriate. It is not advised to wait for the final version of this document – it has a long history of over ten years that may not be over yet. Moreover, since the problem is one of harmonisation of mandatory law of member states, proposing a model law is not enough.

2.7.9. *Reduce Relevant Differences in Administration Policies*

Member-state administrative competencies are not easily harmonised over Europe. National administrative bodies have been given competence to develop a policy when executing or applying rules. This may be on any administrative subject. This diffusion of policy-making competence is very much in

tune with the principle of subsidiarity. Consequently, explicit reasons have to be provided for harmonisation in this area.

The Community should facilitate research efforts directed to ways and means a legally adequate framework is developed that will support international harmonisation of public administration policies. The research will easily expand towards research programs or other programs (e.g., IDA). A particularly hot issue seems to be the identification of essential harmonisation requirements that provide Community weight in the subsidiarity-based balance between central and distributed organisation of competencies.

One of the acute problem areas laid bare by the TEDIS program is the necessity for harmonisation among administrative bodies in member states with respect to the use self invoicing.

An opinion supporting awareness on the unfair competition positions resulting from lack of harmonisation concerning the use of electronic invoices among administrative bodies in member states is considered appropriate.

3. Summary, Recommendations

3.1. *Summary*

The EDICON project provides (i) a consolidation of TEDIS II projects and (ii) recommendations concerning the development of EDI. These have been summarised in Sections 2.1 and 2.3. The consolidated reports have yielded over 35 recommendations.

3.1.1. *Persistent Issues and Recommendations*

The EDICON project team has structured and adapted this material, using scenario analyses and the results of international expert brain-storm sessions. The results are summarised using the concept of persistent issues. Table VI combines the persistent issues that fetter the development of EDI with relevant recommendations as proposed by the EDICON project team.

Thus the EDICON project has transformed 35 heterogeneous recommendations from the TEDIS II reports into 12 recommendations, related to the treatment of persistent issues fettering the development of EDI in Europe.

3.2. *The Recommendations Revisited*

The EDICON recommendations shown earlier will be processed by the European Commission and it would be helpful if they could be rearranged in a manner that fits the Community procedures and -organisation.

In the work program of the Commission for 1996, the EDICON recommendations may be processed under the issues mentioned in Section 3.2:

Table VI: Persistent issues and recommendations

Persistent issue	***Recommendations***
(1) a good telecommunications infra structure	1. *It is recommended that the Community will remain alert on this (global telecommunications infra structure) issue and will facilitate analytical research as well as pilot studies in order to clarify the issues involved.*
(2) advancements in relevant technology	2. *It is recommended that the Community facilitates legal research together with scientific IT research c.q. projects concerned with IT system development in order to identify and address legal issues that are facilitated by the research results. It is recommended that this line of action is effectively realised in the fifth framework program*
(3) interconnectivity of Trusted Third Parties	3. *Research efforts directed to ways and means how interoperability between KCA-TTPs can be supported (e.g., by message standards, by message scenario standards, by Chinese Wall techniques) is indicated. Concerning these research efforts directed to ways and means the Internet may be used as an infra structure for open-EDI and the impact thereof for the competitive position of SMEs is mentioned as an important aspect*
(4) inter operability across sector-specific EDI systems	4. *Research should be directed towards ways and means of handling and presenting standard terms and conditions for transaction-based participation in open-EDI in a legally valid way.* 5 *Research should also be directed to ways and means in which interoperability between EDI systems can be supported by message standards and by message scenario standards - possibly in co-operation with the ISO initiative on open-EDI.*
(5) control for sensitive data concentration at TTPs etc	6. *It is recommended that the Community facilitates research efforts directed to conditions, ways and means TTPs may support the necessary level of trust between the trade and public administration. This needs a combined technical, organisational and legal approach Not only theoretical and analytical work is to be done. This type of research questions may especially need the advances of pilot studies and simulations.* 7 *It is also recommended that the Community facilitates research efforts and preliminary legislatory discussion directed to ways and means business data protection may be realised and regulated The issue here is not "confidentiality by contract". In the information society so many ways and means of acquiring sensitive business data are becoming available to agents that have no contractual relationship with the relevant businesses (e.g., data mining), that legal definition of accepted business data processing is acutely necessary. It is recommended that the Community will issue a green paper on this subject. During the brainstorm sessions it was suggested that in this context minimal criteria and requirements for TTPs should be provided/facilitated by the Community.*
(6) old/new law for new technology (legal uncertainty)	8. *Legal uncertainties will sooner or later be cleared by legislation or case law at a national level There is no guarantee that these national solutions will be compatible Consequently, the Community should remain aware of the timing of harmonisation actions As regards new law for new technology, the Community should remain/be abreast in the international discussions leading up to standardisation of EDI-messages, EDI message scenarios and harmonised legislative efforts It is strongly recommended (also by participants in the brainstorm sessions) that the Community uses the extensive publication of Community funded research results in this respect. With respect to the development of EDI, this implies the publication of TEDIS reports (for instance using web-pages on the Internet)*
(7) technology-specific law making	9. *Legislation and other Community actions may seriously affect the transaction costs of EDI systems The state-of-the-art in legislation tradition should yield legislation that is up to several years of development in technological research. The issue is considered of ample importance and the Community should consequently facilitate research that addresses the issues implicated*
(8) differences in member state laws	10. *A directive formulating minimal functional conditions for harmonisation of the legal validity of electronic documents (and their evidential value) just like paper documents is due. Additionally, an opinion supporting the UNCITRAL document of September 12, 1995 (re-defining the legal concept of a signature) is considered appropriate*
(9) differences in member state administrative policies	11 *The Community should facilitate research efforts directed to ways and means a legally adequate framework is developed that will support international harmonisation of public administration policies The research will easily expand towards research programs or other programs (e g., IDA). A particularly hot issue seems to essential harmonisation requirements that provide Community be the identification of weight in the subsidiarity-based balance between central and distributed organisation of competencies.* 12 *An opinion supporting awareness on the unfair competition positions resulting from lack of harmonisation concerning the use of electronic invoices among administrative bodies in member states is considered appropriate*

"Leaning on the sectors of the future" and notably the subsections on the information society and the subsection on research and technological development. Furthermore relations with Section 3.3 "Infra structure and transport" are obvious.

Because the development of information and communication technology (ICT) in general and the development of EDI in particular permeates into literally all the tasks and into all the DGs of the Commission, all DGs are confronted with the effects of EDI in society, and many are already (or will soon be) taking action. At least the following DGs are affected:

- DG I – External relations: a necessary result of the globalisation of telecommunications;
- DG III – Industry: the management of research programs like ESPRIT/ IT and other programs such as IDA;
- DG IV – Competition: the maintenance/creation of level playing fields;
- DG V – Employment, industrial relations and social affairs: The "Information Society" initiatives;
- DG X – Information, communication, culture, audio-visual: media, pluralism, media concentration;
- DG XIII – Telecommunication, information market, Exploitation of research: "INFO2000", research into ICT-issues, into ICT-applications and into new opportunities for exploitation of telematics and content;
- DG XV – The internal market and financial services: intellectual property rights, personal data protection, encryption, financial organisations and their relations to electronic payment procedures;
- DG XVI – Regional policies and cohesion: the harmonisation of policies developed by national governmental bodies with discretionary power;
- DG XX – Financial control: issues of computer fraud and -crime;
- DG XXIV – Consumer policy: the protection of the consumer in open EDI (i.e.: the electronic market place).

Consequently, it is difficult to get a clear picture of who is doing what concerning ICT, EDI and electronic commerce in Europe. It is to be hoped that the ISPO (information society program organisation) initiative will provide the necessary information.

Below, final tables are presented in which the recommendations are separated in accordance with the EC action repertory. Moreover, the recommendations are related to the DGs that may want to participate in the action involved and in the programs that may be appropriate.

3.2.1. *Recommendations for Legislation*

Table VII: Recommendations for legislation

Recommendations	Affected DG
1. *The Commission should draft a directive formulating minimal functional conditions for harmonisation of the legal validity of electronic documents (and their evidential value, just like paper documents).*	S-G, DGI, DGX, DGXIII, DGXVI, DGXX, DGXXIV
2. *New directives (as EU legislative action) may seriously affect the transaction costs of EDI systems. The state-of-the-art in legislation tradition should yield results that are up against several years of technical development. The issue is considered of ample importance and the Community should consequently implement in its legislative procedures the availability of explicit costs-to-the-trade statements.*	S-G, all DGs
3. *The Commission should draft a Decision which explicitly prescribes the inclusion (in EC research projects) of concurrent, appropriate legal research efforts into the possible consequences that the use of the results of the primary research project may have. This is especially of importance for pilot studies.*	S-G, DGIII, DGV

Consideration

The first recommendation is very generally felt to be acutely necessary. Very different approaches are emerging all over Europe (and, indeed, over the world) and different attitudes are shown by legislators (Norway, UK), as well as by governmental institutions having policy-making competence (VAT authorities).

Since there does not seem to be a relevant knowledge gap, preliminary research is no longer required. Since the promulgation of different solutions may reflect fundamental different attitudes towards security issues, the legislation needs to be prepared by discussion (e.g., of a common position, the development of a model law as suggested in UNCITRAL).

The different attitudes mentioned do lead up to different national competitive positions and tilted playing fields for EDI and electronic markets in general. This will be especially harmful to SMEs that want to participate in international EDI activities.

Since harmonisation is not to be expected through self-emergent or EU-policy-induced standardisation or even through international standardisation initiatives (e.g., the UNCITRAL model law mentioned earlier), the subsidiarity principle does not apply. After all, the problems are partly due to the proliferation of mandatory law requirements that will not easily subside for standards.

The second and the third recommendation concern internal EU procedures and are a result of the consideration of EDICON recommendations from the EU-action repertory perspective. If the current state-of-the-art in legislation techniques does not provide procedures for technique-independent legal drafting, then not only adequate research should be initiated. In the legislation procedure itself, those elements that make the importance of the issue visible should be implemented in order to minimise damages.

3.2.2. *Recommendations for Non-Binding Supportive Action*

Table VIII: Recommendations on non-binding harmonisation-supportive action

	Recommendation	Affected DG
1	*An opinion supporting the model law on Electronic Commerce by UNCITRAL is considered appropriate*	S-G, DGI, DGX, DGXIII, DGXVI, DGXX, DGXXIV
2	*An opinion supporting awareness on the unfair competition positions resulting from lack of harmonisation concerning the use of electronic invoices among administrative bodies in member states is considered appropriate*	DGIV, DGXVI
3	*Legal uncertainties will sooner or later be cleared by legislation or case law at a national level There is no guarantee that these national solutions will be compatible Consequently, the Community should remain aware of the timing of harmonisation actions With regard to new law for new technology, the Community should remain/be abreast in the international discussions leading up to discussions leading up to standardisation of EDI-messages, EDI message scenarios and harmonised legislative efforts*	S-G, all DGs
4	*It is strongly recommended (also by participants in the brain storm sessions) that the Community uses the extensive publication of Community funded research results for international debate, eventually supporting harmonisation With respect to the development of EDI, this implies the publication of TEDIS reports (for instance using web-pages and listservers on Internet)*	DGIII, DGV, DGXIII

Consideration

The first and third recommendation will support the global discussion on standardisation,[6] for instance of encryption and its uses.[7] Although legislation concerning the electronic signature has been proposed (and accepted) in different countries over the world, the encryption issue involved has not yet been settled enough for actual legislation. On the other hand, standardisation is important for the development of EDI (also for SMEs) and there is no specific knowledge gap that blurs the issue.

The last three recommendations have in common with the first, that if the real issue is: political differences in implemented legal attitudes in member states, that then international (scientific) discussion of pilot studies may provide support for growing mutual understanding. TEDIS program projects provide precisely the results that can be the base for such discussion.

3.2.3. *Recommendations on Research*

Table IX: Recommendations on research

	Recommendation	Affected DG/Program
	Applied legal research	
1	*It is recommended that the Community facilitates **applied legal** research, secondary to scientific IT research c q pilot projects concerned with IT system development in order to identify and address legal issues that are provoked by the research results It is recommended that this line of action is effectively realised in the fifth framework program* (See also legislation recommendation 3)	S-G, DGIII, DGV, DGXIII LAB, ESPRIT, IT, ACTS, IDA, SEMPER, INFO2000, 5th Framework
	Fundamental legal research	
2	*Legislation and other Community actions may seriously affect the transaction costs of EDI systems The state-of-the-art in legislation tradition should yield legislation that is up to several years of development in technological research The issue is considered of ample importance and legal and legislative state-of-the-art techniques are by no means complete. The Community should consequently facilitate **fundamental legal research** that addresses the issues implicated*	S-G, DGIII, DGIV, DGV, DGXIII, DGXV, DGXVI, DGXX ESPRIT, IT, ACTS, IDA, INFO2000, 5th Framework
3	*It is also recommended that the Community facilitates **fundamental legal research** efforts and preliminary legislation discussion directed to ways and means business data protection may be realised and regulated The issue here is not "confidentiality by contract" In the information society so many ways and means of acquiring sensitive business data are becoming available to agents that have no contractual relationship with the relevant businesses (e g , data mining), that legal definition of accepted business data processing is acutely necessary It is recommended that the Community will issue a green paper on this subject During the brainstorm sessions it was suggested that in this context minimal criteria and requirements for TTPs should be provided/facilitated by the Community*	
4	*The Community should facilitate **fundamental legal research** directed to ways and means a legally adequate framework can be developed that will support international harmonisation of public administration policies The research will easily expand towards research programs or other programs (e g , IDA) A particularly hot issue seems to be the identification of essential harmonisation requirements that provide Community weight in the subsidiarity-based balance between central and distributed organisation of competencies*	
	Combined technical-organisational-legal research	
5	*Combined **technical-organisational-legal research** efforts directed to ways and means how interoperability between KCA-TTPs can be supported (e g , by message standards, by message scenario standards, by Chinese Wall techniques) is indicated Concerning these research efforts directed to ways and means the Internet may be used as an infra structure for open-EDI and the impact thereof for the competitive position of SMEs is mentioned as an important aspect*	S-G, DGIII, DGV, DGXIII ESPRIT, IT, ACTS, IDA, SEMPER, 5th Framework
6	*Combined **technical-organisational-legal research** should be directed towards ways and means of handling and presenting standard terms and conditions for transaction-based participation in open-EDI in a legally valid way*	
7	*Combined **technical-organisational-legal research** should also be directed to ways and means in which interoperability between EDI systems can be supported by message standards and by message scenario standards - possibly in co-operation with the ISO initiative on open-EDI*	
8	*It is recommended that the Community facilitates combined **technical-organisational-legal research** efforts directed to conditions, ways and means TTPs may support the necessary level of trust between the trade and public administration Not only theoretical and analytical work is to be done This type of research questions may especially need the advances of pilot studies and simulations*	

The major part of the EDICON recommendations concern research. The TEDIS II research projects have yielded many answers, but also many important research questions.

- *Consideration on applied legal research*

  It is shown by several TEDIS projects that it is very easy in the culture of scientific research to forget about the legal aspects of the use

of the (prospected) results. Clear examples are given by the PORTIA, the DEVOTECH and the EDILEG projects. Since dematerialisation of transactions invariably proves to have legal effects, it is to be considered bad practice if in EDI- (electronic commerce-) research projects that create or use pilot studies no specific attention to legal aspects is given from the very initiation and in the design of the project. Applied legal research will often be sufficient.

Applied legal research will suffice to check the (possibly implicit) assumptions made by the scientific researchers on legal consequences against existing law by lawyers and/or legal researchers. The results of these legal analyses should be taken seriously: very expensive reparation activities may otherwise be the result. If for instance the EDIPAY, PORTIA, PROTEDI and MANDATE projects are right in their conclusions that the UN/EDIFACT standard messages do have serious drawbacks for legally valid use in open environments and consequently should be changed, this either results in very expensive software update/development efforts due to changes in standards, or results in (also expensive) missed opportunities. Since applied legal research is relatively inexpensive, and since its results may imply complete scientific research project redesign, it is recommended as a standard element in the evaluation procedure for every EU research project on ICT-issues.

- *Consideration on fundamental legal research*

The phrase 'fundamental legal research' is used to distinguish from applied legal research and from fundamental research in areas of the sciences. This type of research assumes the legal discipline to have an individual and specific research domain that may support the possibilities for conflict resolution using normative 'quality systems'. Implementation of the knowledge involved will often have the flavour of an old and settled tradition. The changing perspectives through communication technology and through internationalisation (for instance within the Community) create practical problems in society. Some of them cannot be met with appropriate and sound legal solutions. These solutions need fundamental legal research. The TEDIS consolidation resulted in the identification of three research issues of this type.

The first one (techniques for technology-independent legislation) is a specific research question that is well known and very important – as is again shown by analysing virtually all the consolidated TEDIS projects (that do not recommend on this issue themselves). Here, a serious knowledge gap is identified that can only be approached by research. Since this is by no means research that fits in business R&D

activities, the EC should consider promoting and funding. Here the TEDIS consolidation produces a specific research question that has much wider application than just EDI.

The second fundamental legal research looks at ways and means in which business data may be protected legally. This is a very specific issue pertaining especially to EDI and electronic commerce. Since solutions seem to be necessary in order to allow EDI and electronic commerce to really take off, and since it again does not concern R&D research – the EC should again consider funding. Here a program, sustaining parallel legal research projects might be indicated in order to prevent the uncoordinated emergence of member-state specific solutions. Perhaps it would fit in as an additional sub theme in the INFO2000 program.

The third fundamental legal research recommendation addresses ways and means of internationally co-ordinating public administrative policies. Not is meant here the co-ordination of political hot issues as Dutch and French drugs policies or UK cattle. The question concerns the legal support of international day-to-day co-operation at public administration level. Current 'legal quality systems' in this area either involve international treaties and conventions, or common positions at EU level. It seems appropriate that in the EU ways and means are developed that have shorter incubation time. The research seems to relate to the IDA program, where the same problem has been encountered.

3.2.3.1. *Combined Technical-Organisational-Legal Research.* The combined technical-organisational-legal research issues are a result of the specific circumstances of EDI development. Pure scientific research has a lead on organisational and legal solutions that will support applications. To gain from these solutions, combined research is necessary, since organisational and legal constraints may induce new scientific questions (and solutions).

With many options available, the research mentioned here aims at finding and optimisation of (conditions for) specific electronic trade relations. The main technique would be simulation and pilot studies by combined teams of scientific, trade and legal experts. The four research questions mentioned are fundamental to the development of EDI.

Notes

1. The overall project responsibility is in the joint hands of: Prof. Dr. Hans Franken, Professor of Computer Law and of Jurisprudence, Leiden University, PO Box 9521, 2300 RA Leiden,

The Netherlands, of Mr. Rob E. van Esch, Senior legal advisor of the Legal and Fiscal Department of Rabobank Nederland, PO Box 17100, 3500 HG Utrecht, The Netherlands, of Herman Roos RA, KPMG Management Consulting NV Director, Euclideslaan 1, PO Box 85200, 3508 AE Utrecht, The Netherlands, and of Prof. Dr. Ronald M. Lee, Euridis Scientific Director, Erasmus University Rotterdam, PO Box 1738, 3000 DR Rotterdam, The Netherlands. Day-to-day project management: Dr. Aernout H.J. Schmidt, Associate Professor at the Department of Law and Information Technology, University of Leiden, PO Box 9521, 2300 RA Leiden, The Netherlands. Project team members: Guido Hosman, Hans Franken, Aernout Schmidt (University of Leiden), Max van Aalst, Paul Overbeek, Herman Roos, Taco de Vries (KPMG Management Consulting NV), Lei Lei, René Wagenaar (Euridis, Erasmus University Rotterdam), Rob van Esch (Rabobank Nederland), Simone van der Hof (University of Utrecht).

2. Chinese Wall techniques consist of organisational measures that prevent different departments of an organization to gain access to the information available to the other.
3. In the consolidation report, a detailed overview of recommendations is provided. Here, we give a summary.
4. This section is almost literally selected from the report by Simone van der Hof (appendix 5, accessable via http://rulj287.LeidenUniv.nl/.
5. This section is based on the report by Guido Hosman (appendix 2, accessable via http://rulj287.LeidenUniv.nl/.
6. Numerous organisations and projects contribute to the development of standards. We mention the ongoing work of UN/EDIFACT, UNCITRAL, INFOSEC, CEN/CENELEC, ICC, OSI, EBES, the Bolero project, etc. We are aware that the EC is often already participating in or even facilitating work in progress and is certainly monitoring developments.
7. The EC Green Paper on legal protection for encrypted services in the internal market explicitly excludes services in order to guarantee the integrity and confidentiality of the message transmitted [Com(96) 67 final, p. 7].