LEGAL ASPECTS OF ICT IMPLEMENTATION IN TURKISH CONSTRUCTION INDUSTRY; "APPLICABILITY OF eLEGAL FRAMEWORK"

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ABSTRACT

LEGAL ASPECTS OF ICT IMPLEMENTATION IN TURKISH CONSTRUCTION INDUSTRY; "APPLICABILITY OF eLEGAL FRAMEWORK"

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With increasing awareness of gains and importance of the strategic use of Information and Communication Technologies (ICT), the implementation rate of ICTs in construction sector is increasing. However, these technologies have not been covered by legal and contractual practices. The industry needs to implement application frameworks and legal re-structuring of the existing related laws and regulations to use ICT in a legal and contractually valid environment.

In this thesis, an EU funded project, eLEGAL; which defines a framework for legal conditions and contracts regarding the use of ICT in construction industry, is selected as a model project to address legal and contractual issues regarding ICT use in Turkish construction industry. Moreover, the applicability of this project's results are discussed by using real cases and defining the barriers, opportunities, methods and tools to use ICT legally admissible in Turkish construction industry.

Keywords: legal and contractual validity, Turkish construction industry, eLEGAL, information and communication technology

ÖZ

LEGAL ASPECTS OF ICT IMPLEMENTATION IN TURKISH CONSTRUCTION INDUSTRY; "APPLICABILITY OF eLEGAL FRAMEWORK"

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Bilişim Teknolojilerinin kazandırdıklarının ve öneminin daha çok fark edilmesiyle birlikte, bu teknolojilerin inşaat sektöründeki kullanımı da artmaktadır. Ancak bu teknolojiler henüz tam anlamıyla yasal ve sözleşmeye dayanan uygulamalarla desteklenmemiştir. İnşaat sektörünün bilişim teknolojilerini yasal ve sözleşmeye dayanan ortamda kullanabilmesi için uygulama çerçeveleri geliştirilmesi ve şu anda kullanılan ilgili kanun ve yönetmeliklerin yeniden yapılandırılması gerekmektedir.

Bu tezde Türk inşaat sektöründe bilişim teknolojilerinin yasal olarak kullanımını incelemek amacı ile Avrupa Birliği tarafından finanse edilen ve inşaat sektöründe bilişim teknolojilerinin kullanımını yasal ve sözleşmeler çerçevesinde inceleyen eLEGAL projesi model proje olarak seçilmiştir. Bu projenin sonuçlarının Türk inşaat sektöründe uygulanabilirliği; gerçek vakalar kullanarak ve bilişim teknolojilerinin yasal geçerlik içinde kullanılmasındaki engeller, fırsatlar, metotlar ve araçlar tanımlanarak tartışılmıştır.

Anahtar Sözcükler: yasal ve sözleşmeye dayanan geçerlik, Türk inşaat sektörü, eLEGAL, bilişim teknolojileri

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LIST OF ABBREVIATIONS

AEC	Architecture, Engineering, Construction
ASP	Application Service Provider
BILTEN	Information Technologies and Electronics Research Institute
CA	Certification Authority
CAD	Computer Aided Design
CEN	European Standards Committee
DES	Data Encryption Standard
DSS	Decision Support System
DWF	Design Web Format
DWG	Drawing
DXF	Drawing Interchange File Format
EDI	Electronic Data Interchange
EIVKD	Electronic Communication and Protection of Secrecy and Council Directive
ERP	Enterprise Resource Planning
ETIK	Electronic Commerce Commission
ETKK	Electronic Commerce Coordination Commission
ETSI	European Telecommunications Standards Institute
EU	European Union
FIPS	Federal Information Processing Standards
HP	Hewlett Packard
HTML	Hyper Text Markup Language

IAWL	Ideal and Artistic Works Law
ICT	Information and Communication Technology
IFC	Industry Foundation Classes
IP	Internet Protocol
IPR	Intellectual Property Rights
IST	Information Society Technologies
ISO	International Organization for Standardization
ITSEC	Information Technology Security Evaluation Criteria
LAN	Local Area Network
MS	Microsoft
PC	Personal Computer
PIN	Personal Identification Number
PKI	Public Key Infrastructure
PPA	Public Procurement Authority
RDBMS	Relational Database Management System
RTD	Research and Technical Development
SME	Small and Medium Enterprise
SPO	State Planning Organization
STEP	Standard for the Exchange of Product data
STAP	Short Term Action Plan
TI	Telecommunication Institute
TUBITAK	The Scientific and Technical Research Council of Turkey
UAP	Urgent Action Plan
UEKAE	National Research Institute of Electronics and Cryptology
UNCITRAL	United Nations Commission of International Trade Law

UK	United Kingdom
VE	Virtual Enterprise
VKD	Directive of the Protection of Natural Persons in the Process of Personal Data
VNR	Virtual Negotiation Room
VR	Virtual Reality
WAN	Wide Area Network
WLAN	Wireless Local Area Network
WP	Work Package
WWW	World Wide Web
XML	eXtensible Mark-up Language
XSD	eXtensible Schema Definition

CHAPTER 1

INTRODUCTION

1.5 General

With the increasing globalization that started in the last quarter of the 20th century, international competition has become more dependent on information. To stay competitive in an environment that depends on information, construction companies have to make rapid changes in organizational structures and processes.

The use of information and communication technology (ICT) in construction has been growing cautious but steady. Many organizations are now at a level of ICT maturity to enable them to realize significant business benefits through the deployment of advanced ICT systems. This is being helped by other industries such as retail and manufacturing highlighting their achievements. At the same time current management thinking is also fostering more collaborative approaches which require a level of communications which can only be achieved by an IT-centered infrastructure. (eLEGAL state-of-art- assessment, 2001)

Effective communication is vital in construction due to the large number of project participants, the separation of design and construction disciplines and the geographically dispersed nature of the projects (Barrie and Paulson, 1992). The use of information and communication technologies based information exchange in construction sector has become common as use of the Internet and communication tools have increased in the last ten years.

The full use of ICT is hampered by poorly defined responsibilities, overlapping communication techniques and mistrust. This situation causes difficulties to construction companies which have to trust on electronic exchange of information and documentation which are not covered by contractual practice, and

therefore haven't got legal validity. Therefore, lack of contractual frameworks which define legal conditions and contracts and tools that provide legal support seems to be one of the obstacles behind the use of ICT in construction sector.

eLEGAL is a EU-funded international research project as a result of which a framework for legal conditions and contracts regarding the use of ICT in construction sector was developed.

According to the eLEGAL state-of-the-art assessment and workshops with international experts, a number of key issues have to be addressed in order to facilitate the application of ICTs to construction industry, which include;

- making email contractually valid and enable pure electronic communication,
- avoiding a "media-breach" between project participants,
- working in a legally valid manner using an ASP (Application Service Provider) and other issues related to project collaboration web sites,
- liability for errors resulting from translation between different CAD software programs – or preferably avoidance,
- managing hard/soft copy discrepancies,
- enabling project adoption of digital signatures.

In order to achieve these aims and make the use of ICT legally admissible in a country, the construction industry in that country and the government –which makes necessary regulations and laws - has to be ready and have a will for adoption.

1.2 Aim Of The Research Study

This thesis specially aims,

- To discuss the applicability of eLEGAL framework in Turkey

- to promote pure electronic collaboration in Turkish construction sector by using a framework defined in eLEGAL project for legal conditions and contracts regarding the use of ICT in construction projects.
- to improve relationships between partners in construction projects in order to provide more trust and reduced number of disputes.
- to make the Turkish construction sector aware of the requirements of legal support in information exchange and use of ICT in construction projects, in order to use the benefits of ICT more efficient and secure.
- to contribute the Turkish construction industry in the race of competition against the rivals in the global business environment.
- to provide contractual and legal support for ICT use in construction projects

1.3 Research Overall Methodology

Research overall methodology can be summarized as follows:

- conducting research on construction business cases and industrial requirements based on literature reviews in related research and technical development (RTD).
- determining the requirements of the industry based on the consultations with managers, supervisors from public and private organizations.
- selecting a model project contains important findings related to the legal use of ICT in project business that can meet the requirements of Turkish construction industry.
- analyzing current contractual practices and cases both in public and private organizations by gathering the existing clauses and legal cases in relation to the application of ICT in Turkish construction sector based on both literature review and consultation with public and private bodies.
- conducting research on the related laws in Turkey that supports the results of the model project and industry requirements based on literature review and consultations with legal experts.

- conducting research on the current situation of ICT use in Turkish construction industry both in public and private organizations based on open-ended interviews and literature review.
- making an assessment study to examine if the model project's results and/or ideas are applicable in Turkish construction industry considering the related laws, ICT infrastructure and future plans of the industry.

1.3.1 Information Sources

The research presented in this thesis is based on the literature review in related research and technical development (RTD), assessment of industry requirements, consultations with professionals from the public and private organizations.

Information collection was done by face-to-face interviews and open ended questions with managers, researchers, directors from public sector and engineers, project managers from private sector. Moreover, legal experts, university researchers and lawyers are interviewed for ICT related laws and their applicability in the construction sector.

The eLEGAL project coordinator's opinions were also taken in some steps of the research.

1.4 ICT use in the Construction Industry

The construction industry is a project based business bringing together many different organizations to complete a desired goal. The strategic use of Information and Communication Technologies (ICT) has enabled this goal to be completed more effectively (Hassan, Shelbourn, Carter, 2003). However, construction sector has not adopted ICT with the same rate as other industries, such as manufacturing and financial services.

Unlike other economic sectors, the construction industry is characterized by activities which are discontinuous, dispersed, diverse and distinct. (Taylor, Francis, 1994) Therefore, ICT implementation in the construction industry is more difficult than other industries. On the other hand, construction sector is in need of innovation and process improvement in order to remain competitive in today's digital economy.

As the impact of technologies such as 3D visualization, animation, virtual reality, e-commerce, and project specific web sites are revolutionizing global markets into an era of the new economy, the engineering and construction industry must re-invent itself to meet the increasing owner demands of high performance. Owner organizations are requiring the engineering/construction industry to perform at extraordinary levels of project delivery (Songer, 2000). Advances in project delivery systems and information technologies provide tremendous potential for enhancing the engineering and construction industry's overall performance. However, the majority of industry participants have been slow to embrace the use of new technologies to enhance project performance to desired levels.

ICT is perceived as the main enabler to implement radical changes in construction business processes, and ICT-based expected improvements and impacts are envisaged in many fields of activities like:

- Construction stages including planning, design, procurement and site operations;
- Digital sites : introducing ICT and automation in site operations ;
- Business processes including project management, contractual and legal matters;
- Life cycle performance(s) of building and construction, including monitoring and performance measurements, as regards e.g. the conformity with customer needs or the management of total Life-cycle costs (investment, operation, maintenance);
- Quick, efficient and cost-effectively construction, along with Building Product customisation and differentiation;
- Supply chain management;

- Costing and accounting operations;
- Convergence of home, services and workplaces, provide proximity access to services and leisure, and ubiquitous working – closer working communities;
- Along with an enhanced use of communication, team working, & knowledge sharing tools, smooth / transparent use of ICT (for end users), and process improvement through best options / practice and progress monitoring. (Roadcon Project, 2003)

1.4.1 Implementation of ICT in Construction Industry

1.4.1.1 Factors Affecting the Use of ICT

Information Technology is an area where increased investment is necessary in order to remain competitive in the market, increase efficiency, increase transparency, reduce timescales and cost, and raise the entry level for contracting.

There are many factors that affect the use of ICT in construction projects. The ICT deployment in the construction industry depends on the following key factors.

- Value of the project
- Technological capability of the parties
- Use of ICT in past projects – previous experience
- Client demands
- Number of parties – greater number and diversity should lead to greater use
- Desire for better and faster communication
- Partnering and desire for better collaboration
- Information overload and desire to reduce the paper mountain
- Wish for greater transparency (eLEGAL Project WP1, 2002)

1.4.1.2 Main Barriers Related to Use ICTs

Appropriate implementation of information technologies is a key focus area that must be addressed by the construction industry. One reason for the difficulty of implementing ICT is the misalignment of current organizational structures and cultures with ICT models for integrated, collaborative work environments. The construction industry is largely decentralized composed of separate organizations, which must participate together on a project by project basis. The multi-participant, multi-organizational framework is a significant barrier to implementing ICT in the industry. (Young, Davis 2001)

According to the Roadcon project (2003) different barriers have in the past restrained the take up and advanced use of different ICT tools. These barriers need to be overcome for the industry to progress further in the exploitation of ICTs to support its business activities. These barriers can be classified as follows;
Organizational Barriers: lack of business incentives, poor ICT strategies, lack of training, lack of appropriate ICT support.
People Barriers: lack of personal incentives, lack of education/training/continuous professional development, cultural issues, reluctance to changes in business processes.
Technology Barriers: difficulties in using new technologies, lack of support from ICT providers (or ICT department), incompatibility/interoperability problems: lack of (use of) standards.
Legal Barriers: risks for liability, lack of legal support for use of ICT, security of ICT transactions, IPR issues for electronic information and documentation.

In Turkish Construction Industry, one of the most important barriers that needs to be overcome is legal barriers related to use ICT: New technologies have not been sufficiently considered by any legal and contractual practices. Electronic information is often, in contrast to hard copy of documents, not considered legally valid. Given the importance of the contract – a document enforceable at law – as basis for the project, electronic communication and documentation is considered

much less significant as it will have no or litte bearing in a legal dispute. In Turkish construction industry, although, the use of ICT has become vital, it is not covered by contractual practice. Therefore, in order to increase the use of ICTs on construction projects, the legal and contractual support should be provided.

1.4.2 Emerging ICT Support

Although Turkish construction industry can not embrace the advancements as quick as other sectors like banking, merchandising or finance, the obligations that have to be fulfilled to survive, urge the companies adopt to use ICT.

The expected improvements related to e-business that the construction industry should adopt are illustrated below.

1.4.2.1 E-Commerce

Fundamentally, e-commerce focuses on the electronic exchange of information using information and telecommunication infrastructures (the World Wide Web and the Internet). Whilst there are many definitions of e-commerce, there are also many forms of e- commerce, for example Kalakota and Whinston (1997) propose three types:

- inter-organisational (business to business);
- intra-organisation (within businesses); and
- customer to business.

Industry sectors such as retail and banking have openly embraced ecommerce to improve their performance, and gain a strategic competitive advantage. While at the most basic level, e-commerce is simply about doing business electronically. The benefits of using the www and the Internet to conduct business-to-business transactions and to sell products have been well documented (Gattiker, 2000). For example, e-commerce can reduce an organisation’s costs, particularly across supply chains, improve customer service, create additional revenue streams and create new business relationships. In particular, McAdam (2000) suggests that small-medium sized contracting organisations may benefit from sharing resources through an

enhanced collaborative process. Love and Gunasekaran (1997) suggested that inter-organisational collaboration enabled by electronic information exchange and sharing, can create a competitive advantage for organisations that re-engineer their supply chains. In doing so, optimising the benefits of collaboration as well as reducing risks associated with information technology (ICT) implementation. However, Gulati (1999) suggests that the benefits gained from the collaboration are dependent on the exchange relationship between organisations such as trust, interdependence and bargaining power.

The Public Procurement Authority (PPA), which is administratively and financially autonomous, is a public legal entity with duties;

1) to evaluate and conclude any complaints claiming that the proceedings carried out by the contracting entity within the period from the commencement of the tender proceedings until the signing of the contract are in violation of this Law and the related legislative provisions,
2) to prepare, develop and guide the implementation of all the legislation concerning this law and Public Procurement Contracts Law and the standard tender documents and contracts,
3) to provide training on procurement legislation, to provide national and international coordination,
4) to gather information relating to the contracts and tender proceedings carried out as specified by the Authority, to compile and publish statistics relating to quantity, price and other issues,
5) to keep the records of those who are prohibited from participating in tenders,
6) to carry out research and development activities,
7) to regulate the principles and procedures with regard to tender notices, to publish Public Procurement Bulletin in printed or electronic media.
8) In cases where it is established that domestic tenderers are prevented due to unfair reasons from participating in tender proceedings taking place in foreign countries, to take relevant measures in order to ensure that the tenderers of those countries are prevented from participating in the tenders held under the scope of this Law, and to furnish proposals to the Council of Ministers in order to ensure that the necessary arrangements are made.

According to the second president of PPA, Adnan Zengin, the main goal of the authority is to prevent illegalities, grafts and lawlessness in the public procurements. In order to achieve this goal electronic procurement has an important role and the authority is working and keeps going step by step. The previous step before the electronic procurement system is procurement control system in which it is the first time that the citizens can reach and examine the procurement's durations, complains, and results. After finishing the legal and technical infrastructure modifications, e-procurement will be used in order to regulate and control the public procurement market.

1.4.2.2 Application Service Provider (ASP)

An increasingly popular method for providing online services is the use of an Application Service Provider (ASP). An Application Service Provider, or ASP, is a third-party business that distributes software over a wide area network. That is, instead of actually buying an application, customers rent it from the ASP, who in turn becomes responsible for servicing the software, including providing upgrades. Having a reliable ASP may even relieve the companies of the need for an ICT department altogether.

Services provided by an ASP include user management, access control: accounting, billing, software installation and provisioning, maintenance, integration with user IT systems, and hosting of third-party software.

According to ASPnews.com, ASPs are broken down into five subcategories:

- Enterprise ASPs -- deliver high-end business applications.
- Local/Regional ASPs -- supply wide variety of application services for smaller businesses in a local area.
- Specialist ASPs -- provide applications for a specific need, such as Web site services or human resources.

- § Vertical Market ASPs -- provide support to a specific industry, such as construction.
- § Volume Business ASPs -- supply general small/medium-sized businesses with prepackaged application services in volume.

ASPs set up and manage services on behalf of clients, providing facilities and functionality for other project participants. These arrangements should also be governed by contracts, both between the ASP and the client, and between the ASP and the other parties on the project. These contracts need to cover “Service Level Agreements”, “Licensing Agreements”, Intellectual Property Rights, and should generally promote the use of electronic communications technologies for project data exchange and sharing.

The ASP service may vary from being seen as merely a means of communication between the parties (eg: EDI agreements) to the ASP service being placed at the centre of a contract, setting out the reporting/auditing procedures to be followed by each participant in order that they may comply with their obligations under the contract. This range of services could be:

Minimum

- Contract allows parties to communicate/facilitate information flows electronically (by email, no project website)

Or

- Design co-ordination via Project Website
- Design co-ordination and project document management via Project Website
- Design co-ordination and project document management plus financial reporting via Project Website

Ultimately

- All communication/information flows must go via website/be confirmed on website.

It is also possible for Clients/Project Managers to own the software. There would then be no ASP Agreements but there would still be End User License

Agreements to protect the intellectual property rights in the software. (eLEGAL deliverable D11)

1.4.2.3 Digital Notary

Electronic commerce on an open network will enable global transactions at any time, thus reducing costs and increasing opportunities for trade, but on the other hand, it will also be exposed to errors, tampering and denials. To improve this situation, the introduction of a digital notary seems appropriate. A digital (or electronic) notary is the mechanism for electronic commerce that proves who has made an electronic interchange (what), with whom it was made, and when it was made.

The simplest example of a digital notary service is one designed to validate the existence of a particular electronic document, such as a contract, at a given point in time. The notary service receives the document with the author's electronic signature attached. It verifies the signature and then returns a copy of the document, complete with the notary service's digital signature, including a guaranteed date and time at which the verification took place. Being equivalent to a "digital postmark" this will be authoritative in cases of conflicting claims regarding, for example, research results or a contract. (eLEGAL deliverable D11)

Surety is the leader of digital notary services which defines themselves the leading provider of tamperproof data integrity solutions that generate irrefutable evidence of exactly what electronic records were created and precisely when. According to surety.com, the company provides mission-critical technology for all applications that protect intellectual property, ensure corporate governance, and drive regulatory compliance.

The electronic or digital notary concept is not new in Turkey. Since 2002, the frameworks and regulations have been prepared to arrange the technical and legal infrastructure of e-notaries in Turkey. According Turan (2004) Turkey should give more importance to digital notaries to achieve e-transformation and e-Europe aims.

Moreover, the related laws and studies should be finalized immediately which are milestones to achieve the aim of e-Turkey.

1.4.2.4 Electronic Signature

In general, two main questions may arise for a computer user who views a digital document: Who is the author of the record, i.e. the originator? ; and when this record was created or last modified?

There are good solutions to both of these questions. A solution for the first question is the well known concept of digital signatures. In principle, a digital signature is an asymmetric procedure involving a pair of corresponding keys. A private key is used for the creation of a digital signature. This key is kept secret. The other corresponding key (known as the public key) is publicly available. The public key will be used to verify the received digital signature.

In general, signing a digital signature involves the following steps, as illustrated in Figure 1.1

- "compressing" the original document into a small hash value using a hash function;
- generating the digital signature by encryption of the hash value using the senders private key; and
- signing the document with the generated signature. (attaching the signature to the original document)

The private key has to be kept secret. A safe way of doing this is to keep the private key on a smart card and never export the private key from it.

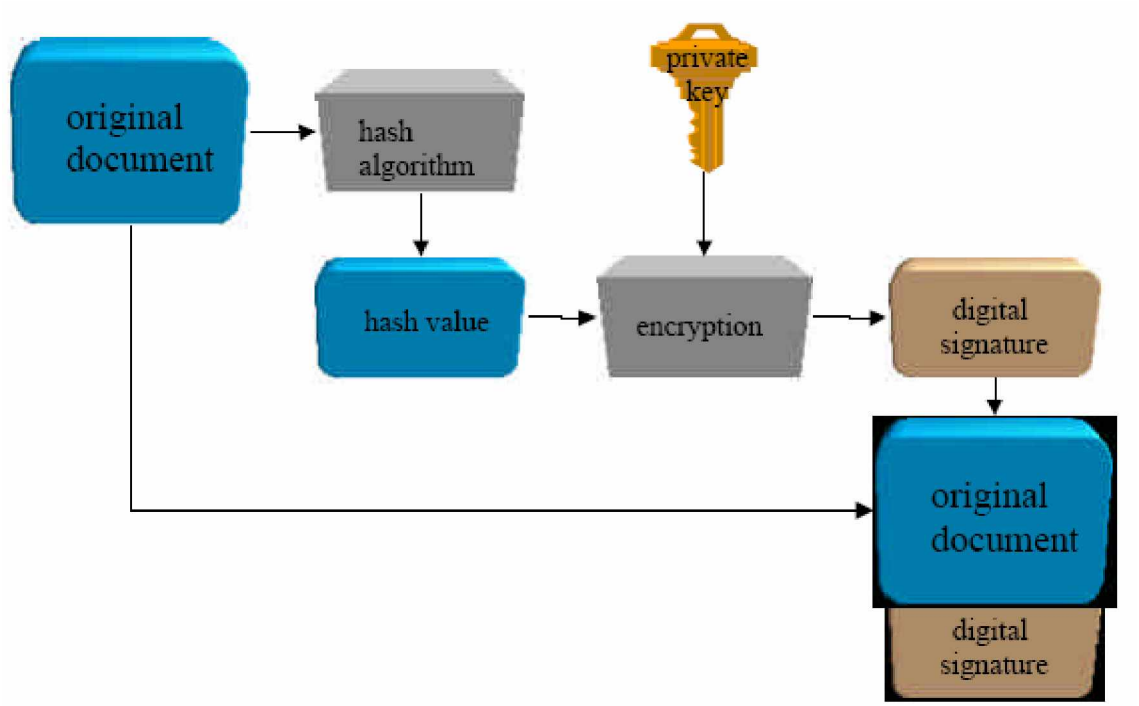

Figure 1.1 - The procedure of electronic signing

The recipient of the document can now verify the digitally signed document using the following procedure, as illustrated in Figure 1.2.

- to make sure the document is intact, and from the specified sender, the hash value is calculated from the document using the same hash algorithm used when the original document was compressed;
- the hash value from the senders' digital signature is also decoded, using the sender's public key; and
- the two calculated hash values are compared. If the calculated hash from the document matches the decoded hash value from the senders' signature, then the received message is confirmed to be from the signed sender and has not been changed during transmission.

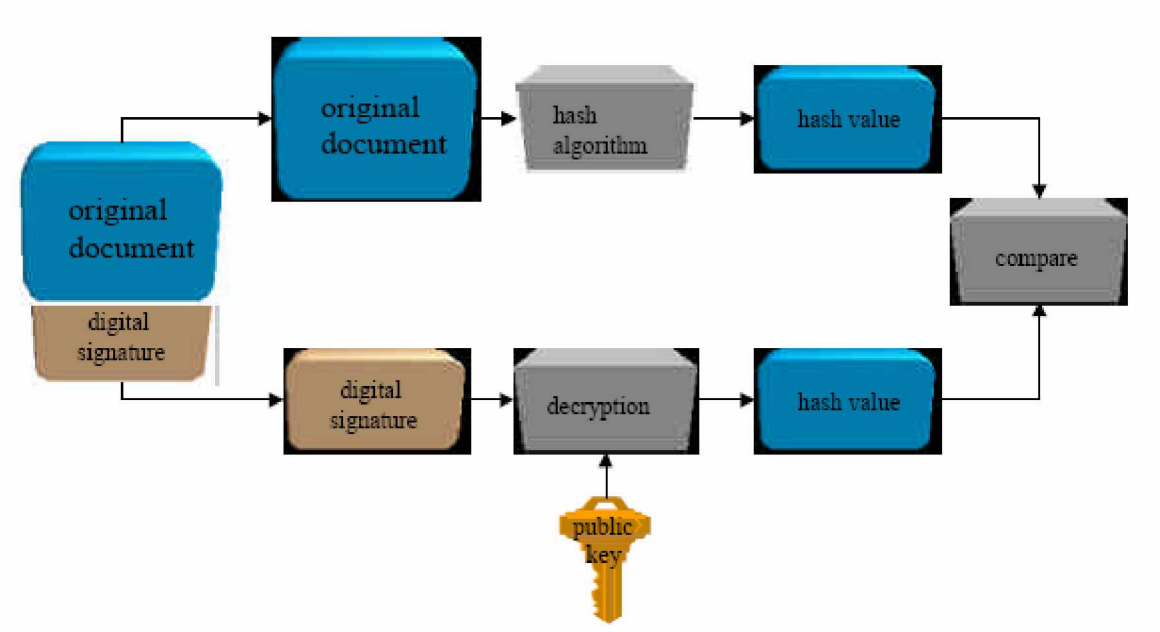

Figure 1.2 - Verification of signature

1.4.2.5 Certification Authority:

In order to prevent someone from publishing a public key under a false name, it is necessary for all parties to register themselves with a trusted authority, usually known as the certification authority (CA).

Special algorithms are used for signing documents, and for verifying documents and signatures. These have the property that knowledge of the public key does not enable an attacker to deduce the users´ corresponding private key. However, if either through careless or intent, someone else gains access to the users private key, this person will be able to forge the legitimate users signatures on documents. At this time, even the value of legitimately signed documents is uncertain.

Proving that a paper document (e.g. a contract) existed at a particular time, and has not been changed since particular time, is nothing new. It has been done for decades. In contrast, the certification of the integrity of an electronic document is

much more difficult. One reason for this is the fact that computer clocks can be easily changed, as can computer files.
In order to avoid this situation, the use of a digital time stamping system is appropriate. The “certificate” that is returned by a digital time stamping system is a certificate for a particular record at a particular time.

The procedure works by mathematically linking the components of a record to a “summary number” that is widely witnessed by, and widely available to, members of the public including, of course, users of the system. The computational methods employed ensure that only the record in question can be linked, according to the “instructions” contained in its time-stamp certificate, to this widely witnessed summary number.

The verification procedure takes a particular record and a putative time-stamp certificate for that record and a particular time, and uses this information to validate whether that record was indeed certified at the time claimed, by checking it against the widely available summary number for that moment.

In Turkey, after the electronic signature law came into force on July 2004, the regulations about electronic signatures and certification authorities were prepared by Telecommunication Institution. Telecommunication Institution (TI) hasn’t been give license to the electronic certificate service providers yet. Although, TI’s regulations finished on 23 January 2005, service providers’ preparation period is still continuing to get licence.

Commercially three firms are working to be a electronic certificate service provider which are TurkTrust, TurSign, and e-Guven. These firms have to make investment at least 3-7 million dollars and at most 15 million dollars for technical and administrative hardware.

TUBITAK-UEKAE is charged to give the government’s departments’ entire electronic certificate. Furthermore, local software products are used and except TSK, MIT, EGM, JGK, SGK, DİB none of the institution can be a service provider.

1.5 Model Project

The legal problems and issues are arising with the rapid development of ICTs. With the use of the technologies, responsibilities appear relative to use level. Therefore, Turkish ICT managers need to be aware of their responsibilities about main legal issues to enable the successful use of ICT in a legal and contractually valid manner in their projects. The main issues, later described in this thesis are legal admissibility of documents exchanged using ICTs, protection of personal data, intellectual property rights, agreements with technology suppliers, ownership of and access to data, agreements between project team members in relation to the use of technology etc.

These issues are researched in some European Union funded research projects such as eLEGAL, ALIVE, ICCI, ICSS, ToCEE and GLOBEMEN. Although, the aims of these projects are not mainly to solve and show the complete picture of successful use of ICT in a legal and contractually valid manner, they all made a contribution to this research area. One of the aims of this thesis is to discuss the legal and contractual issues and cases, and to describe the laws, methods and tools that can be used to enable the growth of technology to be used in a legal and contractually valid environment in Turkey. Among other RTD projects eLEGAL is chosen for its purpose being parallel to the aim of this research and the applicability of its findings in Turkey who is a EU candidate were analyzed and discussed.

CHAPTER 2

THE eLEGAL PROJECT AND ITS RESULTS

2.1 What is eLEGAL?

eLEGAL is a research project within the European Information Society Technologies (IST) program. The “eLEGAL” acronym represents the grand title of "Specifying legal terms of contract in ICT environment". This project has nine participating organizations from four EU countries which are United Kingdom, Germany, Finland and Italy.

2.2 Objectives of eLEGAL

According to the eLEGAL project deliverable D11, the goal of eLEGAL is to define a framework for legal conditions and contracts regarding the use of ICT in project business.

The project defines the industrial requirements for ICT based legal support taking the construction industry as a pilot for other industries. Moreover, it defines the legal basis for contracts on ICT use allowing variations in different countries where the laws, regulations and ICT usage culture are different from each other.

One of the main results of eLEGAL is tools for contract configuration and negotiation which improves project business relationships in construction projects and lead to more trust and reduced number of disputes. The contract configuration tool is software that is able to produce model contracts for construction projects. Additionally, these contracts can be easily negotiated by using a “virtual negotiation room” on the Internet in which different parties of a construction project who want to form a contract are automatically guided while being linked together via the Internet. An electronic library of clauses was built by the eLEGAL legal team which is the

knowledge base of the contract configuration tool. This was done taking samples of national regulations of the participating countries and the directives of the European Union into consideration.

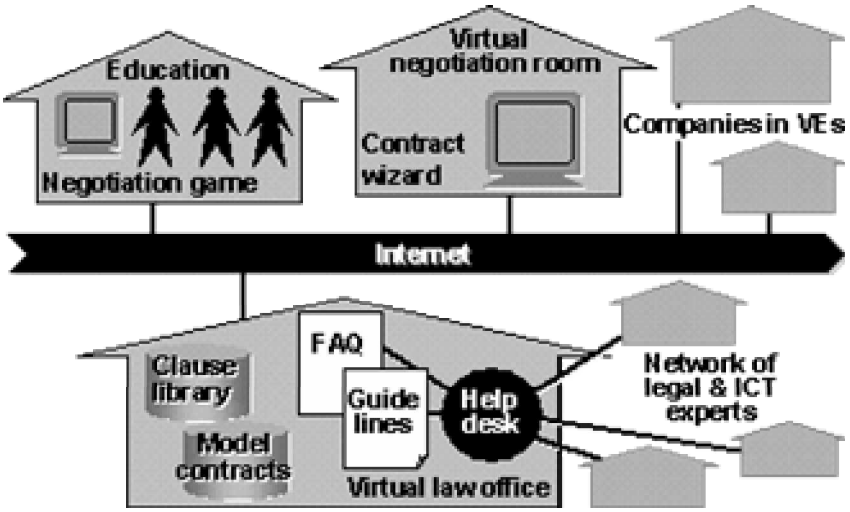

Figure 2.1 - eLEGAL software suit

Consequently, the scope of the eLEGAL is not to create new construction contracts but to cover only the parts of the contracts that concern ICT environments within the construction project. Therefore, the conventional/traditional contract will not be drawn up by the eLEGAL tools, and is outside the scope of the eLEGAL project. The "ICT Contract" will be the output of the contracting tools being produced in the eLEGAL project. (eLEGAL project deliverable D13, 2001)

2.3 User Requirements for Legal Support

One of the key results of eLEGAL project is defining the user requirements for legal support by taking the construction industry as a pilot for other industries. The case diagrams are used -as it is used in project deliverable D13- to show legal and technology support required by the industry.

2.3.1 Virtual Enterprise Definition

The eLEGAL project team defines a Virtual Enterprise (VE) as: "*a temporary form of business collaboration, employing ICTs as fundamental enablers, built upon strategic business alliances around new business opportunities that dissolve once the business objectives have been achieved*"**.**

Although the eLEGAL project is considering ICT support for VEs, it is particularly focusing on the construction industry as a pilot for other industries. Therefore, a specific type of VE, the construction project is the main focus of this study.

2.3.2 The eLEGAL Vision for ICTs in VEs

According to the project deliverable D13, the eLEGAL vision can be summarized as follows; ICT is used only during the operational phases of a VE for the support of specific business processes. Data exchange and the communication of information between project participants will be undertaken entirely by electronic methods during the contracting, operation and dissolution phases of a VE as it is seen in the table 2.1. All parties will be contractually in a position to use ICTs exclusively, instead of sending a fax or letter as official confirmation of electronic communications. This situation will be of great benefit to all participants in a project. There will be time and cost savings related to transmittal and storage.

The provision of contractual support for ICT use in the virtual enterprise will lead to confidence in the application of the technology by all parties. This legal framework, regulating the new ways of working, will result in more trust and hence, improved business relationships. The eLEGAL vision is one where the construction industry will take significant steps away from the traditional adversarial approach to business. (eLEGAL Project Deliverable D13, 2001)

Table 2.1 - Phases of a VE covered by eLEGAL

VE Phase	**Relevance to the eLEGAL Project**
1. Identification (of business need)	*outside the scope of the eLEGAL Project.* This is a business issue that has to be addressed by the client organisation, either internally, or with the assistance of external consultants.
2. Partner search	*outside the scope of the eLEGAL Project.* The eLEGAL project is only concerned with proving legal support for partners that have already been selected.
3. Contracting	*The Contracting phase of a VE is a primary concern for the eLEGAL Project.* During the contracting phase, the preparation of a contract for ICT support may need to be undertaken in parallel with the drafting of the general contract(s) for the operation of the VE. The conclusion and execution of contracts (contracting procedures) may themselves require legal support to enable exclusive application of electronic means to these processes, a central issue for eLEGAL.
4. Operation	*The Operational phase of a VE is a primary concern for the eLEGAL Project.* The Operational phase is primarily concerned with the generation and exchange of information by the VE, requiring the use of ICTs, and hence contractual support for ICTs.
5. Dissolution	*The dissolution phase (the end of a VE) needs to be considered by the eLEGAL Project.* The information produced in the Operation phase has to be managed and 'handed over' to either the Client organisation or those responsible for operating and maintaining the facility. The responsibility for maintaining facility information and its ownership become the main issues.

2.3.3 Legal Requirements for Development

Before describing the scenarios that address specific communications likely to be found in a construction project, a number of specific requirements for legal support are outlined by diagrams and supporting text.

These are the requirements to:

- provide ICT infrastructure for a project;
- enable the actual use of ICTs; and
- provide legal support for documents.

2.3.3.1 General Requirements for ICT Legal Support (Infrastructure)

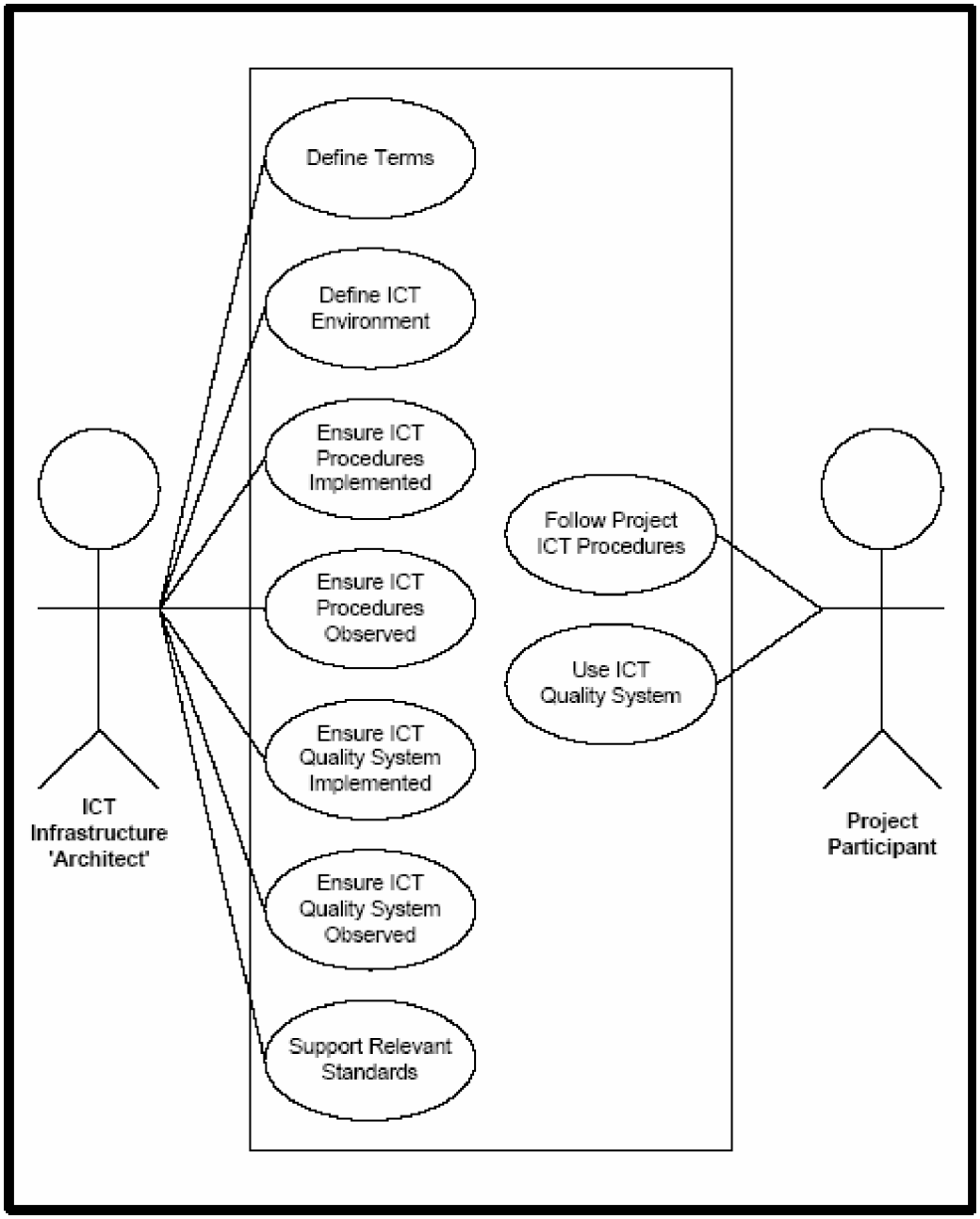

Figure 2.2- General Requirements for ICT Legal Support concerning the infrastructure

Before ICTs can be used throughout a Virtual Enterprise (VE), a number of fundamental enablers have to be in place, which is called here as “Infrastructure”.

ICT Infrastructure Architect: The development of the infrastructure described below has been assigned to this actor who can be one of these project parties;

- The Client – having experience of similar projects would be desirable;
- A Contractor – main contractors often provide some form of ICT infrastructure for their subcontractor partners;
- A Project Manager – either a ‘general’ project manager, or a specific project manager responsible for the ICT provision; or

Project Participant: Anyone that uses the project ICT environment, who is required to use the system in a way that maximizes the benefits to all parties.

Definition of Terms: The terms referred here include general reference terms relating to ICTs and their application, or describe the parties involved, but should specifically clarify all elements requiring a legal definition.

Define an ICT Environment: ICT Infrastructure Architect should consider a number of factors to define an ICT environment such as:

- Project related factors – complexity, scope, time constraints, ICT budget, and potential for cost savings from innovative ICT application or innovative business processes requiring ICT support;
- Partner related factors – number of partners in the VE, their location, ICT maturity and capability (i.e. hardware platforms, software applications and even minimum PC specification); and
- Communications – Information flows and data exchange requirements.

Ensure ICT Procedures are Implemented: After legal stipulation is made regarding application of a particular ICT environment, some form of management or guidance is needed to support this application.

Ensure ICT Procedures are Observed: After utilizing the full potential of ICT environment, ICT Infrastructure Architect should ensure ICT Procedures are observed. Because everything can not be legislated for, so procedures could be used where appropriate.

Ensure ICT Quality Systems Implemented and Observed: Depending on the policies of the country within which the VE is operating, the requirements of the client, or the usual practices of the parties involved, some form of quality

management of the ICT environment and its application may be needed. This could be in the form of implementing and observing an ICT quality system.

Support Relevant Standards: The ICT environment should comply with and support relevant standards.

Follow Project ICT Procedures and Use of an ICT Quality System: The users of a project ICT environment will be required to use the system in the most beneficial way for all parties. This requires following project ICT procedures and use of an ICT quality system.

2.3.3.2 General Requirements for ICT Legal Support (Using ICTs)

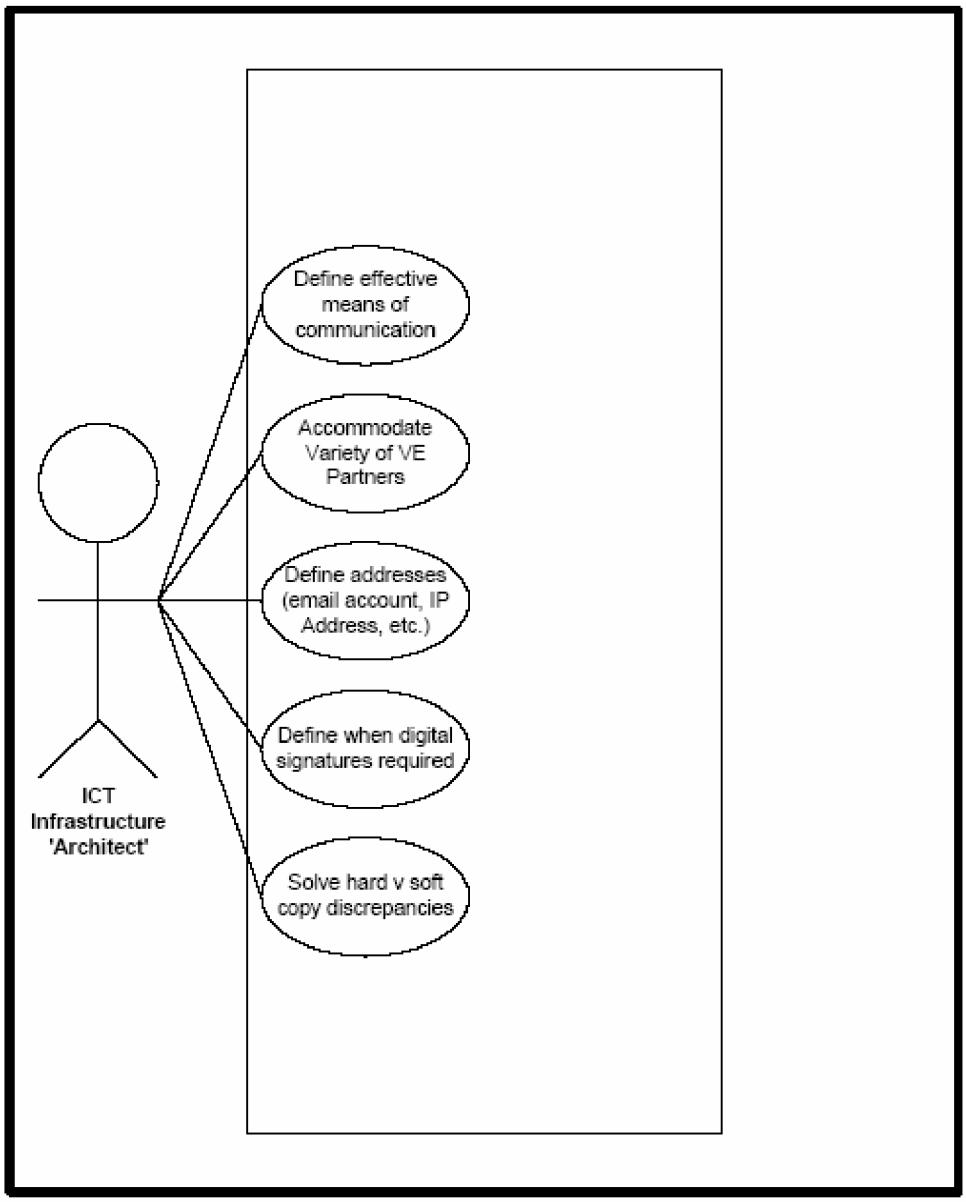

Figure 2.3 - General Requirements for ICT Legal Support concerning ICT use

Define Effective Means of Communication: Once a general ICT infrastructure is in place, further consideration has to be given to its use to maximize benefits and minimize the risk of problem. For this purpose choosing the method of communication for data exchange is an essential aspect.

Accommodate a Variety of VE Partners: The means of communication should also be chosen in order to accommodate a variety of VE partners and when accommodating a variety of VE partners, ICT infrastructure architect should consider the various working practices of the parties involved, any cultural issues resulting from parties being based in other countries, and in particular any legal issues related to the countries of the various parties.

Define Addresses (Email Accounts, IP Address, etc.): Other details may also need consideration in order to make a means of communication legally effective. Therefore, to accommodate the various forms of ICT communication it will be necessary to define addresses.

Digital Signature Requirement: Although a communication may be sent to a recognized address, the parties may also require some form of proof of authorship of a message/data. This can be provided by a digital signature, but any legal support for ICTs may require a definition of when digital signatures are required.

Hard vs. Soft Copy Discrepancies: Despite these safeguards, there is still a potential risk resulting from corrupt data or from differences between a soft and a hard copy of a document. Therefore, it is also necessary to consider how to solve hard and soft copy discrepancies in order to quickly and easily prevent disputes resulting in delay or incorrect work.

2.3.3.3 Legal Support for Documents

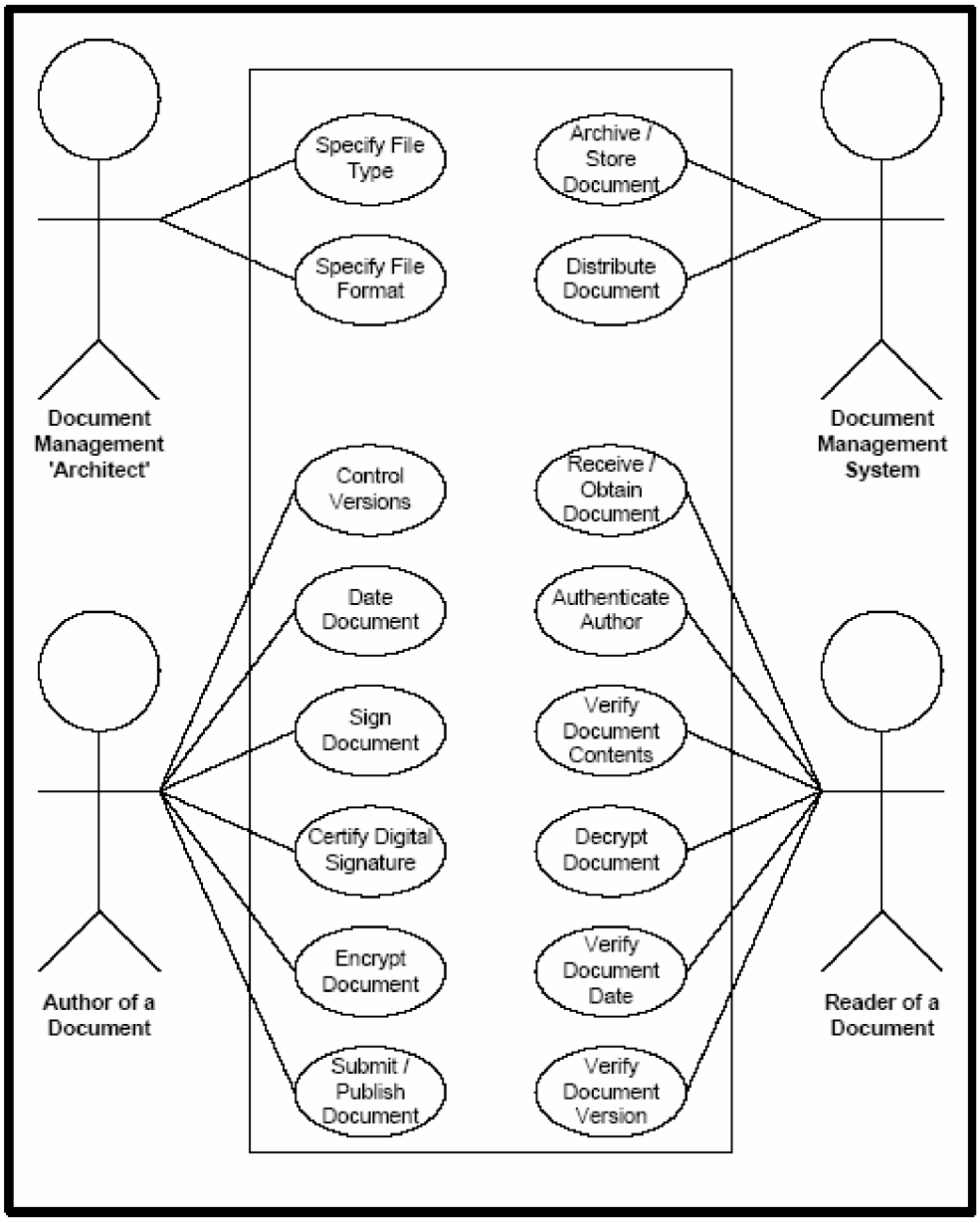

Figure 2.4 - Legal Support for Documents

A document is a container for information that may be presented in a variety of styles and formats which are a letter, a report, or other recognizable publication that is used to communicate information.

Document Management Architect: To improve efficiency of communication, and increase the potential for direct re-use of the data within a document, certain

parameters for a document should be agreed. This process could be undertaken by the document management architect who should:

- Efficiently and effectively store data for project use; and
- Provide the client with a comprehensive record of the facility that has been built for it, in a manner that allows maximum re-use of the data for operation of the client's business, and for maintenance of the facility.

Specify File Types: Until software independent means of exchanging data are fully available, specific file types may have to be specified to improve data compatibility

Specify File Format: Detail the layout of files/documents including such issues as naming conventions, reference numbers, etc.

Author of a Document: When guidelines (or legal stipulation if appropriate) are available for the type and format of data the author of a document is able to produce the document. The author could be any party included the project.

Document Management System, Control Versions, Dating a Document: The production of documents should be carefully managed. Document management system should control versions of documents to prevent amendments to previously published documents being overlooked. This management process should also include dating a document.

Sign a Document: For legal validity of documents an author should sign a document. Many methods are available, and most electronic/digital forms of signature, such as using biometrics or PKI systems would appear to offer significant advantages over a hand-written (and often illegible) signature.

Certified Digital Signature: To sign with a valid signature the author can use certified digital signature which has been verified by certification authority.

Encrypt the Document: The author should encrypt the document while signing it with digital signature for security.

Submit/Publish the Document: After the signing and dating and encryption of a document, the author can submit/publish the document, which should be a legally valid container of data, which can be exchanged by email and stored.

Archive/Store a Document, Distribute a Document: The document management system which provides the requirements for legally admissible storage, should archive/store the document and distribute the document.

Reader of a Document: After a document has been published and made available to the project participants by the document management system, it can be read by a reader of a document.

Receive/Obtain a Document: The reader will first receive/obtain the document from the document management system and made a number of checks to satisfy about the content of the document.

Authenticate Author: By using digital signatures, the reader makes an identity proof which is called authentication of author.

Verify Document Contents: The use of a digital signature can also be used to verify document contents, allowing the reader to be sure that the document they are reading is the same as the original sent/published by the author.

Decrypt the Document: If encryption was used to protect the contents of the document, the reader will also need to decrypt the document using appropriate tools.

Verify the Document Date, Verify the Document Version: For integrity and legal validity of the document some care should be taken to ensure that the parties are using the latest information. The reader should verify the document date, verify the document version and check these details against previous issues. These requirements are important to ensure redundant work is not undertaken, and can be assisted by digital signatures and related technologies or using an appropriate document management system.

2.3.4 Typical Scenarios to Support an ICT Contract

The eLEGAL project will develop tools that can prepare an ICT contract which supports specific scenarios that address specific communications likely to be found on a construction project. These scenarios or examples, which are e-mail communications, CAD data exchange and project collaboration web sites, illustrate potential applications of ICTs in various project communications.

2.3.4.1 Scenario 1: Contractually Supported Email Communications

Email has been widely adopted by many organizations for use on construction projects. However, its application causes many legal issues such as; ensuring that the intended recipient receives a message and proving this fact, checking that what is

received is legally valid and identical to what was sent and extend to the storage of messages for project records.

Therefore, the first scenario that eLEGAL offers for providing contractual support for ICTs in VEs is:

“The adoption of email by a VE as a mechanism for undertaking project communications in a contractually supported, and legally valid manner.”

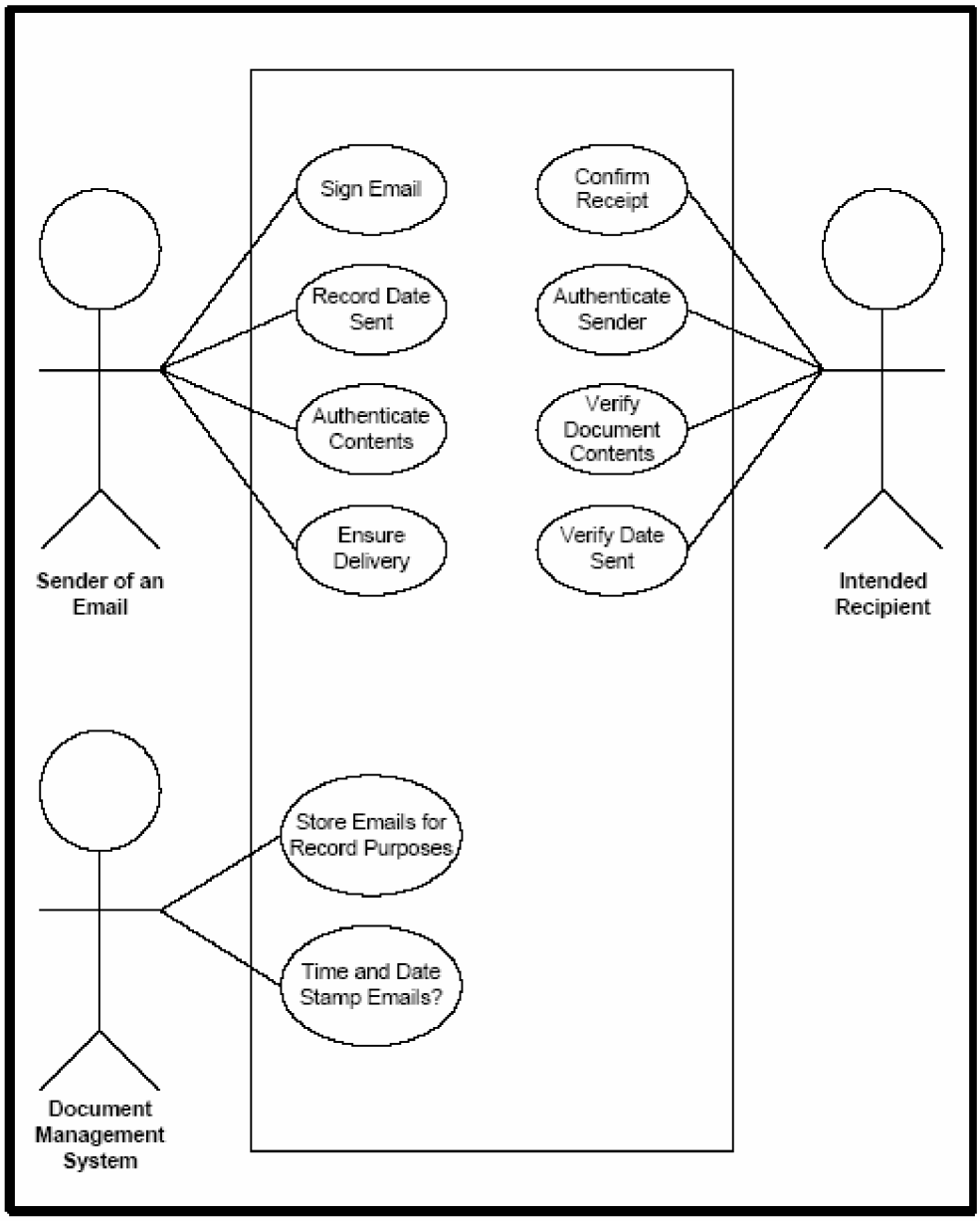

Figure 2.5 - Contractually Supported Email Communications

The requirements described below cover the application of email in a VE, where email could be used to send instructions instead of letters, to issue information or as a mechanism to distribute/exchange documents and CAD data files.

The scenario for the application of email to project communications has some similarities to the requirements for legal support of documents.

Sender of an Email, Intended Recipient: instead of an author of a document and reader of a document, this scenario involves sender and intended recipient, who can be any project participant.

Sign the Email, Record Date Sent, Authenticate Contents: The sender of an email will want to ensure that his message is legally valid, so he sign the email, record date sent and authenticate the contents of the message same as for a document.

Ensure Delivery: After authenticating the contents, the sender will want to ensure delivery of the message to the intended recipient which is an important legal consideration.

Document Management System: An important part of any effective ICT environment will be some form of document management system that can manage emails across the project.

Storing Emails for Record Purposes: For future reference, the storage of emails is very important issue to be considered.

Time and Date Stamp Emails: This is needed for proof of the existence of the message and an agreed date/time of sending.

Confirm Receipt: The Intended Recipient should confirm receipt of the message in order to continue the legal validity of email as a communication method on the project. This can be done by several methods, depending on legal considerations, such as the recipient sending a signed confirmation of receipt, or could be done automatically by the email or document management systems.

Authenticate the Sender: Before confirming receipt, the recipient should know who the sender is.

Verifying Document Contents: Also the recipient should ensure that the content of the message is changed or not.

Verify Date Sent: After all, the recipient should verify date sent, either from the message itself or using the document management system.

2.3.4.2 Scenario 2: Contractually Supported CAD Data Exchange

Current contractual practices consider the exchange of CAD data, but typically this is limited to the specification of a particular type of CAD software, for example "AutoCAD 14 or later to be used' on a specific project. Therefore, current practice results in the use of a hand-written signature on a paper hardcopy as the only method for achieving legal admissibility. Therefore, the second scenario for providing contractual support for ICTs in VEs is: "The application of CAD data exchange techniques by a VE as a mechanism for exchanging drawings and related data in a contractually supported, and legally valid manner."

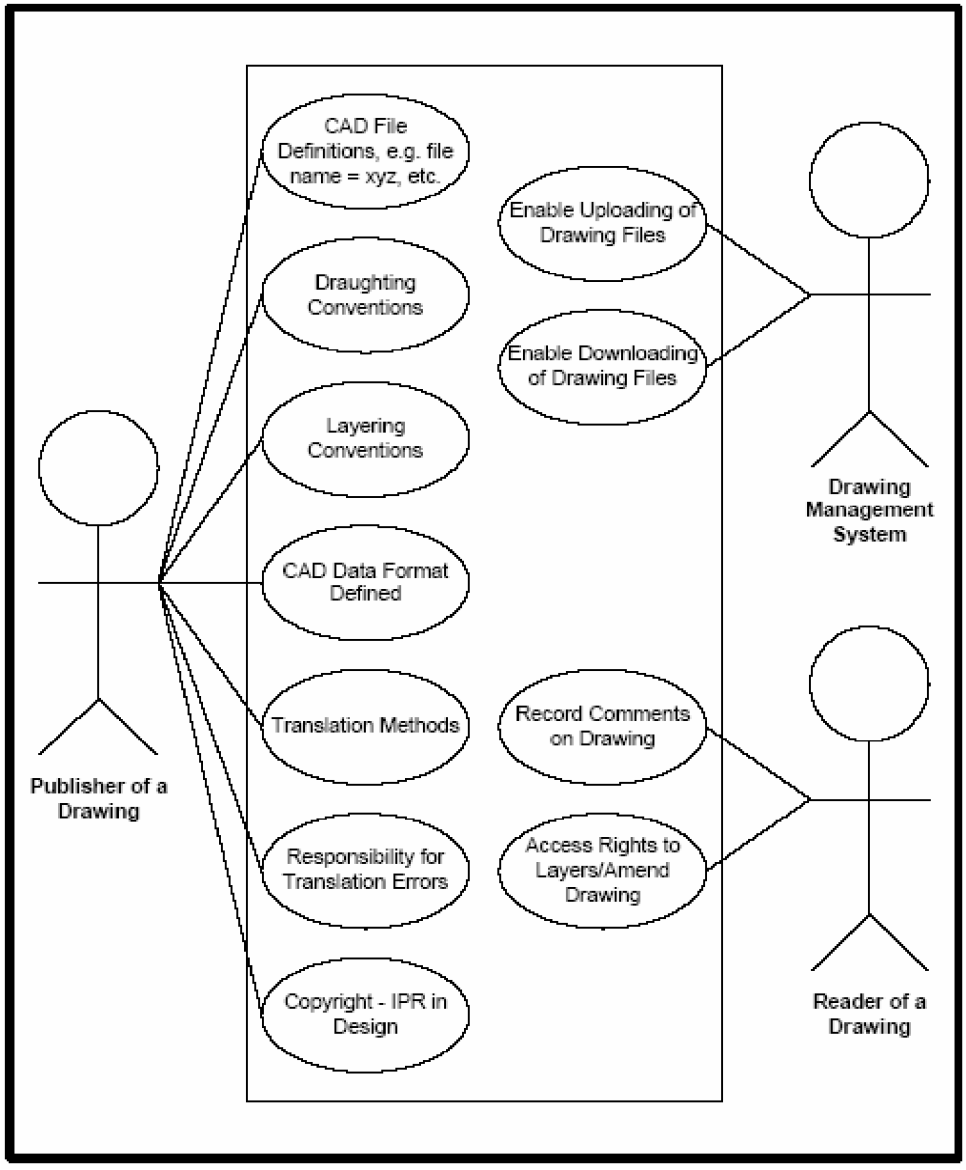

Figure 2.6 - Contractually Supported CAD Data Exchange

Publisher of a Drawing: Any member of the project team that is involved in the design of a facility, such as a designer, a consultant or a subconsultant can undertake this role.

CAD File Definitions: The first task of the publisher is configuring the CAD file for appropriate manner for the project such as defining names of CAD files, or other conventions, as agreed by the Virtual Enterprise.

Draughting Conventions, Layering Conventions: The VE should recognize and formalize Draughting Conventions and Layering Conventions to assist with the structuring of CAD data.

CAD Data Format can be Defined: Specifying a particular CAD system for use on a project for CAD data exchange should be done because the variety of CAD software systems (and versions of those systems) leads to compatibility problems when data needs to be exchanged from one organization and their CAD system to another organization's CAD system.

Translation Methods: In the future, CAD systems should support platform and software independent objects, but to make use of current CAD systems, consideration of translation methods is needed. These may specify types of file format, such as 'DXF', 'DWF' or 'DWG'.

Responsibility for Translation Errors: These standards can cause problems. Exporting a CAD file to DXF format, and then re-importing it back into native CAD format can often result in differences to the original CAD file. Therefore, careful consideration should be given to legal considerations relating to responsibility for translation errors.

Copyright and IPR in a Design: The process of design results in the generation of Intellectual Property Rights (IPR) – the ideas that underlie the design shown on a drawing. This IPR belongs to a particular party, often the designer who licences the client to make use of it for that project. However, the copyright and IPR in a design is a serious issue, particularly if CAD data files can be exchanged and re-used by other participants in a VE. Following definition of a CAD file's format, and production of the drawing, the data needs to be used on the project, and in particular, exchanged with other project participants. This should be possible through a number of mechanisms, possibly requiring legal support. Email could be used to transfer files between project participants.

Enable Uploading of Drawing Files, Enabling Downloading of Drawing Files: Project participants will require access to the files, either through email messages, or by the drawing management system.

Reader of a Drawing: This role is likely to be performed by most of the parties to a project at some time.

Record Comments on a Drawing: Upon receiving a copy of a drawing, the reader is likely to perform one or both of the main activities involving CAD data, namely commenting on the design work of others, or using the data from others to advance their own design work. Each of these processes requires careful planning from both a legal and technical perspective. For example, when a party comments on a drawing, the comments need to be recorded to ensure that their interests in the data/drawing are highlighted and legally valid.

Access Rights to Layers/Amend Drawings: Adding an overlay to a CAD file, in the form of comments on the design, is altogether different to allowing a third party to change the drawing or associated data in the CAD file. Therefore, legal and practical consideration should be given to the access rights to layers, amend drawings. The CAD data should be available for re-use by the relevant parties.

2.3.4.3 Scenario 3: Project Collaboration Web Services

Project collaboration websites are becoming increasingly common within the construction industry, providing a range of services to support communications on a project by giving general publication and information services, collaboration support and project management support.

Therefore, the third scenario for providing contractual support for ICTs in VEs is: "The deployment of a Project Collaboration Website by a VE as a mechanism for undertaking project communications in a contractually supported, and legally admissible manner."

a) Provision of a Project Collaboration Website

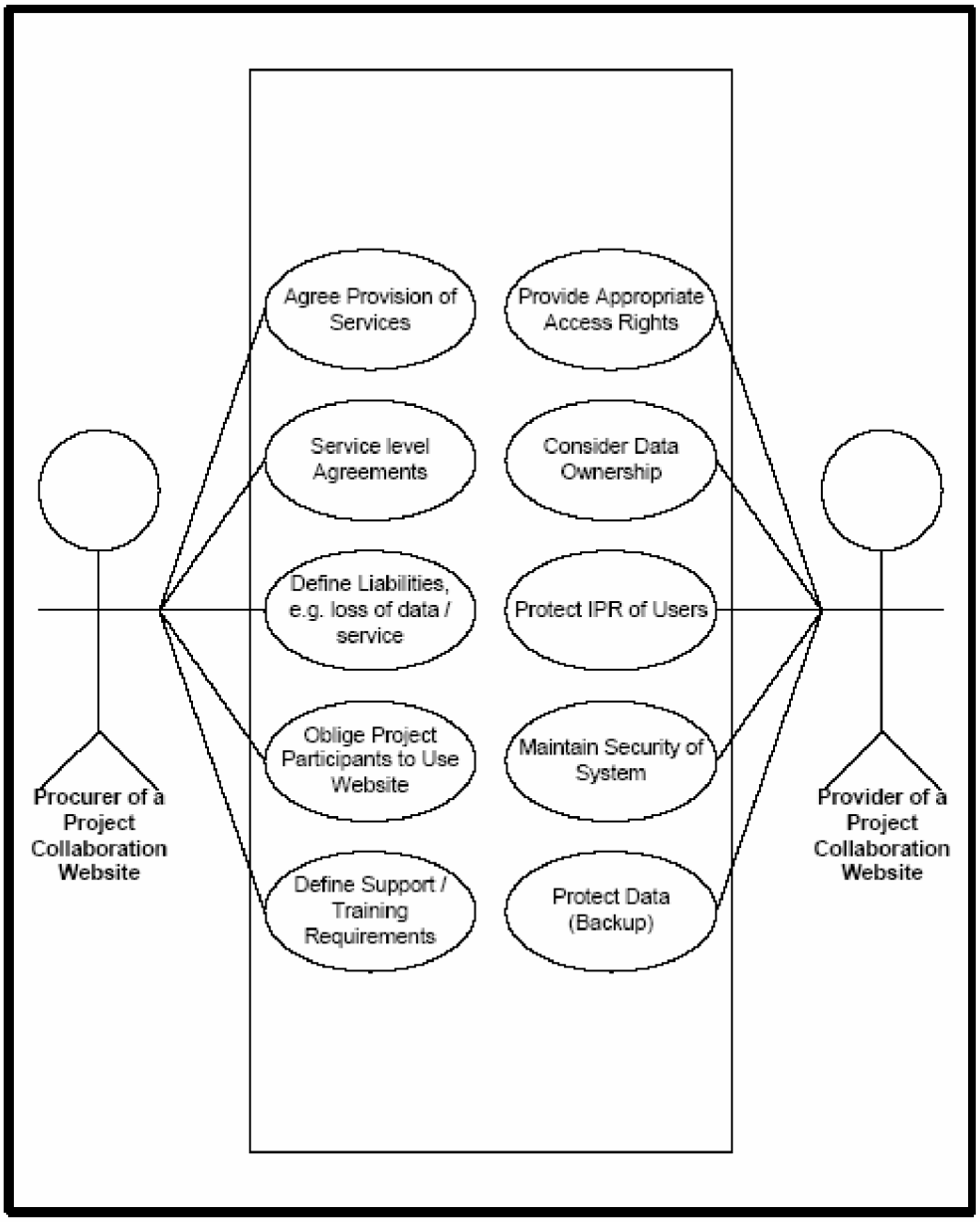

Figure 2.7 - Provision of a Project Collaboration Website

Procurer of a Project Collaboration Website: A member of the Virtual Enterprise will arrange for the provision of a Project Collaboration Website who could be fulfilled by a specific Project Manager for the ICT provision, the client or contractor, depending on knowledge, experience, and control requirements.

Provider of a Project Collaboration Website: The party providing the service is often called an Application Service Provider (ASP). The ASP could be an ASP external to the VE or one of the parties to the VE that has such a system, e.g. an experienced client or main contractor, depending on knowledge/experience/control requirements.

Agreeing the Provision of Services: Project collaboration websites provide a range of functions and services, and the procurer will need to consider the requirements of the project when agreeing the provision of services with the provider. The agreement on what services are required is likely to take the form of a contract between the parties (an 'ASP contract'). This contract should consider all issues related to the provision and use of the services of the Project Collaboration Website.

Service Level Agreements: After defining what services are required, negotiations will also be required to reach service level agreements, describing the scope and availability of these services, and how they are to be made available for the project.

Define Liabilities, e.g. loss of data/service: The procurer should also define liabilities to ensure that his and the project's interests will be covered by the provider.

Oblige Project Participants to Use the Website: Legal support is required for this obligation to use the Project Collaboration Website which is the subject of ICT contract.

Define Support/Training Requirements: Users may struggle with the technology, or not use it in an efficient manner if they are not suitably trained. Therefore, the procurer, in conjunction with the provider, should define support/training requirements, which can be implemented with appropriate legal support.

Provide Appropriate Access Rights: The parties using the site will need to be able to enter the site and access the information that they will need to undertake their work. They will also want to know that only authorized parties are able to access their data once posted on the site.

Consider Data Ownership: It will be necessary for all parties involved in the system to consider data ownership, as one party placing its design work onto other parties Project Collaboration Website system on behalf of another party could cause difficulties.

Protect IPR of Users: It is also in the interest of the procurer to ensure that the provider will protect IPR of users.

Maintain Security of the System: The design work undertaken by each organisation in the VE must be protected. In addition to managing access and ownership of the data, the provider will also need to ensure that it can maintain security of the system, to prevent hacking and other unwanted attention.

Protect Data (Backup): This may be in the form of regular, secure (off-site) backups, or a mirror server running the same Project Collaboration Website as a spare in case of failure. Whatever approach is taken, careful consideration of continuity of service is required, along with attention to any data or communications that occur when a Project Collaboration Website is unavailable.

Use of a Project Collaboration Website

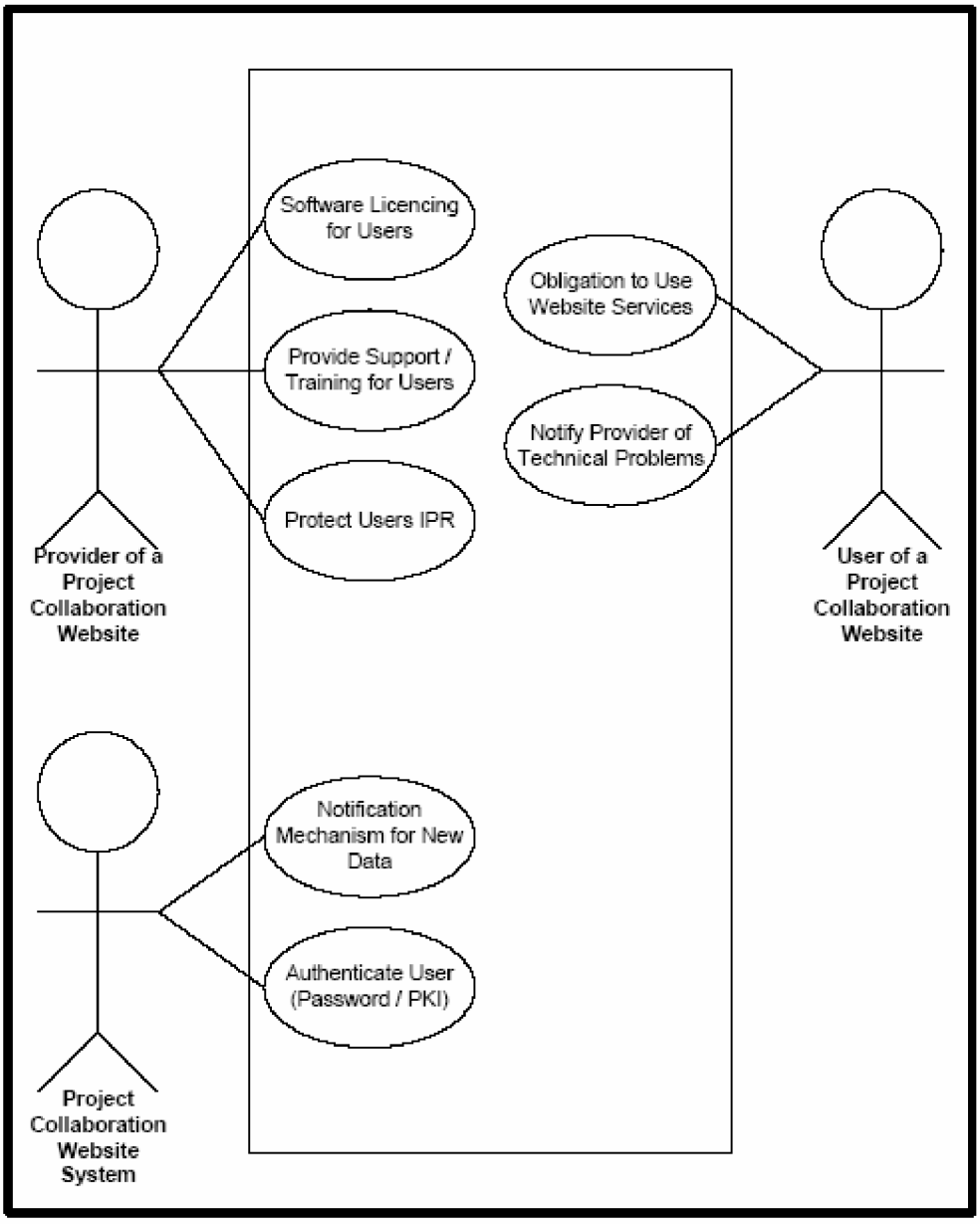

Figure 2.8 - Use of a Project Collaboration Website

Provider of a Project Collaboration Website: After agreeing on the set-up of the Project Collaboration Website, the provider of a project collaboration website should enable members of the Virtual Enterprise/project team to use the system.

Software Licensing for Users: An agreement between the provider and the users. This agreement might detail the software and services that the provider will permit

the users to access, and potentially describe how the users can access these services and what they can use them for.

Provide Support/Training for Users: This might be specific to the user or the software and services they are using.

Protect User's IPR: Re-assuring the users that their interests are being protected by the system and the provider.

Notification System for New Data: Depending on the workflow arrangements in the project, it might be desirable to employ a notification system for new data, which could require legal support.

Authenticate the User (Password/PKI): This measure would be required to verify the identity of the user for accessing project data and uploading new data onto the Project Collaboration Website. A number of authentication methods may be applicable such as a password and Public Key Infrastructure. The type of authentication chosen may depend on a number of issues, such as the technology available within the parties in the VE, or perhaps be influenced by the legal frameworks of the countries in which the VE partners operate.

Users of a Project Collaboration Website: It is VE partners, and the individual workers in the organizations, that will be the users of a project collaboration website. Potentially any member of a project team may require access to the Project Collaboration Website in order to obtain or supply information to the project.

Obligation to Use Website Services: This may be some form of agreement between, for example, the client or contractor and the user, requiring legal support to ensure all parties use the system to maximize its benefits.

Notify Provider of Technical Problems: Users must report a problem to protect themselves and to assist in the smooth running of the project.

2.4 Model Contracts

The legal and industrial partners of eLEGAL project reached a consensus on how the application of ICTs to project-based business could be contractually supported, resulting in the "eLEGAL Contractual Framework for ICTs". This framework, illustrated in Figure 2.9, comprises three key;

- **ASP Contract:** An agreement between an ASP (the provider of a project collaboration website) and the party responsible for procuring such services detailing what web services will be provided, various mutual obligations, etc.;
- **End User Licences:** The agreement typically signed when a party agrees to make use of an ASPs services, regulating how the services will be used; and
- **ICT Contract:** An agreement between all parties on a project, detailing mutual obligations to communicate electronically, and specifying how these communications can be undertaken in a manner that ensures contractual admissibility, and thus increased trust and cooperation.

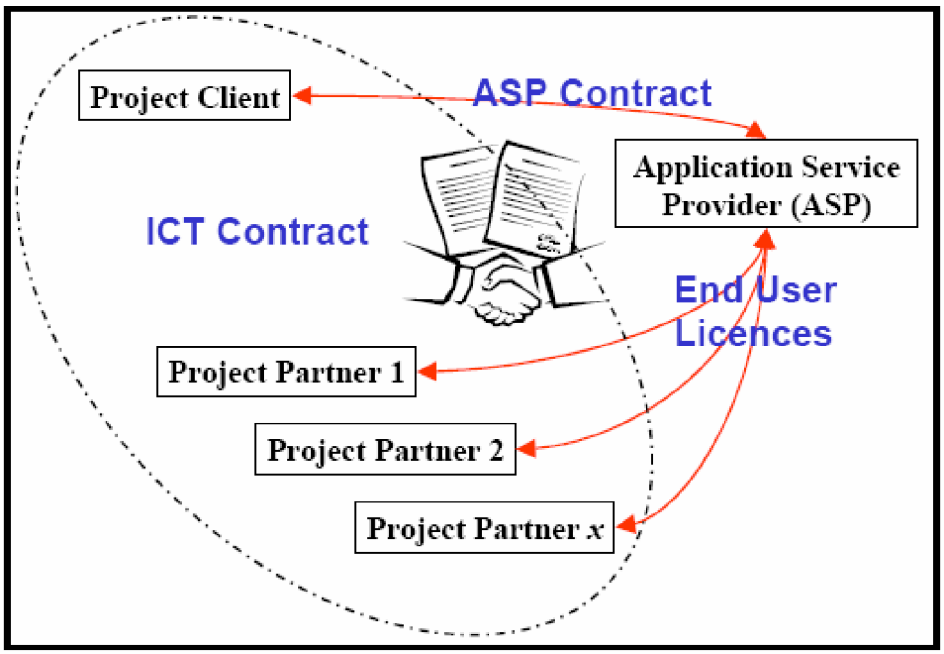

Figure 2.9 - The eLEGAL Contractual Framework

2.4.1 Model ICT Contract

The eLEGAL legal team, involving representatives from Finland, Germany, Italy and the UK, have developed a series of clauses that address common issues faced by the construction industry. These include the contractually valid application of email communications, the use of project collaboration websites and use of Application Service Providers, or ASPs.

In the Appendix A, two model contracts can be found which illustrate the potential applications of the ICT and ASP contracts that can be defined using the eLEGAL Contracting Software Tools. The sample contracts given covers “typical” conditions in construction projects. These are not intended for direct application to a project, because they don’t meet the specific requirements of the project parties and the specific constraints on the project ICT environment.

The first model contract is the ‘ICT Contract’, which describes how a basic ICT infrastructure, i.e. email, can be given contractual support for use on construction projects. In the sample ICT contract which provides contractual support for email communication on construction site consists of clauses that allows the parties choose the degree of use of ICT in the project. For example; in the first clauses (1.1, 1.2) of the contract, participants decide the degree of electronic communication according to their ICT infrastructure. Following five clauses covers the scenario about “contractually supported email communications” described in the previous section and defines the application of this scenario. Other six clauses are about the conditions what if there is an obstacle in information exchange. The last clause (1.12) is about specifying operating environment which is necessary for project collaboration.

2.4.2 Model ASP Contract

The second model contract considers the relevant contractual arrangements for use on a construction project using Application Service Providers. This sample contract includes clauses suitable for use on a UK project where a client is

engaging an Application Service Provider (or "ASP") to provide a web-based project collaboration tool for use by the client and the project team (e.g. architect, consulting engineers, etc). Therefore, the contract is between the client and the technology supplier, and it requires (at clause 4.1) the services to be provided to the project team (defined as "Authorized Users").

Because users other than the client are receiving services from the ASP and yet are not a party to this contract a simpler contract is created between them and the ASP via the Authorised User Licence which is included as a schedule to the ASP contract. The Authorised User Licence contains clauses governing the use of the system by members of the project team. It includes several clauses similar to the ASP contract (for example regarding the ASP's intellectual property rights) but does not include for example payment provisions as the client, and not the users are paying the ASP to provide the services.

2.5 ICT Support Tools

According to eLEGAL project deliverable D11, one of the main results of eLEGAL project is development of contract negotiation, configuration tools and development of a tool for defining the ICT environment in a business project. The development of these ICT support tools, aiding the process of drafting business and ICT contracts, are prepared by eLEGAL project team and specifications are made in the Work Package 3(WP3).

2.5.1 eLEGAL e-Contracting Architecture

The eLEGAL e-contracting architecture consists of two main components, the Contract Wizard and the Virtual Negotiation Room (VNR), supported by a tool for capturing the VE's ICT support definitions. The relationships of these components are shown in Figure 2.10 below.

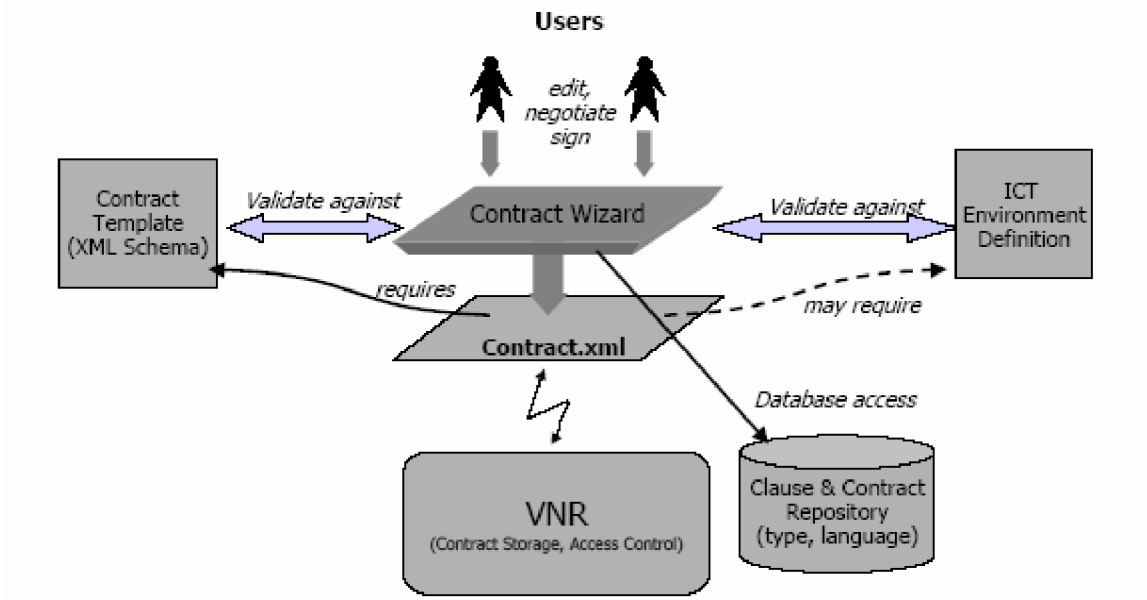

Figure 2.10 - Relationship between contracts, templates, ICT environment definitions, and contract clauses

The first tool called contract wizard is an editing tool for electronic contracts, allows the signing of the contractual parts of the document and access to a contract database, which holds clause texts. It is used for validating, visualizing and printing contracts as well as storing them locally or on the VNR. The second component is the VNR, which serves document management purposes like upload/download of contracts, version control, access control and multi-user support. Furthermore, an ICT environment definition tool's function is to support the capture of essential information of the existing or required ICT environment of a VE.

2.5.2 Tool for Defining The ICT Environment

Basic requirements for the Tool

The ICT environment is described as following in WP3.

- framework of organisations (actors and their roles) in the virtual enterprise (VE),

- tasks and information flows in VE business process,
- software, exchange formats and communication protocols with security and access control issues, supporting data exchange and sharing in VE (between tasks),
- legal conditions and contracts from ICT point of view (to be set using Contract Wizard).

These items and the interdependencies between them need to be illustrated and documented clearly for information exchange with contract drafting tools. The tool for defining ICT environment of a VE should be readily available and usable for very diverse and potentially geographically distant organizations and individuals.
Therefore, the tool has to;

- Be in-expensive, intuitive and web-enabled,
- Provide easy data entering, management and update,
- Capture the essential features of VE and its ICT environment for contract drafting and management. So, the ICT environment definition needs to be provided in such a form that the information is easily accessible by the tools using it, e.g. Contract Wizard for ICT contract drafting.

ICT Architecture

The technical ICT environment to support a VE can be complicated and diverse, being comprised of a number of company specific systems in each participating company, as well as common communication and data storage components.
Definition of ICT support can be divided into 7 layers:
1. Presentation (HTML, VRML, XML/XSL, ...)
2. Application (CAD, IE, Office, ...)
3. Interoperability (IFC, DXF, ...)
4. Communication (Internet, HTTP, ...)
5. Access (IFC-interfaces, XML-interfaces, access control & security)
6. Service (Document management, Content mgmt,...)
7. Storage (RDBMS, File systems, ...)

The general principle of organizing the parts of a system on seven different layers is presented through an example in Figure 2.11.

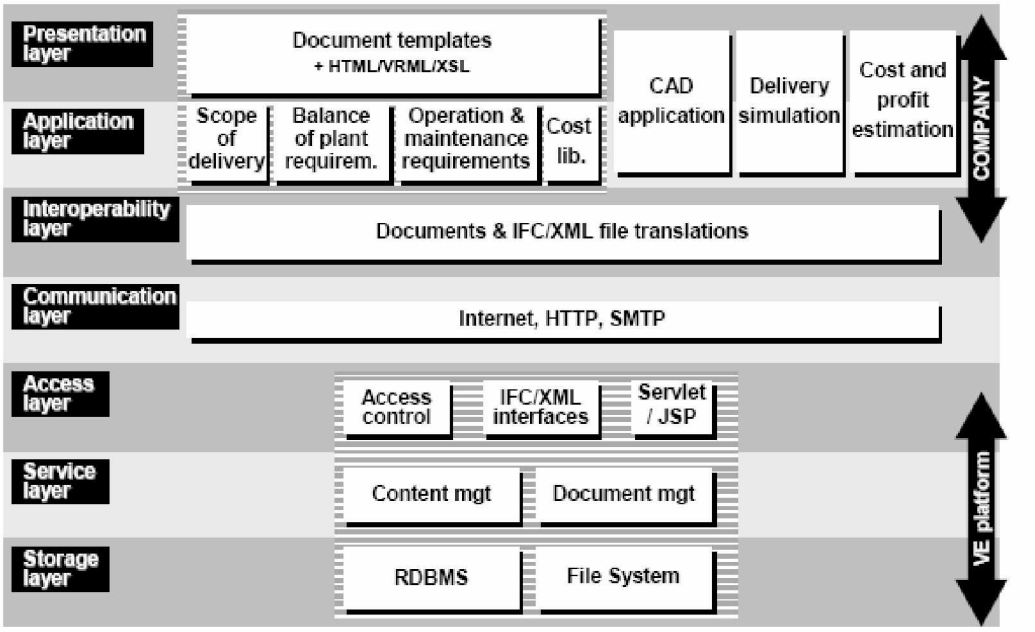

Figure 2.11 - Example of the layered structure of ICT support for VE

Functional requirements

The functional specification which is described in project deliverable D31 will focus on defining which parts of the system need to be covered by an ICT contract and thus captured by the tool. The tool is developed to support different scenarios with different number of actors and information flows. The scenarios are shown in Figure 2.12.

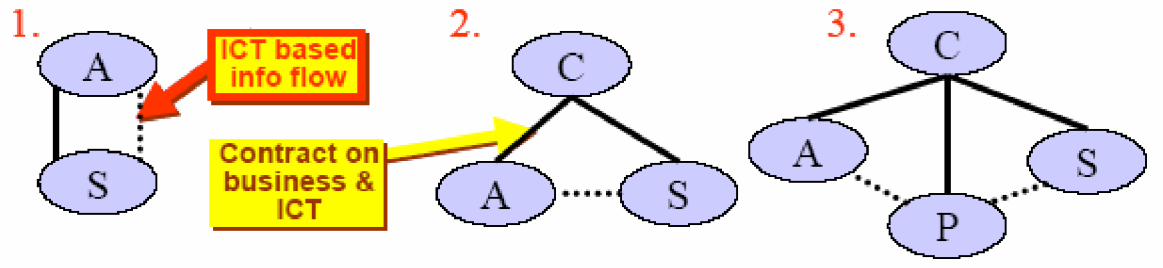

Figure 2.12 - Information exchange scenarios for ICT support capture

Scenario 1: Bilateral relationship between client and consultant (e.g. Architect – Sound analysis engineer).

The basic arrangements assumed in this scenario are:

- Business and ICT contract is established between actors who exchange information
- Information exchange is based on email.

The ICT definition should cover description of tasks, and related information to be sent/received, for both client and consultant, with the following technical issues to negotiate and agree on:

- Presentation of documents (i.e. e-mail and attachment content formatting)
- Application (CAD, office, ...)
- Interoperability (attachment file formats)
- Communication (e-mail)
- Access (signatures)

Scenario 2: Trilateral relationship between client and two consultants.

In this case, the basic assumptions are:

- Business contract is not between actors who exchange information
- ICT contract is usually not between actors who exchange information
- Information exchange is coordinated, but still based on email.

The ICT definition should cover description of tasks, and related information to be sent/received, for both consultants, with the following technical issues to negotiate and agree on:

- Presentation of documents (i.e. e-mail and attachment content formatting)
- Application (CAD, office)
- Interoperability (attachment file formats)
- Communication (e-mail)
- Access (signatures)

Scenario 3: Multilateral relationship between client, consultants and service provider.

The basic assumptions in this scenario are:

- Business contract not between actors who exchange information
- ICT contract (mainly) not between actors who exchange information
- Information exchange/sharing using project server.

In this case, the ICT definition should cover description of tasks, and related information to be sent/received, for both consultants and service provider, with the following technical issues to negotiate and agree on:

- Presentation of documents (i.e. content formatting of uploaded documents and notices)
- Application (CAD, office)
- Interoperability (file formats)
- Communication (project server, clients)
- Access (Access control, signatures)
- Service (Document management, Content mgmt)
- Storage (File system)

In each scenario, the tool shall allow the individual partners (organisations) to define their ICT support capabilities on each relevant layer; this information will provide the basis for negotiation on the ICT environment established for the VE.

2.5.3 Contract Wizard

The project aims to provide an easy to use tool for the creation and editing of XML-based ICT contracts. This Contract Editing tool should be customizable for different scenarios and document types, and for integration with other external components. For this purpose, eLEGAL project team developed a tool called contract wizard which is a software component that allows users to create and edit XML-based contracts. The XML documents representing the contracts can be stored locally or retrieved from a Virtual Negotiation Room that supports the further necessary steps for contracting.

The Contract Wizard implementation in eLEGAL is an independent software application. It was written in the Java programming language and use the Java 2 software platform in version 1.2 or higher.

Architecture of the Contract Wizard

Figure 2.13 below illustrates the architecture and the use of various document types.

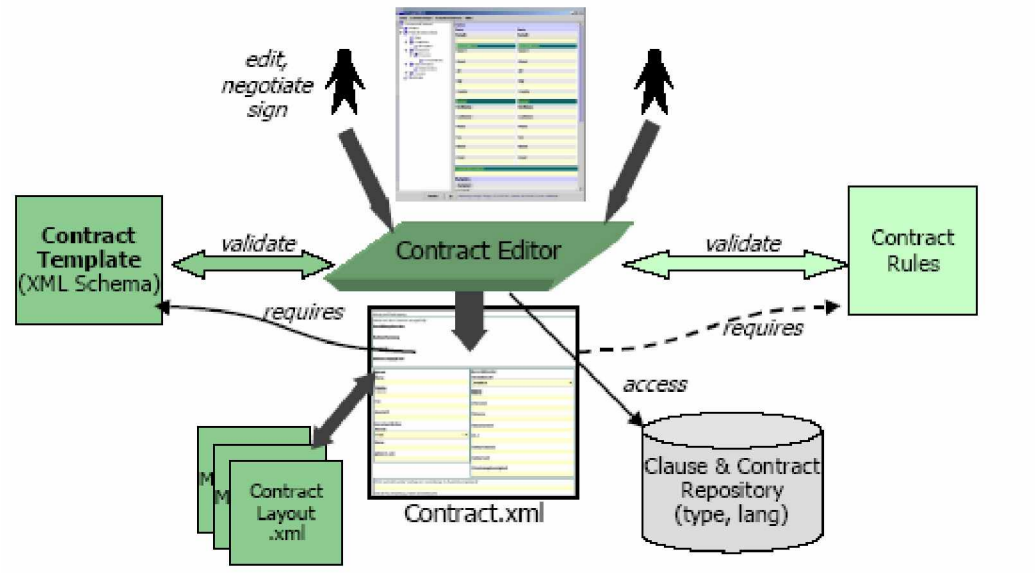

Figure 2.13 - Architecture of the Contract Wizard

Contract Template: It is an XML Schema document that defines the structure of the contract (file name extension is ".xsd")

Contract Layout: It has the same name like the contract template, except for the ending, which is .xml. It defines the visual layout and navigation of the contract.

Contract Model Description: Contract rules are defined in the contract model description. The rules define which clauses are required or optional, and which logical conditions apply to the clauses.

Model Contract: A contract designer may prepare a model contract that can be re-used by him or by end-users. This is a contract document that is partly filled-out.

The contract: This is the final document instance to be achieved.

According to eLEGAL project deliverable D31, the editor has to be capable of embedding signatures in the document, and support multiple signatures for different parts of the contract document. The editor must be able to place signatures in the document and to validate existing signatures for any part of the document.

Another requirement that the editor has to meet is capability of cooperation with external components such as VNR and notary service. It has to be able to use the Virtual Negotiation Room for storage and communication between the contract parties. It also has to support the notary service in the process of collecting notarized signatures. In order to do this, it must first transfer the agreed contract to the notary service.

2.5.4 Contract Negotiation Tool

According to WP3 prepared by eLEGAL consortium, the Virtual Negotiation Room allows organizations to set-up and negotiate bilateral or multilateral contracts as electronic documents. This technology provides a radical reduction in the "time-to-contract" by avoiding any media breaks during the negotiation, signing, and performance phases. The different parties who want to form a contract are linked together via the Internet. The Virtual Negotiation Room will save the contracts as XML-Documents.

The Virtual Negotiation Room is a content management system for documents/contracts. The application provides different functions, user types and document/contract states, is summarized in table 2.2.

Table 2.2 - User types and functions of Contract Negotiation Room

User Type	Functions
admin user	• login and logout • create and delete user • create and delete user groups • change all passwords • list user
contract leader	• login and logout • read, write and delete a document/contract • create and delete directories • lock and unlock a document/contract • read and write document/contract permissions • read and write document properties • change the status from a document/contract • search for documents/contracts with special properties/metadata (get a list) • list versions of documents/contracts • activate an older version of a document/contract as the current one • change his own password • list user • doSign: the contract should send to the e-Notary
contract manager	• login and logout • read and write a document/contract • lock and unlock a document/contract • search for documents/contracts with specials properties/metadata • list versions of documents/contracts • change his own password
e-Notary	• login and logout • save a document/contract

Therefore, the normal life cycle of a contract is:

1. The contract leader creates (write) a new contract based on a template. The state of the contract is “Under Negotiation”. He defines the contract managers for the contract and sets the permissions.

2. The contract manager reads and writes the contract. At the end he agreed the contract.

3. If everyone agrees the contract, the contract leader can set the contract to the “Agreed” state. The contract is now read only. The contract is sent to the e-Notary to start the notarization process with the doSign function.

4. The e-Notary contacts the parties to sign the contract. If everyone has signed the contract, the contract leader set the contract to the “Signed” state. The signed contract is stored by the Notary (Archive) and sent to the Virtual Negotiation Room as a copy.

CHAPTER 3

CURRENT SITUATION OF ICT USE AND LEGAL SUPPORT IN TURKISH CONSTRUCTION INDUSTRY

3.1 Current Contractual Practice and Developments

The continuous progress in science, technology, and especially in the information technologies causes change in many facets of life such as work, communication, education, entertainment, trade etc. and as a matter of fact forces the present institutions and rules to develop. In this process of change which results from the improvements in the production, process, storing, and transfer of information and the traditional administrative constitutions change in form, the law regulations that are in practice are forced to keep up with this new interaction between the dynamics of society. In this context, the legal infrastructure which is going to arrange the relations in the information society indicates the need of legal arrangements involving new and radical changes and of the review of existent legal arrangements. (Turkey ICT Congress legal report, 2002)

Since the beginning of 1990s, there is an increase in the efforts to transform into information society in most of the countries. Essentially, economic and social necessities bring about these efforts. The US has realized an increase in productivity and economic growth due to usage of information and communication technologies from the early 1990s. The European Union (EU) is also increasingly transforming into an information society, its strengths lying in telecommunication technologies. In March 23, 2000, during a meeting in Lisbon, The European Council has envisioned to make Europe the most competitive and dynamic knowledge-based economy in the world in ten years. With respect to this strategy, on June 19-20, 2000 at Fieria, eEurope Program and Action Plan has been initiated. e-Europe Program is believed to be one of the most important projects of the community. Afterwards, it is decided that this initiative should be broadened and a group of candidate countries, including

Turkey, were invited to participate in the program. Turkey has speeded up the efforts to make Turkey an information society as it joins eEurope together with candidate countries.

3.1.1 Formation of Contracts

According to Public Procurement Law No: 4734, a contract is defined as written agreement between the contracting entity and the contractor for the procurement of goods, services or works.

According to CAN (2003), a contract is a legal transaction which may be defined as an exchange of assents by two or more persons, resulting in an obligation to do or to refrain from doing a particular thing which is enforceable by law. Two basic elements of a contract are;

1) An intention to create legal relations,
2) An agreement.

Additionally, there are other prerequisites which can be classified as the essential elements. These can be summarized as follows;

- There must be an offer and acceptance, which is in effect the agreement.
- There must be an intention to create legal relations.
- There is often a requirement of written formalities.
- There must be some form of real consideration.
- The parties must have legal capacity to make contract.
- There must be genuineness of consent by the parties to the terms of the contract.
- The contract must be legal and possible.

The formation of contract in the Turkish Jurisprudence is arranged in the Article 1 of the Code of Obligations.

The contracts can be classified as; the contracts signed between people who are present at the contract moment, i.e. the contracts made between presents; the

contracts signed between people who are not present at that moment, i.e. the contracts made between absentees. This classification depends on the moment which the contract starts to give responsibilities to the parties.

In the contracts made between presents the proposal must be accepted immediately and with the declaration of acceptance, the contract is formed at the same time it comes into effect. Otherwise the contract is not formed. In the contracts made between absentees, the party that has proposed will be committed to the proposal, they have made for a moderate time and will wait for the acceptance news of the other party. As soon as the acceptance news is sent, the decisions of the contracts come into effect and the contract is formed when the acceptance news is delivered to the party that has made the proposal. However, as not a long time has passed between the arrival of the declaration of acceptance to the proposer and the sending of the declaration, as a rule, the moment when the contract, which is made in an electronic environment, is formed and the time it comes into effect is same. On the other hand, it is probable that the proposer cannot learn the declaration of acceptance as a result of some reasons (vacation, disease etc.) on the same day that the drawee has sent. Therefore an agreement will be made when the proposer has learned the declaration of acceptance, the decisions of the trade agreement will come into effect on the date when the drawee has sent the declaration of acceptance. This decision, which we have determined as a basis, will be put into practice when a contract is desired to be made through Internet. However, it is not an adequate criteria solely that the electronic contracts are recognized as “valid” by the law. According to Öngören (2003), in order to mention that the said contract types have legal validity, two situations are required to take place:

1- To have the same legal assurance on the condition that the types of contract which are often used in the application and are accepted as “reliable” especially by the law of evidence are concluded electronically.
2- To adopt the principle of accepting electronic contracts as valid by the special laws according to the “law of procedures”.

3.1.2 ICT Related Legislation

Technologic developments and rapid development of Internet and www has enabled many services that were traditionally being performed by face to face meetings to be done online. Banking sector is known as the leading sector that benefited from these developments. Online banking allowing customers to manage their bank accounts 24 hours a day has replaced the need to go to the bank for financial transactions. Now internet allows people to pay their bills, transfer money, and give orders over a secure internet link without the need for face to face meetings.

According to Turkey ICT Congress Result Report, the system which was working as a mutual information transfer under the name of Electronic Data Interchange (EDI) previously has turned into an electronic trade later. In this situation carrying out commercial transactions in the electronic environment through Internet without the production of paper has become a current issue.

Studies are carried out countrywide in order to provide validity in the legal system for the paperless document -electronic document- in the administrative system and in the classical commercial transactions based on written documents. Also, various international constitutions support studies on the same issue.

United Nations Commission of International Trade Law (UNCITRAL) which is an organ of United Nations General Assembly is one of the institutions carrying out studies in this context. UNCITRAL is established in 1966 by the General Assembly and has agreed to make new regulations upon the need for new applications in making the contract instead of classic proposal and acceptance in the high-speed electronic trade in order to provide standardization and uniform in the international trade law. The formed EDI Study Group has prepared a “Model Law Draft” on this issue, “Model Law about the Electronic Trade” and “Law Guide” related to the issue have been accepted on the 29th session of the United Nations General Assembly. In 1985, UNCITRAL advised the governments on below mentioned issues:

- Over viewing the laws which effect the evaluation of computer records as evidence, providing assessment of the records carried by vehicles, which are formed as a result of the technologic developments, by the courts,
- Over viewing whether the written form is a must in the commercial transactions or in written documents about commerce for the acceptance or validity of the transaction or document, searching opportunities for recording and sending the document or transaction in a readable way for the computer in appropriate places,
- Over viewing the legal obligations about the documents' being written by hand and signed while presenting to the public authorities, searching the opportunity for the presentation of such documents in a readable way for the computer in appropriate places, supplying the administrative units with the necessary equipments and making the necessary arrangements.

According to ETKK Report, the aim of the Model Law in accordance with these suggestions is to provide opportunities for the use of EDI and means of communication and facilitate, to activate the international commerce and to strengthen the economy by providing equality between the paper-based document user and computer based data user. The Model Law aims to combine the developments in the modern means of communication with the traditional paper based documentation and undertakes the computer based techniques about originals of the writing, signature and documents in international law. The functions of the paper-based system are investigated and these functions are equalised. The electronic document is made acceptable by the public authorities and courts. As a result of the availability, it can be totally read through functional equality approach, its unchangeability in time, the maintenance of the new copies of the documents and the distribution of the same data to the parties, the opportunity of the affirmation of the document by means of signature.

3.1.2.1 Electronic Signature Law

The Turkish Electronic Signature Law (ESL) No: 5070 published in the official gazette on 23/01/2003 came into force on 23/07/2004. Regulations were prepared by Telecommunication Institute and finished on January 2005.

Scope and Purpose of the Law

The scope and purpose of the law is explained in the first and the second articles of the electronic signature law. According to this, the objective of the law is "to arrange the principles about the use of the electronic signature with legal and technical aspects". Furthermore the law includes "the legal structure of the electronic signature, the activities of the electronic certificate service providers and the use of electronic signature in every field."

The Definitions Used in the Electronic Signature Law

Electronic Signature: The law defines the electronic signature as data in electronic form which are attached to or logically associated with other electronic data and which serve as a purpose of authentication.

The word "authentication" referred here is authentication of the data but not authentication of the identity information of the signatory. The authentication process can be divided into two as "data authentication" and "entity authentication". Data authentication is the process of certifying the accuracy, integrity, source and qualities alike of a data by another data. Entity authentication is the authentication method used in order to accept the user to the system. For example, entering a PIN-code to get access to an electronic bank account will not fall within the scope of the "electronic signature" definition. Entering the same code in order to confirm a financial transaction, on the contrary, is an example of data authentication and is therefore considered as an electronic signature. Only the data authentication of these authentication methods is the electronic signature.

Moreover, it is necessary for the electronic data to be accepted as the electronic signature; the identity information of the signatory must be attached on it.

The definition in ESL is exactly the same as European Directive. Some member countries of European Union did not literally take over the definition of the Directive, but specified the term “authentication” or specified the functions of an electronic signature.

Signatory: The signatory in ESL defined “the natural person who uses the signature creation device in order to form an electronic signature.” The important point in the definition is that the signatory can only be a natural person.

Although there are definitions in the directive and in the foreign legislations overlapping with this definition, the definitions are not exactly the same as ESL.

The directive defines the signatory as a person who holds a signature creation device and acts either on his own behalf or on behalf of the natural or legal person or entity he represents. From the perspective of the European Directive, it is clear that an electronic signature can refer not only to natural persons but also to all kinds of other entities. An electronic signature can, for example, be the electronic substitute for a stamp belonging to a particular administration within the government or to a specific department of a university.

Some countries such as France, UK, Spain transposed this definition of the directive in a literal or similar way. (Greece, Irelands, Netherlands, Portugal, Norway). For example, Ireland defines a signatory as a person who, or public body which, holds a signature creation device and acts in the application of a signature by use of the device either on his, her or its own behalf or on behalf of a person or public body, he, she or it represents. Other countries made the definition of signatory differently. Italy, for example defines a signatory as a natural person to whom is attributed and who has access to the device for a creation of the electronic signature. Sweden defines a signatory as “a natural person who is authorised to control a signature creation device.” Some countries do not have the term “signatory” defined but use other terminology. German law talks about “Signature-code owners”, which

are natural persons who own signature codes and to whom the appropriate signature test code have been assigned in qualified certificates.

Signature-Creation Data: It is defined in ESL as "unique data, such as codes or private cryptographic keys, which are used by the signatory to create an electronic signature." The definition is the translation of the directive and is defined in the same way in the foreign legislation. The definition of the signature creation data is made with a technology independent method. The technical requirements related to this issue (the length of the key, hash value, random creation quality) should be arranged by the regulations. The signature creation data can be formed both by the certificate service provider and by the owner of the certificate.

Signature-Verification-Data: "Data, such as codes or public cryptographic keys, which are used for the purpose of verifying an electronic signature". This definition is the exact translation of the Directive.

Signature-Creation Device: It means "configured software or hardware used to implement the signature-creation data." This definition is the same of the Directive and is defined in the same way in the foreign legislations. Signature creation devices can be smart cards or computer software.

Signature-Verification Device: "Configured software or hardware used to implement the signature-verification data." This definition is translated from the directive and is defined in foreign legislations in the same way.

Time Stamp: According to the ESL, the time stamp is "the record which is verified by the service provider with the electronic signature in order to determine the time when an electronic data is produced, changed, send, received and/or saved." There is no definition of the time stamp in the European Directive. The definition of the time stamp in the German and Austria Electronic Signature Laws overlaps with the definition in ESL.

Requirements of Signature Creation and Verification Devices:

In the Electronic Signature Law number 5070, the requirements of signature creation and verification devices are defined. In the requirements stated here are the translations of the requirements stated in the Directive Annex III and IV.

According to Annex III of the Directive and, secure signature creation devices must, by appropriate technical and procedural means, ensure at the least that:

a) The signature creation data used for signature generation can practically occur only once, and that their secrecy is reasonably assured.
b) The signature creation data used for signature generation cannot, with reasonable assurance, be derived and the signature is protected against forgery using currently available technology;
c) The signature-creation-data used for signature generation can be reliably protected by the legitimate signatory against the use of others.

Secure signature-creation devices must not alter the data to be signed or prevent such data from being presented to the signatory prior to the signature process.

According to Annex IV of the Directive, during signature verification process it should be ensured with reasonable certainty that:

a) the data used for verifying the signature correspond to the data displayed to the verifier;
b) the signature is reliably verified and the result of that verification is correctly displayed;
c) the verifier can, as necessary, reliably establish the contents of the signed data;
d) the authenticity and validity of the certificate required at the time of signature verification are reliably verified;
e) the result of verification and the signatory's identity are correctly displayed;

f) the use of a pseudonym is clearly indicated; and
g) any security-relevant changes can be detected.

In order to fulfill this goal, a CEN Workshop Agreement (CWA 14171) contains a specification for the signature verification procedure, including both the products used for verification, and their management. The standard identifies the security requirements for the various elements of a signature verification system.

The electronic signature regulations in foreign countries refer to international standard determination institutes (CEN, ETSI, FIBS, ITSEC) for the clauses related to technical requirements of signature creation and verification devices. Therefore, with using the international standards, the signatory can use his electronic signature in many countries. However, the differences between the local signature regulations prevent this standardization and spread use of electronic signature in every country.

Electronic Certificate: It is defined as "an electronic attestation which links signature-verification data to a person and confirms the identity of that person"

Qualified Electronic Certificate: It is a certificate which meets the requirements below and is provided by a certification-service-provider who fulfils the requirements in the Law No:5070 which is translation of Directive Annex I. Qualified certificates must contain:

a) an indication that the certificate is issued as a qualified certificate;
b) the identification of the certification-service-provider and the State in which it is established;
c) the name of the signatory or a pseudonym, which shall be identified as such;
d) provision for a specific attribute of the signatory to be included if relevant, depending on the purpose for which the certificate is intended;
e) signature-verification data which correspond to signature-creation data under the control of the signatory;
f) an indication of the beginning and end of the period of validity of the certificate;
g) the identity code of the certificate;

h) the advanced electronic signature of the certification-service-provider issuing it;
i) limitations on the scope of use of the certificate, if applicable; and
j) limits on the value of transactions for which the certificate can be used, if applicable.

The requirements of the qualified certificates are explained in the Directive, foreign legislations and in ESL, but these are not sufficient. Therefore, many countries refer to the international standards in their e-signature regulations (x.509, ETSI).

Electronic Certification Service Provider: According to ESL, certification service provider (CSP) is "a legal or natural person, private legal entity, public organization that provides services related to electronic certificate, time stamp, and electronic signatures." Although this definition is compatible with the European Directive and many countries' laws, it gives more liability to service providers than others.

Directive defines the certification service provider, an entity or a legal or natural person who issues certificates or provides other services related to electronic signatures. Most countries have transposed this definition of the Directive in a literal sense (Greece, Ireland, Spain, Romania, etc.) or else have adopted a similar approach way. (Austria, Belgium, France, Italy, Portugal, UK, etc.) Belgium, for example, defines CSP as every natural person or legal entity issuing and administering certificates or providing other electronic signature related services. Italy for example, only refers to an entity (and not a person) as CSP; the United Kingdom and the Czech Republic only refer to a person. Some countries restrict the definition of a CSP to the issuing of certificates (Denmark, Finland, Switzerland, Sweden).Denmark uses the term Certification Authority instead of Certification Service Provider. Germany defines the activities of a CSP operating under the scope of the law, to issuing Qualified Certificates or qualified time stamps.

Data Protection

According to the article 12 of ESL the electronic certificate service provider,

- Can't demand data except the data which is required to give electronic certificate and can't obtain this data without the consent of the person.
- Can't keep the certificate in places where is available for the third persons without the consent of the electronic certificate owner.
- Protects the personal data from the third persons and can't transfer or process the personal data for any other purposes without the written consent of the certificate owner.

The verdicts in the article 12 are compatible with the Directive and the foreign legislation. According to Article 8.2 a Certification Service Provider issuing certificates to the public may collect personal data only directly from the data subject, or after the explicit consent of the data subject, and only insofar as it is necessary for the purposes of issuing and maintaining the certificate. The data may not be collected or processed for any other purposes without the explicit consent of the data subject.

The article 8 of the Directive is about the data protection and includes similar obligations stated in ESL. However the article 8 of the Directive additionally refers to Directive number 95/46/EC which is about the protection of personal data. The verdicts of the foreign legislations about the data protection refer to laws related to the protection of the personal data.

Foreign Electronic Certificates

According to the article 14 of Turkish ESL the legal value of the certificates provided by the service provider established in a foreign country in Turkey can be determined in two ways.

- The legal status of the foreign certificates can be determined by international contracts.

- The foreign certificates have the same legal status with the qualified certificate valid in Turkey when a service provider in Turkey guarantees the foreign certificates.

In the Directive the issue of the recognition of the certificates provided by a service provider accredited to a member country is arranged. According to this the certificates provided by service provider accredited to one of the member countries will be valid in other member countries.

Secure Electronic Signature:

A "Secure Electronic Signature" is an electronic signature meeting the following four requirements:

1) uniquely linked to the signatory;
2) capable of identifying the signatory based on qualified electronic certificate;
3) created using secure signature creation devices that the signatory can maintain under his sole control; and
4) linked to the data to which it relates in such a manner that any subsequent change of the data is detectable.

Everybody will notice that these requirements are formulated in a very general and technology- neutral manner. In practice however, the definition refers mainly to electronic signatures based on digital signature technology or, in other words, making use of public key cryptography.

The secure electronic signatures are important because they are equivalent to handwritten signatures. Electronic signatures that have same legal effect in the foreign legislation are defined in different names such as advanced, qualified, universal etc. and different technical requirements. However the common point in all these signatures is that they are formed based on the qualified certificate and in order to create electronic signature.

The definition made in the Law is formed as a result of the combination of some requirements explained in the definition of advanced electronic signature in the

directive article 2/2 and some requirements explained in the article 5/1. In this way a different classification of electronic signature is made from the Directive's classification [electronic signature, advanced electronic signature, electronic signatures equivalent to handwritten signatures (qualified signature)]. In ESL there is only the distinction of electronic signature and secure electronic signature.

The Legal Effects of Secure Electronic Signatures

a) Equality with the handwritten signatures

According to ESL no: 5070 "Secure electronic signature has same legal effects with the handwritten signatures." This verdict is compatible with the directive article 5/1. According to Article 5.1 of the Directive an electronic signature shall be considered equivalent to a handwritten signature in all of the Member States so long as it fulfils the following requirements:

1) it meets the four functional requirements of the Advanced Electronic Signature;
2) it is based on a Qualified Certificate (QC);
3) it is created by a Secure Signature Creation Device (SSCD).

Article 5.1 does not expressly name the electronic signature that responds to the above- mentioned conditions. Nevertheless, for the sake of distinguishing between such a signature and other forms of signature, which do not meet the same level of functional security, the legal doctrine and practice generally refer to the electronic equivalent of the handwritten signature with the term "Qualified Electronic Signature". Further to the recognition of the legal equivalence, the same Article reaffirms in a second paragraph [point (b)] that the Qualified Electronic Signature is admissible as evidence in court proceedings.

Most of the European countries already recognise those electronic forms of signature meeting the functional requirements of the Directive. In a number of countries, however, the types of the electronic signatures as recognised in national

legislation, and in some cases the inherent security characteristics of these types, differ from those of the Directive (e.g. The "Secure" electronic signature verified by a QC in Poland). In many cases, only the terminology used is different (e.g. speaking about "extensive" or "secure" electronic signatures rather than "Advanced" in some countries), while the functional characteristics to be met remain in substance the same as in the Directive. In a few cases, nevertheless, national electronic signatures laws have translated in somewhat stricter terms the functional requirements that lead to the assumption of the legal equivalence. In isolated cases, extra conditions have directly or indirectly been stipulated (e.g., "Recognition" of CSPs through a specific procedure for "Universal" electronic signatures in Bulgaria, accreditation of CSPs in the draft Swiss law). Given these divergencies, the question of whether Article 5.1 has been faithfully transposed in the given legal system, has to be examined in the light of the overall legal principles and rules governing the probative force of the handwritten signatures in the country concerned.

In a few countries, the equivalence is granted to "lower" or "higher" levels of signatures than the Qualified Electronic Signature of the Directive. Accordingly, the "Advanced" electronic signature (Bulgaria) or the digital signature (Italy, Estonia) are automatically be awarded the effect of the handwritten signature. On the other hand, "Universal" electronic signatures in Bulgaria require extra requirements.

b) Admissibility as Evidence in Legal Proceedings:

According to Member States shall ensure that an electronic signature is not denied legal effectiveness and admissibility as evidence in legal proceedings solely on the grounds that it is:

- in electronic form, or
- not based upon a qualified certificate, or
- not based upon a qualified certificate issued by an accredited certification-service-provider, or
- not created by a secure signature-creation device.

Article 5.2 essentially states, in other words, that electronic signatures may not be denied legal effectiveness and admissibility as evidence in legal proceedings solely on the grounds that it is in electronic form or that the signature in question is not a qualified signature. This verdict of Directive is not available in ESL.

Cases where the Electronic Signatures can't be Applied

According to ESL, "the legal transactions which are subjected to a special ceremony or an official state and contracts of guarantee cannot be fulfilled with secure electronic signatures." According to this, the transactions that the notaries perform, the transactions carried out with the notary, the transactions which must be registered (real estate, the purchase and sale of motor vehicle), transactions like marriage which must be carried out in front of the government official can't be fulfilled with electronic signature. However in the law the explanation of the transactions or contracts that can't be fulfilled with electronic signature is made with "general way" which might cause confusion.

3.1.2.2 Protection of Personal Data

With the increasing use of web-based project collaboration, increasing amounts of data will be held centrally on project servers, which may be hosted by a third party. It is important to address who is entitled to have access to this data – not just project communications, i.e. correspondence, drawings, etc., but also to 'meta-data' which is 'data about data' and which can provide information about any project team member's access to, and use of, the project information (Shelbourn et al. 2002).

According to Directive 95/46/EC on the "protection of individuals with regard to the processing of personal data and on the free movement of such data" personal data is defined as "any information relating to an identified or identifiable natural person ("data subject"); an identifiable person is one who can be identified,

directly or indirectly, in particular by reference to an identification number or to one or more factors specific to his physical, physiological, mental, economic, cultural or social identity;" (art. 2 a)

This definition is meant to be very broad. Data is "personal data" when someone is able to link the information to a person, even if the person holding the data cannot make this link. Some examples of "personal data": address, credit card number, bank statements, criminal record, etc.

The protection of personal data gained more importance than it had in the past is the natural outcome of the developing information communication technologies that provides easy data transfer. Now the person can be defined in a wider area with his/her name, surname, place and date of birth, the identity number and many distinguishable characteristics. These data are stored by means of a computer, processed and when necessary shared by a network like Internet which has no limit. Although this makes it simpler for public and private works to be carried out, it endangers the privacy of the people and when these data have become “public”, it will have more serious results than losing his/her identity card or passport. Because it is possible to transact and make many operations in the name of another person with these data, for instance to make banking transactions or use this name in government offices. At this point it is a must to take some precautions and to determine what will the consequence of the personal data collected by different means, by whom the personal data will be collected and processed.

In 1981 the “Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data” was negotiated within the Council of Europe. Except from the recommendations accepted by the Council of Ministers previously, it is the most serious step aiming arrangements in this subject. The convention which is opened to signature on January 28, 1981 was signed by Turkey with other member countries of the Council, but Turkey hasn’t fulfilled the necessity yet that the signatory country accepts a Law upon anticipated principles. On the other hand, EU continued its studies and prepared the “Directive 95/46/EC on the protection of individuals with regard to the processing of personal data and on the free movement of such data”. In accordance with this Directive, Member States shall

protect the fundamental rights and freedoms of natural persons, and in particular their right to privacy with respect to the processing of personal data. Following this directive, Directive 2002/58/EC of the European Parliament and the Council of 12 July 2002 concerning "the processing of personal data and the protection of privacy in the electronic communication sector" was adopted and aims to prevent the insufficiencies against the fast development of ICTs. This directive was adopted in 2002 at the same time as a new legislative framework designed to regulate the electronic communications sector. It contains provisions on a number of more or less sensitive topics, such as the Member States keeping connection data for the purposes of police surveillance (the retention of data), the sending of unsolicited e-mail, the use of cookies and the inclusion of personal data in public directories.

As Turkey is a country which has signed the Convention number 108 of the European Council, aims at the membership of the European Union and therefore attempts to harmonize its legislations with the European Union Legislation. A legislation study about the protection of personal data has been planned and a bill has been prepared. "The Bill about the Protection of Personal Data" (BPPD) is a project over which the Ministry of Justice works presently. Mainly, this bill regulates the rights to collect and process the personal data legally, to be updated for certain and legitimate purposes and preserved for an appropriate time for the aims of use, to change and when necessary to erase them, not to share the data contrary to the purpose, the rights of the data ownership. (Basalp, Nilgun, Protection of the Personal Data, 2004)

The Fundamental Concepts in the Protection of Personal Data

As it is expressed in the bill, the Law regulates the protection of the fundamental rights and freedoms of the personality while processing the personal data and the procedures and essentials that the persons and entities processing the personal data will conform.

According to BPPD, processing means "without considering the tools and methods used, any operation or set of operations which is performed upon personal

data such as collection, recording, organization, storage, adaptation or alteration, retrieval, consultation, use, disclosure by transmission, dissemination or otherwise making available, alignment or combination, blocking, erasure or destruction" In accordance with the European Union Legislation "Processing" must include every kind of operations related to the personal data which are carried out by an automatic or a non-automatic means.

Personal data should not be processed at all, except when certain conditions are met. These conditions fall into three categories: transparency, legitimate purpose and proportionality.

The data subject has the right to be informed when his personal data are being processed. The controller must provide his name and address, the purpose of processing, the recipients of the data and all other information required to ensure the processing is fair. (art. 10 and 11)

Data may be processed only under the following circumstances (art. 7):

- when the data subject has given his consent
- when the processing is necessary for the performance of or the entering into a contract
- when processing is necessary for compliance with a legal obligation
- when processing is necessary in order to protect the vital interests of the data subject
- processing is necessary for the performance of a task carried out in the public interest or in the exercise of official authority vested in the controller or in a third party to whom the data are disclosed
- processing is necessary for the purposes of the legitimate interests pursued by the controller or by the third party or parties to whom the data are disclosed, except where such interests are overridden by the interests for fundamental rights and freedoms of the data subject

The data subject has the right to access all data processed about him. The data subject even has the right to demand the rectification, deletion or blocking of data

that is incomplete, inaccurate or isn't being processed in compliance with the data protection rules. (art. 12)

The Process of the Personal Data by the Third Persons

According to the BPPD, the process of the personal data by third persons is possible. As it is explained in article 17 under the title of "The Process of the Personal Data through Transaction" the personal data will be possible for the third persons to process if they are under the control and direction of the person in charge.

The protection of the data in Turkish Law has not attracted much attention despite the goal of European Union. Turkey is behind the progress that the European Union has made in the protection of the data. "Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data" has not been certified from 1981 by the Turkish Grand National Assembly. Turkish Domestic Law and the EU Data Protection Legislation limits the data transfer from the EU countries with the existence of the protection rules equivalent to the EU. At this point the harmonization must be provided and an independent audit board of the personal data protection must be established. For Turkey's forming a reliable policy of data protection is one of the fore and foremost conditions of the EU goal.

The Telecommunication Institution is determined as the responsible organization for the arrangement of the regulations named "The Regulation about the Processing of the Personal Data in Telecommunication Sector and the Protection of Secrecy" and "The Regulation about the Processing of the Personal Data in Electronic Communication Sector and the Protection of Secrecy".

The Telecommunication Institution has arranged regulation in the scope of the duty given. Uniformity with EU Law has been attempted to be provided on issues like the security, the responsibility of informing the probable risks to the user, the secrecy of communication and the processing of the traffic data in the Regulation which has come into effect by being published on February 6, 2004 in the Official

Gazette under the name of “The Regulation about the Processing of the Personal Data in the Telecommunication Sector and the Protection of Secrecy”.

3.1.2.3 Intellectual Property Rights

According to World Intellectual Property Organization (WIPO), intellectual property refers to creations of the mind: inventions, literary and artistic works, and symbols, names, images, and designs used in commerce.

Intellectual property is divided into two categories: Industrial property, which includes inventions (patents), trademarks, industrial designs, and geographic indications of source; and Copyright, which includes literary and artistic works such as novels, poems and plays, films, musical works, artistic works such as drawings, paintings, photographs and sculptures, and architectural designs. Rights related to copyright include those of performing artists in their performances, producers of phonograms in their recordings, and those of broadcasters in their radio and television programs.

One of the most important legal issues in the electronic environment is protection of intellectual works, designs, databases, creations, trademarks, inventions under patent law, copyrights, know- how and all confidential information concerning intellectual property rights. In this context, as a part of Turkey’s harmonization with the EU in advance of customs union, a contemporary protection is almost maintained with the Ideal and Artistic Works Law(IAWL) in 1995.

Designers have expressed concerns about the effect that the Internet and especially on-line project collaboration tools will have on their copyright in their designs. In the EU, the same legal protection is afforded to those seeking to prevent unlawful copying electronically as in the paper world, but the ease with which unlawful copies can be made is dramatically increased when material is made available electronically (ALIVE 2002).

According to first article of IAWL, “any ideal and or artistic products which carry the peculiarity of their owners…. which are regarded as branches of knowledge and literature, traditional Turkish music, fine arts or cinema” are regarded as intellectual property and only the creations that are accepted as intellectual property is protected. From the definition, intellectual properties should be the product of an ideal study, carry the characteristics of its creator and be regarded within the context of the work types such as;

- Works that are mentioned through language and writing,
- Computer programs and their preparatory designs,
- Dances, and stage works without words,
- Technical and scientific photographs, maps, plans, sketches, pictures, models and architectural, city planning and stage designs which are scientific and literary works,
- Any kinds of musical works which are oral or wordless compositions,
- Pictures, patterns, fine writings, works made on various substances, calligraphy and serigraphy,
- Sculptures, relieves and carvings,
- Architectural works,
- Hand works, textile and fashion designs,
- Photographical works and slides,
- Graphic works,
- Caricatures,
- Fine art works of any kind of typecasting,
- Cinema works,

The intellectual property owners have moral and economic rights. Moral rights include; the right to present the work to public at any time and in any type he wishes, the right to give information about the content of the work, the right to declare the name of the owner of the work, the right to forbid any change which can be made in the work and the right to protect the integrity of the work. These rights belong to the creators of the work and their inheritors, and can’t be transferred to anyone else.

The economic rights of the work owner are developing, multiplying, publishing, presentation, broadcasting via radio, share and pursuit rights.

According to IAWL 8th article, the work owning is defined with "the owner of a work is the one who creates it". If there would be a change within the content of the work, according to IAWL 52nd article the permission should be taken with a written agreement because this moral right belongs to the work owner as its creator even if a third person has the economic right of the work.

As for the E-mail subject, it is possible to benefit from the IAWL 85th article. This verdict doesn't allow the writings such as mails and diaries to be published without the permission of both the persons who write them and persons related with them. Therefore, considering an e-mail similar to a post mail, if it is published after it is taken from electronic environment without the consent of the writer or any persons related to him, this will bring the responsibility of punishment and indemnity.

a) The Issuing of the Work on Internet to the Users with the Consent of its Owner

According to Law, if a work, database or site, which hasn't been presented to public by any means and known by the owner or by a limited number of persons, is transferred to the Internet and presented to the knowledge of Internet users, this is accepted 'open to public'. The intellectual property owner can "open to public" his work or can authorize some third persons. It definitely doesn't mean that the owner of the work sacrifices his/her other moral and economic rights if the work is transferred to Internet with the permission of the owner (by the owner himself or by a third person authorized-permitted).

The owner, who issues his work to the service of the users in the Internet, may be accepted as he has permitted interference at least for a personal use. Besides IAWL 85th article, the work is not only evaluated under circumstances like copying to electronic environment while being presented to public, especially by means of paying a definite amount, but also benefits from technological opportunities which

prevents copying. Therefore, contrary to restrictions, benefiting becomes against to Law.

b) The Issuing of the Work on Internet to the Users without the Consent of the Owner

If an intellectual property is transferred to digital environment and opened to public's view without the approval of its owner, then this certainly means the violation of the owner's not only moral but also economic rights, especially the rights of multiplying and publishing. If the intellectual property is issued to Internet by unauthorized persons or without permission, the situation becomes the subjects of indemnity and criminal cases.

According to IAWL 52nd article, representation (presentation) and publication which are the economic rights of the work owner can be done by third persons; through an agreement which clearly depicts the mentioned rights or by a one-sided approval disposal.

3.1.2.4 E-Commerce and Consumer Rights

Protection of Consumers in respect of Distance Contracts

The Constitution of 1982, article 172, gives constitutional guarantee to consumer rights by mentioning "*Government takes precautions to protect and illuminate the consumers, encourages the consumers' self-protecting enterprises*". There wasn't any private Law in our country protecting the consumers until 1995. The consumers were trying to keep and make use of their rights by means of some decrees placed in various Laws. Related articles in Turkish Criminal Law (art.363, art.394, art.396, art.397, art.398, art. 401, art.402), was trying to protect the consumer rights by means of some decrees in Civil Law and Debts Law. Nevertheless, the legal emptiness caused irreversible right violations.

The compulsions that were appeared during the entrance period to European Union resulted in; the changes in laws needed for years and the implementations of

the new laws. These were affirmative legal steps for our country. Nevertheless, the new law articles fell short to meet the needs, Therefore, the review of the Law and the change in some articles became a current issue as a result of not being able to prevent some violations.

Consequently, as a result of the insistence of the needs and the need for the Laws to be consistent with the Adaptation Laws of Europe, important changes took place in the Law and the new Law was accepted in March 6, 2003.

The new Law includes the purchase processes, which are realized in the written and/or visual environments via telephone or in electronic environment. In these kinds of contracts which are called "Distance Contracts", a condition is maintained to inform the consumers and it is also mentioned that the contract won't be valid unless the consumer affirms it in a written form. Therefore, the seller has to submit the order, which is ordered by means of these ways, in 30 days. In addition to this, the consumer has the right to withdraw from the order. 9/A Article decree that is regulated under the title of 'distance contracts' in Law is like this:

"Article 9/A- *Distance contacts are made in the environments of written, visual, telephone and electronic or by using other means of communication and without being face to face with consumers, determining the submission or withdrawal of the good to the consumer on time or afterwards.*
Before the approval of the distance sales contract, the information should be submitted to the consumer, the details of which would be determined with a notification that will be published by the Presidency. The contract won't be valid until the consumer approves that he has this information in a written document. The approval process of the contracts that take place in the electronic environment is again made in the electronic environments. The seller and the maintainer have their fulfilment in thirty days from the time the consumer acquires his order on. This time can be extended up to ten days on the condition that the consumer will be informed beforehand with a written document. The seller or maintainer has the responsibility to prove that the delivery of the non-material goods, which are submitted to the

consumer in the electronic environment or services presented to him, has realized in the proper way.
Except the decrees which prevent the demands for a document that claims from the consumer to give payments under any name for any service or good mentioned in the contract during the withdrawal right, the decrees related to sales to door are also implemented to distance contracts.
From the time the withdrawal notification reaches himself, the seller or maintainer has the responsibility to return the amount of money, the valuable documentary and any document he has taken, which puts the consumer into debt as a result of this legal process, within ten days and to take back the goods within twenty days."

The law which leads this article is 'Directive 97/7/Ec of the European Parliament and of the Council of 20 May 1997 on the protection of consumers in respect of distance contracts.

After the acceptance of this law, "Method and Basis of Distance Contracts Implementation Regulation" come into force with the Official Gazette numbered 25137 and dated 06.13.2003,

According to Article 2, this regulation applies to contracts concerning goods or services concluded between a supplier and a consumer under an organized distance sales or service on time or afterwards which is realized by means of using written, visual and electronic environments or other means of communication and without being face to face with consumers.

For consumers to trade electronically firstly depends on personal knowledge, protection of privacy and the reliability of the system. Easily attained personal information and the lack of sufficient protection not only causes serious losses for the consumer but also bears lack of confidence for the system, therefore this prevents from achieving the goal of an information society.

3.1.3 Gathering Existing Clauses and Cases Concerning the Legal Use of ICTs

A survey about the current contractual practices is conducted for gathering the existing clauses and searching for legal cases concerning the application of ICTs in Turkish Construction Industry. In order to collect existing clauses and cases project managers, IT managers, engineers were interviewed from 10 large and medium scale AEC companies. Moreover, high level bureaucrats, administrators, engineers from public organizations (Ministry of public works and Settlement, Ministry of Culture, State Planning Organization) are interviewed. The interviews were conducted as face to face meetings questions with open ended. Also, sample contracts, specifications, regulations and related construction laws were analyzed to find examples of existing clauses and cases concerning the legal use of ICTs in construction industry.

3.1.3.1 Existing Clauses and Cases in Turkey

Private Organizations

Medium and large scale companies are storing data both in electronic environment and as hard copies. For legal admissibility of official documents such as contracts, correspondence, drawings, specifications and raw data, they are stored as hard copies. All of the companies that interviewed keep the original paper documents for reference in case of disputes because unlike the electronic versions, they have legal validity. Electronic versions are stored in different document management systems (some of them are standard because of ISO 9001) to re-use and find the document easily.

None of the companies whether medium or large scale used a binding clause in their contracts related to use of ICT for this purpose.

The survey conducted for this report and Kumas (2004) showed that in Turkish construction industry documents such as contracts, correspondence, drawings, specifications and raw data are commonly exchanged using ICT but this

practice is very rarely regulated by contractual clauses. Most of the data that is exchanged in electronic environment include CAD drawings, text files, charts, data tables, digital photographs, MS Office files and DXF files. The legal validity and admissibility of documents is entirely provided by a signed paper copy.

The following examples are the only clauses that can be found from the interviews and literature review, related to use of ICT concerning data exchange formats.

"The drawings can be given with unchangeable CD format with five (5) original hard copies."

"The drawings are exchanged using AutoCAD2000 format or later."

In recent contracts especially made between designer and contractor, e-mail addresses are required for data exchange, although it is not enough to bear legal validity.

Thus, the use of ICT in Turkish construction industry is intended to speed up the transmission process, and did not bear any legal validity. Because it is possible to modify the electronic version of documents after they have been transferred.

Public Organizations

Public organizations are the owner of the major projects in Turkey. Therefore, most of the data exchange, storing and achieving processes take place between the public organizations and private contractors in Turkey. Although, the application of ICT to the public organizations is necessary for the country's welfare, the ICT use is very limited. According to Özbay (2000) one of the reasons is lack of competition in the public organizations; so they don't need to re-new themselves and use new technology.

In most of the public organizations, computers are still used as typewriters. The only software used except MS Office products is AutoCAD which is used for only drawing.

Although, ICT infrastructure (PC, LAN, Internet, Intranet) in most of the offices are enough to use electronic communication, unexceptionally all of the documents are exchanged solely on hard copy. Furthermore, these documents stored/achieved for at least ten years which requires large archive rooms in every public organization related to construction.

Every public organization requires all kind of documents –handing over protocol, design calculations, application drawings, interim payments, and progress reports, work programs, other reports related with the project and correspondence- signed by the related authority either within the organization or within the contractor's organization.

All of the organizations depend on the signature concept, because in case of a dispute, the signed documents are the most valid evidences in the court. A signed document is supposed to be read by the owner of the signature. In case of a change in the document, the one who make the changes must sign the place which he changed. By this way the one who signed the document first will not be responsible for the modified text. An unsigned document is not a valid document. (Özbay,F.O., 2000)

Thus, in public sector, ICT is rarely used in practice and is not used officially, different from the private sector. However, after the Public Procurement Law No: 4734 came into force on January 2003, a couple of clauses are added to support the use of ICT. Although, they are not binding and important clauses, it is necessary to start somewhere to adapt technology.

- The Public Procurement Authority (PPA), which is administratively and financially autonomous, is a public legal entity has high authorization on the guidance of public investments. In the next chapter its duties are explained briefly. PPA's one of the duties is keeping the records of those who are prohibited from participating in tenders. Contracting entities benefit from these records and ask before the signing the contract if the winner tenderer is prohibited or not from the participating in tenders. After taking the

confirmation from the PPA showing the status of tenderer, contracting entity can continue the tender proceeding or cancel it.

According to PPA decision No: 2003/DK.L-185 dated 13.06.2003, confirmation demands can be done with using PPA's web site (www.kik.gov.tr) in order to learn if the successful tenderer is prohibited or not from participating in tenders. When contracting entities demand confirmation from the web site of the PPA, they take the confirmation number and password which is required to get confirmation document. Contracting entities don't need to make official correspondence after taking the confirmation document from internet.

Although, PPA's this decision makes the confirmation process faster, the legal admissibility of this document should be discussed which is done in the next chapter.

- According to the Law No. 4734, contract documents can be prepared and sold to the contractors in the "compact disc (CD)" format by taking required safety measures.
  1) CD should be numbered with a permanent pen and the project's name should be written on the CD and signed by authorized person.
  2) The table of contents that lists the documents and their formats should be prepared and put in a file in the CD.
  3) The CD should be one time writable (CD-R), can't be re-writable (CD-RW).
  4) After finishing the writing session, CD should be finalized.
  5) CD's serial number and indicative properties should be noted.

- According to Construction Works Specification article 8, if necessary, contractor is required to use software for planning and scheduling the work program. This clause is valid only for complex projects.

- According to Public Procurement Law Article 47 – (Amendment:4964/Article 29) The contracting entities may also announce the results of the tender depending on the significance and characteristics of

the work which is the subject of the tender via other newspapers or broadcasting instruments published in the country or abroad, or via, data processing networks or through electronic communication (internet).

3.1.3.2 Existing Clauses and Cases in Four Countries participating eLEGAL

This study, conducted by eLEGAL team, gathered examples of existing clauses and legal cases concerning the Information and Communication Technology (ICT) in Finland, Germany, Italy and the UK, in which the eLEGAL consortium comprises organizations from these four countries.

In summary, the study revealed that official documents are formally submitted solely on paper. The use of ICT seems to be only intended to speed up the transmission process, but effectively has no legal validity. However, the legislation to support technology may exist, but may not have been adopted by the construction industry within its contractual practices, and hence, the use of ICTs is not legally valid in current conditions.

Some Examples of Clauses Used in Contracts

Building Contract (Asia) High Speed Rail

This contract specifies:

Standards for CAD Drawings: Definitions:

Necessary for data exchange (adds to value chain, enables computer assisted facility management, etc.)

A1. Obligations.

A1.1. Data has to be valid, secure, well organised, properly managed.

A1.2. All drawings have to be digital.

A2. Only certain software products are supported (like Auto Desk's AutoCAD release 14 or later, Windows NT V4.0 or later). Drawings (files) from other CAD

systems have to be submitted in dxf format. File translation is not regarded as a problem (7.3.1 and 7.3.4) though it will become one.
A3. Clauses concerning drawing software are based on layers, not on AEC-objects.
A4. Signatures on drawings: only on hardcopies of drawings (6.13.2). Gap in the system!
Both hardcopy and electronic versions have to be supplied (7.3.1). Hardcopy drawings are the contract documents (7.3.3.a).

Germany Project S.

Pool of data for data processing – CAD – and other data.
Definition of data exchange format (data model format): *.dxf, AutoCAD Release 13 (*.dwg)
Definition of the paper drawings format as a plot file: HP-GL/2
Definition of how to convert data models into plot files.
Storage for archive purposes
Actions when exchanging data with external partners, i.e. those who do not follow project procedures for data exchange
Drawings of existing conditions exist on a different software platform (e.g. CAD-Software from von Intergraph (Bentley)). Conversion into *.dwg takes place.
Detailed definitions of paper sizes,layer-names, line formats, scales (1 length unit is 1 m).
Workflow system for drawings, not for contracts
Not mentioned but obviously executed: signing the drawings by using a symmetric signature with passwords stored on the PC.

An Italian oil company:

They reported an experience of dealing with a company that, for some contracts, required documents to be exchanged *"not using word processor files (such as Microsoft Word .doc files) but as PDF files that cannot be modified by the recipient".*

An engineering company:

In their contracts with subcontractors, the company just asks that *"the drawings are exchanged using AutoCAD 14 DWG format".*

A major engineering company:

In contracts with subconsultants they require that *"the drawing exchange is done through DWG files and that the filename should contain the document number"*.

For a contract in Abu Dhabi, they were required to use a specific software package for document management.

3.2 Current Situation of ICT Use In Turkish Construction Industry

To establish the current and planned situation regarding the use of ICT in Turkish Construction Industry, a survey is carried out both in private and public organizations by face to face appointments to 12 organizations, most of which are large-medium scale companies. The survey is composed of open-ended questions and these questions are directed to top level managers, project managers and engineers and architects in private companies and administrators, top level engineers and ICT managers are interviewed in public organizations.

Moreover, to get an descriptive overview of ICT use and make an analysis of the requirements of the industry, Nihan Kumaş's (2004), Bilge Erdoğan's (2003) and Fuat Oğuz Özbay's (2000) surveys are used which were carried out in different years and generally aims to analyze the current situation in Turkish Construction Industry.

3.2.1 ICT Infrastructure (Hardware, network architecture)

According to the Kumaş's and Çiftçi's survey, all of the contractors stated that they used PCs as their major ICT hardware platform and they all stated that their PCs were linked via a local area network system. The authorization allowance and restrictions are defined for each user or user group according to their departments or projects they are involved in. Some of them have WAN that help them to communicate with their construction sites and offices around Turkey. Intranet is used only in large scale companies in which their communication system is designed in order that any information recorded on site, generally material, labour

and equipment data, can be accessed from each office after the record. The companies, which have construction sites or offices abroad, use internet as a communication media which is considered as a cost-effective communication solution.

In the public organizations, PC / worker percentage is getting higher day by day after the last two government's "transition to information society" and e-government targets. In every ministry and every main organization ICT departments were established as a result of these targets. ICT departments' main function is to establish LAN in their work area and if necessary solve the problems of not trained users which is very common in the public organizations. WAN and Intranet is still unfamiliar terms for most of the public organization related to construction. Internet use became very common in every unit for 2-3 years although it is used mostly in spare times.

3.2.2 Electronic Communication

According to the survey results, e-mail is the preferred communication media among all of the companies. The documents exchanged with e-mail include CAD drawings, text files, charts, data tables, digital photographs, MS Office files and DXF files. Instant messaging, e-documents and e-drawings are also commonly used communication media in private sector of Turkish construction industry.

The conferencing systems, -data, multimedia, video- or groupware tools and applications such as shared whiteboards, shared application programs are not used by contractors and the industry cannot fully benefit from these technologies.

All of the survey results show that electronic communication is preferred for high speed, immediate response, and data recovery characteristics in private organizations.

The public organizations generally use hard copies during the communication within their organization and with other parties. Some of them accept fax documents sent within their organization but its original copy is required to be sent later. The fax documents received from contractors are not taken into consideration. Although, the ICT infrastructure is enough for effective electronic communication in many organizations, all of the documents are still transferred in hard copies. The information flow within the organization and with external parties is not redesigned in compliance with the innovations in the information technology.

3.2.3 Most Used Software Programs

All of the respondents use all components (word processing, spreadsheet, presentation) of the office automation system. Microsoft is the nearly only vendor in this area. AutoCAD for 2D design and drawing applications is used by all of the respondents. Half of them also use this program for 3D design.

The most widespread structural analysis program is SAP2000 across the industry. Nearly every company upgrades its SAP2000 version right after the new version is issued. StaadPro, Etabs are also used across the industry for specific purposes. Probina, Babalioglu are the Turkish reinforced concrete design programs which are successfully used.

Primavera and Microsoft Project are the dominant packages in the market used for time and resource planning and management. The companies which have structured project management system use them.

According to Kumaş's survey, a variety of specialist application industry software is used for document control, cost control and reporting, cost planning, estimating, and cash flow forecasting. Advanced software applications such as those based on knowledge-based expert systems and simulation are rarely used. At the project site level, the use of software packages is limited to office administration, cost control and reporting, and document control.

The results show decision support systems are used rarely in Turkish construction industry. The DSS used here generally comes as a part of an ERP package and extracts strategic operational information. The majority of firms believe that construction professionals will become more familiar to DSS and ERP in the next 5 years.

In the public organizations, the most used –in many organizations only- software is Microsoft's office automation programs. (word processing, spreadsheet) AutoCAD is widely used by architects for 2D design and control the existing design. Although, some of the designs are prepared in public organizations, the drawings are exchanged only with hard copies. The program packages are used for interim payment calculations by control engineers, all of which are prepared by Turkish software vendors. OSKA is the one of the vendor widely preferred in this sector by its products like e-hakediş, e-kik.

3.2.4 Knowledge Management

According to survey results Turkish private construction organizations immediately need knowledge management applications. Half of the all respondents use databases to hold customer contact details, stock details, material specific information and machinery details, to store time and resource planning information or to hold information about their e-papers and e- drawings. None of the companies use data warehousing and data mining tools but it is foreseeable that most of them will start to use these tools in near future.

According to Kumaş's survey, some of the respondents use multimedia applications for improving communication with customers and some of them use it for also training purposes. Half of the respondents are willing to use internet based multimedia applications in the near future, and also think that multimedia applications will be used as a main tool in company presentations and in firm training activities.

In the public organizations, none of the knowledge management applications in the electronic environment is used. All of the records, drawings, correspondence, interim payment documents etc. are stored/ archived in the large archive rooms in the hard copy format. According to law, every document that is recorded must be stored at least ten years in the archive rooms, because of this reason directors or managers don’t give enough importance to the storage in electronic environment and don’t make investment on this applications.

CHAPTER 4

APPLICABILITY AND ADOPTION OF ELEGAL PROJECT'S RESULTS IN TURKEY

In this chapter, the applicability of eLEGAL in Turkey is discussed with different aspects. The research and the survey results show that Turkish Construction Industry's ICT adaptation level is at "automation" level where ICT is used to carry out tasks that previously performed manually. Although, the adaptation of ICT at this level has allowed the companies to automate a number of time-consuming and error-prone activities and gain benefits in cycle-time, productivity and accuracy, the legal aspects arising with adaptation are ignored most of these companies. With the increasing adaptation levels the legal issues appear as a barrier for ICT deployment for Turkish construction companies. Therefore, to apply and adopt the eLEGAL project to Turkish Construction Sector, first barriers for the adoption of ICT should be overcome.

Hence, in the first two sections barriers to adoption and deployment of ICT for Turkish construction companies are discussed and survey results are analyzed. Then Industry's future plans related to deployment of ICT are discussed. Also, the potential legal issues that may appear with implementation of these plans are described in this section. In the fourth section, the future improvements related to legal and contractual governance are illustrated. In the next two sections the applicability of eLEGAL project's results are discussed with two real case studies. Then, Turkish government's policy and targets related to legal use of ICT is explained briefly.

4.1 Barriers to ICT Deployment

The introduction of information and communication technologies is not so easy. The implementation of new systems produces problems, ranging from technical limitations to cultural and social issues. (Hassan, Shelbourn and Carter, 2003)

According to Roadcon project (2003) in which the ICT requirements of the European construction industry are analyzed, the current barriers to ICT deployment in the construction industry can be summarized as follows. Some are related to the very nature of the construction industry while others are linked to the lack of maturity and appropriateness of ICT solutions today.

a) Organizational barriers

- Lack of long-term partnering between actors that could result in proper ICT strategy adoption and ICT infrastructure deployment.
- No global actors to enforce the use of standards and ICT on projects.
- Owners or Contractors are scarcely involved in RTD or progress activities and projects.

b) Cultural and educational barriers

- Little awareness of ICT potential (availability and business benefits) by general end-users (practitioners) and resistance to change.
- Lack of IT strategies in most construction organizations (majority of SMEs). Especially, ICT training is not really a concern for most organizations.
- Lack of confidence for e-transaction solutions (e.g. e-procurement)
- Lack of dialogue and good understanding on construction needs between ICT researchers and vendors on one hand, and practitioners on the other hand.
- Relationships that privilege direct human contacts and reduce the potential of ICT solutions.

c) Barriers related to existing ICT offer

- Lack of robustness, flexibility and scalability of existing ICT solutions.
- Lack of interoperability between ICT solutions.

- Loss of efficiency in using ICT solutions due to multiple data inputting and time spent to learn new tools.
- Lack of solutions adapted to the very nature of the sector (including mobile and wireless solutions for site-based work).
- Persistent confidentiality and security problems (virus attacks, unauthorized access, hacking…), even if this concern is shared by all industrial activities.
- ICT solutions tend to be expensive with low immediate return on investment.
- High investment from one stakeholder to implement a solution when returns are high only when aggregating small returns of the level of each stakeholder.
- Piecemeal developments carried out without business (inter and intra-companies) global views.

d) Legal issues

- Legislation to support the use of ICT may exist but it has yet to be fully realized by the research community and the construction industry.
- In some areas (e.g. liability and contract enforceability issues), the legal framework needs to be adapted to stimulate and regulate the use of ICT.

4.2 Barriers to ICT Adoption in Turkish Construction Industry

Despite the fact that the construction industry has significantly made up for lost time in computer equipment, the use of ICT tools and services is still not as widely used as in other industries. The regional character of the construction industry, cultural aspects and the limited vertical and horizontal integration impede the deployment of ICT in the construction industry as compared to other industries. In fact, the construction sector is not fundamentally a driving force as regards the need for new ICT applications. (ROADCON project, 2003)

In the survey which was carried out in 2004 by Nihan Kumaş, the barriers that prevent from more advanced use of ICT are given in Table 4.1.

Table 4.1 – Survey Results related with Impediments to ICT Adoption.

Barriers that prevent from more advanced use of IT (N=50)

	N	**%**
Training	40	80%
Cost of technology	37	74%
Conservative nature of industry	25	50%
Security of hardware at site	12	24%
Legal support for use of ICT	**8**	**16%**
Incompatibility/interoperability problems	8	16%
Lack of technical support	5	10%

According to the survey results, the contractors' barriers to adoption of ICT can be summarized as follows:

- The most common problems are lack of training associated with its implementation and system knowledge, and cost of technology.
- Contractors are unaware of the impact that potential advanced applications of ICT could have on the organization's competitive position. For instance, several contractors using specialized planning and scheduling software for drawing bar charts only.
- Risk adverse nature of the construction industry is an important barrier for ICT development.
- Only %16 of the respondents complained about the lack of legal support for ICT use. The lack of legal validity of e-documents, data exchange, e-contracts were seen as an impediment allowing them to follow the information revolution.
- Only 16% of the contractors stated that incompatibility and interoperability problems directed them to continue the traditional methods for their transferred documents to be readable.

In the survey that is carried out for analyzing the current situation of legal problems related to ICT use, it is seen that most of the contractors are unaware of the

legal aspects about the data exchange with e-mail, digital signature, intellectual property rights, data protection in electronic environment, legal validity of documents etc.

Most of the contractors who haven't got any complaint about the lack of legal support for use of ICT, state that their ICT adoption level is not enough to use the legal frameworks such as eLEGAL. Although they are aware of the importance of using ICT to remain competitive in the industry, they don't take into consideration the time, resource and labor force losses because of not using the benefits of such frameworks.

One of the most important barriers is the public organizations' conservative and risk adverse nature of mentality. Most companies suffer from the senior engineers and project coordinators, highly experienced but failing to follow many technological advances, since they can not use the electronic opportunities at maximum efficiency. Although the main reason seems to be the non-competitive nature of public organizations (they are the owner of biggest projects and do not compete with any organizations), the senior managers' and engineers' resistance to use new technology is an important barrier for public organizations to adopt ICT.

4.3 Turkish Construction Industry's Future Plans Related to Deployment of ICT

Although ICT sector in Turkey had been negatively affected by the 2001 financial crisis, the sector were rapidly recovered with high growth rates. The Turkish ICT sector grew up 12% in 2003, %16 in 2004 and total market reached 11.9 billion US dollars. The telecommunication sector took the 9.6 billion US dollars part and rest of 2.3 billion dollars consists of information technologies. Moreover, with the development of private and public sector's investment to information technologies, spreading and increasing kinds of electronic communication services, the ICT sector is expected to be grown up by 15.6% and reach 13.8 billion dollars in 2005 by comparing with previous year's data. (SPO, Information Society Department, 2004)

This section aims to get an idea about the future plans and requirements of the industry related to ICT with using the survey results of Kumaş (2004). In her survey 50 private organizations were interviewed by face-to-face appointments and e-mailing. Questions in the survey were asked about how ICT will be used in their company and which areas they think as vital or important to adapt. The survey results about the Turkish construction industry future plans are illustrated in the table below.

Table 4.2 – Survey Results related to Industry Future Plans

Future Plans (N=50)

	Vital	**Important**	**Not Important**
IT training and education	86%	14%	0%
Multimedia Applications	44%	56%	0%
Data Warehousing	40%	40%	20%
ERP	28%	62%	10%
Digital catalogues	32%	48%	20%
Collaboration	56%	44%	0%
Integration and Interoperability	40%	60%	0%
3D Modeling and Visualization	34%	66%	0%
VR	34%	46%	20%
Simulation	10%	60%	30%

According to the results ICT training is the most important requirement of construction ICT in Turkey. All firms agree that their employees need more ICT training.

Multimedia Applications are found as a vital requirement by 44% of the respondents but 56% considers it as an important topic. Multimedia can be used as an efficient medium for marketing purposes and in firm education. The industry is aware of the benefits of multimedia applications but there is a lack of trained employees.

Companies believe that they do not have a reasonable level of control on their data and Data Warehousing and Data Mining techniques will be very helpful to manage data resources. Data Warehousing Applications has been found as a vital

area of research by 40% of the participants and has been found important by 40%. The rest do not find is it as an important issue.

28% of the firms think the effective use of ERP is a vital area for Construction IT research. For 62% of them this subject is important but the rest as 10% do not consider ERP as important. The respondents believe internet and related technologies will change project management concepts, and industry will share project management information in electronic project management portals.

Digital catalogs will be an effective medium for the construction procurement in the future. 32% of the respondents think Digital Catalogs will be vital tools for the future of procurement and 48% of them find it as an important requirement. 20% of the respondents do not think digital catalogues as industrial requirement.

The Collaboration in Construction has been found as one of the most important topics. 56% of the industry think that their communication problems will be solved by advanced ICT applications and find this subject as a vital area of research for the future. 44% of the respondents find this subject as an important area of Construction ICT.

Firms explain that they have data, time and financial loses because, the software used for different aspects of the project is not integrated. 40% of the respondents find this subject as a vital issue and 60% of the firms grade it as an important requirement.

34% of the firms find Project Model approach vital and 66% of the respondents find this approach important. However, 34% of respondents find Virtual Reality as vital area of research, while 46% of the firms find it as an important area and are willing to use VR applications in the near future. The respondents also think CAD related technologies would change the way they exchange design information in the next 5 years. But, only %10 of them thinks they are finding construction process simulation tools as vital issue. For 20% of the

respondents VR is not important and also 30% of contractors think simulation trivial. (Kumas, 2004)

The general consensus of the industry is: ICT is important and firms could not remain competitive without it. Most contractors plan to upgrade their existing software, with no intentions of implementing advanced technological or software applications in the short term. Nevertheless, most of them recognized that they needed to embrace advancements in ICT if they were to remain competitive. Consequently, contractors need to be better educated about the potential applications of ICT.

One of the main education items is certainly about the legal responsibilities and aspects of IT users that appear as a result of advancements in the sector. Every improvement causes legal responsibility and every innovation in the IT sector requires legal frameworks and regulations in states such as Turkey.

According to the survey results, industry believes that digital catalogues will be an effective medium for the construction procurement in the future. The main laws related to the effective, legal use of digital catalogues are e-commerce laws, protection of intellectual property rights and copyrights, and some main trade laws. If contractor or user doesn't have at least an idea about these laws and frameworks about the potential legal use of them in the construction sector, security and trust can not be provided which are the main elements of commerce in electronic environment.

The Collaboration in Construction has been found as another important topic that should be analyzed in legal perspective as well as technical side. In order to improve collaboration between the parties in a project –or virtual enterprise- in an electronic environment, parties need trustable and safe environment for secure data use or exchange. To provide this environment, legislation to support technology should be adopted by contractual practices. Furthermore, industry should benefit

from the frameworks and projects like eLEGAL for efficient and conscious use of new information and communication technologies and to work on legal basis .

4.4 Future Improvements Related to Legal & Contractual Governance

The trust and confidence in the use of ICT is an important issue to be considered for the effective collaboration of parties in an organization. To provide trust and confidence in the use of ICT in a construction project, legal and contractual issues shouldn't be a barrier. In the figure 4.3, a graphical representation of the different activities needed at different timescales to enable full legal and contractual governance for ICT and collaborative working is illustrated.

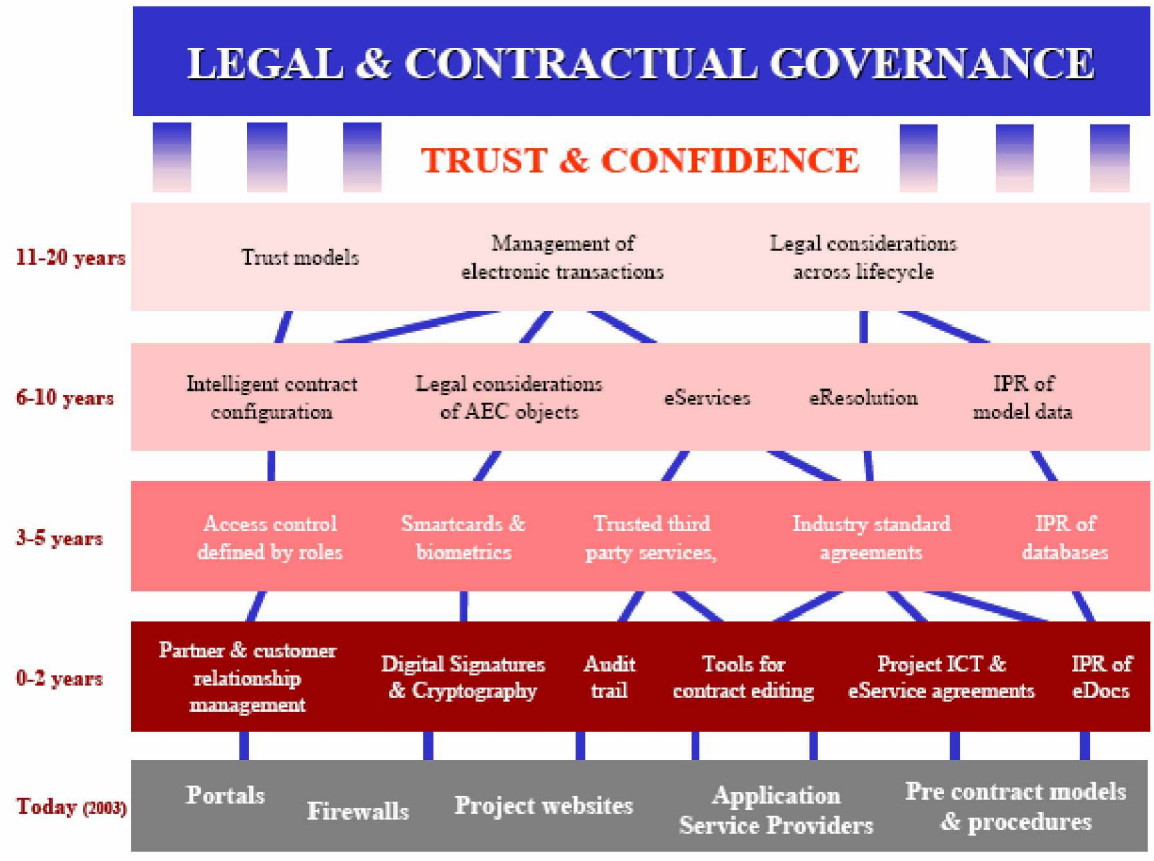

Figure 4.1 - Roadmap of legal and contractual governance for ICT in collaborative working (Source: Hassan, Shelbourn and Carter, 2003)

According to the Roadcon project, object-model based ICT will be the flavor of future ICT developments for the construction industry. Although object model based ICT is a very new subject for Turkish construction industry, the legal issues of using the objects needs to be researched and understood by the industry.

The developments in other industries in the use of partner and customer relationship management, ICT & eservice agreements and intellectual property rights (IPR) of e-documents are promising in Turkey. If it was thought that the Turkish construction industry adopts the improvements after seeing the full implementation of other industries, the legal and contractual governance can be provided in the following years.

The identification and clarification of the benefits of addressing the legal and contractual aspects of using the digital signature and notary technology in any country is also a big challenge for future research. (Hassan, Shelbourn and Carter, 2003) Although the technical and legal infrastructure of digital signatures is ready in Turkey, the Turkish construction industry needs time to adopt it.

The barriers for the use of the tools for contract editing in Turkey are described in next section.

4.5 Potential in Integration of eLEGAL Tools in Turkish Construction Industry

The eLEGAL e-contracting architecture consists of two main components, the Contract Wizard and the Virtual Negotiation Room (VNR), supported by a tool for capturing the VE's ICT support definitions. The relationships and functions of these components were explained briefly in chapter 2.

In this section the potential integration of eLEGAL tools and possible barriers to the implementation of these tools in Turkish construction industry is illustrated.

4.5.1 Life Cycle of an ICT Contract Created by the eLEGAL Tools

Best way of understanding the applicability of eLEGAL tools to the Turkish practice is analyzing perceptible cases where these tools are used. The case examined in this chapter is about a signed contract between Italian and Finnish Company, published in eLEGAL newsletter no.3

Geodeco S.p.A. is an Italian consulting engineering company who signed a contract to provide consulting services for geotechnical design analysis for a Power Plant facility to the Finnish company Fortum Engineering. The exchange of data between two companies consist of loading and geotechnical data provided by Fortum to Geodeco as input data and foundation members and displacements provided by Geodeco to Fortum as results of consulting service.

An ICT contract was established between two companies in order to regulate the data exchange rules and formats. The “eLEGAL Contract Editor” was used to draft set of clauses for the contract. These clauses were negotiated by the two parties, using the “eLEGAL Contract Negotiation Room” in order to agree on a common data exchange methodology and rules. The XML-schema and clause libraries underlying these tools could easily be expanded to incorporate the relevant clauses and conditions required for a consulting contract.

During the contract negotiation some iterations were necessary in order to agree on a common data exchange scheme. The Contract Negotiation Server which was established by Enterprise Net Finland Oy (ENeF) in Finland, was used to store the contract drafts during the negotiation process. An “ASP Contract” was also necessary in order to allow proper use of the services provided by ENeF as the Application Service Provider. (ASP)

According to the ICT Contract, the computed results will be provided to Fortum in terms of foundation members objects, contained in STEP files and the analyses will be performed by means of the Geodes System. The foundation members, as computed by the system, are plotted on the original plant map provided

by Fortum. In such a way, an immediate visual check can be performed in order to detect possible conflicts arising between the proposed foundations and other parts of the plant. Such results are then sent to Fortum in terms of objects (as established by the contract) in a STEP file.

The use of the Contract Editor, together with the Contract Negotiation Server, allowed quick and secure transactions during the negotiation phase and also for the final contract editing and signing. At the end of the negotiation phase, the two parties electronically signed the contract, and the consulting activity was performed.

It has to be noted that some of the clauses contained in the contract have been drafted with the help of the "eLEGAL Contract Wizard" such as those concerning data exchange formats. Other clauses, involving specific aspects of the design activities, needed specific knowledge about the project under discussion and were therefore drafted directly by the parties. (eLEGAL newsletter no:4)

4.5.2 Barriers to the implementation of eLEGAL tools in Turkish Construction Industry

To integrate and make use of the eLEGAL ICT support tools in Turkish construction companies, a few barriers have to be removed which are caused by differences in language, technology and legislation.

First of all, a framework should be formed specific to Turkish laws in order to build an electronic library of clauses. Turkish laws still have some insufficiency regarding to provide pure electronic communication. Main problem is legislations to support existing technologies but there is lack of adequate practice and framework for adoption.

- According to Turkish Act, the contracts must be in Turkish in order to be legally valid. So, if the project undertaken by the parties is going to be

governed by the Turkish act, the clauses must be drafted, negotiated and signed in Turkish.

- The electronic signature has not been used in Turkey yet. After its coming into force on July 2004, the regulations about electronic signatures and certification authorities were prepared by the Telecommunication Institution. Telecommunication Institution (TI) have not given license to the electronic certificate service providers yet. Although, TI's regulations finished on 23 January 2005, service providers' preparation period is still continuing to get license.

- Under the current legal and technological circumstances explained in the previous chapter, the public organizations are not ready to use such an advanced ICT system in its projects. Although the ICT infrastructure is enough to operate the tools, the system of communication, storage and legal infrastructure that were mentioned before seems to be the biggest barriers. So, it is not possible to see public bodies to use the results of eLEGAL which are the major clients of the projects in Turkish Construction Industry.

- An increasingly popular method for providing online services is the use of an Application Service Provider (ASP). An Application Service Provider, or ASP, is a third-party business that distributes software over a wide area network. That is, instead of actually buying an application, customers rent it from the ASP, who in turn becomes responsible for servicing the software, including providing upgrades. Having a reliable ASP may even relieve the companies of the need for an IT department altogether. Although ASPs give such services around the world; data warehousing, document management, e-commerce, engineering, programming, ERP, Project Management etc., it is very new in Turkey and the use of it is limited. Some of the ASPs working in the Turkish market are; Doruknet, Garanti Technology, Siemens Business Services and Koç.net. None of the construction companies in Turkey used APSs for their business, so experience of ASPs in construction sector is very low. Therefore, if Turkish construction companies could aware of the benefits and convenience

of the ASPs after the successful use of other sectors, ASPs may become a popular system across the industry.

- The barriers that prevent Construction sector from more advanced use of ICT which were illustrated in the previous section are also valid for using the ICT support tools of eLEGAL.

- The contract negotiation tool has an option to send the document to digital notary service which verifies the signature and then returns a copy of the document, complete with the notary service's digital signature, including a guaranteed date and time at which the verification took place. Until January 2003, according to the previous law (Public procurement law no:2886), all traditional contracts must be registered and notarized by public notary. However, after the new public procurement law enforced the contracts being registered and notarized by a public notary is not required, unless otherwise stated in tender documents. Although a lot of studies are continuing to prepare infrastructure of digital notary services in Turkey, it is hard to say that this system will be adopted by public notaries in three years. (Turan,2004) Therefore, in tender documents, the ICT contracts prepared by eLEGAL tools shouldn't be required to be registered and notarized in this period.

4.6 Case Study

4.6.1 Legal Admissibility of Confirmation Document

According to the Public Procurement Law article 40, prior to the approval of a tender decision by the contracting officer, the contracting entity must confirm whether the successful tenderer is prohibited from participation in tenders and must attach the related document to the tender decision.

Until the date 13.06.2003, the contracting entities could demand confirmation documents by using fax in order to speed up the transmission process. However, they

should also make official correspondence to make the process legal, as the fax documents haven't got legal validity. After Public Procurement Authority (PPA) took this decision (2003/DK.D-105), some of the contracting entities didn't make official correspondences and used illegal confirmation documents. In order to prevent this situation PPA made a second regulation and made it possible to get confirmation documents by using authority's web site. The steps of getting confirmation document are illustrated in figure 4.2.

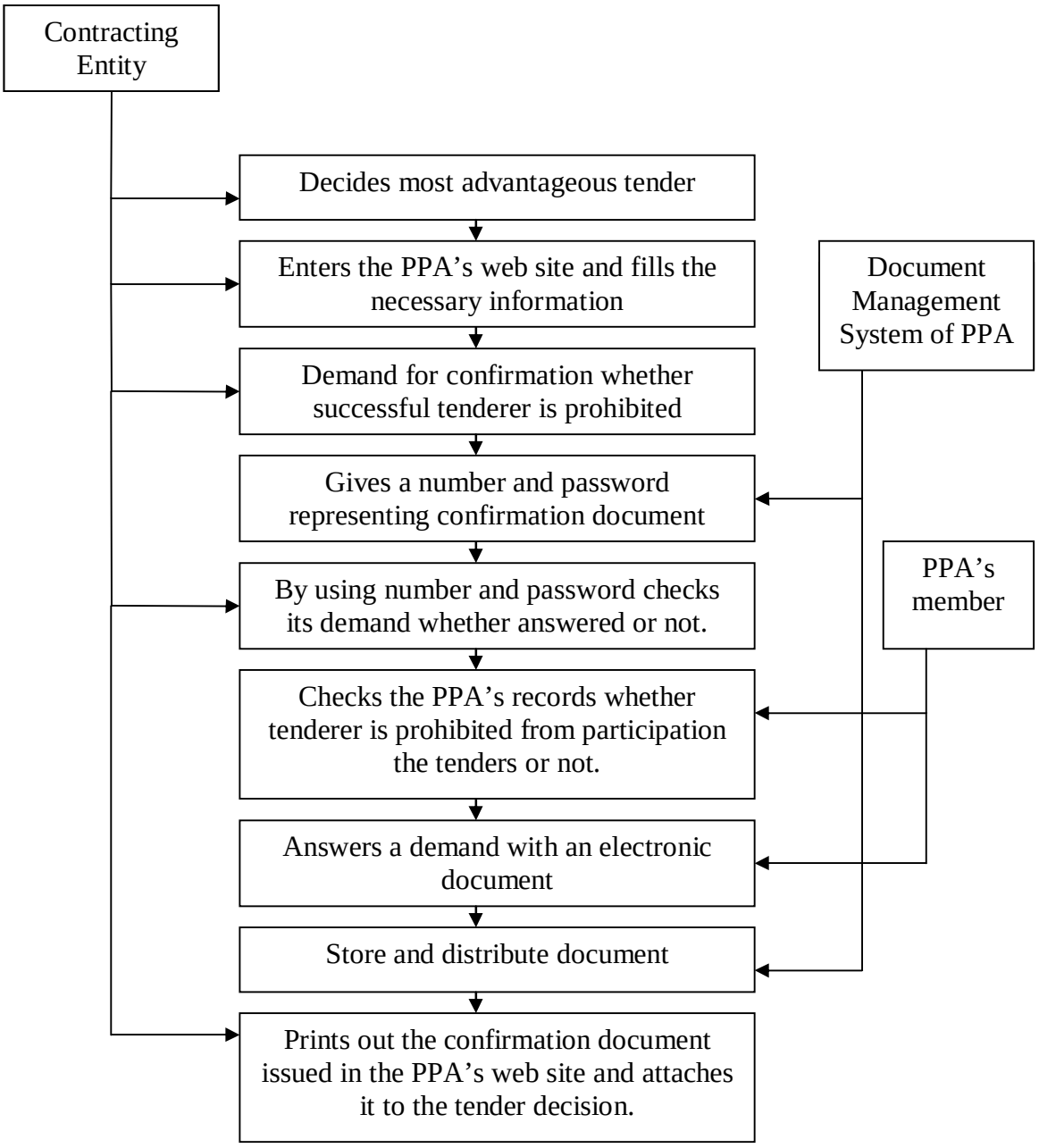

Figure 4.2 – Getting a Confirmation Document

1) After contracting entity decides on the most advantageous tender, the entity asks for confirmation whether tenderer is prohibited from participation in tenders by filling the tenderer's necessary information on application form issued in PPA's web site (www.kik.gov.tr). Contracting entity is liable for the correctness of information on the application form.
2) After filling the application form, PPA's document management system gives a number and password which represents the confirmation document.
3) By using the number and password, contracting entity checks if its confirmation demand is answered or not.
4) A PPA member checks its records and answers the demand whether the successful tenderer is prohibited from participation in tenders or not.
5) Contracting entity prints out the confirmation document issued in the PPA's web site and attaches it to the tender decision for approval of contracting officer.

According to PPA decision No: 2003/DK.L-185 dated 13.06.2003 contracting entities don't need to make official correspondence after taking the confirmation document from internet. This document didn't bear any legal validity since it was possible to modify the electronic version after it has been issued.

In the current situation as it is explained in the previous chapter, a legally valid document in public sector must have basic features on it; such as hand written signature, date and number that specifies the document. When a document delivered to a public organization, first its number and date is recorded for making the document legally valid. Moreover, unsigned documents and erased or corrected documents are not recorded since they are not legally admissible. Most important purpose of this procedure is preventing to modify the document after it has been issued.

Although, the confirmation document that is issued by PPA has data and number on it, it has no handwritten signature on it. Besides, there is no security measure to prevent modifications on the electronic version.

4.6.2 Suggested Model for Legally Admissible Confirmation Document

As it is illustrated in Figure 2.4, eLEGAL project prepared a model to provide legal support for documents in electronic environment. This model is a taken as a guideline while developing the suggested model and illustrated in figure 4.3.

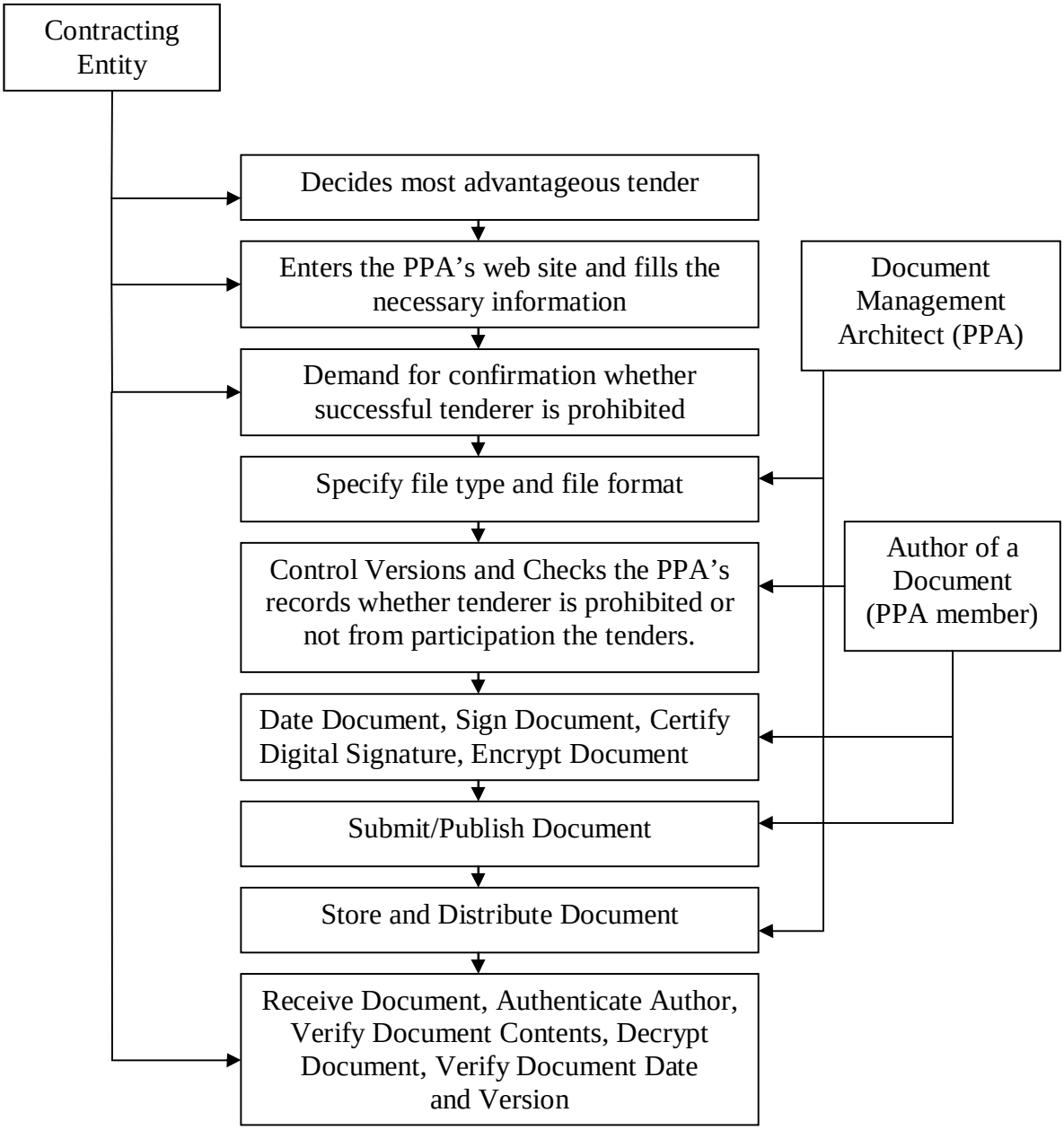

Figure 4.3 – Suggested Model for Legally Admissible Confirmation Document

According to this model, after contracting entity decides most advantageous tender, enters the PPA's web site, fills the tenderer's necessary information and demand for confirmation as it is recently used, first document management architect specifies file types and file format which is done in the PPA's web site. In order to use tender control system and get information from this system Internet Explorer 6.0 or more and Java should be used.

Secondly, when guidelines or legal stipulation are available for the type and format of data, author of a document who prepares the confirmation document should respectively control versions, date document, sign document, certify digital signature, encrypt document and submit/publish the document. In the PPA's system, author of document can not use the electronic signature -because of the legal and technical issues previously described-, so can't sign the document, certify digital signature and encrypt document. Therefore, most important necessities of legally valid documents in electronic environment can not be provided.

Thirdly, the document management system which provides the requirements for legally admissible storage should archieve/store the document and distribute the document. The document management system works well in PPA that author can easily control the versions and get necessary information from this system. Moreover, every administrator can reach the information of its previous or current tenders by using the web site whose security is provided by Verisign, international certificate service provider.

Finally, reader of a document who asked for the confirmation and attaches the related document to the tender decision, receive the document, authenticate the author, verify the document contents, decrypt document, verify document date and verify document version. In the current system after receiving the document authentication of author can not be done. Besides, decryption which is related to electronic signature is not used in the PPA's current system. Although, Verisign guarantees the system's security by asking user name and password, there is not a proof that the content of the document and the document date is the same when the

author publishes it. Thus, the use of electronic signature will solve all these problems and these documents will become legally admissible.

4.7 Turkish Government's Policy Related to Use of ICT

In Turkish construction industry the government plays essentially two roles: regulator and client in the construction processes. Clear government leadership will raise the awareness of the both industry and the clients and encourage a more rapid take up of ICT than would otherwise occur. As a major owner and user of constructed facilities the government has a role to play and perhaps take the lead. A fundamental requirement is that the government as a major industry client provided the leadership for industry improvement. Innovative research and development should be recognized as a critical success factor. A proportion of any research and development budget should be set aside for the purpose of identifying and assuring the continuous transfer of scientific discoveries into business. The government is the only construction client entity to have the motivation and resources to follow these objectives and provide leadership. (Lenard, D., Abbott, C., 2001)

The role of public sector in Turkish construction industry should be as a catalyst in introducing new technologies and financing research, and there should be active participation of the private sector improving and increasing productivity with the government.

The government is aware of the opportunities that ICT sector and launch e-transformation of Turkey project in order to accelerate Turkey's transition to information society. It was launched as a part of Turkey's commitment to join the European Union and to leverage Turkey's potential to become an important player in the global arena.

Since the previous government took place in December 2002, there is a new approach that urges public institutions to take necessary measures in order to remedy long-term problems, like financial stability, public management, social security

administration, agriculture, and manufacturing. These actions on the most needed areas of interest are combined in Urgent Action Plan (UAP), which takes place in the core of 58th and 59th Governments' Program. As a part of this Urgent Action Plan's Public Management Reform Section, information society issues are declared as one of the most significant projects. e-Transformation Turkey Project aims to foster the evolution and to coordinate information society activities.

Responsible institution for this specific project is identified as State Planning Organization (SPO), which is affiliated to the Prime Ministry. SPO is responsible for overall coordination of countrywide economic and social development programs, allocation of funds to public investment projects, and advising to the government. The time frame set for e-transformation Turkey Project is 6 months for an Action Plan and continuous for the entire project term. (SPO Information Society Department, 2005)

To clarify the objectives and principles of the project, a Prime Minister's Circular, dated February 27, 2003 has been issued. According to this Circular, the objectives of e-Transformation Project are as follows:

- Policies, laws, and regulations regarding ICT will be re-examined and changed if necessary, with respect to the EU acquis; eEurope+ Action Plan, initiated for the candidate countries, will be adapted to Turkey.
- Mechanisms that facilitate the participation of citizens to decision-making process in the public domain via using ICT will be developed.
- Transparency and accountability for public management will be enhanced.
- Good governance principles will be put in place in government services through increased usage of ICT.
- ICT diffusion will be promoted.
- Public ICT projects will be coordinated, monitored, evaluated and consolidated if necessary in order to avoid duplicating or overlapping investments.
- Private sector will be guided according to the above-mentioned principles.

In order to realize these objectives and to ensure the success of the project, a new coordination unit, Information Society Department, within SPO is established. This Department is responsible for the overall coordination of the project. Before this project was launched, lack of efficient coordination between institutions made the progress slow and ineffective.

To increase the participation and the level of success, an Advisory Board with 41 members has been established. This consulting body consists of the representatives of public institutions, non-profit organizations, and universities. The Board had its first meeting at the end of May 2003 to discuss and elaborate the Short Term Action Plan.(STAP)

Actions aiming to establish interoperable and secure online information services have the first priority in STAP. Besides, actions in STAP are in line with actions of Urgent Action Plan that covers restructuring of public management, increasing efficency in public services, and introducing citizen-oriented services. Also, eEurope 2005's goals and harmonization of Turkish legislation to EU acquis has been taken into account.

STAP has the following main topics:

- Legislation regarding regulatory and legal framework,
- Technical infrastructure and information security,
- Education and human resources for planning of required human capital,
- eGovernment for introducing electronic services to citizens without bureaucratic barriers,
- Standards for integrated and interoperable services,
- eHealth, which is one of the important thematic issues in eEurope,
- eCommerce for the development of eBusiness environment, especially for SMEs.(SPO Information Society Department, 2005)

ICT application should be increased in every sector. It must be one of the most important factors of socio-economic development and must ensure national defense and security. Raising the Turkish software industry into a key economic

sector with a high growth rate will lead to significant contribution to the modernization.

According to Kumas (2004) development of user friendly software products on international and Turkish standards for serving the design and construct of complicated works such as multi-store buildings, large scale bridges, airports, harbors, sport complexes etc. will eliminate all the social and cultural barriers for ICT development. When such an ICT culture is adopted by the major contractors, it will permeate to medium size and smaller construction organizations, through the project value chain (by involvement in projects and joint ventures with large contractors), by observing the advantages and by necessity to be able to communicate with other partners. The ICT culture will then have spread to all types of construction projects, large or small.

CHAPTER 5

SUMMARY AND CONCLUSION

5.1 Summary

For years, international research has pointed to the fact that that the strategic use of Information and Communication Technologies (ICT) is an enabler for construction to achieve major improvements and to reach goals more efficiently. With increasing awareness of gains and importance of ICT by the sector, the implementation rate of ICTs in construction sector is increasing. However, these technologies have not been covered by legal and contractual practices. The industry needs to implement application frameworks and legal re-structuring of the existing related laws and regulations to use ICT in a legal and contractually valid environment.

To enable many of the legal and contractual barriers for ICT use in construction projects, EU-funded research has produced a number of simple tools to enable project based businesses to realize legal and contractual validity of ICT in their projects (Hassan, Shelbourn, Carter, 2003). eLEGAL is an European Union funded IST project that defines a framework for legal conditions and contracts regarding to use of ICT in construction industry. As an EU candidate country, Turkey should benefit from these projects and investigate the applicability of such frameworks in order to be competitive in related sectors. In this research, eLEGAL is selected as a model project to address legal and contractual issues regarding ICT use in Turkish construction industry. Moreover, the applicability of this project's results is discussed in previous chapters.

Construction sector has many kinds of information flow between parties participating in a project. It is acknowledged that, even though technology and legislation to cover these communications is available, there is a lack of contractual

governance in these communications which is one of the factors that decreases the trust and confidence between parties. In order to implement these methods and tools and also other results of the project, a research study and survey is conducted to analyze the current situation of ICT use and legal and contractual practices in Turkish construction industry.

First, the formation of contracts in the Turkish laws are examined to analyze how a contract is formed according to Turkish Jurisprudence and to see if there is a legal barrier to make an electronic transaction in Turkey.

The main ICT related legislation, which should be considered by the managers in the contract phase of the project to work in a legal and contractually valid environment, is introduced. It is observed that the EU membership process of Turkey (1999) has had a positive effect, as the legislations to support the technology has increased The governments aim of transition to Information Society resulted in enforcement of new laws covering such facets as electronic signature, intellectual property rights (IPR), e-commerce and consumer rights. The law related to protection of personal data is expected to come into force soon. Furthermore, for e-government, regulations have been prepared. In order to enable the successful use of ICT in a legal and contractually valid manner in their projects, managers of ICT need to be aware of these laws and regulations.

A survey about the current contractual practices is then conducted for gathering the existing clauses and searching for legal cases concerning the application of ICT in Turkish construction industry. According to the survey results, the use of ICT seems only to be intended to speed up the transmission process but effectively has no legal validity. Although there is an increase in ICT related clauses in the recent contracts and laws as discussed in section 3.1.3, no clauses related the legal issues such as IPR, protection of personal data or privacy were observed. Thus, the use of ICT in projects mostly dependent on the unofficial and unwritten transactions resulting in a number of potentially serious implication such as validity of contract notices, ownership of data and intellectual property rights.

In the last section of the third chapter current situation of ICT use in Turkish construction industry is assessed to evaluate if ICT usage is of level sufficient for the tools and methods developed by eLEGAL to provide legal and contractually valid environment.

Barriers to adoption of ICT for Turkish construction companies and the future plans of the industry related to deployment of ICT are described by using existing survey results in order to analyze the problems from the management viewpoint. Then, the activities needed to enable full legal and contractual governance of ICT are discussed and according to these activities, the position of Turkish construction industry is analyzed. The potential integration of eLEGAL tools and possible barriers to the implementation of these tools in Turkish construction industry is then described. Next, the real case study about legal admissibility of confirmation document which is recently used in public procurements is discussed by using the eLEGAL project's results and developed a solution for legal admissibility of this document.

5.2 Conclusion

ICT investment in Turkish construction industry is increasing day by day. However, many construction companies are prudently waiting for concrete proof for investment feasibility from other leading companies in the sector or waiting for the widespread use of new information technologies in other sectors.

The adoption of ICT and benefiting from the ICT related solutions in Turkish construction industry increases with recognizing the importance of using ICTs in construction projects. Moreover, Turkish international contracting services undertakes more works in foreign countries, so the effective use of IT becomes important for project communication. However, still the fully implementation of the results of eLEGAL project is difficult. The industry needs time to consider and realize the necessity to use ICTs in the legal and contractually valid environment. First, the industry must be aware of that the investment to provide legal and

contractual support can be ignored when the results of the investment is considered which the major of them are trust, confidence, and therefore improved business relationship.

Many companies and public organizations in Turkey should increase their adoption level of ICT, in other words, they should use the benefits of ICT before considering the legal and contractual governance. Without a reasonable level of ICT environment, it is impossible to talk about making an ICT contract In order to establish an ICT environment, organizational, cultural, educational barriers and barriers related to legal issues should be overcome. The solution general ICT implementation barriers overlaps with the solution of barriers related to legal issues. In Turkish construction sector, the most important problem is attitude; there is a resistance to adaptation of new technology in Turkish construction industry rooted in the nature of the industry. A majority in the sector has same opinion that despite of the highly increasing investments in the construction sector, traditional systems are still considered more effective. However, if the managers or users are informed and trained, the resistance will be lower. Thus, the requirement of legal and contractually supported ICT use understood better in the following years by the implementation and responsibilities of ICT increased.

The use of electronic signatures is widely used in other sectors such as manufacturing or finance. The Turkish parliament should pass the bill about the protection of personal data and should regulate the issues about IPR.

According to the Turkish construction sector's current ICT infrastructure, ICT use practices and habits, and Turkey's current legal and contractual situation, the thought of fully application of eLEGAL project's results in following years is very optimistic.

However, typical scenarios which illustrate potential applications of ICTs in various project communications could be implemented by private and public organizations after electronic signature is widely used by the Turkish construction industry. Moreover, although it seems difficult to make a complete ICT contract

separate from the traditional contract, as a minimum it can be possible to add more ICT related clauses to the contracts that supports ICT tools and approves electronic documentation and communication as legally valid.

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APPENDIX A

MODEL CONTRACTS

Email Communication on Construction Sites

1.1 Selection of the degree of electronic communication (please select:)

□ Any written communication between the participants of this ICT- contract will be executed electronically. Letters, faxes are not allowed.

or

□ Mix of electronic and paper-based communication: faxes, letters and electronic communication is allowed.

1.2 Non electronic communications

1.2.1 If documents from a source outside the Project Team are being produced in paper form the Project Team member receiving the paper documents must endeavour to ensure that the third party provides them in electronic form or if this is not possible must either

make a detailed electronic record of the existence of those paper documents including a record of where they are located

or

transform them into an electronic format as specified in the user manual (e.g. a *.pdf-Format, Acrobat Reader Version ….).

1.2.2 In either case the recipient of the paper documents must digitally sign either the record of them or the new electronic versions in order to make the document contractually valid. Doing this he declares implicitly that the content in the delivered file is identical to the paper version. He can restrict this declaration or make explanations e.g. when a drawing is separated into several

*.pdf-parts. This has to be done in such a manner that it is visible in the same *.pdf-document. For selection purposes (please crossmark)

□ key words have to be included in the file name

□ the use of a DMS (Document management System) is obligatory including mandatory fields which have to be filled out by the sender

1.2.3 Explanation: Building participants from outside the ICT-contract (like public authorities, like suppliers) cannot be forced to provide pure electronic communication. There has to be established a contractual "interface" for bringing this outside information inside the circle of the ICT-contract-participants.

1.3 Digital Signature & Encryption

Every electronically transmitted item (notice, file, document) has to be digitally signed. Otherwise it will not be contractually valid. It is in the responsibility of the receiver to validate the authenticity of the sender. Encryption is (please crossmark):

□obligatory

□not necessary.

The digital signature has

□ to fulfil the following requirements: type of encryption (RSA,DSS, …): , storage of the secret key on smart card/ on PC,storage of the public key in the public database …, or

□ to be applied for at the following Certification Service provider: ….., using the following selection: …...

1.4 Authorisation for companies

The following persons are authorised to digitally sign on behalf of the following companies:…

1.5 Confirmation of receipt

For evidence purposes every receipt of an electronically transmitted info (email /document/file) has to be confirmed by the receiver. This has to be done within .. minutes after receipt.

1.5.1 The confirmation must contain

□a full copy of every received, decrypted item. The confirmation has to be signed digitally.

or

□the hashvalue created by the sender which has been digitally signed by the receiver.

Explanation: In order to be able to validate the content of the transmission the recipient has to "sign" the content he received and send it back to the sender. Thus the sender is able to proof that the receiver has got the items with exactly the same content he had sent off. The first possibility (sending back the item) is not convenient as the sender has to verify the content he received. Using the second possibility (signing the hashcode) is preferable.

1.5.2 It is in the responsibility of the sender to validate

that sent and received items are identical

that the confirmation of receipt arrived at the sender.

1.5.3 Concerning emails/info the receiver is obliged

to accept them

to read them

to send back a confirmation of receipt to the sender

to verify the message (check of authentification of sender, of integrity of transmitted info)

1.5.4 Explanation: Recommended for use for this purposes is an automatic response email-system enabling digital signatures (for e.g….)

1.6 Obstacles for sender or receiver of data

1.6.5 If there are technical obstacles in sending the confirmation, the sender has to react immediately: either he

sends a fax to the receiver of the confirmation or executes a telephone call to the following person:… or or sends a SMS to the following mobile number: …

1.6.6 Sender failed: If the sender realises that a delivery failed or was not possible or did not lead to a confirmation of receipt within the time limit mentioned above then the sender has to send his email once again. If it does not work sender is authorised to send the email to a default inbox

□ to be agreed by the parties

□ with the following email address: …

Additionally sender has to notify the receiver by means of fax, telephone or SMS. The receiver is obliged to send back a confirmation of receipt of this message.

Explanation: If the sender has used a SMS for notification he is able to get back automatically from his provider a protocol whether and when the receiver received the SMS. Thus using SMS is advantageous.

1.6.7 Receiver failed: If the receiver is not able to issue off a confirmation of receipt, he has to notify sender by means of fax, telephone, SMS.

1.7 Fine or incentivisation for missing confirmation

1.7.1 Fine:

If confirmations have – despite the above-mentioned obligation - not been given the following fines for the receiver apply: for the 3rd and above not transmitted confirmation …€ for each missing confirmation.

or

Incentivisation: If all parties agree that confirmations have not been a problem each of the parties gets an additional compensation of… €.

1.7.2 Fine or additional compensation is claimed from / granted to (please mark with a cross)

□ the individuals

□ the parties

1.8 Time Stamp

The trust centre's time stamp has to be provided for every transaction.

Explanation: The time stamp is one of the necessary items for evidence (in order to prove that the transmitted info was delivered from the sender and when it was delivered). The standard case is: when signing an info (e.g. a file) an online connection is established to the trust centre. The centre sends the time info as a self signed file (as an additional file or as an amendment to the signature file). Thus it is visible at which time the signature was executed. This preferably is to be combined with the hashvalue: the hashvalue receives a time stamp. Then authenticity, content and time of the info is visible. To ease the use of this feature the software has to be appropriate.

1.9 Accuracy and limitation of the information content

A party may restrict the accuracy of its data provided that it communicates any such restriction to the recipient at the time of sending the information. The limitation takes place even if the data has a much higher accuracy. If a

party wants to restrict its data this has to be expressed explicitly. Other restrictions of the data are not admissible.

Explanation: Data is sent with an accuracy of say 8 decimal places. For e.g. a preliminary design it may be restricted.

1.10 General Reciprocal obligations

Parties agree to use email protocol described in the e-mail Protocol Schedule.

1.11 Hint: Copyright in drawings: strict version control, any amendments are to be recorded, easily accessible, full version history must be available, not only storing the current version of the document. That is the key for saying who is the owner of that particular part of the data.

1.12 Hint: Definition of project's standards:

Specifying operating environment is necessary for project collaboration.

Example:

1.12.1 Software: When sending data the parties are obliged to use the following software for creation or altering the data: … The parties can use different software if the following functions are identical to the above-mentioned software:

1.12.2 Access to ASP: provided is access using the internet and the address www…., … using ISDN or ADSL

1.12.3 Hardware: -Standard-PC (recommendation: [3] Pentium II, 400 Mhz, 128 MB Hauptspeicher), CD-ROM- and floppy-drive, at least 17" Monitor, operation system Windows NT 4.0 or Windows 2000 Professional, peripheral devices: plotter, A4 printer, A4-scanner)

1.12.4 Others: the naming field has to be positioned and as demonstrated in CAD template …

1.12.5 Bills of quantities have to be delivered

(a) □ in the German GAEB format. Software for reading this format has to be according to the functions used by the software sidoun (manufacturer is ….)

(b) □ in the existing XML-schema (defined in …. provided by the client)

1.12.6 Every other data has to be delivered according to the XML categories defined in …., provided by the client.

Communication on Construction Sites Using ASPs

1. parties/date of agreement

1.1 Parties: Client, ASP

1.2 Date

1.3 Addresses/registered offices

2. Definitions

"Agreement" means this Agreement entered into by the Parties.

"ASP" means [insert name of ASP].

"Authorised Use Policy" means the Authorised Use Policy as agreed between the Client and Authorised Users set out in the Authorised Use Policy Schedule.

"Authorised User Licence" means the Authorised User Licence set out at Appendix [ ] which is entered into by the ASP and those using the System.

"Authorised Users" means users of the System authorised by the Client who have entered into an Authorised User Licence.

"Business Day" means any day which is not a Saturday, a Sunday or a public holiday in the City of London.

"Client" means [identify Project Client].

"Commencement Date" means [specify date on which service is to commence].

"Data Controller, Data Processor and Personal Data" shall have the same meanings as in the Data Protection Act 1998.

"Equipment" means the equipment defined in the User Manual.

"Fees" means the fees set out in the Fees Schedule payable by the Client to ASP in accordance with this Agreement.

"Information System" means a system for generating, sending, receiving, storing or otherwise processing electronic communications.

"Intellectual Property Rights" means patents, trademarks, trade secrets, service marks, registered designs, applications for any of the foregoing, copyright, design rights, database rights; know-how, confidential information,

trade and business names and any other similar protected rights in any country throughout the world (whether registered or unregistered).

"Metadata" means information relating to the use of the System by Authorised Users in relation to the Project.

"New Version" means a new version of the System which supersedes the version used on the Project. "Normal Working Hours" means 8am until 6pm Monday to Friday excluding public holidays.

"Party" or "Parties" means a party or the parties to this Agreement.

"Project" means [identify project on which the System is to be used].

"Project Data" means data relating to the Project which may be entered onto the System by an Authorised User.

"Security Policy" means the security policy set out in the Security Schedule.

"Service Fees" means the fees payable by the Client to the ASP for the Services as set out in the Fees Schedule.

"Services" means [specify extent of Services provided by ASP] as set out in the Services Schedule.

"System" means [specify the ASP's service offering] which can be accessed byAuthorised Users via the Web Site.

"Term" means the period of [specify minimum estimated project duration] starting on the
Commencement Date.

"User Manual" means the latest version of ASP's User Manual for use of the System.

"Web Site" means [identify web address at which System is located].

3. Term

3.1 This Agreement shall commence on the Commencement Date and shall continue for the Term unless terminated by the Client giving the ASP 28 days written notice, such notice not to expire within 3 months of the Commencement Date, or unless otherwise terminated in accordance with this Agreement.

4. ASP’s obligations

4.1 Subject always to the Client’s continued compliance with the Agreement, including but not limited to payment of the Fees ASP shall make the System available to Authorised Users in accordance with this Agreement.

4.2 The ASP shall provide the Services subject to the following restrictions:

4.2.1 a restricted number of Authorised Users are permitted to use the Services at any one time as set out in the Services Schedule;

4.2.2 the Client must comply and must ensure that each Authorised User complies promptly with any reasonable instructions given by the ASP from time to time in connection with the use of the Services; and

4.2.3 the Client will and will procure that each Authorised User complies with the Authorised Use Policy as set out in the Authorised Use Policy Schedule.

4.3 The ASP undertakes to implement and maintain the security procedures to protect the Project Data as set out in the Security Policy.

4.4 ASP shall use reasonable skill and care in providing the Services to Client and Authorised Users.

4.5 [ASP’s obligations to provide remedial services in the event of an interruption to the Services.]

4.6 [ASP’s obligation to release upgrades to the application containing remedies to bugs or errors identified.]

4.7 [ASP’s right to interrupt the Services in order to implement the upgrade or release.]

4.8 [ASP's obligation to co-operate upon reasonable basis with other ICT service providers to the project.]

4.9 [ASP's obligation to install the application.]

4.10 [ASP's obligations to install the application to support a new or replacement project participant.]

5. INTELLECTUAL PROPERTY

5.1 The Client acknowledges that the Intellectual Property Rights in the System and Services are owned by ASP and are only made available to the Client and Authorised Users in accordance with the Agreement and for so long as the Agreement remains in force and thereafter the Client and Authorised Users shall cease to use the System and Services.

5.2 ASP is either the sole and exclusive owner or an authorised licensee or user of all Intellectual Property Rights in the System and Services and reserves all such rights to itself. No title or ownership of the System or Services or of any third party right comprised in them is transferred to the Client or any Authorised User and neither may transfer, sub-licence, rent, lease, network, distribute or grant the rights granted to them in respect of the System or the Services to any other party.

6. CONFIDENTIALITY

6.1 The ASP shall keep confidential all Project Data put onto the Web Site by any of the Parties. The ASP shall not disclose the Project Data to any third party save:

6.1.1 any officer, employee or contract staff for the time being working for the ASP who may reasonably need to know it; or

6.1.2 as otherwise required by law;
provided that the ASP shall be responsible for ensuring that any person to whom Project Data is disclosed complies with any conditions of confidentiality applying to such information under this Agreement.

6.2 The Client shall keep confidential all information about the ASP and its technology which it gains from its use of the System. The Client shall not disclose any such information to any third party save:

6.2.1 any officer, employee or contract staff for the time being working for the Client who may reasonably need to know it; or

6.2.2 as otherwise required by law;
provided that the Client shall be responsible for ensuring that any person to whom such information is disclosed complies with any conditions of confidentiality applying to such information under this Agreement.

6.3 Nothing in Clauses 6.2.2 and 6.2.3 shall apply to any information:

6.3.1 which is (or which becomes) available to the public other than by breach of this Agreement or of any other duty;

6.3.2 which the party receiving the information already possesses or which it obtains or originates independently in circumstances in which that party is free to disclose it.

6.4 The obligations in this clause shall survive termination of this Agreement for a period of [5] years after such termination.

6.5 [ASP's obligation to implement access control policy as agreed by the project participants as described in the Security Schedule.]

7. password protection

7.1 The ASP will provide the Client and Authorised Users with a user name and password to enable them to log onto a secure area via the URL http://www. …….. in order to access the Services.

7.2 Each user name and password will give the Client and Authorised Users access to the Services that they require.

7.3 The Client will and will procure that Authorised Users will:

7.3.1 Use the user name and password solely for the purpose of enabling it to access the Services for the purposes of the Project;

7.3.2 Keep the user name and password confidential;

7.3.3 Store the user name and password securely; and

7.3.4 Not divulge the user name and password to any third party.

7.4 The Client will promptly notify the ASP of any changes in the number and identity of Authorised Users and their user names and passwords.1

8. OWNERSHIP AND TREATMENT OF DATA

8.1 The Client warrants that it is the owner of the Data it loads onto the System. In the course of providing the Services, the ASP or its agents, contractors or sub-contractors may need to copy, modify or adapt the Project Data and the Client grants to the ASP and its agents, contractors or sub-contractors a non-exclusive licence to use the Project Data for the purpose of providing the Services.

8.2 The Client warrants that the Data that it loads onto the System will not contain any material which is unlawful, obscene, defamatory, incites racial hatred, breaches third party intellectual property rights or violates any export control laws and that the Client's use of the Services will comply in all respects with the Authorised Use Policy.

8.3 In the event that there is a breach of the warranty given by the Client in Clauses [ ] or [ ] above or if there is any breach of the Authorised Use Policy by the Client the ASP may subject to giving 24 hours notice suspend access to the Services by any party and/or remove Project Data from its servers.

8.4 The ASP will back up Project Data in accordance with the Security Schedule and will not be responsible for backing up any Project Data which has not been saved to its servers due to either the relevant file remaining open or the person using the Services failing to save such Project Data.

8.5 Upon termination of the Agreement the ASP shall keep the Project Data for a period of [ ] and shall make the same available for collection by the Parties in the format specified in the Security Schedule.

9. Data Protection

9.1 All rights, title and interest in any personal data contributed to the Web Site shall vest solely in those who contribute those personal data.

9.2 The Client acknowledges that in providing the Web Site the ASP is acting as a Data Processor under the Data Protection Act 1998 (the "Act") and the Client is the Data Controller under the Act.

9.3 The instructions given by the Client to the ASP in respect of the Personal Data must at all times be in accordance with the laws of the United Kingdom.

9.4 The ASP will process the Personal Data to provide the Web Site in terms of this Agreement and in accordance with the Client's instructions given from time to time.

9.5 The ASP will not use the Personal Data for any purposes which are inconsistent with those instructed by the Client.

9.6 The ASP will not disclose any Personal Data to a third party except at the specific request of the Client or where obliged to do so by law.

9.7 The ASP warrants that it has appropriate operational and technological processes and procedures in place to safeguard against any unauthorised access, loss, destruction, theft, use or disclosure of Client's Personal Data.

9.8 The Client indemnifies ASP against all costs, expenses, (including legal expenses), damage, loss (including loss of business and loss of profits), liabilities, claims, actions or proceedings, which the ASP may incur arising out of the ASP's processing of the Client's Personal Data in accordance with the Client's instructions in its capacity as Data Processor.

10. Fees

10.1 The ASP's Fees are set out in the Fees Schedule as varied from time to time.

11. Client's Obligations

11.1 In consideration of ASP providing the System and Services the Client agrees to pay to ASP the Fees in accordance with the Fees Schedule.

11.2 The Client warrants that it shall use the System and Services strictly and only in accordance with this Agreement.

11.3 The Client shall indemnify ASP against all and any loss, damage, cost, expense or other claim arising from any breach of the warranties given by the Client in this Clause.

12. new versions

12.1 For the duration of this Agreement the ASP will:

12.1.1 inform the Client of any planned or completed New Version;

12.1.2 offer to the Client the opportunity to examine:

(a) any New Version; and
(b) any tests or results of tests of such New Version that the ASP may carry out, or may have carried out; and
(c) at the Client's request install and integrate such New Version in the System [on the ASP's normal commercial terms/at a charge to be determined pursuant to this Agreement].

12.2 If the ASP releases a New Version and the Client decides not to implement such New Version then such decision will not give rise to any right to terminate this Agreement nor will it result in any adverse effect on the Services or the performance of the ASP's obligations under this Agreement. However, if the ASP has released [a][two] New Version[s] since the version which forms part of the System, and the Client has not, within [24 months] of the ASP's having notified the Client that the [second] New Version is available, acquired and installed either of those two New Versions, then (provided such failure is not attributable to a failure of the New Version in question to achieve acceptance pursuant to Clauses [ ] and [ ]) the ASP will be entitled to terminate this Agreement by [three months'] written notice to the Client.

13. ORDERS FOR OPTIONAL SERVICES AND VARIATIONS

13.1 The Client may from time to time require the ASP to supply optional services of the type set out in the Services Schedule or implement variations to the System at the rates set out in the Services Schedule (as varied from time to time in accordance with this Agreement). The ASP will use all reasonable endeavours to comply with the Client's request but the Client acknowledges that the ASP's ability to do so will depend upon the availability of appropriate resources at the time in question.

13.2 Where the ASP agrees to provide optional services or variations such agreement will be embodied in an order for optional services or variation. Each such order will be made under, and will incorporate, the terms of this Agreement.

14. Variations to the contract

14.1 Any amendment, waiver or variation of this Agreement will not be binding on the Parties unless set out in writing, expressed to amend this Agreement and signed by or on behalf of each of the Parties.

15. Termination

15.1 Either Party may terminate this Agreement forthwith on giving written notice in writing to the other Party, if the other Party:

15.1.1 commits any material breach of this Agreement and, in the case of a breach capable of being remedied, the parties fail to reach an agreed resolution by the dispute resolution procedure set out in clause [ ];

15.1.2 convenes any meeting of creditors or passes a resolution for winding up or suffers a petition for winding up which is not discharged within 21 days;

15.1.3 has an administrative receiver appointed over the whole or part of its assets or suffers the appointment of an administrator; or

15.1.4 being an individual compounds with its creditors or comes to any arrangements with any creditors.

15.2 ASP may terminate this Agreement forthwith without notice if the Client fails to pay invoices presented by the ASP in accordance with clause [11.1] above.

15.3 Termination of this Agreement howsoever caused shall not affect the rights of either Party under this Agreement which may have accrued up to the date of termination.

15.4 During the period of notice referred to above the ASP shall provide the Services and make the Website available to the Client and the Authorised Users.

16. Consequences of termination

16.1 The Client and the Authorised Users own all data and Metadata produced on and in connection with the Web Site.

16.2 All of the data and metadata are subject to the confidentiality provisions under clause [6] of this Agreement.

16.3 Upon termination or expiry of this Agreement (for whatever reason) if the Client or an Authorised User so requires [and subject to the Client paying all outstanding sums due to the ASP] the ASP shall provide the Client or the

Authorised User with reasonable assistance at the ASP's standard fees in providing for the orderly migration of the data from the Website in accordance with the User Manual and backup copies of all data not already provided in accordance with this Agreement.

17. INSURANCE and LIMITATION of LIABILITY

17.1 On signature of this Agreement, the ASP will provide to the Client evidence that it has in force an insurance policy which will, inter alia, provide professional indemnity or errors and omission cover of not less than £[ ] per claim or series of related claims per year. The ASP will maintain such policy in force for the term of this Agreement and one year thereafter.

17.2 The liability of the ASP to the Client will not exceed the amount of £[ ] per claim or series of related claims per year (whether or not such sum, or any sum, is recoverable under the policy referred to in Clause 17.1) and shall not exceed the aggregate amount of £[ ] in any year.

17.3 Nothing in this Clause 17 will be construed as attempting to limit the liability of either Party in respect of injury to or the death of any person caused by any wilful or negligent act or omission of either Party, its employees, agents or subcontractors, or for fraud.

17.4 The ASP will not be liable for any loss or damage caused by or resulting from any defect or inaccuracy in the System or services if the loss or damage occurred after the Client had been supplied with any modification which did not contain the defect or inaccuracy concerned.

17.5 The liability of the Client to the ASP will not exceed the amount of £[ ] per claim or series of related claims per year and shall not exceed the aggregate amount of £[ ] in any year.

18. Entire Agreement

18.1 This Agreement is the complete and exclusive statement of the Agreement between the parties relating to the subject matter of the Agreement and supersedes all previous communications, representations and arrangements, written or oral. Except as aforesaid, each Party acknowledges that no reliance is placed on any representation made but not embodied in this Agreement.

19. Notices

19.1 Any notice given under or in relation to this Agreement will be by e-mail in which case it will be deemed to have been signed provided the full name, position and company of the sender is clearly shown.

19.2 Any such notice will be deemed to have been received [in the case of e-mail at the time that the e-mail enters [an] [the Designated] Information System of the intended recipient provided that no error message indicating failure to deliver has been received by the sender.

19.3 Provided that if deemed receipt occurs before 9am on a Business Day the notice will be deemed to have been received at 9am on that day, and if deemed receipt occurs after 5pm on a Business Day, or on a day which is not a Business Day, the notice will be deemed to have been received at 9am on the next Business Day.]

19.4 The addresses of the parties for the purposes of this-clause are:
[the Client representative]
[Position]
[E-mail:]
[Address]:
[etc.]

19.5 In proving such service it will be sufficient to prove that the e-mail was sent to the relevant Party in accordance with this Clause.

20. Dispute resolution

20.1 It is the intention of the Parties to settle amicably by negotiation all disagreements and differences of opinion including matters of performance, procedure and management arising out of this Agreement. Accordingly it is agreed that the following procedure will be followed prior to the serving of written notice terminating this Agreement or in relation to any matter of dispute between the Parties.

20.2 In the event that any disagreement or difference of opinion arises between the Parties under this Agreement the matter will be disposed of in the following way:

20.2.1 the Client and the ASP will meet to attempt resolution of the dispute. Should they not meet within [fourteen (14) days] of the date on which either Party convenes a meeting to resolve the matter or should they not be able to resolve the matter within [fourteen (14)] days of first meeting, then the matter will promptly be referred by either Party to the [state individual's position] of the Client and the [state individual's position] of the ASP for immediate resolution.

20.2.2 If, within [14 days] of the matter first having been referred to the [last level of escalation] no agreement has been reached between the Parties as to the matter in dispute, the dispute resolution process will be deemed to have been exhausted in respect of the matter in dispute, and each Party will be free to pursue the rights granted to it by this Agreement in respect of such matter without further reference to the dispute resolution process.

20.3 For the avoidance of doubt, this Clause will not prevent either Party from seeking injunctive relief in the case of any breach or threatened breach by the other or any obligation of confidentiality or any infringement by the other of the first-named Party's Intellectual Property Rights.

21. Jurisdiction and choice of law clause

21.1 This Agreement will be governed by and construed in accordance with English law and each Party hereby submits to the exclusive jurisdiction of the courts of England and Wales

22. Support

22.1 [Some alternatives:
ASP will provide telephone helpdesk support during Normal Working Hours.
Or
ASP will provide telephone helpdesk support 24 hours a day, 7 days a week, every day of the year for logging problems with the service. In addition, ASP will be available to respond to queries during Normal Working Hours.
Or
ASP will provide telephone helpdesk support 24 hours a day, 7 days a week, every day of the year.]

23. Operating Environment

23.1 Each Party will ensure that it has and uses the Equipment required to access the Web Site as set out in the User Manual. For the avoidance of doubt ASP is not responsible for providing PCs, modems, printers or other equipment that Authorised Users may need to access the services.

24. Service levels availability

24.1 With effect from the Commencement Date and during the term of this agreement the ASP will provide that:

24.1.1 the Web Site will remain connected to and accessible via the internet;

24.1.2 the Web Site will be available [ ]% of the time, to be calculated in accordance with Clause 24.8;

24.2 ASP shall monitor and report to the Client its compliance with its obligations under this Clause 24.

24.3 The Client accepts and acknowledges that compliance with Clauses 24.1 may be affected by events beyond ASP's reasonable control (including faults caused by the acts or omissions of the network provider and/or the availability of the underlying telecommunications systems) and the Client agrees that in no circumstances will ASP have any liability in respect of and to the extent of such events.

24.4 ASP may from time to time, carry out routine maintenance work in respect of servers and associated systems equipment used in provision of the Web Site, to ensure that they remain in good and working order and condition, provided that such routine maintenance work does not cause the Web Site to be unavailable or inaccessible.

24.5 ASP may need to carry out non-routine maintenance which causes the Web Site to be unavailable or inaccessible for a limited period of time. ASP will advise the Client of the time at which such non-routine maintenance occurs and if possible give prior notice of it.

24.6 Subject to payment of the Fees, ASP will supply to the Client on or before the [ ] day of each [month] a statement detailing the access and usage of the Web Site and the amount of time expressed as a percentage that the Web Site was available during the preceding month.

24.7 The level of availability shall be calculated using the following formula:
A = (T-D)/T
where:
A = Availability (expressed as a percentage)
T = Time
D = Downtime during any given month which means periods of scheduled maintenance for which ASP shall give Client 48 hours notice and which shall only be carried out between 8pm and 8am UK time.

24.8 To the extent that the Web Site is not available as a result of any act or omission on an the Client's part (whether directly or indirectly), or as a result of the factors contemplated in Clause 24.1, such failure will not be taken into account in the calculation of availability.

24.9 If the report provided pursuant to Clause 24.2 indicates an availability percentage of less than [ ]% ASP will provide a credit against the fees payable for the following month as follows:
[DEFINE CREDITS]

24.10 Notwithstanding any other provision in this Agreement ASP will be entitled, without notice, at any time, to change the bandwidth and/or storage allocation of the Web Site and to make any changes to the hosting services which are necessary to comply with any applicable safety, security or other statutory requirements, or which do not materially affect the nature or quality of the services.

25. BENEFIT OF AGREEMENT

25.1 No term of this Agreement is intended to confer a benefit on, or be enforceable by, any person who is not a Party to the Agreement (whether under the Contracts (Rights of Third Parties) Act 1999 or otherwise).

ASP CONTRACT SCHEDULES
SERVICES SCHEDULE

1. [Describe in broad terms the functionality or functions of the application, for example:

1.1 Document management system (storage and retrieval)

1.2 Project management system

1.3 Communication system

2. Describe the performance levels which the ASP and the Client agree in terms of:

2.1 The hardware and operating environment.

2.2 Search capabilities to be able to easily find relevant information in data which is stored on the ASP's server. This includes devices for easy tracking of failures and responsibilities. The ASP provides for this purpose the following software: …. XML-field: This includes capabilities for (please mark):

2.2.1 selecting info contained in CAD drawings

2.2.2 selecting notices and confirmation of notices

2.2.3 searching requests and approvals of relevant persons

2.2.4 searching which people were involved in a certain detail of the project.

2.2.5 providing court evidence including printing relevant data on paper.