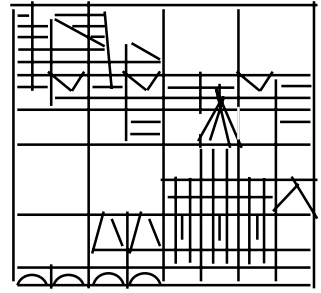


Universität Konstanz  
Mathematisch-Naturwissenschaftliche Sektion  
Fachbereich Informatik und Informationswissenschaft



# **Investigation of the Critical Factors of Success in Telepathology – an International Comparison Study**

**DISSERTATION - APPENDIX**  
zur Erlangung des Doktors der Naturwissenschaften  
an der Universität Konstanz

eingereicht von

**Ingrid Hosch**

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Referenten:

1. Professor Rainer Kuhlen, Universität Konstanz
2. Professor Klaus Kayser, Universität Heidelberg

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# APPENDIX I

## STATEMENTS ABOUT ACCURACY IN THE CONTEXT OF TELEPATHOLOGY

### 1. FIRST LETTER OF THE GERMAN MEDICAL BOARD OF PATHOLOGISTS

Letter 1 of the Berufsverband Deutscher Pathologen e.V., Prof. Stolte, Gelsenkirchen, 8.3.1999, Title: Stellungnahme des Berufsverbandes Deutscher Pathologen e.V. und der Deutschen Gesellschaft für Pathologie e.V. zur histologischen Untersuchung von entnommenem Gewebe (statement about the histological examination of tissue samples).

*Die Entnahme von Gewebe ist eine Verletzung der Integrität des Gesamtorganismus, die stets auf der Grundlage einer klar definierten Indikation vorgenommen wird. Der Eingriff selbst und die Artdiagnose des entnommenen Gewebes sind zu dokumentieren.*

*Deshalb hat - auch unter dem Gesichtspunkt der Stärkung und Erweiterung von Patientenrechten und des Patientenschutzes - der Patient / die Patientin ein Recht bzw. einen Anspruch auf histologische Diagnosesicherung des entnommenen Gewebes. Die histologische Untersuchung ist aber auch eine qualitätssichernde Maßnahme. Langjährige Erfahrungen haben gezeigt, daß beim Vergleich der klinischen Diagnose mit der histologischen Diagnose des Pathologen nicht selten gravierende und völlig unerwartete Befunde aufgedeckt werden, selbst an als 'harmlos' entnommenen Geweben. Deshalb muß uneingeschränkt gelten, daß jedes entnommene menschliche Gewebe histologisch zu untersuchen ist. Die histologische Untersuchung, deren Ergebnis möglicherweise schwerwiegende Konsequenzen nach sich zieht, ist medizinisch notwendig und darf nicht wirtschaftlichen Zwängen unterworfen sein.*

*Ergänzend ist zu bedenken, daß bei gerichtlichen Auseinandersetzungen die histologische Diagnosesicherung als wesentlicher Bestandteil jeder Dokumentation erhebliche Bedeutung erlangen kann.*

### 2. SECOND LETTER OF THE GERMAN MEDICAL BOARD OF PATHOLOGISTS

Letter 2 of the Berufsverband Deutscher Pathologen e.V., Dr. Med. Wolfgang Oehmichen, Mönchengladbach, 12.4.1996: Title: Intraoperative Schnellschnittbeurteilung per Ferndiagnostik (Intraoperative Frozen Section Examination per Telepathology)

*In Zusammenhang mit den vielfältigen positiven Anwendungsmöglichkeiten von Telekommunikation in der Medizin wird gelegentlich auch von dem vermeintlichen Vorteil gesprochen, über beliebige Entfernungen hinweg Schnellschnittdiagnostik zu betreiben. Das excidierte Material wird während der Operation von jemandem präpariert und für die mikroskopische Beurteilung durch Schneiden und Färben vorbereitet. So angefertigte Präparate werden unter ein Mikroskop gelegt und die Bilder mittels Telefonleitung und Computer übertragen. Als Vorteile des Verfahrens werden Schnelligkeit und Kostenersparnis genannt.*

*Die Vorstände des Berufsverbandes Deutscher Pathologen und der Deutschen Gesellschaft für Pathologie teilen die vorgenannte Ansicht nicht.*

*Zu den schwierigsten Teilen der intraoperativen Schnellschnittdiagnostik gehört die makroskopische Beurteilung und Präparation des zu untersuchenden Gewebestücks. Sie muß unabdingbar und unmittelbar von einem Facharzt für Pathologie vorgenommen werden. Die Bildübertragung des Makropräparates ist z.B. wegen der notwendigen Palpation keineswegs ausreichend. Ärzte operativer Fächer oder gar technisches Hilfspersonal können und dürfen dabei nicht eingesetzt werden. Selbst bei*

*erfahrenen Pathologen und selbst bei häufig auftretenden Schnellschnittuntersuchungen wie z.B. bei Mammatumorexcisionen kann es vorkommen, daß sich nur mit Mühe etwas Verdächtiges finden und untersuchen läßt. Unter Umständen müssen sogar mehrere Abschnitte des Präparates unabhängig voneinander präpariert und mikroskopiert werden. Die Vorbereitung auf diese Tätigkeit ist ausschließlich Gegenstand der Weiterbildung von Fachärzten für Pathologie, die mindestens 500 selbständig durchgeführte biotische Schnellschnittuntersuchungen nachweisen müssen.*

*Es ist auch nicht möglich, wie manchmal vorgeschlagen wird, wenigstens 'einfache' Schnellschnittfälle tediagnostisch zu bearbeiten. Im Einzelfall ist die Schwierigkeit der makroskopischen Präparation nicht vorher zu bestimmen, so daß hier noch einmal dringend auf die erforderliche fachärztliche Kompetenz eines Pathologen verwiesen werden muß, zu der sich ohnehin noch eine langjährige fachspezifische Erfahrung gesellen sollte.*

*So wenig es üblich ist, daß der Pathologe seine gynäkologischen Exfoliativpräparate selbst abstreicht oder selbst Ergüsse punktiert oder Feinnadelpunktionen vornimmt, so wenig erhebt er auch Anspruch auf Durchführung kleiner Operationen, obwohl er ja über vorzügliche anatomische Kenntnisse verfügt. Umgekehrt sollte aber auch der Operateur sich dessen bewußt sein, daß er bei der makroskopischen Bearbeitung von Schnellschnittmaterial sehr schnell an die Grenze seiner verantwortungsbewußt ausgeübten fachärztlichen Tätigkeit stößt.*

*Unsere Auffassung wird gestützt durch das ärztliche Standes- und Weiterbildungsrecht auf der Grundlage der Selbstbeschränkung der Ärzte auf die von ihnen gewählten Fachgebietsgrenzen einerseits wie durch zivil- und haftungsrechtliche Konsequenzen andererseits. Die für Operateure enorm bedeutende Haftpflichtversicherung kann nur innerhalb des Rahmens ihres Fachgebiets wirken. Eine Überschreitung dieser Fachgebietsgrenzen kann sowohl für den Krankenhausträger als auch für den Operateur selbst den Verlust der Absicherung durch die Haftpflichtversicherung im Bereich der Überschreitung zur Folge haben. Darüber hinaus sollten die gezeichneten Grenzen aber zusätzlich jeweils persönlich verantwortungsvoll nachempfunden werden.*

*Der Berufsverband Deutscher Pathologen e.V. bittet gemeinsam mit der Deutschen Gesellschaft für Pathologie e.V. die Bundesärztekammer, und hier besonders den Ausschuß Berufsordnung, unsere Auffassung mit entsprechenden öffentlichen Stellungnahmen zu unterstützen.*

### 3. AZZOPARDI IN THE SERIES: MAJOR PROBLEMS IN PATHOLOGY

A few simple dicta are here in order as their observance would eliminate a substantial number of errors. Like all generalizations they must be treated as such and exceptions allowed for.

1. *Never report on a frozen section when you are mentally or physically preoccupied with something else.  
Never use a microscope without a very low power objective.  
Never report without examining the gross specimen.*
2. *If the microscopic pathology does not fit the macroscopic description or the clinical history, you may be missing something vital. The alternative is dual (or multiple) pathology.*
3. *Overdiagnosis is commoner than underdiagnosis, especially with pathologists of less than 10 years' experience and especially with infiltrating (as opposed to in situ) malignancy.  
Underdiagnosis of in situ lesions on frozen section is not too serious.  
Overdiagnosis of infiltrating carcinoma is a mutilating error. If in doubt, await paraffin sections.*
4. *If the macroscopic appearance is benign, beware of diagnosing carcinoma. Think again. The microscopic interpretation is probably wrong. (Certain in situ carcinomas are the exception.)*

Points 1 and 2 are partially applicable to paraffin as well as to frozen sections. A few specific examples of erroneous diagnoses will emphasize these points.

- a) *Severe epithelial hyperplasia in a fibroadenoma was diagnosed by an inexperienced pathologist as infiltrating carcinoma. Insufficient attention had been paid to the circumscribed margin of the lesion, and the fact that it was a fibroadenoma had been completely missed. In this instance the hyperplasia was unusually exuberant but benign.*
- b) *Papillary 'cystadenoma'. An extremely able pathologist diagnosed a lesion as infiltrating carcinoma. Macroscopically it looked perfectly benign to him and to me. He called it malignant because he was too busy, because he was using a poor microscope without a scanning lens and had relied too much, perhaps, on the impression derived from the methylene blue preparation. Because of this combination of errors he failed to recognize a papillary 'cystadenoma'. The two-layered lining in parts of the lesion was hardly discernible with the optical apparatus available. Even more important, in the absence of a scanning view, it was difficult to appreciate the very well delineated outline of the lesion. The small focus of apocrine epithelium could be recognized with some difficulty in the H and E preparation and with much greater difficulty in the methylene blue preparation. All these points were clarified when a good microscope with a scanning lens was used. Personally I was only really suspicious of the erroneous diagnosis of malignancy because of Dictum 4: both of us had regarded the macroscopic appearances as unequivocally benign. In this situation, with experienced pathologists, I have yet to come across an instance of infiltrating carcinoma, though doubtless, extremely rarely, one of microscopic size will produce just such a situation.*
- c) *Sclerosing adenosis with apocrine metaplasia can mimic the pleomorphism and atypia of malignancy even on paraffin section, if one is unaware of the problem. I have seen this error committed by a group of consultants, including a surgical pathologist with an international reputation. On frozen section, the problem can be even more difficult. Again, a good microscope, a scanning view of the lesion and examining H and E sections for the identification of apocrine metaplasia are all-important. Knowledge of the existence of this type of lesion and remembering Dictum 3 can be crucial.*
- d) *Sclerosing adenosis in pregnancy. An excellent pathologist, with a first-class reputation on both sides of the Atlantic, was just about to label a lesion carcinoma when specific enquiry elicited the information that the patient was pregnant. Failure of the surgeon to appreciate that this data might constitute vital information nearly led to a mastectomy in another patient with sclerosing adenosis.*
- e) *Sclerosing adenosis. One of the best pathologists I have known and the present writer were shown sections of a difficult case which the senior registrar (senior resident or chief resident) regarded as probably malignant. We both concurred and another patient with sclerosing adenosis lost a breast. We were both preoccupied with another problem and made the cardinal error of not examining the macroscopic specimen. This case also illustrates the important point that an erroneous diagnosis is not any more correct for having been replicated by several observers. Multiplication of the same erroneous diagnosis does not make that diagnosis correct! Also neither of the two consultants involved in this case was the consultant 'on call'. In these circumstances I believe that there is probably an unconscious tendency to feel less personal responsibility for the diagnosis. The last two circumstances which led to an error in this case could be prevented by attention to what could be called the 'principle of divided and diminished responsibility'. Just as a patient should have a single clinician who acts as the final pathway for diagnosis and treatment, the patient should have a single consultant who, in the final analysis, takes the sole responsibility for a histopathological opinion.*

# APPENDIX II

## STANDARDS AND PROTOCOL IN MEDICINE

(Source: Houtchens et al., 1995)

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## 1. GENERAL PROTOCOL FOR THE ORGANIZATION OF CLINICAL INFORMATION

Patient demographics (unique identifier, header)
Chief complaint
History of present illness
Past history
Family history
Review of systems
Physical examination
Standard studies (clinical lab, imaging, electrographic tracings)
Special studies
Initial impressions
Plan of management
Clinical course (subsequent studies, interventions, responses)
Subsequent impressions, interpretations, and questions

## 2. PATIENT DATA DOMAINS

Symptoms and findings
Clinical observations
Anatomic sites
Diagnostic study results
Microbes and etiologic agents
Diagnoses
Procedures
Interventions
Drugs
Units of measure
Medical devices
Outcome variables and functional status

### 3. REPRESENTATIVE ELECTRONIC FILE FORMATS

Name of File/Originator	Extension	Class	Comment
Adobe Illustrator	AI	Vector	
Adobe Photoshop	PSD	Raster	
Amiga ILBM	IFF	Raster	
ASCII Text	TXT	Vector	Any generic text file
AT&T Group 4	ATT	Raster	FAX format
AutoCAD DXF	DXF	Vector	ASCII encoded
CALS Raster	CAL	Raster	Government standard
<b>CompuServe Global Image Format*</b>	<b>GIF</b>	<b>Raster</b>	<b>Interlace support</b>
DataBeam	DBX	Raster	
Dr. Halo	CUT	Raster	Separate palette file
FAX type	FAX	Raster	Defined by FAX card
GEM Image	IMG	Raster	GEM standard
GEM Metafile	GEM	Vector	
HP LaserJet	PCL	Raster	Soft font support
HP Plotter	PGL	Vector	HP 7475 plotter based
Inset Systems	PIX	Raster	Can contain text
Inset Systems	IGF	Metafile	Screen capture
<b>Joint Photographic Experts Group*</b>	<b>JPG</b>	<b>Compressed</b>	<b>Still images</b>
KoFax Group 4	KFX	Raster	Blach & white images
Lotus	PIC	Vector	Arbitrary colors
MacPaint	MAC	Raster	Macintosh
Mac PICT	PCT	Metafile	Macintosh
MathCAD	MCS	Vector	
MS-Windows	WMF	Metafile	
Metafile	CGM	Metafile	Many expressions
Microsoft Paint	MSP	Raster	Blach & white
<b>Motion Picture Experts Group*</b>	<b>MPG</b>	<b>Compressed</b>	<b>Moving images</b>
PC Paintbrush	PCX	Raster	
<b>Photo CD</b>			<b>Kodak still images</b>
<b>PM Bitmap BMP</b>	<b>BMP</b>	<b>Raster</b>	
PM Metafile	MET	Metafile	
PostScript Language	EPS	Metafile	TIFF link for viewing
<b>TIFF Tagged Image File Format*</b>	<b>TIF</b>	<b>Raster</b>	<b>Many expressions</b>
TARGA	TGA	Raster	Full color support
Tektronix Plot 10	P10	Vector	
Wavelet		Compressed	Hybrid tensor
WordPerfect Document	WPD	Extended text	
WordPerfect Graphics	WPG	Metafile	Raster and vectors
* = These files support image management			

#### 4. ORGANIZATIONS INVOLVED IN HEALTHCARE STANDARDS

In the following schedules organizations and their roles in establishing and maintaining health care standards are identified.

##### 4.1 GOVERNMENT ORGANIZATIONS INVOLVED IN HEALTHCARE STANDARDS

Government level	Acronym	Name	Representative involvement
International (United Nations)	WHO	World Health Organization	International Classification of Diseases (ICD-9)
United States	DHHS	Department of Health and Human Services	United States ICD-9 Clinical Modification (ICD-9-CM)
DHS Agencies and Institutes	AHCPR	Agency for Health Care Policy and Research	
	ATSDR	Agency for Toxic substances and disease Registry	
	ADMHA	Alcohol, Drug Abuse and Mental Health Administration	
	CDC	Centers for Disease control and Prevention	Data collection; preventative and therapeutic recommendations
	FDA	Food and Drug Administration	Medical device approval
	HCFA	Health Care Financing Administration	Medicare financing rules
	HRSA	Health Resources and Services Administration	
	IHS	Indian Health Service	Geographically distributed healthcare delivery Longitudinal medical and record development
	NIH	National Institutes of Health	Healthcare research funding National Cancer Institute 3-D telemammography project
	NLM	NIH National Library of Medicine	Medical subject headings (MeSH) Unified Medical Language System (UMLS) Metathesaurus project Visible Human Project High performance medical computing and communications

##### 4.2. USA HEALTHCARE PROVIDER PROFESSIONAL ORGANIZATIONS INVOLVED IN PRACTICE STANDARDS

Acronym	Name	Representative involvement
ACC	American College of Cardiology	Digital imaging and communications in medicine (DICOM) 3.0 standard for cardiology imaging
ACOG	American College of Obstetrics and Gynecology	DICOM 3.0 standard for laparoscopy
ACP	American College of Physicians	DICOM 3.0 standard for endoscopy
ACR	American College of Radiology	ACR Standards, including ACR Teleradiology Standard DICOM 3.0 standard for diagnostic imaging
ACS	American College of Surgeons	DICOM 3.0 standard for laparoscopy and endoscopy

Acronym	Name	Representative involvement
ADA	American Dental Association	DICOM 3.0 standard for diagnostic imaging in dentistry
AHIMA	American Health Information Management Association	Medical records standards
AMIA	American Medical Informatics Association	Computerized patient record standards
ANA	American Nurses Association	Medical records standards
AOA	American Osteopathic Association	DICOM 3.0 standard for diagnostic imaging
CAP	<b>College of American Pathologists</b>	<b>Systematic Nomenclature of Pathology (SNOP)</b> <b>Systematic Nomenclature of Medicine (SNOMED)</b> <b>DICOM 3.0 standard for pathology imaging</b>
RSNA	Radiological Society of North America	DICOM 3.0 standard for diagnostic imaging

#### 4.3 USA INDEPENDENT INSTITUTES, CORPORATIONS, AND LOBBIES INVOLVED IN PRACTICE STANDARDS

Acronym	Name	Representative involvement
AHA	American Hospital Association	Medical records standards
AMA	American Medical Association	Current Procedural Terminology (CPT) codes
ASTM	American Society for Testing and Materials	Specification of multiple standards related to data interchange Gabrieli Medical Nomenclature (GMN)
CPRI	Computer-bases Patient Record Institute, Inc.	Recommendation of standards for computerized patient record
HIAA	Health Insurance Association of America	
HIMSS	AHA Healthcare Information and Management System Society	Computerized patient record standards
IOM	Institute of Medicine (Chartered by NAS, 1970)	Committee on Improving the Patient Record Recommendation (1991) to form CPRI
JCAHO	Joint Commission of Accreditation of Healthcare Organizations	Accreditation of healthcare institutions
MGMA	Medical Group Management Association	
NAS	National Academy of Sciences (Chartered by Congress, 1863)	Identification of key issues in medical care, research, education
NCPDP	<b>National Council of Prescription Drug Programs, Inc.</b>	<b>System for transmission and tracking of medical prescriptions</b>

## 5. ORGANIZATIONS INFLUENCING COMMUNICATION STANDARDS

### 5.1 GOVERNMENT STANDARDS SETTING BODIES INVOLVED IN COMMUNICATIONS

Government level	Acronym	Name	Composition and representative involvement
International	CEN	European Technical Committee for Normalization	Technical Committee 251 addresses healthcare informatics
	IEC	International Electrotechnical Commission (Founded 1906)	Non-treaty organization Composed of national committees of 43 countries Addresses electrical and electronics issues
	ISO	International Organization for Standardization (United Nations; 1946)	Non-treaty organization Composed of designated national standards bodies Addresses all fields except electrotechnical
	ITU	International Telecommunications Union	Treaty organization Composed of government telecommunication agencies Addresses radio, telegraph, telephone, television Close cooperation with IEC and ISO
	ITU-R	ITU Consultative committee for Radio (formerly CCIR)	Broadcast industry standards
	ITU-T	ITU Consultative Committee for Telecommunications (formerly CCITT)	Telecommunications standards (telephone, telegraph, television) Standards for FAX and video coder-decoder devices
	FCC	Federal Communications commission	
	FTSC	Federal Telecommunications Standards Committee	

### 5.2 USA INDEPENDENT STANDARDS SETTING ORGANIZATIONS INVOLVED IN COMMUNICATIONS

Acronym	Name	Representative involvement
ACS	Accredited Standards Committee	Committee X12 addresses medical financial data management
AIIM	Association for Information and Image Management	Information management and communications standards
ANSI	American National Standards Institute (Founded 1918)	Coordinates voluntary standards system Approves USA national standards Represents USA in international standards system
ASCII	ANSI American Standards Committee for Information Interchange	ASCII code tables
ASTM	American Society for Testing and Materials	Committee E31: Medical applications of computerized systems
COS	Corporation for Open Systems	UNIX operating system environment standardization

<b>Acronym</b>	<b>Name</b>	<b>Representative involvement</b>
ECSA	Exchange Carriers Standards Association	USA telephone long distance carriers standards
HISPP	ANSI Healthcare Information Standards Planning Panel	Composed of ASTM, HL 7, IEEE, NEMA, and other similar members Joint Working Group with ACR-NEMA for DICOM 3.0
HL7	Health Level 7 (Founded 1987)	Application layer transmission of medical information
IEEE	Institute of Electrical and Electronics Engineers	Composed of societies of engineering professionals Application layer transmission of medical information Medical information bus standard
IAB	Internet Activities Board	Internet Engineering Task Force Internet Research Task Force
NEMA	National Electrical Manufactures Association	Electrical power interface standards Joint Working Group with ACR, HISPP for DICOM 3.0 standard
NIST	National Institute of Standards and Technology	USA government official standards setting body Publication of Federal Information Processing Standards (FIPS)
NTSC	National Television Standards Committee	USA television standards

## 6. STANDARDIZED VOCABULARY - CODED MEDICAL VOCABULARIES AND RESPONSIBLE ORGANIZATIONS

<b>Acronym</b>	<b>Name of vocabulary</b>	<b>Responsible organization</b>	<b>(Org. acronym)</b>
COSTAR	Computer Stored Ambulatory Record	Harvard University Clinics (Octo Barnett)	
CPT	Current Procedural Terminology	American Medical Association	(AMA)
GMN	Gabrieli Medical Nomenclature	American Society for Testing and Materials	(ASTM)
Iliad	Iliad Data Dictionary	Applied Informatics, Inc.	(AI)
ICD-9	International Classification of Diseases, 9th ED.	World Health Organization	(WHO)
ICD-9-CM	ICD-9, Clinical Modification	Department of Health and Human Services	(DHHS)
MeSH	Medical Subject Headings	National Library of Medicine	(NLM)
PTXT	Pointer to Text	Intermountain Health Care/3M Corp.	(IHC)
Read	Read Clinical Classification	English organization	
<b>SNOMED III</b>	<b>Systematic Nomenclature of Medicine</b>	<b>College of American Pathologists</b>	<b>(CAP)</b>
<b>SNOP</b>	<b>Systematic Nomenclature of Pathology</b>	<b>College of American Pathologists</b>	<b>(CAP)</b>
UMLS Meta-1	Unified Medical Language System Metathesaurus	National Library of Medicine	(NLM)

## 7. ISO OPEN SYSTEM INTERFACE (OSI) COMMUNICATION PROTOCOL LAYERS

OSI layer	Event (ISO standards)	Competing standards by which layers usually are implemented
7	Application	American Society for Testing and Materials ASTM 1238 Health Level 7 (HL 7) Institute of Electrical and Electronics Engineers IEEE P1157 Medical Data Interchange Standard (MEDIX)
6	Presentation (encoding)	Abstract Syntax Notation.1 (ISO ASN.1) Accredited Standards Committee X-12 Electronic Data Interchange (EDI) Health Level 7 (HL 7) Standard Generalized Markup Language (SGML)
5	Session	Berkely Sockets
4	Transport	NetBIOS, Sockets, SPX Transmission Control Protocol - Internet Protocol (TCP-IP)
3	Network	Ethernet, Internet Protocol (Institut für Pathologie), NetBEUI, X.25
2	Data link	Ethernet, HDLC, LAPE, LAPD, LLC
1	Physical	Ethernet, IEEE RS-232, IEEE 802.x, Token Ring

## 8. STANDARDS RECOMMENDED BY CPRI AND AMIA FOR TRANSFERRING MESSAGES AND DATA

Subject matter and kind of communication	Acronym/number	Responsible organization/name of standard	Current users/comments
Clinical alpha-numeric information within an institution (Linkages assumed to be 'tight, synchronous')	HL 7	Health Level 7	USA: 200 + healthcare institutions; many universities Australia and New Zealand; Adopted as national standard (HL 7 is considered a practical superset of ASTM E1238)
Clinical alpha-numeric information between institutions (Linkages assumed to be 'loose, intermittent, non-synchronous')	ASTM E1238	American Society for Testing and Materials Clinical Data Interchange Standard	USA: Most large laboratory vendors, to transmit lab results France: consortium of 25 lab system vendors (Harmonization et Promotions des Informatiques Medicales)
Medical images in all contexts, between all picture archiving systems	ACR-NEMA DICOM 3.0	American College of Radiology - National Electrical Manufacturers' Association Digital imaging and communications in medicine	USA: ACR-NEMA is seeking 'deemed status' from ANSI Europe: CEN CT 251 is involved and supportive Potential subscribers: <b>pathology</b> , cardiology, endoscopy Used in Kodak PhotoCD, Japanese Image Store optical disc
Information from laboratory instruments to computer systems	ASTM 1394	American Society for Testing and Materials	USA: Current generation clinical laboratory instruments
Information between critical care devices/instruments and computers	IEEE P1073	Institute of Electrical and Electronics Engineers	USA: Under development since 1984; accepted 1991; implemented 1994
Electroneurographic signals (ECG) devices and computers	CEN TCPT 251	European Technical Committee for Normalization Standard for transmitting ECG data	

Subject matter and kind of communication	Acronym/number	Responsible organization/name of standard	Current users/comments
Electroneurographic signals (EEG, EMG) between computers	ASTM 1467	American Society for Testing and Materials Standard specification for transferring digital neurophysiological data between computer systems	USA: Adopted by EEG systems manufacturers (Similar in structure to ASTM 1238 and HL 7)
Clinical medical logic, alerts, decision support prompts, guidelines	ASTM E1460	American Society for Testing and Materials Standard specification for defining and sharing modular health knowledge databases (Arden syntax)	
Messages from applications to bibliographic retrieval systems	ANSI Z39, 50	American National Standards Institute	
Billing and remittance transactions between care site and payer	ASC X12	Accredited Standards Committee X12 Subcommittee standard	USA: Adopted by Health Care Financing Agency (HCFA)
Billing and eligibility information between pharmacies and payers	NCPCP	National Council for Prescription Drug Programs NCPDP standards	USA: In use since 1985; about 60 % pharmacies participate

## 9. IMAGE DATA

### 9.1 DETERMINANTS OF IMAGE RESOLUTION

Image type	Analog	y
Still	Physical medium Camera optics Camera electronic 'chips' Film (X-ray film is 8 bits deep) Scanner (12-16 bits deep) Video monitor screen and color card	Digitization protocol Number of picture elements (pixels) digitized Bits used to encode each pixel (DICOM 3.0 specifies 12 bits per pixel) Size (diameter) of each pixel
Moving	Bandwidth in megahertz (MHz = $10^6$ cycles/sec) Color video subcarrier frequencies: National Television Standards Committee: 3.58 MHz (NTSC video; North America) Phase Alternate Line: 4.43 MHz (PAL video; most of Europe) Sequential Couleur Avec Memoire: 4.41 MHz (SECAM video; France, Russia)	Bandwidth in megabits/second (Mbps) T-1 = 1.544 Mbps T-2 = 6.312 Mbps T-3 = 44.736 Mbps T-4 = 274.176 Mbps

### 9.2. IMAGE SIZE

The size of medical images conveniently is classified as small or large matrix. Representative images and viewing devices within these categories are described in the following table.

Matrix size	Image type	Example	Pixels (lines)/frame	Bits/pixel
Small matrix	Still	Magnetic resonance	256 x 256 pixels	8
		Computer tomography	512 x 512 pixels	8
		Ultrasound		
		Nuclear scintigraphy		
		Digital fluorography		
		Personal computer 'capture card' image	320 x 240 pixels	4 or 8 or 12
			512 x 512 pixels	

Matrix size	Image type	Example	Pixels (lines)/frame	Bits/pixel
	Moving (analog video)	National Television Standards Committee video (NTSC TV; North America) Phase Alternate Line TV (PAL; most of Europe) Sequential Couleur Avec Memoire TV (SECAM; France, Russia)	525 (483 active video lines) 625 lines 625 lines	
	Viewing monitor	Personal computer (PC) monitor	640 x 480 lines	
Large matrix	Still	Conventional radiographs (chest radiographs, skeletal films) Mammograms Computer radiography <b>Pathology slides</b>	2048 x 2048 pixels 2048 x 2048 pixels (min) Variable Variable	8 or 12 to digitize; 8 to read 12 8 or 12 12 or 24
	Moving (video)	High definition television USA: digital video Japan: analog video	1000+ x 1000+ pixels 1000+ lines	
	Viewing monitor	High resolution workstations	1024 x 1024 pixels 2048 x 2048 pixels 4096 x 4096 pixels 5K+ x 5K+ pixels	8 or 12 8 or 12 or 16 12 or 16 or 24

### 9.3. DIGITAL STORAGE REQUIREMENTS FOR REPRESENTATIVE IMAGES

Image type	Example	Megabytes (typical)	Calculation (image sizes are as shown in table before)
Still	Magnetic resonance study	2 MB	256 x 256 pixels/each small matrix frame = 65.536 pixels/frame; 65.536 pixels/frame x (8bits = 1 byte)/pixel = 65.536 bytes/frame; 65.536 bytes/frame x 20-40 frames/study = 1.310.720-2.261.440 bytes/study; 1.310.720-2.621.440 bytes/(2 <sup>20</sup> = 1.048.576 bytes)/megabyte = 1.25-2.50 megabytes.
	Chest radiograph	4 MB	2.048 x 2.048 pixels/single large matrix frame = 4.194.304 pixels/radiograph; 4.194.304 pixels/radiograph x (8 bits = 1 byte)/pixel = 4.194.304 bytes/radiograph; 4.194.304 bytes/2 <sup>20</sup> = 1.048.576 bytes)/megabytes = 4.00 megabytes
	Computed tomography study	6 MB	512 x 512 pixels/each small matrix frame = 262.144 pixels/frame; 262.144 pixels/frame x 20-40 frames/study = 5.242.880-10.485.760 bytes/study; 5.242.880-10.485.760 bytes/2 <sup>20</sup> = 1.048.576 bytes)/megabytes = 5.00-10.00 megabytes
	Pathology slide	12 MB	2.048 x 2.048 pixels/slide frame = 4.194.304 pixels/slide; 4.194.304 pixels/slide x (24 bits = 3 bytes)/pixel = 12.582.912 bytes/slide; 12.582.912 bytes/(2 <sup>20</sup> = 1.048.576 bytes)/megabytes = 12.000 megabytes
Moving	Black and white video (Image size 640 x 480)	8.79 MB/sec	640 digital samples/horizontal line x 480 lines of vertical resolution = 307.200 pixels/frame; 307.200 pixels/frame x (8 bits = 1 byte)/pixel = 307.200 bytes/frame; 307.200 bytes/frame x (video refresh rate = 30 frames)/sec = 9.216.000 bytes/sec; 9.216.000 bytes/sec/(2 <sup>20</sup> = 1.048.576 bytes)/megabytes = 5.79 MB/sec.
	Partial bandwidth color 4:2:2 component video*	17.58 MB/sec	8 bits/Y channel pixel + 4 bits/R-Y channel pixel + 4 bits/B-Y channel pixel = 16 bits/each color video pixel = twice the bits for each black and white pixel; 2 x 8.79 MB/sec = 17.58 MB/sec.

Image type	Example	Megabytes (typical)	Calculation (image sizes are as shown in table before)
	Full bandwidth color 4:4:4 component video*	26.37 MB/sec	8 bits/Y channel pixel + 8 bits/R-Y channel pixel + 8 bits/B-Y channel pixel = 24 bits/each color video pixel = thrice the bits for each black and white pixel; 3 x 8.79 MB/sec = 26.37 MB/sec.
* Note. Digital color component code „I:J:K“ indicates the rates, expressed as multiples of the carrier frequency, at which the „color difference“ signals from each of the component analog video channels are digitized; the Y (yellow) color signal is digitized at „I“ times the carrier frequency; the R-Y (red-yellow) color difference signal is digitized at „J“ times the carrier frequency; the B-Y (blue-yellow) color difference signal is digitized at „K“ times the carrier frequency.			

## 10. SOME SUPPLIERS OF PROPRIETARY DIAGNOSTIC IMAGE SYSTEMS

Discipline	Manufacturer	Location
Radiology	Agfa Matrix	Ridgefield Park, NJ
	DeJarnett Research	Towson, MD
	DuPont Medical Products	Wilmington, DE
	Eastman Kodak company	Rochester, NY
	Fuji Medical Systems USA	Stamford, CT
	General Electric Medical Systems	Milwaukee, WI
	Merge Technologies	Milwaukee, WI
	Philips Medical Systems	Shelton, CT
	Picker International	Cleveland, OH
	Siemens Medical Systems	Hoffman Estates, IL
	Sony Electronics Medical Systems	Montvale, NJ
3M	St. Paul, MN	
Toshiba Medical Systems	Tustin, CA	
Vortech Data	Richardson, TX	
Pathology	Roche Imaging Systems	Elon College, NC
	Corrabi Telemetrics International	Seattle, WA
	Siemens Medical Systems	Frankfurt Germany
	Sony Electronics Medical Systems	Montvale, NJ

## 11. WIDE AREA COMMUNICATION SERVICES TRANSMISSION RATES

The following table shows communication services for specific data types and transmission rates:

Communication service	Transmission rates	Data types
Analog modems	1.2-28.8 kilobits/sec	Asynchronous data
Integrated services digital network (ISDN)	64 kilobits-1.5 megabits/sec (T-1 = 1.544 megabits/sec)	Digital voice, packet data
Frame relay	64 kilobits - 35 megabits/sec T-2 = 6.312 megabits/sec)	Packet voice, fast packets, images
Switched multimegabit data service (SMDS)	10-100 megabits/sec T-3 = 44.736 megabits/sec)	Cells, images, video, voice
Asynchronous transfer mode (ATM)	25 megabits-2.4 gigabits/sec (T-4 = 274.176 megabits/sec)	Cells, images, interactive video
Synchronous optical network (SONET)	150 megabits - 10 gigabits/sec	SONET frames, interactive video

## APPENDIX III

### TELEMATICS PROJECTS IN HEALTH CARE

#### 1. PROJECTS IN EUROPE

Source: <http://www2.echo.lu/telematics/health>

The European Community realized the need of telemedicine services and supports various applications in preventive medicine, diagnostic, therapy, after-care, research, as well as administration and statistics. However, the projects of the EC are often focused on detail solutions by accepting negative effects at worldwide standardization [Detken, 1997].

Name	Description
AMBULANCE	Mobile unit for health care provision via telematics support
AORTICS	Advanced open resources telematics in <b>critical care</b> situations
BEAM II	<b>Biomedical</b> equipment assessment and management
CARDI-ASSIST	Improving <b>cardiac</b> telediagnosis and <b>surgery</b> enabling - technologies and <b>3D ultrasound imaging</b>
CARDIO EUG7	Feasibility study on the European component of the <b>G7 Global Health Care Cardiovascular</b> Sub Project
CARDLINK 2	A patient held <b>portable record</b> for particular application in cases of <b>medical emergency</b>
CATCH	<b>Citizens advisory</b> system based on telematics for communication and health
CHAINE	The comprehensive hospital & ambulatory care information <b>networking</b> for <b>episode linkage</b>
CHIN	Co-operative health information <b>networks</b> for the community
COCO	Coordination and continuity in <b>primary care</b> : the regional healthcare information <b>network</b>
CONQUEST	Clinical <b>oncology network</b> for quality in European <b>standards of treatment</b>
DIABCARD 3	Improved communication in <b>diabetes</b> care based on <b>chipcard</b> technology
DIABCARE Q-NET	<b>Diabcare</b> quality <b>network</b> in Europe
EASI	European applications in <b>surgical</b> interventions
ECOLE / GRIP	European collaboration in <b>oncology literature</b> evaluation / getting research into practice
EHCR	EHCR support action
EHTO	European health telematics observatory
ENN	European <b>neurological network</b>
EOCS:HSC	European occupational <b>case studies</b> in health and social care
ET-ASSIST	European telemedicine for <b>medical assistance</b>
EU-MIE'96	EU-MIE'96
EU/CENII	„2nd Eu/Cen workshop on the <b>electronic healthcare record</b> “
EUROPATH	European <b>pathology</b> assisted by telematics for health
FACT	Feasibility studies for the creation of <b>global cardiovascular</b> multimedia <b>databases</b>
GALEN-IN-USE	Generalized architecture for language encyclo-pedia and nomenclatures in medicine
GASTER	<b>Gastrointestinal endoscopy</b> applications for <b>standards</b> in telecommunications and research
GETS	Global <b>emergency</b> telemedicine services
GLOBAL HORIZON	Feasibility study on the implementation of the European component of the G7 global <b>cancer network</b> sub-project
G7 GLOPHIN	Global <b>public health information network</b> feasibility study/accompanying measure
HANSA	Healthcare advanced <b>networked system architecture</b>
HC-REMA	Health Care <b>REsource Management</b>
G7 CARDS	International harmonization of use of data <b>G7 cards</b> in health care - feasibility study
HEALTHPLANS	A concerted action to <b>support</b> national and regional health authorities in developing plans for the <b>introduction</b> of health care telematics
HEALTHWATCH	Health-watch database
HECTOR	Health <b>emergency management</b> and coordination through telematics operational resources
HERMES	Telematic healthcare - remoteness and <b>mobility</b> factors in common European scenarios
HOMER-D	HOME <b>REhabilitation</b> treatment - Dialysis

Name	Description
HORIZON ACTION	HORIZONtal accompanying measure for the cluster for telematics-assisted <b>cooperative work</b> for health care professionals
HSPRO-EU	Health and <b>safety promotion</b> in the European Union
14C	Integration and communication for the continuity of <b>cardiac</b> care
IAEVA	A distributed <b>multimedia database</b> and environment for virtual „walks“ of 3D models of <b>human organs</b>
IGOS	Image guided <b>orthopaedic</b> surgery
INFOCARE	Interactive information system for health / <b>social care</b>
ISAR-T	Integration system <b>architecture telematics</b>
ISHTAR	Implementing <b>secure</b> health care telematics applications in Europe
IT EDUCTRA	Information technologies <b>education</b> and training
ITHACA	Telematics for integrated client centered <b>community care</b>
MACRO	Multimedia application for clinical research in <b>oncology</b>
MARGRITE	Marrow graft: <b>integrated telematics</b> in Europe
MANSEV	Market authorization by <b>network</b> submission and evaluation
MEDICO	Multimedia <b>education</b> data-system in clinical <b>oncology</b>
MERMAID	Medical <b>emergency</b> aid through telematics
NDSNET	Harmonization of <b>nephrology</b> data systems within <b>regional networks</b>
NIGHTINGALE	<b>Nursing</b> informatics: generic high-level training in informatics for nurses; general applications for learning and education
NIVEMES	A network of integrated <b>vertical medical services</b> targeting <b>shipvessels</b> and remote populations
OPHTEL	Telematics in <b>ophthalmology</b>
ORQUEST	A telematics system for <b>oral</b> health quality enhancement
PLANEC	Planning of the care of the <b>elderly</b> in the European community
PRESTIGE	Prestige - <b>guidelines</b> in health care
PROGUIDE	Promoting the development, dissemination, and evaluation of <b>guidelines</b> of <b>clinical practice</b>
PROMPT	<b>Protocols</b> for medical <b>procedures and therapies</b>
PROREC	Promotion <b>strategy</b> for European electronic
RECOVER	RED-CROSS overall <b>emergency</b> resource management system
REMEDES	Reseaux <b>multimedia</b> Europeens <b>pour docteurs</b> et établissements de sante
SAMMIE	Solution avancie pour le marchi medical <b>intra-hopital</b> Européien
SEAHORSE	Support, empowerment and awareness for <b>HIV/AIDS</b> ; the on-line research and sel-help exchange
SIREN	<b>Security</b> in regional networks
STAR	<b>Seamless telematics</b> across regions
SYNAPSES	Federated health care <b>record</b> server
T-IDDM	Telematic management of <b>insulin</b> dependent <b>diabetes</b> mellitus
TANIT II	Telematics for <b>anesthesia</b> and intensive therapy II
TARGET	Telematics applications in radiation and general <b>oncology</b>
TASTE	Technology assessment in <b>Tele-Neuro-Medicine</b>
TELENURSE	Telematic applications for <b>nurses</b>
TESEMED	Telematics in community <b>pharmacies</b> for responsible <b>self-medication</b>
TESUS	Telesurgical staffs
THIN	<b>Travel</b> health information network
TOMELO	Towards a strategic alliance between developers of medical terminology and health <b>care record systems</b>
TRUSTHEALTH	<b>Trustworthy</b> health telematics
USEDHE	User-group on the <b>architecture</b> of health care information systems
VATAM	<b>Validation</b> of telematics applications in medicine
VICO	<b>Cultural values</b> in information and communication technology
VREPAR	Virtual reality environments for <b>psycho-neuro-physiological</b> assessment and rehabilitation
WISECARE	Workflow information systems for European <b>nursing</b> care
HEAL SA	Joint <b>conference</b> on telematics for health European Union - South Africa 1996
TELECAT	<b>Symposium</b> and exhibition on implementation of information systems in health care

**2. TELEMEDICINE PROJECTS IN GERMANY:**

<b>Name</b>	<b>Participants</b>	<b>Name</b>	<b>Participants</b>
Apotheken-Pilotversuch	Neuwied	MEDKOM	Telekom
ARUBA	DeTe Berkom	MEDWIS	medis Institut
Bayern Online	Bayerische Staatsregierung	METNET	
BERMED	DeTe Berkom	MULTIMED	Tumorzentrum Hannover
CEREC	Siemens	Multimedia Gelsenkirchen	RWE
DOXX	be	NOAh	Uni Regensburg
Health Online Service	Burda	PADKOM	DeTe Berkom
HERMES	DLR Köln	RADKOM	DeTe Berkom
HISTKOM	DeTe Berkom	RATEMA	DeTe Berkom
Infocity NRW	Vebeikom	REGKOM	Deutsche Telekom
KAMEDIN	Telekom	RTB-Bayern	DFN, Kliniken rechts der Isar
KISMET	FZ Karlsruhe, Uni Tübingen	SICONET	DeTe Berkom
igitales Radiologiesystem Krefeld	KH Krefeld	SPIRIT	DeTe Berkom
MEDAP	DeTe Berkom, TU Berlin	TECN	DeTe Berkom
MEDICAL NETWORK		TELEMED	DeTe Berkom
MEDICUS-2	DKFZ Heidelberg u.a.	VIVIMED	DeTe Berkom, Art & Corr
MEDICON	DeTe Berkom		

Further international program descriptions can be downloaded at the TIE homepage:  
<http://tie.telemed.org/links/international.as>; „Other Internet Resources for Telemedicine -  
 International Links“.

### 3. EXAMPLES OF TELEPATHOLOGY SUPPLIERS:

Source: Perednia, 1995/(3); O'Brien, 1998, p. 152.

#### STATIC IMAGING SYSTEMS:

- Optel Inc.'s Telemedicine and Telepathology (Optel Communications, Syosset, NY)
- Pathmaker, a multimedia, Internetbased telepathology system (developed by Stephen Erde, M.D., Cornell University Medical Center, available free on the Internet)
- AutoCyte's Image Manager System (image capture and file management system, specially designed for pathology and cytology laboratories; images are archived in a relational database)
- Roche Image Manager (Roche Image Analysis Systems, Inc., Elon College, North Carolina, U.S.A.) [Galvez, 1998, p. 664; Hancock, 1996, pp. 91 ff.; Wray, 1995, p. 271 ff.].
- MECOM system (Dept. of Pathology, Teaching Hospital Aachen, Technical University of Aachen, Pauvelsstr. 30, Aachen, Germany)
- DISKUS (developed by Hilgers C., Königswinter, Germany, <http://www.hilgers.com>)
- Thomas Arnold, Roche Image Analysis, Elon College, NC, oral communication,
- John Gerbauer, Sony Medical Division, Montvale, NJ, oral communication
- TelMed - Discovery Medical Systems, Overland Park, KS, USA [Becker, 1993, p. 909]
- **Leica** IM 1000. A modular imaging management system for small as well as for huge organizations. IM 1000 is mostly used in combination with the imaging capturing system DC 100 or DC 200 [Anonymous, 2000/(2), p. 39].

#### DYNAMIC AND HYBRID IMAGING SYSTEMS:

- **Corabi** International Telemetrics, Inc., Alexandria, Virginia, USA
- 'Lucia D' von **Nikon**. A modular imaging management system with features for live imaging transfer as well as for static imaging handling [Anonymous, 2000/(1), p. 38].
- Path Maker, designed by the Cornell University and based on the video-teleconferencing program **CUSeeMe** (Cornell University and White Pine, Nashua, NH, USA) [Azumi, 1996, p. 451].
- Other telepathology programs are based on the video conference systems: **InPerson** (Silicon Graphics, Mountain View, CA, USA), or **NetMeeting** (Microsoft, Redmond, WA, USA).

## APPENDIX IV

### ARMED FORCES INSTITUTE OF PATHOLOGY - DIAGNOSTIC FEE SCHEDULE

Source: [http://www.afip.org/consult/Standard\\_C...e\\_Schedule/diagnostic\\_fee\\_schedule.http](http://www.afip.org/consult/Standard_C...e_Schedule/diagnostic_fee_schedule.http)

		Advance payment/Retainer	Invoice charge
<b>General:</b>	Basic diagnostic charge made on customers slides (no special studies)	\$ 100	\$ 120
<b>Special studies:</b>	Lab recuts (H&E)	25	25
	Immunohistochemistry	100	150
	Histochemistry	100	150
	Electron microscopy	250	400
	Wet tissue processing	150	150
	Molecular diagnosis	200	300
<b>Bone:</b>	Bone & joint evaluation	150	150
	Metabolic bone evaluation (qualitative & quantitative)	350	450
<b>Cardiovascular:</b>	Endomyocardial biopsy electron microscopy only	250	300
	Endomyocardial biopsy evaluation including electron microscopy	350	400
	Endomyocardial biopsy evaluation with light microscopy only & shy; tissue evaluation only	150	200
	Temporal artery biopsy evaluation with blocks	200	200
	Congenital & adult heart evaluation & shy; gross and light microscopy	400	450
	Slides only	250	300
<b>Cytology:</b>	Pap smears	50	50
	Non-gynecologic cytopathology without immunohistochemistry	100	100
	Flow cytometry & shy; breast, bladder, and placental specimens	100	100
<b>Environmental Pathology:</b>	Muscle enzyme AMP deaminase/creatine kinase/adenylate kinase & shy; frozen muscle	150	200
	Myo-AMP deaminase gene: assay for the major deficiency mutation on whole blood	200	250
<b>Deficiencies:</b>	Carnitine palmityl & Acetyl Transferases & shy; with enzyme assay only	150	200
	Isozyme of AMP deaminase by Ab & shy; with enzyme assay only	300	350
	Ammonia & Lactate levels & shy; serum or plasma & shy; fresh frozen	100	150
<b>Blood Enzyme:</b>	Erythrocyte Lactate Transporter Assay & shy; fresh blood	250	300
	Deficiencies Hypoxanthine/inosine/Adenosine & shy; serum/plasma & shy; fresh/frozen	100	150
<b>Metal Analysis: (serum / tissue)</b>	Group 1: charge/metal Ag, Al, Ca, Cu, Fe, K, Mg, Mn	100	125
	Group 2: charge/metal Cd, Co, Cr, Li, Ni, Pb, V, Zn	150	175
	Group 3: charge/metal As, Hg, Se, Sn, Ti	250	275
	Electron Microscopy	100	100
	Infrared microspectrophotometry	100	100

		Advance payment/Retainer	Invoice charge
<b>Miscellaneous:</b>	Ischemic forearm Exercise Test (NH3 & Lactate)	350	400
	IR microscopic evaluation of foreign material in tissue	100	125
	Laser Raman microscopic evaluation of foreign material in tissue	150	175
	Quantitative iron or copper by atomic absorption spectroscopy	100	100
	Assay of PCB's or organophosphates or organo-Cl or PAH's (in blood, serum, plasma, urine or tissue)	250	275
<b>Dermatopath:</b>	Basic diagnostic charge for one specimen	100	100
	Each additional specimen	25	25
	Gyn & Breast: ER & Professor on consult cases only	110	110
<b>Hematopath:</b>	Diagnosis made without immunophenotyping	100	120
	Diagnosis with lymphohoreticular phenotyping	200	250
<b>Infectious Diagnosis:</b>	Infectious diagnosis requiring block or tissue submission for special stains	175	200
	Infectious diagnosis requiring immunohistochemistry	200	250
	Infectious diagnosis requiring electron microscopy	300	350
	Helicobacter pylori culture & shy; fresh gastric biopsy	150	200
<b>Kidney/Nephro- pathology:</b>	Kidney biopsy light microscopy	100	120
	Electron microscopy	300	300
	Immunofluorescent microscopy	180	180
	Kidney biopsy complete	500	600
	Medical Complete anthropological examination of skeletal remains	400	400
<b>Medical Examiner:</b>	Anthropological examination of non-legal, historic remains	200	200
	Review of medicolegal case	500	500
	Facial reconstruction	500	500
<b>Mutagen Path:</b>	Unscheduled DNA Synthesis	1950	1950
	RNA Synthesis Inhibition	1950	1950
	UV Survival curve	950	950
<b>Neuropath:</b>	Muscle biopsy evaluation including histochemistry	275	350
	Nerve biopsy evaluation, paraffin and plastic sections	175	250
	Electron microscopy for nerve or other neuropathologic specimens	350	400
	Autopsy brain & shy; gross and microscopic	400	500
	Slides only	150	200
	Blocks only	250	300
	Nerve biopsy teases fiber preparation	200	250
<b>Ophthalmic:</b>	Eye & shy; whole specimen	150	200
<b>Pediatric path:</b>	Complete fetal autopsy with placental examination (less than 20 weeks or 500 gms)	200	300
	Fetal autopsy (slides only)	175	250
<b>Pulmonary:</b>	Mesothelioma evaluation (without electron microscopy)	200	250
<b>Soft Tissue:</b>	Soft tissue evaluation including immunohistochemistry	200	250

# APPENDIX V – QUESTIONNAIRES TO USERS AND NON-USERS

## Users' Questionnaire for the Analysis of the Factors of Success of Telepathology

Telepathology is a field of telemedicine and has been defined as the practice of pathology by visualizing an image from a distant location on a video monitor rather than viewing a specimen directly through a microscope. Telepathology can be used for primary diagnosis, consultation, quality assurance, proficiency testing, distance learning or even for staff meetings.

Def.: The specialized telepathology expert will be called **consultant**; the beneficiary of telepathology services is called **client**.

ADDRESS AND PERSONAL DATA (these data are only used internally or for questions - anonymity is guaranteed)	
Name, surname	
Institution name	
Institution address	
e-mail and www-address	

<b>1</b>	<b>General questions</b>																																			
1.1	<p><b>Your institution is a</b> (Please, put a cross where appropriate):</p> <input type="checkbox"/> medical center / university hospital <input type="checkbox"/> smaller clinic <input type="checkbox"/> doctor's office <input type="checkbox"/> other: _____																																			
1.2	<p><b>To which occupational group do you belong to?</b> (Please, put a cross where appropriate)</p> <input type="checkbox"/> general pathologist <input type="checkbox"/> specialized pathologist <input type="checkbox"/> reference pathologist <input type="checkbox"/> physician, but no pathologist <input type="checkbox"/> medical staff (e.g. laboratory or medical technician) <input type="checkbox"/> computer technician, technical expert <input type="checkbox"/> other - which? _____																																			
1.3	<p><b>In which pathological area is your main emphasis?</b> (Please, check all appropriate boxes)</p> <input type="checkbox"/> macroscopy <input type="checkbox"/> histology <input type="checkbox"/> cytology <input type="checkbox"/> other: _____																																			
1.4	<p><b>Please give your sex?</b>    <input type="checkbox"/> male    <input type="checkbox"/> female</p>																																			
1.5	<p><b>To which group of age do you belong to?</b> (Please, check the appropriate box)</p> <input type="checkbox"/> < 35 years <input type="checkbox"/> 35 to 50 years <input type="checkbox"/> > 50 years																																			
1.6	<p><b>What is the extent of your computer experience?</b> (Please, check the appropriate box)</p> <input type="checkbox"/> no experience <input type="checkbox"/> average (use of standard applications) <input type="checkbox"/> very experienced (fundamental knowledge about computer technology, programming and/or networks)																																			
1.7	<p><b>What is your attitude when faced with new technologies?</b> (Please, check the appropriate box)</p> <p>receptive/curious    critical/skeptical no</p> <p><b>My attitude towards</b></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">+2</th> <th style="text-align: center;">+1</th> <th style="text-align: center;">0</th> <th style="text-align: center;">-1</th> <th style="text-align: center;">-2</th> <th style="text-align: right;">comment</th> </tr> </thead> <tbody> <tr> <td>new technologies in general is .....</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: right;"><input type="checkbox"/></td> </tr> <tr> <td>telemedicine is .....</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: right;"><input type="checkbox"/></td> </tr> <tr> <td>telepathology is .....</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: right;"><input type="checkbox"/></td> </tr> <tr> <td>Internet-services is (WWW, e-mail,..).....</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: right;"><input type="checkbox"/></td> </tr> </tbody> </table>		+2	+1	0	-1	-2	comment	new technologies in general is .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	telemedicine is .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	telepathology is .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Internet-services is (WWW, e-mail,..).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Internet-services is (WWW, e-mail,..).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																														
<b>2</b>	<b>General questions about your telepathology system</b>																																			
2.1	<ul style="list-style-type: none"> <li>• Do you already use a telepathology system?    <input type="checkbox"/> yes    <input type="checkbox"/> no    <input type="checkbox"/> no comment</li> <li>• If yes, which kind?    <input type="checkbox"/> static system (images are selected and transmitted at once to consultant)  <input type="checkbox"/> dynamic system (live-images, client and consultant are present, video-conference system)  <input type="checkbox"/> optional both - static and dynamic images are transmitted (hybrid system)</li> <li>• If dynamic, with remote robotic controlled microscope?    <input type="checkbox"/> yes    <input type="checkbox"/> no</li> </ul>																																			

2.2

- Please give your **system's name** and **supplier** (address): \_\_\_\_\_  
\_\_\_\_\_
- At which year** was telepathology **introduced** at your institution: \_\_\_\_\_
- Do you still use your system or did you stop using it?**     still in use     system stopped - at which year? \_\_\_\_\_  
**Why was it stopped?** \_\_\_\_\_  
\_\_\_\_\_

2.3 **What are the reasons and objectives for the introduction and use of your telepathology system?**  
(Please, check ALL appropriate boxes)

- Strategic decision (e.g. threat of competition, improvement of institutional reputation)
- Quality improvement (better examination, shorter procedures, increased expert know-how)
- Wish of more efficiency and cost reduction (internal cost saving, economical decision)
- Internal engagement of physicians (e.g. pathology director wanted to test such a system)
- Wish of cooperation (e.g. closer cooperation with institutions, clinics and doctors of the region)
- Pressure of cooperation (e.g. medical association - to meet the demands of a partner clinic)
- To avoid having patients transferred or treated at other clinic
- Wish to increase number of examinations (more utilization of equipment and specialty know-how)
- Participation in a research project
- Other reasons and/or short description of introduction: (please describe) \_\_\_\_\_  
\_\_\_\_\_

2.4 **Please, classify the significance of different telepathology services?**  
(Please, mark appropriate box = 3 crosses per line)

column 2 - question: „how big is your interest“ - it doesn't matter, whether you use this service or not, mark your judgement, please)  
Assessment: +4 = very high; 0= no interest at all, no meaning)

	<b>do you already use / offer</b>		<b>how interested are you in using it?</b>					<b>general judgement of the meaning of service in the next 5 years</b>				
	<i>yes</i>	<i>no</i>	<i>highly</i>	<i>not at all</i>				<i>highly</i>	<i>not at all</i>			
			+4	+3	+2	+1	0	+4	+3	+2	+1	0
• <b>Primary diagnosis in emergency cases</b> (e.g. catastrophes) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <b>Primary diagnosis for frozen section</b> examinations .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <b>Primary diagnosis on a routine basis</b> .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Request of colleagues opinion in uncertain cases ( <b>second look</b> ) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Specialized expert consultation in difficult cases ( <b>reference diagnosis</b> ) ..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Centrally organized ' <b>on call</b> ' services' (e.g. weekend services) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <b>Interdisciplinary cooperation</b> and communication .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• External <b>centralized pathological case archiving</b> of data and images .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Distance <b>learning</b> and online <b>education</b> .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Discussion <b>groups</b> , consideration of difficult cases, forums .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <b>Quality assurance</b> and control, proficiency testing (DNA-cytometry..) ..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <b>Information retrieval</b> in databases (e.g. Medline) or Internet (WWW) ..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <b>other:</b> (please, assess and describe them) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**3 Questions about your department and about the use of telepathology**

3.1 **What is the size of your department or institution measured by number of pathologists and examinations?**

- Number of pathologists (please mark appropriate field)     1     2     3-5     > 5     no comment
- How many of them are using your telepathology system? \_\_\_\_\_
- Please give average examinations per year:     < 20.000     20.000-50.000     > 50.000     no comment

3.2	<p><b>Are you a consultant (telepathology expert) or beneficiary (client) of telepathology?</b> (Please, check appropriate box)</p> <p><input type="checkbox"/> consultant <input type="checkbox"/> client <input type="checkbox"/> both (you offer and use telepathology services) <input type="checkbox"/> other: _____</p> <ul style="list-style-type: none"> <li>If you are a consultant - which <b>geographical areas</b> do you <b>provide</b> your telepathology services to?           <ul style="list-style-type: none"> <li><input type="checkbox"/> regional <input type="checkbox"/> national <input type="checkbox"/> international <input type="checkbox"/> other: _____</li> </ul> </li> </ul>
3.3	<p>Which <b>profession</b> does the staff on the <b>client's side</b> have? (please mark ALL appropriate fields)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> pathologist <input type="checkbox"/> surgeon <input type="checkbox"/> medical technician <input type="checkbox"/> other: _____</li> </ul>
3.4	<p><b>Integration</b> - to which systems is <b>your</b> telepathology system directly linked: (Please, <b>check ALL appropriate boxes</b>)</p> <p><input type="checkbox"/> other internal <b>pathology</b> systems <input type="checkbox"/> other internal <b>medical</b> systems <input type="checkbox"/> internal <b>administrative</b> systems</p>
3.5	<p><b>Connection:</b> Which kind of physical medium do you use to connect your computer with client/consultant?</p> <ul style="list-style-type: none"> <li><b>Client:</b> <input type="checkbox"/> analog telephone-modem <input type="checkbox"/> ISDN <input type="checkbox"/> local network <input type="checkbox"/> other: _____</li> <li><b>Consultant:</b> <input type="checkbox"/> analog telephone-modem <input type="checkbox"/> ISDN <input type="checkbox"/> local network <input type="checkbox"/> other: _____</li> </ul> <p>Comment: _____</p>
3.6	<p><b>Legal questions</b></p> <ul style="list-style-type: none"> <li>How is qualified <b>staff</b> guaranteed? <input type="checkbox"/> staff/users are personal known <input type="checkbox"/> other: _____</li> <li><b>Liability:</b> <input type="checkbox"/> client is entirely responsible <input type="checkbox"/> expert is entirely responsible <input type="checkbox"/> client + expert, each <u>for his part</u> <ul style="list-style-type: none"> <li><input type="checkbox"/> both <b>together</b> <input type="checkbox"/> other: _____</li> </ul> </li> </ul>
3.7	<p><b>Please give the approximately EXPENSES and REVENUES of your system.</b></p> <ul style="list-style-type: none"> <li>Which <b>currency</b> do you use? _____</li> <li><b>Investment - please, distinguish by client's and consultant's side</b> (approximately in total): At client's side ca.: _____ At consultant's side ca.: _____ Other : _____</li> <li>How are these <b>capital expenditures financed</b>? Financed by: <input type="checkbox"/> state/research subsidy <input type="checkbox"/> participants' budgets <input type="checkbox"/> telepathology revenues <input type="checkbox"/> other: _____</li> <li><b>Operational cost:</b> Please give the average cost per examination of a tele-case (including net-cost, staff salary, etc.): Operational costs are approx.: _____</li> <li>Are telepathology <b>services reimbursed</b>? <input type="checkbox"/> yes <input type="checkbox"/> no If yes, please give average <b>revenues per case</b> - approx.: _____</li> </ul>
3.8	<p><b>Examination Process</b></p> <p>∅ approx. <b>time</b> needed per case.: _____ <b>minutes per case</b></p> <p>∅ approx. <b>images transferred</b> per case.: _____ <b>images per case</b></p>
3.9	<p><b>System's Reliability</b></p> <ul style="list-style-type: none"> <li>Please give approx. system interruptions per sessions: ca. _____</li> <li>Reasons for interruption <input type="checkbox"/> network instability <input type="checkbox"/> program errors <input type="checkbox"/> other - please name them: _____</li> </ul>
3.10	<p><b>Questions about cooperation partners (hospitals, doctors), with whom do you exchange telepathological services</b></p> <ul style="list-style-type: none"> <li><b>Please give your telepathology partner distinguished by distance</b> (total amount of partners per distance group) :       <ul style="list-style-type: none"> <li>- number of participating <b>telepathology clients</b>: &lt;30 km . _____ 30 - 100 km: _____ &gt;100 km: _____</li> <li>- number of participating <b>telepathology consultants</b>: &lt;30 km . _____ 30 - 100 km: _____ &gt;100 km: _____</li> </ul> </li> <li><b>Judgement of cooperation:</b> +4 +3 +2 +1 0       <ul style="list-style-type: none"> <li>- What about is your interest in cooperation's? <i>great interest</i> <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> <i>no interest</i></li> <li>- How do you assess the importance of cooperation in the future? <i>very important</i> <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> <i>not important</i></li> </ul> </li> <li><b>At which distance (in km and minutes) do you regard telepathology as more efficient than specimen transport?</b> Your estimation: a) at approx.: _____ km distance <input type="checkbox"/> don't know b) at approx.: _____ minutes transportation time</li> </ul>

3.11 **Number of telepathology examinations at your department / institution**

- Compared to the total of examinations at your department, what is the part of telepathology? \_\_\_\_\_ %
- Please, give approximately number of telepathological examinations in your department in 1998 and 1999

	<i>number of telepatho-logical examinations</i>		<i>no examination of this kind</i>
	<i>1998</i>	<i>1999</i>	
• intraoperative frozen sections (microscopical) .....	_____	_____	<input type="checkbox"/>
• cytological smear (microscopical) .....	_____	_____	<input type="checkbox"/>
• surgical specimens (microscopical) .....	_____	_____	<input type="checkbox"/>
• biopsy specimens (microscopical) .....	_____	_____	<input type="checkbox"/>
• quantitative evaluation (DNA-Cytometry, Histometry, PCR, FISH, CEH).....	_____	_____	<input type="checkbox"/>
• expert consultations (general) .....	_____	_____	<input type="checkbox"/>
• other: .....	_____	_____	<input type="checkbox"/>

which one? \_\_\_\_\_

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3.12 • **In which areas do you use telepathology?**  
 (Please, select and **rate the frequency of use** on a scale from blank box=never, 1=rare, 2=often, 3=always)

<input type="checkbox"/> Cytopathology	<input type="checkbox"/> Electromicroscopy	<input type="checkbox"/> Immunopathology	<input type="checkbox"/> Ophthalmology
<input type="checkbox"/> Cytogenetics	<input type="checkbox"/> Forensic Pathology	<input type="checkbox"/> Microbiology	<input type="checkbox"/> Parasitology
<input type="checkbox"/> Dermatology	<input type="checkbox"/> Hematology	<input type="checkbox"/> Molecular Pathology	<input type="checkbox"/> Toxicology
<input type="checkbox"/> DNA-Analysis	<input type="checkbox"/> Histopathology	<input type="checkbox"/> other? _____	

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3.13 • **Which organs are examined by telepathology?**  
 (Please, select and **rate the frequency of use** on a scale from blank box=never, 1=rare, 2=often, 3=always)

<input type="checkbox"/> Bladder	<input type="checkbox"/> Gastrointestinal	<input type="checkbox"/> Larynx, pharynx	<input type="checkbox"/> Thyroid gland
<input type="checkbox"/> Bones	<input type="checkbox"/> Gynecological; ovary, uterus	<input type="checkbox"/> Lymph node	<input type="checkbox"/> Salivary gland
<input type="checkbox"/> Bone marrow	<input type="checkbox"/> Head, neck	<input type="checkbox"/> Lung	<input type="checkbox"/> Skin
<input type="checkbox"/> Breast, mammary gland	<input type="checkbox"/> Heart	<input type="checkbox"/> Nervous system	<input type="checkbox"/> Soft tissue
<input type="checkbox"/> Blood	<input type="checkbox"/> Kidney	<input type="checkbox"/> Penis/testes/cord	<input type="checkbox"/> Spleen
<input type="checkbox"/> Eyes	<input type="checkbox"/> Liver and gallbladder	<input type="checkbox"/> Prostate	<input type="checkbox"/> Suprarenal gland
<input type="checkbox"/> Endocrine	<input type="checkbox"/> other: _____		

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**4 Judgement of the following factors for the success of telepathology systems**

4.1 **Considering the experience with your system, how do you judge the following criteria for telepathology success?**  
 (Please mark appropriate box - by doing so, **take the rate** of influence between the different points **into account**;  
 Judgement: +4 = „very important, huge influence“, 0 = „no influence at all“)

	<i>huge influence</i>	<i>no influence</i>	<i>no remark</i>
<b><u>Influence of Surrounding, Quality and Cost Efficiency</u></b>			
• <b><u>How important is support and the acceptance for the success of telepathology?</u></b>	+4	+3	+2 +1 0
- <b>Availability of advisory centers</b> which help choosing the equipment for your specific need .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- <b>External acceptance</b> (insurance companies, HMO, health care politicians and providers..) ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Internal acceptance of <b>top management</b> (clinic director, medical director..).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Internal acceptance of <b>physicians</b> and medical staff (users) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Acceptance of <b>patients</b> .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <b><u>What influence do political or cultural factors have on the success of telepathology?</u></b>	+4	+3	+2 +1 0
- Influence of <b>health care politics</b> and <b>health care laws</b> .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Internal <b>institution politics</b> (e.g. integration of telepathology in institutions objectives).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Influence of <b>geographical factors</b> (health care provider density, population density).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Influence of <b>cultural factors</b> (historical structures and business character, ethic...) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• <b><u>Which influence does the clarification of legal questions have on the success of TP?</u></b>	+4	+3	+2 +1 0
- Explicitness of <b>legal liability regulations</b> .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- <b>Qualification</b> (licensure regulations) of all people involved has to be guaranteed.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Weight of explicit regulations about <b>reimbursement</b> (per contract or law) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Explicit regulations about data exchange and <b>data protection</b> have to be set up.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- **How do you judge the influence of organizational factors for the success of telepathology?** +4 +3 +2 +1 0
  - Influence of a well structured **project design + management** by system implementation.....      .....
  - **Coordination of system usage** (no waiting time, who is communicating at what time?) .....      .....
- **How much influence does the quality of the examination and diagnosis have?** +4 +3 +2 +1 0
  - Accuracy of **macro** examination (correct gross examination, correct cut of sample field).....      .....
  - Guarantee of high quality **sample preparation + precise field selection** (qualified sender) ...      .....
  - Accuracy of **micro** examination (identical to direct microscope examination).....      .....
- **Judgement of cost-benefit factors and of economical efficiency?** +4 +3 +2 +1 0
  - Influence of **investment** and subsequent **cost** on the success of telepathology projects .....      .....
  - **Cost effectiveness** of telepathology services, economic efficiency .....      .....
  - Improvement of **health care efficiency** (faster diagnoses, shorter treatment procedures....).....      .....

**Judgement of Equipment’s and System’s Components on Telepathology Success**

- **Which influence does the equipment quality have on the success of TP projects?** +4 +3 +2 +1 0
  - Judgement of the influence for the **equipment** used (microscope, camera, video..).....      .....
  - Influence of the **computer equipment** (PC performance, monitor size and quality, etc.).....      .....
  - Influence of the available **network connections** (speed, security, stability) .....      .....
- **How much influence do system’s integration aspects have on the general success of TP?** +4 +3 +2 +1 0
  - Development and use of homogeneous **technical standards** .....      .....
  - Standards - **compatible** data and image formats .....      .....
  - **Internal system integration** (links to internal administrative and medical systems) .....      .....
  - **External system integration** (automatic data input of external data in your system) .....      .....
- **What influence does the quality of the available data have on the general success of TP?** +4 +3 +2 +1 0
  - Quality of **textual data** (completeness of data, sufficient data about patient and case .....      .....
  - Quality of monitor **images** (resolution, color, contrast, sufficient for clear diagnosis?) .....      .....
  - Quality of **image handling** (orientation in image, focusing, simple objective change) .....      .....
- **How much influence does the system security and system quality have?** +4 +3 +2 +1 0
  - Influence of **system reliability** (strong crashes and total break downs = system not usable) ...      .....
  - Influence of **access control** (access to system and data).....      .....
  - **Data security** (no loss of data by exchange, protection from data misuse) .....      .....
- **What influence does the user comfort and user-friendliness of the system have?** +4 +3 +2 +1 0
  - Influence of fast **respond times** and fast image transfer on the acceptance .....      .....
  - Influence of **system stability** (short interruption), high system availability (24-hours/day) .....      .....
  - Influence of **user support** (system training, help menus, 24-hour-support-hotline) .....      .....
  - **Simplicity of system use**, clear and logical system structure .....      .....
  - Influence of **system flexibility** and of system’s ability to support the pathological workflow..      .....

**Further important factors of success for telepathology** - please list: \_\_\_\_\_  
 \_\_\_\_\_

**5 Judgement of the advantages and disadvantages of telepathology services**

- 5.1 **Where do you see the advantages of telepathology?** (please mark ALL appropriate boxes) *great none no*
- **Advantages in cost efficiency of medical treatment** +4 +3 +2 +1 0
    - More **efficiency in procedures and structures** (sharing resources, equipment ..).....      .....
    - **Cost reduction, savings** (less tissue sample transportation, less staff needed) .....      .....
    - **Additional revenues** due to telemedicine services (higher amount of cases).....      .....
    - Survival of pathology department (increase of **rate of capacity utilization**).....      .....
    - Improvement of **reputation** of pathology department .....      .....

5.2	<ul style="list-style-type: none"> <li>• <b>Advantage of quality improvement?</b> <span style="float:right">+4 +3 +2 +1 0 <i>remark</i></span></li> <li>– Improvement of <b>diagnosis quality</b> (faster diagnostic results, second opinion) .....<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> .....<input type="checkbox"/></li> <li>– Improvement of <b>patient treatment</b> process (less operations, fast and consistent therapy) ...<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> .....<input type="checkbox"/></li> <li>– <b>Same quality</b> of patient treatment, location independent .....<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> .....<input type="checkbox"/></li> <li>– Efficient <b>on-call-services</b> (24-hour-service, bridge resource gaps, holiday replacements).....<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> .....<input type="checkbox"/></li> <li>– Better <b>communication</b> between treating physicians (primary doctor and specialists).....<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> .....<input type="checkbox"/></li> <li>– Improvement of <b>research findings</b> (due to centralized data storage and analysis).....<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> .....<input type="checkbox"/></li> <li>– Improved <b>access to high quality medicine</b>, reduction of <b>doctors isolation</b>.....<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> .....<input type="checkbox"/></li> <li>– Improvement of <b>know-how standards</b> due to high quality online education, forums.....<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> .....<input type="checkbox"/></li> <li>• <b>Further important advantages</b> - please list? _____ _____</li> </ul>
5.3	<p><b>Where do you see the risks and disadvantages of telepathology ?</b> <span style="float:right"><i>high no effect no</i></span> (Please judge the degree of disadvantage; +4=high risk, 0=no risk / effect ) <span style="float:right">+4 +3 +2 +1 0 <i>remark</i></span></p> <ul style="list-style-type: none"> <li>– <b>Higher expenses</b> and unnecessary investments, rise of health-care-costs .....<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ... <input type="checkbox"/></li> <li>– <b>Accuracy of diagnoses</b> isn't guaranteed (insecure diagnostic quality). .....<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ... <input type="checkbox"/></li> <li>– <b>Overtaxing</b> of pathological experts (additional frequentation of experts).....<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ... <input type="checkbox"/></li> <li>– Inefficient <b>work routine</b> due to long waiting time by real-time syst. (consultant occupied) ..<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ... <input type="checkbox"/></li> <li>– <b>Loss of jobs</b>, shift of pathological examinations to other medical centers.....<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ... <input type="checkbox"/></li> <li>– Reduction of pathologist's <b>education</b> quality .....<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ... <input type="checkbox"/></li> <li>– Uncertainty of <b>legal questions</b>.....<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ... <input type="checkbox"/></li> <li>– Uncertainty of <b>data security</b> and data privacy questions.....<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ... <input type="checkbox"/></li> <li>– Uncertainty of <b>reimbursement</b> .....<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ... <input type="checkbox"/></li> <li>– This <b>technology is not reliable</b>, far to insecure and error prone.....<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ... <input type="checkbox"/></li> <li>– <b>Loss of information</b> due to local separation of sample treatment and diagnosis .....<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ... <input type="checkbox"/></li> </ul> <p><b>Further disadvantages</b> - please list? _____ _____</p>
<b>6</b>	<b>Final Questions</b>
6.1	<p><b>Which structure of telepathology would you recommend ?</b> (Please only mark one alternative)</p> <p><input type="checkbox"/> <b>Rejection</b> - telepathology useless, therefore it shouldn't be introduced</p> <p><input type="checkbox"/> <b>Waiting, until technology is proved and until all unsolved questions are answered (reimbursement, liability ...)</b></p> <p><input type="checkbox"/> <b>Development of concepts and introduction of solutions</b> (if you have marked this box, please specify in geographical zones and to what extent health care applications should be considered) considering the following <b>geographical zones</b>:</p> <p><input type="checkbox"/> international <input type="checkbox"/> Europe <input type="checkbox"/> USA <input type="checkbox"/> national <input type="checkbox"/> regional <input type="checkbox"/> individual / focused on specific project</p> <p>the <b>concept content</b> should take into consideration:</p> <p><input type="checkbox"/> mainly telepathology <input type="checkbox"/> all telemedical applications <input type="checkbox"/> the whole health care system</p> <p><input type="checkbox"/> <b>Other recommended strategies</b>: (please describe in short words) _____ _____</p>
6.2	<p><b>Please, write down the <u>three most essential advantages</u> of your system. What aspects of your project went well?</b></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>

6.3	<p><b>Please, write down the three most essential disadvantages of your system. Which recommendations would you give to colleagues? What should they try to avoid? What would you do differently if you were to begin a again?</b></p> <hr/> <hr/> <hr/> <hr/>																																																								
6.4	<p><b>Discussing with colleagues, who don't use telepathology, what are the arguments against it?</b> (Please make a cross at ALL appropriate boxes)</p> <p><input type="checkbox"/> <b>Costs</b> (investment is too expensive)</p> <p><input type="checkbox"/> <b>Inefficiency</b> of service (e.g. because reimbursement is not clear)</p> <p><input type="checkbox"/> <b>Fear</b> of examination errors and <b>inaccurate diagnoses</b> (e.g. because monitor image is not sufficient)</p> <p><input type="checkbox"/> Fear of incorrect <b>sample preparation and field selection of specimens</b></p> <p><input type="checkbox"/> <b>Legal uncertainty</b> (as long as there are no clear regulations, they won't use telepathology)</p> <p><input type="checkbox"/> <b>No interested partners</b> for pathological cooperation</p> <p><input type="checkbox"/> Colleagues cannot see any <b>benefits</b> for themselves</p> <p><input type="checkbox"/> <b>Traditional method</b> of examination is <b>sufficient</b></p> <p><input type="checkbox"/> Colleagues <b>don't know how to handle</b> this technology</p> <p><input type="checkbox"/> There is no market for telepathology</p> <p><input type="checkbox"/> Colleagues are so involved in <b>every-day-business</b>, that there is no time to worry about telepathology</p> <p><input type="checkbox"/> Colleagues don't have the <b>necessary equipment</b> (e.g. no PC, no software, no network access)</p> <p><input type="checkbox"/> <b>Standards are missing - the idea of far-reaching integration won't work</b></p> <p><input type="checkbox"/> <b>Technology isn't reliable</b>, (colleagues prefer to wait until technology is established - avoidance of wrong investments, unnecessary time consumption, wasted money)</p> <p><input type="checkbox"/> Other (please describe): _____</p>																																																								
6.5	<p><b>Where do you see the main sources of diagnostic accuracy errors?</b> (Please mark all appropriate boxes)</p> <p><b>pay attention to the weight of the different factors</b></p> <p>Judgement: +4 = important fact, huge influence; 0= no influence at all</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 80%;"></th> <th style="text-align: center; font-size: small;"><i>huge influence</i></th> <th style="text-align: center; font-size: small;"><i>no influence</i></th> <th style="text-align: center; font-size: small;"><i>no remark</i></th> </tr> <tr> <th></th> <th style="text-align: center; font-size: x-small;">+4 +3 +2 +1 0</th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>- low expertise (e.g. specialized know-how is not sufficient) .....</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>- insufficient diagnostic experience (e.g. due to low examination rates) .....</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>- not enough education in practicing telepathology .....</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>- not enough experience with robotic microscope and video monitor image interpretation .....</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>- Errors in the selection of the right tissue sample (sampling errors) .....</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>- Incorrect preparation or staining of tissue sample .....</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>- Inaccurate field selection .....</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>- Incorrect interpretation .....</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>- Insufficient quality of video image .....</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>- not enough images available (e.g. due to long transfer time of images) .....</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>- not enough case information available (low communication, access to data) .....</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>- psychological stress factors by ad-hoc examinations (intraoperative frozen sections) .....</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </tbody> </table> <p>• <b>Further reasons for incorrect telepathological diagnoses, comments to accuracy:</b> _____</p>		<i>huge influence</i>	<i>no influence</i>	<i>no remark</i>		+4 +3 +2 +1 0			- low expertise (e.g. specialized know-how is not sufficient) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- insufficient diagnostic experience (e.g. due to low examination rates) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- not enough education in practicing telepathology .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- not enough experience with robotic microscope and video monitor image interpretation .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- Errors in the selection of the right tissue sample (sampling errors) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- Incorrect preparation or staining of tissue sample .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- Inaccurate field selection .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- Incorrect interpretation .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- Insufficient quality of video image .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- not enough images available (e.g. due to long transfer time of images) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- not enough case information available (low communication, access to data) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- psychological stress factors by ad-hoc examinations (intraoperative frozen sections) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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6.6	<p><b>Trends and future developments</b></p> <p>• Do you think, that telepathology will become established in health care? <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> no comment</p> <p>• What trend do you recognize? Where will telepathology end up? (please describe in short words) _____</p> <hr/> <hr/>																																																								

**Thank you very much for your participation !!!**

## Non-Users: Fragebogen zur Analyse der Erfolgsfaktoren von Telepathologie. Fragen an Pathologen, die keine Telepathologie betreiben

Telepathologie ist ein Teilbereich der Telemedizin. Unter Telepathologie versteht man den Einsatz von Telekommunikationstechnologien zur Durchführung von **externen pathologischen Ferndiagnosen** (Bildbefundung am Monitor über das Netz) und zum **Austausch** und zur Sammlung von Daten, Bildern und **pathologischem Wissen auf Distanz**.

Durch Angabe Ihrer Adresse helfen Sie mir bei der Auswertung (z.B. bei Nachfragen). Aber auch eine anonyme Rücksendung ist willkommen. **Falls der Platz für eine Antwort nicht ausreicht, bitte auf Seite 5 (mit Angabe der Nummer) ausführen.**

<b>Adresse, Angaben zur Person</b>	
(Dieser Block dient für Rückfragen und für die Zusendung des Endberichtes. Die Anonymität der Untersuchung wird garantiert)	
<b>Name, Vorname</b>	
<b>Straße, PLZ, Ort</b>	
<b>e-Mail Adresse</b>	
<b>Datum:</b>	

<b>1</b>	<b>Allgemeine Fragen</b>																												
<b>1.1</b>	<b>Ihr Arbeitsplatz befindet sich an einer:</b> <input type="checkbox"/> Universitätsklinik / medizinisches Zentrum <input type="checkbox"/> Klinik (jedoch nicht Uni) <input type="checkbox"/> Praxis oder Outsourcing-Klinikeinheit <input type="checkbox"/> andere - welche? _____																												
<b>1.2</b>	<b>Zu welcher Berufsgruppe gehören Sie?</b> (Bitte Zutreffendes ankreuzen) <input type="checkbox"/> Facharzt für Pathologie <input type="checkbox"/> Spezialisierter Facharzt für Pathologie <input type="checkbox"/> Referenzpathologe <input type="checkbox"/> Andere- welche? _____ <b>Seit wann arbeiten Sie als Pathologe/in (incl. Facharztausbildung)?</b> Seit ca. _____ <u>Jahren</u>																												
<b>1.3</b>	<b>In welchem Gebiet ist Ihr Arbeitsschwerpunkt?</b> (Bitte Zutreffendes ankreuzen) <input type="checkbox"/> Makroskopie <input type="checkbox"/> Histologie <input type="checkbox"/> Zytologie <input type="checkbox"/> andere - welche? _____																												
<b>1.4</b>	<b>Bitte markieren Sie Ihre Geschlechtsgruppe:</b> <input type="checkbox"/> männlich <input type="checkbox"/> weiblich																												
<b>1.5</b>	<b>Welcher Altersgruppe gehören Sie an?</b> (Bitte Zutreffendes ankreuzen) <input type="checkbox"/> < 35 Jahre <input type="checkbox"/> 35 bis 50 Jahre <input type="checkbox"/> > 50 Jahre																												
<b>1.6</b>	<b>Welche Erfahrungen haben Sie mit Computern?</b> (Bitte Zutreffendes ankreuzen) <input type="checkbox"/> keine <input type="checkbox"/> mittel (Arbeiten mit Anwendungsprogrammen) <input type="checkbox"/> groß (grundlegende EDV-Kenntnisse)																												
<b>1.7</b>	<b>Wie verhalten Sie sich gegenüber neuen Technologien?</b> (Bitte bewerten) <table style="width:100%; border:none;"> <tr> <td></td> <td style="text-align:center">aufgeschlossen</td> <td style="text-align:center">skeptisch</td> <td style="text-align:right">keine</td> </tr> <tr> <td></td> <td style="text-align:center">+2 +1 0 -1 -2</td> <td></td> <td style="text-align:right">Angaben</td> </tr> <tr> <td><b>Meine Einstellung zu</b></td> <td></td> <td></td> <td></td> </tr> <tr> <td>neuen Technologien generell ist.....</td> <td style="text-align:center">□ □ □ □ □</td> <td></td> <td style="text-align:right">□</td> </tr> <tr> <td>Telemedizin allgemein ist.....</td> <td style="text-align:center">□ □ □ □ □</td> <td></td> <td style="text-align:right">□</td> </tr> <tr> <td>Telepathologie ist.....</td> <td style="text-align:center">□ □ □ □ □</td> <td></td> <td style="text-align:right">□</td> </tr> <tr> <td>Internetdiensten ist (WWW, e-mail,..).....</td> <td style="text-align:center">□ □ □ □ □</td> <td></td> <td style="text-align:right">□</td> </tr> </table>		aufgeschlossen	skeptisch	keine		+2 +1 0 -1 -2		Angaben	<b>Meine Einstellung zu</b>				neuen Technologien generell ist.....	□ □ □ □ □		□	Telemedizin allgemein ist.....	□ □ □ □ □		□	Telepathologie ist.....	□ □ □ □ □		□	Internetdiensten ist (WWW, e-mail,..).....	□ □ □ □ □		□
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Internetdiensten ist (WWW, e-mail,..).....	□ □ □ □ □		□																										
<b>1.8</b>	<b>Woher kennen Sie das Schlagwort Telepathologie?</b> (Mehrfachnennung möglich) <input type="checkbox"/> Tageszeitung, Fernsehen, Medien <input type="checkbox"/> Fachzeitschriften <input type="checkbox"/> Kongresse <input type="checkbox"/> Diskussionen mit Kollegen <input type="checkbox"/> andere - welche? _____																												

<b>2</b>	<b>Fragen zu Ihrer Abteilung / Ihrem Institut</b>																																																																																																																																																																																																																
<b>2.1</b>	<b>Wie groß ist Ihre Institut, gemessen an der Zahl der Pathologie-Fachärzte bzw. Praxispartner?</b> (Zutreffendes ankreuzen) <input type="checkbox"/> 1 Facharzt <input type="checkbox"/> 2 Fachärzte <input type="checkbox"/> 3 bis 5 Fachärzte <input type="checkbox"/> > 5 Fachärzte																																																																																																																																																																																																																
<b>2.2</b>	<b>Kooperationen - Anzahl der Institutionen</b> (Klinik, Praxis,..), mit denen Sie im Bereich Pathologie zusammenarbeiten (d.h. externe Partner, für die Sie pathologische <u>Leistungen erbringen</u> oder <u>empfangen</u> ). <ul style="list-style-type: none"> <li>• <b>Anzahl Kooperationspartner unter Berücksichtigung der Distanzen:</b> (Bitte Angabe Gesamtzahl Partner je Distanzeinheit)            &lt; 30 km _____    30 - 100 km: _____    &gt; 100 km: _____</li> <li>• <b>Beurteilung der Bedeutung von Kooperationen:</b> <span style="float:right">+4 +3 +2 +1 0</span>            Wie groß ist Ihr Interesse an pathologischen Kooperationen/Zusammenarbeit    groß <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> kein Interesse            Einschätzung der Bedeutung von Kooperationen in Zukunft?    groß <input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/><input type="checkbox"/> keine Bedeutung</li> </ul>																																																																																																																																																																																																																
<b>2.3</b>	<b>Wie groß ist die Zahl der Untersuchungen in Ihrem Institut?</b> <ul style="list-style-type: none"> <li>• Untersuchungszahl gesamt pro Jahr ca:    <input type="checkbox"/> &lt; 20.000    <input type="checkbox"/> 20.000-50.000    <input type="checkbox"/> &gt; 50.000    <input type="checkbox"/> keine Angabe</li> <li>• davon Anteil Untersuchungen für Externe (= Ärzte außer Haus): ca. _____ % <i>sind Untersuchungen für Externe</i></li> </ul>																																																																																																																																																																																																																
<b>2.4</b>	<b>Welche technischen Voraussetzungen sind bei ihnen vorhanden?</b> <input type="checkbox"/> PCs - Anzahl: _____ <input type="checkbox"/> Workstation - Anzahl: _____ <input type="checkbox"/> Video-Kameras - Anzahl: _____ <input type="checkbox"/> PACS-Archiv <input type="checkbox"/> Möglichkeit zur Digitalisierung von Bildern - wie tun Sie das? <input type="checkbox"/> Frame Grabber <input type="checkbox"/> Digitale Kamera <input type="checkbox"/> Digitalen Scanner	<b>Welchen Netzzugang haben Sie?</b> <input type="checkbox"/> keinen Zugang <input type="checkbox"/> (analoges) Modem <input type="checkbox"/> ISDN-Anschluss <input type="checkbox"/> andere: _____																																																																																																																																																																																																															
<b>3</b>	<b>Fragen zur Telepathologie</b>																																																																																																																																																																																																																
<b>3.1</b>	<b>Beurteilung der Bedeutung verschiedener Telepathologie Leistungs- und Serviceangebote?</b> <small>(Bitte Zutreffendes ankreuzen und gewichten -&gt; 3 Kreuzchen pro Zeile; zu Spalte 2 - Frage: „wie groß ist Ihr Interesse daran“ - egal ob Sie diesen Service nutzen / anbieten oder nicht , bitte kreuzen Sie Ihre Einstellung dazu an; Bewertung: +4=sehr hoch; 0=kein Interesse/keine Bedeutung)</small> <table style="width:100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th rowspan="3"></th> <th colspan="2" style="text-align:center;"><b>Offeriere / nutze ich schon</b></th> <th colspan="5" style="text-align:center;"><b>Wie groß ist Ihr Interesse daran?</b></th> <th colspan="5" style="text-align:center;"><b>Allgemeine Einschätzung der Bedeutung in den nächsten 5 Jahren</b></th> </tr> <tr> <th colspan="2"></th> <th colspan="5" style="text-align:center;">hoch    keines</th> <th colspan="5" style="text-align:center;">hoch    keine</th> </tr> <tr> <th style="text-align:center;">Ja</th> <th style="text-align:center;">Nein</th> <th style="text-align:center;">+4</th> <th style="text-align:center;">+3</th> <th style="text-align:center;">+2</th> <th style="text-align:center;">+1</th> <th style="text-align:center;">0</th> <th style="text-align:center;">+4</th> <th style="text-align:center;">+3</th> <th style="text-align:center;">+2</th> <th style="text-align:center;">+1</th> <th style="text-align:center;">0</th> </tr> </thead> <tbody> <tr> <td>• <b>Erstdiagnose</b> - Telepathologie als <b>Ausnahme</b> z.B. bei Unwetter.....</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> </tr> <tr> <td>• <b>Erstdiagnose</b> - Telepathologie bei <b>Schnellschnitten</b> .....</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> </tr> <tr> <td>• <b>Erstdiagnose</b> - <b>regelmäßiger</b> Einsatz bis <b>Dauerrououtineinsatz</b>.....</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> </tr> <tr> <td>• <b>Zweitdiagnose</b> - Möglichkeit eines „<b>second look</b>“ per Telepathologie....</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> </tr> <tr> <td>• <b>Zweitdiagnose</b> - <b>Referenzkonsultation</b> per Telepathologie .....</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> </tr> <tr> <td>• Zentrale <b>Bereitschafts-, Hintergründdienste</b> (Urlaubsvertretung).....</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> </tr> <tr> <td>• <b>Interdisziplinäre Zusammenarbeit u. 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<b>3.2</b>	<ul style="list-style-type: none"> <li>• <b>Nutzen Sie bereits ein Telepathologiesystem?</b>    <input type="checkbox"/> ja    <input type="checkbox"/> nein    <input type="checkbox"/> keine Angabe</li> <li>• bei <b>ja</b>, welcher Art?    <input type="checkbox"/> <b>statisches</b> System (offline Bildversand = Bilder gehen an Mailbox, vergleichbar zu e-mail)                                              <input type="checkbox"/> <b>dynamisches</b> System (live-images, Sender+Consultant anwesend, vergl. Videokonferenzsystem)                                              <input type="checkbox"/> <b>optional beides möglich</b> (statisch u. dynamisch)                                              <input type="checkbox"/> <b>andere:</b> _____</li> </ul> <p>Bitte <b>Systemname</b> und <b>Herstelleradresse</b> angeben: _____</p> <p>_____</p>																																																																																																																																																																																																																

4	<b>Bedeutung verschiedener Einflußfaktoren auf den Erfolg von Telepathologieanwendungen</b>			
4.1	<b>Welche Bedeutung haben die nachstehenden Faktoren auf den erfolgreichen Einsatz von Telepathologiesystemen bzw. auf die Akzeptanz der Betroffenen.</b>			
	(Bitte achten Sie auf die Gewichtung untereinander: +4 bedeutet „sehr wichtig“, 0 für „unwichtig“)			
	<b><u>Umfeld, Qualität, Wirtschaftlichkeit</u></b>	sehr wichtig	un- wichtig	keine Angabe
	• <b><u>Wie wichtig ist die Unterstützung und Akzeptanz für den Erfolg von Telepathologie?</u></b>	+4	+3	+2
	– Qualifizierte Beratung bei der sinnvollen Auswahl der jeweiligen Systemkomponenten .....	□	□	□
	– Externe Unterstützung (Führsprache von Kostenträgern, Berufsverbänden, Politikern, etc.) ..	□	□	□
	– Interne Unterstützung vom Top-Management (Klinikdirektor, medizinische Leitung) .....	□	□	□
	– Interne Akzeptanz der Ärzte und des med. Personal (Nutzer) .....	□	□	□
	– Akzeptanz der Patienten.....	□	□	□
	• <b><u>Welche Bedeutung haben politische/kulturelle Faktoren auf den Erfolg?</u></b>	+4	+3	+2
	– Einfluss gesundheitspolitischer Rahmenbedingungen, rechtlicher Rahmen .....	□	□	□
	– Institutspolitik (z.B. Einstufung der Telepathologie als strategischer Wettbewerbsfaktor).....	□	□	□
	– Einfluss geographischer Gegebenheiten (z.B. Krankenhausdichte, Bevölkerungsdichte).....	□	□	□
	– Einfluss kultureller Bedingungen (gewachsene Struktur, historische Hintergründe, Ethik).....	□	□	□
	• <b><u>Welche Bedeutung haben organisatorische Faktoren?</u></b>	+4	+3	+2
	– Einfluss von Telepathologie-Projektorganisation / Projekt-Management auf Erfolg.....	□	□	□
	– System-Nutzungscoordination (Vermeidung von Warte-/Leerzeiten = wer/wann/mit wem)....	□	□	□
	• <b><u>Welche Bedeutung hat die Klärung spezieller rechtlicher Fragen?</u></b>	+4	+3	+2
	– Eindeutige Klärung von Haftungsfragen .....	□	□	□
	– Qualifikation der Akteure muß gewährleistet sein .....	□	□	□
	– Eindeutige Klärung der Leitsungsabrechnung (Verträge, Gesetze).....	□	□	□
	– Eindeutige Klärung des Datenschutzes und Datenaustausches (Art + Umfang der Daten).....	□	□	□
	• <b><u>Welchen Einfluss hat die Qualität der Untersuchung für den Erfolg von Telepathologie?</u></b>	+4	+3	+2
	– Eindeutige Makro-Untersuchung (eindeutige Grob-Befundung, richtige Schnittausswahl) .....	□	□	□
	– Exakte Proben-Präparierung u. Feldauswahl (auch bei Ausführen durch Nicht-Pathologen) ...	□	□	□
	– Eindeutige Mikro-Befundung (Befund identisch zur direkten Mikroskopuntersuchung) .....	□	□	□
	• <b><u>Welche Bedeutung hat die Wirtschaftlichkeit und Effizienz auf den Erfolg?</u></b>	+4	+3	+2
	– Bedeutung der Höhe der Investitions- und Folgekosten.....	□	□	□
	– Kostendeckung bei den erbrachten Telepathologieleistungen, Wirtschaftlichkeit .....	□	□	□
	– Effizienzsteigerung (z.B. schnellere Befundung, effizienterer Behandlungsablauf) .....	□	□	□
	<b><u>Ausstattung und System</u></b>			
	• <b><u>Welchen Einflusses hat die Ausstattungsqualität auf den Erfolg von Telepathologie?</u></b>	+4	+3	+2
	– Bedeutung der Qualität eingesetzter Geräte (Mikroskop, Kamera, Video, etc.) .....	□	□	□
	– Bedeutung der EDV-Ausstattung (PC Leistungsstärke, Bildschirmgröße und -auflösung).....	□	□	□
	– Bedeutung der Netzwerkverbindungen (Geschwindigkeit, Stabilität).....	□	□	□
	• <b><u>Welche Bedeutung hat die Integration der Systemumgebung auf den Erfolg?</u></b>	+4	+3	+2
	– Entwicklung und Verwendung einheitlicher technischer Standards.....	□	□	□
	– Einheitliche kompatible Standards bei Datenstrukturen und Bildformaten.....	□	□	□
	– Interne Systemintegration (z.B. mit internen administrativen u. medizinischen Systemen) .....	□	□	□
	– Externe Systemintegration (einfache Datenübergabe/-übernahme externer Systeme).....	□	□	□
	• <b><u>Welche Bedeutung hat eine gute Qualität der übertragenen Daten auf den Erfolg?</u></b>	+4	+3	+2
	– gute Datenqualität (z.B. Vollständigkeit der Daten, ausreichend Daten über Patient + Fall)....	□	□	□
	– gute Bildqualität (Auflösung, Farbqualität, Kontrast, muß eindeutige Befundung erlauben) ...	□	□	□
	– gutes Bild-Handling (Zoomen, freies Bewegen im Bild, klare Orientierung im Bild) .....	□	□	□

	<ul style="list-style-type: none"> <li>• <b>Welche Bedeutung haben die Systemsicherheit und Systemqualität auf den Erfolg?</b> <span style="float: right;">+4 +3 +2 +1 0</span></li> <li>– Bedeutung der Systemsicherheit (Stromausfall, Systemausfall/Notfallkonzept) ..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– Gewährleistung der Zugangs- / Zugriffssicherheit (Passwortkontrolle) ..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– Datensicherheit (Keine Datenverluste bei Übertragung, Schutz vor Datenmissbrauch) ..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>• <b>Welche Bedeutung haben Bedienerfreundlichkeit und System-Nutzerkomfort?</b> <span style="float: right;">+4 +3 +2 +1 0</span></li> <li>– Bedeutung von Antwortzeiten und schneller Bildübertragungsgeschwindigkeit..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– Systemstabilität (Anzahl der Systemabstürze), hohe Systemverfügbarkeit (24 Std.) ..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– Gute Betreuung (z.B. Schulung, Handbücher, 24-Std.-Hotline) ..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– Einfachheit der Systemerlernung und -bedienung, klarer System- und Menü-Aufbau..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– System folgt u. unterstützt den Arbeitsablauf einer Untersuchung, hohe Systemflexibilität. .... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>• <b>Weitere wichtige Faktoren</b> - welche? _____</li> <li>• <b>Bemerkungen:</b> _____</li> </ul>		
4.2	<p><b>Wo sehen Sie die Vorteile von Telepathologie?</b> (Bitte bewerten) <span style="float: right;">hoch      keine      keine</span></p> <p style="text-align: right;">+4 +3 +2 +1 0      Angabe</p> <ul style="list-style-type: none"> <li>• <b>Vorteile bezüglich der Qualitätsverbesserung?</b></li> <li>– Verbesserung der <b>Gutachtenqualität</b> (schnelle Erstbefundung, Zweitbefundung)..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– Verbesserung der <b>Patientenbehandlung</b> (weniger OPs, schnelle+konsistenteTherapien) .... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– Einheitliche <b>Patientenversorgung</b> (selbst in abgelegenen Krankenhäusern)..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– Optimierter <b>Personaleinsatz</b> (24-Stunden-Service, verteilte Wochenenddienste) ..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– Verbesserung der <b>Kommunikation</b> zwischen behandelnden Ärzten (mit Chirurg...)..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– Verbesserung der <b>Forschung</b> (z.B. durch zentrale, flexible Auswertung von Falldaten) ..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– Erhöhung des <b>Zugangs zu hochwertiger Medizin</b>, weniger Isolation von Ärzten..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– Erhöhung <b>Knowhow-Standard</b> durch hochwertige Online-<b>Weiterbildungen</b>, Foren ..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>• <b>Vorteile bezüglich Wirtschaftlichkeit und Effizienz?</b> <span style="float: right;">+4 +3 +2 +1 0</span></li> <li>– Effizientere <b>Arbeitsabläufe und Strukturen</b>, effizienter Ressourceneinsatz..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– <b>Kostenreduktion, Einsparungen</b> (weniger Proben Transporte, Personalreduktion)..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– <b>Zusatzeinnahmen</b> durch telepathologische Leistungen (<b>erweitertes Leistungsangebot</b>) .... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– <b>Sicherung des Fortbestandes</b> der pathologischen Abteilung (<b>Auslastungssteigerung</b>) ..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– <b>Imageerhöhung</b> nach außen ..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>• <b>Weitere wichtige Vorteile/Stärken von Telepathologie</b> - welche? _____</li> </ul>		
4.3	<p><b>Wo sehen Sie die Gefahr/Nachteile der Telepathologie ?</b> <span style="float: right;">hoch      keine      keine</span></p> <p>(Bitte bewerten, wie groß Sie die Gefahr einschätzen) <span style="float: right;">+4 +3 +2 +1 0      Angabe</span></p> <ul style="list-style-type: none"> <li>– <b>Kostensteigerung</b> und unnötige Investitionen, Verteuerung des Gesundheitswesens ..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– Abnahme der <b>Gutachtenqualität</b> (z.B. durch Qualitätsverlust bei den Bildern) ..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– Zeitliche <b>Überbelastung</b> der Spezialisten ..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– Gefahr von <b>großen Leer-/Wartezeiten</b> bei ‘real-time Lösung’ - stört Arbeitsablauf ..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– Verlust von <b>Arbeitsplätzen, Abwanderung</b> der Befundung in andere Zentren ..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– Abnahme der <b>Weiterbildungsqualität</b>..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– Ungeklärte <b>Haftungsfragen</b> bei Befundung..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– Ungeklärte <b>Datensicherheit</b> und Datenschutz..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– Ungeklärte <b>Abrechnung; unwirtschaftlich - Einnahmen decken hohe Kosten nicht</b> ..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– <b>Technologie</b> ist noch <b>nicht erprobt</b>, viel zu unsicher und <b>fehleranfällig</b> ..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>– <b>Informationsverlust</b> durch räumliche Trennung von Untersuchung und Befundung ..... <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ..... <input type="checkbox"/></li> <li>• <b>Weitere Nachteile/Gefahren/Schwächen</b> - welche? _____</li> </ul>		

5	<b>Zukunftsprognosen</b>
5.1	<p><b>Welche Einführungsstrategie für Telepathologie würden Sie für sinnvoll erachten?</b> (Bitte auswählen)</p> <p><input type="checkbox"/> <b>Ablehnen von Telepathologie</b></p> <p><input type="checkbox"/> <b>Vorerst warten</b> bis Technologie weiter erprobt und Umfeld geklärt (Datenschutzes, Haftung, Finanzierung, etc.)</p> <p><input type="checkbox"/> <b>Entwicklung von Konzepten und Einführen von Lösungen</b>        (bitte diese Strategie genauer spezifizieren, z.B. Telepathologie sollte bei uns a) projektbezogen und b) nur für Pathologie konzipiert werden - oder ein Konzept müsste dringend a) europaweit konzipiert werden und b) das gesamte Gesundheitswesen einbeziehen.  <u>auf folgender geographischer Ebene:</u>  <input type="checkbox"/> international <input type="checkbox"/> europaweit <input type="checkbox"/> USA <input type="checkbox"/> national <input type="checkbox"/> regional (Bundesland) <input type="checkbox"/> individuell/projektbezogen  <u>inhaltlich soll dieses Konzept sich konzentrieren auf:</u>  <input type="checkbox"/> schwerpunktmäßig Telepathologie <input type="checkbox"/> alle Telemedizinanwendungen <input type="checkbox"/> das gesamte Gesundheitswesen</p> <p><input type="checkbox"/> <b>Sonstiges Vorgehen:</b> (bitte beschreiben): _____        _____        _____</p> <p><input type="checkbox"/> keine Angabe</p>
5.2	<p><b>Welches sind Ihre Gründe der Nicht-Nutzung von Telepathologie?</b> (Mehrfachnennung möglich)</p> <p><input type="checkbox"/> <b>Kosten</b> (Investition zu teuer)</p> <p><input type="checkbox"/> <b>Unwirtschaftlichkeit</b> (da z.B. Abrechnung nicht geklärt, unrentabel)</p> <p><input type="checkbox"/> Befürchtung, daß <b>Befundungsqualität schlechter</b> wird (z.B. weil Bild nicht so gut ist wie direkt am Mikroskop)</p> <p><input type="checkbox"/> <b>Präparieren und Feldselektion</b> bei Telepathologie <b>viel zu unsicher?</b></p> <p><input type="checkbox"/> <b>Rechtliche Unsicherheit</b> (solange nicht geklärt, kein Interesse)</p> <p><input type="checkbox"/> Potentielle <b>Kooperationspartner / Expertenrunde fehlen</b></p> <p><input type="checkbox"/> Erkenne noch <b>keinen Nutzen</b> darin für mich</p> <p><input type="checkbox"/> <b>Herkömmliche Untersuchungsweise reicht aus</b></p> <p><input type="checkbox"/> Kenne mich mit dieser <b>Technologie und dem Marktangebot</b> zu wenig aus</p> <p><input type="checkbox"/> Bin zu ausgelastet, habe <b>keine Zeit</b> mich um die Einführung dieser neuen Technologie zu kümmern</p> <p><input type="checkbox"/> Fehlende oder mangelhafte <b>Ausstattung</b> (z.B. keine PCs, ISDN-Anschluß, Software)</p> <p><input type="checkbox"/> Fehlende <b>Standards (später evtl. Probleme bei Kompatibilität)</b></p> <p><input type="checkbox"/> Technologie <b>zu unsicher</b>, (warte lieber bis sich diese Technologie etabliert hat - vermeide dadurch <b>Fehlinvestition</b> - spare Zeit und Geld)</p> <p><input type="checkbox"/> Sonstige (bitte angeben): _____        _____        _____</p>
5.3	<p><b>Trend - Zukunftsaussichten</b></p> <p>• Wird sich <b>Telepathologie durchsetzen?</b> <input type="checkbox"/> Ja <input type="checkbox"/> Nein <input type="checkbox"/> keine Angaben</p> <p>• Wohin geht der <b>Trend</b> (bitte kurz erläutern)? _____        _____        _____</p>

**Ergänzende Erläuterungen:**


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**Vielen Dank für Ihre Mitarbeit !!!**

# APPENDIX VI

## ACCURACY RESULTS

Diagnostic accuracy is an important topic for telepathology research. Various diagnostic performance and validation studies for telepathology were already executed to identify reasons for diagnostic errors. Diagnostic accuracy rates were investigated, and individual performance parameters such as individual level of certainty were examined.

As a guiding value accuracy for pathology should be > 98% for clinically important diagnoses [Almagro, 1996, p, 472]. The value of malignancy by conventional frozen section is approximately at 92 % [Steffen, 1997/(2), p. 25]. The overall objective is, that with telepathology these accuracy values should be achieved, too. Several studies have already proved that telepathology can provide routine diagnostic pathology services with a diagnostic accuracy almost comparable with that of conventional light microscopy [Almagro, 1998, p. 1161].

Doing so, studies have indicated that diagnosis with static image is slightly less reliable than live microscopy [Weinberg, 1996, p. 833]. In the literature telepathology systems have shown accuracy rates ranging from 68,8 to 95,0 % for frozen tissue sections and accuracy ranging from 86,0% to 96,4 % at permanent sections [Callas, 1997, p. 816]. McLaughlin mentioned an accuracy rate for static systems between 80-88 % [McLaughlin, 1998, pp. 12]. Results of accuracy studies are summarized in the following schedules.

The comparison of accuracy results is difficult, since differences in diagnostic error rates among studies are often related to specific aspects of the experimental design, equipment specifications and system configurations, specimen types, case mix, and the levels of expertise of the telepathologists rendering the diagnoses. The same it is with session time. Some studies just look at the examination time, other studies add image transfer time or preparation time. That is why the data in the following schedule can only be seen as average data.

### INFORMATION ABOUT THE FOLLOWING SCHEDULE:

If the year of the test was not published, it had been reckoned.

4th column: S = static system; D = dynamic system; DLM = direct light microscope; SO = second opinion contact;

6th-9th column: Errors are distinguished by clinically significant errors, those that would have resulted in a change in clinical follow-up or treatment, and clinically not relevant errors;

6th, 8th, 10th column: the percentage is based on the amount of test cases, but without deferred cases;

14th column: amount of images per case in average; the numbers in the brackets give the range of images/case;

15th column: time needed per examination; the number in the brackets give the range of time/case.

Description of tests: TP = telepathology.

Schedule I															
	Place of Test	Year	static/ dynam	Amount of test cases	Accurate diagnoses		false diag. clinically <b>not</b> relev.		false - clinically relevant		not con- clusive, deferred		aver. image p. case	time p. case in min.	
					all	%	all	%	all	%	all	%			
1	Tucson/A ITN		S	144	127	<b>88,2</b>	139	<b>96,5</b>	5	<b>3,5</b>					
2	Washingt on	1993	S	50	28	<b>56,0</b>	43	<b>86,0</b>	7	<b>14,0</b>			4,5	16	
			DLM		no data available										
3	Iowa	1995	S	250	150	<b>60,0</b>	214	<b>85,6</b>	36	<b>14,4</b>					
			DLM		168	67,2	239	95,6	11	4,4					
4	Dijon	1995	S	200	177	<b>88,5</b>	not avail.		23	<b>11,5</b>					
			DLM		191	95,5	not avail.		9	4,5					
5	Boston	1995	S	200	185	<b>92,5</b>	not avail.		15	<b>7,5</b>					
			DLM		197	98,5	not avail.		2	3					
6	Tottori/Ja pan	1996	S	117	104	<b>88,9</b>	109	<b>93,2</b>	8	<b>6,8</b>			6,2	13 (2-42)	
			DLM		no data available										
7	Vermont	1996	S	285	260	<b>91,2</b>	275	<b>96,5</b>	10	<b>3,5</b>					
			DLM		276	96,8	280	98,2	5	1,8					
8	Tucson	1997	S	150	130	<b>86,7</b>	143	<b>95,4</b>	7	<b>4,6</b>					
			DLM		131	87,3	143	95,4	7	4,6					
9	Tucson		S	200 (191)	155	<b>81,2</b>	181	<b>94,8</b>	10	<b>5,2</b>	9	4,5	5,38		
			DLM		no data available										
10	Milwauke e	1996	D	200 (195)	190	<b>97,4</b>	194	<b>99,5</b>	1	<b>0,5</b>	5	2,5	2,73 (1-18)	case: 12,1 slide: 4,43	
			DLM	200	197	98,5	200	100	0	0					
11	Milwauke e	1997	D	200 (197)	192	<b>97,5</b>	194	<b>98,5</b>	3	<b>1,5</b>	3	1,5	2,3 (1-13)	case: 8,9 slide: 3,78 (2,8 - 4,7)	
			DLM	200	195	97,5	198	99,0	2	1	0				
12	Birmingh am	1996	D	192 (165)	155	<b>93,9</b>	159	<b>96,4</b>	6	<b>3,6</b>	27	14,0			
			DLM		no data available										
13	Tokyo/Ja pan	1992	D	158	143	<b>90,5</b>	151	<b>95,7</b>	7	<b>4,4</b>	0				
			DLM		no data available										
14	Tucson - AINT	1994	S	150 (142)	not avail.		132	<b>93,0</b>	10	7	8	5,3	13 or less	15 (5 to 30)	
			SO	2nd opinion was requested in 44 % / 66 cases											
15	Tucson - AINT	1995	S	171 (144)	127	<b>88,2</b>	139	<b>96,5</b>	5	<b>3,5</b>	27	15,8	4(1-40)		
			SO	2nd option was requested in 23,6 % / 34 cases											
16	France	1995	S	100	98	<b>98</b>	not avail.		2	<b>2</b>					
			SO	2nd opinion was possible in 98 %											
17	Trento	1996	S	58	50	<b>86</b>	not avail.		8	<b>14</b>			6(2-11)	25 min	
			SO	not available											

No.	Description of the Executed Tests of Schedule I
1	Source: [Halliday, 1997, pp. 17-21]. Test design: Mix of cases; number of images per case ranged from 1 to 40 (median of 4); in 98 % of the cases 13 or fewer images were transmitted; Result: 27 cases were deferred by the telepathologist; for 13 of these 27 tissue blocks could be obtained and immunohistochemistry studies were performed; for 14 of them the telepathologist claimed the original glass slides for examination by conventional light microscopy.

No.	Description of the Executed Tests of Schedule I
2	Source: [Becker, 1993, pp. 909 ff.]. Test design: use of the static imaging system <b>TelMed</b> , at Walter Reed Army Medical Center; 52 surgical frozen section cases were examined; the referring pathologist selected appropriate sample fields.
3	Source: [Raab, 1996, pp. 599 ff.; Wakely, 1996, pp. 529 ff.]. Study design: 50 cytological cases (cervical-vaginal smears) examined by 5 pathologists by TP and DLM; slides were screened by an experienced cytotechnologist. Results: False negative with DLM 8, with TP 34; false positive with DLM 7, with TP 7. Problem: observers tended to undercall dysplasia; low grade squamous intraepithelial lesions were classified as benign smears and HGSTLs were classified as benign or ASCUS. Specimen measures: LGSIL (low grade squamous intraepithelial lesions); HGSIL (high grade squamous intraepithelial lesions); ASCUS (atypical squamous cells of undetermined significance); AGUS (atypical glandular cells of undetermined significance) [measurement see Raab, 1996, p. 599].
4	Source: [Allaert, 1996, pp. 27 ff.; Allaert, 1995/2, p. 596 ff.]. Test design: 4 pathologists took part; they got training sets of 50 images before the test started – this way they became familiar with the system and felt comfortable viewing still images on the monitor; 200 random cases of routine surgical pathology (160 benign, 40 malignant lesions) were examined (4 groups of 50 cases); a short clinical history was presented for each case; a single representative slide was selected from each case, this slide was magnified: 5-12 images per case, sampling at low (100x), intermediate (200x) and high (400x) magnifications; images are stored on CD-ROM and displayed at a Macintosh computer.
5	Source: [Weinberg, 1996, p. 833]. Study design: a still imaging system was used by four pathologists, a total of 200 cases of routine surgical pathology had been examined (50 cases each) by computer CD-ROM still images and DLM. Results: 87,5% concordance between TP and DLM; compared to the consensus (correct) diagnosis DLM showed an accuracy of 95,5%, whereas TP only achieved 88,5%. Accuracy errors occurred due to image selection problems and inadequate image quality, the lack of sufficient images and clinical information, as well as insufficient expertise.
6	Source: [Adachi, 1996, pp. 436-441]. Test design: Cyto-technician and surgeon selected the specimen fields of the slides; 117 frozen section tissue specimens from 100 patients; from Aug. 93 - May 1995. Results: Errors due to inadequate clinical information and wrong field selection at 8 cases. Nevertheless: „in none of the eight cases was there a change of surgical procedure through use of the telepathology service“ [Adachi, 1996, pp. 438, 440]. Average time taken for examination of each specimen was 13 min. (ranging from 2 to 42 min); Average number of transmitted images: 6,2 (ranging between 2 and 20); six cases requested more than 11 images, while 13 cases could be diagnosed from 2 images.
7	Source: [Callas, 1997, pp. 814 ff.]. Study design: 285 routine cases from archives; 6 test pathologists; samples were prepared and microscope is controlled by client pathologist; receiving video pathologist viewed the slide, requesting the slide be moved or objectives changed as needed; images are transmitted by ISDN. Results: With video 260 cases were correctly examined, 15 incorrect, but with no significant consequence; with DLM 276 cases were correct, 4 were incorrect without a significant clinical consequence. Overall certainty did not differ a lot for video versus DLM: TP uncertainty in 41 cases; DLM uncertainty in 39 cases; Most of the cases with clinically significant differences involved lesions with inherently high interobserver variation or were caused by insufficient experience using TP.
8	Source: [McLaughlin, 1998, pp. 11-17]. Study design: 50 gram-stained slides; 3 test pathologists; 20 cases were used for training before the final test. Results: Interpretation errors due to inappropriate case identification, image quality, number of fields, field selection due to operating errors and lack in handling the system.
9	Source: [Weinstein, 1997/(2), p. 22]. Study design: 2 pathologists tested archive glass slides with a static imaging system. 200 cases (2 x 100) categorized as correct, minor error, major error, deferred. Result: Accuracy rate is heavily dependent on the person capturing the images; 5,49 images were captured per case in average.

No.	Description of the Executed Tests of Schedule I																		
10	<p>Source: [Almagro, 1996, pp. 470-473; Dunn, 1996/(1), pp. 467-9; Dunn 1997/(2), pp. 1-10]. Study design: 2 testing pathologists (pathologist A: 140 cases, B: 60 cases), each with 20 years of experience in pathology.</p> <p>Results: At one case a small focus of acute ulceration in a specimen of foreskin was only recognized by DLM, not by TP - this was a matter of video image quality and the problem in field selection (3 cases were deferred because of uncertainty due to the quality of the video images); at 3 cases the diagnosis was discordant due to misinterpretation of the pathologist with both - TP and DLM. Case deferrals may be slightly more common with TP than with DLM. However, the number of deferrals and discordant diagnoses by TP could be decreased by using the static-imaging feature more frequently. The level of diagnostic accuracy appears to meet the standards set for surgical pathology - for both TP and DLM[Dunn, 1997/(2), p. 9].</p> <p>TIME: Capturing, transmitting, storing, and viewing a low-resolution static image adds approx. 2 minutes per image to the procedure. For high-resolution static images 4 to 5 minutes per usable image has to be added to the process. Turnaround time (interval between specimen receipt and report availability till documentation) for non-deferred cases (97,5 %) is averaged less than 2 days; for deferred cases 5.5 days - by DLM: 4 , but much longer for deferred cases =&gt; in summary: turnaround time is reduced by more than 50 %. Viewing times are considerably longer on a video monitor than on DLM. One factor for longer viewing time appears to be system inefficiencies inherent in operating a motorized microscope by remote control. Another factor is the relatively small size of the dynamic video-imaging window, which limits the amount of information presented [Dunn 1997/(2), pp. 8, 9]. Time per case: 8,9 minutes (time decreased by 30 % for the second half of the slides). That is that as more experience with monitor examination, as faster a pathologist becomes.</p> <p>Each pathologist had a higher level of certainty when examining the cases by conventional light microscope than by telepathology. For pathologists, the level of certainty was higher for the second group of 50 cases read by TP [Dunn, 1997/(1), p. 11].</p>																		
11	<p>Source: [Dunn, 1997/(1), pp. 8-12]. Test design: 100 cases examined twice, once by TP and later by conventional DLM. Performance is tested for the first 50 cases and the second 50 cases separately. The cases have not been seen previously by these pathologists. True diagnosis was served by a consensus of 4 pathologists. A senior laboratory technologist performed all local functions (including assembling of the test set, forwarding brief case histories, positioning glass slides for each case). Results: Incorrect diagnosis results were due to field selection, interpretation, and insufficient video image quality.</p>																		
12	<p>Source: [Winokur, 1996, p. 474; Winokur, 1998, pp. 43 ff.]. Test design: hybrid system, frozen sections and permanent sections, 3 pathologists, 64 cases = 192 Results: deferred diagnoses due to: a) difficult specimen structure (also difficult to diagnose with light microscope), b) too less experience with electronic images; from the 6 incorrect cases 5 were wrong negative, 1 wrong positive.</p>																		
13	<p>Source: [Eide, 1994, p. 885; Shimosato, 1992, pp. 414 ff.]. Test design and results:</p> <table border="1"> <thead> <tr> <th>Media</th> <th>System Type</th> <th>Time image transfer</th> <th>No. examined</th> <th>Diagnostic accuracy</th> <th>incorrect, no consequence</th> </tr> </thead> <tbody> <tr> <td>Optical fibre</td> <td>real-time live image</td> <td>15 min by one</td> <td>158 lesions (100 cases)</td> <td>90,5</td> <td>95,7</td> </tr> <tr> <td>ISDN 64 kbit/s</td> <td>still image</td> <td>telephone line; 3 min. compressed</td> <td>59 paraffin sections 16 frozen sections 38 cytological smears</td> <td>88,1 68,8 96,3</td> <td>93,2 100 100</td> </tr> </tbody> </table> <p>Sample error was due to misinterpretation because of too less case information and because pathologists were not accustomed to examine images on the monitor. Communication speed was also a problem, since optical fibers are very expensive and ISDN is often ineffective with public phone lines.</p>	Media	System Type	Time image transfer	No. examined	Diagnostic accuracy	incorrect, no consequence	Optical fibre	real-time live image	15 min by one	158 lesions (100 cases)	90,5	95,7	ISDN 64 kbit/s	still image	telephone line; 3 min. compressed	59 paraffin sections 16 frozen sections 38 cytological smears	88,1 68,8 96,3	93,2 100 100
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14	<p>Source: [Battacharyya, 1995, pp. 9-17; Weinstein, 1995, pp. 219-226]. Study design: Test of second opinion consultations; international participants; 150 surgical pathology cases; 11 pathologists participated - 3 as referring pathologist, 8 as triage pathologist subspecialty consultant; in 88 cases no sub-specialist was necessary.</p>																		

No.	Description of the Executed Tests of Schedule I																														
15	Source: [Halliday, 1997, pp. 17-21]. Results: 5 errors due to field selection, 8 due to interpretation, 4 due both = 17; 5 errors were clinically significant.																														
16	Source: [Vieillefond, 1995, pp. 246-250]. Test design: Test at the Hospital du Kremlin-Bicetre, Hospital Ambroise Paré; 50 hepatic biopsies and 50 prostatic biopsies; Result: Accuracy of diagnosis was obtained in 2 minutes with 4 images at 86 % of the cases; getting additional data such as new images led to an overall accuracy rate of 98 %.																														
17	Source: [Della Mea, 1997, pp. 239, 241]. Test design: Static imaging between University Hospital of Udine and the City Hospital of Trento: <table border="1"> <thead> <tr> <th>Pathology</th> <th>Cases</th> <th>Agreement</th> <th>Images</th> <th>Size Kb/case</th> <th>Compression</th> </tr> </thead> <tbody> <tr> <td>Gastroint.</td> <td>76</td> <td>83,0</td> <td>4,5</td> <td>248</td> <td>16,5:1</td> </tr> <tr> <td>Breast</td> <td>48</td> <td>83,7</td> <td>2,8</td> <td>98</td> <td>25,7:1</td> </tr> <tr> <td>Skin</td> <td>20</td> <td>78,9</td> <td>5,3</td> <td>295</td> <td>13,7:1</td> </tr> <tr> <td>Intra-operative</td> <td>154</td> <td>96,7</td> <td>5,0</td> <td>262</td> <td>17,2:1</td> </tr> </tbody> </table> Result: Main error depended on sampling errors and not on image quality [Della Mea, 1996, p. 25]. Time needed for acquisition was 4 (3-6) minutes, while delivery time was 19 (12-33) minutes, giving a total of 24 (16-39) minutes. Three cases had a delivery time from more than 1 hour due to network problems. Since acquisition time is low, but delivery time high, static imaging is more suitable for cases which are not urgent [Della Mea, 1997, p. 242].	Pathology	Cases	Agreement	Images	Size Kb/case	Compression	Gastroint.	76	83,0	4,5	248	16,5:1	Breast	48	83,7	2,8	98	25,7:1	Skin	20	78,9	5,3	295	13,7:1	Intra-operative	154	96,7	5,0	262	17,2:1
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## ACCURACY BASED ON THE GOLDEN STANDARD

Studies using the following schedule distinguish between false malign (C) and false benign (B) results instead of false clinically relevant and not relevant diagnoses.

	„golden standard“ malign diagnoses	„golden standard“ benign diagnoses	total
TP - malign diagnoses	A	C	
TP - benign diagnoses	B	D	

### Information About Schedule II:

Sometimes, the year of test was not give. Then the year was estimated.

4th column: S = static system; D = dynamic system; DLM = direct light microscope;

5th column: amount without brackets = examined cases + deferred cases; amount in brackets = finally diagnosed cases (=all correct and incorrect cases);

6th-9th column: Accurate diagnosed cases, distinguished in malign and benign - in total and in %; in some lines the amount of correct diagnoses is given as one total and not distinguished in malign and benign.

10th-13th column: Incorrect diagnosed cases of TP, distinguished in malign and benign - in total and %;

6th-13th column: The percentage is based on the correct / incorrect part of benign and malign diagnoses;

14th-15th column: Deferred diagnoses in total and in %;

16th -column: amount of images per case in average;

17th column: time needed per examination; the number in the brackets give the range of time/case.

Schedule II - Accuracy Based on the Golden Standard																		
No	Place	Year	Stat./ Dyn.	Amount of Cases	Accurate diagnoses				Incorrect diagnosis				Not conclusive		Images / case	Exami- nation time		
					A / malign		D / benign		B / TP benign		C / TP malign		deferred diagnoses				total	time/ case min.
					all	%	all	%	all	%	all	%	all	%				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
1	Georgia	1995	S	99	89 cases		89 %		data not available									
				80	69 cases		86 %		data not available									
				66	56 cases		84 %		data not available									
2	Tottori	1994	S	20	18 cases		90 %		2		10 %				6,2	13 (10-16)		
3	Dijon	1995	S	700	560 cases		80 (95) %		data not available				35	5,0	3-20	30-60		
4	Baltimore	1996	S	146	24	96	120	99	1	1	1	4			4,3	15		
5	Sapporo	1994	S	59 (55)	19	100	36	100	0	0	0	0	4	6,8				
6	Sapporo	1995	S	135 (127)	39	100	88	100	0	0	0	0	8	5,9				
7	Norway	1992	D	48 (46)	8	100	38	95	2	5	0	0	2	4,2	4-14	25-35		
8	Norway	1992	D	155 (143)	51	98,1	92	97,8	2	2,2	1	1,9	12	7,7		5		
9	Switzerland	1996	D	93 (84)	44	100	36	90	4	10	0		9	9,6	8	30-45		
10	Norway	1995	D	162 (155)	150 cases		96,7 %		4	2,6	1	0,7	7	4,3		9		
11	Stuttgart	1996	D	118 (107)	97 cases		90,7 %		9	8,4	1	0,9	11	9,3				
12	Stuttgart	1996	D	278 (270)	268 cases		99,2 %		2	0,8	0	0	8	2,9		15		
13	Heidelberg	1993	S	600	Telepathology was used for panel discussions between experts - final concordant diagnoses could be given in about 80 % of the cases													

No.	Description of the Executed Tests of Schedule II
1	Source: [Prasse, 1995, pp. 259-266]; Test design: Test was executed in Georgia; communication bandwidth varied from 56 kbps to 384 kbps; 640 x 480 x 256 colors; cases: 99 cytology, 80 hematology, 66 histology; Result: There occurred diagnostic problems due to transmission speed and image quality. The desktop video conference system in Georgia was judged as not satisfactory for definitive diagnostic purposes, but seen as a good tool for general illustrations and case discussions between pathologists [Prasse, 1995, p. 264].
2	Source: [Ito, 1994, p. 801]. Test design: 10 kidney biopsies and 10 liver cases at Tottori / Japan; Result: 2 cases were not accurate due to field selection and case communication.
3	Source: [Martin, 1996, p. 460; Martin, 1995, p. 194]; Test design: 790 cases were examined during a period of 4 years in 11 laboratories; Results: tele-discussions last about 15 minutes, the whole examination about 30-60 minutes. A teliagnosis was established on 3 to 20 transmitted images (mean 7); nearly 80 % of the diagnoses could have been confirmed immediately; 15 % were more or less modified; in the remaining 5 % of the cases the problem remained unsolved after the initial discussion - in these cases it was necessary either to send new images after additional investigation or to forward the slides and paraffin blocks to the expert [Martin, 1996, p. 460]. Two more studies were executed: Fine-needle biopsies taken from 50 liver nodules and 50 prostate lesions - concordance of the diagnosis reached 97,5%; 200 surgical specimens were tele-examined between the University of Dijon and Boston's Brigham and Women's Hospital.
4	Source: [Weinstein, 1997/(1), p. 34] Test design: 46 skin specimen - frozen section examinations; Result: 1 % = margin was not selected for diagnosis; 4 % = the tumor extended to a cleft in the tissue that was misinterpreted by the transmitting operator and selected as the deep margin; in no instance was diagnostic interpretation limited by poor fidelity of the video images.

No.	Description of the Executed Tests of Schedule II
5	Source: [Fujita, 1995, pp. 105-110]. Result: There was one borderline case with an atypical ductal hyperplasia of the breast; of the conclusive cases 2 were benign and one 1 malignant by paraffin section examination.
6	Source: [Fujita, 1995, p. 105 ff.] Test design: Static imaging, images selected by referring cyto-technologist, 135 cases; Result: There were no serious misdiagnoses. Only a few minor mismatches occurred, again due to insufficient interpretation and field selection. However, the mismatched cases were very specific. They are described by Fujita, 1995, pp. 108-109. The cyto-technician at the remote site was very reliable; macroscopic images were sent via FAX; no wrong diagnosis occurred; Considering liability: reliable in Japan is always the telepathologist!
7	Source: [Eide, 1992/(2), p. 411; Nordrum, 1991, p. 517, Eide, 1994, p. 885]. Results: No false positive; two false negative diagnoses- one due to sampling error, the second was diagnosed as sclerosing and intraductal adenosis, but showed infiltrating carcinoma on paraffin embedded material; 2 inconclusive diagnoses were (both) given on thyroid tumor tissues.
8	Source: [Eide, 1992/(1), pp. 405 ff.]; Test design: 80 cases, mix of frozen sections from different organs; two examining pathologists. Result: Two false negative diagnoses due to quality of video images and missing information of a case; one false positive - a biopsy of the pancreas with irregular proliferating ducts in chronic pancreatitis was diagnosed to be an adenocarcinoma. The overall agreement within the final diagnosis was 91 %.
9	Source: [Steffen, 1997/(1), pp. 25-27, 37]; Test design: From 1992 to 1996, 93 frozen sections from different organs had been examined; Result: In average, per examination 2 (0-8) macroscopical and 6 (2-17) microscopical images were transferred from Samedan to Basel. The time needed for a telepathological examination was 30 minutes up to a maximum of 45 minutes, measured from the time when the first image was transferred till the diagnosis was made [Steffen, 1997/(1), p. 37].
10	Source: [Nordrum, 1995, p. 255; Nordrum, 1997, p. 172]; Test design: Test of different organ specimens - breast (52) and thyroid tissues (22), lymph nodes (5), ovary (5), and other.
11	Source: [Schmid, 1996/(2), p. 480]. Test design: Image transfer by ISDN lines; three pathologists tested 118 frozen sections on lung surgery.
12	Source: [Schmid, 1996/(2), p. 480]. Test design: 8 B-ISDN channels, 139 frozen sections cases, tested by 2 pathologists at the University of Tuebingen/Germany and Stuttgart/Germany.
13	Source: [Kayser, 1993/(2), p. 395; Kayser, 1995/(1), pp. 52-59]; Test design: Hospital Baumgartnerhoehe (Vienna, Austria), Klinikum Heckeshorn (Berlin, Germany), and Thoraxklinik (Heidelberg, Germany). Each participating institute was obliged to send HE- and PAS-stained histopathological slides comprising 100 bronchial biopsy cases and 100 surgical specimens with primary lung cancer to the participating partners - all in all 300 biopsy cases and 300 surgical specimens were included in the study. Finally 120 cases with a broad variety of lung tumors have been discussed intraoperatively. Reclassification of the bronchial carcinomas was performed independent of each other, based on the criteria of the WHO. Statements of the staining and fixation quality as well as of the characteristic areas of the slides were noted. A time schedule was defined for expert consultations of difficult cases and panel discussions [Kayser, 1995/(1), p. 55].  Result: No technical problems occur during the transmission of images. The quality of the transmitted images (contrast and color) was sufficient to permit an accurate diagnosis; spatial resolution was poor in case of low magnification - sufficient at magnifications x 25 or higher. Average time for transmission was 95 seconds (range 40 to 180 seconds) with a transmission rate of 9,600 baud; 1 to 3 images were necessary for a diagnosis [Kayser, 1993/(2), p. 397]. Unfortunately unexpected breakdowns of the ISDN connection occurred in 4/25 transmissions. Failures of the modems could be excluded.  In all, telepathology demonstrated to be effective in panel discussions. Final concordant diagnoses could be given in about 80 % of the cases - biopsy: 236 correct, 64 discrepant; surgical cases: 212 correct, 88 discrepant.

## SUMMARY OF ACCURACY TESTS

### SUMMARY OF SCHEDULE I:

As expected, accuracy with static imaging systems is lower than with dynamic systems. The accuracy rate of dynamic systems is quite high with 90,5 to 97,5 %, yet if incorrect diagnoses which are not clinically significant are added, dynamic systems even achieve an accuracy rate of 95,7 to 99,5 %. In summary schedule I showed accuracy rates as follows:

Degree of Accuracy	Static Systems	Dynamic Systems	Both Together
Accurate diagnoses	56 - 92,5 %	90,5 - 97,5 %	56 - 97 %
Incorrect diagnoses, clinically not significant	85,6 - 96,5 %	95,7 - 99,5 %	85,6 - 99,5 %
Incorrect diagnoses, clinically significant	3,5 - 14,4	0,5 - 4,4 %	0,5 - 17,4 %
Deferred diagnoses	0 - 4,5	1,5 - 14,0 %	0 - 14 %

### SUMMARY OF SCHEDULE II:

The accuracy results vary from 90 to 100 %. Accurate diagnoses with malign samples achieved 96-100 %, accurate diagnoses of benign diagnoses varied between 90-100 %. Incorrect diagnoses occurred at 0,7-10 % of the cases. Incorrect benign samples were diagnosed at 0,8-10 %, incorrect malign between 0,7-4 %. This reflects the tendency of telepathologists to avoid incorrect malign diagnoses due to the consequences. Deferred diagnoses vary from 2,9 to 9,6 %.

An extensive overview of further accuracy test results is given by O'Brien [O'Brien, 1998, pp. 155, 161, 163].

## TRANSMISSION AND EXAMINATION TIME PER CASE

[Eide, 1994, p. 884]:

Authors	Image system	Network capacity	Average transmission time per image	Average number of still images per case	Time for diagnosis	Remote controlled
Kayser (1991)	still	9,6 Kbit/s	3,2 min	not given	15,9 min	no
Shimosato (1992)	still live	6 Kbit/s Optical fibre	2 min real time	not given	15 min 3 min	yes yes
Eide (1992)	still/live	2 Mbit/s	still: 3,5 s live: real time	-	13 min	yes
Kayser & Drlicek (1992)	still	9,6 Kbit/s	1,4 - 2 min 16.5 min 58 s	1-3	6,4 - 18 min	no
Becker (1993)	still	14,6 Kbit/s		4,5	9,3 min	no
Oberholzer (1993)	still	64 Kbit/s		7	25 - 35 min	yes

## APPENDIX VII

### SCHEDULE ABOUT THE KIND OF SPECIMENS EXAMINED WITH TELEPATHOLOGY SYSTEMS

Telepathology systems are employed in various medical domains. Such domains include dermatology, nephrology, liver disease, hematology, microbiology, etc. There are even some specialty areas, where telepathology systems become a part of an integrated automated service process. For example, in the case of women cancer diseases, cytology exams are excellent candidates for tele-lecture processing through telepathology systems. New centrifugation techniques allow to prepare glass slides and relevant images through operator-independent techniques. Such technology could for example be used for tele-expertise in mass-screening campaigns for medically emerging countries to overcome the lack of adequate pathological infrastructures [Allaert, 1999].

Telepathology systems are not appropriate for all types of pathological examinations. That is why the following schedules are regarding the areas and type of organs examined with actually employed telepathology systems.

### RESULTS OF THIS STUDY

The participating telepathology users (40) at the study in Constance reported, that they use their system for the following areas and organs:

„In which areas do you use telepathology?“					
	User total	User %		User total	User %
Histopathology	34	85	Cytogenetics	1	2,5
Cytopathology	16	40	Forensic Pathology	1	2,5
Immunopathology	11	27,5	Molecular Pathology	1	2,5
Dermatology	10	25	Ophthalmology	1	2,5
DNA-Analysis	5	12,5	Electromicroscopy	0	0
Hematology	4	10	Microbiology	0	0
Parasitology	2	5	Toxicology	0	0

„Which organs are examined by telepathology?“					
	User total	User %		User total	User %
Breast, mammary gland	22	55	Endocrine	9	22,5
Lymph node	19	47,5	Kidney	8	20
Gynecological; ovary, uterus	18	45	Liver and gallbladder	7	17,5
Gastrointestinal	16	40	Larynx, pharynx	7	17,5
Thyroid gland	16	40	Salivary gland	7	17,5
Lung	15	37,5	Penis, testes, cord	6	15
Soft tissue	14	35	Suprarenal gland	6	15
Skin	13	32,5	Bone marrow	5	12,5
Head, neck	12	30	Eyes	4	10
Prostate	12	30	Blood	3	7,5
Bladder	11	27,5	Heart	3	7,5
Bones	10	25	Spleen	3	7,5
Nervous system	10	25			

**KIND OF ORGANS EXAMINED BY TELEPATHOLOGY FROM THE LITERATURE**

Sources of the schedule data:

- A. Tucson, Arizona (AITN), Bhyttacharyya, 1995, p. 13  
 B. Basel (CH), Steffen, 1997, p. 27  
 C. Boston, Weinberg, 1996, p. 112  
 D. Norway, Eide, 1992/(1), p. 406  
 E. Milwaukee, Dunn, 1997/(2), p. 2  
 F. Milwaukee, Dunn, 1997/(1), p. 9  
 G. Vermont, Callas, 1997, p. 815  
 H. Japan, Adachi, 1996, p. 437  
 I. Japan, Fujita, 1995, p. 107  
 J. France, Allaert, 1996, p. 27; Allaert, 1995/(2), p. 596  
 K. Tucson, Halliday, 1997, p. 19

Organ Type	A	B	C	D	E	F	G	H	I	J	K	Total	in %
Gastro-intestinal	12		42	3	96	33			4	42	26	246	15,13
Skin	17	3	35		31	24	64		1	35	8	201	12,79
Breast, mammary gl.	8	54	13	9			19	29	8	13	6	151	9,33
Lymph node	10		6	13			2	11	66	6	13	127	7,45
Gyn. , ovary, uterus	10	14	35	3			12			35	19	118	7,51
Thyroid		3	6	14			1	37	8			69	4,05
Prostate			5	6	25	14	10		1		1	62	3,64
Soft tissue	11		9			16	12	2		9	10	58	4,05
Head, neck			19							19	8	46	2,70
Lung	10		6	3			6	11	9		9	44	3,17
Cervix/endocervix							30					30	1,76
Colorectal	15						30					30	2,64
Bone and joint			1		4		6		4	1	13	29	1,70
Gallbladder			6		4	6	6	7				29	1,70
Liver	10			8		1	3		2	6	8	28	2,23
Endometrium						1	27					28	1,64
Penis, testicle, cord			6	3	7						3	19	1,11
Urinary bladder					8	3	8					19	1,11
Upper GI							18					18	1,06
Kidney			3						4	3	4	14	0,82
Synovium/tendon			6			1				6		13	0,70
Brain								11				11	0,65
Miscellaneous					11							11	0,65
Hernia					10							10	0,59
Oral cavity							4		6			10	0,59
Pancreas				2			1		7			10	0,59
Bladder										6	4	10	0,50
vocal cord/larynx		4					5					9	0,49
Nervous system											8	8	0,47
Salivary gland		8										8	0,47
Blood vessel			3							3		6	0,35
Extremity amputation					4	1						5	0,29
Products of conception							5					5	0,29
Adrenal gland								2	2			4	0,23
Parathyroid				3					1			4	0,23
Vast deferent							4					4	0,23
Ear							3					3	0,18
Endocrine											3	3	0,18
Multiple tissues						3						3	0,18

<b>Organ Type</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>K</b>	<b>Total</b>	<b>in %</b>
Sinus							3					3	0,18
Placenta							2					2	0,12
Thymus								2				2	0,12
Tonsil							2					2	0,12
Eye							1					1	0,06
Heart											1	1	0,06
Meninges							1					1	0,06
Other	47	8		13	2			12	2			74	5,75
<b>TOTAL</b>	<b>150</b>	<b>94</b>	<b>200</b>	<b>80</b>	<b>200</b>	<b>103</b>	<b>285</b>	<b>124</b>	<b>125</b>	<b>200</b>	<b>144</b>	<b>1705</b>	<b>100</b>

## **APPENDIX VIII - RESULTS OF THE QUESTIONNAIRES**

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# 1 PARTICIPANTS CHARACTERISTICS

## 1.1 INFORMATION ABOUT PARTICIPANT'S EMPLOYER

The characteristics of participants are as follows:

Employer	In which kind of institution do you work?					
Group	medical center		small clinic		doctor's office	
	total	per cent	total	per cent	total	per cent
Non-User	18	25,0	17	23,6	37	51,4
User	32	80	5	12,5	3	7,5
All	70	62,5	22	19,64	20	17,86
Institution	Institution, where replying user is employed, in relation of system type					
Group	university hospital		small hospital		doctor's office	
	total	per cent	total	per cent	total	per cent
Static system	8	62	2	15	3	23
Dynamic, non-rob.	4	80	1	20	0	0
Dynamic-robotic	20	91	2	9	0	0
Total	32	80	5	12,5	3	7,5

The percentage is divided into a) percentage per system type (static, non-robotic, dyn.-robotic), and b) % in relation of all systems

Size	How big is your institution/department, measured by the amount of pathologists.														
Group	one pathologist		two pathologists		3-5 pathologists		> 5 pathologists		no pathologist no information						
	total	%	total	%	total	%	total	%	total	%					
Non-User	10	13,9	24	33,3	24	33,3	14	19,5	0	0					
User	3	7,5	4	10,0	10	25,0	21	52,5	2	5,0					
All	13	11,6	28	25,0	34	30,3	35	31,3	2	1,8					
Relation at users	Number of pathologists, distinguished by system type.														
Group	one pathologist		two pathologists		3-5 pathologists		> 5 pathologists		no pathologist no information						
	total	%	total	%	total	%	total	%	total	%					
static	0	0	0	3	23,0	7,9	5	38,5	13,2	5	38,5	13,2	0	0	0
dyn.-non-robotic	2	40,0	5,3	0	0	0	0	0	0	3	60,0	7,9	0	0	0
dynamic-robotic	1	4,6	2,6	1	4,6	2,6	5	22,7	13,2	13	59,1	34,1	2	9,0	5
all systems	3	7	4	11	10	26	21	56	2	5,0					

The percentage is divided into a) percentage per system type (static, non-robotic, dyn.-robotic), and b) % in relation of all systems

Size	How big is your institution/department, measured by the amount of pathologists.											
Group	< 20.000		20.000-50.000		> 50.000		no information					
	total	%	total	%	total	%	total	%				
Non-User	19	26,4	36	50,0	14	19,4	3	4,2				
User	13	32,5	19	47,5	6	15,0	2	5,0				
All	32	28,6	55	49,1	20	17,9	5	4,4				
Relation at users	Number of pathologists, distinguished by system type.											
Group	< 20.000		20.000-50.000		> 50.000		no information					
	total	%	total	%	total	%	total	%				
static	4	30,8	10,5	6	46,1	15,8	3	23,1	7,9	0	0	0
dyn.-non-robotic	4	80,0	10,5	1	20,0	2,6	0	0	0	0	0	0
dynamic-robotic	5	25,0	13,2	12	60,0	31,6	3	15,0	7,9	2	9,1	5,0
all systems	13	34	19	50	6	16	2	5,0				

The percentage is divided into a) percentage per system type (static, non-robotic, dyn.-robotic), and b) % in relation of all systems

## 1.2 USER'S PROFESSION

Profession	To which occupational group do you belong to?					
Group	general pathologist		specialized pathologist		reference pathologist	
	total	%	total	%	total	%
N-User	56	77,8	6	8,3	10	13,9
User	24	60,0	10	25	6	15
All	80	71,4	16	14,3	16	14,3
Profession	Profession of participating users in relation to system type					
	general pathologist		specialized pathologist		reference pathologist	
	total	%	total	%	total	%
Static system	7	17,5	4	7,5	2	5,0
Dynamic, non-rob.	1	2,5	1	0	3	7,5
Dynamic-robotic	16	37,5	5	12,5	1	2,5
All users	24	57,5	10	20	6	15

Specialty	Area of occupation (macroscopy = MA; histology = HI; cytology = CY)							
Group	histology (HI)		MA + HI		HI + CY		MA+HI+CY	
	total	%	total	%	total	%	total	%
N-User	38	52,8	5	6,9	13	18,1	16	22,2
User	19	47,5	3	7,5	8	20	10	25
All	57	50,9	8	7,1	21	18,8	26	23,2

There was no participant only doing macroscopy or cytology

## 1.3 USER'S CHARACTERISTICS

Computer Experience	What is the extent of your computer experience?					
Group	no experience		average experience		huge experience	
	total	per cent	total	per cent	total	per cent
N-User	5	6,9	65	90,3	2	2,8
User	1	2,5	26	65,0	13	32,5
All	6	5,4	91	81,2	15	13,4

Age and Sex	Please give your age and sex.									
Group	Age						Sex			
	< 35 years		35 to 50 years		> 50 years		male		female	
	total	%	total	%	total	%	total	%	total	%
N-User	1	1,4	34	47,2	37	51,4	66	91,7	6	8,3
User	2	5	17	42,5	21	52,5	35	87,5	5	12,5
All	3	2,7	51	45,5	58	51,8	101	90,2	11	9,8

## 1.4 CHARACTERISTICS IN RELATION TO SYSTEM TYPE

Profession	Degree of specialization of participating users in relation to system type									
	general pathologist		specialized pathologist		reference pathologist		physician surgeon		medical technician	
	total	%	total	%	total	%	total	%	total	%
Static system	7	54	3	23	2	15	1	8	0	0
Dynamic, non-rob.	1	20	3	60	0	0	0	0	1	20
Dynamic-robotic	15	68	5	22	1	5	1	5	0	0
Total	23	57,5	11	27,5	3	7,5	2	5	1	2,5

Institution	Institution, where replying user is employed, in relation of system type					
Group	university hospital		small hospital		doctor's office	
	total	per cent	total	per cent	total	per cent
Static system	8	62	2	15	3	23
Dynamic, non-rob.	4	80	1	20	0	0
Dynamic-robotic	20	91	2	9	0	0
<b>Total</b>	<b>32</b>	<b>80</b>	<b>5</b>	<b>12,5</b>	<b>3</b>	<b>7,5</b>

### 1.5 ATTITUDE OF PARTICIPANTS TO NEW TECHNOLOGIES

Question	What is your attitude when faced with new technologies?									
Group	curious	+2	+1	0	-1	-2	very critical	no remark	Mean	St.Error
N-User	very positive	42	21	4	4	1	skeptical	0	1,38	0,11
User		25	12	1	2	0		0	1,50	0,12
All		67	33	5	6	1		0	1,42	0,08

Question	What is your attitude to telemedicine services in general?									
Group	curious	+2	+1	0	-1	-2	very critical	no remark	Mean	St.Error
N-User	very positive	22	23	15	10	2	skeptical	0	0,74	0,13
User		21	16	3	0	0		0	1,45	0,10
All		43	39	18	10	2		0	0,99	0,10

Question	What is your attitude to telepathology services?									
Group	curious	+2	+1	0	-1	-2	very critical	no remark	Mean	St.Error
N-User	very positive	18	19	11	17	7	skeptical	0	0,33	0,16
User		25	13	1	1	0		0	1,55	0,11
All		43	32	12	18	7		0	0,77	0,12

Question	What is your attitude to Internet services (WWW, e-mail, etc.)?									
Group	curious	+2	+1	0	-1	-2	very critical	no remark	Mean	St.Error
N-User	very positive	33	21	9	6	3	skeptical	0	1,04	0,13
User		28	7	2	0	3		0	1,45	0,18
All		61	28	11	6	6		0	1,18	0,11

### 1.6 INTEREST IN COOPERATIONS

Question	What about is your interest in cooperation?									
Group	great interest	+4	+3	+2	+1	0	no interest	no remark	Mean	St.Error
N-User		37	13	11	5	1		5	3,19	0,13
User		29	8	2	1	0		0	3,63	0,11
All		66	21	13	6	1		5	3,36	0,09

Question	How do you assess the importance of cooperation in the future?									
Group	very important	+4	+3	+2	+1	0	not important	no remark	Mean	St.Error
N-User		37	15	11	4	1		4	3,22	0,12
User		31	6	1	1	0		1	3,72	0,10
All		68	21	12	5	1		5	3,40	0,09

**QUESTIONS ONLY TO NON-USERS**

NON-USER Question	Please give current cooperation partners, distinguished by distance.								
Distance in km	Amount of partners								
	0		1 to 9		10 to 100		> 100		no
	total	%	total	%	total	%	total	%	information
< 30 km	10	16,7	14	23,3	22	36,7	14	23,3	12
30 to 100 km	11	18,6	18	30,5	26	44,1	4	3,8	13
> 100 km	12	20,7	23	39,7	20	34,5	3	5,2	14
<b>total non-users*</b>	1	1,6	14	23	21	34,4	25	41	11

NON-USER Question	Please give percentage of external examinations compared to overall examinations.						
	0 to 49		50 to 89		90 to 100		no
	total	%	total	%	total	%	information
<b>Non-User</b>	14	24	24	41	20	35	14

**QUESTIONS ONLY TO USERS ABOUT TELEPATHOLOGY PARTNERSHIPS**

USER Question	Please give amount of telepathology partners, distinguished by distance.										
Distance in km	Amount of partners										
	0		1		2 to 3		4 to 10		> 10		
	total	%	total	%	total	%	total	%			
<b>Clients</b>	< 30 km	31	77,5	6	15,0	2	5,0	1	2,5	0	0
	30 to 100 km	31	77,5	7	17,5	1	2,5	1	2,5	0	0
	> 100 km	19	47,5	8	20,0	5	12,5	6	15	2	5,0
	<b>total clients*</b>	8	20,0	14	35,0	5	12,5	11	27,5	2	5,0
<b>Consultants</b>	< 30 km	34	85	3	7,5	2	5,0	1	2,5	0	0
	30 to 100 km	35	87,5	3	7,5	0	0	2	5,0	0	0
	> 100 km	18	45	8	20,0	7	17,5	6	15,0	1	2,5
	<b>total consult*.</b>	11	27,5	11	27,5	6	15,0	11	27,5	1	2,5

\* the line gives the amount of client-/consultant partners in total. That is for example, that 8 users answered, that they do not have a client partner, 14 answered that they do only have one client partner, ...

The participating users were asked to give the number of cooperating clients and consultants, distinguished by distance. The schedule gives the number of partners in categories of 0, 1, 2-3, 3-10, and >10. The fourth line 'total clients' and 'total consultants' gives the overall amount of client and consultant partners.

**2 RATINGS OF THE INTEREST IN VARIOUS SERVICES****2.1 SINGLE JUDGEMENT OF TELEPATHOLOGY'S SERVICE UTILIZATION****2.1.1 PRIMARY DIAGNOSTIC VIA TELEPATHOLOGY**

Service	Primary diagnosis in emergency cases (e.g. epidemic disease)									
Group		+4	+3	+2	+1	0		no remark		
<b>CURRENT INTEREST OF STUDY PARTICIPANTS</b>									<b>Mean</b>	<b>St.Error</b>
N-User	<b>high interest</b>	3	1	11	9	40	<b>no interest</b>	8	0,72	0,14
User		1	3	7	6	16		7	1,00	0,20
All		4	4	18	15	56		15	0,81	0,11
<b>GENERAL JUDGEMENT OF SERVICE MEANING IN 5 YEARS</b>									<b>Mean</b>	<b>St.Error</b>
N-User	<b>high interest</b>	2	3	7	17	31	<b>no interest</b>	12	0,80	0,13
User		1	2	6	13	7		11	1,21	0,18
All		3	5	13	30	38		23	0,93	0,11

Service	Primary diagnosis for frozen section examinations.										
Group		+4	+3	+2	+1	0		no remark			
CURRENT INTEREST OF STUDY PARTICIPANTS										Mean	St.Error
N-User	high interest	11	4	8	8	37	no interest	4	1,18	0,18	
User		18	4	3	6	6		3	2,59	0,26	
All		29	8	11	14	43		7	1,68	0,16	
GENERAL JUDGEMENT OF SERVICE MEANING IN 5 YEARS										Mean	St.Error
N-User	high interest	8	5	13	17	21	no interest	8	1,41	0,17	
User		19	6	3	5	2		5	3,00	0,22	
All		27	11	16	22	23		13	1,97	0,15	

Service	Primary diagnosis on a routine basis.										
Group		+4	+3	+2	+1	0		no remark			
CURRENT INTEREST OF STUDY PARTICIPANTS										Mean	St.Error
N-User	high interest	2	3	8	10	44	no interest	5	0,64	0,13	
User		5	2	7	7	14		5	1,34	0,24	
All		7	5	15	17	58		10	0,88	0,12	
GENERAL JUDGEMENT OF SERVICE MEANING IN 5 YEARS										Mean	St.Error
N-User	high interest	2	1	10	13	36	no interest	10	0,71	0,13	
User		5	5	3	9	10		8	1,56	0,26	
All		7	6	13	22	46		18	1,00	0,13	

### 2.1.2 SECOND OPINION DIAGNOSIS VIA TELEPATHOLOGY

Service	Request of colleagues opinion in uncertain cases (second look).										
Group		+4	+3	+2	+1	0		no remark			
CURRENT INTEREST OF STUDY PARTICIPANTS										Mean	St.Error
N-User	high interest	16	14	13	11	13	no interest	5	3,13	0,18	
User		21	9	1	4	3		2	3,08	0,21	
All		37	23	14	15	16		7	2,48	0,14	
GENERAL JUDGEMENT OF SERVICE MEANING IN 5 YEARS										Mean	St.Error
N-User	high interest	15	9	20	9	11	no interest	8	2,13	0,17	
User		21	4	2	4	2		7	3,15	0,23	
All		36	13	22	13	13		15	2,47	0,15	

Service	Specialized expert consultation in difficult cases (reference diagnosis).										
Group		+4	+3	+2	+1	0		no remark			
CURRENT INTEREST OF STUDY PARTICIPANTS										Mean	St.Error
N-User	high interest	14	13	10	8	7	no interest	20	2,37	0,19	
User		25	6	0	3	4		2	3,18	0,22	
All		39	19	10	11	11		22	2,71	0,15	
GENERAL JUDGEMENT OF SERVICE MEANING IN 5 YEARS										Mean	St.Error
N-User	high interest	13	12	14	5	5	no interest	23	2,47	0,18	
User		20	5	2	1	3		9	3,23	0,23	
All		33	17	16	6	8		32	2,76	0,15	

## 2.1.3 COMMUNICATION, EDUCATION AND INFORMATION SERVICES

Service	Centrally organized 'on call' services (e.g. weekend services, 24-hour path. advice desk).									
Group		+4	+3	+2	+1	0		no remark		
CURRENT INTEREST OF STUDY PARTICIPANTS									Mean	St.Error
N-User	high interest	2	6	9	9	39	no interest	7	0,82	0,14
User		3	3	6	8	15		5	1,17	0,22
All		5	9	15	17	54		12	0,94	0,12
GENERAL JUDGEMENT OF SERVICE MEANING IN 5 YEARS									Mean	St.Error
N-User	high interest	4	4	9	13	32	no interest	10	0,95	0,16
User		4	5	7	5	11		8	1,56	0,25
All		8	9	16	18	43		18	1,16	0,14

Service	Interdisciplinary cooperation and communication.									
Group		+4	+3	+2	+1	0		no remark		
CURRENT INTEREST OF STUDY PARTICIPANTS									Mean	St.Error
N-User	high interest	15	9	12	12	19	no interest	5	1,84	0,19
User		17	7	8	1	4		3	2,86	0,22
All		32	16	20	13	23		8	2,20	0,15
GENERAL JUDGEMENT OF SERVICE MEANING IN 5 YEARS									Mean	St.Error
N-User	high interest	12	13	12	11	16	no interest	8	1,91	0,18
User		16	5	6	2	5		6	2,74	0,25
All		28	18	18	13	21		14	2,19	0,15

Service	Centralized pathological case archiving of data and images.									
Group		+4	+3	+2	+1	0		no remark		
CURRENT INTEREST OF STUDY PARTICIPANTS									Mean	St.Error
N-User	high interest	6	10	15	8	27	no interest	6	1,39	0,17
User		10	5	7	3	11		4	2,00	0,27
All		16	15	22	11	38		10	1,61	0,15
GENERAL JUDGEMENT OF SERVICE MEANING IN 5 YEARS									Mean	St.Error
N-User	high interest	8	7	18	11	20	no interest	8	1,56	0,17
User		11	4	5	5	7		8	2,22	0,28
All		19	11	23	16	27		16	1,78	0,15

Service	Distance learning and online education.									
Group		+4	+3	+2	+1	0		no remark		
CURRENT INTEREST OF STUDY PARTICIPANTS									Mean	St.Error
N-User	high interest	12	10	23	6	18	no interest	3	1,88	0,17
User		22	4	4	4	3		3	30,3	0,22
All		34	14	27	10	21		6	2,28	0,14
GENERAL JUDGEMENT OF SERVICE MEANING IN 5 YEARS									Mean	St.Error
N-User	high interest	12	14	22	7	10	no interest	7	2,17	0,16
User		21	5	1	4	2		7	2,22	0,28
All		33	19	23	11	12		14	2,51	0,14

Service	Discussion groups, consideration of difficult cases, forums, etc.									
Group		+4	+3	+2	+1	0		no remark		
CURRENT INTEREST OF STUDY PARTICIPANTS									Mean	St.Error
N-User	high interest	21	15	15	10	7	no interest	4	2,49	0,16
User		18	10	5	0	3		4	3,11	0,20
All		39	25	20	10	10		8	2,70	0,13
GENERAL JUDGEMENT OF SERVICE MEANING IN 5 YEARS									Mean	St.Error
N-User	high interest	18	14	19	9	5	no interest	7	2,48	0,15
User		20	6	3	0	2		9	3,18	0,22
All		38	20	22	9	7		16	2,76	0,13

Service	Quality assurance and control, proficiency testing (DNA-cytometry, etc.)									
Group		+4	+3	+2	+1	0		no remark		
CURRENT INTEREST OF STUDY PARTICIPANTS									Mean	St.Error
N-User	high interest	9	13	12	11	23	no interest	4	1,62	0,18
User		12	10	6	2	7		3	2,49	0,24
All		21	23	18	13	30		7	1,92	0,15
GENERAL JUDGEMENT OF SERVICE MEANING IN 5 YEARS									Mean	St.Error
N-User	high interest	9	11	12	10	22	no interest	8	1,61	0,18
User		14	7	6	2	4		7	3,18	0,22
All		23	18	18	12	26		15	2,00	0,15

Service	Access to Internet information (e.g. information databases like MEDLINE, www, etc.)									
Group		+4	+3	+2	+1	0		no remark		
CURRENT INTEREST OF STUDY PARTICIPANTS									Mean	St.Error
N-User	high interest	20	15	12	5	12	no interest	8	2,41	0,18
User		16	8	5	2	2		7	3,03	0,21
All		36	23	17	7	14		15	2,62	0,14
GENERAL JUDGEMENT OF SERVICE MEANING IN 5 YEARS									Mean	St.Error
N-User	high interest	24	14	9	7	8	no interest	10	2,63	0,18
User		19	5	3	1	4		8	3,35	0,20
All		43	19	12	8	12		18	2,78	0,15

#### 2.1.4 TREND OF TELEPATHOLOGY INTRODUCTION

Trend	Do you think, that telepathology will become established in health care?					
Group	yes		no		no comment	
	total	%	total	%	total	%
Non-User	36	50%	13	18%	23	32%
User	37	93%	0	0	3	7%
All	73	65%	13	12%	26	23%

## 2.2 SUMMARY RATINGS OF TP-SERVICE UTILIZATION

The schedule on the next page shows a) the actual utilization of various telepathology services, b) the mean of the judgement of the interest of participants in employing these services, and c) the judgement of the future meaning of telepathology services for pathologists. The columns of a) are sorted by the frequency of utilization of users, columns b) and c) by the judgement of the importance of all.

Judgment of interests in employing telepathology services									
Actual utilization of telepathology services	utilization		Interest in telepathology service utilization	interest of participants (mean)			judgement of future meaning		
	user	n-user		user	n-user	all	user	n-user	all
1.Second look	32	0	1.Internet info., WWW	3,03	2,41	2,62	3,06	2,63	2,78
2.Reference diagnosis	24	0	2.Reference diagnosis	3,18	2,37	2,71	3,23	2,47	2,76
3.Frozen sections	24	0	3.Discussions, forums, etc.	3,11	2,49	2,70	3,35	2,48	2,76
4.Internet info., WWW	21	14	4.Online education	3,03	1,88	2,28	3,18	2,17	2,51
5.Online education	21	5	5.Second look	3,08	2,13	2,48	3,15	2,13	2,47
6.Interdisciplinary cooperation	21	1	6.Interdisciplinary cooperation	2,86	1,84	2,20	2,74	1,91	2,19
7.Discussions, forums, etc.	18	4	7.Quality assurance	2,49	1,62	1,96	2,76	1,61	2,00
8.Quality assurance	10	3	8.Frozen sections	2,59	1,18	1,68	3,00	1,41	1,97
9.Emergency diagnosis	9	0	9.Central case archiving	2,00	1,39	1,61	2,22	1,56	1,78
10.Routine diagnosis	6	0	10.On call services	1,17	0,82	0,94	1,56	0,95	1,16
11.Central case archiving	4	1	11.Routine diagnosis	1,34	0,64	0,88	1,56	0,71	1,00
12.On call services	1	0	12.Emergency diagnosis	1,00	0,72	0,81	1,21	0,80	0,93

### 3 ANALYSIS OF VARIOUS FACTORS OF SUCCESS

#### 3.1 INFLUENCE OF SURROUNDING, QUALITY AND COST EFFICIENCY

„How important is support and the acceptance for the success of telepathology introduction?“

Question	Availability of advisory centers which help choosing the equipment for your specific needs									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		37	15	6	2	4		8	3,23	0,14
User		15	11	8	0	5		1	2,79	0,21
All		52	26	14	2	9		9	3,07	0,12

Question	External acceptance (insurance companies, HMO, health care politicians and providers, etc.)									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		22	17	13	4	8		8	2,64	0,17
User		16	9	9	3	1		2	2,95	0,18
All		38	26	22	7	9		10	2,75	0,13

Question	Internal acceptance of top management (clinic director, medical director, etc.)									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		19	13	10	5	11		14	2,41	0,20
User		19	10	5	1	1		4	3,25	0,16
All		38	23	15	6	12		18	2,73	0,14

Question	Internal acceptance of physicians and medical staff (users)									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		35	11	9	4	6		7	3,00	0,16
User		27	6	2	1	1		3	3,54	0,15
All		62	17	11	5	7		10	3,20	0,12

Question	Acceptance of patients									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		4	2	10	11	30		15	0,93	0,16
User		7	6	6	7	8		6	1,91	0,25
All		11	8	16	18	38		21	1,30	0,15

„What influence do political or cultural factors have on the success of telepathology introduction?“

Question	Influence of overall health care politics and health care laws									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		32	13	10	4	6		7	2,94	0,16
User		16	12	3	5	4		0	2,78	0,21
All		48	25	13	9	10		7	2,88	0,13

Question	Internal institution's politics (e.g. integration of telepathology into institutions objectives)									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		14	13	17	4	16		8	2,08	0,18
User		12	14	5	4	1		4	2,89	0,18
All		26	27	22	8	17		12	2,37	0,14

Question	Influence of geographical factors (health care provider density, population density)									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		20	18	10	4	10		10	2,55	0,18
User		12	12	9	2	5		0	2,60	0,21
All		32	30	19	6	15		10	2,57	0,14

Question	Influence of cultural factors (historical structures and business character, ethic, etc.)									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		5	10	18	11	14		14	1,67	0,16
User		4	9	8	10	7		2	1,82	0,21
All		9	19	26	21	21		16	1,73	0,13

„Which influence does the clarification of legal questions have on the success of telepathology?“

Question	Influence of explicitness of liability regulations, clearness of legal situation.									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		55	7	4	1	1		4	2,41	0,19
User		20	9	6	2	0		3	3,27	0,15
All		75	16	10	3	1		7	3,53	0,08

Question	Qualification (licensure regulations) of all people involved has to be guaranteed.									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		58	6	4	0	0		4	2,38	0,18
User		20	7	5	4	2		2	3,03	0,20
All		78	13	9	4	2		6	3,52	0,09

Question	Weight of explicit regulations about reimbursement (per contract or law).									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		33	9	9	11	3		7	3,68	0,09
User		13	4	8	10	1		4	2,50	0,22
All		46	13	17	21	4		11	2,75	0,13

Question	Explicit regulations about data exchange and data protection have to be set up.									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		45	8	8	4	0		7	3,79	0,06
User		14	12	5	5	1		3	2,89	0,19
All		59	20	13	9	1		10	3,25	0,10

„How do you judge the influence of organizational factors for the success of telepathology?“

Question	Influence of a well structured project design and management by system implementation.									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		16	12	12	6	8		18	2,89	0,16
User		17	14	5	0	1		3	3,24	0,15
All		33	26	17	6	9		21	2,75	0,13

Question	Coordination of system usage (no waiting time, coordination of communication, case schedules).									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		16	15	11	7	9		14	3,45	0,12
User		21	11	2	2	1		3	3,32	0,16
All		37	26	13	9	10		17	2,75	0,14

„How much influence does the quality of the examination and diagnosis have?“

Question	Accuracy of macro-examination (correct gross-examination, correct cut of sample fields).									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		59	6	3	0	0		4	3,82	0,06
User		26	10	1	1	1		1	3,51	0,14
All		85	16	4	1	1		5	3,71	0,06

Question	Guarantee of high quality sample preparation and precise field selection (qualified client).									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		63	2	3	0	1		3	3,83	0,08
User		29	7	1	0	1		2	3,66	0,12
All		92	9	4	0	2		5	3,77	0,07

Question	Accuracy of micro-examination (identical to direct microscope examination).									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		60	7	2	0	0		3	3,84	0,05
User		28	6	2	0	2		2	3,53	0,16
All		88	13	4	0	2		5	3,73	0,07

„Judgement of cost-benefit factors and of economical efficiency?“

Question	Influence of investment and subsequent cost on the success of telepathology projects.									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		34	16	11	4	0		7	3,23	0,12
User		13	8	11	3	1		4	2,81	0,18
All		47	24	22	7	1		11	3,08	0,10

Question	Cost effectiveness of telepathology services, economic efficiency.									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		35	7	16	6	2		6	3,02	0,15
User		11	11	10	3	1		4	2,78	0,18
All		46	18	26	9	3		10	2,93	0,11

Question	Improvement of health care efficiency (faster diagnoses, shorter treatment procedures, etc.).									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		24	14	13	7	5		9	2,71	0,16
User		19	5	9	2	1		4	3,08	0,19
All		43	19	22	9	6		13	2,85	0,12

### 3.2 INFLUENCE OF EQUIPMENT AND SYSTEM COMPONENTS

„Which influence does the equipment quality have on the success of telepathology projects?“

Question	Judgement of the influence for the equipment used (microscope, camera, video, etc.).									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		44	15	6	0	0		7	3,58	0,08
User		23	14	1	0	0		2	3,58	0,09
All		67	29	7	0	0		9	3,58	0,06

Question	Influence of the computer equipment (PC performance, monitor size and quality, etc.).									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		46	13	4	1	0		8	3,63	0,08
User		20	9	8	1	0		2	3,26	0,14
All		66	22	12	2	0		10	3,49	0,08

Question	Influence of the available network connections (speed, security, stability).									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		47	12	6	0	0		7	3,63	0,08
User		21	14	1	0	0		4	3,56	0,19
All		68	26	7	0	0		11	3,60	0,06

„How much influence do system's integration aspects have on the general success of telepathology?“

Question	Development and use of homogeneous technical standards.									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		30	19	12	0	0		11	3,30	0,10
User		15	11	9	2	0		3	3,05	0,15
All		45	30	21	2	0		14	3,20	0,09

Question	Standards - compatible data and image formats.									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		33	17	11	0	0		11	3,36	0,10
User		22	10	4	2	0		2	3,37	0,14
All		55	27	15	2	0		13	3,36	0,08

Question	Internal system integration (links to internal administrative and medical systems).									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		24	14	13	4	1		16	3,00	0,14
User		4	15	8	8	1		4	2,36	0,17
All		28	29	21	12	2		20	2,75	0,11

Question	External system integration (automatic data input of external data in your system).									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		28	16	10	3	0		15	3,21	0,12
User		6	12	8	9	1		4	2,36	0,18
All		34	28	18	12	1		19	2,88	0,11

„What influence does the quality of the available data have on the general success of telepathology?“

Question	Quality of textual data (completeness of data, sufficient data about patient and cases).									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		52	10	6	0	0		4	3,63	0,08
User		17	12	5	3	0		3	3,16	0,16
All		69	22	11	3	0		7	3,50	0,08

Question	Quality of monitor images (resolution, color, contrast, sufficient for clear diagnosis?).									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		62	5	1	0	0		4	3,90	0,04
User		32	3	2	0	0		3	3,81	0,08
All		94	8	3	0	0		7	3,87	0,04

Question	Quality of image handling (orientation in image, focusing, simple objective change).									
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		57	9	2	0	0		4	3,81	0,06
User		26	5	2	3	0		4	3,50	0,15
All		83	14	4	3	0		8	3,70	0,07

„How much influence does the system security and system quality have?“

Question										
Influence of system reliability (strong crashes and total break-downs = system no more usable).										
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		34	16	10	4	1		7	3,20	0,13
User		23	8	6	0	0		3	3,46	0,12
All		57	24	16	4	1		10	3,29	0,09

Question										
Influence of access control and security (access to system and data).										
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		41	10	9	4	1		7	3,32	0,13
User		16	9	9	3	0		3	3,03	0,16
All		57	19	18	7	1		10	3,22	0,10

Question										
Data security (no loss of data by exchange, protection from data misuse).										
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		46	9	7	1	0		9	3,59	0,09
User		25	3	5	4	0		3	3,32	0,18
All		71	12	12	5	0		12	3,49	0,09

„What influence does the user comfort and user-friendliness of the system have?“

Question										
Influence of fast respond times and fast image transfer on the acceptance.										
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		42	17	6	2	0		5	3,48	0,10
User		28	9	1	0	0		2	3,71	0,08
All		70	26	7	2	0		7	3,56	0,07

Question										
Influence of system stability (short interruption), high system availability (24-hours/day).										
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		50	13	4	0	0		5	3,69	0,07
User		23	10	3	1	0		3	3,49	0,12
All		73	23	7	1	0		8	3,62	0,06

Question										
Influence of user support (system training, help menus, 24-hour-support-hotline).										
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		41	15	8	1	2		5	3,37	0,12
User		12	13	8	4	0		3	2,89	0,16
All		53	28	16	5	2		8	3,20	0,10

Question										
Simplicity of system usage, clear and logical system structure.										
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		43	17	7	0	1		4	3,49	0,10
User		26	11	0	1	0		2	3,63	0,10
All		69	28	7	1	1		6	3,54	0,07

Question										
Influence of system flexibility and of system's ability to support the pathological workflow.										
Group	huge influence	+4	+3	+2	+1	0	no influence	no remark	Mean	St.Error
N-User		40	20	3	2	2		5	3,40	0,11
User		20	15	0	2	0		3	3,43	0,12
All		60	35	3	4	2		8	3,41	0,09

### 3.3 SUMMARY OF FACTOR JUDGMENTS

<b>Standard Error of Various Factors</b>	<b>non-user</b>	<b>user</b>	<b>all</b>
Quality of images	3,90	3,81	3,87
Accurate sample handling	3,83	3,66	3,77
Accurate micro examination	3,84	3,53	3,73
Accurate macro examination	3,82	3,51	3,71
Quality of image handling	3,81	3,50	3,70
System stability	3,69	3,49	3,62
Network connections	3,63	3,56	3,60
Medical equipment	3,58	3,58	3,58
Speed of transaction	3,48	3,71	3,56
Clear legal liability	2,41	3,27	3,53
Licensure regulations	2,38	3,03	3,52
Quality of data	3,68	3,16	3,50
Simple, user-friendly interface	3,49	3,63	3,50
Computer equipment	3,63	3,26	3,49
Data security	3,59	3,32	3,49
System flexibility	3,40	3,43	3,41
Standardized data formats	3,36	3,37	3,36
System reliability	3,20	3,45	3,29
Data security regulation	3,79	2,89	3,25
Access control	3,32	3,03	3,22
User support	3,37	2,89	3,20
Technical standards	3,30	3,05	3,20
Internal acceptance - physicians	3,00	3,54	3,20
Investment costs	3,23	2,81	3,08
Availability of advisory desk	3,23	2,79	3,07
Cost effectiveness	3,02	2,78	2,93
External system integration	3,21	2,36	2,88
Health care politics and laws	2,94	2,78	2,88
Process efficiency	2,71	3,08	2,85
Clear reimbursement	3,68	2,50	2,75
Process management	3,45	3,32	2,75
Internal system integration	3,00	2,36	2,75
Project management	2,89	3,24	2,75
External acceptance	2,64	2,95	2,75
Internal acceptance - management	2,41	3,25	2,73
Geographical factors	2,55	2,60	2,57
Internal politics of institution	2,08	2,89	2,37
Cultural factors	1,67	1,82	1,73
Acceptance of patients	0,93	1,91	1,30

## 4 ADVANTAGES AND DISADVANTAGES

### 4.1 ADVANTAGES:

#### 4.1.1 ADVANTAGES IN COST EFFICIENCY

Advantage	More efficiency in procedures and structures (sharing resources, equipment, etc.).									
Group	big advantage	+4	+3	+2	+1	0	no advantage	no remark	Mean	St.Error
N-User		6	5	17	13	26		5	1,28	0,16
User		8	9	13	5	1		4	2,50	0,18
All		14	14	30	18	27		9	1,71	0,13

Advantage	Cost reduction, saving (less tissue sample transportation, less staff needed).									
Group	big advantage	+4	+3	+2	+1	0	no advantage	no remark	Mean	St.Error
N-User		4	5	9	15	35		4	0,94	0,15
User		9	4	2	16	5		4	1,89	0,24
All		13	9	11	31	40		8	1,27	0,13

Advantage	Additional revenues due to telemedicine services (higher amount of cases).									
Group	big advantage	+4	+3	+2	+1	0	no advantage	no remark	Mean	St.Error
N-User		2	4	10	16	34		6	0,85	0,13
User		3	7	9	10	7		4	1,69	0,20
All		5	11	19	26	41		10	1,15	0,12

Advantage	Survival of pathology department (increase of rate of capacity utilization).									
Group	big advantage	+4	+3	+2	+1	0	no advantage	no remark	Mean	St.Error
N-User		6	5	11	10	37		3	1,03	0,16
User		3	6	7	9	9		6	1,56	0,22
All		9	11	18	19	46		9	1,20	0,13

Advantage	Improvement of reputation of department of pathology.									
Group	big advantage	+4	+3	+2	+1	0	no advantage	no remark	Mean	St.Error
N-User		14	12	11	17	13		5	1,96	0,17
User		6	13	12	4	2		3	2,46	0,17
All		20	25	23	21	15		8	2,13	0,13

#### 4.1.2 ADVANTAGES IN QUALITY IMPROVEMENT

Advantage	Improvement of diagnosis quality (faster diagnostic results, second opinion).									
Group	big advantage	+4	+3	+2	+1	0	no advantage	no remark	Mean	St.Error
N-User		12	5	6	11	35		3	1,25	0,19
User		17	13	2	5	3		0	2,90	0,20
All		29	18	8	16	38		3	1,85	0,16

Advantage	Improvement of patient treatment process (less operations, fast and consistent therapy).									
Group	big advantage	+4	+3	+2	+1	0	no advantage	no remark	Mean	St.Error
N-User		6	5	8	19	31		3	1,07	0,15
User		10	11	11	6	2		0	2,53	0,18
All		16	16	19	25	33		3	1,61	0,14

Advantage	Same quality of patient treatment, location independent.									
Group	big advantage	+4	+3	+2	+1	0	no advantage	no remark	Mean	St.Error
N-User		5	7	16	24	15		5	1,45	0,14
User		10	15	7	3	2		3	2,76	0,18
All		15	22	23	27	17		8	1,91	0,13

Advantage	Efficient qualified on-call-services (24-hour-service, bridge resource gaps, holiday stand-in).									
Group	big advantage	+4	+3	+2	+1	0	no advantage	no remark	Mean	St.Error
N-User		2	2	8	18	37		5	0,72	0,12
User		1	4	9	16	7		3	1,35	0,16
All		3	6	17	34	44		8	0,94	0,10

Advantage	Better communication between treating physicians (primary doctor and specialists).									
Group	big advantage	+4	+3	+2	+1	0	no advantage	no remark	Mean	St.Error
N-User		7	11	24	13	14		3	1,77	0,15
User		16	12	9	0	2		1	3,03	0,17
All		23	23	33	13	16		4	2,22	0,13

Advantage	Improvement of research findings (due to centralized data storage and analysis).									
Group	big advantage	+4	+3	+2	+1	0	no advantage	no remark	Mean	St.Error
N-User		5	15	15	15	16		6	1,67	0,16
User		8	10	8	7	5		2	2,24	0,22
All		13	25	23	22	21		8	1,88	0,13

Advantage	Improved access to high quality medicine, reduction of doctors isolation.									
Group	big advantage	+4	+3	+2	+1	0	no advantage	no remark	Mean	St.Error
N-User		8	15	12	20	13		4	1,78	0,16
User		21	11	4	3	0		1	3,28	0,15
All		29	26	16	23	13		5	2,33	0,13

Advantage	Improvement of know-how standards due to high quality online education, forums, discussions									
Group	big advantage	+4	+3	+2	+1	0	no advantage	no remark	Mean	St.Error
N-User		12	18	12	15	11		4	2,07	0,16
User		18	10	5	3	1		3	3,11	0,18
All		30	28	17	18	12		7	2,44	0,13

#### 4.1.3 SUMMARY OF WEIGHTED ADVANTAGES

Kind of Advantage	non-user	user	all
(cursive letters are concerning about cost efficiency, the other aspects are about quality improvements)			
Improvement of know-how standards due to high quality online education, forums, etc.	2,07	3,11	2,44
Improved access to high quality medicine, reduction of doctors isolation	1,78	3,28	2,33
Better communication between treating physicians (primary doctor and specialists)	1,77	3,03	2,22
<i>Improvement of reputation of pathology department</i>	1,96	2,46	2,13
Same quality of patient treatment, location independent	1,45	2,76	1,91
Improvement of research findings (due to centralized data storage and analysis)	1,67	2,24	1,88
Improvement of diagnosis quality (faster diagnostic results, second opinion)	1,25	2,90	1,85
<i>More efficiency in procedures and structures (sharing resources and equipment)</i>	1,28	2,50	1,71
Improvement of patient treatment process (less operations, fast and consistent therapy)	1,07	2,53	1,61
<i>Cost reduction, savings (less tissue sample transportation, less staff needed)</i>	0,94	1,89	1,27
<i>Survival of pathology department (increase of rate of capacity utilization)</i>	1,03	1,56	1,20
<i>Additional revenues due to telemedicine services (higher amount of cases)</i>	0,85	1,69	1,15
Efficient on-call-services (24-hour-service, bridge resource gaps, holiday replacements)	0,72	1,35	0,94

## 4.2 DISADVANTAGES

### 4.2.1 DISADVANTAGES - WEIGHTING OF DIFFERENT ASPECTS

„Where do you see the risks and disadvantages of telepathology?“

Disadvantage		Higher expenses and unnecessary investments, rise of health-care-costs.									
Group	huge	+4	+3	+2	+1	0	no	no remark	Mean	St.Error	
N-User	disadvantage	28	17	10	12	3	disadvantage	2	2,79	0,15	
User		6	7	9	7	10		1	1,79	0,22	
All		34	24	19	19	13		3	2,43	0,13	

Disadvantage		Accuracy of diagnoses isn't guaranteed (insecure diagnostic quality).									
Group	huge	+4	+3	+2	+1	0	no	no remark	Mean	St.Error	
N-User	disadvantage	14	16	17	11	5	disadvantage	9	2,37	0,15	
User		3	6	5	12	13		1	1,33	0,21	
All		17	22	22	23	18		10	1,97	0,13	

Disadvantage		Overtaxing of pathological experts (additional frequentation of experts by simple cases).									
Group	huge	+4	+3	+2	+1	0	no	no remark	Mean	St.Error	
N-User	disadvantage	21	15	8	14	7	disadvantage	7	2,45	0,17	
User		7	1	9	10	10		3	1,59	0,23	
All		28	16	17	24	17		10	2,14	0,14	

Disadvantage		Inefficient work routine due to long waiting time by real-time systems.									
Group	huge	+4	+3	+2	+1	0	no	no remark	Mean	St.Error	
N-User	disadvantage	16	14	12	11	10	disadvantage	9	2,24	0,18	
User		8	8	9	6	6		3	2,16	0,22	
All		24	22	21	17	16		12	2,21	0,14	

Disadvantage		Loss of jobs, shift of pathological examinations to other medical centers.									
Group	huge	+4	+3	+2	+1	0	no	no remark	Mean	St.Error	
N-User	disadvantage	10	10	11	19	14	disadvantage	8	1,73	0,17	
User		2	3	3	7	23		2	0,79	0,19	
All		12	13	14	26	37		10	1,38	0,14	

Disadvantage		Reduction of pathologist's education and training quality.									
Group	huge	+4	+3	+2	+1	0	no	no remark	Mean	St.Error	
N-User	disadvantage	10	4	11	12	30	disadvantage	5	1,28	0,18	
User		2	1	0	6	30		1	0,44	0,16	
All		12	5	11	18	60		6	0,97	0,13	

Disadvantage		Uncertainty of legal situation.									
Group	huge	+4	+3	+2	+1	0	no	no remark	Mean	St.Error	
N-User	disadvantage	41	9	6	10	3	disadvantage	3	3,09	0,15	
User		10	9	10	4	4		3	2,46	0,21	
All		51	18	16	14	7		6	2,87	0,13	

Disadvantage										
Uncertainty of data security and data privacy questions.										
Group	huge	+4	+3	+2	+1	0	no	no remark	Mean	St.Error
N-User	disadvantage	28	12	9	14	4	disadvantage	5	2,69	0,17
User		9	3	11	7	7		3	2,00	0,23
All		37	15	20	21	11		8	2,44	0,14

Disadvantage										
Uncertainty of reimbursement, telepathology is not efficient.										
Group	huge	+4	+3	+2	+1	0	no	no remark	Mean	St.Error
N-User	disadvantage	28	14	6	9	8	disadvantage	7	2,69	0,18
User		8	4	13	3	8		4	2,03	0,23
All		36	18	19	12	16		11	2,46	0,15

Disadvantage										
Technology is not reliable, but far too insecure and error prone.										
Group	huge	+4	+3	+2	+1	0	no	no remark	Mean	St.Error
N-User	disadvantage	16	9	13	17	7	disadvantage	10	2,16	0,17
User		3	2	4	7	22		2	0,87	0,20
All		19	11	17	24	29		12	1,67	0,15

Disadvantage										
Loss of information due to local separation of sample treatment and diagnosis.										
Group	huge	+4	+3	+2	+1	0	no	no remark	Mean	St.Error
N-User	disadvantage	28	11	10	11	6	disadvantage	6	2,67	0,17
User		2	5	6	9	16		2	1,16	0,20
All		30	16	16	20	22		8	2,12	0,15

#### 4.2.2 SUMMARY OF WEIGHTED DISADVANTAGES

Kind of Disadvantages	non-user	user	all
Uncertainty of legal questions	3,09	2,46	2,87
Uncertainty of reimbursement	2,69	2,03	2,46
Uncertainty of data security and data privacy questions	2,69	2,00	2,44
Higher expenses and unnecessary investments, rise of health-care-costs	2,79	1,79	2,43
Inefficient work routine due to long waiting time by real-time systems (consultant occupied)	2,24	2,16	2,21
Overtaxing of pathological experts (additional frequentation of experts)	2,45	1,59	2,14
Loss of information due to local separation of sample treatment and diagnosis	2,67	1,16	2,12
Accuracy of diagnoses is not guaranteed (insecure diagnostic quality)	2,37	1,33	1,97
This technology is not reliable, far too insecure and error prone	2,16	0,87	1,67
Loss of jobs, shift of pathological examinations to other medical centers	1,73	0,79	1,38
Reduction of pathologist's education quality	1,28	0,44	0,97

## 5 JUDGEMENT OF ACCURACY FACTORS

„Where do you see the main sources of diagnostic accuracy errors?“								
Accuracy Factors	huge influence			no influence			Mean	Stand. Error
	+4	+3	+2	+1	0	no remark		
Not enough education and training in practicing telepathology	10	12	5	5	2	6	2,68	0,21
Errors in the selection of the right tissue sample (sampling errors).	15	3	7	6	3	6	2,62	0,24
Inaccurate field selection.	14	4	4	6	4	8	2,56	0,26
Not enough experience with robotic microscope and screen image interpretation.	7	7	5	8	3	10	2,23	0,24
Low expertise (e.g. specialized know-how is not sufficient).	8	8	4	6	6	8	2,19	0,26
Insufficient diagnostic experience (e.g. due to low examination rates).	6	8	6	6	6	8	2,06	0,25
Insufficient quality of video images.	3	9	6	9	5	8	1,88	0,22
Incorrect preparation or staining of tissue samples.	5	5	6	10	6	8	1,78	0,24
Not enough images available (e.g. due to long transfer time of images).	3	3	12	6	6	10	1,70	0,22
Incorrect interpretation.	5	3	7	11	6	8	1,69	0,23
Psychological stress at tele-ad-hoc examinations (intraoperative frozen sections).	4	2	4	7	13	10	1,23	0,26
Not enough case information available (low communication, access to data).	3	1	6	11	11	8	1,19	0,21

## 6 AREAS OF TELEPATHOLOGY UTILIZATION

„In which areas do you use telepathology?“					
	User total	User %		User total	User %
Histopathology	34	85	Cytogenetics	1	2,5
Cytopathology	16	40	Forensic Pathology	1	2,5
Immunopathology	11	27,5	Molecular Pathology	1	2,5
Dermatology	10	25	Ophthalmology	1	2,5
DNA-Analysis	5	12,5	Electromicroscopy	0	0
Hematology	4	10	Microbiology	0	0
Parasitology	2	5	Toxicology	0	0

„Which organs are examined by telepathology?“					
	User total	User %		User total	User %
Breast, mammary gland	22	55	Endocrine	9	22,5
Lymph node	19	47,5	Kidney	8	20
Gynecological; ovary, uterus	18	45	Liver and gallbladder	7	17,5
Gastrointestinal	16	40	Larynx, pharynx	7	17,5
Thyroid gland	16	40	Salivary gland	7	17,5
Lung	15	37,5	Penis, testes, cord	6	15
Soft tissue	14	35	Suprarenal gland	6	15
Skin	13	32,5	Bone marrow	5	12,5
Head, neck	12	30	Eyes	4	10
Prostate	12	30	Blood	3	7,5
Bladder	11	27,5	Heart	3	7,5
Bones	10	25	Spleen	3	7,5
Nervous system	10	25			

Number of telepathology examinations by participating users (in summary of all participants and single examination numbers)	1998	1999
Intraoperative frozen sections (microscopical)	summary: 1070 (2x5, 2x10, 2x30, 1x40, 1x80, 1x100, 1x110, 1x250, 1x400)	summary: 4684 (2x5, 1x8, 2x10, 1x11, 1x20, 2x30, 2x60, 1x85, 1x100, 1x250, 1x4000)
Cytological smear (microscopical)	summary: 259 (2x2, 1x20, 1x30, 1x40, 1x65, 1x100)	summary: 213 (2x5, 1x7, 1x20, 1x30, 1x40, 1x50, 1x56)
Surgical specimens (microscopical)	summary: 1230 (2x3, 1x10, 1x30, 1x35, 1x150, 1x1000)	summary: 1363 (1x3, 2x10, 2x20, 1x30, 2x50, 1x170, 1x1000)
Biopsy specimens (microscopical)	summary: 246 (1x2, 1x4, 1x10, 1x30, 2x50, 1x700)	summary: 378 (1x5, 1x10, 1x20, 1x24, 1x30, 2x50, 1x89, 1x100)
Quantitative evaluation (DNA-cytometry, histometry, PCR, FISH, CEH)	summary: 1050 (1x150, 1x900)	summary: 1770 (1x20, 1x100, 1x150, 1x400, 1x1100)
Expert consultations (general)	summary: 913 (2x5, 2x10, 1x7, 1x11, 1x15, 1x150, 1x700)	summary: 1222 (2x5, 1x6, 1x12, 3x20, 1x34, 1x50, 1x150, 1x900)

## 7 REASONS FOR TELEPATHOLOGY INTRODUCTION

„What are the reasons and objectives for the introduction and use of your telepathology system?“	User Total	User %
Strategic decision (e.g. threat of competition, improvement of institutional reputation)	23	57,5
Quality improvement (better examination, shorter procedures, increased expert know-how)	23	57,5
Wish of cooperation (e.g. closer cooperation with institutions, clinics and doctors of the region)	23	57,5
Participation in a research project	19	47,5
Internal engagement of physicians (e.g. pathology director wanted to test such a system)	11	27,5
Wish of more efficiency and cost reduction (internal cost saving, economical decision)	10	25
To avoid having patients transferred or treated at other clinics.	5	12,5
Pressure of cooperation (e.g. medical association - to meet the demands of a partner clinic)	3	7,5
Wish to increase number of examinations (more utilization of equipment and specialty know-how)	1	2,5

## 8 ALREADY AVAILABLE EQUIPMENT OF NON-USERS

Equipment		amount is first given in total, then in per cent											
Personal computers	number	0		1-5		6-10		>10					
	total	3	6%	34	50%	17	25%	14	19%				
Workstations	number	0		1-2		3		4		5		8	
	total	34	50%	14	21%	9	13%	6	9%	3	4%	2	3%
Cameras	number	0		1		2		3		>3			
	total	39	55%	13	18%	10	14%	5	7%	4	6%		
PACS	number	0				1							
	total	69				97%				2		3%	
Digitalization	kind	no digitalization		frame grabber (fg)		digital camera (dc)		digital scanner (ds)					
	total	40	56%	4	6%	3	4%	4	6%				
	kind	fg + dc		fg + ds		dc + ds		fg + dc + ds					
	total	1	1%	7	10%	7	10%	5	7%				
Network access	kind	no external access		modem		ISDN		modem + ISDN		LAN / Uni network			
	total	7	10%	14	20%	44	62%	3	4%	3	4%		

## APPENDIX IX - FACTOR ANALYSIS - TABLES

### ATTITUDE WHEN FACED WITH NEW TECHNOLOGIES (FOUR VARIABLES)

#### RELIABILITY ANALYSIS - SCALE (ALPHA)

Kind of technology	Questionnaire number	Mean	Std D.	Cases
1. new technology in general	SV_1_7_1	1,4144	0,8594	116,0
2. telemedicine	SV_1_7_2	0,9817	1,0128	116,0
3. telepathology	SV_1_7_3	0,7658	1,2646	116,0
4. Internet services (www)	SV_1_7_4	1,1308	1,1578	116,0

Variables: 4; Mean: 12,2927; Variance: 11,0921; Std.D.: 3,3305

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item - Total correlation	Alpha if Item Deleted
SV_1_7_1	8,8783	7,6252	,5748	,7199
SV_1_7_2	9,3110	6,2971	,7415	,6238
SV_1_7_3	9,5269	6,0260	,5584	,7271
SV_1_7_4	9,1618	6,9401	,4609	,7730

Reliability Coefficients: N of Cases = 116,0; N of Items = 4; Cronbachs Alpha = ,7679

(Cronbachs Alpha measures the value of single ratings compared to the overall mean; at a alpha value of 1,0 all ratings are identically; for an internal consistence alpha should be higher than 0,65, which is the case at the ratings above.

Therefore the values can be accumulated to one factor.

### WISH TO COOPERATE (TWO VARIABLES)

		SMEAN(V_3_10_8)	SMEAN(V_4_1_1)
Participants interest SMEAN (V_3_10_8)	Pearson Correlation	1,000	,823
	Sig. (2-tailed)	,	,000
	N	116	116
Importance of cooperation in the future SMEAN (V_4_1_1)	Pearson Correlation	,823	1,000
	Sig. (2-tailed)	,000	,
	N	116	116

\*\* Correlation is significant at the 0.01 level (2-tailed); Value of correlation analysis: 0,83

The two questions can be summarized to one factor.

## JUDGEMENTS OF INTEREST IN VARIOUS TELEPATHOLOGY SERVICES INTEREST OF PARTICIPANTS

Rotated Factor Matrix:

	<b>Factor 1</b>	<b>Factor 2</b>
I2_5_1	.00426	.68085
I2_5_2	.09287	.76315
I2_5_3	.05197	.82002
I2_5_4	.38109	.71936
I2_5_5	.41777	.59765
I2_5_6	.21896	.55015
I2_5_7	.66702	.37507
I2_5_8	.68295	.15060
I2_5_9	.79286	.18732
I2_5_10	.75422	.16945
I2_5_11	.55324	.46113
I2_5_12	.74772	-.09287

<b>Variable</b>	<b>Communality *</b>	<b>Factor</b>	<b>Eigenvalue</b>	<b>Pct of Var</b>	<b>Cum Pct</b>
I2_5_1	.46358 *	1	4.92428	41.0	41.0
I2_5_2	.59102 *	2	1.77287	14.8	55.8
I2_5_3	.67513 *				
I2_5_4	.66270 *				
I2_5_5	.53172 *				
I2_5_6	.35060 *				
I2_5_7	.58559 *				
I2_5_8	.48910 *				
I2_5_9	.66372 *				
I2_5_10	.59756 *				
I2_5_11	.51871 *				
I2_5_12	.56771 *				

Method of extraction: analysis of the principal components with a rotating component factor matrix.

Method of rotation: varimax by using Kaiser's normalization. The rotation is converted into 3 iterations.

Overall variance explained by 2 factors: 55,8 %.

## JUDGEMENT OF INTEREST IN FIVE YEARS

Rotated Factor Matrix:

	<b>Factor 1</b>	<b>Factor 2</b>
I2_6_1	.02477	<b>.66543</b>
I2_6_2	.18334	<b>.76446</b>
I2_6_3	.10944	<b>.80066</b>
I2_6_4	.39248	<b>.70687</b>
I2_6_5	.40025	<b>.61257</b>
I2_6_6	.19027	<b>.62491</b>
I2_6_7	<b>.70703</b>	.23110
I2_6_8	<b>.64446</b>	.23580
I2_6_9	<b>.80641</b>	.18985
I2_6_10	<b>.72176</b>	.30737
I2_6_11	<b>.60824</b>	.43034
I2_6_12	<b>.77259</b>	-.09972

<b>Variable</b>	<b>Communality *</b>	<b>Factor</b>	<b>Value</b>	<b>Pct of Var</b>	<b>Cum Pct</b>
I2_6_1	.44341 *	1	5.17040	43.1	43.1
I2_6_2	.61802 *	2	1.64789	13.7	56.8
I2_6_3	.65304 *				
I2_6_4	.65371 *				
I2_6_5	.53545 *				
I2_6_6	.42672 *				
I2_6_7	.55329 *				
I2_6_8	.47093 *				
I2_6_9	.68633 *				
I2_6_10	.61541 *				
I2_6_11	.55514 *				
I2_6_12	.60685 *				

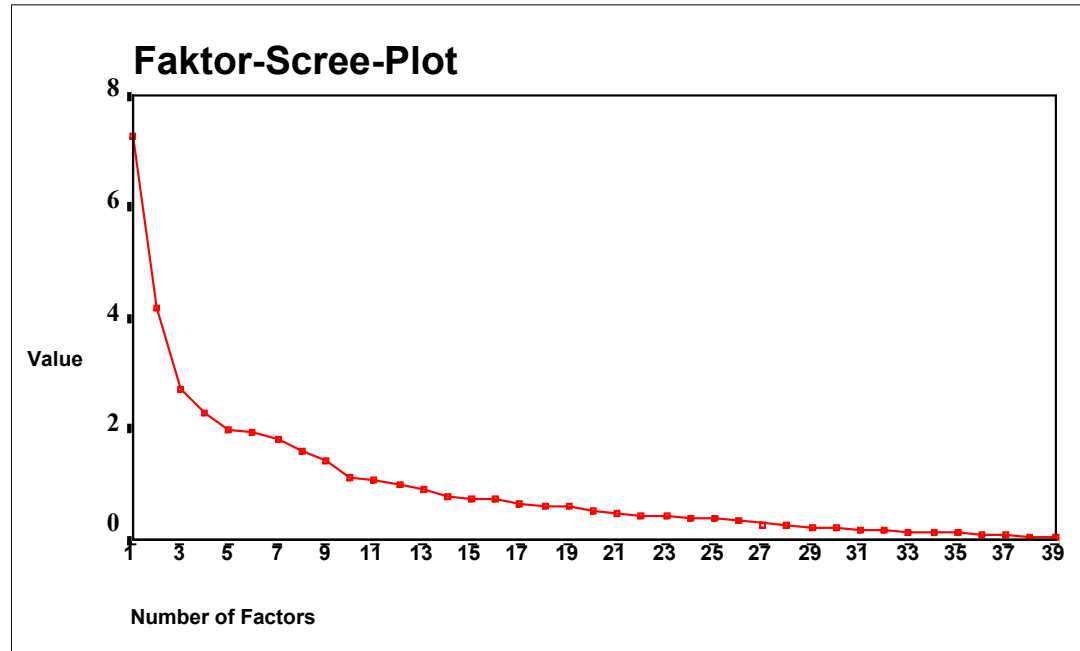
Method of extraction: analysis of the principal components with a rotating component matrix.

Method of rotation: varimax by using Kaiser's normalization. The rotation is converted into 3 iterations.

Overall variance explained by 2 factors: 56,8 %.

## JUDGEMENT OF FACTORS OF TELEPATHOLOGY'S SUCCESS

### SCREE PLOT OF FACTOR ANALYSIS



Variable	Communality	* Factor	Value	Pct of Var	Cum Pct
F4_1_1	.60790	* 1	7.27257	18.6	18.6
F4_1_2	.63271	* 2	4.19282	10.8	29.4
F4_1_3	.55299	* 3	2.72451	7.0	36.4
F4_1_4	.58031	* 4	2.30433	5.9	42.3
F4_1_5	.55127	* 5	2.00877	5.2	47.4
F4_2_1	.52282	* 6	1.93769	5.0	52.4
F4_2_2	.68893	* 7	1.83515	4.7	57.1
F4_2_3	.50705	* 8	1.60321	4.1	61.2
F4_2_4	.58925	* 9	1.44466	3.7	64.9
F4_4_1	.69164	* 10	1.13246	2.9	67.8

- Overall variance explained by 12 factors: 73,2 %. VARIMAX rotation 1 for extraction 1 in analysis 1 - Kaiser Normalization, VARIMAX converged in 29 iterations.  
-> result after first factor analysis by the program; yet, because at two of the twelve factors only one variable was included and since the graphic allowed an analysis of 10 and 5 factors, further analyses were executed.
- Overall variance explained by 10 factors: 67,8 %; VARIMAX converged in 15 iterations. Referring to the scree plot, this distribution of variables was finally taken for further significance calculations.
- Overall variance explained by 5 factors: 46,50 %; VARIMAX converged in 22 iterations.  
Unfortunately the analysis with 5 factors was too inaccurate, that is why finally the analysis with 10 factors was taken as basis for the significance calculations with other variables.

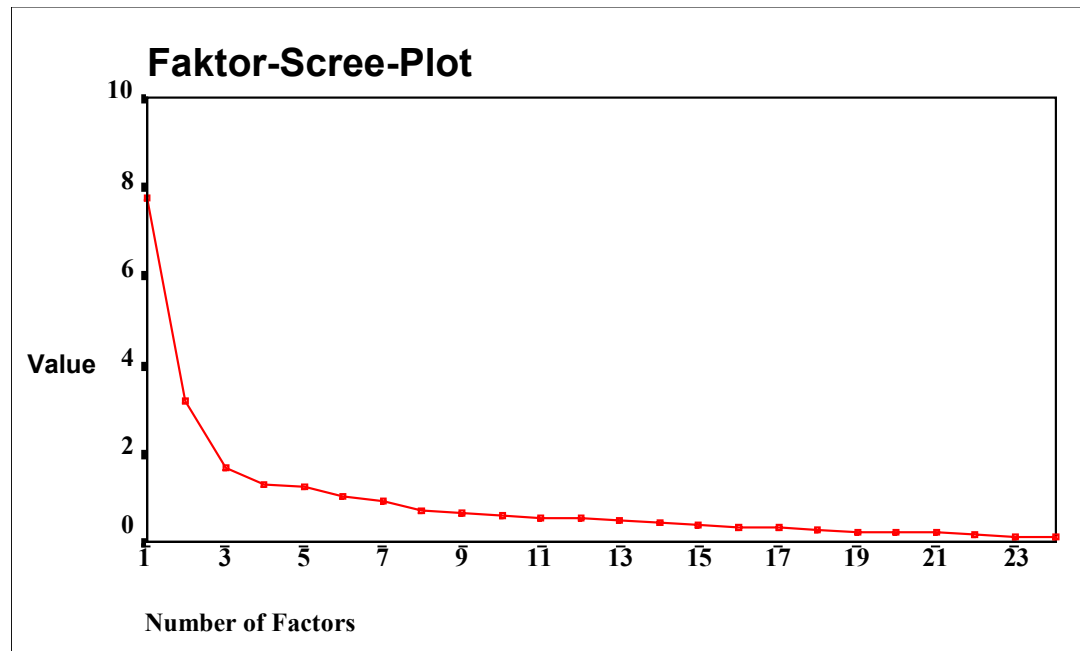
**JUDGEMENT OF FACTORS FOR TELEPATHOLOGY SUCCESS - COMPRESSED TO 10 FACTORS**

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8	Factor 9	Factor 10
F4_1_1	.32437	.32103	.37251	<b>.42626</b>	-.01413	-.00164	-.04219	.17053	-.19261	-.10485
F4_1_2	<b>.55109</b>	.26251	.30007	.16279	.22247	-.02005	.02917	.27441	-.12771	-.03467
F4_1_3	<b>.67691</b>	-.03377	-.13246	.06999	.06409	.00032	-.01765	.24941	-.06703	.00940
F4_1_4	<b>.70616</b>	-.08227	.09233	.18623	-.05322	-.04655	-.09355	.01173	.03126	-.12962
F4_1_5	<b>.53547</b>	-.12758	-.18434	.03655	.09840	-.18281	.17587	-.23166	.11052	-.27025
F4_2_1	<b>.44669</b>	.28055	.18060	.09533	.14140	-.19144	.08414	.16729	-.25715	.21223
F4_2_2	<b>.71859</b>	-.02493	-.00396	-.08984	.16436	-.26374	.10613	.08096	.11369	.19113
F4_2_3	<b>.57209</b>	.08098	-.17087	-.14542	-.00236	.23315	.06132	.05879	.01202	.24724
F4_2_4	<b>.47706</b>	.09380	-.10085	-.20126	-.14116	.22813	.09839	.06309	.12624	.44791
F4_4_1	-.01971	.11555	<b>.80099</b>	.04775	.15139	.05061	.04530	-.00659	-.00465	.08024
F4_4_2	-.09760	.01021	<b>.73311</b>	.05480	.03287	.08482	-.04153	-.20304	.02666	-.01062
F4_4_3	.00733	.02829	<b>.62004</b>	-.07278	.08092	-.02369	.42203	.08764	.29397	.07590
F4_4_4	-.05421	.01524	<b>.64921</b>	.08860	.04840	.09103	.32973	-.04506	.11764	.11860
F4_3_1	.44649	.09505	-.05075	.03870	.01617	-.00386	-.02917	<b>.68580</b>	.09850	.09931
F4_3_2	.36804	.04985	-.04348	.05730	.09481	-.04451	-.00776	<b>.73390</b>	.18215	.00724
F4_5_1	-.10185	-.02179	.13587	.14379	-.02120	<b>.79009</b>	.17530	-.02059	-.06605	.22754
F4_5_2	-.03498	-.01089	.20358	-.02375	.26071	<b>.79956</b>	.12417	-.00032	.04187	-.05955
F4_5_3	-.02405	.09112	-.06633	-.10401	.07683	<b>.82779</b>	-.02065	-.02966	.09696	-.00639
F4_6_1	-.06804	.11451	.22957	.15314	.09110	.16569	<b>.71937</b>	.04088	.01038	.16928
F4_6_2	.00472	.02269	.27305	.03654	.18263	.07501	<b>.75983</b>	-.10242	.00988	.00315
F4_6_3	.39041	.04517	-.14935	-.04580	-.10717	.05767	<b>.65073</b>	.05432	.12488	.01128
F4_7_1	.06016	.04174	.01952	<b>.75466</b>	.28579	-.06503	.08324	.03889	.24291	-.00005
F4_7_2	-.03023	.21659	.07168	<b>.77678</b>	.00170	.05577	.26308	-.14071	.09869	.09521
F4_7_3	-.04578	.17513	-.03767	<b>.77552</b>	.11127	-.06599	-.10838	.08088	.07287	.07564
F4_8_1	-.10663	<b>.72657</b>	-.03512	.18991	.16982	.12481	.13359	.29449	-.01235	.02445
F4_8_2	.05048	<b>.70527</b>	-.06285	.13831	.40234	-.09319	.08196	.14508	.01594	-.01989
F4_8_3	.17730	<b>.72186</b>	.10651	-.00491	-.03845	.08044	-.00078	-.34371	.21952	.11735
F4_8_4	-.06887	<b>.83304</b>	.16774	.11732	.10971	.02005	-.01605	-.12267	.15186	.13585
F4_9_1	.11545	.33290	.19362	.26893	.10917	.02441	-.02286	<b>-.56516</b>	-.04266	.16193
F4_9_2	.22322	-.07616	.21367	<b>.60038</b>	.02610	.10763	-.05072	-.11330	-.16242	.35046
F4_9_3	.09045	.11824	.08403	.30197	.15020	.07325	.10806	-.08243	.00913	<b>.75771</b>
F4_10_1	.06394	.08435	.05781	.09457	.15367	.10300	.05543	.19808	<b>.83071</b>	-.10134
F4_10_2	.00334	.21288	.22988	.17689	-.04618	-.02407	.10458	-.03939	<b>.64162</b>	.43581
F4_10_3	-.06575	.16734	.30166	.17001	.10918	-.03632	.16876	.15610	<b>.51659</b>	.53292
F4_11_1	.17321	.05083	-.05587	.00553	<b>.69450</b>	-.01541	-.15217	.12058	.34745	.06555
F4_11_2	.04409	.23018	.35890	.22939	<b>.36675</b>	.22258	-.35058	-.02598	.28372	-.08875
F4_11_3	.01907	.40162	.28533	.14973	<b>.59369</b>	-.01950	.10767	-.28318	-.03724	.24616
F4_11_4	.08139	.14775	.07296	.15038	<b>.76877</b>	.15815	.17617	-.04681	-.02258	-.06403
F4_11_5	.00210	.12814	.18491	.11488	<b>.76401</b>	.15925	.09219	.07167	-.01888	.07780

Method of extraction: analysis of the principal components with a rotating component matrix. Method of rotation: varimax by using Kaiser's normalization. The rotation is converted by 15 iterations. Overall variance explained by 12 factors: 67,8%.

**ADVANTAGES AND DISADVANTAGES -**

SCREE PLOT OF ADVANTAGES AND DISADVANTAGES ANALYSIS:



Variable	Communality	* Factor	Value	Pct of Var	Cum Pct
V5_2_1	.67400	* 1	7.74513	32.3	32.3
V5_2_2	.68415	* 2	3.20326	13.3	45.6
V5_2_3	.62412	* 3	1.67384	7.0	52.6
V5_2_4	.68182	* 4	1.32261	5.5	58.1
V5_2_5	.62686	* 5	1.25532	5.2	63.3
V5_1_1	.62880	* 6	1.07443	4.5	67.8

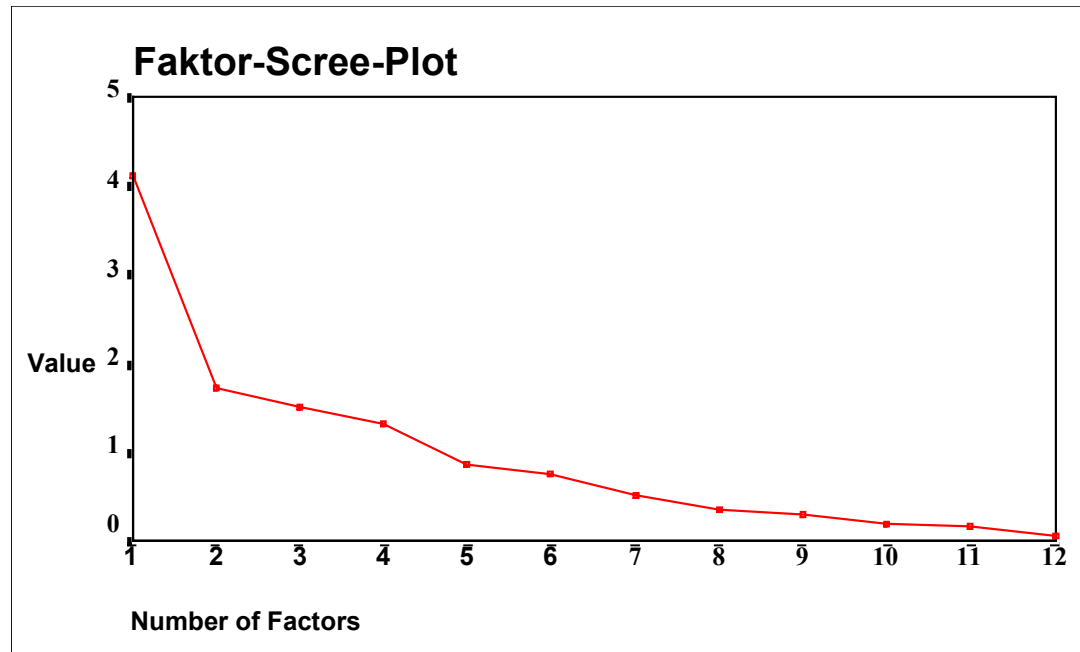
Referring to scree plot: 4-factorial solutions; 56, 44% explained variation by; rotated component matrix.  
 Extraction method: principal component analysis. Rotation method: VARIMAX with Kaiser’s normalization.  
 Rotation converged in 10 iterations.

Referring to the system’s variable accumulation: six factors; explained variation by 67,8%  
 Extraction method: principal component analysis. Rotation method: VARIMAX with Kaiser’s normalization.  
 Rotation converged in 17 iterations. This distribution was taken for further significance calculations.

**ADVANTAGES AND DISADVANTAGES - FROM 24 ATTITUDES TO SIX FACTORS**

	<b>Factor 1</b>	<b>Factor 2</b>	<b>Factor 3</b>	<b>Factor 4</b>	<b>Factor 5</b>	<b>Factor 6</b>
V5_2_1	.03384	<b>.54994</b>	.48616	-.30523	.18204	-.08810
V5_2_2	-.02061	<b>.64053</b>	.30017	-.38270	.19056	-.02373
V5_2_3	-.00583	<b>.71668</b>	.17809	-.00893	.27218	.06767
V5_2_4	-.02203	<b>.81032</b>	.08757	.00582	.07775	-.10469
V5_2_5	-.21415	<b>.72127</b>	-.01333	.14313	-.19002	-.06326
V5_1_1	-.29726	<b>.48904</b>	.27651	-.26679	.39177	-.01232
V5_1_2	-.36674	<b>.42753</b>	.32490	-.26501	.39384	.03179
V5_1_3	-.35580	<b>.45481</b>	.19923	-.26237	.35315	.19231
V5_1_4	-.09866	.29320	.22057	-.05249	<b>.70400</b>	-.02500
V5_1_5	-.40348	.38998	<b>.43149</b>	.18113	.30565	-.08837
V5_1_6	.00868	.06481	<b>.82604</b>	-.04895	.10975	.16228
V5_1_7	-.21271	.22465	<b>.80982</b>	.00811	.04164	-.09274
V5_1_8	-.13261	.14056	<b>.82606</b>	.07677	.07592	-.14788
N5_3_1	<b>.50255</b>	-.15887	-.24410	.36683	.30989	.26479
N5_3_2	<b>.57427</b>	-.12259	-.25230	.01702	-.32890	.36104
N5_3_3	.20502	-.29629	-.00759	.26444	.24974	<b>.64977</b>
N5_3_4	.14543	.12325	-.04739	.21964	-.13639	<b>.84135</b>
N5_3_5	<b>.73749</b>	.08904	.00806	.30240	.02519	-.12625
N5_3_6	<b>.72947</b>	-.01757	-.15912	.17281	-.16651	.20594
N5_3_7	.24641	.04052	.08691	<b>.62431</b>	-.40723	.21845
N5_3_8	.26933	-.05778	.12495	<b>.69441</b>	-.17725	.28488
N5_3_9	.29349	-.08178	-.08285	<b>.76950</b>	.15926	.10704
N5_3_10	<b>.72931</b>	-.22603	-.04891	.23822	.05091	.03403
N5_3_11	<b>.72539</b>	-.15796	-.06517	.05574	-.24300	.35881

**ACCURACY FACTORS**



Variable	Communality *	Factor	Value	Pct of Var	Cum Pct
A6_5_1	.89419 *	1	4.13189	34.4	34.4
A6_5_2	.85018 *	2	1.74173	14.5	48.9
A6_5_3	.49886 *	3	1.50893	12.6	61.5
A6_5_4	.66547 *	4	1.33224	11.1	72.6
A6_5_5	.85233 *				
A6_5_6	.73398 *				
A6_5_7	.90636 *				
A6_5_8	.71904 *				
A6_5_9	.73372 *				
A6_5_10	.70002 *				
A6_5_11	.50576 *				
A6_5_12	.65488 *				

	Factor 1	Factor 2	Factor 3	Factor 4
A6_5_1	.08153	.93592	.01866	.10608
A6_5_2	.13383	.90142	.12651	.06087
A6_5_3	.22274	.31166	.54266	.24006
A6_5_4	-.08133	-.06647	.59351	.54971
A6_5_5	.76971	.16829	.45194	-.16526
A6_5_6	.17589	.02170	.83813	.01068
A6_5_7	.83782	.24069	.34468	-.16638
A6_5_8	.06795	.39273	-.02154	.74815
A6_5_9	.82802	.13911	.06476	.15673
A6_5_10	.71408	-.03174	-.28293	.33023
A6_5_11	.62264	-.01650	.13577	.31522
A6_5_12	.22870	-.01174	.16361	.75873

Method of extraction: analysis of the principal components with a rotating component matrix.

Rotating matrix of components: explained variation by 72.62 %.

Method of rotation: varimax by using Kaiser's normalization. The rotation is converted into 11 iterations.

## **ANALYSES WHICH WERE NOT USED FOR FURTHER SIGNIFICANCE CALCULATIONS**

### **ADVANTAGES AND DISADVANTAGES – ACCUMULATED TO FOUR FACTORS**

	<b>Factor 1</b>	<b>Factor 2</b>	<b>Factor 3</b>	<b>Factor 4</b>
V5_2_1	-.12035	<b>.66087</b>	.34880	-.10925
V5_2_2	-.19874	<b>.74513</b>	.16428	-.08137
V5_2_3	.00645	<b>.76384</b>	.16294	.06432
V5_2_4	.04483	<b>.77826</b>	.07742	-.20113
V5_2_5	.05768	<b>.57863</b>	.05005	-.32047
V5_1_1	-.42214	<b>.60775</b>	.27169	.07288
V5_1_2	-.46971	<b>.55186</b>	.33343	.11172
V5_1_3	-.42737	<b>.56690</b>	.20287	.20425
V5_1_4	-.28986	<b>.47378</b>	.27191	.34179
V5_1_5	-.23588	.40973	<b>.57441</b>	.01307
V5_1_6	.03414	.18580	<b>.73475</b>	.14178
V5_1_7	-.09680	.27050	<b>.79725</b>	-.13548
V5_1_8	-.02850	.19194	<b>.82141</b>	-.12360
N5_3_1	.47518	-.10128	-.21989	<b>.51290</b>
N5_3_2	<b>.56507</b>	-.15216	-.42060	.14604
N5_3_3	.28077	-.20334	.01603	<b>.74190</b>
N5_3_4	.41611	.10526	-.07959	<b>.54432</b>
N5_3_5	<b>.69225</b>	.08760	-.08181	.00002
N5_3_6	<b>.70597</b>	-.03040	-.30625	.13831
N5_3_7	<b>.70711</b>	-.13795	.15171	-.02272
N5_3_8	<b>.68804</b>	-.17501	.22319	.19902
N5_3_9	<b>.59031</b>	-.15551	.09441	.30183
N5_3_10	<b>.62668</b>	-.18467	-.14876	.19457
N5_3_11	<b>.67784</b>	-.14100	-.26741	.21654

Method of extraction: analysis of the principal components with a rotating component matrix.

Method of rotation: VARIMAX by using Kaiser Normalization. The rotation is converted into 10 iterations.

Explained variance: 56.44%

<b>Advantages and Disadvantages – compressed from 24 variables to 6 factors</b>	<b>Factor 1</b>	<b>Factor 2</b>	<b>Factor 3</b>	<b>Factor 4</b>
<b>Uncertainty</b>				
5.3.2 <b>Accuracy of diagnoses</b> isn't guaranteed	56507			
5.3.5 <b>Loss of jobs</b> , examination shift to other medical centers	69225			
5.3.6 Reduction of pathologist's <b>education quality</b>	70597			
5.3.7 Uncertainty of <b>legal questions</b>	70711			
5.3.8 Uncertainty of <b>data security</b> and data privacy questions	68804			
5.3.9 Uncertainty of <b>reimbursement</b>	59031			
5.3.10 This technology is <b>not reliable</b> , far too error prone	62668			
5.3.11 <b>Loss of information</b> due to task splitting	67784			
<b>More efficiency due to medical quality improvement</b>				
5.1.1 Improvement of <b>diagnosis quality</b> (faster diagnostic results)		66087		
5.1.2 Improvement of patient <b>treatment process</b>		74513		
5.1.3 <b>Same quality</b> of patient treatment, location independent		76384		
5.1.4 Efficient <b>on-call-services</b> (24-hour-service)		77826		
5.2.1 <b>More efficiency</b> in procedures and structures		57863		
5.2.2 <b>Cost reduction, savings</b> (less tissue sample transportation)		60775		
5.2.3 <b>Additional revenues</b> due to telemedicine services		55186		
5.2.4 <b>Survival of pathology department</b> (capacity utilization)		56690		
5.2.5 Improvement of <b>reputation</b> of pathology department		47378		
<b>Higher know-how</b>				
5.1.5 Better <b>communication</b> between treating physicians			57441	
5.1.6 Improvement of <b>research findings</b> (data storage + analysis)			73475	
5.1.7 Improved <b>access to medicine</b> , reduction of doctors isolation			79725	
5.1.8 Improvement of <b>know-how standards</b> , online education			82141	
<b>Less efficiency</b>				
5.3.1 <b>Higher expenses</b> and unnecessary investments				51290
5.3.3 <b>Overtaxing</b> of pathological experts				74190
5.3.4 <b>Inefficient work routine</b> due to real-time coordination				54432

**JUDGEMENT OF FACTORS FOR TELEPATHOLOGY SUCCESS - TWELVE FACTORS**

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8	Factor 9	Factor 10	Factor 11	Factor 12
F4_1_1	-.01856	.39396	<b>.42851</b>	.28843	-.01434	.15211	-.00518	.21240	-.14531	.32095	.01124	-.02936
F4_1_2	.22604	.14525	.40507	<b>.44946</b>	-.00669	-.00584	-.05559	.25160	-.02996	.38864	.26151	-.03362
F4_1_3	.04514	-.02194	-.10844	<b>.76062</b>	-.09398	-.09923	.03080	.24440	-.05090	.14331	.07827	.16014
F4_1_4	-.05036	.16274	.05811	<b>.69455</b>	-.01992	.16109	-.01704	.26615	-.09999	-.25182	.02462	-.03056
F4_1_5	.11243	.05009	-.10551	<b>.59951</b>	.04754	-.11605	-.20113	-.25453	.12474	-.00399	.19599	-.28147
F4_2_1	.15497	.14996	.20296	.19093	.14784	.20402	-.24436	.33378	-.27565	.13045	<b>.34441</b>	.12332
F4_2_2	.17852	-.08046	-.00530	<b>.60387</b>	.10087	.04454	-.28465	.21965	.08517	-.08386	.33486	.15499
F4_2_3	.03870	-.04037	-.07824	.25383	.01408	.04933	.13863	.16416	.00824	.00672	<b>.69432</b>	.00390
F4_2_4	-.09304	-.08389	-.03417	.10850	.07297	.08770	.12406	.17324	.13986	-.03603	<b>.76399</b>	.15163
F4_4_1	.15669	.03008	<b>.79938</b>	-.05728	.15588	.06879	.04300	-.00558	.08258	.07877	-.02569	.10578
F4_4_2	.04792	.06142	<b>.75072</b>	-.11784	.06252	.07023	.07466	-.18305	.08814	-.07056	-.04139	-.00932
F4_4_3	.08144	-.06818	<b>.46990</b>	-.04452	.57960	.11346	-.01493	.18478	.26964	-.12405	-.05434	.06044
F4_4_4	.02710	.00227	.46828	.09315	<b>.48177</b>	.15463	.15672	.01710	.10567	-.09085	-.32688	.30306
F4_3_1	.00395	.02332	-.05909	.27445	-.00530	-.06763	-.01213	<b>.75318</b>	.07785	.14981	.19459	.06334
F4_3_2	.08525	.07456	-.05509	.14963	.03728	-.11260	-.06283	<b>.81900</b>	.13869	.08904	.19005	-.08530
F4_5_1	-.02876	.11059	.11213	-.06920	.16590	-.06676	<b>.79223</b>	-.11000	-.00573	.08770	.07317	.26096
F4_5_2	.26947	-.00586	.22555	-.07979	.12922	-.08044	<b>.77446</b>	-.05752	.07379	.06456	.14290	-.11332
F4_5_3	.08809	-.09821	-.12056	-.05312	.02877	.19518	<b>.83374</b>	.05955	.01016	-.06680	.04025	-.01713
F4_6_1	.07767	.16072	.10763	-.08316	<b>.74895</b>	.00598	.15544	-.00356	.04468	.15694	.05978	.14949
F4_6_2	.17843	.08352	.13275	-.03954	<b>.83558</b>	.04879	.05924	-.05110	-.02886	-.04081	.05788	-.04473
F4_6_3	-.11689	-.06719	-.24993	.44281	<b>.59262</b>	.00886	.06356	.03942	.11116	.11346	.14178	.03544
F4_7_1	.28099	<b>.76145</b>	.00081	.06647	.09461	.01537	-.05551	.10756	.22561	.02001	-.08385	.00354
F4_7_2	.00535	<b>.79340</b>	.08623	-.02347	.22020	.09276	.03866	-.16329	.16337	.22577	.04491	.06821
F4_7_3	.10190	<b>.76619</b>	-.06406	-.04711	-.06586	.16301	-.04330	.19296	.03062	.06114	-.16916	.12209
F4_8_1	.16457	.14537	-.00805	-.09857	.05949	.27839	.11345	.16154	.09997	<b>.76445</b>	-.00714	.04594
F4_8_2	.40294	.09836	-.06908	.07679	.04784	.40823	-.09009	.13776	.05016	<b>.59919</b>	-.06816	.03644
F4_8_3	.00780	.01695	.04991	.11222	.06794	<b>.82593</b>	.06911	-.10387	.14474	.18549	.09287	.09033
F4_8_4	.14201	.13104	.12240	-.15089	.05694	<b>.75280</b>	.00648	.03648	.12803	.38673	.00125	.10620
F4_9_1	.16143	.38368	.19601	-.08006	.08203	<b>.56663</b>	-.02941	-.26987	-.13756	-.16072	.24061	.02612
F4_9_2	.02371	<b>.58626</b>	.23692	.18937	-.02727	-.01124	.10524	-.04329	-.12648	-.06939	.10763	.39690
F4_9_3	.15065	.26518	.02200	.05826	.12158	.14749	.07473	-.04086	.07009	.04448	.16380	<b>.78667</b>
F4_10_1	.17498	.10944	.01952	.03214	.06231	.06393	.10190	.23044	<b>.81851</b>	-.00543	.03026	-.21185
F4_10_2	-.02146	.15487	.21033	.00102	.07089	.14951	-.03532	-.09397	<b>.76591</b>	.14990	.15293	.36220
F4_10_3	.11144	.12297	.19342	-.07155	.21869	.13493	-.01991	.15696	<b>.58896</b>	.08154	.00720	.52661
F4_11_1	<b>.70884</b>	.03615	-.11815	.06465	-.05779	.17548	-.01112	.33558	.22097	-.19227	.01146	.01271
F4_11_2	.37891	.19578	.30454	.06720	-.20261	<b>.38800</b>	.26514	.18802	.18843	-.09109	-.25768	.00314
F4_11_3	<b>.61338</b>	.16189	.26609	-.01883	.15653	.36917	-.03820	-.19625	-.01308	.18682	.05662	.24706
F4_11_4	<b>.76700</b>	.14276	.09718	.11826	.13821	-.02002	.14769	-.10169	.02194	.24219	.01613	-.03984
F4_11_5	<b>.75711</b>	.09709	.17094	.00356	.11710	.00047	.15932	.05824	.00973	.16849	-.03342	.11285

Method of extraction: analysis of the principal components with a rotating component matrix. Explained variance: 73,2%.

Method of rotation: VARIMAX by using Kaiser Normalization. The rotation is converted into 29 iterations.

Various Factors of Success – compressed from 39 variables to 12 factors	Factor	Various Factors of Success – compressed from 39 variables to 12 factors	Factor
<b>1. Workflow</b>	<b>1</b>	<b>7. Accuracy of diagnostic</b>	<b>7</b>
4.11.1 Influence of <b>fast respond times</b> / image transfer	70884	4.5.1 Accuracy of <b>macro examination</b> (correct gross exam.)	79223
4.11.3 Influence of <b>user support</b> (training, help menus, hotline)	61338	4.5.2 Accurate <b>sample preparation</b> and precise field selection	77446
4.11.4 <b>Simplicity of system use</b> , user-friendly system	76700	4.5.3 Accuracy of <b>micro examination</b>	83374
4.11.5 Influence of <b>system flexibility</b> to support the workflow	75711		
<b>2. Equipment</b>	<b>2</b>	<b>8. Management aspects</b>	<b>8</b>
4.1.1 <b>Availability of advisory desks</b> for system selection	39396	4.3.1 Influence of <b>structured project design</b>	75318
4.7.1 Quality of <b>medical equipment</b> (microscope)	76145	4.3.2 <b>Coordination</b> of system utilization	81900
4.7.2 Quality of <b>computer equipment</b> (PC, monitor size, etc.)	79340		
4.7.3 Influence of <b>network connections</b> (bandwidth, stability)	76619		
4.9.2 Quality of <b>monitor images</b> (resolution, color, contrast)	58626		
<b>3. Legal Certainty</b>	<b>3</b>	<b>9. Reliability</b>	<b>9</b>
4.4.1 Explicitness of <b>legal liability regulations</b>	79938	4.10.1 Influence of <b>system reliability</b> (total break downs)	81851
4.4.2 Qualification ( <b>licensing agreements</b> )	75072	4.10.2 Influence of <b>access control</b> (access to system and data)	76591
4.4.3 <b>Reimbursement</b> regulation (per contract or law)	46990	4.10.3 <b>Data security</b> (no misuse or loss of data by exchange)	58896
4.4.4 Regulations about data exchange and <b>data protection</b>	48177		
<b>4. Acceptance</b>	<b>4</b>	<b>10. Standards</b>	<b>10</b>
4.1.2 External <b>acceptance</b> (e.g. insurances, <b>HMOs</b> , politicians)	44946	4.8.1 Compatible <b>technical standards</b>	76445
4.1.3 Internal <b>acceptance</b> of <b>top management</b> (director)	76062	4.8.2 Compatible <b>data and image formats</b>	59919
4.1.4 Internal <b>acceptance of physicians</b> and medical staff (users)	69455		
4.1.5 <b>Acceptance of patients</b>	59951		
4.2.2 Internal <b>institution politics</b> (institution's objectives)	60387		
<b>5. Cost</b>	<b>5</b>	<b>11. Politics</b>	<b>11</b>
4.6.1 Influence of <b>investment and subsequent cost</b>	74895	4.2.1 Influence of <b>health care politics</b> and <b>health care laws</b>	34441
4.6.2 <b>Cost effectiveness</b> of telepathology services	83558	4.2.3 Influence of <b>geographical factors</b> (population, landscape)	69432
4.6.3 Health care <b>efficiency</b> (e.g. shorter treatment procedures)	59262	4.2.4 Influence of <b>cultural factors</b> (structures, ethic...)	76399
<b>6. Compatibility, Integration</b>	<b>6</b>	<b>12. Image Handling</b>	<b>12</b>
4.8.3 <b>Internal system</b> integration (e.g. integrated HIS)	82593	4.9.3 Quality of <b>image handling</b> (orientation, focusing, etc.)	78667
4.8.4 <b>External system integration</b> (other TP-systems)	75280		
4.9.1 Quality of <b>textual data</b> (patient and case data in advance)	56663		
4.11.2 Influence of <b>system stability</b> (short interruptions)	38800		

**JUDGEMENT OF FACTORS FOR TELEPATHOLOGY SUCCESS - FIVE FACTORS**

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
F4_1_1	<b>.45090</b>	.21341	.31704	-.12163	-.21688
F4_1_2	.39032	.13375	<b>.59738</b>	.05198	-.09458
F4_1_3	.04132	-.13896	<b>.71910</b>	-.00137	-.05222
F4_1_4	.05933	.01838	<b>.61473</b>	-.14533	-.16479
F4_1_5	-.04988	-.06247	<b>.44659</b>	-.11544	-.13315
F4_2_1	.30386	.15975	<b>.51406</b>	-.11744	-.12458
F4_2_2	.03715	.05667	<b>.73723</b>	-.14397	.09670
F4_2_3	-.05200	.00118	<b>.56652</b>	.20268	.08221
F4_2_4	-.13430	.14466	<b>.47952</b>	.13861	.25662
F4_4_1	.26360	<b>.57915</b>	-.05305	.10450	-.06009
F4_4_2	.14887	<b>.52660</b>	-.21841	.06099	-.14615
F4_4_3	.02757	<b>.64161</b>	.06019	.08276	.29620
F4_4_4	.09689	<b>.69466</b>	-.04891	.09345	.07107
F4_3_1	.09361	-.16919	<b>.63521</b>	.00781	.33487
F4_3_2	.11567	-.20062	<b>.58064</b>	.01500	.39632
F4_5_1	.00264	.39305	-.09414	<b>.58480</b>	-.02476
F4_5_2	.08902	.25100	-.05035	<b>.79181</b>	-.00721
F4_5_3	.01416	.02555	-.07831	<b>.73137</b>	.09015
F4_6_1	.07123	<b>.63562</b>	.07308	.19694	.13510
F4_6_2	.00071	<b>.62600</b>	.09534	.21242	.02645
F4_6_3	-.19970	.27756	<b>.47553</b>	.07297	.19995
F4_7_1	.57509	.17538	.10491	-.19475	.06947
F4_7_2	<b>.49965</b>	.42051	-.02940	-.21387	-.02234
F4_7_3	<b>.59759</b>	.05171	-.00927	-.29033	-.00644
F4_8_1	<b>.58995</b>	-.00797	.01628	.16031	.24342
F4_8_2	<b>.69572</b>	-.08968	.12868	.08207	.16492
F4_8_3	<b>.45295</b>	.20286	.00248	.00866	.16936
F4_8_4	<b>.66621</b>	.17306	-.13449	.00899	.22505
F4_9_1	<b>.44282</b>	.34478	-.08283	-.07964	-.25640
F4_9_2	.32118	<b>.38778</b>	.19187	-.15681	-.27710
F4_9_3	.32568	<b>.44708</b>	.14335	-.05585	.11194
F4_10_1	.22068	.05270	.07459	.09870	<b>.70828</b>
F4_10_2	.26005	.44212	-.01891	-.16986	<b>.61048</b>
F4_10_3	.29923	.48166	.02203	-.08849	<b>.60712</b>
F4_11_1	<b>.45856</b>	-.18154	.21973	.24260	.27705
F4_11_2	<b>.58239</b>	.06326	-.06357	.21827	.08210
F4_11_3	<b>.66527</b>	.35012	-.01206	.16815	-.08821
F4_11_4	<b>.54506</b>	.09575	.13775	.43472	-.09396
F4_11_5	<b>.54578</b>	.13519	.09433	.43363	-.01762

Method of extraction: analysis of the principal components with a rotating component matrix. Explained variance: 46,5%.

Method of rotation: varimax by using Kaiser's normalization. The rotation is converted into 22 iterations.

Various Factors of Success – compressed from 39 variables to 5 factors	Factor	Various Factors of Success – compressed from 39 variables to 5 factors	Factor
<b>1. Equipment and Standards</b>	<b>1</b>	<b>3. Surrounding</b>	<b>3</b>
4.1.1 <b>Availability of advisory desks</b> for system selection	45090	4.1.2 External <b>acceptance</b> (e.g. insurances, <b>HMOs</b> , politicians)	59738
4.7.1 Quality of <b>medical equipment</b> (microscope)	57509	4.1.3 Internal <b>acceptance of top management</b> (director)	71910
4.7.2 Quality of <b>computer equipment</b> (PC, monitor size, etc.)	49965	4.1.4 Internal <b>acceptance of physicians</b> and medical staff (users)	61473
4.7.3 Influence of <b>network connections</b> (bandwidth, stability)	59759	4.1.5 <b>Acceptance of patients</b>	44659
4.8.1 Compatible <b>technical standards</b>	58995	4.2.1 Influence of <b>health care politics</b> and <b>health care laws</b>	51406
4.8.2 Compatible <b>data and image formats</b>	69572	4.2.3 Influence of <b>geographical factors</b> (population, landscape)	73723
4.8.3 <b>Internal system</b> integration (e.g. integrated HIS)	45295	4.2.4 Influence of <b>cultural factors</b> (structures, ethic...)	56652
4.8.4 <b>External system integration</b> (other TP-systems)	66621	4.2.2 Internal <b>institution politics</b> (institution's objectives)	47952
4.9.1 Quality of <b>textual data</b> (patient and case data in advance)	44282	4.3.1 Influence of <b>structured project design</b>	63521
4.11.1 Influence of <b>fast respond times</b> / image transfer	45856	4.3.2 <b>Coordination</b> of system utilization	58064
4.11.2 Influence of <b>system stability</b> (short interruptions)	58239	4.6.3 Health care <b>efficiency</b> (e.g. shorter treatment procedures)	47553
4.11.3 Influence of <b>user support</b> (training, help menus, hotline)	66527		
4.11.4 <b>Simplicity of system use</b> , user-friendly system	54506		
4.11.5 Influence of <b>system flexibility</b> to support the workflow	54578		
<b>2. Cost in the Context of Equipment Quality</b>	<b>2</b>	<b>4. Diagnostic Accuracy</b>	<b>4</b>
4.4.1 Explicitness of <b>legal liability regulations</b>	57915	4.5.1 Accuracy of <b>macro examination</b> (correct gross exam.)	58480
4.4.2 Qualification ( <b>licensing agreements</b> )	52660	4.5.2 Accurate <b>sample preparation</b> and precise field selection	79181
4.4.3 <b>Reimbursement</b> regulation (per contract or law)	64161	4.5.3 Accuracy of <b>micro examination</b>	73137
4.4.4 Regulations about data exchange and <b>data protection</b>	69466		
4.6.1 Influence of <b>investment and subsequent cost</b>	63562		
4.6.2 <b>Cost effectiveness</b> of telepathology services	62600		
4.9.2 Quality of <b>monitor images</b> (resolution, color, contrast)	38778		
4.9.3 Quality of <b>image handling</b> (orientation, focusing, etc.)	44708		
		<b>5. Security Concerns</b>	<b>5</b>
		4.10.1 Influence of <b>system reliability</b> (total break downs)	70828
		4.10.2 Influence of <b>access control</b> (access to system and data)	61048
		4.10.3 <b>Data security</b> (no misuse or loss of data by exchange)	60712

**JUDGEMENT OF ACCURACY ASPECTS - TWO FACTORS**

	Factor 1	Factor 2
A6_5_1	.04191	<b>.79483</b>
A6_5_2	.12758	<b>.76708</b>
A6_5_3	.37232	<b>.50634</b>
A6_5_4	.11855	<b>.41231</b>
A6_5_5	<b>.86575</b>	.11463
A6_5_6	<b>.43566</b>	.22725
A6_5_7	<b>.89236</b>	.14004
A6_5_8	.04144	<b>.72026</b>
A6_5_9	<b>.79796</b>	.17142
A6_5_10	<b>.58602</b>	.05233
A6_5_11	<b>.63388</b>	.16705
A6_5_12	.27106	<b>.44762</b>

VARIMAX converged in 3 iterations.

Rotated Factor Matrix:

Accuracy variables – compressed from 12 variables to 4 factors	Factor 1	Factor 2
<b>1. Examination Process</b>	<b>1</b>	<b>2</b>
6.5.5 Errors with tissue sample ( <b>sampling errors</b> )	86575	
6.5.6 Incorrect <b>preparation</b> or staining of tissue samples	43566	
6.5.7 Inaccurate <b>field selection</b>	89236	
6.5.9 Insufficient quality of <b>video images</b>	79796	
6.5.10 Not enough <b>images</b> available (transfer time of images)	58602	
6.5.11 Not enough <b>case information</b> available	63388	
<b>2. Know-how and stress</b>	<b>1</b>	<b>2</b>
6.5.1 Low <b>expertise</b> (e.g. specialized know-how is not sufficient)		79483
6.5.2 Insufficient <b>diagnostic experience</b>		76708
6.5.3 Not enough <b>education in practicing telepathology</b>		50634
6.5.4 Not enough experience with <b>video image interpretation</b>		41231
6.5.8 Incorrect <b>interpretation</b>		72026
6.5.12 Psychological stress factors by ad-hoc examinations		44762

## APPENDIX X – SIGNIFICANCE ANALYSES

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**USERS AND NON-USERS**

112 participants returned their questionnaires to Constance. Of these, 72 were non-users and 40 were users. The difference of the judgements (accumulated factors) of these two groups were statistically analyzed by variance analysis.

**Multivariate Tests of Significance (S = 1, M = 9, N = 44 1/2)**

Test Name <sup>1</sup>	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.51470	4.82558	20.00	91.00	.000
Hotellings	1.06057	4.82558	20.00	91.00	.000
Wilks	.48530	4.82558	20.00	91.00	.000
Roys	.51470				
Note.. F statistics are exact.					

**Univariate F-tests with (1,110) D. F.**

VARIABLE	HYPOTH. SS	ERROR SS	HYPOTH. MS	ERROR MS	F	SIG. OF F
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES</b>						
DIAGN_6	12.90637	87.17497	12.90637	.79250	16.28565	.000
EDUCA_6	14.27615	104.59223	14.27615	.95084	15.01428	.000
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES - JUDGEMENT FOR THE NEXT 5 YEARS</b>						
DIAGN_7	14.42716	75.74669	14.42716	.68861	20.95124	.000
EDUCA_7	12.48230	96.87366	12.48230	.88067	14.17365	.000
<b>VARIANCE ANALYSIS OF RATING OF VARIOUS FACTORS OF TELEPATHOLOGY'S SUCCESS</b>						
SURR_2	3.76585	63.17014	3.76585	.57427	6.55759	.012
INTEG_2	3.53028	52.61279	3.53028	.47830	7.38092	.008
LEGAL_2	6.22508	61.89470	6.22508	.56268	11.06328	.001
EQUIP_2	.83893	27.52151	.83893	.25020	3.35310	.070
WORKF_2	.06826	36.08585	.06826	.32805	.20807	.649
ACCUR_2	1.64700	34.72804	1.64700	.31571	5.21681	.024
EFFIC_2	.20730	80.28041	.20730	.72982	.28404	.595
MANAG_2	3.23816	57.72358	3.23816	.52476	6.17074	.014
RELI_2	.21129	64.71904	.21129	.58835	.35912	.550
IMAG_2	2.05496	45.70466	2.05496	.41550	4.94578	.028
<b>VARIANCE ANALYSIS OF ADVANTAGE AND DISADVANTAGE JUDGEMENTS</b>						
FEAR_03	27.63348	89.70220	27.63348	.81547	33.88638	.000
EFFIC_3	25.39658	78.01579	25.39658	.70923	35.80844	.000
QUAL_3	28.26555	98.45369	28.26555	.89503	31.58044	.000
UNCER_3	9.49421	129.48849	9.49421	1.17717	8.06530	.005
ONCALL_3	8.90776	102.74609	8.90776	.93406	9.53665	.003
WORKF_3	4.64094	145.86430	4.64094	1.32604	3.49985	.064

<sup>1</sup> (Please excuse that the statistical values are in the letter type ,courier'. These values are directly taken from SPSS).

### CALCULATIONS OF MEANS OF ALL FACTORS OF THE FACTOR ANALYSIS

	Non-User			User			All			All
	N	Mean	St.Dev.	N	Mean	St.Dev.	N	Mean	St.Dev.	Sign.
<b>Interest in Telepathology Services</b>										
DIALOG_6	72	1,3124	0,9133	40	2,0208	0,8467	112	1,5654	0,9495	***
EDUCA_6	72	1,9584	1,0055	40	2,7035	0,9171	112	2,2245	1,0348	***
<b>Interest in Telepathology Services – Judgement for the Next 5 Years</b>										
DIAGN_7	72	1,4277	0,8232	40	2,1768	0,8418	112	1,6952	0,9013	***
EDUCA_7	72	2,0865	0,9362	40	2,7832	0,9424	112	2,3354	0,9926	***
<b>Subspecialty of Cytology in Relation to the Rated Factors of Telepathology's Success</b>										
SURR_2	72	2,3040	0,8497	40	2,6867	0,5525	112	2,4407	0,7765	**
INTEG_2	72	3,1822	0,6898	40	2,8117	0,6948	112	3,0499	0,7112	**
LEGAL_2	72	3,4382	0,6713	40	2,9461	0,8756	112	3,2624	0,7834	***
EQUIP_2	72	3,5868	0,4740	40	3,4061	0,5447	112	3,5223	0,5055	-
WORKFL_2	72	3,4836	0,6248	40	3,4321	0,4633	112	3,4652	0,5707	-
ACCUR_2	72	3,8256	0,4141	40	3,5725	0,7604	112	3,7352	0,5725	*
EFFIC_2	72	2,9851	0,8395	40	2,8953	0,8805	112	2,9530	0,8515	-
MANAG_2	72	2,8699	0,8230	40	3,2247	0,4969	112	2,9966	0,7411	**
RELIA_2	72	3,3656	0,7839	40	3,2750	0,7353	112	3,333	0,7648	-
IMAGE_2	72	3,8029	0,4528	40	3,5202	0,8937	112	3,7019	0,6559	*
<b>Advantage and Disadvantage Judgements in Relation to Cytology</b>										
FEAR_3	72	2,1271	0,9300	40	1,0905	0,8518	112	1,7569	1,0281	***
EFFIC_3	72	1,2495	0,9135	40	2,2433	0,6937	112	1,6045	0,9652	***
QUAL_3	72	1,8365	1,0143	40	2,8850	0,8072	112	2,2110	1,0685	***
UNCER_3	72	2,8056	1,0945	40	2,1979	1,0673	112	2,5886	1,1190	**
ONCALL_3	72	0,7321	0,9630	40	1,3207	0,9727	112	0,9423	1,0029	***
WORKFL_3	72	2,3254	1,1590	40	1,9005	1,1379	112	2,1736	1,1644	-

## 1.1 SINGLE VALUES OF USERS AND NON-USERS

### 1.1.1 SINGLE VALUES OF INTEREST IN TELEPATHOLOGY SERVICES

#### Multivariate Tests of Significance (S = 1, M = 11, N = 42 1/2)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.34830	1.93740	24.00	87.00	.014
Hotellings	.53445	1.93740	24.00	87.00	.014
Wilks	.65170	1.93740	24.00	87.00	.014
Roys	.34830				

Note.. F statistics are exact.

#### Univariate F-tests with (1,110) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F	
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES</b>							
DIAGN_6	12.90637	87.17497	12.90637	.79250	16.28565	.000	<b>Diagnostic Support</b>
I2_5_1	1.45833	121.20147	1.45833	1.10183	1.32355	.252	Primary diagnoses in emergency
I2_5_2	44.90520	254.08528	44.90520	2.30987	19.44061	.000	Primary diagn. - frozen sections
I2_5_3	10.10250	144.48574	10.10250	1.31351	7.69124	.007	Primary diagn. - routine basis
I2_5_4	23.06261	206.78501	23.06261	1.87986	12.26823	.001	Second look consultation
I2_5_5	16.55169	186.61136	16.55169	1.69647	9.75656	.002	Reference consultations
I2_5_6	2.55150	147.08850	2.55150	1.33717	1.90814	.170	On call support - 24hours/day
EDUCA_6	14.27615	104.59223	14.27615	.95084	15.01428	.000	<b>Education and Know-How</b>
I2_5_7	23.39806	221.36156	23.39806	2.01238	11.62707	.001	Interdisciplinary cooperation
I2_5_8	7.36817	216.72007	7.36817	1.97018	3.73984	.056	Central case archiving
I2_5_9	29.47029	206.03915	29.47029	1.87308	15.73357	.000	Distance online-education
I2_5_10	8.43872	171.32090	8.43872	1.55746	5.41825	.022	Online discussion groups, forums
I2_5_11	16.85572	222.53476	16.85572	2.02304	8.33186	.005	Quality assurance
I2_5_12	7.17981	185.70679	7.17981	1.68824	4.25283	.042	Information retrieval, WWW
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES - JUDGEMENT FOR THE NEXT 5 YEARS</b>							
DIAGN_7	14.42716	75.74669	14.42716	.68861	20.95124	.000	<b>Diagnostic Support</b>
I2_6_1	2.46100	95.13450	2.46100	.86486	2.84555	.094	Primary diagnoses in emergency
I2_6_2	50.56984	182.33925	50.56984	1.65763	30.50732	.000	Primary diagn. - frozen sections
I2_6_3	12.60000	133.40000	12.60000	1.21273	10.38981	.002	Primary diagn. - routine basis
I2_6_4	19.42677	180.75880	19.42677	1.64326	11.82208	.001	Second look consultation
I2_6_5	13.03187	152.66224	13.03187	1.38784	9.39005	.003	Reference consultations
I2_6_6	6.46510	158.14129	6.46510	1.43765	4.49700	.036	On call support - 24hours/day
EDUCA_7	12.48230	96.87366	12.48230	.88067	14.17365	.000	<b>Education and Know-How</b>
I2_6_7	13.67932	209.01456	13.67932	1.90013	7.19914	.008	Interdisciplinary cooperation
I2_6_8	7.62222	198.78403	7.62222	1.80713	4.21787	.042	Central case archiving
I2_6_9	19.10262	165.38717	19.10262	1.50352	12.70527	.001	Distance online-education
I2_6_10	13.20501	140.28457	13.20501	1.27531	10.35432	.002	Online discussion groups, forums
I2_6_11	24.30556	201.69444	24.30556	1.83359	13.25575	.000	Quality assurance
I2_6_12	3.25512	187.05339	3.25512	1.70049	1.91423	.169	Information retrieval, WWW

## 1.1.2 OVERVIEW OF MEANS OF THE RATINGS OF THE INTEREST IN TELEPATHOLOGY SERVICES

telepathology services	Current Interest in Telepathology Services							Future Interest in Telepathology Services						
	users		non-users		all		all	users		non-users		all		all
	mean	St.D.	mean	St.D.	mean.	St.D.	sign.	mean.	St.D.	mean.	St.D.	mean.	St.D.	sign.
Factor 1 – diagn. support	2,02	0,85	1,31	0,91	1,57	0,95	***	2,70	0,84	1,96	0,82	2,22	0,90	***
Reference diagnosis	3,18	1,37	2,37	1,37	2,71	1,43	***	3,23	1,29	2,47	1,26	2,76	1,33	***
Second look	3,08	0,13	2,13	1,44	2,48	1,47	***	3,15	1,31	2,13	1,38	2,47	1,44	***
Frozen sections	2,59	1,58	1,18	1,52	1,68	1,69	***	3,00	1,31	1,41	1,30	1,97	1,53	***
On call services	1,17	1,30	0,82	1,16	0,94	1,22	-	1,56	1,41	0,95	1,22	1,16	1,32	*
Routine diagnosis	1,34	1,41	0,64	1,05	0,88	1,23	**	1,56	1,46	0,71	1,01	1,00	1,25	***
Emergency diagnosis	1,00	1,15	0,72	1,10	0,81	1,12	-	1,21	1,00	0,80	1,05	0,93	1,05	-
Factor 2 – high know-how	2,18	0,92	1,43	1,01	1,70	1,03	***	2,78	0,94	2,09	0,94	2,34	0,99	***
Internet info., WWW	3,03	1,19	2,41	1,47	2,62	1,41	*	3,06	1,39	2,63	1,42	2,78	1,42	-
Discussions, forums, etc.	3,11	1,17	2,49	1,33	2,70	1,31	*	3,35	1,09	2,48	1,24	2,76	1,26	***
Online education	3,03	1,37	1,88	1,40	2,28	1,49	***	3,18	1,29	2,17	1,28	2,51	1,37	***
Interdisciplinary cooperation	2,86	1,32	1,84	1,52	2,20	1,53	***	2,74	1,46	1,91	1,45	2,19	1,51	**
Quality assurance	2,49	1,46	1,62	1,45	1,96	1,51	**	2,76	1,37	1,61	1,45	2,00	1,53	***
Central case archiving	2,00	1,60	1,39	1,38	1,61	1,49	*	2,22	1,58	1,56	1,36	1,78	1,47	*

- St.D. = standard deviation; root of ((summary (rating – mean)<sup>2</sup>/ number of group members) [see Friedrichs, 1990, p. 137].
- sign. = significant difference between users' and non-users' ratings: \*\*\*=highly significant; \*\*= very significant; \*=significant

## 1.1.3 SINGLE RATINGS OF FACTOR OF SUCCESS

**Multivariate Tests of Significance (S = 1, M = 18 1/2, N = 35 )**

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.52902	2.07368	39.00	72.00	.004
Hotellings	1.12324	2.07368	39.00	72.00	.004
Wilks	.47098	2.07368	39.00	72.00	.004
Roys	.52902				

Note.. F statistics are exact.

**Univariate F-tests with (1,110) D. F.**

VARIABLE	HYPOTH. SS	ERROR SS	HYPOTH. MS	ERROR MS	F	SIG. OF F
<b>VARIANCE ANALYSIS OF RATING OF VARIOUS FACTORS OF TELEPATHOLOGY'S SUCCESS</b>						
SURR_2	3.76585	63.17014	3.76585	.57427	6.55759	<b>.012 Surrounding</b>
F4_1_2	2.08019	160.79236	2.08019	1.46175	1.42308	.235 External acceptance (HMOs)
F4_1_3	13.41709	164.93397	13.41709	1.49940	8.94831	.003 Internal accept.- top management
F4_1_4	6.31701	145.76142	6.31701	1.32510	4.76718	.031 Internal accept. - users
F4_1_5	17.00671	159.98230	17.00671	1.45438	11.69341	.001 Acceptance - patients
F4_2_1	.63713	184.75335	.63713	1.67958	.37934	.539 Health care politics / laws
F4_2_2	13.56998	179.74002	13.56998	1.63400	8.30476	.005 Institutions politics/strategy
F4_2_3	.06124	190.95837	.06124	1.73599	.03528	.851 Geographical factors
F4_2_4	.42136	152.53697	.42136	1.38670	.30386	.583 Cultural factors
INTEG_2	3.53028	52.61279	3.53028	.47830	7.38092	<b>.008 Integration / standardization</b>
F4_8_1	1.19832	68.72005	1.19832	.62473	1.91814	.169 Homogeneous technical standards
F4_8_2	.00129	64.90781	.00129	.59007	.00218	.963 Compatible data + image formats
F4_8_3	7.62222	101.62778	7.62222	.92389	8.25015	.005 Internal system integr. (HIS)
F4_8_4	13.66012	94.03881	13.66012	.85490	15.97865	.000 External system integration
LEGAL_2	6.22508	61.89470	6.22508	.56268	11.06328	<b>.001 Clear legal situation</b>
F4_4_1	3.68425	72.44909	3.68425	.65863	5.59382	.020 Liability regulations
F4_4_2	13.62376	78.83850	13.62376	.71671	19.00866	.000 Licensure regulations
F4_4_3	3.21269	173.59920	3.21269	1.57817	2.03570	.156 Reimbursement regulations
F4_4_4	6.64180	104.23075	6.64180	.94755	7.00942	.009 Data protection regulations
EQUIP_2	.83893	27.52151	.83893	.25020	3.35310	<b>.070 Equipment Quality</b>
F4_1_1	4.41128	150.11299	4.41128	1.36466	3.23250	.075 Support desk for syst. selection
F4_7_1	.00072	39.04783	.00072	.35498	.00202	.964 Medical equipment (microscope)
F4_7_2	2.89461	58.59558	2.89461	.53269	5.43398	.022 Computer equipment (PC, monitor)
F4_7_3	.11809	38.04033	.11809	.34582	.34147	.560 Network performance
F4_9_2	.16610	17.96723	.16610	.16334	1.01690	.315 Image quality (resolution)

<b>WORKF_2</b>	.06826	36.08585	.06826	.32805	.20807	.649	<b>Workflow Efficiency</b>
F4_11_1	1.24038	50.60723	1.24038	.46007	2.69610	.103	Respond times
F4_11_2	.88455	43.73083	.88455	.39755	2.22499	.139	System stability
F4_11_3	5.11729	97.64233	5.11729	.88766	5.76493	.018	User support and training
F4_11_4	.41499	57.71835	.41499	.52471	.79089	.376	Simple/user-friendly interface
F4_11_5	.01916	79.20199	.01916	.72002	.02661	.871	System flexibility
<b>ACCUR_2</b>	1.64700	34.72804	1.64700	.31571	5.21681	.024	<b>Accurate Diagnostic</b>
F4_5_1	2.30628	45.71241	2.30628	.41557	5.54972	.020	Accurate macro examination
F4_5_2	.66059	50.49828	.66059	.45908	1.43897	.233	Accurate sample preparation
F4_5_3	2.30628	50.83390	2.30628	.46213	4.99059	.028	Accurate micro examination
<b>EFFIC_2</b>	.20730	80.28041	.20730	.72982	.28404	.595	<b>Efficiency</b>
F4_6_1	3.77424	101.59210	3.77424	.92356	4.08660	.046	Investment costs
F4_6_2	1.18900	133.33060	1.18900	1.21210	.98095	.324	Cost effectiveness of services
F4_6_3	2.77975	149.94752	2.77975	1.36316	2.03920	.156	Health care efficiency
<b>MANAG_2</b>	3.23816	57.72358	3.23816	.52476	6.17074	.014	<b>Management</b>
F4_3_1	13.09712	136.08970	13.09712	1.23718	10.58627	.002	Project management
F4_3_2	17.72206	152.21478	17.72206	1.38377	12.80708	.001	Real-time coordination
F4_9_1	5.90630	60.34132	5.90630	.54856	10.76697	.001	Quality of case data
<b>RELI_2</b>	.21129	64.71904	.21129	.58835	.35912	.550	<b>Reliability / Security</b>
F4_10_1	1.45544	87.72103	1.45544	.79746	1.82509	.179	System reliability (crash)
F4_10_2	1.89490	105.36001	1.89490	.95782	1.97835	.162	Access control
F4_10_3	1.46132	77.52868	1.46132	.70481	2.07337	.153	Data security
<b>IMAG_2</b>	2.05496	45.70466	2.05496	.41550	4.94578	.028	<b>Image handling</b>
F4_9_3	2.05496	45.70466	2.05496	.41550	4.94578	.028	orientation, focusing, etc.

## 1.1.4 OVERVIEW OF MEANS OF THE RATINGS OF THE FACTORS OF SUCCESS

Rating of Factors of Success	users		non-users		all		all sign.	Rating of Factors of Success	users		non-users		all		all sign.
	mean	St.D.	mean	St.D.	mean.	St.D.			mean.	St.D.	mean.	St.D.	mean.	St.D.	
Factor 1: Surrounding	2,69	0,55	2,30	0,85	2,44	0,78	**	Factor 6: Accuracy	3,57	0,76	3,83	0,41	3,74	0,57	*
4.1.2 External acceptance (HMOs)	2,95	1,10	2,64	1,34	2,75	1,26	-	4.5.1 Accurate macro examination	3,51	0,87	3,82	0,48	3,71	0,67	*
4.1.3 Internal accept.– top management	3,25	0,98	2,41	0,15	2,73	1,38	**	4.5.2 Accurate sample preparation	3,66	0,77	3,83	0,64	3,77	0,69	-
4.1.4 Internal accept. - users	3,54	0,92	3,00	1,32	3,20	1,22	*	4.5.3 Accurate micro examination	3,53	0,99	3,84	0,44	3,73	0,70	*
4.1.5 Acceptance - patients	1,91	1,46	0,93	1,21	1,30	1,39	***								
4.2.1 Health care politics / laws	2,78	1,35	2,94	1,31	2,88	1,33	-								
4.2.2 Institutions politics/strategy	2,89	1,07	2,08	1,46	2,37	0,14	**								
4.2.3 Geographical factors	2,60	1,30	2,55	1,41	2,57	1,37	-								
4.2.4 Cultural factors	1,82	1,27	1,67	1,25	1,73	1,26	-								
Factor 2: Integration, standards	2,81	0,69	3,18	0,69	3,05	0,71	**	Factor 7: Efficiency	2,90	0,88	2,99	0,84	2,95	0,85	-
4.8.1 Technical standards	3,05	0,93	3,30	0,78	3,20	0,84	-	4.6.1 Investment costs	2,81	1,10	3,23	0,94	3,08	1,02	*
4.8.2 Compatible data + image formats	3,37	0,87	3,36	0,77	3,36	0,81	-	4.6.2 Cost effectiveness of services	2,78	1,06	3,02	1,19	2,93	1,15	-
4.8.3 Internal system integration (HIS)	2,36	1,03	3,00	1,05	2,75	1,09	**	4.6.3 Health care efficiency	3,08	1,11	2,71	1,29	2,85	1,24	-
4.8.4 External system integration	2,36	1,11	3,21	0,91	2,88	1,08	***								
Factor 3: Clear legal situation	2,95	0,88	3,44	0,67	3,26	0,78	***	Factor 8: Management	3,22	0,50	2,87	0,82	2,99	0,74	**
4.4.1 Liability regulations	3,27	0,92	3,68	1,39	3,53	0,85	**	4.3.1 Project management	3,24	0,88	2,89	1,31	2,75	1,28	***
4.4.2 Licensure regulations	3,03	1,25	3,79	1,40	3,52	0,93	**	4.3.2 Real-time coordination	3,32	0,99	3,45	0,93	2,75	1,34	***
4.4.3 Reimbursement regulations	2,50	1,30	2,89	0,78	2,75	1,32	-	4.9.1 Quality of case data	3,16	0,94	3,68	0,63	3,50	0,79	***
4.4.4 Data protection regulations	2,89	1,13	3,45	0,53	3,25	1,04	**								
Factor 4: Equipment quality	3,41	0,54	3,59	0,47	3,52	0,51	-	Factor 9: Reliability	3,28	0,74	3,37	0,78	<b>3,33</b>	0,76	-
4.1.1 Support desk for syst. selection	2,79	1,30	3,23	1,14	3,07	1,22	-	4.10.1 System reliability (crash)	3,46	0,76	3,20	1,01	3,29	0,94	-
4.7.1 Medical equipment (microscope)	3,58	0,54	3,58	0,65	3,58	0,62	-	4.10.2 Access control	3,03	1,00	3,32	1,02	3,22	1,03	-
4.7.2 Computer equipment (PC, monitor)	3,26	0,88	3,63	0,67	3,49	0,78	*	4.10.3 Data security	3,32	1,07	3,59	0,75	3,49	0,89	-
4.7.3 Network performance	3,56	0,55	3,63	0,65	3,60	0,61	-								
4.9.2 Image quality (resolution)	3,81	0,51	3,90	0,35	3,87	0,42	-								
Factor 5: Workflow efficiency	3,43	0,46	3,48	0,62	3,47	0,57	-	Factor 10: Image handling	3,52	0,89	3,80	0,45	<b>3,70</b>	0,66	*
4.11.1 Respond times	3,74	0,51	3,48	0,78	3,56	0,70	-	4.9.3 image orientation, focusing, ...	3,52	0,89	3,80	0,45	3,70	0,66	*
4.11.2 System stability	3,49	0,76	3,69	0,58	3,62	0,65	-								
4.11.3 User support and training	2,89	0,98	3,37	0,96	3,20	0,99	**								
4.11.4 Simple/user-friendly interface	3,63	0,62	3,49	0,80	3,54	0,74	-								
4.11.5 System flexibility	3,43	0,75	3,40	0,93	3,41	0,87	-								

- St.D. = standard deviation; root of ((summary (rating – mean)<sup>2</sup>/ number of group members) [see Friedrichs, 1990, p. 137].
- sign. = significant difference between users' and non-users' ratings: \*\*\*=highly significant; \*\*= very significant; \*=significant

## 1.1.5 SINGLE SIGNIFICANCE CALCULATIONS OF ADVANTAGES AND DISADVANTAGES

**Multivariate Tests of Significance (S = 1, M = 11 , N = 42 1/2)**

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.59562	5.33928	24.00	87.00	.000
Hotellings	1.47291	5.33928	24.00	87.00	.000
Wilks	.40438	5.33928	24.00	87.00	.000
Roys	.59562				
Note.. F statistics are exact.					

**Univariate F-tests with (1,110) D. F.**

FEAR_03	27.63348	89.70220	27.63348	.81547	33.88638	.000	Fears
D5_3_1	23.95009	186.78386	23.95009	1.69804	14.10459	.000	Higher expenses
D5_3_2	24.02045	160.89132	24.02045	1.46265	16.42257	.000	Less diagnostic accuracy
D5_3_5	19.73900	176.34923	19.73900	1.60317	12.31245	.001	Loss of jobs
D5_3_6	16.98092	181.93417	16.98092	1.65395	10.26691	.002	Reduced education quality
D5_3_10	36.08156	180.02844	36.08156	1.63662	22.04636	.000	Technology not reliable
D5_3_11	51.48268	191.13271	51.48268	1.73757	29.62912	.000	Loss of information
EFFIC_3	25.39658	78.01579	25.39658	.70923	35.80844	.000	More effic.due to high medicine
A5_1_1	68.18107	231.47031	68.18107	2.10428	32.40121	.000	Improved diagnostic quality
A5_1_2	52.60714	167.42956	52.60714	1.52209	34.56250	.000	Improved pat. treatment process
A5_1_3	37.86067	138.36049	37.86067	1.25782	30.10016	.000	Same quality of medicine
A5_2_1	31.55523	155.70691	31.55523	1.41552	22.29236	.000	Efficient processes (resources)
A5_2_2	19.35240	177.10914	19.35240	1.61008	12.01950	.001	Cost reduction, savings
A5_2_3	15.10140	131.69271	15.10140	1.19721	12.61387	.001	Additional revenues
A5_2_4	5.66361	179.05484	5.66361	1.62777	3.47936	.065	High utilization
A5_2_5	5.61796	178.49742	5.61796	1.62270	3.46210	.065	Improved reputation of institute
QUAL_3	28.26555	98.45369	28.26555	.89503	31.58044	.000	Higher med. standard
A5_1_5	39.96061	151.55790	39.96061	1.37780	29.00322	.000	Better communication
A5_1_6	7.35243	174.02257	7.35243	1.58202	4.64749	.033	Improved research
A5_1_7	53.94046	151.61094	53.94046	1.37828	39.13603	.000	Improved access to medicine
A5_1_8	23.89986	169.94776	23.89986	1.54498	15.46937	.000	Improved know-how standard
UNCER_3	9.49421	129.48849	9.49421	1.17717	8.06530	.005	Uncertainty
D5_3_7	8.88257	175.26837	8.88257	1.59335	5.57478	.020	Uncertain legal situation
D5_3_8	10.41545	197.23840	10.41545	1.79308	5.80870	.018	Uncertain data security
D5_3_9	9.21815	207.83136	9.21815	1.88938	4.87894	.029	Uncertain reimbursement
ONCALL_3	8.90776	102.74609	8.90776	.93406	9.53665	.003	On-call services
A5_1_4	8.90776	102.74609	8.90776	.93406	9.53665	.003	Efficient on-call services
WORKF_3	4.64094	145.86430	4.64094	1.32604	3.49985	.064	Inefficient workflow
D5_3_3	15.67780	202.40063	15.67780	1.84001	8.52052	.004	Overtaxing of expert
D5_3_4	.12183	194.46817	.12183	1.76789	.06892	.793	Inefficient work routine

## 1.1.6 OVERVIEW OF MEANS OF THE RATINGS OF ADVANTAGES AND DISADVANTAGES

Rating of Factors of Success	users		non-users		all		all sign.	Rating of Factors of Success	users		non-users		all		all sign.
	mean	St.D.	mean	St.D.	mean.	St.D.			mean.	St.D.	mean.	St.D.	mean.	St.D.	
Factor 1: Fears	1,09	0,85	2,13	0,93	1,76	1,03	***	Factor 4: Uncertainty	2,20	1,07	2,81	1,09	2,59	1,12	**
D5.3.1 Higher expenses	1,79	1,40	2,79	1,25	2,43	1,39	***	D5.3.7 Uncertain legal situation	2,46	1,29	3,09	1,28	2,87	1,32	*
D5.3.2 Less diagnostic accuracy	1,33	1,29	2,37	1,23	1,97	1,35	***	D5.3.8 Uncertain data security	2,00	1,41	2,69	1,35	2,44	1,41	*
D5.3.5 Loss of jobs	0,79	1,20	1,73	1,37	1,38	1,39	***	D5.3.9 Uncertain reimbursement	2,03	1,40	2,69	1,45	2,46	1,47	*
D5.3.6 Reduced education quality	0,44	1,01	1,28	1,45	0,97	1,37	***								
D5.3.10 Technology not reliable	0,87	1,26	2,16	1,37	1,67	1,47	***								
D5.3.11 Loss of information	1,16	1,25	2,67	1,40	2,12	1,53	***								
Factor 3: More efficiency	2,24	0,69	1,25	0,91	1,60	0,97	***	Factor 5: On-call services	1,35	0,99	0,72	0,99	0,94	1,04	**
A5.1.1 Improved diagnostic quality	2,90	1,28	1,25	1,55	1,85	1,660	***	A5.1.4 Efficient on-call services	1,35	0,99	0,72	0,99	0,94	1,04	**
A5.1.2 Improved pat. treatment process	2,53	1,16	1,07	1,28	1,61	1,42	***								
A5.1.3 Same quality of medicine	2,76	1,10	1,45	1,16	1,91	1,30	***								
A5.2.1 Efficient processes (resources)	2,50	1,07	1,28	1,29	1,71	1,35	***								
A5.2.2 Cost reduction, savings	1,89	1,45	0,94	1,21	1,27	1,37	***								
A5.2.3 Additional revenues	1,69	1,22	0,85	1,08	1,15	1,20	***								
A5.2.4 High utilization	1,56	1,29	1,03	1,33	1,20	1,34	-								
A5.2.5 Improved reputation of institute	2,46	1,06	1,96	1,43	2,13	1,33	-								
Factor 3: High med. standard	2,89	0,81	1,84	1,01	2,21	1,07	***	Factor 6: Inefficient workflow	1,90	1,14	2,33	1,16	2,17	1,16	-
A5.1.5 Better communication	3,03	1,05	1,77	1,23	2,22	1,31	***	D5.3.3 Overtaxing of expert	1,59	1,40	2,45	1,40	2,14	1,46	**
A5.1.6 Improved research	2,24	1,33	1,67	1,27	1,88	1,32	*	D5.3.4 Inefficient work routine	2,16	1,37	2,24	1,41	2,21	1,39	-
A5.1.7 Improved access to medicine	3,28	0,93	1,78	1,30	2,33	1,39	***								
A5.1.8 Improved know-how standard	3,11	1,09	2,07	1,35	2,44	1,36	***								

- St.D. = standard deviation; root of  $((\text{summary (rating - mean)}^2) / \text{number of group members})$  [see Friedrichs, 1990, p. 137].
- sign. = significant difference between users' and non-users' ratings: \*\*\*=highly significant; \*\*= very significant; \*=significant

<b>Mean of Judgement of Various Factors - ADVANTAGES (divided in participant's group, place of judgement, mean)</b>	<b>non-user</b>		<b>user</b>		<b>all</b>	
	<b>num</b>	<b>mean</b>	<b>num</b>	<b>mean</b>	<b>num</b>	<b>mean</b>
Improvement of know-how standards by online education, forums	1	2,07	2	3,11	1	2,44
Improved access to high quality medicine, reduction of isolation	3	1,78	1	3,28	2	2,33
Better communication between treating physicians	4	1,77	3	3,03	3	2,22
Improvement of reputation of pathology department	2	1,96	8	2,46	4	2,13
Same quality of patient treatment, location independent	6	1,45	5	2,76	5	1,91
Improvement of research findings (centralized data analysis)	5	1,67	9	2,24	6	1,88
Improvement of diagnosis quality (faster diagnostic results)	8	1,25	4	2,90	7	1,85
More efficiency in procedures and structures (sharing resources)	7	1,28	7	2,50	8	1,71
Improvement of patient treatment process (less operations)	9	1,07	6	2,53	9	1,61
Cost reduction, savings (less tissue sample transportation)	11	0,94	10	1,89	10	1,27
Survival of pathology department (capacity utilization)	10	1,03	12	1,56	11	1,20
Additional revenues due to telemedicine services	12	0,85	11	1,69	12	1,15
Efficient on-call-services (24-hour-service, bridge resource gaps)	13	0,72	13	1,35	13	0,94

<b>Mean of judgement of various factors - DISADVANTAGES (divided in participant's group, place of judgement, mean)</b>	<b>non-user</b>		<b>user</b>		<b>all</b>	
	<b>num</b>	<b>mean</b>	<b>num</b>	<b>mean</b>	<b>num</b>	<b>mean</b>
Uncertainty of legal questions	1	3,09	1	2,46	1	2,87
Uncertainty of reimbursement	3	2,69	3	2,03	2	2,46
Uncertainty of data security and data privacy questions	4	2,69	4	2,00	3	2,44
Higher expenses and unnecessary investments	2	2,79	5	1,79	4	2,43
Inefficient work routine due to long waiting time at real-time syst.	8	2,24	2	2,16	5	2,21
Overtaxing of pathological experts	6	2,45	6	1,59	6	2,14
Loss of information due to task sharing	5	2,67	8	1,16	7	2,12
Accuracy of diagnoses is not guaranteed	7	2,37	7	1,33	8	1,97
This technology is not reliable, far too insecure and error prone	9	2,16	9	0,87	9	1,67
Loss of jobs, shift of pathological examinations to medical centers	10	1,73	10	0,79	10	1,38
Reduction of pathologist's education quality	11	1,28	11	0,44	11	0,97

**COMPUTER EXPERIENCE****Univariate F-tests with (2,109) D. F.**

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
DIAGN_6	3.43984	96.64150	1.71992	.88662	1.93986	.149
EDUCA_6	10.22340	108.64498	5.11170	.99674	5.12840	.007
DIAGN_7	3.77034	86.40351	1.88517	.79269	2.37819	.098
EDUCA_7	9.50213	99.85383	4.75107	.91609	5.18624	.007
SURR_2	1.49034	65.44565	.74517	.60042	1.24109	.293
INTEG_2	.65653	55.48655	.32827	.50905	.64486	.527
LEGAL_2	2.03006	66.08972	1.01503	.60633	1.67406	.192
EQUIP_2	.52407	27.83637	.26203	.25538	1.02605	.362
WORKF_2	.02681	36.12730	.01340	.33144	.04044	.960
ACCUR_2	2.87357	33.50147	1.43678	.30735	4.67471	.011
EFFIC_2	1.98660	78.50111	.99330	.72019	1.37921	.256
MANAG_2	7.48192	53.47982	3.74096	.49064	7.62465	.001
RELI_2	.03302	64.89730	.01651	.59539	.02773	.973
IMAG_2	2.61458	45.14503	1.30729	.41417	3.15637	.046
FEAR_03	5.96194	111.37375	2.98097	1.02178	2.91743	.058
EFFIC_3	4.77771	98.63466	2.38885	.90491	2.63989	.076
QUAL_3	10.31377	116.40546	5.15689	1.06794	4.82882	.010
UNCER_3	3.33639	135.64630	1.66819	1.24446	1.34050	.266
ONCALL_3	1.83342	109.82042	.91671	1.00753	.90986	.406
WORKF_3	2.58014	147.92511	1.29007	1.35711	.95060	.390
EXAM_5	.43263	33.96024	.21631	.31156	.69428	.502
EXPER_5	1.35502	56.63912	.67751	.51962	1.30385	.276
EDUC_5	.37660	29.44303	.18830	.27012	.69709	.500
INTER_5	.41842	41.80867	.20921	.38357	.54543	.581

Participants were asked to judge their computer experience. For this they were offered the options: low, middle, and high. The results are as follows:

<b>COMPUTER EXPERIENCE</b>		
<b>Interest of participants in telepathology services</b>		
DIAGN_6	Correlation by Pearson	0,1688
	Significance (2-directions)	<b>0,075</b>
EDUCA_6	Correlation by Pearson	0,2541
	Significance (2-directions)	<b>0,007</b>
<b>Service interest in the next five years</b>		
DIAGN_7	Correlation by Pearson	0,2042
	Significance (2-directions)	<b>0,031</b>
EDUCA_7	Correlation by Pearson	0,2238
	Significance (2-directions)	<b>0,018</b>
<b>Judgement of advantages and disadvantages</b>		
FEAR_3	Correlation by Pearson	-0,2151
	Significance (2-directions)	<b>0,023</b>
EFFIC_3	Correlation by Pearson	0,2133
	Significance (2-directions)	<b>0,024</b>
QUAL_3	Correlation by Pearson	0,2470
	Significance (2-directions)	<b>0,009</b>
UNCER_3	Correlation by Pearson	-0,1486
	Significance (2-directions)	0,118
ONCALL_3	Correlation by Pearson	0,0097
	Significance (2-directions)	0,919
WORKFL_3	Correlation by Pearson	-0,1247
	Significance (2-directions)	0,190

<b>COMPUTER EXPERIENCE</b>		
<b>Judgement of various factors of telepathology's success</b>		
SURR_2	Correlation by Pearson	0,0858
	Significance (2-directions)	0,368
INTEG_2	Correlation by Pearson	-0,0518
	Significance (2-directions)	0,587
LEGAL_2	Correlation by Pearson	-0,1621
	Significance (2-directions)	<b>0,088</b>
EQUIP_2	Correlation by Pearson	-0,0439
	Significance (2-directions)	0,646
WORKFL_2	Correlation by Pearson	-0,0226
	Significance (2-directions)	0,813
ACCUR_2	Correlation by Pearson	-0,2657
	Significance (2-directions)	<b>0,005</b>
EFFIC_2	Correlation by Pearson	-0,142
	Significance (2-directions)	0,882
MANAG_2	Correlation by Pearson	0,2401
	Significance (2-directions)	<b>0,011</b>
RELIA_2	Correlation by Pearson	0,0119
	Significance (2-directions)	0,901
IMAGE_2	Correlation by Pearson	-0,1162
	Significance (2-directions)	0,223

\*\* The correlation is significant on the level of 0,01 (2-dimensional).

\* The correlation is significant on the level 0,05 (2-dimensional).

### ATTITUDE WHEN FACING NEW TECHNOLOGIES

Participants were asked to rate their attitude when facing new technologies. The values of these ratings were statistically analyzed with various variables. In addition, the attitude about new technologies was compared to the values of computer experience. There was a significant relation.

ATTITUDE WHEN FACING NEW TECHNOLOGIES		
<b>Interest of participants in telepathology services</b>		
DIAGN_6	Correlation by Pearson	0,4646
	Significance (2-directions)	<b>0,000</b>
EDUCA_6	Correlation by Pearson	0,5259
	Significance (2-directions)	<b>0,000</b>
<b>Service interest in the next five years</b>		
DIAGN_7	Correlation by Pearson	0,3285
	Significance (2-directions)	<b>0,000</b>
EDUCA_7	Correlation by Pearson	0,3985
	Significance (2-directions)	<b>0,000</b>
<b>Judgement of advantages and disadvantages</b>		
FEAR_3	Correlation by Pearson	-0,3763
	Significance (2-directions)	<b>0,000</b>
EFFIC_3	Correlation by Pearson	0,5450
	Significance (2-directions)	<b>0,000</b>
QUAL_3	Correlation by Pearson	0,4507
	Significance (2-directions)	<b>0,000</b>
UNCER_3	Correlation by Pearson	-0,1996
	Significance (2-directions)	<b>0,035</b>
ONCALL_3	Correlation by Pearson	0,3445
	Significance (2-directions)	<b>0,000</b>
WORKFL_3	Correlation by Pearson	-0,0928
	Significance (2-directions)	0,330

ATTITUDE WHEN FACING NEW TECHNOLOGIES		
<b>Judgement of various factors of telepathology's success</b>		
SURR_2	Correlation by Pearson	0,3616
	Significance (2-directions)	<b>0,000</b>
INTEG_2	Correlation by Pearson	0,0015
	Significance (2-directions)	0,987
LEGAL_2	Correlation by Pearson	-0,0870
	Significance (2-directions)	0,362
EQUIP_2	Correlation by Pearson	0,0002
	Significance (2-directions)	0,999
WORKFL_2	Correlation by Pearson	0,0480
	Significance (2-directions)	0,615
ACCUR_2	Correlation by Pearson	-0,2170
	Significance (2-directions)	<b>0,022</b>
EFFIC_2	Correlation by Pearson	0,1017
	Significance (2-directions)	0,286
MANAG_2	Correlation by Pearson	0,3993
	Significance (2-directions)	<b>0,000</b>
RELIA_2	Correlation by Pearson	-0,0554
	Significance (2-directions)	0,562
IMAGE_2	Correlation by Pearson	-0,0892
	Significance (2-directions)	0,350

\*\* The correlation is significant on the level of 0,001 (2-dimensional).

\* The correlation is significant on the level 0,05 (2-dimensionoal).

**SYSTEM TYPE (STATIC : DYNAMIC)****Multivariate Tests of Significance (S = 1, M = 9 , N = 8 1/2)**

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.54773	1.15050	20.00	19.00	.382
Hotellings	1.21105	1.15050	20.00	19.00	.382
Wilks	.45227	1.15050	20.00	19.00	.382
Roys	.54773				
Note.. F statistics are exact.					

**Univariate F-tests with (1,38) D. F.**

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES</b>						
DIAGN_6	1.24272	26.71394	1.24272	.70300	1.76775	.192
EDUCA_6	.09057	32.71318	.09057	.86087	.10521	.747
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES - JUDGEMENT FOR THE NEXT 5 YEARS</b>						
DIAGN_7	1.65293	25.98532	1.65293	.68382	2.41718	.128
EDUCA_7	.02436	34.61397	.02436	.91089	.02674	.871
<b>VARIANCE ANALYSIS OF THE RATINGS OF VARIOUS FACTORS OF TELEPATHOLOGY'S SUCCESS</b>						
SURR_2	.05169	11.85175	.05169	.31189	.16574	.686
INTEG_2	.11722	18.71044	.11722	.49238	.23807	.628
LEGAL_2	2.08510	27.81417	2.08510	.73195	2.84869	.100
EQUIP_2	.13625	11.43481	.13625	.30092	.45278	.505
WORKF_2	.05681	8.31487	.05681	.21881	.25961	.613
ACCUR_2	.03237	22.51977	.03237	.59263	.05462	.816
EFFIC_2	.30929	29.92774	.30929	.78757	.39271	.535
MANAG_2	.08058	9.54815	.08058	.25127	.32069	.575
RELI_2	.06553	21.02055	.06553	.55317	.11847	.733
IMAG_2	.79507	30.35172	.79507	.79873	.99541	.325
<b>VARIANCE ANALYSIS OF ADVANTAGE AND DISADVANTAGE JUDGEMENTS</b>						
FEAR_3	.02071	28.27342	.02071	.74404	.02783	.868
EFFIC_3	.00118	18.76557	.00118	.49383	.00238	.961
QUAL_3	1.93873	23.47255	1.93873	.61770	3.13863	.084
UNCER_3	4.74414	39.68471	4.74414	1.04433	4.54274	.040
ONCALL_3	.00920	36.88754	.00920	.97072	.00948	.923
WORKF_3	9.52116	40.97766	9.52116	1.07836	8.82930	.005
<b>VARIANCE ANALYSIS OF ACCURACY JUDGMENTS</b>						
EXAM_5	.93685	33.45601	.93685	.88042	1.06409	.309
EXPER_5	.96254	57.03160	.96254	1.50083	.64134	.428
EDUC_5	.08368	29.73594	.08368	.78252	.10693	.745
INTER_5	.41592	41.81116	.41592	1.10029	.37801	.542

**SYSTEM TYPE (ROBOTIC : NON-ROBOTIC)****Multivariate Tests of Significance (S = 1, M = 9 , N = 8 1/2)**

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.71444	2.37679	20.00	19.00	.032
Hotellings	2.50189	2.37679	20.00	19.00	.032
Wilks	.28556	2.37679	20.00	19.00	.032
Roys	.71444				
Note.. F statistics are exact.					

**Univariate F-tests with (1,38) D. F.**

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES</b>						
DIAGN_6	1.69194	26.26472	1.69194	.69118	2.44791	.126
EDUCA_6	.00084	32.80292	.00084	.86323	.00097	.975
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES - JUDGEMENT FOR THE NEXT 5 YEARS</b>						
DIAGN_7	.67568	26.96257	.67568	.70954	.95227	.335
EDUCA_7	1.39237	33.24596	1.39237	.87489	1.59147	.215
<b>VARIANCE ANALYSIS OF THE RATINGS OF FACTORS OF TELEPATHOLOGY'S SUCCESS</b>						
SURR_2	.15528	11.74816	.15528	.30916	.50226	.483
INTEG_2	1.42481	17.40285	1.42481	.45797	3.11115	.086
LEGAL_2	.32609	29.57317	.32609	.77824	.41901	.521
EQUIP_2	.14183	11.42922	.14183	.30077	.47156	.496
WORKF_2	.08810	8.28358	.08810	.21799	.40414	.529
ACCUR_2	.17786	22.37428	.17786	.58880	.30207	.586
EFFIC_2	.98576	29.25127	.98576	.76977	1.28058	.265
MANAG_2	.05220	9.57653	.05220	.25201	.20713	.652
RELI_2	.19328	20.89281	.19328	.54981	.35154	.557
IMAG_2	.75962	30.38716	.75962	.79966	.94993	.336
<b>VARIANCE ANALYSIS OF ADVANTAGE AND DISADVANTAGE JUDGEMENTS</b>						
FEAR_3	.60868	27.68545	.60868	.72856	.83546	.366
EFFIC_3	.03816	18.72858	.03816	.49286	.07744	.782
QUAL_3	3.57571	21.83556	3.57571	.57462	6.22274	.017
UNCER_3	4.21849	40.21036	4.21849	1.05817	3.98660	.053
ONCALL_3	.38220	36.51454	.38220	.96091	.39775	.532
WORKF_3	12.53049	37.96833	12.53049	.99917	12.54095	.001
<b>VARIANCE ANALYSIS OF ACCURACY JUDGMENTS</b>						
EXAM_5	.45102	33.94184	.45102	.89321	.50495	.482
EXPER_5	1.54129	56.45285	1.54129	1.48560	1.03749	.315
EDUC_5	.16262	29.65700	.16262	.78045	.20837	.651
INTER_5	.00621	42.22087	.00621	1.11108	.00559	.941

## SINGLE VALUES OF ACCURACY RATINGS – DISTINGUISHED BY STATIC/DYNAMIC AND ROBOTIC / NON-ROBOTIC

### Multivariate Tests of Significance

	Significance of Static / Dynamic Comparison				Significance of Robotic / Non-Robotic Comparison			
	df	Middle of Squares	F	p	df	Middle of Squares	F	p
6.5.1	1	1,197	,281	,279	1	2,103	1,197	,281
6.5.2	1	,667	,419	,693	1	1,067	,667	,419
6.5.3	1	2,532	,120	,118	1	3,088	2,532	,120
6.5.4	1	,177	,676	,858	1	,248	,177	,676
6.5.5	1	,645	,427	,647	1	1,136	,645	,427
6.5.6	1	,002	,968	,579	1	2,466E-03	,002	,968
6.5.7	1	1,456	,235	,282	1	2,653	1,456	,235
6.5.8	1	,300	,587	,958	1	,430	,300	,587
6.5.9	1	,030	,863	,741	1	3,946E-02	,030	,863
6.5.10	1	1,589	,215	,924	1	1,698	1,589	,215
6.5.11	1	2,715	,108	,022	1	3,125	2,715	,108
6.5.12	1	,159	,692	,327	1	,248	,159	,692

**CLIENT'S QUALIFICATION****Multivariate Tests of Significance (S = 1, M = 9 , N = 6 1/2)**

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.59519	1.10272	20.00	15.00	.430
Hotellings	1.47029	1.10272	20.00	15.00	.430
Wilks	.40481	1.10272	20.00	15.00	.430
Roys	.59519				
Note.. F statistics are exact.					

**Univariate F-tests with (1,34) D. F.**

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES</b>						
DIAGN_6	1.21476	25.13580	1.21476	.73929	1.64315	.209
EDUCA_6	.09895	23.07374	.09895	.67864	.14581	.705
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES - JUDGEMENT FOR THE NEXT 5 YEARS</b>						
DIAGN_7	.47768	26.09177	.47768	.76740	.62247	.436
EDUCA_7	.75468	23.45816	.75468	.68995	1.09382	.303
<b>VARIANCE ANALYSIS OF THE RATINGS OF FACTORS OF TELEPATHOLOGY'S SUCCESS</b>						
SURR_2	.08288	11.10358	.08288	.32658	.25380	.618
INTEG_2	.78429	17.45466	.78429	.51337	1.52773	.225
LEGAL_2	.71096	26.07760	.71096	.76699	.92695	.342
EQUIP_2	.08023	10.36686	.08023	.30491	.26313	.611
WORKF_2	.36052	6.81010	.36052	.20030	1.79992	.189
ACCUR_2	.00989	9.14287	.00989	.26891	.03678	.849
EFFIC_2	.07680	28.11151	.07680	.82681	.09289	.762
MANAG_2	.01149	9.42250	.01149	.27713	.04147	.840
RELI_2	.36873	19.27012	.36873	.56677	.65059	.426
IMAG_2	.32087	29.80273	.32087	.87655	.36606	.549
<b>VARIANCE ANALYSIS OF ADVANTAGE AND DISADVANTAGE JUDGEMENTS</b>						
FEAR_3	.00332	22.11958	.00332	.65058	.00511	.943
EFFIC_3	.06093	18.01905	.06093	.52997	.11497	.737
QUAL_3	2.70306	19.88204	2.70306	.58477	4.62246	<b>.039</b>
UNCER_3	1.12950	38.37383	1.12950	1.12864	1.00076	.324
ONCALL_3	1.65573	34.42748	1.65573	1.01257	1.63517	.210
WORKF_3	.47701	48.68861	.47701	1.43202	.33311	.568
<b>VARIANCE ANALYSIS OF ACCURACY JUDGMENTS</b>						
EXAM_5	3.87057	30.52229	3.87057	.89771	4.31158	<b>.045</b>
EXPER_5	.03010	57.96404	.03010	1.70482	.01766	.895
EDUC_5	4.47653	25.34309	4.47653	.74538	6.00567	<b>.020</b>
INTER_5	.02717	42.19992	.02717	1.24117	.02189	.883

**WISH TO COOPERATE WITH OTHER INSTITUTIONS**

<b>ATTITUDE WHEN FACING NEW TECHNOLOGIES</b>		
<b>Interest of participants in telepathology services</b>		
DIAGN_6	Correlation by Pearson	0,3314
	Significance (2-directions)	<b>0,000</b>
EDUCA_6	Correlation by Pearson	0,3150
	Significance (2-directions)	<b>0,001</b>
<b>Service interest in the next five years</b>		
DIAGN_7	Correlation by Pearson	0,3378
	Significance (2-directions)	<b>0,000</b>
EDUCA_7	Correlation by Pearson	0,3069
	Significance (2-directions)	<b>0,001</b>
<b>Judgement of advantages and disadvantages</b>		
FEAR_3	Correlation by Pearson	-0,1463
	Significance (2-directions)	0,124
EFFIC_3	Correlation by Pearson	0,3933
	Significance (2-directions)	<b>0,000</b>
QUAL_3	Correlation by Pearson	0,2801
	Significance (2-directions)	<b>0,003</b>
UNCER_3	Correlation by Pearson	-0,2255
	Significance (2-directions)	<b>0,017</b>
ONCALL_3	Correlation by Pearson	0,2043
	Significance (2-directions)	<b>0,031</b>
WORKFL_3	Correlation by Pearson	-0,0802
	Significance (2-directions)	0,401

<b>ATTITUDE WHEN FACING NEW TECHNOLOGIES</b>		
<b>Judgement of various factors of telepathology's success</b>		
SURR_2	Correlation by Pearson	0,0945
	Significance (2-directions)	0,322
INTEG_2	Correlation by Pearson	0,0302
	Significance (2-directions)	0,752
LEGAL_2	Correlation by Pearson	-0,1048
	Significance (2-directions)	0,272
EQUIP_2	Correlation by Pearson	0,0532
	Significance (2-directions)	0,577
WORKFL_2	Correlation by Pearson	0,1389
	Significance (2-directions)	0,144
ACCUR_2	Correlation by Pearson	-0,0187
	Significance (2-directions)	<b>0,845</b>
EFFIC_2	Correlation by Pearson	0,1372
	Significance (2-directions)	0,149
MANAG_2	Correlation by Pearson	0,0868
	Significance (2-directions)	0,363
RELIA_2	Correlation by Pearson	-0,0318
	Significance (2-directions)	<b>0,739</b>
IMAGE_2	Correlation by Pearson	-0,0819
	Significance (2-directions)	0,390

\*\* The correlation is significant on the level of 0,001 (2-dimensional).

\* The correlation is significant on the level 0,05 (2-dimensioanal).

**DEPARTMENT SIZE BY EMPLOYED PATHOLOGISTS****Univariate F-tests with (3,105) D. F.**

<b>Variable</b>	<b>Hypoth. SS</b>	<b>Error SS</b>	<b>Hypoth. MS</b>	<b>Error MS</b>	<b>F</b>	<b>Sig. of F</b>
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES</b>						
DIAGN_6	3.55786	93.92495	1.18595	.89452	1.32579	.270
EDUCA_6	11.91465	103.16251	3.97155	.98250	4.04229	.009
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES - JUDGEMENT FOR THE NEXT 5 YEARS</b>						
DIAGN_7	1.52953	85.88325	.50984	.81794	.62333	.601
EDUCA_7	4.58044	100.06377	1.52681	.95299	1.60213	.193
<b>VARIANCE ANALYSIS OF THE RATINGS OF FACTORS OF TELEPATHOLOGY'S SUCCESS</b>						
SURR_2	2.23986	62.85690	.74662	.59864	1.24720	.296
INTEG_2	.57487	53.25701	.19162	.50721	.37780	.769
LEGAL_2	.66846	61.76685	.22282	.58826	.37878	.768
EQUIP_2	.48707	25.20686	.16236	.24007	.67630	.568
WORKF_2	.37055	34.83539	.12352	.33177	.37230	.773
ACCUR_2	1.06038	34.02999	.35346	.32410	1.09060	.356
EFFIC_2	.37080	77.52063	.12360	.73829	.16741	.918
MANAG_2	3.52458	56.42100	1.17486	.53734	2.18643	.094
RELI_2	1.44508	60.81858	.48169	.57922	.83162	.479
IMAG_2	1.62340	43.05076	.54113	.41001	1.31981	.272
<b>VARIANCE ANALYSIS OF ADVANTAGE AND DISADVANTAGE JUDGEMENTS</b>						
FEAR_3	4.79832	108.92242	1.59944	1.03736	1.54184	.208
EFFIC_3	3.74302	97.17097	1.24767	.92544	1.34820	.263
QUAL_3	8.61283	116.51452	2.87094	1.10966	2.58722	.057
UNCER_3	5.30436	129.42856	1.76812	1.23265	1.43440	.237
ONCALL_3	1.34628	109.16957	.44876	1.03971	.43162	.731
WORKF_3	2.61235	142.99411	.87078	1.36185	.63941	.591
<b>VARIANCE ANALYSIS OF ACCURACY ASPECTS</b>						
EXAM_5	.15526	28.77815	.05175	.27408	.18882	.904
EXPER_5	2.26667	50.43188	.75556	.48030	1.57308	.200
EDUC_5	.10104	28.18255	.03368	.26841	.12548	.945
INTER_5	1.51853	37.59957	.50618	.35809	1.41354	.243

**DEPARTMENT SIZE BY AMOUNT OF EXAMINATIONS****Univariate F-tests with (2,104) D. F.**

<b>Variable</b>	<b>Hypoth. SS</b>	<b>Error SS</b>	<b>Hypoth. MS</b>	<b>Error MS</b>	<b>F</b>	<b>Sig. of F</b>
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES</b>						
DIAGN_6	1.16993	93.03022	.58497	.89452	.65394	.522
EDUCA_6	2.59702	110.75099	1.29851	1.06491	1.21936	.300
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES - JUDGEMENT FOR THE NEXT 5 YEARS</b>						
DIAGN_7	1.81782	81.22941	.90891	.78105	1.16370	.316
EDUCA_7	3.66576	100.08923	1.83288	.96240	1.90450	.154
<b>VARIANCE ANALYSIS OF THE RATINGS OF FACTORS OF TELEPATHOLOGY'S SUCCESS</b>						
SURR_2	.72849	64.16203	.36425	.61694	.59040	.556
INTEG_2	.48094	52.45121	.24047	.50434	.47681	.622
LEGAL_2	1.20898	60.64463	.60449	.58312	1.03665	.358
EQUIP_2	.04036	25.36184	.02018	.24386	.08275	.921
WORKF_2	.46651	34.16857	.23325	.32854	.70996	.494
ACCUR_2	.23484	34.71796	.11742	.33383	.35174	.704
EFFIC_2	.59606	75.68463	.29803	.72774	.40953	.665
MANAG_2	3.73080	56.02312	1.86540	.53868	3.46289	.035
RELI_2	.18565	59.85173	.09282	.57550	.16129	.851
IMAG_2	.22282	44.28243	.11141	.42579	.26165	.770
<b>VARIANCE ANALYSIS OF ADVANTAGE AND DISADVANTAGE JUDGEMENTS</b>						
FEAR_3	.59491	112.22526	.29746	1.07909	.27566	.760
EFFIC_3	.44331	98.33495	.22165	.94553	.23442	.791
QUAL_3	2.75761	116.38051	1.37880	1.11904	1.23213	.296
UNCER_3	5.33178	128.70928	2.66589	1.23759	2.15410	.121
ONCALL_3	.85541	107.89244	.42771	1.03743	.41228	.663
WORKF_3	.44257	140.47082	.22128	1.35068	.16383	.849
<b>VARIANCE ANALYSIS OF ACCURACY ASPECTS</b>						
EXAM_5	.20012	28.73156	.10006	.27626	.36220	.697
EXPER_5	.43639	52.26190	.21820	.50252	.43420	.649
EDUC_5	.06117	28.22221	.03058	.27137	.11270	.894
INTER_5	.23155	38.88555	.11577	.37390	.30964	.734

**AGE OF PARTICIPANTS****Multivariate Tests of Significance (S = 1, M = 9 , N = 44 1/2)**

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.27427	1.71951	20.00	91.00	.044
Hotellings	.37791	1.71951	20.00	91.00	.044
Wilks	.72573	1.71951	20.00	91.00	.044
Roys	.27427				
Note.. F statistics are exact.					

**Univariate F-tests with (1,110) D. F.**

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES</b>						
DIAGN_6	.01180	100.06954	.01180	.90972	.01297	.910
EDUCA_6	.60292	118.26547	.60292	1.07514	.56078	.456
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES - JUDGEMENT FOR THE NEXT 5 YEARS</b>						
DIAGN_7	.47375	89.70010	.47375	.81546	.58097	.448
EDUCA_7	2.94506	106.41090	2.94506	.96737	3.04439	.084
<b>VARIANCE ANALYSIS OF THE RATINGS OF FACTORS OF TELEPATHOLOGY'S SUCCESS</b>						
SURR_2	1.36935	65.56664	1.36935	.59606	2.29734	.132
INTEG_2	.11445	56.02862	.11445	.50935	.22470	.636
LEGAL_2	.94670	67.17308	.94670	.61066	1.55028	.216
EQUIP_2	.08967	28.27077	.08967	.25701	.34888	.556
WORKF_2	.21978	35.93433	.21978	.32668	.67278	.414
ACCUR_2	.77048	35.60456	.77048	.32368	2.38038	.126
EFFIC_2	.95835	79.52936	.95835	.72299	1.32552	.252
MANAG_2	.48163	60.48011	.48163	.54982	.87598	.351
RELI_2	.02483	64.90550	.02483	.59005	.04207	.838
IMAG_2	.36662	47.39299	.36662	.43085	.85094	.358
<b>VARIANCE ANALYSIS OF ADVANTAGE AND DISADVANTAGE JUDGEMENTS</b>						
FEAR_3	1.88567	115.45002	1.88567	1.04955	1.79665	.183
EFFIC_3	.05287	103.35950	.05287	.93963	.05627	.813
QUAL_3	.06068	126.65856	.06068	1.15144	.05270	.819
UNCER_3	2.02064	136.96205	2.02064	1.24511	1.62286	.205
ONCALL_3	1.78124	109.87261	1.78124	.99884	1.78330	.185
WORKF_3	2.12999	148.37526	2.12999	1.34887	1.57910	.212

**SIGNIFICANT RATINGS OF SINGLE VALUES DUE TO AGE**

## Multivariate Tests

Effect		Value	F	Hypothesis df	Error df	Significance
Q_AGE	Pillai-Spur	,861	1,715	87,000	24,000	,067
	Wilks-Lambda	,139	1,715	87,000	24,000	,067
	Hotelling-Spur	6,217	1,715	87,000	24,000	,067
	Highest Root by Roy	6,217	1,715	87,000	24,000	,067

Source	Dependent Variable	Total of Square of Type III	df	Middle of Squares	F	Significance.
2.5.12	current interest in Internet services	9,237	1	9,237	5,533	,020
2.6.4	future inter. in second look consult.	11,218	1	11,218	6,530	,012
2.6.5	future inter. in reference consult.	7,056	1	7,056	4,893	,029
2.6.11	future inter. in quality assurance	7,009	1	7,009	3,521	,063
2.6.12	future inter. in Internet services	8,591	1	8,591	5,201	,025
4.1.4	acceptance of physicians	4,818	1	4,818	3,599	,060
4.2.1	influence of health care politics	5,755	1	5,755	3,524	,063
4.2.2	influence of institution's politics	7,519	1	7,519	4,451	,037
4.5.3	accurate micro-examination	2,837	1	2,837	6,203	,014
5.1.1	TP will improve diagnostic quality	13,210	1	13,210	5,073	,026
5.3.6	TP will reduce education quality	7,577	1	7,577	4,356	,039
5.3.7	disadvantage: uncertain legal questions	5,037	1	5,037	3,093	,081

**KIND OF PATHOLOGICAL DISCIPLINE (HISTOLOGY, CYTOLOGY, MACROSCOPY)****Multivariate Tests of Significance (S = 1, M = 9 , N = 34 1/2)**

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.32553	1.71339	20.00	71.00	.051
Hotellings	.48264	1.71339	20.00	71.00	.051
Wilks	.67447	1.71339	20.00	71.00	.051
Roys	.32553				
Note.. F statistics are exact.					

**Univariate F-tests with (1,90) D. F.**

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES</b>						
DIAGN_6	1.37628	80.33198	1.37628	.89258	1.54192	.218
EDUCA_6	.35538	102.23560	.35538	1.13595	.31285	.577
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES - JUDGEMENT FOR THE NEXT 5 YEARS</b>						
DIAGN_7	.18085	70.54597	.18085	.78384	.23072	.632
EDUCA_7	.50402	94.46040	.50402	1.04956	.48022	.490
<b>VARIANCE ANALYSIS OF THE RATINGS OF FACTORS OF TELEPATHOLOGY'S SUCCESS</b>						
SURR_2	.59134	49.38862	.59134	.54876	1.07758	.302
INTEG_2	.00718	46.20026	.00718	.51334	.01400	.906
LEGAL_2	.08406	57.81497	.08406	.64239	.13086	.718
EQUIP_2	.46484	21.04122	.46484	.23379	1.98826	.162
WORKF_2	.00489	30.86281	.00489	.34292	.01426	.905
ACCUR_2	.18168	34.62074	.18168	.38467	.47228	.494
EFFIC_2	2.29236	57.07690	2.29236	.63419	3.61464	.060
MANAG_2	.45642	45.23365	.45642	.50260	.90813	.343
RELI_2	.31984	45.81299	.31984	.50903	.62833	.430
IMAG_2	.27175	39.37541	.27175	.43750	.62113	.433
<b>VARIANCE ANALYSIS OF ADVANTAGE AND DISADVANTAGE JUDGEMENTS</b>						
FEAR_3	.23160	91.99492	.23160	1.02217	.22657	.635
EFFIC_3	1.89261	83.01252	1.89261	.92236	2.05191	.155
QUAL_3	.45575	91.39674	.45575	1.01552	.44878	.505
UNCER_3	1.91472	115.85753	1.91472	1.28731	1.48738	.226
ONCALL_3	.24052	74.65586	.24052	.82951	.28996	.592
WORKF_3	2.88434	123.68689	2.88434	1.37430	2.09877	.151
<b>VARIANCE ANALYSIS OF ACCURACY JUDGMENTS</b>						
EXAM_5	.69552	33.69735	.69552	.88677	.78433	.381
EXPER_5	.16457	57.82957	.16457	1.52183	.10814	.744
EDUC_5	2.04847	27.77115	2.04847	.73082	2.80298	.102
INTER_5	2.22633	40.00075	2.22633	1.05265	2.11498	.154

**RECOMMENDED STRATEGY OF TELEPATHOLOGY INTRODUCTION****Multivariate Tests of Significance (S = 2, M = 8 1/2, N = 43 )**

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.86789	3.41141	40.00	178.00	.000
Hotellings	1.99097	4.33036	40.00	174.00	.000
Wilks	.28367	3.86127	40.00	176.00	.000
Roys	.62565				
Note.. F statistic for WILKS' Lambda is exact.					

**Univariate F-tests with (2,107) D. F.**

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES</b>						
DIAGN_6	27.01716	70.41966	13.50858	.65813	20.52577	.000
EDUCA_6	38.42139	75.10425	19.21069	.70191	27.36921	.000
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES - JUDGEMENT FOR THE NEXT 5 YEARS</b>						
DIAGN_7	21.25248	68.14503	10.62624	.63687	16.68512	.000
EDUCA_7	28.43955	78.87888	14.21977	.73719	19.28927	.000
<b>VARIANCE ANALYSIS OF THE RATINGS OF FACTORS OF TELEPATHOLOGY'S SUCCESS</b>						
SURR_2	6.64349	59.14643	3.32174	.55277	6.00926	.003
INTEG_2	.74010	55.40047	.37005	.51776	.71471	.492
LEGAL_2	5.74976	62.36986	2.87488	.58290	4.93207	.009
EQUIP_2	.39153	27.86411	.19576	.26041	.75174	.474
WORKF_2	.32550	35.32614	.16275	.33015	.49296	.612
ACCUR_2	2.24788	34.05640	1.12394	.31828	3.53124	.033
EFFIC_2	2.17121	78.23375	1.08561	.73116	1.48478	.231
MANAG_2	10.19168	46.74733	5.09584	.43689	11.66388	.000
RELI_2	.34463	64.02909	.17232	.59840	.28796	.750
IMAG_2	.59760	46.66484	.29880	.43612	.68513	.506
<b>VARIANCE ANALYSIS OF ADVANTAGE AND DISADVANTAGE JUDGEMENTS</b>						
FEAR_3	41.88081	72.87056	20.94041	.68103	30.74799	.000
EFFIC_3	34.61398	66.20069	17.30699	.61870	27.97324	.000
QUAL_3	39.15963	87.51470	19.57981	.81789	23.93929	.000
UNCER_3	11.63846	126.17135	5.81923	1.17917	4.93501	.009
ONCALL_3	12.09075	98.66708	6.04538	.92212	6.55594	.002
WORKF_3	7.65004	139.18172	3.82502	1.30076	2.94059	.057

**KIND OF OCCUPATION****Multivariate Tests of Significance (S = 1, M = 9, N = 44 1/2)**

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.32364	2.17715	20.00	91.00	.007
Hotellings	.47849	2.17715	20.00	91.00	.007
Wilks	.67636	2.17715	20.00	91.00	.007
Roys	.32364				
Note.. F statistics are exact.					

**Univariate F-tests with (1,110) D. F.**

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES</b>						
DIAGN_6	.13763	99.94371	.13763	.90858	.15148	.698
EDUCA_6	4.48798	114.38040	4.48798	1.03982	4.31611	.040
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES - JUDGEMENT FOR THE NEXT 5 YEARS</b>						
DIAGN_7	.09776	90.07609	.09776	.81887	.11939	.730
EDUCA_7	1.94267	107.41328	1.94267	.97648	1.98946	.161
<b>VARIANCE ANALYSIS OF THE RATINGS OF FACTORS OF TELEPATHOLOGY'S SUCCESS</b>						
SURR_2	.31143	66.62456	.31143	.60568	.51419	.475
INTEG_2	.00063	56.14245	.00063	.51039	.00123	.972
LEGAL_2	.42001	67.69977	.42001	.61545	.68244	.411
EQUIP_2	.71813	27.64231	.71813	.25129	2.85773	.094
WORKF_2	.00122	36.15289	.00122	.32866	.00371	.952
ACCUR_2	.12984	36.24519	.12984	.32950	.39406	.531
EFFIC_2	.62464	79.86307	.62464	.72603	.86036	.356
MANAG_2	.31355	60.64819	.31355	.55135	.56870	.452
RELI_2	.23858	64.69174	.23858	.58811	.40568	.525
IMAG_2	4.33303	43.42658	4.33303	.39479	10.97562	.001
<b>VARIANCE ANALYSIS OF ADVANTAGE AND DISADVANTAGE JUDGEMENTS</b>						
FEAR_03	.04413	117.29155	.04413	1.06629	.04139	.839
EFFIC_3	.01204	103.40033	.01204	.94000	.01281	.910
QUAL_3	4.49790	122.22133	4.49790	1.11110	4.04814	.047
UNCER_3	2.32111	136.66158	2.32111	1.24238	1.86828	.174
ONCALL_3	.02336	111.63048	.02336	1.01482	.02302	.880
WORKF_3	1.63124	148.87401	1.63124	1.35340	1.20529	.275
<b>VARIANCE ANALYSIS OF ACCURACY JUDGMENTS</b>						
EXAM_5	.00133	34.39153	.00133	.90504	.00147	.970
EXPER_5	1.34532	56.64882	1.34532	1.49076	.90244	.348
EDUC_5	.00211	29.81751	.00211	.78467	.00269	.959
INTER_5	.19515	42.03193	.19515	1.10610	.17643	.677

**KIND OF INSTITUTION****Multivariate Tests of Significance (S = 2, M = 8 1/2, N = 44 )**

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.48203	1.44485	40.00	182.00	.055
Hotellings	.66804	1.48638	40.00	178.00	.043
Wilks	.56895	1.46591	40.00	180.00	.049
Roys	.32535				
Note.. F statistic for WILKS' Lambda is exact.					

**Univariate F-tests with (2,109) D. F.**

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES</b>						
DIAGN_6	9.63131	90.45003	4.81566	.82982	5.80328	.004
EDUCA_6	23.22649	95.64189	11.61325	.87745	13.23525	.000
<b>VARIANCE ANALYSIS OF INTEREST IN TELEPATHOLOGY SERVICES - JUDGEMENT FOR THE NEXT 5 YEARS</b>						
DIAGN_7	7.07287	83.10098	3.53643	.76239	4.63859	.012
EDUCA_7	16.23435	93.12161	8.11718	.85433	9.50125	.000
<b>VARIANCE ANALYSIS OF THE RATINGS OF FACTORS OF TELEPATHOLOGY'S SUCCESS</b>						
SURR_2	4.03525	62.90074	2.01763	.57707	3.49632	.034
INTEG_2	.42172	55.72136	.21086	.51121	.41247	.663
LEGAL_2	2.70538	65.41440	1.35269	.60013	2.25398	.110
EQUIP_2	.12096	28.23947	.06048	.25908	.23345	.792
WORKF_2	.04569	36.10842	.02285	.33127	.06896	.933
ACCUR_2	1.35482	35.02022	.67741	.32129	2.10843	.126
EFFIC_2	1.23583	79.25188	.61792	.72708	.84986	.430
MANAG_2	6.77842	54.18333	3.38921	.49709	6.81803	.002
RELI_2	.26400	64.66632	.13200	.59327	.22250	.801
IMAG_2	1.31673	46.44289	.65836	.42608	1.54516	.218
<b>VARIANCE ANALYSIS OF ADVANTAGE AND DISADVANTAGE JUDGEMENTS</b>						
FEAR_3	13.99359	103.34210	6.99679	.94809	7.37986	.001
EFFIC_3	11.31341	92.09896	5.65671	.84494	6.69477	.002
QUAL_3	18.52626	108.19298	9.26313	.99260	9.33222	.000
UNCER_3	7.31809	131.66460	3.65905	1.20793	3.02918	.052
ONCALL_3	2.22650	109.42734	1.11325	1.00392	1.10890	.334
WORKF_3	7.56779	142.93746	3.78389	1.31135	2.88549	.060