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### APPENDIX 1. CLASSIFICATION OF QOE METRICS FOUND IN THE SYSTEMATIC MAPPING

Legend	
Data Extraction criteria	Possible Answer of each data extraction criteria
QoE characteristic	EFFE=Effectiveness, EFFI=Efficiency, SATI=Satisfaction, FREE=Freedom from risk, COCO=Context coverage
Metric	Name of the metric
Lifecycle phase	Req. = Requirements, Acq. = Acquisition, Dev. = Development, Int = Integration, Ope. = Operation, Ret = Retirement
Artifact evaluated	Spe. = Specification of cloud service, Arc. = Architecture of cloud service, Ser. = Cloud Service
Type of service	SaaS= Software as a service, PaaS = Platform as a service, IaaS= Infrastructure as a service
Stakeholder viewpoint	CSP = Cloud Service Provider, CSC = Cloud Service Consumer, CSB = Cloud Service Broker, CSD = Cloud Service Developer, USE= End-user
Validation procedure	A.A. = Axiomatic approach, A.T.M = Approach based on the Theory of Measurement, C.S. = Case study, SU. = Survey, C.E = Controlled Experiment, N.V.= Not validate, P.C. = Proof of concept

				Lifecyc	le phas	e		Artif	act eva	luated	Ty	ype of	servi	ce		Stakel	holder	view	point			Va	lidati	on pro	cedure				
QoE Sub- characte characteristic ristic	Metric	Req.	Acq.	Dev.	Int.	Ope.	Ret.	Spe.	Arc.	Ser.	Saa	S Pa	aaS Ia	aaS	CSP	CSB	CS	СС	CSD	USE	oretical dation A.T.N	<u>V</u>	mpiri alida .E.		SU.	No Vali N.V	dation P.C.	- Ref.	Paper
EFFE Productivity	Service cost	X	X			X				Х	ζ			X	X	У	K	X					X						S14
EFFE	Access update ratio (AUR)	)		X		X				X	ζ	X		X	X			X	X								X		S23
EFFE	Cost					X				Х	ζ			X	X												Х	ζ	S15
EFFE	Cost	X	X			X		X		X	ζ.	X			X	<b>Y</b>	X	X									Х	ζ.	S08
EFFE	Price	X	X			X		X	(						X			X									X		S19
EFFE	Pricing	X	X			X		X		X	ζ.	X	X	X	X	<u> </u>	X	X									X		S03
EFFE	QoE		X			X				X	ζ.	X			X			X									Х	ζ.	S04
EFFE	QoE RAS System (Ins Upd Del)	n X				X				X		X		X	X			X	X								X		S23

				Lifecycl	e phase	e		Artif	act eval	luated	Тур	e of ser	rvice		Stakel	nolder vi	ewpoir	nt			Valida	tion pro	ocedure		
QoE Sub- characte characteristic ristic	Metric	Req.	Acq.	Dev.	Int.	Ope.	Ret.	Spe.	Arc.	Ser.	SaaS	PaaS	IaaS	CSP	CSB	CSC	CSD	USE	Theoretica Validation A.A A.	n	Empi Valid C.E.	irical lation C.S.	SU.	No Validation N.V. P.O	Ref. Paper
EFFE	QoE RAS System (Sel)	ı X				X				X	X		X	X		X	Х	[						X	S23
EFFE	QoE RAS User (Ins Upd Del)	r X				X				X	X		X	X		X	X	ζ.						X	S23
EFFE	QoE RAS User (Sel)	r X				X				X	X		X	X		X	X	ζ.						X	S23
EFFE	QoE System R&Q (Ins Upd Del Sel)	) X				X				X	X		X	X		X	X	ζ.						X	S23
EFFE	QoE System Tota (Ins Upd Del Sel)	1 X				X				X	X		X	X		X	X	(						X	S23
EFFE	QoE User R&Q (Ins Upd Del Sel)	) X				X				Х	X		X	X	:	X	Х	(						X	S23
EFFE	QoE User Tota (Ins Upd Del Sel)	l X				X				X	X		X	X		X	Х	ζ.						X	S23
EFFE	StateCost					X				X			X	X											X S15
EFFE	Successful service outcomes	e				X				X	X		X	X		X	X	<u> </u>						X	S23
EFFE	TransCost					X				X			X	X											X S15
EFFI	Worrkload delay					X				X			X	X				X	ζ.						X S24
SATI Acceptability	Flow-Short-Scale (FSS) [17] or the Flow State Scale	e				X				X	X			X		X		X	ζ.					X	S18
SATI Acceptability	Game Engagemen Questionnaire (GEngQ) or Immersive Experience Questionnaire																								
	(IEQ)					X				X	X			X		X		X	X.					X	S18

				]	Lifecycl	le phase	e		Artifa	ct eval	uated	Тур	e of se	rvice		Stakeh	older v	iewpoin	ıt		Validat	ion pro	cedure			
QoE characte ristic	Sub- characteristic	Metric	Req.	Acq.	Dev.	Int.	Ope.	Ret.	Spe.	Arc.	Ser.	SaaS	PaaS	IaaS	CSP	CSB	CSC	CSD	USE	Theor Valida A.A	Empir Valid		SU.	No Validation N.V. P.	<u>.                                    </u>	Ref. Paper
SATI	Acceptability	Game Experience Questionnaire (GEQ) or in-game version (iGEQ)					X				X	X X			X	:	X	ζ	X					X		S18
SATI	Acceptability	Igroup Presence Questionnaire (IPQ)					X				X	X			X		X	ζ.	X					X		S18
SATI	Acceptability	Player Experience of Need Satisfaction (PENS)					X				X	X			X		X	ζ	X					X		S18
SATI	Acceptability	Presence Questionnaire (PQ)					X				X	X			X		Х	ζ	X					X		S18
SATI	Acceptability	Self-Assessment Manikin (SAM)					X				X	X			X	-	X	ζ.	X					X		S18
SATI	Courtesy	Degrees of formalization of the employee's language and attitude (DoF-ATT)							X			X	. X	X X					X						X	S33
SATI	Courtesy	Free trial		X		X	X				X	X	. X	X	X	X	X	ζ.						X		S03
SATI	Pleasure	API	X	X		X	X		X		X	X	. X	X	X	. X	X	ζ						X		S03
SATI	Pleasure	Client interface	X	X		X	X		X		X	X	X	x x	X	X	. x	<b>C</b>						X		S03
SATI	Pleasure	Use Intention		X			X				X			Х	X	X	. x	ζ.			X					S10
SATI	Pleasure	User Experience Level	X	X			X				X	X	X	X	X	X	Х	ζ						X		S03
SATI	Pleasure	User patient					X				X			Х	X				X						X	S07
SATI	Responsivenes	s Delay Score					X				X	X			X		X	ζ.							X	S04
SATI	Responsivenes	s Game delay (GD)					X				X	X							X						X	S06

					Lifecy	cle phas	e		Artifa	act evalı	uated	Тур	e of s	service		Stakeh	older	viewpoii	nt		Validat	ion pro	cedure			
QoE characte ristic	Sub- characteristic	Metric	Req	. Acc	ı. Dev	. Int.	Ope.	Ret.	Spe.	Arc.	Ser.	SaaS	Paa	ıS IaaS	CSP	CSB	CSO	C CSD	USE	Theorem Valid A.A	Empi Valid C.E.	rical ation C.S.	SU.	No Valida N.V.	ation P.C.	Ref. Paper
SATI	Responsiveness	Network del (ND)	lay				X				X	X							Х						X	S06
SATI	Responsiveness	Playout delay (Ol	D)				X				X	X							X						X	S06
SATI	Responsiveness	Processing del (PD)	lay				X				X	X							X						X	S06
SATI	Responsiveness	Response Del (RD)	lay				X				X	X							X						X	S06
SATI	Responsiveness	Responsiveness (RESP)					X				X	X		X					X						X	S32
SATI	Responsiveness	Responsiveness (RESP-CQ)					X				X	X		х х					X						X	S31
SATI	Responsiveness	Responsiveness(I	R )		X :	X					X			y				y	X X						X	S05
SATI	Trust	Cloud Custon Confidence Level	ner l				X				X	X			Х	(									X	S21
SATI	Trust	Monitoring	2	X	X		X		X		X	X		X X	. x	x x		X						X		S03
SATI	Trust	Monitoring	2	X	X						X			X		X		X						X		S02
SATI	Trust	Number of Client	ts		X						X	X							X					X		S01
SATI	Trust	Perceived fluid of gameplay (AC scale)					X				X	X							X						X	S22
SATI	Trust	Perceived graph quality (ACR sca					X				X	X							X						X	S22
SATI	Trust	Reliability (Rel)					X				X			X	. x			X						X		S28
SATI	Trust	Reputation	2	X	X		X				X	X		X X	X	X X		X						X		S03
SATI	Trust	Reputation					X				X			y	X	ζ			X					X		S29

				I	Lifecyc	le phase	e		Artifa	act evalı	uated	Тур	e of se	ervice		Stak	eholo	der viev	wpoin	t		Valida	tion pro	cedure			
QoE characte ristic	Sub- characteristic	Metric	Req.	Acq.	Dev.	Int.	Ope.	Ret.	Spe.	Arc.	Ser.	SaaS	PaaS	S IaaS	CSP	CSE	В	CSC (	CSD	USE	Theoretical Validation		lation		No Validation	<u>.                                    </u>	Ref. Paper
																					A.A A.T.M.	C.E.	C.S.	SU.	N.V. P.	C.	
SATI	Trust	Reputation o service provider	of X	X							X			2	K		X	X		X					X		S02
SATI	Trust	Reputation (Repws	s)				X				X	X								X					X		S09
SATI	Trust	Security (Sec)					X				X			2	K 2	X		X							X		S28
SATI	Trust	Transparency		X							X			2	K			X		X					X		S11
SATI	Trust	Trust					X				X	X	X	ζ 2	K					X					X		S25
SATI	Trust	Trustworthiness o service	of	X							X	X								X						X	S17
SATI	Trust	Trustworthiness o virtual resource and services					X				X	X	X	<b>C</b> 2	X					X					X		S30
SATI	Trust	Utility of trust for request (Ti)	r				X				X			2	X 2	X		X							X		S28
SATI	Trust	Video Quality Score Squality	y				X				X	X			2	X		X								X	S04
SATI	Utility	API	X	X							X			2	K		X	X		X					X		S02
SATI	Utility	Customer support	X	X	X	X	X		X	[	X	X	X	ζ 2	K 2	X	X	X							X		S03
SATI		Game Mean Opinion Score (GMOS)					X				X	X								X						X	S26
SATI		Mean opinion scor (MOS)	e				X				X	X							X							X	S27
SATI		Mean opinion scor (MOS)	e				X				X	X							X							X	S27
SATI		Mean opinion scor (MOS)	e				X				X	X							X							X	S27

				I	Lifecyc	le phase	е		Artif	act eval	uated	Тур	e of s	service	e		Stakeh	older	viewpoii	nt			Valida	tion pro	cedure			
	Sub- e characteristic	Metric	Req.	Acq.	Dev.	Int.	Ope.	Ret.	Spe.	Arc.	Ser.	SaaS	Paa	aS Ia	aS C	CSP	CSB	CS	C CSD	USE	Valid	retical ation A.T.M.	Empi Valid		SU.	No Validat N.V.		Ref. Paper
SATI		Mean opinion score (MOS)	:	X			X				X				X	X	X		X				Х					S10
SATI		Mean opinion score (MOS)	:				X				X	x x								X						X		S20
SATI		Satisfaction degree		X			X				X	X		X	X	X			X				X	(				S16
SATI		satisfaction rate					X				X					X			X				X					S14
SATI		Service Visibility					X				X	X				X				X							X	S21
SATI		User Experience	X	X							X				X		X		X	X						X		S02
SATI		User rating					X				X	X		X	X					X						X		S25
SATI		User rating					X				X	X		X	X					X						X		S25
FREE	Environmental risk	Carbon Cost (CFP)		X							X	X				X			X							X		S12
FREE	Environmental risk	Data Center Infrastructure Efficiency (DCIE)	•	X							X				X				X							X		S11
FREE	Environmental risk	Data Center Performance per Energy (DPPE)		X							X				X				X							X		S11
FREE	Environmental risk	Efficiency of the physical infrastructure (PUE)		X							X				X				X							X		S11
FREE	Environmental risk	IT equipment energy efficiency (ITEE)		X							X	:			X				X							X		S11
FREE	Environmental risk	IT equipment utilization (ITEU)	:	X							X	-			X				X							X		S11

				I	ifecycl	le phase	,		Artif	act eva	luated	Тур	e of se	ervice		Sta	kehold	ler vie	wpoint	t			Validat	tion pro	cedure			
QoE characte ristic	Sub- characteristic	Metric	Req.	Acq.	Dev.	Int.	Ope.	Ret.	Spe.	Arc.	Ser.	SaaS	PaaS	S IaaS	cs:	P CS	SB (	CSC	CSD	USE	Valid	retical lation A.T.M.	Empi Valid C.E.	ation	SU.	No Validation N.V. P.		Ref. Paper
FREE	Environmental risk	Penetration of renewable (green) energy into the system (GEC)		X							X			2	X			X								Х		S11
FREE	Environmental risk	Power Usage Efficiency (PUE)		X							X			2	X			X								X		S11
FREE	Environmental risk	Service Sustainability(E)		X							X	X	ζ.			X		X								X		S12
COCO	Flexibility	Flexible Capacity																										
		(C)					X				X		Σ	ζ		X											X	S21
COCO	Flexibility	Flexible Degree					X				X		<b>y</b>	ζ		X											X	S21
COCO	Flexibility	Flexible Distance (Si)					X				X		<b>y</b>	ζ		X											X	S21
COCO	Flexibility	Flexible Force (Fi)					X				X		y	ζ		X											X	S21
COCO	Flexibility	Flexible Point (FXPi)					X				X		y	ζ		X											X	S21
COCO	Flexibility	Payment flexibility					X				X	X	х х	ζ 2	X					X						X		S25
COCO		User Experience Level					X				X	X	ζ.			X		X									X	S13