action plans 115–116, 118, 158, 164–165 active errors 111–112 advanced measurement approaches (AMA) 3–4, 13–18, 81–85 aggregating risk data 160–163, 190 anonymity 217–218 approvals, project risk management 182–183 assets culture/behavior aspects 121–122 damage risk 21 inventories 197–199 project risk management 187 asymmetry, loss data 166–169, 176–178 attack risks 213, 215 audits 10, 24, 98–101, 107–108, 135–137, 163–165 availability aspects 66–67, 203 averages, risk reporting 167–169	blockchains 207, 209–210, 212, 215–219 board responsibilities 37–41, 44–47, 95, 101–102, 142–143 bottom-up risk analysis 3–5, 9–10, 44–45 boundary event reporting 136–137 bow tie tool 116–118 brainstorming 14–15 breaches 41–48, 162–163, 193–196 British road signs 146 budgets 53–54, 181–187, 191–192 building good reputations 222–223 business continuity 203 business disruption risk 22 business environment and internal control factors (BEICF) 84, 143–144 business ownership 95–97, 99–101 business practice risk 21 business values 175–178
banking/banks cryptocurrency risk 207–219 culture/behavior aspects 121–122, 125–126 regulatory capital 77–92 risk appetite/tolerance 43 risk identification 31–32 Basel categories 20–23, 25–27, 211–212, 214 Basel Committee 77–82, 87, 115, 129–130, 161 Basel II-III 77–92 baselining operational risk 176–178 basic indicator approach (BIA) 80 Bayesian models 72–74 behavior aspects 119–126, 164–165, 203–205 BEICF see business environment and internal control factors benchmarking 169 BIA see basic indicator approach biases 13–15, 65–67, 108–109 Bitcoins 207–209, 213–219	Cambridge Analytica 194–195 capital modeling/risk assessments 77–92 risk appetite 47–49 risk monitoring 129–132, 136, 143–144, 175 scenario analysis 63–65, 72–73, 84–92 cascades 31–32 categories Basel risk levels 20–23, 25–27, 211–212, 214 cryptocurrency risk 210–212, 214 key risk indicators 146–149 risk reporting data aggregation 161 cause analysis causal indicators 148 risk identification 7–8, 14, 17, 19, 23–26, 29–33 risk management sequences xxii risk management taxonomy 23–26

cause analysis (Continued)	conversion, data aggregation 160–163
risk mitigation 115–118	coordinated attack risks 213, 215
scenario analysis 14, 17	core business processes 43
CCAR see comprehensive capital analysis and	corporate governance 37, 95, 99, 101–103
review	corrective controls xxiii, 25, 106, 116–117
Centre for Cyber Security 198–199	COSO (Committee of Sponsoring Organizations)
change achievement, conduct/culture 122–126	xx–xxi, 37, 42, 171
characteristics	credit risks 38–39, 151–152
key risk indicators 145–146	crime
reputation risks 221–222	confidential data 69–72
circular presentation of risks see risk wheels	cryptocurrency risk 211, 214-219
clients' products & business practices 21	cyber risks 193-198, 202, 211, 214-219
climate change 29	crisis management 224-229
closure 184–185	cryptocurrency risk 207-219
clusters 29–33	anonymity 217–218
colour-coded risk levels 46–47, 57–59	Basel categories 210-212, 214
competency 121–123, 226	Bitcoins 207–209, 213–219
compliance risks 43, 157, 173–175	blockchain 207, 209-210, 212, 215-219
comprehensive capital analysis and review (CCAR)	crime 211, 214–219
88–91	double-spending risks 215–216
comprehensive frameworks 41–42, 88–91	drivers 213–219
conditional probability 72–74	exposure 210, 213–219
conduct	irreversible transactions 216-217
behavior aspects 119–126, 164–165	losses/mistakes 216–217
change achievement 122–126	mining strategies 209, 212, 215-216
definitions 119–120	risk identification 208-211, 214, 217-218
risk appetite 43	risk mitigation 210, 213-214
risk mitigation 119–126	transaction verification 215-218
risk reporting 119, 124, 164-165	verification 215–218
confidential data 69–72	virtual wallets 211-212, 215-217
confidentiality 203	vulnerabilities 210, 213–219
connectivity, risk identification 29-33	"cube" framework xxi
consistency, conduct/culture 123–124	culture 119–126, 164–165
consolidation, scenario analysis 75–76	currency risks 207–219
content aspects, risk reporting 157-158	cut-of mix, 83-84
continuity testing 227	cyber risks
controls	crime 193–198, 202, 211, 214–219
see also risk and control self-assessments	cryptocurrency 207–219
information security risks 193-206	fraud 193–196, 211, 214–219
key risk indicators 144, 154-155	information security risks 193-206
regulatory capital 84	risk identification 30, 33
risk appetite 41–45	theft 193, 197–198, 202, 211, 214
risk management sequences xxiii	cybersecurity see cyber risks
risk management taxonomy 24-27	
risk mitigation 105-113, 115-118	damages 8, 21
testing 107–110	dashboards, risk reporting 164-165, 191

data aggregation 160, 162, 100	aruntagurrangy righ 212, 219
data aggregation 160–163, 190 databases 64–65, 129–132, 137–139	cryptocurrency risk 212–218
data breaches 193–196	key risk indicators 151–152 risk assessments 39, 42–43, 60
	· · · · · · · · · · · · · · · · · · ·
data capture 150–155 data collection 129–139	risk identification 19–22
	risk mitigation 110–113
data compromise 193	risk monitoring 144–152, 162, 167–168
data fields 132–134	estimation biases 66–67
data losses 82–85, 166–169, 176–178	European Banking Authority (EBA) 82
data quality reviews 137	European banks 31–32, 166, 176–178
data requirements, key risk indicators 150–151	events
deadly sins 173–174	cryptocurrency risk 210–212
debriefing 184–185	event templates 115
debts 77	risk assessments 40–47, 52–58, 63–66, 69–75,
decentralized governance 213, 215	82–90
decision-making 98–101, 125–126, 157–158,	risk identification 6–7, 13–14, 19–26
174–175, 181–182	risk management sequences xxii–xxiii
delivery and process management 22	risk mitigation 96–97, 105–106, 112–113, 115–123
Delphi method 67–68	risk monitoring 129–139, 174–177
design	risk reporting 163–169
key risk indicators 150–155	examination controls 107
risk mitigation controls 109-113	excess risk analysis 47–49
detective controls 25, 105-106, 116-117	•
diamonds 29	execution/delivery 22
digital signatures 208–209	expert judgment 65, 67–68
directive controls 25, 106	exposure
documentation	cryptocurrency risk 210, 213–219
operational risk governance 102-103	key risk indicators 147–149
scenario analysis 14, 74-76	risk appetite 45
double-spending risks 215-216	risk identification tools 5–6
drivers, cryptocurrency risk 213-219	risk management sequences xxii
duplicative controls 109	external data (ED) 83–85
	external fraud 20
earnings before interest and tax (EBIT) 186–187	external losses 10–11
EBA see European Banking Authority	
ED see external data	Facebook scandal 194–195
	factor models 86
electronic currency risks 207–219	failures
employee data leaks 195–196	key risk indicators 148
employee interviews 10	risk identification 22
employment practice risks 20	systematic patterns 116–118
encryption 208, 212, 218	fault tree analysis (FTA) 67–74
enterprise risk management (ERM) xxi, 171	feedback assessments 171
environment influences, conduct/culture 123–124	filtering 83–84
Equifax 194–195, 225	flash questionnaires 199–201
ERM see enterprise risk management	follow-up aspects 96–97, 118, 158, 174
errors	framework alignment 46–49, 59–61

fraud	RCSA exercises 53–59
confidential data selling 69-72	risk management sequences xxiii
crisis management 226	risk management taxonomy 23–26
cryptocurrency risk 211, 214–219	scenario analysis 63–65, 72–76
cyber risks 193–196, 211, 214–219	incentives
risk identification 20	conduct/culture 122
frequency assessments 64-65, 87	risk reporting 135-136
frequency of testing 108-109	incident data collection
frequent data losses 166–167	data fields 132-134
front-line risk management 95–97	losses 129–139
FTA see fault tree analysis	non-financial impact fallacy 130-132
FTSE 100 insurance company 4, 16	processes 132–139
funnel structures 40–41	regulatory requirements 129-132, 136-137
future directions 232–233	reporting 129-139
	resistance 134–136
general ledgers 137–138	reviews 137-139
generation phases, scenario analysis 15–18	risk monitoring/reporting 129-139
geopolitical risks 32–33	self-reporting incentives 135-136
Glass-Steagall Act in 1999 (repeal of) 78–79	validation 137-139
golden rules 157, 173–174	incident management xxiii, 197
good reputations 222–224	influence aspects, conduct/culture 123-124
governance	information asset inventories 197-199
action plan design 118	information disclosures 78
cryptocurrency risk 213, 215	information security risks (ISR) 193-206
key risk indicators 153–154	asset inventories 197-199
•	behavior aspects 203–205
operational risk 95–103	breaches 193-196
project risk management 181–182, 185, 192	controls 193–206
risk mitigation 118	crisis management 225–226
scenario analysis 13–14	cyber risks 193–206
Great Depression 77	key risk indicators 205–206
gross income benchmarks 169	leaked data 193–196
	media reports 193–196
hacking incidents 225	questionnaires 199–201
heatmaps 46–47, 57–59	RCSA 200, 202
history, regulatory capital 77–79	reputation risks 193, 195, 197-198
human error 110–112, 116, 151–152	risk assessments 199-203
hybrid models, regulatory capital 86	risk identification 197–199
	risk mitigation 199–201, 203–205
ICAAP see Internal Capital Adequacy Assessment	scenario analysis 200, 203
Process	standards 196–197
IFRS Standards 79	surveys 199–203
ILD see internal loss data	taxonomy 197–199
IMA see internal modeling approaches	technical measures 203–205
impacts	third party risks 193, 195, 197-198
definitions 53–54	information technology (IT) 138, 193

inquiry controls 107	design 150–155
insurance, risk mitigation 100-101, 110, 112-113	errors 151–152
insurance companies	exposure 147–149
information security risks 195–196	failure indicators 148
risk appetite 46–47	features of 145-146
scenario generation phase 16	governance 153–154
sur-solvency 46–47	information security risks 205-206
top-down risk identification 4	number requirements 150–151
integrity 203	performance 144
internal audits 98–99	preventive controls 154–155
Internal Capital Adequacy Assessment Process	project risk management 192
(ICAAP) 5, 88–91	risk appetite 46–47, 141–145
internal controls 24, 84, 105–113	risk monitoring 129–130, 139, 141–155
internal databases 82–83	risk reporting 158, 160–163
internal fraud 20, 226	roles 141–144
internal loss data (ILD) 82–85	selection phases 150–151
internal losses 10–11, 82–85	stress/stretch 148
internal modeling approaches (IMA) 16, 81-85	thresholds 145–146, 151–154
international asset management firms 121–122	validation 146, 154–155
international banks 121–122	knowledge-based errors 111
international financial firms 43	KPI see key performance indicators
International Organization for Standardization	KRI see key risk indicators
(ISO)	KKI see key fisk indicators
ISO 31000 xx-xxi, 171	
ISO/IEC 27001 196	lagging indicators 10–11, 145–146, 149
risk mitigation 105	large data losses 166–167
interviews 4, 10	latent errors 111–112
inventories 197-199	LDA see loss distribution approaches
investment companies 72-74, 89-90	leaked data 193–196
involvement stages, project risk management	leasing companies 8
181–185	legal & compliance risks 43
irreversible transactions 216-217	level 1 risk categories 20-23, 25-27, 211-212
ISO see International Organization for	level 2 risk categories 20-23, 25-27, 211-212, 214
Standardization	level 3 risk categories 20-23, 214
ISR see information security risks	life cycles, project risk management 182
IT see information technology	likelihood ratings 53–59
	loss data 82-85, 166-169, 176-178
key control indicators (KCI) 144	loss distribution approaches (LDA) 85-88
key performance indicators (KPI) 47, 144	losses
key risk indicators (KRI)	cryptocurrency risk 216-217
BEICF requirements 143–144	incident data collection 129–139
board responsibilities 142–143	regulatory capital 77–92
categories 146–149	risk appetite 46–47
characteristics 145–146	risk identification 10–11
controls 144, 154–155	risk management taxonomy 23–24
data capture 150–155	risk reporting 129–130, 166–169
*	1 0

macroeconomic stress testing 91	operational risk governance
maintaining good reputations 223–224	audits 98–99
management	board responsibilities 95, 101–102
reputation risks 221–229	committees 101–103
risk identification xxiv, 3–11	documentation 102–103
scenario analysis 63-64, 73, 75-76	internal audits 98–99
market infrastructure companies 27, 43	organization aspects 101–103
market risks 38-39	ownership 95–97, 99–101
maturity assessments 171-178	partnership models 100–101
MECE see Mutually Exclusive and Collectively	policies 102–103
Exhaustive	procedures 102–103
median 168	risk committees 101–103
media reports 193-196	risk functions 97–101
mentors 123	risk mitigation 95–103
metrics, risk reporting 164-165	three lines of defense model 95–102
mining companies 29-31	operational risks
mining strategies 209, 212, 215-216	future directions 232–233
mis-selling risks 43	Pillar 1 78–88
mistakes/errors	RCSA exercises 51–57, 182, 187, 190–191,
cryptocurrency risk 216-217	199–203
risk mitigation 111	regulatory capital 78–88
modeling regulatory capital risks 77–92	risk appetite 38–42, 45–46, 49
modern representations, RCSA 58–59	risk connectivity 29, 32–33
Monte Carlo simulations 73–74, 87	risk definition and taxonomy 19, 22–26
Mutually Exclusive and Collectively Exhaustive	risk identification 5, 8, 10–11, 29, 32–33
(MECE) 23, 25–26	risk monitoring 171–178
()	risk networks 29, 32–33
natural disasters 225	scenario analysis 13–18
near misses 10–11, 115–116, 118	optimistic controls 109
networks, risk identification 25–33	organization aspects 101–103
	ORIC see Operational Risk Consortium
no average in risk 167–169	ORX see Operational Riskdata eXchange
non-financial impact fallacy 130–132	Association
Nordic bank 135	outages 73–74, 226
number requirements, key risk indicators	ownership of risks 95-97, 99-101
150–151	own funds 77
objectives, RCSA exercises 51–53	
observation controls 107	Paradise Papers 194
occurrence impacts/probability 51, 53–60, 64–65,	partnership models 100–101
72–74	peer-to-peer systems 207–219
operational risk capital modeling	people environment influences 123
77–92	performance, key risk indicators 144
Operational Risk Consortium (ORIC)	performance controls 108, 144
17–18, 83, 166	personal values 122
Operational Riskdata eXchange Association	physical asset damage 21
(ORX) 17–18, 83, 166	physical environment influences 123-124

platform outages 73–74	QIS see quantitative impact studies	
policies	quality assessments 172	
project risk management 184–185	quality reviews 137	
risk governance 102–103	quantification details 73–74	
pooling expert judgment 67–68	quantitative impact studies (QIS) 80	
portfolios 183–184	quartiles 168	
preparation phases, scenario analysis 13–14	questionnaires 199-201	
preventive controls		
key risk indicators 154–155	rare data losses 166–167	
risk management sequences xxiii	RCSA see risk and control self-assessments	
risk management taxonomy 24	reconciling, risk identification tools 5	
risk mitigation 24, 105–106, 110–113,	regulations, incident data collection 129-132,	
116–117	136–137	
primary controls 106	regulatory capital	
PRINCE 2 181–182	advanced measurements 81-85	
probability of occurrence 51, 53–60, 64–65,	banks 77–92	
72–74	Basel II 77–92	
procedures, operational risk governance 102–103	BEICF 84	
processes, incident data collection 132–139	calculation datasets 82–83 CCAR process 88–91	
process mapping 4, 9	control factors 84	
progress assessments 124–125	external data 83–85	
project risk management 181–192	frequency assessments 87	
approvals 182–183	history 77–79	
closure 184–185	ICAAP 88–91	
data aggregation 190	internal databases 82-83	
debriefing 184–185	losses 77–92	
decision-making 181–182	modeling 77–92	
governance 181–182, 185, 192	Monte Carlo simulations 87	
key risk indicators 192	operational risks 78–88	
life cycles 182	Pillar 1 78–88	
policy 184–185	Pillar 2 78, 88–92	
portfolios 183–184	rationale 77–79 risk assessments 77–92	
ratings 186–189	scenario analysis 63–65, 72–73, 84–86, 89–92	
RCSA 182, 187, 190–191	severity assessments 87	
risk assessments 181–182, 187–190	standardized measurement 79–81	
risk function 181–187	standardized medsurement 75 61	
risk identification 181-182, 187-190	stress testing 90–92	
risk mitigation 182	supervisory reviews 78, 88–92	
risk monitoring 182, 191-192	units of measure 88	
risk ratings 186–189	wind-down planning 92	
risk reporting 191–192	regulatory compliance 157, 173–174	
risk update 182	reperformance controls 108	
stage-gate processes 181–182	repetitive controls 109–110	
propinquity 123–124	reputation 221–229	
pyramid structures 46–47	benefits 224	

reputation (Continued)	modeling 77–92
characteristics 221–222	operational risk capital modeling 77–92
creating 222–223	project risk management 181–182, 187–190
crisis management 224–229	RCSA exercises 46–47, 51–61, 65, 84–85
definition 221	regulatory capital 77–92
good reputations 222–224	risk appetite 37–49, 98
information security risks 193, 195, 197–198	**
maintenance 223–224	risk management frameworks xxi, 46–49, 59–61
management 221-229	scenario analysis 63–76
risk appetite 44	risk-based control testing 108–109
residual risk self-assessment (RSA) 51	risk champions 97
resignations 149	risk clusters 29–33
resilience 221–229	risk committees 101–103
crisis management 224–229	risk connectivity 29–33
definitions 224	risk and control assessment (RCA) 51, 159
resistance, risk reporting 134–136	risk and control self-assessments (RCSA)
retail banks 43	framework alignment 59–61
revenue impacts 8	heatmaps 46–47, 57–59
reverse stress testing 92	impact ratings 53–59
reviews, incident data collection 137–139	incident data collection 129–130
rewards, risk appetite 38–39	information security risks 200, 202
risk, definitions xix–xx, 19–27	likelihood ratings 53–59
risk appetite	matrix 46-47, 57-59
board responsibilities 37, 39–41, 44–47	modern representations 58-59
bottom-up risk analysis 44–45	objectives 51–53
comprehensive frameworks 41–42	occurrence impacts/probability 51, 53-60
controls 41–45	operational risks 182, 187, 190-191, 199-203
definitions 37–40	probability of occurrence 51, 53-60
excess risk analysis 47–49	project risk management 182, 187, 190-191
framework alignment 46–49	risk appetite 46–47
key risk indicators 46–47, 141–145	risk assessments 46-47, 51-61, 65, 84-85
operational risk governance 98	risk identification tools 3-4
rewards 38–39	risk management frameworks 59-61
risk assessments 37–49, 98	risk mitigation 100, 108, 116
risk limits 41–44	risk monitoring 129–130, 153, 160, 173
risk management frameworks 46–49	structures 51–53
risk management tools 42, 46	risk functions 97-101, 181-187
risk reporting 158, 160–162	risk governance 95–103, 153–154
risk tolerance 41–47	risk identification xxi, xxiii–xxiv, 1–33
structures 39–49	bottom-up risk analysis 3–5, 9–10
top-down risk analysis 44–45	cause analysis 7–8, 14, 17, 19, 23–26, 29–33
risk assessments xxi, xxiii–xxiv, 35–92	clusters 29–33
capital 77–92	connectivity 29–33
cryptocurrency risks 208	cryptocurrency risk 208–211, 214, 217–218
heatmaps 46–47, 57–59	exposure 5–6
information security risks 199–203	information security risks 197–199

interviews 4, 10	governance 118		
lagging indicators 10–11	human error 110–112, 116		
losses 10–11	information security risks 199–201, 203–205		
management tools xxiv, 3–11	insurance 100–101, 110, 112–113		
near misses 10–11	internal controls 105–113		
networks 25–33	near misses 115–116, 118		
process mapping 4, 9	•		
project risk management 181–182, 187–190	operational risk governance 95–103 preventive controls 24, 105–106, 110–113,		
risk appetite 49	116–117		
risk clusters 29–33			
risk connectivity 29–33	project risk management 182 RCSA exercises 100, 108, 116		
risk lists 8, 25–27, 29–31			
risk networks 25–33	risk management actions xxiii–xxiv		
risk registers 27, 29–30, 33	risk management frameworks xxi		
risk wheels 6–8	risk management tools xxiv		
root causes 8	risk transfers 105, 112–113		
scenario analysis 3–4, 13–18	root cause analysis 115–118		
taxonomy 23–27	systematic patterns of failure 116–118		
tools xxiv, 3–11	target culture 120–126		
top-down risk analysis 3–5	testing controls 107–110		
vulnerabilities 5–6	transfers 105, 112–113		
risk limits 41–44	types of controls 105–113		
risk lists 8, 25–27, 29–31	risk monitoring 127–178		
risk management	baselining operational risk 176–178		
actions xxiii–xxiv	business values 175–178		
frameworks xx–xxi, 46–49, 59–61, 171–178	capital 129-132, 136, 143-144, 175		
scenario analysis 63–64, 73, 75–76	compliance 157, 173–175		
sequences xxi–xxiii	data collection 129-139		
taxonomy 23–27	deadly sins 173-174		
tools xxiv, 3–11, 42, 46	errors 144-152, 162, 167-168		
risk mitigation 93–126	follow-up 158, 174		
action plans 115–116, 118	golden rules 157, 173-174		
bow tie tool 116–118	incident data collection 129-139		
cause analysis 115–118	key risk indicators 129-130, 139, 141-155		
conduct 119–126	maturity assessments 171-178		
controls 105–113, 115–118	ORM maturity 171–178		
corrective controls 25, 106, 116–117	project risk management 182, 191–192		
cryptocurrency risk 210, 213–214	quality assessments 172		
culture 119–126	RCSA exercises 129–130, 153, 160, 173		
definitions 105	reporting separation 159–160		
design of controls 109–113	risk management actions xxiii–xxiv		
detective controls 25, 105–106, 116–117	risk management frameworks xxi, 171–178		
events 115–118	risk management tools xxiv		
failure systematic patterns 116–118	risk reporting 129–139, 157–169		
follow-up 96–97, 118	risk networks 25–33		
good practice 115–116	risk ownership 95–97, 99–101		
good practice 115-110	115K OWNERSHIP 75-71, 77-101		

minto motivo - 107, 100	and advanta		
risk ratings 186–189	anchoring 66		
risk registers 27, 29–30, 33	Bayesian models 72–74		
risk reporting	biases 13–15, 65–67		
action plans 158, 164–165	capital 63–65, 72–73, 84–92		
aggregating risk data 160–163	cause analysis 14, 17		
averages 167–169	conditional probability 72–74		
behavior aspects 119, 124, 164–165	consolidation 75–76		
benchmarking 169	Delphi method 67–68		
boundary events 136–137	documentation 74–76		
challenges 158–164	estimation biases 66–67		
conduct 119, 124, 164-165	expert judgment 65, 67–68		
content aspects 157–158	fault tree analysis 67–74		
dashboards 164–165	frequency assessments 64-65		
data aggregation 160-163	generation phases 15–18		
data losses 166–169	governance phases 13–14		
golden rules 157	impact assessments 63-65, 72-76		
gross income benchmarks 169	information security risks 200, 203		
incentives 135-136	investment companies 72-74		
incident data collection 129-139	management 63-64, 73, 75-76		
key risk indicators 158, 160-163	Monte Carlo simulations 73–74		
losses 129–130, 166–169	occurrence probability 64-65, 72-74		
monitoring separation 159-160	outages 73–74		
no average in risk 167-169	preparation phases 13–14		
project risk management 191-192	quantification detail 73–74		
risk appetite 158, 160-162	regulatory capital 63–65, 72–73, 84–86, 89–92		
risk monitoring 129-139, 157-169	risk assessments 63–76		
rules 157	risk identification 3-4, 13-18		
story creation 169	risk management 63-64, 73, 75-76		
risk tolerance 41–47	scenario data 84		
risk transfers 105, 112-113	scenario sheets 74–75		
risk update 182	scenario stress testing 90–91		
risk wheels 6–8	selection phases 15–18		
rogue trading 226	severity assessments 63–64		
root cause analysis 8, 115–118	systematic estimation 66–67		
RSA see residual risk self-assessment	validation 63, 74–76		
rules	scoring mechanisms 160–163		
conduct/culture 124	secondary controls 106		
risk reporting 157	security risks 193–206		
	selection phases		
safety, Basel categories 20	key risk indicators 150–151		
sampling 109	scenario analysis 15–18		
Sarbanes–Oxley (SOX) regulations 107	self-assessments <i>see</i> risk and control		
scaling, loss data 83–84	self-assessments		
scenario analysis	self-certification controls 107		
advanced measurements 3–4, 13–18	self-reporting incentives 135–136		

sensitive information 218	risk definitions 23–27
sensitivity stress testing 90	risk identification 23–27
sequences of risk management xxi-xxiii	TDRA see top-down risk analysis
service level agreements (SLA) 144	technical measures, information security risks
severity assessments 63-64, 87	203–205
SIFI see systemically important financial	theft, cyber risks 193, 197–198, 202,
institutions	211, 214
SLA see service level agreements	third party risks
slips/errors 111	information security risks 193, 195,
SMA see standardized measurement approach	197–198
Sound Management of Operational Risk 78, 80–81,	reputation 44, 193, 195, 197–198, 225
115, 161	three lines of defense model (3 LoD) 95–102
SOX see Sarbanes–Oxley regulations	three-pillars approach 77–78
staff interviews tools 10	thresholds, key risk indicators 145–146,
staff turnover 149	151–154
stage-gate processes 181–182	top-down risk analysis (TDRA) 3–5, 44–45
standalone databases 137–139	transaction verification 215–218
standardized measurement approach (SMA) 79–81,	transfers, risk mitigation 105, 112–113
130, 136	transparency 226
standards information security risks 196–197	umsparency 220
ISO standards xx–xxi, 105, 171, 196	uncoverable losses/mistakes 216–217
stochastic models 85	units of measure (UoM) 88
story creation, risk reporting 169	units of measure (COM) 66
strategic objectives 37–49	11.1.2
stress, key risk indicators 148	validation incident data collection 137–139
stress testing 90–92	key risk indicators 146, 154–155
stretch, key risk indicators 148	scenario analysis 63, 74–76
structures	•
RCSA exercises 51–53	value, risk management frameworks 175–178
risk appetite 39–49	velocity, RCSA exercises 51 verification, cryptocurrency risk 215–218
supervisory review processes 78, 88–92	violations 111
sur-solvency 46–47	virtual currency risks 207–219
surveys 32–33, 199–203	virtual wallets 211–212, 215–217
systematic estimation 66–67	vulnerabilities
systematic patterns of failure 116–118	cryptocurrency risk 210, 213–219
system failures 22	risk identification tools 5–6
systemically important financial institutions (SIFI)	Tion racination tools b
78	WEF see World Economic Forum
system outages 226	willingness, conduct/culture 122
systems uptime 203	wind-down planning 92
	workplace safety 20
target culture 120–126	workshops 14, 51
taxonomy	World Bank war room training sessions
definitions 23–27	227–228
information security risks 197–199	World Economic Forum (WEF) risk network 29
mornation became flows 177 177	