Risk Management

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step	table	description
Plan risk management	tabelA	risk management activities ,plan of work flow
	tableB	some important activities and the details of them
	tableC	stakeholders and the timing for intervention
	tableD	strategies-for-risk-management , every activity in the plan has a strategy—include in different tables
Identify risks	tableA	risk-sources-table (RST)
	tableB	risk-entries-table (RET)
	tableC	constraints—resources—staff,just a sample of questionnaire, based on the RET used to identify risks in more detailed way
Risk analysis	tabelA	probability-parameters table, used to indicate the level of probability of the occurrence of the risk
	tableB	impact-evaluation-criteria table ,used to indicate the level of the impact of the risk
	tableC	risk value (RV) , indicate the level of risk in general way
	tableD	experts voting and retrieve the data, used to indicate how the expert scores the risk—the score means what
	tableE	ST- scaleable, the relative importance of two factors of one risk —used to analyze in quantitative way
	tableF	result of the analysis and combine the value range of R with the intuitive description of risks
	matrixA	IL-PL-matrix , just form a matrix to represent the tableA/B — get the RV
	matrixB	the authority of expert and the weight of the factors of risks—used to estimate the risk value in quantitative way
Plan risk responses		Recognized risk quantification checklist where you can find out all the information of all the risks ,including all output of the work done before (including responses)
Monitor and control risks		MSRT some information about the risks and main parts are the history and current status of any risk ,and the changes over time

Plan risk management

INCLUDING tableA/B/C/D

tableA

risk-management-activity								
roles	responsibility	precondition (completed activity)	input	mainprocess	output	endif	measurement	activityname
system analyst	make RMP	project plan and the technical solution	document of precondition	*1RM resource* 2assignment 3training plan *4stakeholders and timing* *5RM process description* 6approval rules	RMP	1the document of RMP 2approved	statistics of workload	plan management
RG and SA	identify risks and sources	project plan and the technical solution and risk-management-plan	document of precondition	1risk sources 2risk categories	RST RET	documents of RST and RET	statistics of workload	define risk sources and categories
experts of logistics business	define the parameters for analysis of risk	sources and categories	RST RET	1criterion for probability and impact of risk 2risk threshold 3ACP of RM	REOR RMR	documents of REOR and RMR	statistics of workload	define the of risk parameters
system analyst and other experts	draft and maintain the strategies for risk management	RST RET REOR RMR	RST RET REOR RMR	draft and maintain the strategies for risk management	RMS	documents of RMS	statistics of workload	strategies for risk occurrence
SA and RO	identify risk and documented	RST RET RMS	RST RET RMS	according to RET: 1identify the risks related to the cost\performance\schedule 2the environment factors 3elements in WBS 4elements of project plan 5describe the background/ precondition and outcomes' 6confirm the impact	RIT	documents of RIT	statistics of workload	identify the risks
system analyst and other experts of logistics business	estimate and order the risk	RST RET RMS	RST RET RMS	1use the parameters to estimate the risks 2according to the estimation ,rank the risks and set priorities	RQCL	documents of RQCL	statistics of workload	quantification activity and set priorities
SA and PM	monitor the changes of risks ; find out new/upgrade/ residual risks ；delete the relived risks	RST RET RIT RMR	RST RET RIT RMR	1compare the risk level and the threshold 2check the status of the risk 3report the monitoring output of the risks 4notify the stakeholders	MSRT	documents of MSRT	statistics of workload	monitor and control risks
SA and RO and RG	work out the response plan for the risks	RST RET RIT RMR MSRT	RST RET RIT RMR MSRT	1work out the plan for risk occurrence 2 execute the plan 3 report the consequences of the execution 4modify the deviation	RRP RRPR	documents of RRP and RRPR	statistics of workload	work out the response plan for the risks

note:
SA- System Analyst
RO- Risk Originator
PM- Project Manager
RG- Risk Group

RMP- risk management plan
RST- risk sources table
RET- risk entries table
REOR- rules for estimating and ordering the risk
ACP- activity control parameters
RMR- risk management requirements
RMS- risk management strategies(or responses)
RIT- risk identification table
RQCL- risk quantification check list
MSRT- monitoring status of risks table
RRP- risk response plan
RRPR-risk response plan report

tableB

	important-activities-description		
detail	**RM resource**	**stakeholders and timing**	**RM process description**
input	1scale 2finance	1the project activity	1defined criteria and standard RM process 2tailoring and integration
output	1RM human resource 2RM tools 3computation resource	1stakeholders 2timing	1 document 2 tracing the change

tableC

stakeholders-and-timing-table	
stakeholders	timing for intervention
software development center	setting up the project ; full participation
company /international business department	identify requirement change ,participate in the requirement risk activities and review and notify
product research and development department	when the triggers of the risk happen trigger:product contract management ; data migration rules ; test of environment and plan
relevant system technical group	when the triggers of the risk happen trigger: system interface validation ; join-test verification

tableD

strategies-for-risk-management	
project	main content
risk management scope	exclude force majeure risk
identification	RET
analysis	model based on RET (more in RQCL)
tracing	(more in MSRT)
response	(more in RRP and RRPR)
notify	1 weekly meeting to summary 2 email or other tools to notify in real-time
specific sources of project	(more in RST)
categories and definition	(more in RIT)
parameters and threshold	(more in REOR)
project for monitoring the risk status	(more in MSRT)
interval of risk reviewing and monitoring	1 week

Identify risks

INCLUDING tableA/B/C

tableA

risk-sources-table (RST)	
risk sources	**detailed description()**
project management	management failure ; execution affected ; wrong product orientation ; no precedents —hard to estimate
requirement	uncertain requirements ; the change of requirements ; misunderstanding
quality	the low quality of product ; bad performance
staff	staff turnover ; communication barriers ; inadequate people
cost	insufficient project fund ; cost overrun ; financial matters
tech	defects of technical scheme ; unavailable
schedule	the unrealistic estimate of schedule
environment	chaos of development environment

tableB

risk-entries-table (RET)		
1product	**2development environment**	**3constraints**
1.1requirements	**2.1development process**	**3.1resources**
stability	suitability	schedule
integrity	process control	staff
definition	familiarity	budget
feasibility	product control	equipment
validity	formality	
cases		
scale		
1.2design	**2.2development system**	**3.2contract**
functionality	deliverables	types of contract
difficulty	production output	constraints
interface	reliability	dependencies
performance	familiarity	
testable	system support	
hardware constraints		
1.3code and unit testing	**2.3management process**	**3.3interface of project**
Unit Test	plan	development department
codes	organization	hardware provider
1.4integration and testing	**2.4management methodology**	co-management
environment	monitoring	related department
product	human management	strategies
system	quality insurance	
	configuration management	
1.5project features	**2.5work environment**	
maintainability	quality attitude	
reliability	teamwork	
security	communicate	
safety	encouragement	
human factors		

tableC

project constraints—resources—staff(example of the questionnaire)

3.1.b.1	is there any strict staff members or technical requirements?		
3.1.b.2	staff : whether is there any probability of these problems occurrence?	current situation	previous situation
	are they suitable for the project? whether there are adequate staff? developers learned the tech needed before? what about the workload of project and every member? are they trained or not? if staff turnover is high,what about the consequences? ……		
3.1.b.3	have risks about staff in previous situation occurred?and what's the impact?		
3.1.b.4	in terms of staff, how about your confidence level of the success?(level 1~5 , 1 means no confidence)		

Risk analysis

INCLUDING tableA/B/C/D/E/F matrixA/B

tableA

probability-parameters		
probability	description	level
0~20%	highly impossible	1
20~40%	impossible	2
40~60%	uncertain	3
60~80%	possible	4
80~100%	certain	5

tableB

impact-evaluation-criteria				
impact level	quality performance index	schedule performance index	cost performance index	level
very low	no impact	98~100%	98~100%	1
low	slight impact	95~98%	95~98%	2
moderate	certain degree of impact	90~95%	90~95%	3
high	severe impact	85~90%	85~90%	4
very high	failed	0~85%	0~85%	5
threshold	according to project review	<=95%	>= 5% of expected cost	

tableC

risk value (RV) = probability level (PL)* impact level (IL) —based no the parameters defined in table
level PL,IL={1,2,3,4,5}
RV={1,2,3,4,5,6,8,9,10,12,15,16,20,25}

PL-IL-RV		
label	description	RV
SL	super low	1,2
L	low	3,4
M	moderate	5,6,8,9
H	high	10,12,15,16
SH	super high	20,25

matrixA

IL-PL-matrix					
IL \ PL	1	2	3	4	5
1	SL	SL	L	L	L
2	SL	L	M	M	H
3	L	M	M	H	H
4	L	M	H	H	SH
5	M	H	H	SH	SH

tableD

subjective(experts voting and retrieve the data)		
project(expert's opinion)	value range	get data
the relative importance of factors of one risk	RV	m_{xij} ,represent the expert x scores the relative importance of factor i and factor j
the possibilities of all factors of one risk	1~5 larger—greater possibility	p_{xi}, represent the expert x scores the factor i
the impact level —quality schedule cost(respectively)	1~5 larger—greimpact	$cq_{xi}, cp_{xi}, cc_{xi}$ respectively represents the expert x scores the impact severity to quality/schedule/cost of factor i
note: assume there are k experts and n risk factors		

matrixB

the authority of experts		
A M1 M2 M3 … … Mk		mxy represents the relative authority of comparison between the xth expert and the yth expert
M1 m11 m12 … … m1k		when scores the risk A — the vector of the authority of kth expert :T (V = [v1,v2,,,,,vk])
M2 m21 m22 … … m2k		
M3 …		T(V)—>transpose of V
… …		vx represents the authority of the expert when he/she scores risk A
… …		
Mk mk1 mk2 … … mkk		v1+v2+v3+… …+vk =1
the weight of factors of risk		
Ai B1 B2 B3 … … Bk		big represents the relative importance of comparison between the ith factor of risk Ai and the jth factor of risk Ai
B1 b11 b12 … … b1k		
B2 b21 b22 … … b2k		the value range from 1~9 and the reciprocal of them
B3 …		
… …		judge based on the scaletable(ST)
… …		
Bk bk1 bk2 … … bkk		

tableE

ST- scaleable	
sale	description
1	the two factors have same importance
3	one slightly important than another
5	obviously important than
7	strongly important than
9	extremely important than
2,4	the middle value between the two neighboring values
6,8	the middle value between the two neighboring values
the reciprocal	the importance of two factors exchanged order

expert x scores the risk A : T(Wx = [wx1, wx2, wx3, wx4 ,… … ,wxn])
wxi represents that within the estimation of expert x, the weight of factor i
wx1+wx2,+wx3,+wx4 … … +wxn =1

and considering the authority of the experts , get the combination weights T(**W =[w1,w2,w3…. ….wn]**)

and the weight of the ith factor of risk **Wi** =Σ（vx* wxi） x ranges from 1 to k

and calculate the integrity index CR , when CR<0.1 ,meaning that the matrix meets the need of integrity, we can then decide the weight of the factor of the risk.Otherwise it needs adjustment.

Pi =Σ（vx* pxi） x ranges from 1 to k — Pi: the probability of the occurrence of the ith factor ; vx: the authority of the xth expert —>
the combination weight of the probability of occurrence of risk A **P=[P1,P2,P3… …Pn]**

Ci =(cqi + cpi + cci) /3

cqi =Σ（vx* cqxi） x ranges from 1 to k

cpi =Σ（vx* cpxi） x ranges from 1 to k

cci =Σ（vx* ccxi） x ranges from 1 to k
—> get the combination estimation of risk A **C=[C1,C2,C3,… …Cn]**

according to risk value (RV) = probability level (PL)* impact level (IL) , assessment of overall risk R =Σ（Pi*Ci*Wi）(i ranges from 1 to n)

tableF

R	risk level
(0,2]	SL
(2,4]	L
(4,9]	M
(9,16]	H
(16,25]	SH

Plan risk responses

sample:

Recognized risk quantification checklist																			
				analysis			level	time				status							
id	categories	precondition	description	probability	impact	severity	level	start	review	end	order	current	change factor	maychangeto	owner	relationship	outcomes	response plan	easy-to-find-level
1	internal/ predictable/ uncertain	get requirements	interface problems with related systems	4.8	4.2	20.16	SH	2016 /04/0 5	2016/ 04/12	2016 /05/1 2	3	not start	starting the design activity	open or occure	Mr.zhao	requirements ; staff	cannot have the same interface method and impact the coding phase	decide the related staff and modules ; repair in time ; get the feedbacks ; and downgrade the level ; review risk periodically	1
2	internal / technical/ uncertain	set up the project	staff turnover	2.1	4.5	9.45	H	2016 /03/0 6	2016/ 03/20	2016 /07/2 0	8	open	staff turnover	occure	Mr.li	every process activities	serious delay of schedule ; increase the cost of project	adequate personal ; the tech sharing ; staff training plan	1
3	… …																		

Monitor and control risks

MSRT(sample)											
track data：2016/04/12											
number	identification time	categories	sources	description	probability	impact	severity	level	strategies	response plan	current status	owner
1	2016/04/05	design	design	interface problems with related systems	4.8	4.2	20.16	SH	avoid and response	decide the related staff and modules ; repair in time ; get the feedbacks ; and downgrade the level ; review risk periodically	open and unsolved	Mr.zhao
2	……											

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