

# Identification and Assessment of Software Project's Risk

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## Summary

*Software Development is fraught with risks—from as early as the proposal creation to the actual testing of the application, there are multitude of factors which introduce risk. Major software projects have the highest probability of being cancelled or delayed due to these factors. This paper provides a quantitative means to assess the risk associated with software development, by outlining the different factors which introduce the risk , assigning weightages to each factor, calculating the overall risk score and then categorizing the project risk as low, medium, high or extreme*

### Key words:

*Software Project, Risk Management.*

## 1. Introduction

Risk is very important entity in software project development and has impact on organizational objectives or uncertainty caused by likelihood of something happening and severity of the consequences [2]. Identification of risks and their assessment is very cumbersome task. For controlling risks, Boehm stressed on mitigation of top ten risk factors which are personnel shortfalls, unrealistic schedules and budgets, developing the wrong functions and properties, developing the wrong user interface, gold-plating, continuing stream of requirements changes, shortfalls in externally furnished components, shortfalls in externally performed tasks, real-time performance shortfalls, straining computer-science capabilities etc.[3] and Caper Jones also identified top five risks factors and divided them into two categories [18] as shown in the table:

Project Sector	Risk Factor	Percent of Projects at Risk
MIS	Creeping user requirements	80%
	Excessive schedule pressure	65%

	Low quality	60%
	Cost overruns	55%
	Inadequate configuration control	50%
Commercial	Inadequate user documentation	70%
	Low user satisfaction	55%
	Excessive time to market	50%
	Harmful competitive actions	45%
	Litigation expense	30%

**Table 1 Risk factors for various project types**

## 2. Identification and Assessment of Software Projects

We have found that for the successful completion of software project, a software manager considers only the top risks, other risks are neglected and this may affect the software projects which may be delayed and even cancelled. For the purposes of this paper, the overall project comprises of a set of distinct activities. Each activity has well defined role or service and marked with weighting factor 1, 2, 3, 4, 5 and 100. It is important to check the importance of each activity before assigning the weighting factor to each. Meaning and value of each weighting factor is illustrated in table 2 and questionnaires related to software project's activity are illustrated after table 2.

**Weighting Factors:**

Meaning	factor	Comment
No Corrective Action necessary	1	
Corrective Action Recommended	2	
Corrective Action Required	3	
Key Success Factor	10	
Life or Death Issue!	100	

**Risk**

**Determination:**

Answers	Range	risk level
Mostly "Yes"	0 - 750	Low
	751 - 2500	Medium
	2501 - 4000	High
Mostly "No"	4000+	Extreme

*Some questions are True/False, allowing only 0 or 2.*

**Answers:**

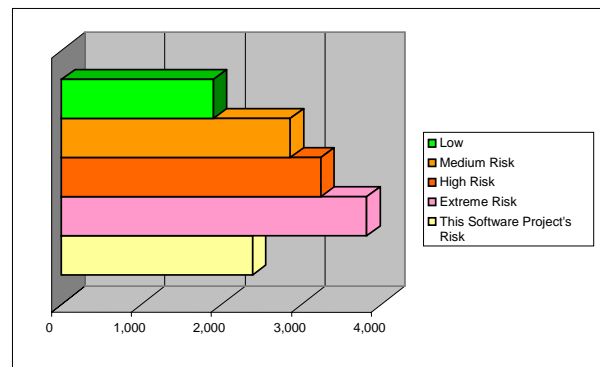
Meaning	value
True / Yes / Mostly / Not Applicable	0
Maybe / Somewhat / Occasionally	1
False / No / Not At All / Don't Know	2

**Table 2** Meaning and value of each weighting factor

**3. Proposed list of questionnaires related to software project's activity**

In this questionnaire list, the efforts have been done to identify all possible activities and assign weighting factor to each activity and ensure providing appropriate entry to each activity which may have some risk factor shown in **Appendix**.

**Graph1.** Bar Chart of risk category of software project



**4. Results and Discussion**

During assessment, software project scores 2386 and falls in medium risk category. In this paper, efforts have been made to assess overall project and consider that each activity has probability of occurrence of risk so can't be ignored otherwise it is likely to affect the category of software project and due to this software project may get cancelled. It is found during assessment of risks that project proposal and approval process has highest possibility of risk occurrence and beside methodology and technology risks has higher possibility of risk occurrence. So meaningful weighing factors assigned to software activity and careful selection of questionnaire list provides opportunity to the project manager and software organization to assess overall activities of the software project within their organization.

**5. Conclusion**

After the emerging of risk management, software organization has become mature and has implemented various risk methodologies in software development but risk still exists with software. It is found that project's proposal and software requirements have highest probability of risk occurrence. Hence it is very important to determine the risk category before controlling the risks. So Organizations make standards and rules for this.

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## Author's Profile



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**Appendix**

<b>Proposal and Initiation Phase Questions:</b>		<b>Wght</b>	<b>Required</b>	<b>0 = True / Yes / Mostly / NA</b> <b>1 = Maybe / Somewhat</b> <b>2 = False / No / Don't Know</b>	<b>SCORE</b>
<b>-</b>	<b>Factor</b>	<b>Entry</b>			
<b>Proposal, and Approval Process Risk</b>					
1	Contract type is simple ( Schedules & Deliverables)	100	0 or 2	0	0
2	All major project assumptions, requirements, schedules, and deliverables are in a legally binding context.	100	0 or 2	0	0
3	Project budget, if need be, may be adjusted (i.e. is not fixed).	100	0 or 2	0	0
4	Project completion date, if need be, may be changed.	100	0 or 2	0	0
5	Project enjoys the highest level of client Support.	100	0 or 2	0	0
6	Project meets Software Project Specification targets.	100	0 or 2	0	0
7	Project scope may be adjusted, if necessary, to ensure a timely, on-budget completion.	100	0 or 2	0	0
8	A successful Software Management planning phase engagement preceded the project.	10	0 or 2	2	20
9	Client has contracted for large projects before.	10	0 or 2	0	0
10	All Project Approvals are in place.	5	0 or 2	2	10
11	Client follows an internal quality management system.	5	0 or 2	0	0
12	Client has contracted before with other company	5	0 or 2	2	10
13	Software project specification management is ready & able to commit to the project.	5	0, 1, or 2	2	10
14	The client has a history of successful projects.	5	0, 1, or 2	2	10
15	The project team enjoys the full support of their sales rep.	5	0, 1, or 2	2	10
16	Project Manager reports directly to the client.	3	0 or 2	2	6
17	Project Manager's company enjoys a good relationship with the client.	3	0, 1, or 2	2	6
18	Funding is for the project and not optional year to year.	2	0 or 2	2	4
19	No special conditions are required, such as clearances or citizenship.	2	0 or 2	2	4
<b>Project Plan Risk</b>					
20	Project is fully compliant with SM Deliverables	100	0 or 2	2	200
21	The need for, and acquiring of, legitimate and substantial test data is adequately identified in the Project Plan.	10	0 or 2	2	20
22	Project Quality Reviews are in the project schedule.	5	0 or 2	2	10
23	The project team was involved in developing the project plan.	5	0, 1, or 2	2	10
24	The Project Management Office has approved the project plan.	5	0 or 2	2	10
25	The project team owns all critical path tasks and deliverables.	5	0 or 2	2	10
26	Reviewing project deliverables is part of the project schedule.	5	0 or 2	2	10
27	Client fully supports the roles & responsibilities in the Quality Plan.	5	0 or 2	2	10
28	All external dependencies are in the project plan.	5	0, 1, or 2	2	10
29	In the project plan, no task duration is for more than 40 hours.	5	0, 1, or 2	2	10
30	The Project Manager developed the project schedule.	5	0, 1, or 2	2	10
31	Final project acceptance criteria is defined in the contract.	5	0 or 2	2	10
32	Project schedule is for less than 12 months.	3	0 or 2	2	6
33	System acceptance rests with a single user group.	3	0 or 2	2	6
<b>Project Management</b>					
34	Project has an assigned, full-time Project Manager.	100	0 or 2	2	200
35	The Project Manager is experienced at project leadership.	100	0, 1, or 2	2	200
36	An Executive Steering Committee exists for this project.	10	0 or 2	2	20
37	Client has a single, assigned, full-time Project Sponsor.	10	0 or 2	2	20
38	Project Manager has received formal project management training.	10	0 or 2	2	20
39	Project Team has ready access to experts in all client areas.	10	0, 1, or 2	2	20
40	The Project Sponsor is empowered to accept deliverables and authorize payments.	10	0, 1, or 2	2	20
41	Project has a strong technical lead, other than the project manager.	5	0 or 2	2	10

42	All other vendors are subcontractors to the Project Mgr's company.	3	0 or 2	2	6
<b>Project Team risk</b>					
-		-	-	-	-
43	All project hardware and software is installed and ready for use.	5	0 or 2	2	10
44	Project Manager reports directly to his/her client/subordinate/deputy	5	0 or 2	2	10
45	Project turnover is (or is expected to be) less than 20%.	5	0 or 2	2	10
46	All project personnel are able to be rotated onto other assignments.	3	0, 1, or 2	2	6
47	Client professionals will make up less than 25% of project staffing.	3	0 or 2	2	6
48	This project is solely owned by an software project specification area	3	0 or 2	2	6
49	The project team all work for the same practice.	2	0, 1, or 2	2	4
<b>Development Risk</b>					
-		-	-	-	-
50	A Software Management Framework is being used.	100	0 or 2	2	200
51	The development methodology is fully supported by the client.	100	0 or 2	2	200
52	The development methodology being used is appropriate for this project.	100	0 or 2	2	200
53	Appropriate documentation standards are being followed.	5	0 or 2	2	10
54	The development methodology is adequately supported with tools.	5	0 or 2	2	10
55	The development methodology being used is reflected in the project plan.	5	0 or 2	2	10
<b>Technology Risk</b>					
-		-	-	-	-
56	This project has well defined deliverables.	100	0 or 2	2	200
57	Existing and legacy systems are well documented.	100	0, 1, or 2	2	200
58	Project team members are experienced with project technologies.	100	0 or 2	2	200
59	The definition of the development, test, and production environments is within the project's scope.	10	0 or 2	2	20
60	The performance requirements of the system are realistic.	10	0 or 2	2	20
61	The project team has built a similar system before.	10	0 or 2	2	20
62	All hardware & software used on the project is generally available	5	0 or 2	2	10
63	All project personnel are adequately trained for their jobs.	5	0 or 2	2	10
64	All required skill levels exist in the pool of available personnel.	5	0, 1, or 2	2	10
65	Project team has ready access to the development environment.	5	0, 1, or 2	2	10
66	All legacy systems will remain unchanged.	3	0 or 2	2	6
67	All technical solutions were prototyped before being recommended.	3	0 or 2	2	6
68	Client is responsible for deployment, not the project.	3	0 or 2	2	6
69	Project entails 3 or fewer subsystems.	3	0 or 2	2	6
70	Project is able to enhance existing functional systems.	3	0, 1, or 2	2	6
71	System is for non-critical decision support functions only.	3	0 or 2	2	6
72	The deployed system, data and application, will be at a single location.	3	0 or 2	2	6
73	Client, or a separate contract, is responsible for Performance and Tuning.	2	0 or 2	2	4
74	Client, or a separate contract, is responsible for user training.	2	0 or 2	2	4
75	Number of system users will remain small.	2	0 or 2	2	4
76	Client is already experienced using a GUI user interface.	1	0, 1, or 2	2	2
77	Client is already experienced using Client/Server.	1	0, 1, or 2	2	2
78	Client is already experienced with Relational Databases.	1	0, 1, or 2	2	2
79	Project only requires connectivity with legacy systems.	1	0 or 2	2	2
80	Project requires only a relational and GUI solution.	1	0 or 2	2	2
81	Project team defines the hardware and software for the system.	1	0 or 2	2	2
<b>Testing, Installation and Maintenance Risks</b>					
82	Draw the maintenance plan if project's does not meet requirements	100	0, 1 or 2	2	0
83	External agencies are decided prior to project	10	0 or 2	2	0
84	All test cases are decided before testing of software	10	0 or 2	2	0
85	Assign responsibility to each member and make schedule plan for Installation	5	0 or 2	2	0
86	Provide Special training for acceptance testing	5	0 or 2	2	0