

Tightrope Risk Analysis

A tool for identifying, analysing & managing risk in a project.

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1. Introduction

Managing a project is like walking a tightrope - it is easy to fall off and hurt yourself. However, we can improve the tightrope and perhaps convert it into a bridge, hence reducing the risk of a calamity.

The project manager has total responsibility for the success - or failure - of a project. In the initial burst of enthusiasm - and the likely refusal of management to contemplate failure - it is easy to overlook the risks. It is the project manager's responsibility to remain pragmatic, to check out the viability of the project, and *to report any doubts about the wisdom of proceeding to the highest management level.*

We can take two views of project risk:-

- We can analyse the project scope and complexity, the environment and the planned resources - *the project characteristics*
- We can analyse the project plans and look at the risks in the *project processes*

Both views are equally relevant. Each demands a different approach. The two approaches are described here. You should use them both at key points in your project; the initiation stage, at each milestone or sign-off point, and whenever the system or the project environment changes.

The results provide indicators as to the overall project risk, and to the possible actions that we can take to reduce the risk. The project manager should always confer with the project sponsor and ensure that the risks and implications are understood. Ultimately the project manager is responsible and so he/she should not proceed with a project where they consider the risks to be unacceptable.

2. The project characteristics check

Overview

The questionnaire provides a formalised way to assess the project characteristics risk. The results will not be absolute and should not replace the conclusions arrived at by experienced management. The questions provide a framework to assist management by revealing factors that might otherwise go unnoticed.

The questionnaire is divided into three sections: The user environment, the system being built, and the team doing the development. Each project is unique; it consists of a set of people within a particular organisation with its own culture, its own problems, its own constraints. The questions may need to be interpreted to suit these conditions. For example, it is possible that more than one team will be involved in the development. An adjustment to the appropriate question and scores may be required.

This risk assessment of the characteristics is best carried out by a mixed group - users, management and team members. The assessment is largely subjective, but a group of people can arrive at

sensible conclusions. The weightings can be modified by choosing intermediate points on the scales if this seems reasonable. Complete the questionnaire - or as much of it as possible - without spending too long on any of the questions. Compute the scores. Compare the results with the scores shown at section 2.3, then use the analysis at section 2.4 to identify the high scoring areas. Plan actions to reduce the score, following the advice at section 2.5.

Project characteristics questionnaire

Project.....

User Environment

	H	M	L
1. How committed are the senior user management? Extremely enthusiastic - L Supportive - M Neutral- H Patchy - add 2 to the score	8	6	2
2. Are the Users knowledgeable about software development procedures and the standards in use? Knowledgeable - L Moderately knowledgeable - M Little or no knowledge - H	4	2	0
3. Are Users aware of, and prepared to follow the Change Control procedures? Yes- L No- H	4		0
4. What is the priority for the project within the User area(s)? High - L Low- M Varies according to User - H	8	4	2
5. How critical will the system be to the day to day operations of the User(s)? Minor impact - L Significant impact- M Major impact - H	9	6	2
6. Are there other outside agencies involved in any agreements, or with some sort of stake in the project? None - L Yes, one - M Yes, more than one - H	20	6	0

	H	M	L
7. How many separate User areas are involved in agreements and decision-making? One - L Two - M More than two - H	20	12	4
8. Are any unions involved? No- L Yes, one - M Yes, more than one - H	20	10	0
9. How many different user sites are involved? One - L Two or three - M More than three - H	6	4	0
10. How severe will the disruption and procedural changes be to the Users? Minor- L Significant - M Major- H	4	2	0
11. Will the User organisation have to change structurally? Minor- L Significant - M Major- H	16	8	0
12. What percentage of existing functions are to be replaced? Less than 25% - L 26-50%- M 51-100%- H	6	4	2
13. How different is this system from others in use in the organisation? Something similar exists - L Parts exist - M Nothing like it exists - H	8	4	2

	H	M	L
14. What flexibility is there with the project deadline(s)? Flexible, they are to be established with the team - L Firm, already established within organisation and if missed will impact on operations - M Fixed by outside agency or other mandate outside organisation's control - H	16	6	1
15. Is the Project Brief fixed, or is the User prepared to discuss it as work progresses? No Project Brief - H Exists and prepared to discuss - L Exists but not prepared to discuss - M	40	10	0
16. How much participation are the users committed to? Expert User(s) committed to significant amount of work - L Significant responsibilities accepted - M Responsibilities very limited - H	16	12	4
17. How knowledgeable are the Users in the proposed application area? Understand area, and have experience of a previous implementation- L Some experience - M Very limited or no experience - H	10	8	2
18. How knowledgeable are the Users with respect to DP? Very knowledgeable - L Some exposure - M None - H	12	6	3
19. What are the communications like between the User area(s) and the DP department? Good- L Fair- M Poor- H	9	6	3
20. Is there any new user-controlled technology or techniques required? No- L Yes- H	9		0

System Complexity

	H	M	L
1. What state is the system proposal document in?	16	6	2
Complete and acceptable - L			
Acceptable but incomplete - M			
Incomplete, unavailable or unacceptable - H			
2. What is the expected operational life of the system?	12	4	1
One-off operation - L			
Short life - M			
On-going function - H			
3. How critical is the system performance going to be?	16		0
Not critical - L			
Critical due to throughput or volume or memory response time - H			
4. What is the condition of the documentation for the existing computer system?	12	6	3
Complete, but may need some work- L			
Acceptable, but incomplete - M			
None or little available - H			
5. What percentage of existing functions are to be replaced?	12	8	4
Less than 25% - L			
26-50%- M			
More than 50% - H			
6. Is there a similar system in existence?	12	6	4
Yes, reasonably similar- L			
Some functions exist - M			
Nothing like it- H			
7. Is the software to be dependent upon hardware?	16	6	0
Hardware independent- L			
Partially dependent - M			
Wholly dependent - H			

	H	M	L
8. Is new hardware required of a type not already used within the organisation? No- L Yes- H	4		0
9. Is additional hardware of any sort required for the project? No- L Yes- H	4		0
10. Approximately how many unique screens will be required? Less than 10 - L Between 10 and 30 - M More than 30 - H	9	6	3
11. Approximately how many unique input/output transactions are there? Less than 10 - L Between 10 and 100 - M More than 100 - H	9	6	3
12. How big is the initial file conversion job going to be? Very little or no data to convert - L One or two files - M Several large files - H	8	4	2
13. How complex is the data editing task? Simple - L Complex - M Highly complex - H	12	9	3
14. How many unique data items are there in the system? Less than 100 - L Between 100 and 500 - M More than 500 - H	6	4	2
15. Are there any security issues with the data? None or few of significance - L One or two significant issues - M More than two of significance – H	10	6	0

	H	M	L
16. How complex is the algorithmic processing going to be? Simple - L Complex- M Highly complex - H	16	9	3
17. Are there system interfaces? No, it is a stand-alone system - L Yes, moderate complexity - M Yes, complex - H Add 6 to the score if the interfacing systems are not within the project team's control.	10	4	0
18. The software will consist of: An outside package that meets all requirements - L Some pre-coded parts written within the organisation - M All or mainly written within the team - H Add 4 if the software is to come from two sources	6	4	2
19. What experience is there of any software package incorporated? It is being used elsewhere in the organisation - L It has been used on a bureau basis - M There is personal experience of it - M No experience of it- H	16	8	0
20. How many programming languages are to be used? One - L More than one - H	8		0
21. What level of language will be used? High level (e.g. Java or VB in web based apps) - L Medium level (e.g. COBOL in legacy system environments) - M Low level (e.g. assembler in manufacturing or equipment control systems) - H	20	4	2

Team Environment

	H	M	L
1. What is the priority of the Project within the IT supplier? High - L Medium- M Low- H	8	4	2
2. How committed is the IT management? Enthusiastic- L Supportive- M Neutral or worse - H	8	6	2
3. What is the total development effort in person-months? Less than 3 person-months - L Between 3 and 20 person-months - M More than 20 person-months - H	16	8	4
4. What is the estimated elapsed project development time? Less than 3 months - L Between 3 and 9 months - M More than 9 months - H	20	8	4
5. How experienced is the project manager? Experienced with a similar project of this type and size - L Some experience of managing projects - M Inexperienced- H	20	8	4
6. How are the team's skills and manpower to be made up? Full-time team members - L Part-time or outside specialists - M Part-time and outside specialists - H	9	6	3
7. What proportion of the team will be from an outside organisation? None - L Less than 25% - M More than 25% - H	16	8	0

	H	M	L
8. Have the team members worked successfully together before? All or most - L Some - M None - H	12	6	3
9. How knowledgeable is the team in the application area? Been involved - L Some have involvement - M Limited or no involvement - H	12	6	2
10. Is the software environment new to the team? (Data base, data communications, languages, etc) None of it - L Some of it - M Most of it - H	16	12	0
11. Has a new operating system to be installed: No- L Yes- H	12		0
12. Is there any hardware new to the team? None - L Peripherals or terminals - M CPU or comms or combinations - H	12	6	0
13. Is the development team on one site? One site - L Two sites - M More than two sites - H	12	6	0
14. Is there an agreed change control process in use, known by the team? No agreed process - H A process, but not used or known by the team - M Process used by the team - L	12	6	0
15. Is there an agreed project development process in use? No agreed process - H Partial process - M Good process - L	12	6	0

3. Risk-reduction

Your project may score badly in just one category, or in more than one.

User environment

A score of 120 or more means that there are almost certainly actions that can be taken to reduce the risk. Some of the risk-reducing actions will include:

- User education & training - This may include managing senior management perceptions of flexibility, managing target dates, change control. It could include education and training in these topics or in the User Acceptance Testing process, or in specifying User Requirements. Consider using formal structured techniques for specifying the user needs, rather than English.
- Communications - establishing improved formal and informal communications with senior managers and stakeholders. Ensure that a Steering Committee is set up with an agreed process and regular meetings. Other formal groups may be required. If there are many stakeholders, and/or they are diverse or geographically scattered, then more time and resources will have to be spent in coordinating responses and obtaining agreements.
- Formalising procedures - Formal agreements and sign-off of key documents, e.g. Project Brief, Business requirements, formalised change control procedures
- Planning - Set up of the steering group or user management structure, paying special attention to progress reporting. Establish an overall plan for the project, including implementation strategy, acceptance testing and training strategies. Develop a detailed plan for the first phase only. Use dependence networks and establish the critical path. Develop plans assuming 'early starts'. Establish the optimum resources required, *then* go and find them. Do *not* plan on the resources already allocated.
- Publicity - This may need extra careful planning and execution. Ensure that project progress is publicised at every opportunity. Invite ideas and feed-back. Give the project an imaginative name. Put notices on notice boards, in the organisation's newsletter. Raise the community's awareness!

System Complexity

A score of 100 or more here indicates that the scope may be too large, considering the many factors that are contributing towards the score.

- **Scope and boundaries** - Re-examine these to see if they are too ambitious. Exclude peripheral areas. Reduce the user scope, that is, it may be possible to develop a solution for a smaller set of users. Reduce the functionality. It may be possible to reduce the risk substantially by re-planning the development on an incremental basis. Focus on asking ‘How little could the project deliver that would be of benefit, and how soon could we do it?’ Redefine the project to deliver these basics. Then define a second project to deliver another level of benefits, and a third project...The projects could run concurrently, each one starting a little later than its predecessor. The projects *could* be considered as stages within the same project, but considering them as different projects makes the whole thing easier to manage and communicate. The projects might be named xxx version one, xxx version two etc.
- **Implementation strategy** - Examine this to see if a more conservative approach is possible; there is often a safer option e.g. pilot, phased, phased pilot etc. (A *pilot* implementation is where we implement the system in a small and manageable part of the business, then extend the implementation gradually. A *phased* implementation is where we implement part of the system, then implement further parts. A *phased pilot* is a combination of these two.)
- **Design strategy** - Re-evaluate this. Could a safer strategy be employed, with fewer new tools, techniques, software? If the project is being used as an organisation or department test-bed for new processes, tools or documentation methods, consider rejecting these ideas. (This project is already dangerous enough without having additional burdens placed on the team.)

Team Environment

A score of around 100 is dangerous.

- **Project priority** - If the project has a low priority and/or has a low commitment from the client and/or the service provider management, then the cost/benefits should be re-examined. A low priority project will have its resources ‘stolen’ easily, and will not obtain agreement easily at milestones. Perhaps the project need not be done, or the benefits need to be emphasised. If it is worth doing then some communications may be required - publicity, ‘selling’ and persuasion.
- **Team structure** - If the team structure is a high risk one, then special efforts should be planned at the beginning of the project in team bonding work. The project manager will need to be good with inter-personal skills and motivation. If consultants or contract staff are involved, then attention should be placed on the recruitment process, to ensure that the best people are found, and retained for the project duration. Training may be required for new software, tools and techniques, and allowances made in the plan for the learning curve for the skills to sharpen as the

project progresses. Staff may also require some familiarisation in the business application. Where team members are not located together, or even on the same site, the team

- communications will be fraught with difficulties. Technology helps, but nothing is as effective as face-to-face discussions. If this situation cannot be avoided, then make plans to ease communications. Consider appointing someone at each site to co-ordinate local and inter-site communications. Formalise acknowledgment of formal communications, make plans for inter-site visits, ensure the budget reflects these extra costs.
- **Project size** - A large project can be broken into smaller chunks, as above. A large team is more difficult to manage than a small one. A project with a long duration has a high risk of suffering from many changes in requirements, and from changes in the client management, the team, and service-provider management. Any personnel change has an effect on productivity and client management changes will almost certainly change the project requirements.

4. Project process check

Overview

We perform this risk check with a nine-step process, starting with the project plans. If we are at the project initiation stage then the plans will be high-level. As the project progresses we shall have more detailed plans and therefore this process check becomes more useful.

Examine the key processes and the key deliverables. Ask the question ‘What can go wrong here?’ We shall then ascertain the probability of the risk and its seriousness. We then calculate the total risk vulnerability and produce a ‘league table’. We establish the highest priority risks and then decide upon the actions to be taken and plan them.

Identify the key processes and key deliverables

Examine the project plans. Identify the major tasks on the plan and the key deliverables. Include the tasks and deliverables being produced by *all* the resources, not just those under your direct control.

Identify the potential causes of failure

Brainstorm with a small group of involved staff. Look at past projects and list what went wrong with them. History is a good indicator of the future. What will we do to prevent similar problems from re-occurring? Now look at *this* project- what can go wrong? Examine the list of tasks and deliverables. List the effects of a failure on the project and establish the underlying causes. Use the Cause-Effect analysis technique where there are linked effects and confused causes. Establish a list of *potential causes of failure*. Do not attempt to put them into any sequence.

Calculate the risk probability

Looking at each risk in turn, we now establish the *probability* of that risk occurring. Nominate a value between 0.1 (low risk) and 0.9 (high risk). '1' is a certainty. Do not spend too long on each one, just establish a consensus view.

Calculate the risk seriousness

Looking at each risk in turn, we now establish the *seriousness* of the effect of that risk. Nominate a value between 0.1 (not very serious) and 0.9 (very serious). '1' is a show-stopper. Again do not spend too long on each one, just establish a consensus view.

Calculate the risk vulnerability

The risk *vulnerability* for any one risk is the product of the two values, *risk probability* and *risk seriousness*. For example, if the probability is 0.3 and the seriousness is 0.7, (that is the probability of this risk occurring is quite low, but it would be fairly serious), then the vulnerability is 0.21.

Rate the risks

Now put the risks in a league table, with the highest values at the top. Given that we probably cannot plan for all risks, it makes sense to look at the most vulnerable ones. The top 33% or so are the ones to look at.

Plan actions to minimise the risk occurrence

We do this in two stages; we want to plan to reduce the chance of the risk and to reduce its effect should it occur anyway. We ask two questions of the top risks:

- What can we do to minimise the chance of the risk occurring?
- What can we do to minimise its effect?

Decide upon the appropriate actions, for example, to check certain results, or to ensure that particular criteria are set for some deliverable. It is easier to build in *quality* to the deliverables when measurable criteria are set at the beginning. Add these actions to your project plans. Very often the tasks involved are quite small in terms of effort, but significant in terms of results. Risks are reduced by following an established process or a project methodology. If your organisation has an agreed project process or methodology, follow it. Your project will gain immeasurably. Do not be tempted or persuaded to 'cut corners' - the risks involved are too great.

Review the risks

Review the risks and the planned actions with your clients. Obtain their feedback. Welcome any suggested changes, that is partly why you are doing the review. (Another reason is to inform them as to the risks involved so that they have a better understanding of the process that you are following and of the need for quality.)

Monitor the risks

At key points you need to check that the risks have not changed in nature. Some will have passed, some will have disappeared, some will have increased in vulnerability, new ones will have emerged. Modify your plans accordingly.

The identification, analysis and management of risk is a core topic of IRM's 3 day training workshop "**Project Management Techniques**". Using Tightrope and practical examples, participants learn the skills and techniques needed to successfully manage risk in a project environment.

For workshop details and schedules visit: www.irm.com.au

5. Feedback

We welcome your feedback on 'Tightrope'. If you would complete the questionnaire here we will take your comments into account in our next release. We guarantee anonymity and we will not make any results public in any way that can identify you or your organisation. All fields are optional.

Name:

Organisation:

Phone:

E-mail:

How was 'Tightrope' useful to you?

What did the results disclose to you?

What action was/will be taken as a result of the analysis?

Which was more beneficial, the 'characteristics' or the 'process' check?

How did your project score on the characteristics check?

User Environment	System	Team	Total
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How big is the project? (Complete whatever you can)

Function points:

Duration:

Resource time (People-days or people-weeks):

Type of project (software development, maintenance, implementation, assessment, review, roll-out)

Any further comments?

Thanks for your time. Please return to:

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