

Risk Model Survey Participant Comment Coding

Theme	Codes	Participants	Responses
Model Advantage , i.e., an advantage of using the proposed model by comparison to textual risk descriptions.	Rigour	10	"encourage designers to think about risk" "force the system architect to model the risk and the outcome" "forces the Ent/Soln Architect to address technical risks as they have to define and map them out" "focus the engineer's thoughts and may assist in identifying design risk areas." "more analysis and it is detailed." "uniform process across many projects" "ensures the process of capture, analysis and mitigation are applied." "uniform process across many projects" "forces the user to consider risks and impacts in a structured manner" "allows some level of rigour to be applied to defining risks and mitigations for design decisions"
	Traceability	9	"Having the system modelled will allow the architect the necessary visibility of interfaces, interactions, dependencies, constraints etc to make faster risk analysis." "Again, the fact that the risk is formally associated with the architecture is good." "I think the review process would help identify risks, I see the model more as a means of ensuring that required details are addressed." "clarify where the risk is within the design" "The examples given lead to a better fit (and a more complete analysis) upon existing (iteratively produced) software that is due to change. Both pieces of example software are established and require a change or refactor – thus the analysis is easier." "It clearly can be used from a traceability point of view to see the path to the identification of a specific risk. This would aid further analysis of the risk, as well as enabling better communication, and understanding around the risk." "Risk model does not help identify risks but does help identify the correct application of mitigation." "Design reviews will benefit from a clear link to architecture design and associated risk." "relating them to the decision / rationale."
	Understanding	8	"it is likely that the output of the work will help to understand the mitigation options."

			<p>"I think that the risk model will help to understand the risk but not necessarily identify the risks. I think that the identification of risk sits outside of the proposed risk model, however the risk model will provide the means to assess the risk and the impact to the system."</p> <p>"Unambiguous description of the risk. Model provides a design for a software application to manage risk aspects – way better than an Excel spreadsheet. I prefer the risk model, as I am a visual learner. The model has a "syntax" that provides more precision than a purely textual description."</p> <p>"Bringing a UML risk notation to design review would help explain design decision mitigations"</p> <p>"identifies high risk areas in delivering against requirements/concerns"</p> <p>"Clear view of risk."</p> <p>"The Risk Model allows the user to visualize the paths/scenarios and consider all potential events/impacts whereas"</p> <p>"I don't think having a model necessarily helps to identify the risks, but would potentially help to document them and analyse their impact"</p>
	Risk Patterns	4	<p>"models can be re-used"</p> <p>"a list of standard risks that should be considered."</p> <p>"Having a diagrammatic way of expressing risk, mitigation and identifying them against classes, areas of functionality would help with analysis and eliciting different design pattern options to mitigate identified risk areas."</p> <p>"Could provide Data Analysis through data mining over time and different projects."</p>
	Automation	2	<p>"If the risk model can be generated in a consistent manner and is repeatable then it would help facilitate automated analysis"</p> <p>"Advantage is that the ARModel formally captures technical risks."</p>
	Early Mitigation	2	<p>"Awareness of obsolescence at the design stage instigates architectural decisions and early mitigation planning"</p> <p>"Like with comprehensive upfront UML design, architectural problems and 'risks' can be solved before code is cut."</p>
	Efficiency	1	<p>"Having risk/mitigations in the same UML design tool would help focus on these aspects during design than having a separate list I had to refer to maintain. Also, as I go through my design as risks occur they could easily be put on the diagram as the same time."</p>
	Report Generation	1	<p>"Reports could be generated that show the project financial impact of risks, or time delays"</p>
Model Applicability, i.e.,	High Integrity	2	<p>"I think it will be highly beneficial, especially for systems/developments with high integrity, safety, security requirements or compliances."</p>

architecture scenarios where the model is perceived to add value to the task of architecting.			"I think that this would potentially benefit 'safety critical' or 'financial' software systems where non-functional requirements are as important if not more important than functional requirements due to the level of analysis work required."
	Requirements Analysis	2	"If the ARModel was extended to include Requirements then it would be applicable when assessing Use Cases etc. within e.g. Enterprise Architect modelling of requirements." "Believe it would be of most benefit in reviewing SOR's and deriving subsystem requirements at bid stage in large architectural programs."
	Not just design risks	2	"It makes sense and could be extended to cover other non-functional areas of architecture design." "Not all risks are associated with design. Modelling of risk should start from day 1 of a project."
	Technical Debt	1	"Is the aim really to manage technical debt?"
	Agile Adoption	1	"Putting the how and why further into the formal class model (rather than into whiteboards, JIRA instances, Jupyter Notebooks, Slack rooms, Confluence pages etc)"
	Architecture Recovery	1	"Using the risk model in place of design would be a good fit for a scenario where there is a "legacy black box" that has little-to-no-design that lives deeply rooted in a complex enterprise application (e.g. a banking model)"
	Change Impact Analysis	1	"I believe this would be best used in early design or managing architectural change through additional requirements/concerns"
	Decision Support	1	"To assist in the comparison of possible design models from a risk perspective."
Barrier to adoption , i.e., a challenge that needs to be overcome to adopt the model in practice.	Operational Risk Analysis	1	"It appears that the risks are at the project level - of bringing the system of interest into being or managing it afterwards?"
	Process	5	"IF the Design Review and its technical risk review activity also re-assesses pre-assessed AD architecture" "It may be more effective with regular integrative architecture and design approach." "If risks are assessed at the outset, then these may be reassessed as requirements(concerns)/design changes and the potential impact." "As a review against implementation/decision decisions and technologies perhaps" "I am not sure if having a model to describe them makes much practical difference but could work if the team or programme adopts a design review framework which ensures the designers do consider risks and challenges them if they have not."
	Training	5	"If the model is understood by all participants and is repeatable then it may help the design process" "A reviewer needs to know the syntax of the AD language when a graphical model is used." "Participants need some relevant experience to understand the model and the modelling language." "I do not see guidance on the assessment of risks other than mitigations being applied." "It also requires an understanding of model-based systems/software engineering."

	Text Needed	3	<p>“Hard to say they both back each other up, for a better understanding.”</p> <p>“Text based approach is also very quick to read”</p> <p>“the descriptions for presentation purposes.”</p>
	PM Integration	3	<p>“as opposed to being tucked away in a separate log and only brought out by the PM at big reviews.”</p> <p>“It will require ‘buy in’ from the normal project risk holders, but technically I think this is great approach to a very important area of software/system Engineering.”</p> <p>“I think it might help with ongoing reassessment of risk due to design changes. But monitoring of risk is really a project management function I don’t see this necessarily helping with that.”</p>
	Flexibility	2	<p>“May not fit every project, may need tailoring.”</p> <p>“The model should be used as reference or guide material and should not be applied as a rigid framework to work by. So, no. I think all elements have merit in appropriate contexts.”</p>
	Risk View	2	<p>“having them as separate views would help.”</p> <p>“I would propose that the “Architecture View” concept is used to partition the overall risk modelling”</p>
	Tooling	2	<p>“Also, the AD model will need to be supported by a technical risk modelling entity/register to hold the outputs of the AR modelling and analysis activity. I don’t recall ever seeing such an entity in an Enterprise Architect model to date.”</p> <p>“Definitely, especially with some software tooling.”</p>
	Extensibility	1	<p>“I think the model appears ok, but users of the model should have scope to add and remove as necessary. It is hard to get a one size fits all model.”</p>
	Needs Testing	1	<p>“This would have to be exercised to see if any are overkill.”</p>
	Overwhelming	1	<p>“My worry is that if not caught early enough, the amount of identified risks may become daunting to deal with.”</p>
Model Disadvantage , i.e., a disadvantage of using the proposed model by comparison to textual risk descriptions.	Effort	7	<p>“Due to the complexities of risk, the cost of modelling and having models”</p> <p>“Can’t really see too many disadvantages other than maybe the cost involved in modelling risk?”</p> <p>“Disadvantage is that there is an obvious cost involved as the ADModel is significantly enlarged to encompass ARModelling elements,”</p> <p>“Might create a bigger overhead than it’s worth to deal with technical debt.”</p> <p>“May be over complex for smaller short-lived projects.”</p> <p>“To generate the models in sufficient detail has a higher overhead than a traditional “risk register”</p> <p>“The main issue that I see is that there is potentially a lot of upfront work required.”</p>
	Cluttering	5	<p>“There is a risk that the risk model could get extremely complicated in a real-life scenario making it difficult to comprehend.”</p> <p>“I think it will get overwhelming quickly”</p> <p>“However, it does clutter the design and therefore understanding of the design.”</p>

			<p>"discipline required as too many "mitigations" leads to a complex diagram – or (as shown) an "impact" affects many things."</p> <p>"The diagram approach is great for smaller tasks but, it can quickly overwhelm the reader for larger tasks with multiple related risks."</p>
	Constraining	1	"but reliance on the model could cause users not to think outside the scope of that model"
	Misuse	1	"Or, if a system architect did not model all available mitigations and steered the model from the wrong risk perspective perhaps?"
	Out of date	1	"With agile I believe that if the risks were identified then they would be addressed quickly by the development team so monitoring of extant risks may be nugatory."
Missing Aspect , i.e., something the participant expected to be in the risk model but could not find.	Probability	5	<p>"The model does not appear to indicate the likelihood of the risk being realised."</p> <p>"NB: there's no mention of the Probability aspect of risk assessment though..."</p> <p>"At the risk of making it even more complex, I would like to have seen probability addressed directly."</p> <p>"likelihood"</p> <p>"a way of expressing probability"</p>
	Impact Level	5	<p>"impact score"</p> <p>"impact level"</p> <p>"Impact could specify cost, effort, delay, capability loss etc as attributes? They could also be split out further as entities?"</p> <p>"Not sure impact is accounted for enough in the model."</p> <p>"Perhaps some kind of 'score' against impact and/or mitigation. This may help with decision making or justifying work to change design/implementation"</p>
	Status	4	<p>"I think that if we had a way of categorising if the concern still remains post mitigation, or solved, then it would allow management, monitoring or later remedial action as part of the risk management process."</p> <p>"Risk Monitoring appears to be out of scope of the ARModel (Part 2 top diagram) – there's no link or trigger for when the AD and ARModel outputs are actively reviewed and assessed through lifecycle stage/design reviews (PDR/CDR or Integration Readiness reviews) or Sprint Retrospectives, etc."</p> <p>"With a recorded status for each risk that is kept up to date as mitigation is applied, indicators change and so on."</p> <p>"Not sure all the information is present for continual monitoring of risks. Another model may be better suited."</p>
	Mitigation Cost	2	<p>"Perhaps cost of mitigation should be included to allow cost/benefit analysis to be calculated on a per-risk basis."</p> <p>"Cost – Linked to mitigation. Many mitigations impose some sort of cost."</p>
	Mitigation Effect	2	"There should perhaps be a weighting mechanism applied as the potential effect of mitigation and effect of the risk is not considered."

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	Risk Category	2	"safety / security criticality could all be covered as Indicators." "Risk Groups – I'm sure risks can be grouped, into different groups. The relationship would need to be many to many."
	Alt. Mitigations	1	"This would probably necessitate the need to model alternative mitigations."
	Compounding Risks	1	"Risks linked to other risks – Risks can be associated with other risks. E.g. Through increased likely hood after risk another risk has occurred etc."
	Events	1	"inclusion of Events when risks have happened would allow better analysis and mitigations."
	Impact Results	1	"'impact results' seems undercooked."
	Overall Risk Score	1	"overall risk score"
	Mitigates Concern	1	"I wonder if there needs to be a direct relationship to a mitigation for the concern element? "
	Related Concern	1	"I find it to be able to 'value' a risk without the impact relating to a stakeholder concern."
	Risk Conflicts	1	"Also, we have only looked at instances in isolation; like with static analysis, it is possible that there may be conflicts across specific reported risks."
Redundant, i.e., something available in the model that the participant considered to be unnecessary.	Analysis Technique	2	"The analysis technique seems overkill." "The sources and justification of the risk – embodied in the Stakeholder and the Analysis Technique and Analysis Results could be out of scope if we just want to model the risks and their mitigations."
	Analysis Results	2	"The sources and justification of the risk – embodied in the Stakeholder and the Analysis Technique and Analysis Results could be out of scope if we just want to model the risks and their mitigations." "'analysis results' are unnecessary."
	Architecture Rationale	1	"architecture rationale would be better being an attribute of architecture decision"