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Risk Timeline Data Set Statistical Analysis

During the January 2016 Cogence forum, partners discussed experiences, both positive and negative that they believed had shaped the outcome of the project. This led the group into a focus on risks: decisions, processes, or situations that can negatively impact the outcome of the project. Risks are known to drive behavior, as they decrease the security of the involved parties.

Widely accepted psychological models such as Maslow's Hierarchy of Needs place the need for security as a significant factor, second only to physiological needs. In these models, the less security an individual or company feels, the more likely they are to act in their own self-interest, as opposed to acting for the greater benefit of the project team. Given this potential for decision-shaping influence, the group decided to further understand the risks that exist in the construction process.

At the March 2016 Cogence Partner Forum, Partners were asked to participate in an exercise that would memorialize how, when, and to what extent different stakeholder groups experienced risk during the project lifespan.

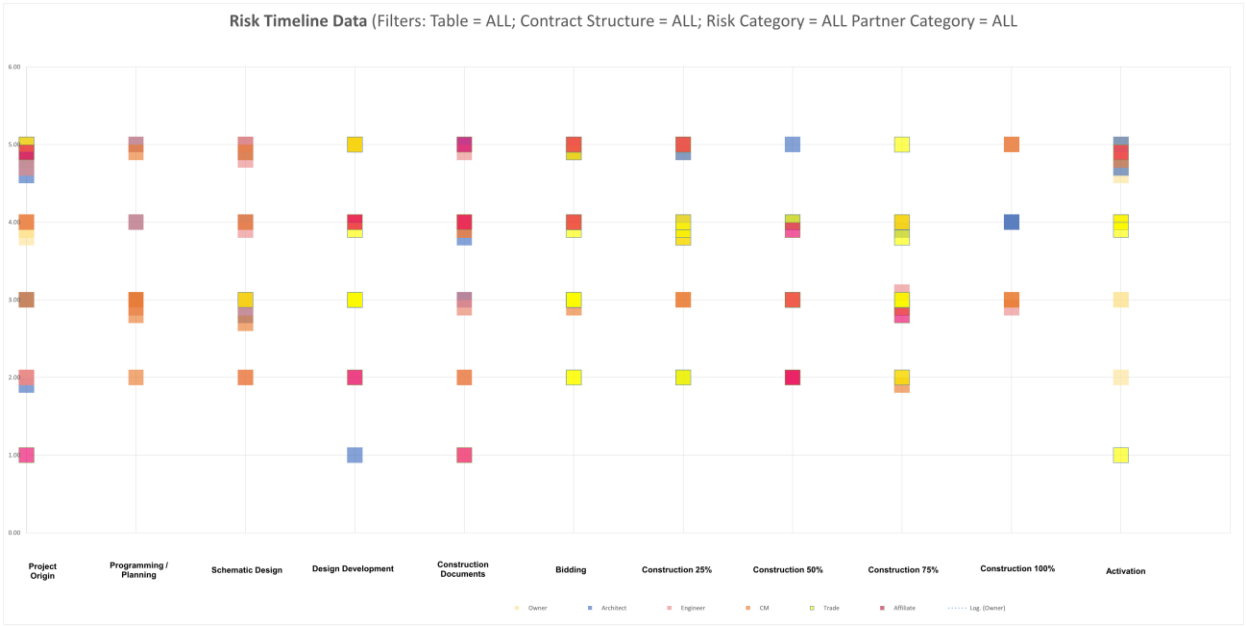
To do this, 6 groups of cross-functional partners collaboratively populated a graphical timeline of the project lifespan with sticky-notes, color coded by partner type, with the risk type written on the note. Each sticky note was placed by the participants at a specific time (X-axis) during the project ranging from project inception to project activation, and at a specific risk level (y-axis) ranging from 0-5.

The results of this exercise were then correlated to a data set of more than 200 individual data points, and input into a spreadsheet allowing for further statistical analysis of the data set. Subsequent findings from this analysis revealed significant depth.

Findings:

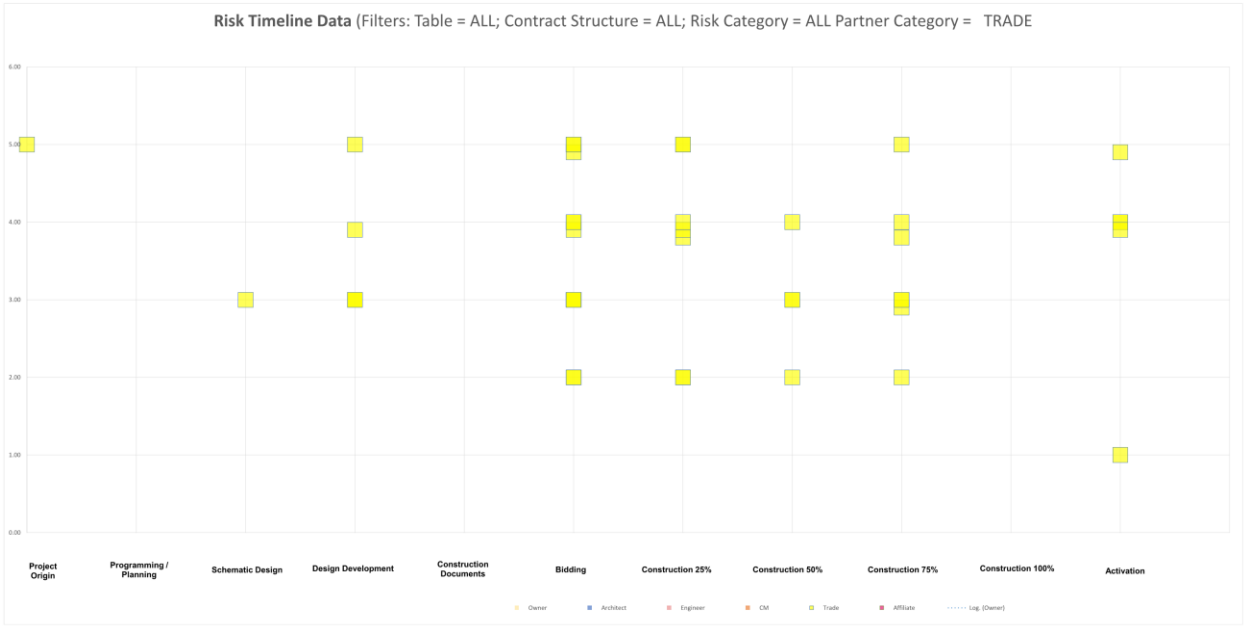
General Findings:

As a whole, the graphical representation of the data set at first seemed chaotic due to the density of information:



Further breakdown of the data set by both partner type and risk category began to reveal visual patterns.

For example, the same data-set filtered by the partner type “Trade” reveals a statistical risk bias towards the latter part of the timeline:



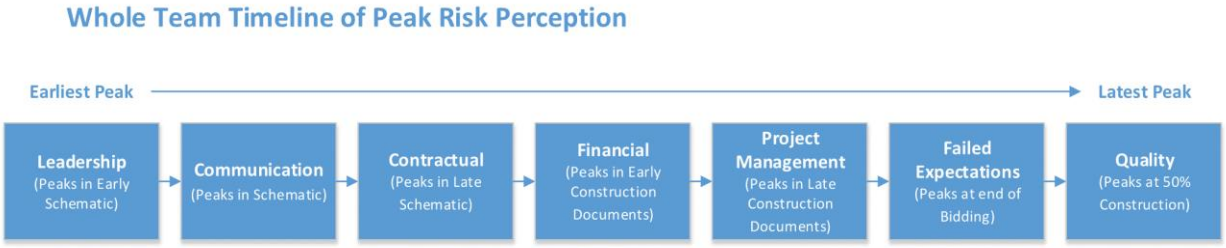
And again, filtered by the risk category “Leadership” reveals a statistical bias toward the early part of the project:

Experiencing Risks by Timescale:

Analyzing the data set further for statistical peaks, averages, and orders, revealed that there is a trend across the entire group of the order in which risk is experienced. First, the raw data (pay specific attention to the timescale column):

Partner Type	Category	Timescale Average	Risk Level Average	Risk Rank Within Category
ALL	Communication	2.3	3.8	3
	Contractual	2.8	3.8	2
	Failed Expectations	5.9	4.02	1
	Financial	4.29	3.76	4
	Leadership	2.21	3.49	6
	Project Management	4.8	3.68	5
	Quality	7.14	3.28	7

Then, a graphical representation of the risk categories ordered by the average time at which they were experienced from this table above:



Level of Risk Experienced:

Seeking to further validate the pattern of risk experienced, the risks were examined by level. Interestingly, the data revealed that there was a near inverse correlation with the order risk was experienced, and the average level of risk it was assigned. Note that while leadership was the first risk to be experienced, it was assigned the second lowest level of risk:

Note that while leadership was the first risk to be experienced, it was assigned the second lowest level of risk, and while failed expectations was the second to last to be experienced, it was ranked as the highest risk experienced.

Further Hypothesis :

Analyzing the data by partner type revealed insight into two possible mechanisms for the experience of risk:

Some risk is experienced in anticipation of risk-shift

- Several types of risk appeared to peak prior to when a partner type was involved, for example, “Leadership” risk for “Trade” partner type peaked in the CD phase, just prior to the Bidding phase when most of these partner types would be involved. It was hypothesized that this risk was experienced due to the “Outsider looking in” effect, knowing that critical decisions were being made that would affect the partner’s responsibilities, but that the partner had no present control over.

Some risk is experienced as risk peaks

- “Financial” risk for the “CM” partner type peaks in the bidding phase, a “Make or Break” time for this partner type, where control estimates may either be validated, or disastrously invalidated.

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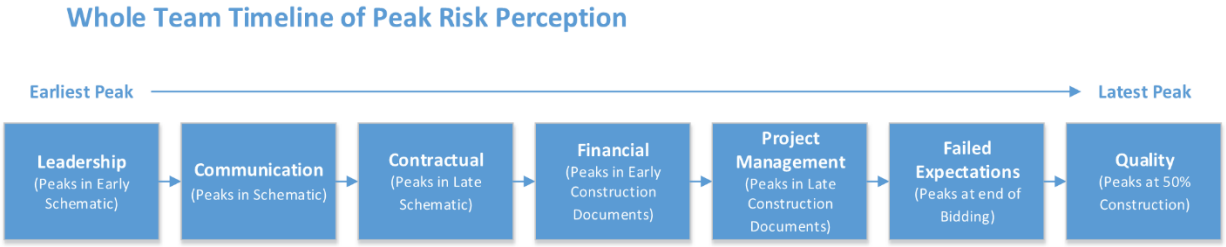
Final Conclusions:

Final analysis of the data led to several possible final conclusions:

- **Risk is ordered in a Cause-and-effect relationship.**

  (i.e. : Leadership failure begets communication failure, and so on.)



- Due to this, the **highest level of experienced risk is associated with risks late in the project that the experiencer has little control over at the time they are experienced.** These risks can likely only be prevented by implementing successful processes to prevent the risks immediately preceding these risks. (i.e. little can be done to correct failed expectations when it peaks during the construction process, but good Project Management processes, enable by good financial decisions, and so on, can mitigate the risk of failed expectations.

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