# Summary Paper Outline v0.1

1. **Introduction**

* Provide motivation for the literature review.
  + Increasing need for scenario planning for many environmental applications/challenges.
    - Refer to Liu et al. and Kling et al. for support and evidence.
  + Futures Studies is also becoming more widely used in many industries and sectors, and scenario planning techniques are essential to the success of different organizations.
* History of scenario planning techniques, from Kahn to today? (Is this a necessary section?)
* It is then clear to see that analysts have used numerous different process and methods, each of them with different characteristics that were suitable for specific purposes.
  + A few examples of different methods used to answer scenario planning questions?
    - Delphi, RDM etc?
* There have been several attempts to organize and categorize these different processes and methods, these included:
  + Bishop et al.
  + Borjeson et al.
  + Van Notten et al.
  + Amer et al.
  + Varum and Melo.
  + Addo-Tenkorang (for CE review).
  + Quick 1-2 sentences on these literature review?
* While several proposed high level classifications (Borjeson et al., Bishop et al., and Van Notten et al.), there has not been a serious attempt to create an in-depth taxonomy of the existing methods.
* This is in-depth taxonomy is important because:
  + This provides insights on the strengths and weaknesses for each method, and can help to identify the most appropriate uses for them.
  + This activity can also identify potential gaps where a new method can be developed and used to address it.

1. **Literature Review**

* Provide an overview of what process, scenario, and methods mean in the literature.
  + Show that semantics aside, we will try to utilize the widest definition in this review.
* Conducted a systematic review of existing futures studies literature.
* Identified a set of prominent review papers.
* First will provide a summary of previous review literature.

* 1. **Van Notten et al.**
* Created high level themes, identified from ~70 case studies in the literature.
* These themes are:
  + Project goal (why?)
  + Process design (How?)
  + Scenario Content (What?)
* Furthermore, Van Notten et al. identified 14 individual characteristics that were applied to the different case studies.
* However, this was a high-level topological analysis, and it review case studies, not actual methods/process.
  1. **Borjeson et al.**
* Topological study of scenario techniques on the classification of the three types of futures.
* Three major scenario classifications:
  + Predictive: What will happen?
  + Explorative: What can happen?
  + Normative: Given an end-goal/target, how can we get there?
* Each classification is further divided into two additional categories.
* Borjeson et al. also identified three differentiating categories to generate scenarios.
  + How to generate the scenario
  + How to integrate the results
  + How to ensure consistency between the results
* Issue: scenario categories are still too generalized. Methods that are suited for different purposes can fall into the same category, and that key qualities/aspects are defined only in normative/qualitative ways.
  1. **Bishop et al.**
* Divided scenario techniques into eight general categories:
  + Judgement: Rely on individual or groups to describe the future (for example, role playing).
  + Baseline/expected scenario technique: create one scenario (baseline) for the future. Often serve as the foundation for all alternatives.
  + Elaboration of fixed scenarios: Given a future scenario, articulate the logic or process of how to achieve that (Incasting, SRI).
  + Event Sequences: Create possible event trees and assign probability to the different sequences.
  + Backcasting: First create the future scenario, then go backwards to see how to connect the dots to arrive at that point.
  + Dimension of uncertainty: Use specific sources of uncertainty to create alternative futures (GBN).
  + Cross-Impact Analysis: Create a probabilistic of an event happening given possible occurrences of other events.
  + Modeling: Systematic modeling to predict the expected future.
* While Bishop et al.’s analysis was extremely detailed, much of the methods surveyed are qualitative/subjective in nature. They did not survey computational intense methods such as RDM, and is a gap in their taxonomy.
  1. **Amer et al.**
* The most recent of a field-wide literature review, Amer et al. approached the survey from a historical perspective on the development of scenario planning techniques.
* Identified three major schools:
  + Intuitive Logic School: The one that received the most attention, most popular set of methods, and include the work done by Herman Kahn and the Shell method.
  + Probabilistic Modified Trends (PMT) School: This includes the several categories identified by Bishop et al. such as Cross-Impact Analysis and Trend Analysis.
  + French School (*La prospective*): Focused mainly on the normative scenarios. Provided guiding visions of the future for the present, and Van Notten’s review mainly focused on methods of this school.
* Literature review showed a wide range of classification efforts.
* However, most of the literature review focused on qualitative scenario planning methods, with mostly high level scenario categories.
* They did not address of any of the specific differences between methods.
* Finally, none of the review identified potential gaps where new methods could prove to be useful (CADS).

1. **Methods/Taxonomy Design**

* Provide a quick overview of what taxonomy is and why it is important (?).
* Introduce the three design principles for a well-designed taxonomy:
  + Perpetual orthogonality: Ensure each method will only appear in a leaf node once.
  + Completeness: The taxa provide as close as possible a complete set of features for scenario planning techniques.
  + Parallel structure: Each level of the taxonomy provides similar resolution.
  1. **Methods**
* Reviewed a set of taxonomy literature that extended beyond the field of future studies:
  + Baladi et al. (Virtual Environment)
  + Utting et al. (Software testing model taxonomy)
  + Ostergaard and Summers (Collaborative design taxonomy)
  + Ceret et al. (Robust system design)
  + Roise et al. (Design competency)
  + Provide a quick summary of each of the taxonomy.
  1. **Proposed Taxonomy**
* Go through each of the major headings (themes)
  + Question: What is the method trying to answer?
  + Data: What kind of data does the method use?
  + Output: What type of output does the method produce?
  + Tools: What additional tools/analysis does the method use/considers?
  + Organization: How do analysts use the method to perform their analysis?
    1. Questions
* Adopted from Borjeson et al.
* Three categories of questions: Normative, Predictive, Explorative.
  + An example of each one here would be useful.
  + Compare and contrast between them.
  + Provide examples of methods that are in each category.
    1. Data:
* Similarly, go through each of the headings of the data section.
  + Provide an example method for each sub-heading.
    1. Output
    2. Tools
    3. Organization
* Go through each of the sections similar to both the question section and the data section. Focus on definition and provide examples of methods that matches with them.

**Question: Where should we introduce the individual methods that we categorized? Here? Or do we need to actually do it?**

1. **Results**

* Present the final matrix of the different methods appropriately categorized.
* Present the result on a method-by-method manner (going across through the columns). \*This section will be particularly long.
* Maybe this is where each method is introduced instead?
* Compare-and-contrast between the methods, pay special attention to similarities and cluster them together. Use this to validate the accuracy of the taxonomy.
* Go through the extensibility of the framework.
  + Can quickly evaluate new methods as they appear.
  + New attributes can also be added.

1. **Discussion:**

* Summarize the result section.
* Would this be an appropriate place to talk about the need for a more rigorous, quantitative, predictive, and collaborative method (CADS) in this section?