



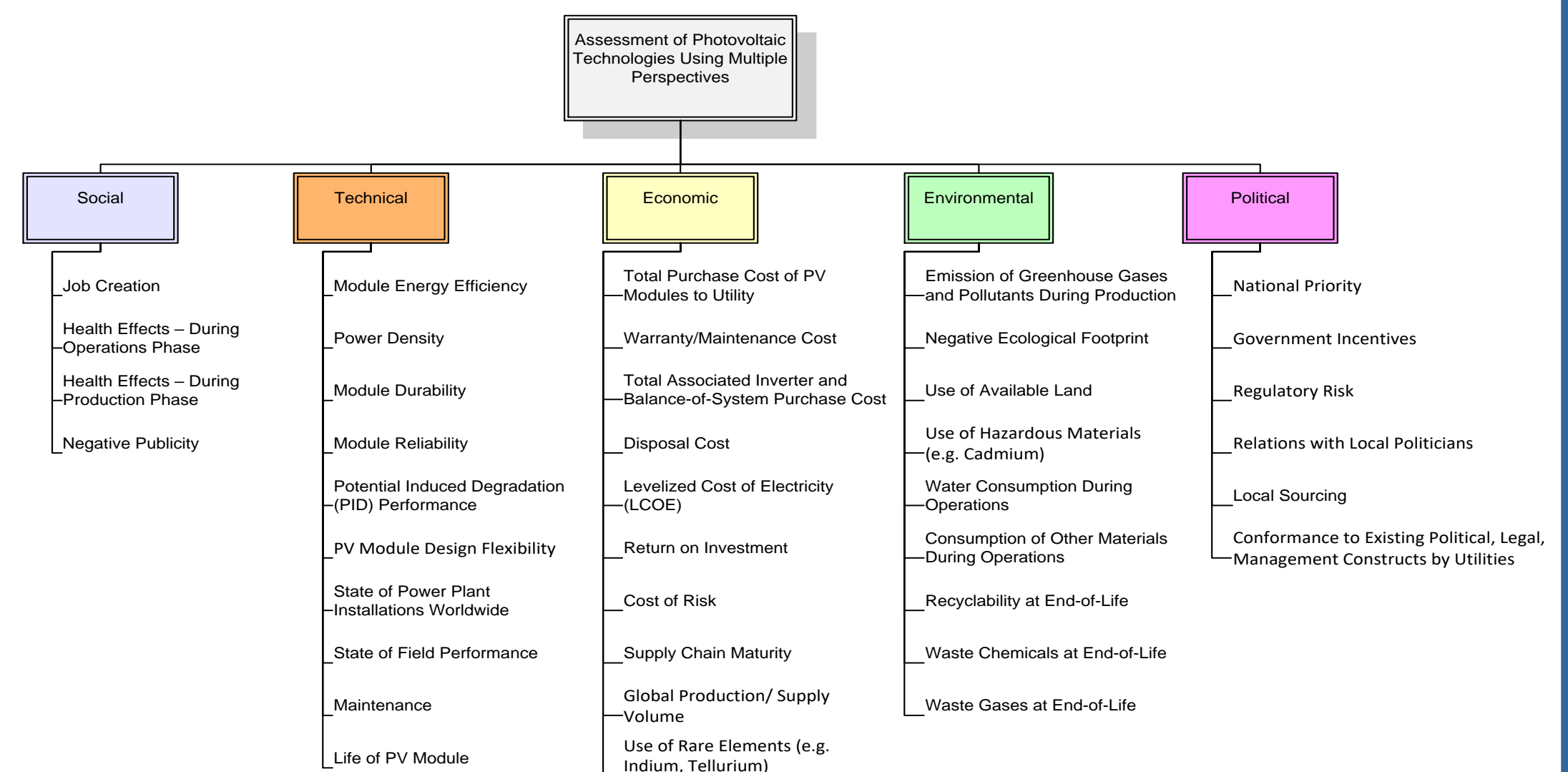
DISSENT AND GAMES IN DECISION MAKING: CASE OF SOLAR TECHNOLOGIES

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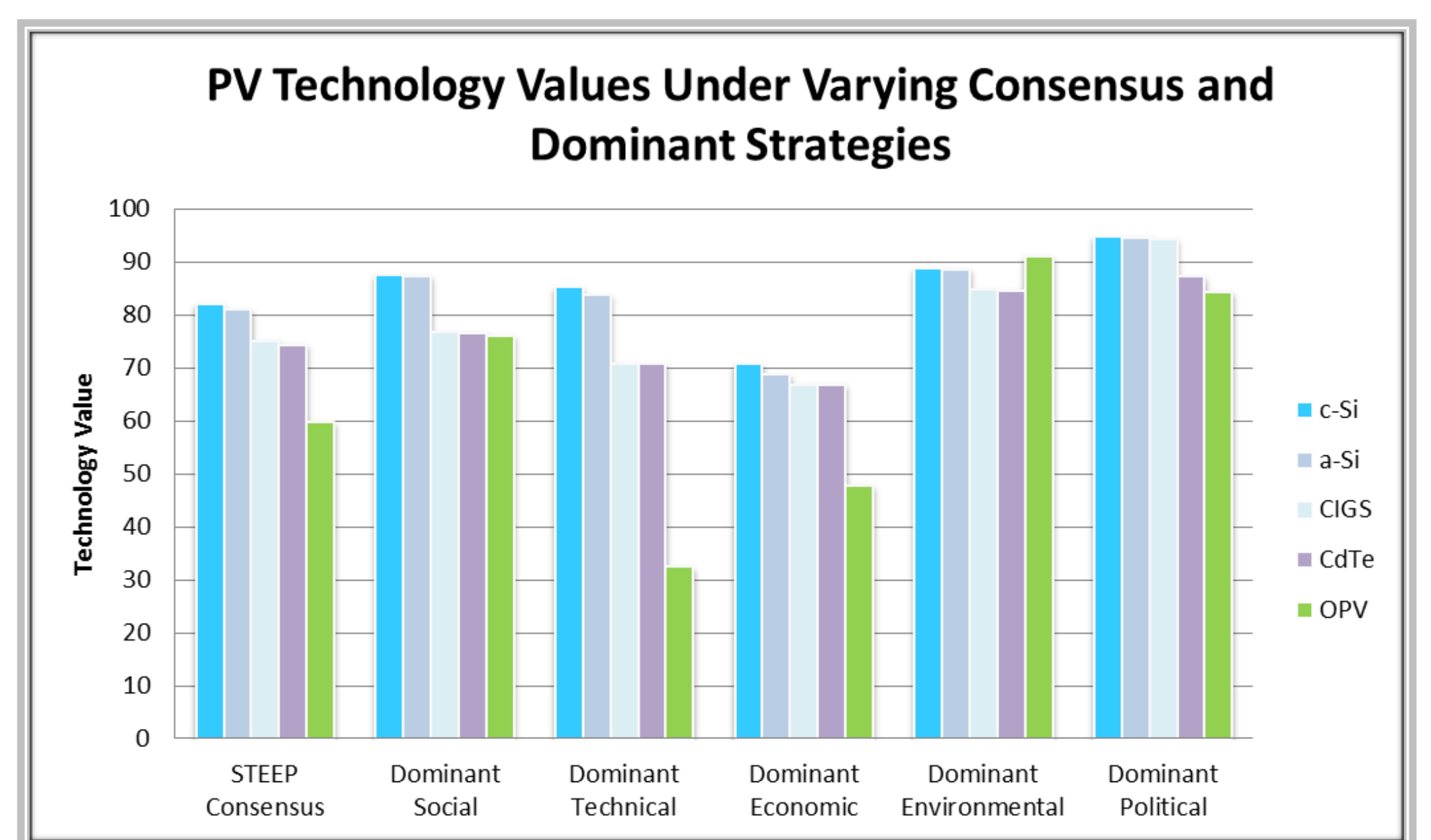
ABSTRACT

- Research in decision modeling has mainly focused on the ranking of alternative choices based on a consensus of experts and decision makers. However, a decision model can also be used represent rational conflict and dissent. This is illustrated by the example of a hierarchical decision model (HDM) to assess alternative solar photovoltaic (PV) technologies. Multiple perspectives are considered for consensus and conflict. The perspectives include: social, technical, economic, environmental, and political (STEEP).
- HDM is an appropriate method for determining the outcome for scenarios that consider one dominant perspective as well as the case where all the perspectives are relatively important.
- Prior research in this area involved the assessment of PV technologies based on the cooperation or consensus of experts. This study focuses on dissent that may lead to conflict. Dissent is evident if only one dominant perspective is considered to evaluate the alternate PV technologies. One dominant perspective implies conflict by the proponents of the other perspectives deemed "unimportant".
- By using such a decision modeling approach, outcomes for both consensus and dissent scenarios are observable and comparable.
- Research is planned to develop this decision modeling approach to form a branch of game theory with a large number of players and decision elements.

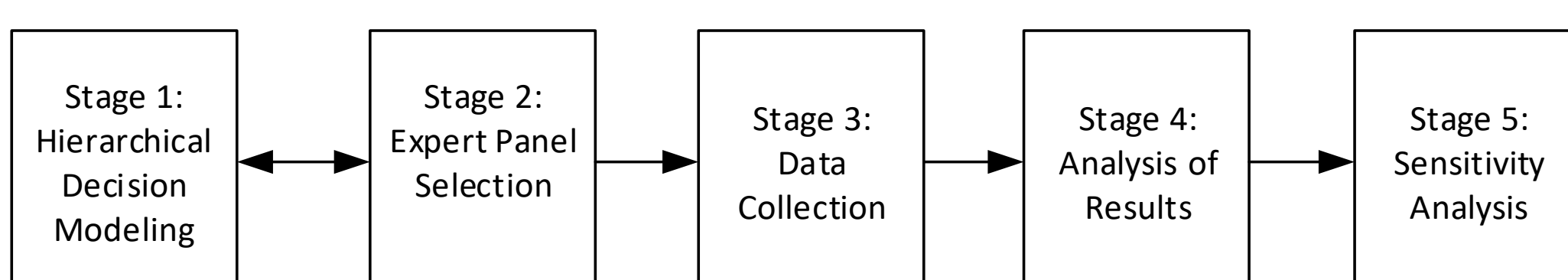
HDM FOR ASSESSMENT OF PV TECHNOLOGIES



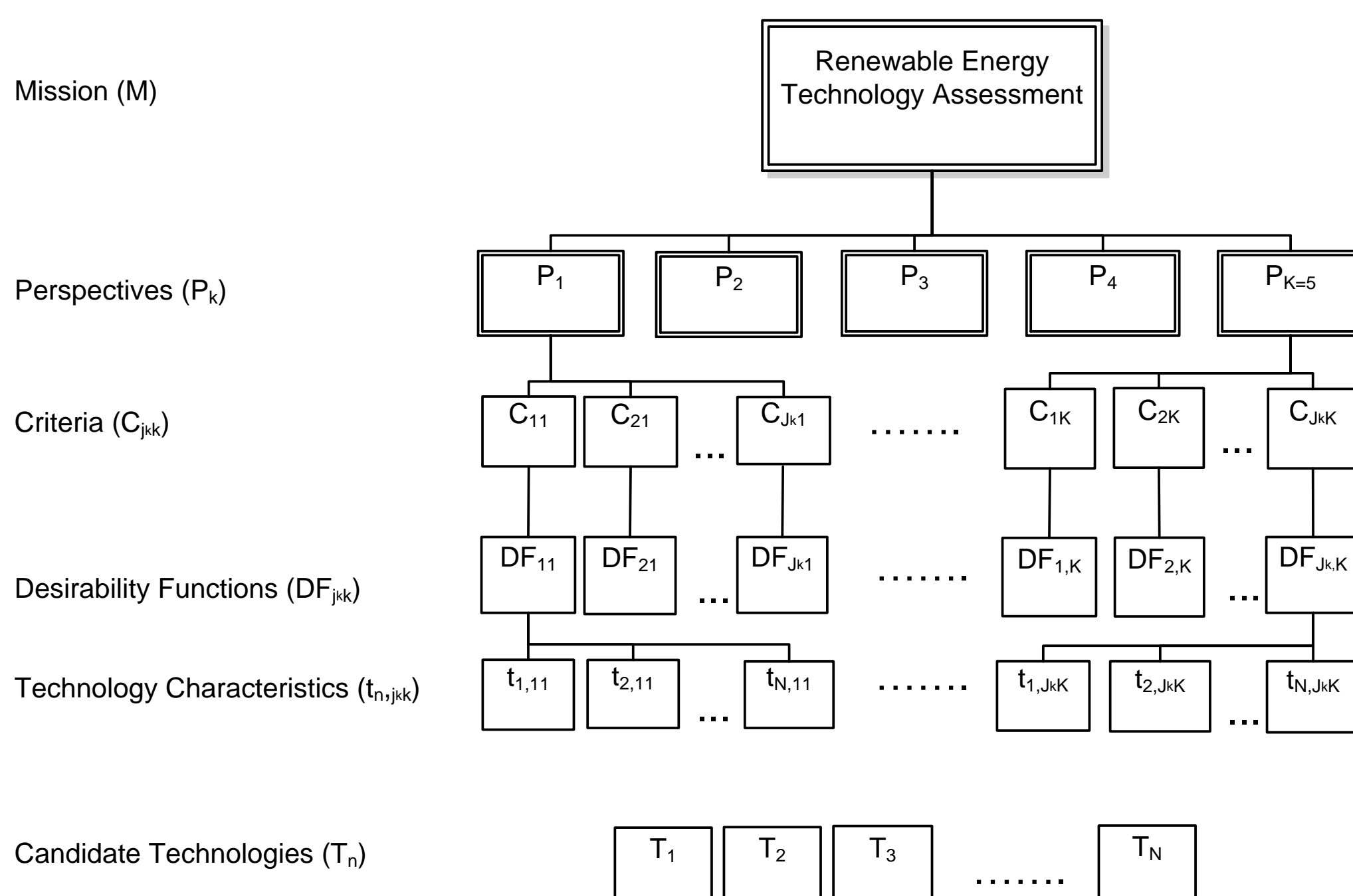
CONSENSUS AND CONFLICT: RESULTS



DECISION MODELING AND GAME THEORY



HIERARCHICAL DECISION MODEL (HDM)



$$TV_n = \sum_{k=1}^K \sum_{j_k=1}^{J_k} p_k \cdot c_{j_k,k} \cdot V(t_{n,j_k,k})$$

CONCLUSION

- A robust decision model was originally developed for the consensus assessment of PV technologies c-Si, a-Si, CIGS, CdTe, and OPV using multiple STEEP perspectives. However, the same model is effective in conflict and dissent situations.
- This research presents the Technology Values for six situations: (1) consensus among all five STEEP perspectives, (2) dominant social perspective, (3) dominant technical perspective, (4) dominant economic perspective, (5) dominant environmental perspective, (6) dominant political perspective
- Even under conditions of conflict and dissent the top ranked technologies may remain the same.
- It is evident that applications of HDM can be for cooperation and conflict by leveraging different aspects of the model. Initially, only the case of PV technology assessment with multiple perspectives was considered.

FUTURE RESEARCH

Future research will focus on developing game theory for HDM and also applying this approach to applications in energy, finance, and healthcare. HDM may be especially useful in game theory applications where there are many players or stakeholders and a large number of decision elements to consider.

