boarded, the recovery period (in terms of high-disturbance months, it is again stressed) is still quite low.

DCI recovery periods are comparable in order of magnitude, with the slightly lower values for the *higher* fuel cost case reflecting its corresponding somewhat superior cost efficiency, as reflected in the majority of the R_C values. The A-CDM value of 10 months is artificially high for two reasons. Firstly, it is biased by the colocation issue. Secondly, the implementation costs are borne largely by non-airline stakeholders, whereas the benefit is calculated only as a delay saving to the airlines (note that this is also the case with the improved sector capacities). The A-CDM values shown in parenthesis are for *airline* strategic (implementation) costs (not shown). These produce payback results comparable with the other mechanisms. (The value for the followers based on Table V was excessively large and is not shown.)

V. Conclusions and Future Research

Using traffic and passenger itinerary data for the whole European network, the cost resilience of four mechanisms, with phased stakeholder uptake, has been assessed under local and disperse disturbance. In the only model of its kind, as far as the authors are aware, a novel cost resilience metric has demonstrated logical properties and captured cost impacts sensitively. We have compared and contrasted the cost benefits of the four diverse mechanisms. Of these, only A-CDM has been assessed within the SESAR context, yet each of the other three demonstrates particular strengths. It would be instructive to explore these further.

Several features of the model may be improved upon, particularly the downstream behaviour of the passenger reaccommodation mechanism, and colocation effects. In addition, higher specification of the disturbances and the construction of a wider sample of traffic and passenger itinerary inputs would be useful. Enhanced airline behaviours (e.g. tactical responses to industrial action and strategic responses to changes in Regulation 261) could also be included. As mentioned, of particular value would be to explore more localised cost resilience values, and to examine the results to date in more detail using further flight-, passenger- and cost-centric metrics: of those deployed in the model, only a small selection has been used here. There is also an opportunity, probably a necessity, to use advanced data visualisation tools to more comprehensively map the large data outputs from each scenario. Initially promising work on payback periods has begun, with opportunities to broaden the included stakeholder costs and to assess cost recovery periods over more typical operational days. Despite uncertainty being one of the main factors generating reduced performance, behaviours are often driven by complex interactions and feedback loops that render it difficult to assess second-order impacts at a network level. Feedback loops in the model could thus potentially generate new emergent macroscopic behaviour, and analysis thereof is a key next step towards the goal of improved cost-benefit analysis in ATM.

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