FUTURE WORK

The thesis focused on quantitative RRT models. Specifically, we investigated the Gupta et al. (2010) model in detail and compared additive scrambling and multiplicative scrambling. It also discussed a few other models including what we call a ‘Two-Stage F-model’ and a ‘Three-Stage model’. The special characteristic of these models was that a known proportion of respondents in both these models were instructed to scramble their responses additively in spite of the fact that both these models were optional RRT models. It was found that these models work better than the traditional one-stage RRT model for highly sensitive questions, which incidentally is the situation of most interest. We also discussed the impact of defying instructions by the respondents.

In Chapter 2, the variance of the mean estimator was minimized separately with respect to the truth parameter $T$ (the other variables were treated as known constants), and also with respect to $n_1$, $n_2$ (sub-sample sizes). Again, the other variables were treated as known constants. One may try to find a global optimum value for the variance of the mean estimator. The global optimum value would minimize the variance of the mean estimator with regard to $T, n_1$ and $n_2$ simultaneously.

In this thesis, we have discussed two privacy measures for quantitative RRT models which use split sample approach. The first measure is a modification of Yan et al. (2009)’s measure (which works for models with one sample) and the modified Yan et al. (2009)’s measure can be applied to models which use two or more sub-samples. The second measure is a modification of Lanke (1976)’s measure (which works for binary models) and the modified Lanke (1976)’s measure can be used for quantitative models. Using these two new measures, we compare four models, viz., Gupta et al. (2006), Gupta et al. (2010), Two-Stage F-model and Three-Stage model. The models were compared only with respect to privacy protection. The issue of the privacy protection can be revisited. A measure of privacy protection based on regression estimator and ratio estimator can be tried.
Another direction for future work would be to make an attempt to combine the essence of Two-Stage $F$-model with the unrelated question model. A model may be considered in which a known proportion of respondents are instructed to respond to unrelated question and the remaining respondents respond using an optional unrelated question model. Similarly, the Three-Stage model and the optional unrelated question model may be combined. In the new model, a known proportion are instructed to respond to the sensitive question, and another proportion of respondents are instructed to respond to the unrelated question and the remaining respondents respond using an optional unrelated question model. This may be tried for both quantitative and categorical response scenarios.

One can also make an attempt to investigate these models in the context of multiple auxiliary variables being available on the lines of Sousa et al. (2010) and Gupta et al. (2012).