Lean manufacturing is mainly focused on elimination of seven deadly wastes using various tools/techniques (Vinodh & Chintha 2011a). Among various tools/techniques of lean manufacturing, VSM is one of the vital technique to identify the opportunities for leanness improvement. In order to improve the framework of VSM, in the present doctoral work, a modified VSM approach is presented. In VSM, the prioritization of improvement proposals gains importance. QFD could be used for prioritization; in order to overcome the impreciseness and vagueness associated with conventional QFD, fuzzy QFD was used. In this context, this doctoral work reports four case studies that are focused on the development of Fuzzy QFD integrated VSM approach for manufacturing organizations. First three case studies were conducted considering traditional data whereas the fourth study is incorporated with environmental data. Various proposals from the perspective of leanness improvement were identified using Fuzzy QFD and implemented in future state map. After implementing the proposals, leanness performance measures like value added time, Total cycle time, Work in process inventory, On time delivery, Defect rate and Uptime were observed to be improved significantly. The managerial and industrial implications as a result of the conduct of the studies are being presented. Besides, a roadmap for implementing the proposed approach was also being proposed. The
conduct of this doctoral work fulfills the research lacunae of developing advanced frameworks of lean tools/techniques. Thus the effectiveness of the VSM tool has been practically validated in real time manufacturing environments.

9.1 LIMITATIONS AND FUTURE RESEARCH DIRECTION

In future more number of studies could be conducted across several sectors for improving the effectiveness of the proposed VSM framework. The computation involved in fuzzy QFD is complex and time consuming. Also the computational error may lead to wrong prioritization of improvement proposals. In order to avoid this, computerized support system could be developed. Also, Artificial Intelligence mechanism could be incorporated to prioritize the results.