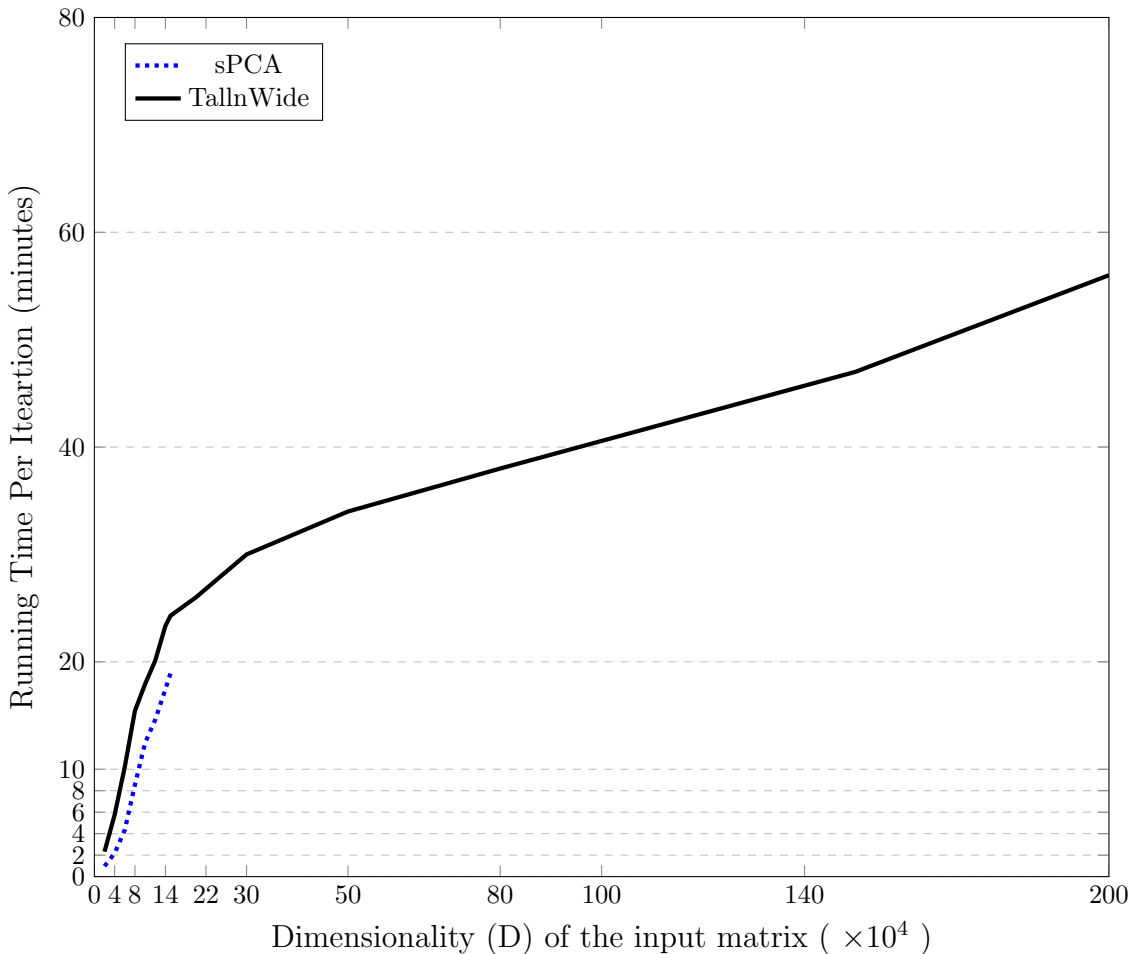
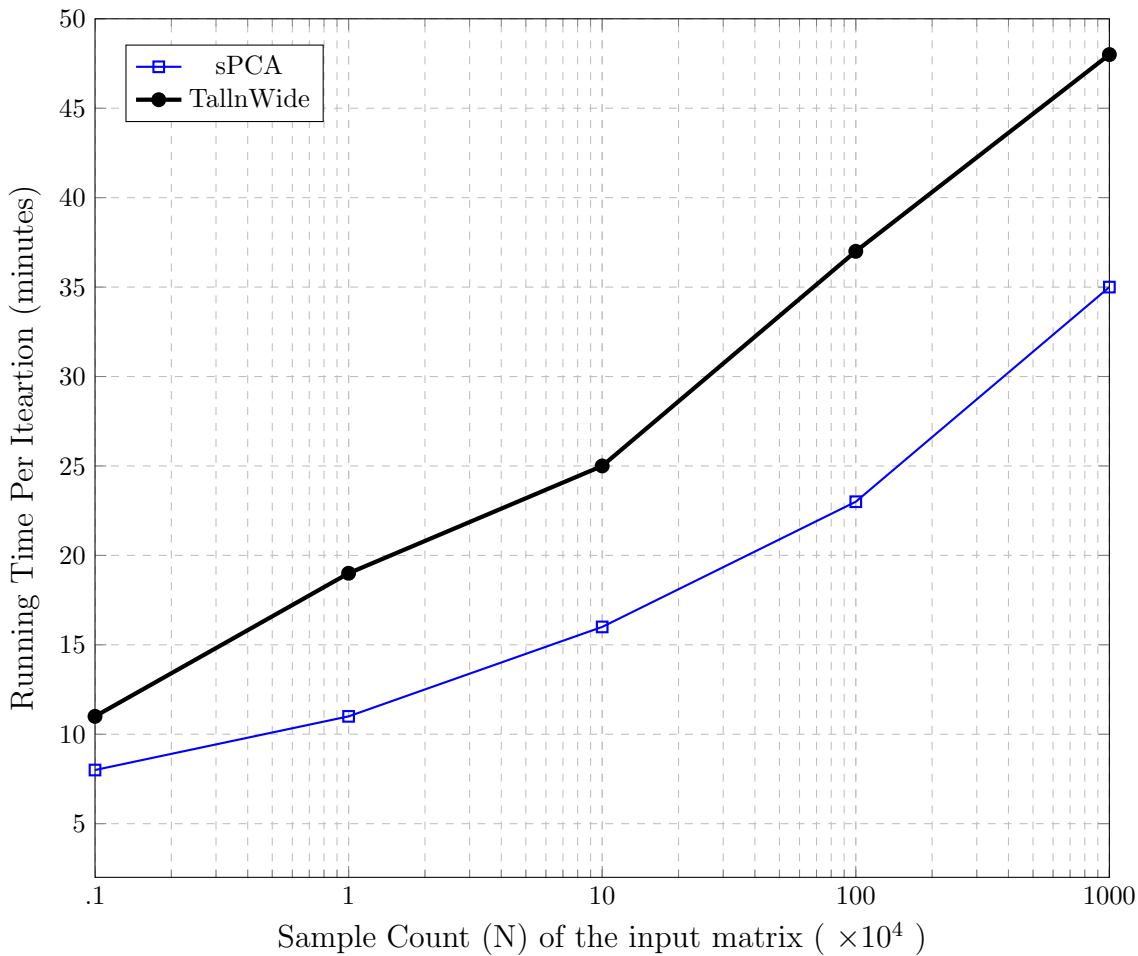


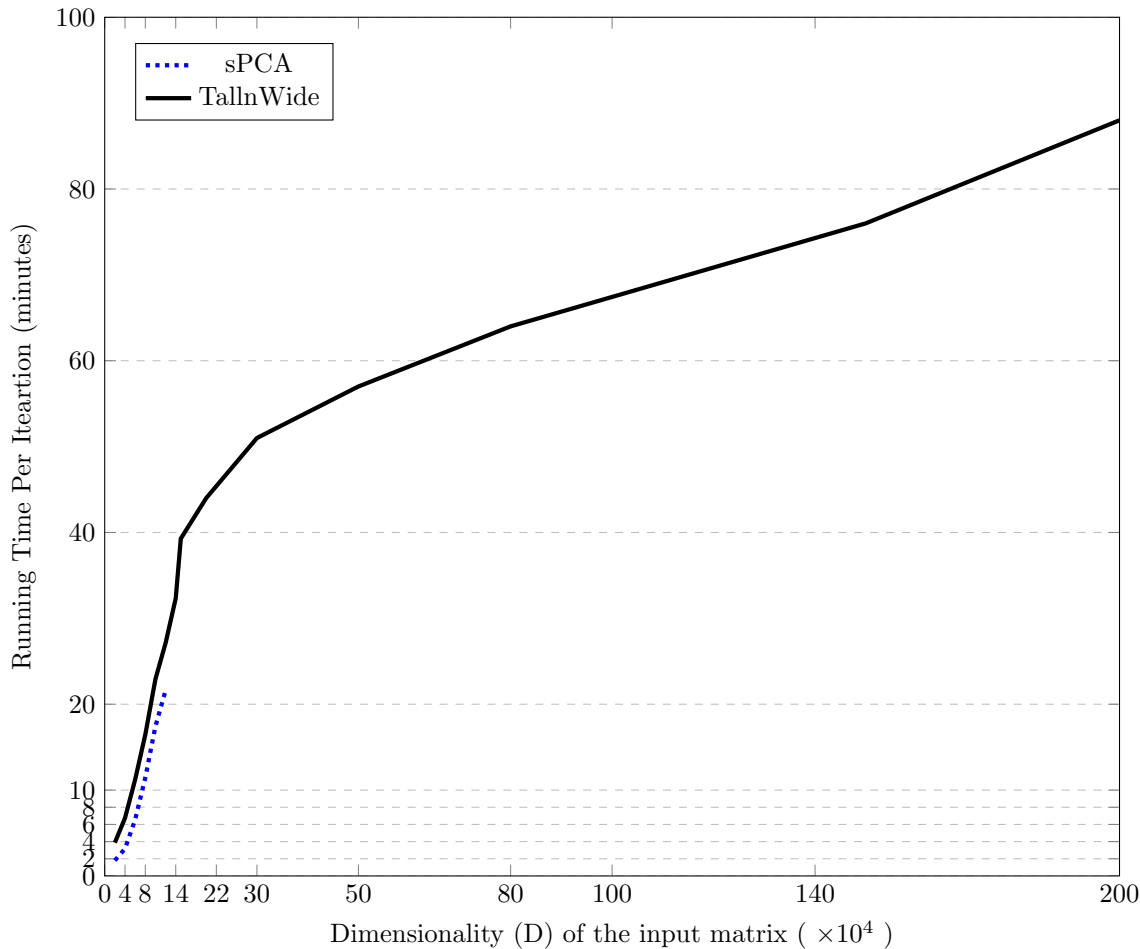
Running Time per Iteration Comparison for Amazon Data for  $N = 21M$



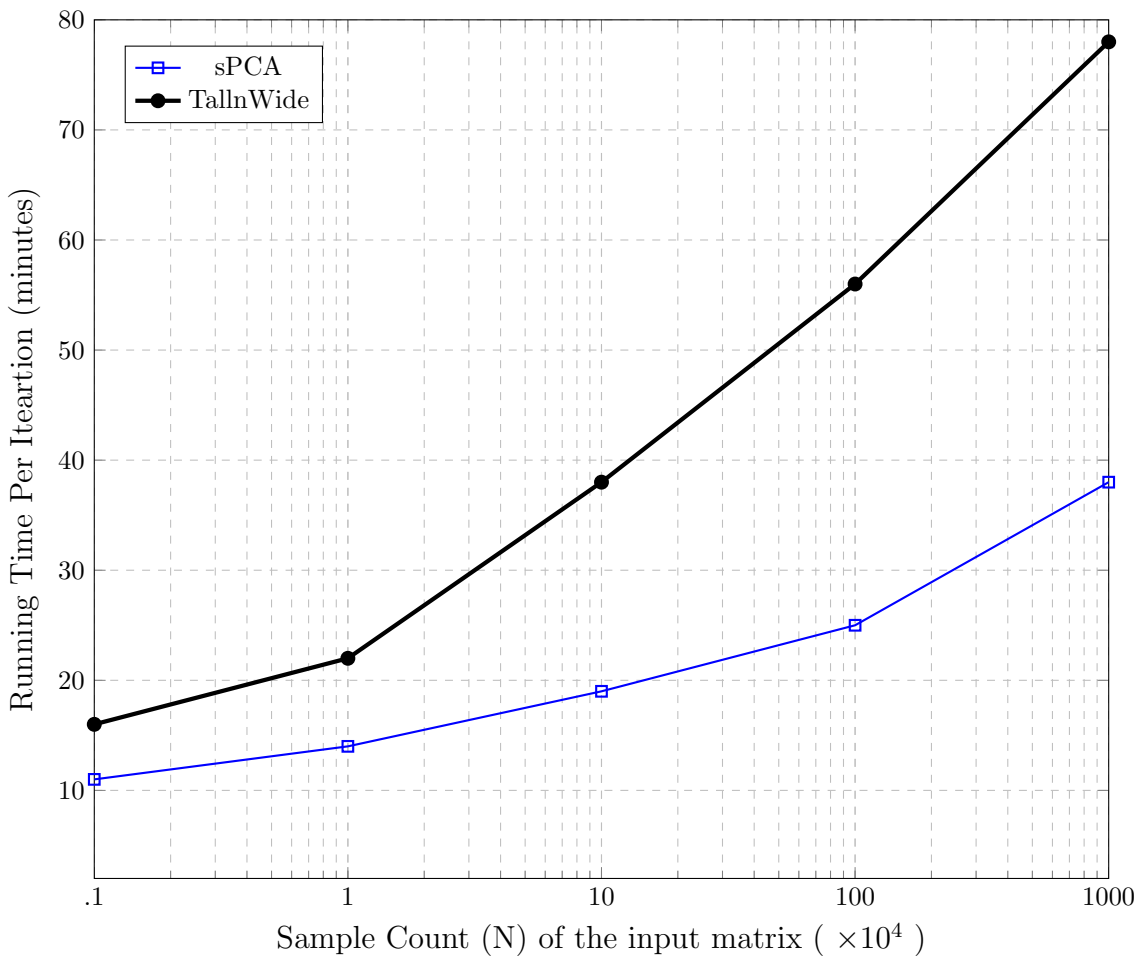
Running Time per Iteration Comparison for Amazon data for  $D = 0.08M$



Running Time per Iteration Comparison for Twitter Data for  $N = 65M$



Running Time per Iteration Comparison for Twitter data *sPCA* with  $D = 0.05M$



Intermediate Data Size for Amazon Data for  $N = 21M$  and memory =  $8GB$ 