Optimizing the warehouse location and transport routes in retail business (Topic presentation)

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Background - History

- History of "logistics" – Moving products from A to B

- Originally logistics was a military system to move troops and machinery

- Nowadays defined as engineering, creating "people systems"

- Goal to transport products to consumers with as low a cost as possible

Background - Motivation

- Personal working experience in logistics and retail
  - Years in retail as a salesman, warehouse worker
  - Noticed some issues where improvement could be beneficial

- Hands-on understanding of the system and problems
  - Could things be done more efficiently?
  - How the suggested changes would affect the entire system?

- Choosing a warehouse location and optimizing the transport routes to minimize costs (transport time)

Objectives

- To decide a suitable location for a warehouse in a retail business through a facility location problem (Weber problem)

- Having accomplished that, to determine optimal transport routes to fulfil the demand of each store location

- Comparison with an existing system
  – Which has a lower transport cost?
  – Which has a lower cost of lost sales?

Facility location problem

- Determining an optimal facility location based on minimizing the weighted sum of distances to each demand location

- In this thesis the problem is a modified Weber problem in which only one facility location is determined
  - First we calculate a weight point for the network
  - Choosing potential facility locations to comparison
  - Determining the optimal location

Optimizing the transport routes

- Routes are determined by assigning transport agents to demand locations through a 0-1 Knapsack problem

- Each location is to be serviced without breaking the transport constraints (e.g. volume, double assignments)

- Each agent has an initial cost, which is paid when they are assigned to at least one demand location

- Matlab used for the computation

Sources

- Logistics journals
- Literature on optimization
- Literature on knapsack problems
- Publications of SAL

- Sources expanded further when writing the thesis

Schedule

- Topic 12/2015

- Topic presentation 01/2016

- Research and formulation 01-/2016

- Writing 02/2016

- Final presentation 04/2016