Party Ice & Party Time Ice Ltd

Cost optimization of ice distribution

Company Information

Party Ice is the oldest ice manufacturer in Cyprus. The Party Ice brand made its first appearance in 1982 by introducing the innovation of packaged ice cubes under the legal entity of the Party Ice & Party Time Ice Ltd, which was founded by the Chavatzia family living at the time in the US. The Chavatzia family realising the need and the many uses of packaged ice in the Western US market, which has a similar weather to Cyprus, with prolonged periods of heat, undertook the challenge to initiate ice production and distribution in Cyprus at a time that this sector was virtually non-existent locally. The company is currently headquartered in the industrial Nissou area (Nicosia) and maintains two additional distribution bases in Limassol (active only during high season), while employing 25 permanent staff.

The Challenge:

The distribution of Party Ice products is executed with proprietary modern truck fleet refrigerators, perfectly suited for distribution of frozen foods, and covers the whole spectrum of retail all over Cyprus including kiosks, supermarkets, hotels, coffee shops, nightclubs, fish markets etc. The company has recently applied route control systems to achieve energy savings, always with the aim to better serve the consumer, and at the best price. By participating in the Study Group with Industry, the company aims to make use of their available data to uncover hidden trends, which can aid to the further optimisize their distribution system and make it more cost-efficient both in terms of fuel costs and man-hours.

Available Data:

More specifically, the company has two tracking systems of the distribution process:
   a) A GPS tracking system which tracks the speed and location of the driver, time of arrival etc.
   b) A receipt system which provides information on the delivery completion time and the delivery destination identity (name of the shop, supermarket etc.).
They would like to combine the information from the two systems and analyse the data in concert in order to optimise their distribution of their ice products.

The company will provide example scenarios and data for each challenge as well as a list of constraints. For example, the company does not operate on a preselling protocol, i.e. they do not know in advance how much stock a customer will buy.

Priority Challenges:
The company has identified two priority challenges:

1) **Selecting the Optimal Distribution Route for Distant-from-Base Areas**
   The geographical route is chosen based on customer's location in a certain region. Each driver is responsible for a particular region each day. In the occasion his supplies are depleted before completing his route, a new loaded truck is then dispatched to a location near his next delivery stop. The driver then continues his route with the newly stocked truck whereas the empty

truck returns to base (Nicosia). In the case of deliveries to distant-from-base regions (e.g. Famagusta) which require re-stocking it is important to quantify which is the optimal design of the route in terms of the location of the first deliver, in order to optimise fuel costs. One scenario is: begin by delivering at the destination closest to the distribution centre, having the benefit of progressively unloading the truck, hence, potentially saving on fuel costs due to the overall lower truck weight. A second scenario is to drive to the furthest destination and begin delivering from there, coming backwards towards the distribution center. In this case, when the truck runs out of supplies it is more likely that the driver will be close to the distribution centre, hence, the new truck will have less distance to cover and as a result less fuel costs.

2) **Long and short-term handling of urgent orders**
   The choice of optimal route based on geographical location is often disrupted due to urgent (not planned) orders. The company would like to identify how to optimally cater these urgent requests in the short-term (how to alter the route for one day) and in the long-term (how to reschedule deliveries based on previous orders record).

   a) *Short-term Approach Scenario:* Certain rural areas are not visited every day. Hence, if a customer from such a region has an urgent request the driver has to modify his route and leave his assigned district to make the urgent delivery. In that case the driver must optimise his route but selecting whether to immediately address the order or continue with his route and then visit all the urgent calls at the end of the day.

   b) *Long-term Approach Scenario:* It can be often observed from previous orders that certain types of shops tend to have an increase in urgent orders due to certain factors, such as the weather. For example, coffee shops tend to increase urgent orders in the summer when demand is higher due to high heat. The company would like to quantify whether it would be more cost-efficient instead of redirecting the driver's route to assign an independent smaller van for addressing the urgent calls during the summer. The company would also like to estimate, which customers would benefit from renting a larger ice storage fridge so that a single order can cover the customer needs for a longer period.