An optimal hub-structure

– Article describing a Master Thesis

Company x is as almost all other companies facing challenges regarding the distribution of their products. The increasing fuel price and regulations from the European Union can be mentioned as examples. The constant growth of the union has led to a standardisation of transports throughout Europe which does not work in favor of low transport prices. Several years ago, the transportation market experienced a deregulation of road transports which led to an over capacity and low prices. This shifted out the smaller logistics companies and the middle sized and larger companies is the ones left. The transportation market has slowly moved away from the over capacity and today, the prices are increasing.

The increase of the fuel price has the largest impact on the transportation costs. The increase last year for the Western European countries was between 15 and 20%. Furthermore, it is by new technology much easier to inspect if the drivers are driving legally. With the directive regarding permitted driving hours (decreasing) and pauses (increasing) during a driver’s working day, the personnel costs will be affected which is the biggest segment in the transportation costs.

To reduce the pollution or the noise, some cities or even countries have introduced driving bans for larger vehicles during parts of the day or at all time. The solution for this problem is to deliver in smaller vehicles or at specific times which results in more complicated planning and increasing costs. Another factor which has an impact is the classification of vehicles. If a Euro 5 truck is chosen, the tax relief is larger than for a Euro 3. However, the transports become more costly due to the expensive use of a newer vehicle.

Company x is also facing other challenges such as an increasing market growth in the Eastern parts of Europe. Due to their slow management process, they are already behind their competitors in these markets and if nothing is done in this situation, the opportunity of being market leader will disappear.

With these challenges, the nine year old network with four hubs in the first layer Company x is using is not the optimal solution. In the current situation, all the transports are Company x-dedicated. This prevents the logistics providers from filling the trucks with goods from other companies which would help decrease the costs. The loading factor from the first layer of hubs to the second is, due to the character of the elevator, much lower than from suppliers to the first layer. All this combined leads to the conclusion that if the distance from first to second layer is decreased, a lot of money can be saved.

Analysing the current system and proposing a new optimised hub-solution was the purpose of the master thesis. However, trying to optimise a hub-structure without the proper resources is not the easiest assignment. Within a large company the data needed for the analysis took more than two months to receive. Going through data for 30,000 elevators was time consuming and trying a new option of hub-structure took at least a week. Therefore the title of our master thesis; “Optimisation of European hub-structure...” is somewhat misleading. To be able to optimise it is necessary to use software where one can try a large number of different solutions. It would preferably
be provided by the University since they can have the use of the software in the future. However, with the help of theoretical literature and articles for trends, our solution was that adding an eastern hub to the other four can save Company x a lot of money. Since the outsourcing of the transports, the addition of a hub would not lead to binding of capital but would only lead to costs saving in form of decreased mileage. Further changes were new market realignments for the existing hubs which we decided should stay in the same location. This was all done by a distance optimisation i.e. the hub closest to the market should do the deliveries. The location for the eastern hub was based on a weighted scorecard where the closeness to market was the most important factor. This is due to the loading factor from the first to second layer which is low and the costs for these are high. Therefore, having shorter distances decreases the costs. Other important aspects we considered were salary level and infrastructure.

The trends are a centralised first layer and a large number of hubs close to the market in the second layer. This could be a solution for Company x if they would outsource not only the transports but also all the planning to the logistics providers. The mentality within Company x is as within many other companies that it is much safer to do what they have always done. Therefore, the decision makings for new solutions take a long time. For Company x it has been a recipe to their success. To be able to recommend a solution for the time frame of five years which we had set up, the small changes needed to be identified. For further recommendations beyond the five years, Company x need to consider changing their processes in the optimisation process of the distribution.

Changing processes is a massive work and it takes a very long time, especially within Company x. If the processes regarding the distribution were changed, they could easily adapt to train mode for the transports from supplier to the first layer of hubs in order to further reduce costs and contribute to a greener environment. With the latest debate regarding environmental changes i.e. the green house effect, the transport prices are expected to increase. Our first question to Company x regarding their usage of train transports received the answer that it would not work for them; it is too slow and would lead to increasing lead times and costs. Like many other companies, cost savings are the most important issue. The elevators Company x are selling have a low energy usage which is a selling concept. This concept is not spread throughout the company. However, if the processes were changed to fit the rail mode there are a lot to gain such as improving environmentally and decreasing costs and stock levels. Company x has not discovered these advantages since they connect rail with increasing lead times, lost control and therefore increasing costs. Changing the processes could mean having value adding activities in the hubs while letting the suppliers produce to stock. This is an area where there is a lot of savings potential since Company x is buying a large number of standardised products made to order.

In the total focus on cost reduction within Company x the relationship towards the suppliers becomes more restrained and the supply chain thinking is lost. You always have to question the theory and supply chain management is perhaps not the key to success. There is always a risk in revealing information to the suppliers or customers which the concept demands. Company x has managed well without a large focus on the model. They are very reluctant in inviting their suppliers in an open discussion. The relationship between the company and their logistics providers are therefore based on pure negotiations. However, how can one say that this is wrong and would Company x improve by a closer cooperation to their supplier? Our conclusion is that it can become a necessity
if Company x wants to fully optimise their hub-structure. Adding a hub in Eastern Europe is a first step towards an optimal solution; a virtual network. This includes a 4PL who is singularly running the network with a large number of hubs, all non-Company x specific. A hub would only be used for the special occasion of an elevator being delivered in the close surroundings. In this system, the 4PL would decide the optimal transportations including mixing of products and modes. Moreover, employing one partner demands a high level of trust and a close cooperation. The goal is for both to gain from the collaboration which is far from the thinking Company x has today.

Our task was to find a new hub-solution and provide figures which they later can use in a negotiation with their logistics providers. Our findings were a large improvement by rather small modifications but there are also much more to gain by implementing larger changes.

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