

Figure 2. Summary of outsourced transportation suppliers

These numbers are computed for one-way trips, back-hauls are always empty. The alternatives available to reduce Fill loss depended on the structure of the flows of the rest of the supply chain. As mentioned previously the organization was experiencing a reduction of its market share and transport planning had not been modified accordingly. Two potential options are available; optimizing the number of hubs of the network; optimizing the number and assignment of DC's to hubs and; redefining the distribution routes from the hubs to the DC's.

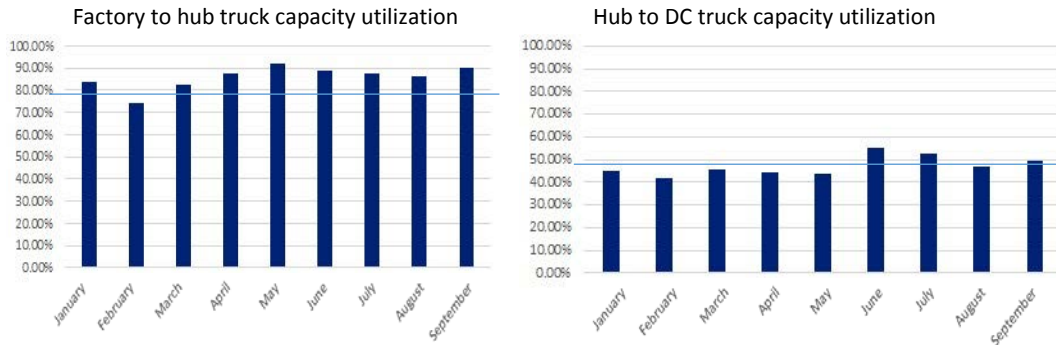


Figure 3. Truck capacity utilization rate

4.2.3 Distribution optimization stage

As shown in Figure 4, the current distribution network presents two strategic improvement areas; the possibility of requiring the addition of one or two new hubs and; the re-assignment of the CD's to hubs. Additionally, and after carrying out the previous tasks, the redefinition of new routes from hubs to DC's are necessary to improve the truck utilization capacity.

The initial task refers to the strategic redefinition of the structure of the network. First, it is desirable to determine the number and location of up to two new hubs in the network, additional to the ones already operating. This decision was taken with the help of the Center of Gravity model. The analysis undertaken to make the previous decision considered the assessment of three scenarios; the actual structure with the current hubs; the actual structure with the addition of one new hub and; the actual structure with two new hubs included. Each scenario was evaluated adding the assignment of DC's to hubs with the help of the transportation model. The preferred solution is illustrated in Figure 5. This new structure includes the addition of new hubs in the cities of Chihuahua and Puebla. Finally, the last task contemplated the redefinition of distribution routes. This was realized using the software Route4me (<https://route4me.com/>). Figure 6 shows an example of one of the new designed routes.

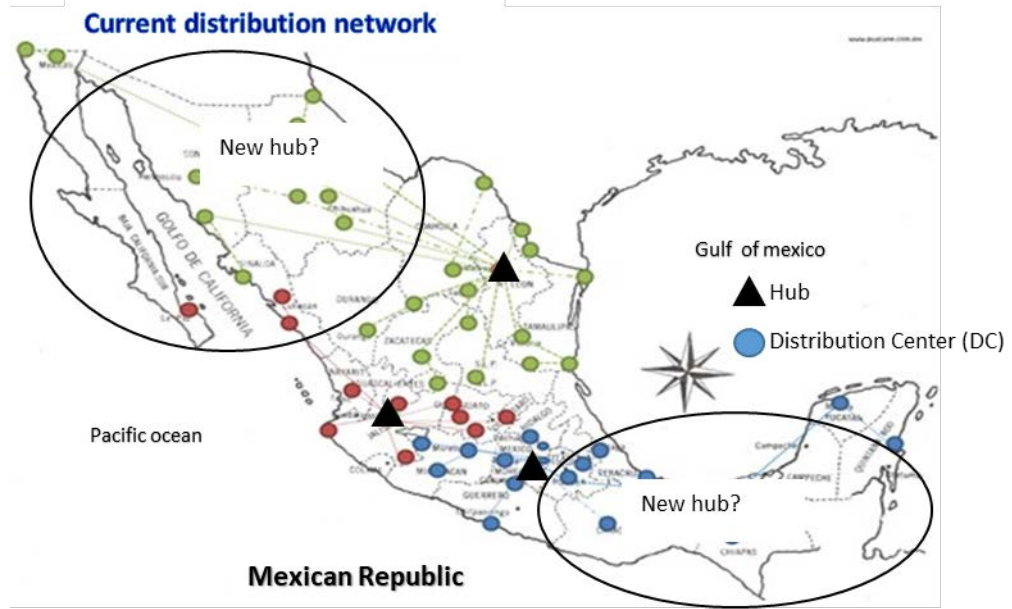


Figure 4. Description of distribution network

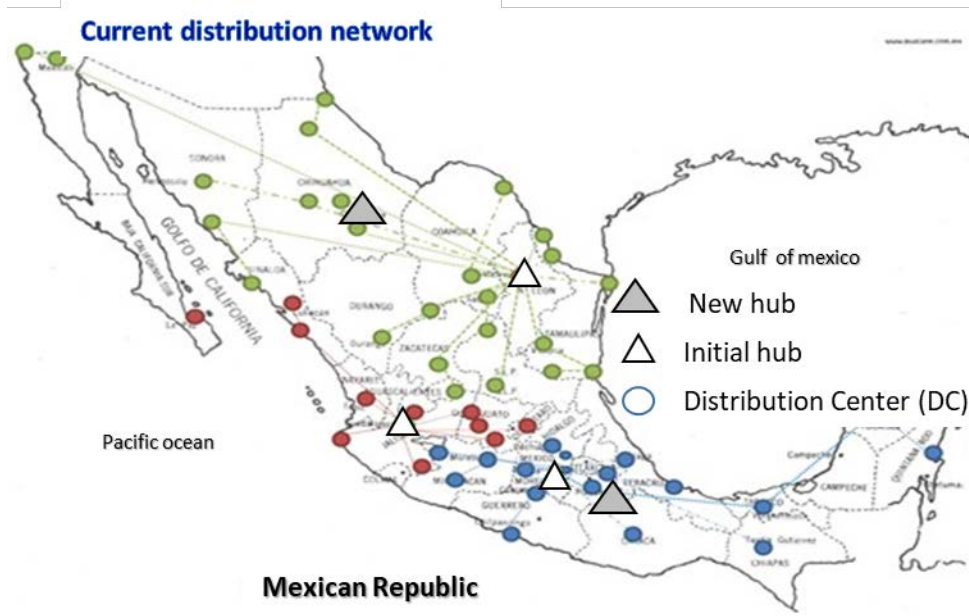


Figure 5. Description of new distribution structure

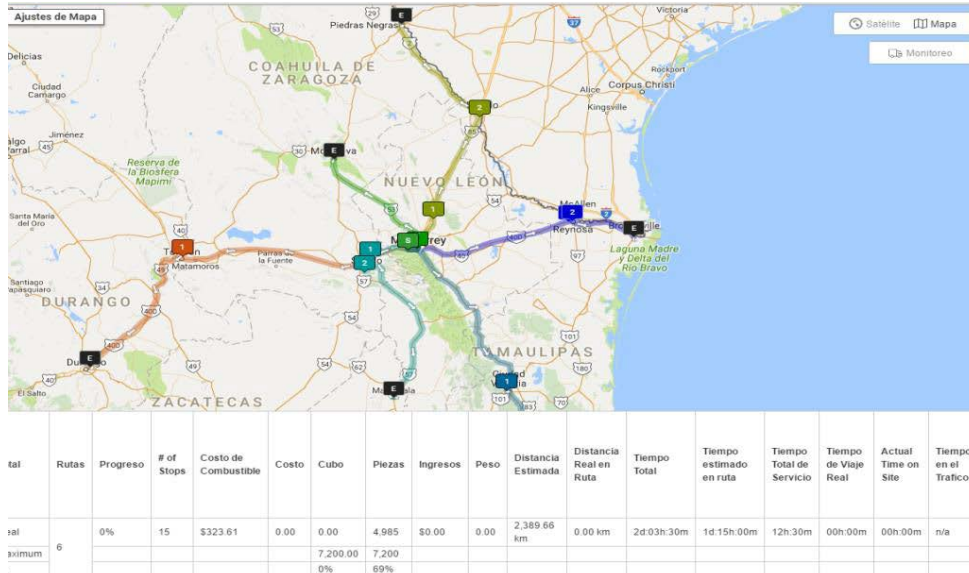


Figure 6. Example of a new designed route

4.3 Implementation and results

The implementation of the previously described initiatives is planned to be stage-wise. The authorization of the investment required to implement the new DC's is expected to be done during the first quarter of year 2017. Meanwhile, the management decided to carry out the reassignment of several DC's to new hubs, and the redefinition of various new routes. They also approved a pilot program of various new routes in the short run. The impact of the new routes on the truck capacity utilization was significant increasing from an average of 46% to the level of 74%. The projected new level of outbound transportation cost is expected to be 9% lower than the initial level.

Simultaneously, higher management approached their transport suppliers to redefine freight terms on the basis of a just cost for the same service. The company was willing to provide volume and certainty in longer contracts for the new relationship. The additional benefits obtained with the project include a better level of service for customers located in the northwestern and southeastern parts of Mexico.

5. Conclusions

As initially mentioned, the problem of concern in this paper is the reduction of outbound transportation cost. The firm of concern is a leading producer and distributor of tobacco products to its hubs and DC's across Mexico. All the outbound transportation of FG is carried out completely by external suppliers. The management in charge of distribution and logistics of the firm decided to establish the objective of reducing inbound transportation.

The scheme used to define the improvement strategy for reducing inbound transportation cost is based on the stages suggested by Di Vece et al., (2015) and Moore (2006). In summary, this document briefly describes the efforts that are part of the first three stages: price negotiation, streamlining operations and optimization. The impact of the implementation of the initiatives is estimated as a reduction of 9% of total outbound transport cost.

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Biography

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