

HYBRID LOGISTICS OF NEWSPAPERS AND E-COMMERCE PRODUCTS

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RESUMO

A logística de jornais e produtos de e-commerce pode ser denominada de logística de cargas expressas. A logística de cargas expressas está cada vez mais presente nos mercados competitivos atuais, sendo necessário o uso de recursos terceirizados otimizados. Este estudo tem o objetivo de descrever e estudar o serviço de distribuição terceirizada híbrida de cargas expressas contribuindo, assim, para sua maior lucratividade. É discutido o caso de uma complexa rede terceirizada operada por um operador logístico. Por fim, são analisados os pontos importantes a serem considerados para as melhores estratégias desses operadores.

ABSTRACT

The logistics of newspaper and e-commerce products can be dominated by logistics express cargo. The logistics express cargo is more visible on the actual competitive markets, thus, needing an optimization of other outsourced resources. This study has an objective of describing and studying the service distribution of the outsourced hybrid expressed cargo, thereby, contributing to a greater profitability. The case of a complex outsourced network operated by a logistics operator was discussed. And finally, the important points considering the best strategies for these operators are analyzed.

1 INTRODUCTION

Logistics can be conceptualized in various ways, among them, the French concept related to activities responsible for planning and development aimed at the military functions, contracts and services (Caxito, 2011). Another concept comes from the Greek word *lógos* meaning: reason, calculation and analysis.

Logistics is of great importance in modern economy, accounting for 8 to 14% of the GDP in industrialized countries and 30 to 40% of the total cost of goods (Hara, 2011). The transport, maintenance of inventory and order processing are the three primary activities needed to achieve the objectives of logistic cost and service level. In this context, transport is the most important logistic activity because it uses up to two-thirds of the logistics costs (Ballou, 2006).

In Brazil, the measure by which cheaper transport services are being offered permits an adaption by the economical structures developing economies with strong outsourcing services. That way, better transport systems collaborate to increase the competition on the global market for guarantees of production scales and the reduction of commodity prices. The growth of computing, communication and technology along with organizational market changes have required new operational forms of production and integrated logistics (Novaes et al, 2011).

The Brazilian transportation infrastructure (CNT, 2010) and management services do not operate efficiently, causing a great imbalance in the transport/logistics matrix. Logistics costs

in Brazil, in 2008, reached approximately 11.6% of the GDP (\$349 billion) while, on the other hand, the United States of America logistics costs showed only 8.7% of the GDP demonstrating that there is yet room for performance improvement.

The cargo transportation through the road system in Brazil has a respectable structure, being responsible for up to 7.5% of GDP (Valente et al, 2008). It is the main via of transporting cargo and is currently seeking more efficiency and progress in the level of service offered, through the implementation of new technologies, management and procedures. In this road transport base scenario, a high growth in the country's logistics express or rapid cargo is evident. Electronic commerce and mobility restrictions of large cities are increasingly promoting this sector of fast transport door to door.

This study has a main goal of studying and analyzing logistic outsourced distribution charges express hybrid journals and e-commerce products networks, optimizing the costs and maintaining the level of service desired. This analysis considers the specialties of this market, such as: the necessity of optimization, transport and cross-docking, great quantity of outsourced partners operators and adequate delivery deadlines.

2 OUTSOURCED LOGISTICS OF CARGO EXPRESS

According to Bowersox et al (2009), the deregulation of the American transport policy in the 80s provoked the free transportation market, which was after extended worldwide. This fact initiates the radical change in the logistics express services sector, passing the hiring of single function to a multifunctional hiring. In this scenario, the POL or providers of outsourced logistics services with personalized services to the demands of the clients appeared, operating transporting equipments, warehouse facilities and information systems interconnecting these complex steps.

In the last decade, in Latin America, the demand for outsourced orders has grown rapidly, although they are restricted to certain products such as books, computers, electronics, correspondence, newspapers/magazines and food (Fuerth, 2007). They are normally made by fast delivery companies, couriers and fraction freight carriers that basically use the modes of road and air transport to carry out activities.

With the current competition in the outsourced logistics sector, there has been an advent of new forms of contracts. According to Cui et al, a new concept of outsourcing would be: "Relations between interfaces of chain supply and thirds-party, where services are offered from the more basic to the more customized, in short and long term partnerships, with an objective of obtaining greater efficiency and effectiveness." This is the migration of the total antique grant system of activity to a system of partnership and trust in which the activities, information and the risks are divided between goods and services. This trust relation involves values such as reputation of the partners, sharing of information, loyalty and relationship time (Tian et al, 2008).

On this market, the current trend of the customers is to wait for new levels of express delivery services (Finamore et al, 2007). Meng et al (2011) have described the current need of improved quality of express logistics services, as well as the resulting of customers dissatisfaction. They identify important attributes to be promoted, such as: reliability, service frequency, call center support service, merchandise warranty; information/delivery tracking, packaging quality; workers' empathy, agility and quickness in delivery.

According to the oxford Economic Forecasting (2005), the express logistics enables small and medium businesses the possibility to use high performance and rapidity with the deliveries, something that they could not do it on their own, which allows them to participate

in global markets. The logistics express contributes to the regional development, connecting regional markets geographically distant and even remote showing a positive growth of about 8 to 10% per year.

In the express cargo transportation, the strategic decisions are based on: the servicing network project, location of the facilities, productive services acquisition of resources (vehicles and equipments) or its outsourcing, in the general definition of service level to be offered, and the establishment of tariff policies (Araújo, 2010). The decisions on the tactical level relate to: the choice of routes, type of service to be operated, definition of the operating system installations, and resource allocation. In the operational level, the tasks include the routing and scheduling of vehicles and crews, configuration and execution of shipments of maintenance plans.

2.1 Logistics costs

Considering the primary logistics activities in function of the number of deposits as shown in Figure 1, one can perceive that the base on the growth in the number of deposits, and the decrease in transport cost. This occurs because the higher freights can be substituted by the lower, and the delivery distance between warehouses and customers decreases (Ballou, 2011). On the other hand, stock costs and processing orders have the opposite behavior; they increase with the growth of warehouses. To decide the number of deposits, the administrator must balance these conflicting costs, arriving at the lowest cost for the system. In the case of the express cargos, this ideal trade-off between deposit quantity and route extension is vital.

One can think that in the outsourced systems, this compensation relationship between transportation costs and warehouse is less severe being that the costs are fully transferred to third parties. However, with the new forms of outsourced organizations through partnerships, most of the time, the contractor assumes direct costs from the third parties, such as rental of properties, proportionate payments to the quantity of employees hired by the third parties and transportation remuneration of the kilometer traveled.

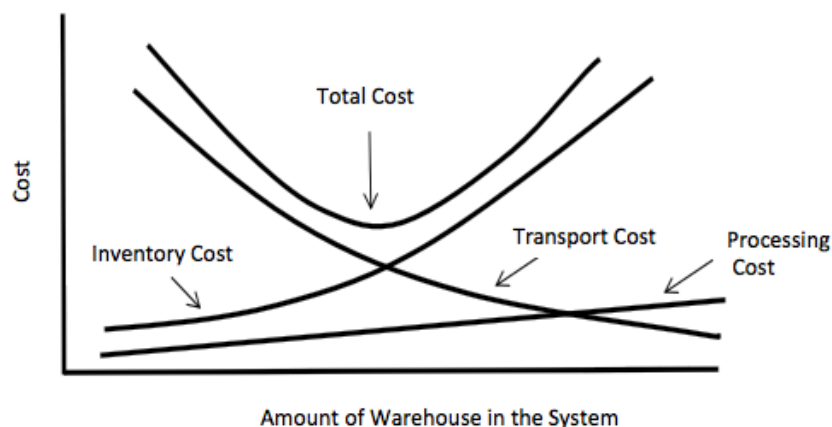


Figure 1: Logistics costs (Ballou, 2011)

2.2 Level of service

The level of logistics service can be defined as the degree of quality by which the flow of goods is managed (Ballou, 2011). This level of service is associated to the service provision costs, starting with the need of performance expected by the customers. There are different ways to evaluate the level of service, such as: the delivery time, stock availability, percentage of deliveries, minimum lot purchase, etc. These forms of assessment can be classified according to the transaction of the product (Figure 2).

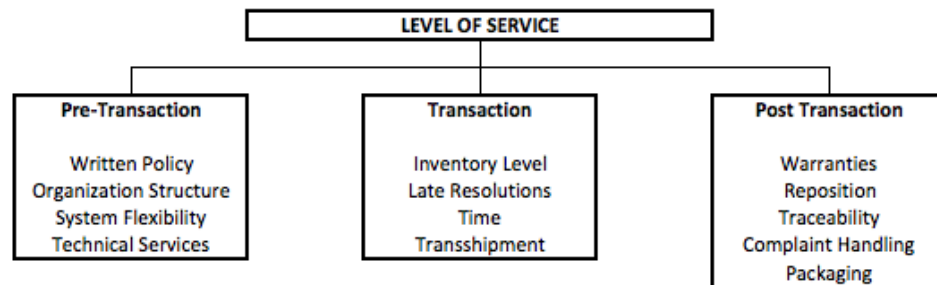


Figure 2: Level of Service

2.3 Technology

The application of Information Technology (IT) in companies that deal with logistics have generated a huge gain in quality, performance e resource availability (Caxito, 2011), especially in the logistics of express cargo with outsourced operations. In this area the flow of information is very dynamic. The inclusion of technology allows companies to improve and to meet their demand with greater efficiency and effectiveness.

The transformation of technology is one of the main drivers of the competition, because it plays a vital role in changing the levels of productivity and work processes. An example of application of information technology is the work of Song et al (2002) who used the digital geographic technology for distribution centers and routes in newspapers mesh. Using scripting technology, Marins (2011) describes gain of up to 15% in the reduction of distribution cost; 97% reliability deliveries, and 19% in reduction of mileage with the reduction of the emission of pollutants and other environmental impacts.

3 LOGISTIC OPERATOR OF EXPRESS CARGO

The logistics express cargo operator is the fastest service company, specializing in managing and executing all or part of the logistic activities through outsourced services of transportation routes and distribution centers. This variant is dominated by Novaes (2001) as shared system. Some important questions to be answered with respect to the Shared System are (Novaes, 1989):

- How to divide the region of service into areas?
- How to select the vehicle and crew that is more adequate for the service?
- What is the average mileage of the fleet and the various times associated with the service, so that it might be possible to quantify the costs?
- Given the various possibilities, how to select the configuration most suitable?

In Figure 3, an example of a complete transportation hybrid network and distribution of a logistics operator is shown in order to facilitate its understanding and analysis. This network is very complex, involving a third-party distribution of express cargo, composed by various modes: road (trucks, light vehicles and motorcycles); bicycle; by foot, air and waterways. This network is basically composed by 12 stages, highlighted by a numeration of 1-12. In Figure 3, these are briefly described.

1. Product loading

The first stage of the networks begins with the reception, labeling, checking, sorting and loading of the cargos. The activities described in the previous sentence are not of the responsibility of the logistic operator, but of the shipper (client), despite the influence in the activities and the deadlines.

2. Transporting to the Central DC

This transport before the central DC is done mostly by the shippers own truck and is also their responsibility.

3. Cross Docking Central DC

From this stage, it is the responsibility of the logistics operator. In this moment the receiving of the cargo type 1 (e-commerce products) in the central DC is realized. The checking, the separation for the destination DC and the packaging are informed the quantities/weight to the transportation team that plans the size of the trucks, and does the loading of the vehicles. Generally, this procedure of receiving products is performed daily during the afternoon, and the central DC has until night to organize all the actions, including loading the trucks.

4. Transportation from the Central DC to the Auxiliary DC (Graphic Park Newspaper)

In the operation of this logistic operator, all the transporters are outsourced. Daily, after being loaded with type 1 products, the trucks leave loaded for the central DC bound for the auxiliary DC. They wait for the loading of the type 2 express cargos (newspapers). This transportation is done by the same vehicles that will perform the routes pre- DCs, trucks of 3.5 tons to 12 tons of capacity.

5. Loading of the trucks at the Auxiliary DC (Park Graphic)

At this point, the type 2 cargos (newspaper) are loaded with the aid of mechanized process, following onto a conveyor-belt until 8 docks where the trucks to be loaded are. The conveyors go up to the trunk of truck giving the task of checking and adding the load into the vehicle.

6. Transportation Pre-DC

After the loading of the type 1 products (e-commerce) in the Central DC and type 2 products (newspapers) on the on the Auxiliary DC, the loaded trucks daily follow the dominated task of pre-DC transportation (before the DC). These trucks follow respectively 20 distinct routes which are bound for the metropolitan area and upstate, stopping on DCs for landing. These vehicles have 3.5 tons to 12 tons de capacity. The same route can have 1-3 DCs, also including other intermediate points of spawning.

The arrival time for each landing point, the time of loading and unloading, and the time of travel are strictly controlled by the transport's team of the logistics operator (OCC – a kind of Operations Control Center). The compliance schedule is an obsession when it comes to express cargo. There are still locals that receive few deliveries where the pre-DC transport is done by fixed bus routes. The same process of transportation described with an output of the auxiliary DC repeats leaving the regional DC.

7. Transportation for the Regional DC

There is a transportation that takes place in the afternoon, with a departure from the Central DC to arrive at the Regional DC. This transportation is performed by a truck with the capacity of 12 tons, taking a great load of type 1 products.

8. Unloading, Cross-docking and loading in the Regional DC

In the regional DC, the truck from the capital unloads the type 1 products. The cross-docking of these products are made for distribution in the western half of the state. These trucks, normally, wait for the loading of type 2 products. At the same time, the capital starts loading products for type 2 western half of the state. At the moment, the truck routes pre-DCs leave loaded e continue towards their destiny.

9. Air Transportation

For some capitals of Brazil, the products of type 1 and 2 are sent by air. This transport function as follows: a small vehicle with a logistics operator collects the products and carries it to the cargo terminal of the airport where they are placed on the regular flights. In the city of destiny, a small vehicle collects and carries the products to a small DC, from where they are distributed.

10. Handling/ Distribution on DCs

After the arrival of the trucks at the DCs from the countryside (during the mid-night/ early morning period), they are landed. They are separated (new cross-docking) and packaged by the employees of the DC and the couriers. Soon, couriers will be leaving on their routes to deliver the goods.

Some of the goods are sent to the smaller DCs in other cities (through the pos-DC transportation) where they will be delivered. The entire structure of the DC is outsourced. The DCs can be of great storage or in the format of small offices. The structure of the DCs is basic, without the existence of the equipments for handling and loading/unloading of cargos.

11. Pos-DC Transportation

The pos-DC transportation is done after the cross-docking in the larger DCs. This transportation is made by the same vehicles of the large DCs, to the contrary of the Pre-DC which is done by specialized outsourced transporters. The vehicles are of smaller portorage (vans, trucks and cars) and there is also the pos-DC transportation carried by bus to cities with a small number of volumes.

12. Distribution

The distribution is the most complex part of the door to door delivery. It is done by the outsourced DCs. This is the stage that includes the larger number of persons (more than 500 persons in the state). In this stage, these products are delivered, with time windows fairer in the larger cities, and windows in the smaller cities. The distribution is composed by all the types of modes, depending on the relief / geographic characteristics of the localities (by foot, bicycle, motorcycle, car, truck, van and even boat).

In this phase, the major operation problems are concentrated, as well as, the major cause of customer satisfaction (by the time of delivery and order conditions). At the final process, the reverse logistics of return products is done. According to Hara (2011), the reverse logistics is the area which plans, operates and controls the flow of information from the return of goods after sales and post-customer, adding value of diverse natures: economic, ecologic, legal and image.

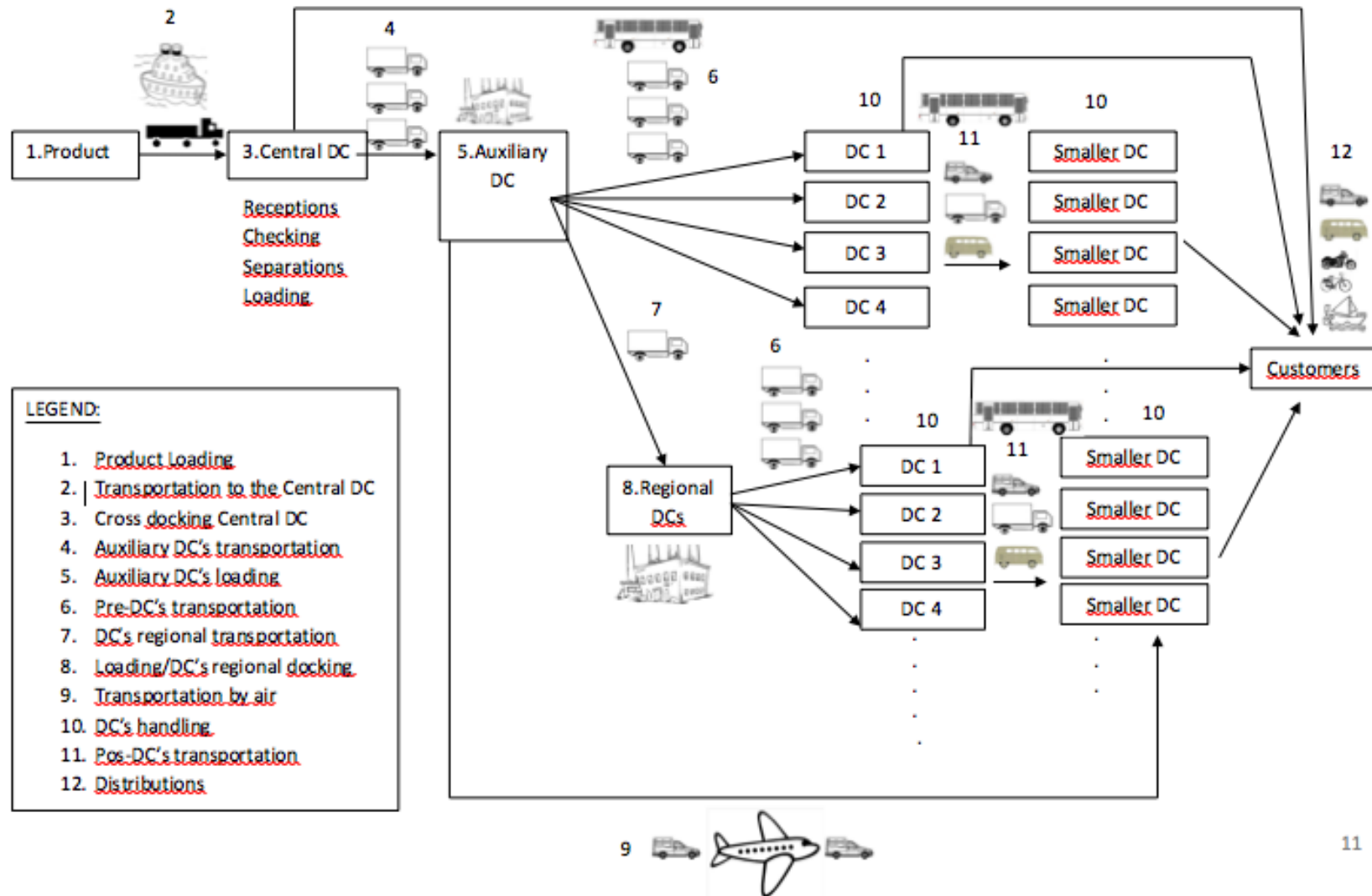


Figure 3: Outsourced door to door Distribution System of the Logistics Operator

4 ANALYSIS OF THE PRE-DC TRANSPORTATION PROBLEM

After the knowledge about the distribution of the logistics operator, the analysis focused specifically on the 6th stage-Pre-DC transportation, where the largest amount of cost was detected and the fleet rationalized opportunities in the system. At this stage, an approximate of 50% of various costs of the network was found, because the size of the vehicles and distances are greater.

For the evaluation, the concept of profitability was considered. The profitability is composed by a term connected to the revenue collected by the service (fix value charged goods delivery), and another linked to the cost expended (depending on the size truck and the distance traveled) (see Equation 1).

$$\text{Profitability} = \sum(\sum V_{gh} * Q_{gh} - \sum C_i * x_{ih} * d_h) \quad (1)$$

Where

V_{gh} : value received for delivery of goods g [R\$];

Q_{gh} : g quantity of goods;

C_i : fix cost of the outsourced vehicle transportation i [R\$/km];

x_{ih} : quantity of vehicles of type i for each route h ;

D_h : amount of km made for each route h .

The starting point was to examine the current profitability compared to the occupation of a vehicle unit (see Figure 4). In Figure 4, when the occupation reached 100%, the same equals to the total capacity of a vehicle unit operating in each pre- DC transportation route. To calculate the percentage of occupation, a parameter weight in kg instead of volume was chosen because it deals with a parameter written on an invoice and, therefore, has more and easier control. It was verified that majority of the time the limitation occurred in function of the weight limit of the vehicles and not the volume. Besides, the dimensions of the box trucks (volumes) are variable, but the capacity in weight is constant and limited by legislation.

It is evident that, for the values of occupation inferior to the capacity, profitability (EBITDAP %) increase with a growth of vehicle occupancy. However, when it passes the 100%, ie, when the occupancy exceeds the capacity, the use of extra vehicles is necessary and profit is reduced. As it can be observed in the months of November and December of 2011, in Figure 4, the increase in the transportation of goods is not directly related to profit increase. This fact occurs in function of an unfavorable relation between occupation and capacity (2 vehicles with capacities of cargo of 200% and occupation of 130%, one vehicle occupied 100% and the other occupied 30%).

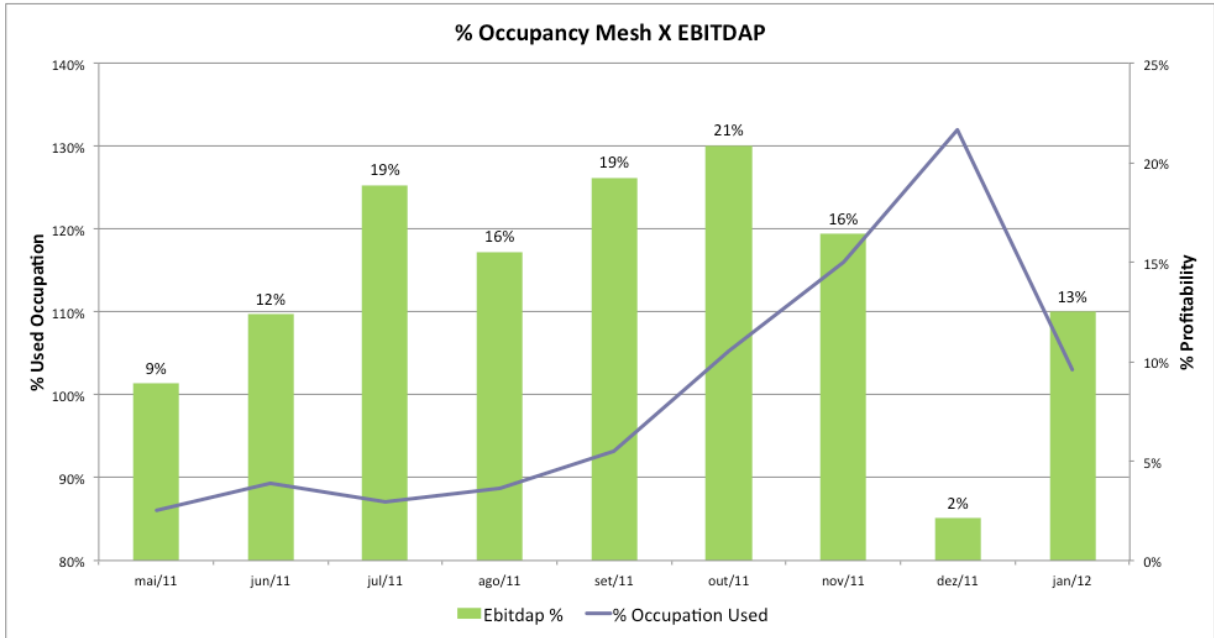


Figure 4: Percentage of use of occupancy of the system versus profitability

Using the analysis presented before in Equation 1 and the current data of the logistics operator, keeping the same product and customer blend, it was possible to mount the graph shown in Figure 5. In this Figure, the profitability base on the occupations used was simulated. The inclusion of a new vehicle in service is only justified when the same presents approximately 55% of its occupied capacity. This can be called the “even break point of business.”

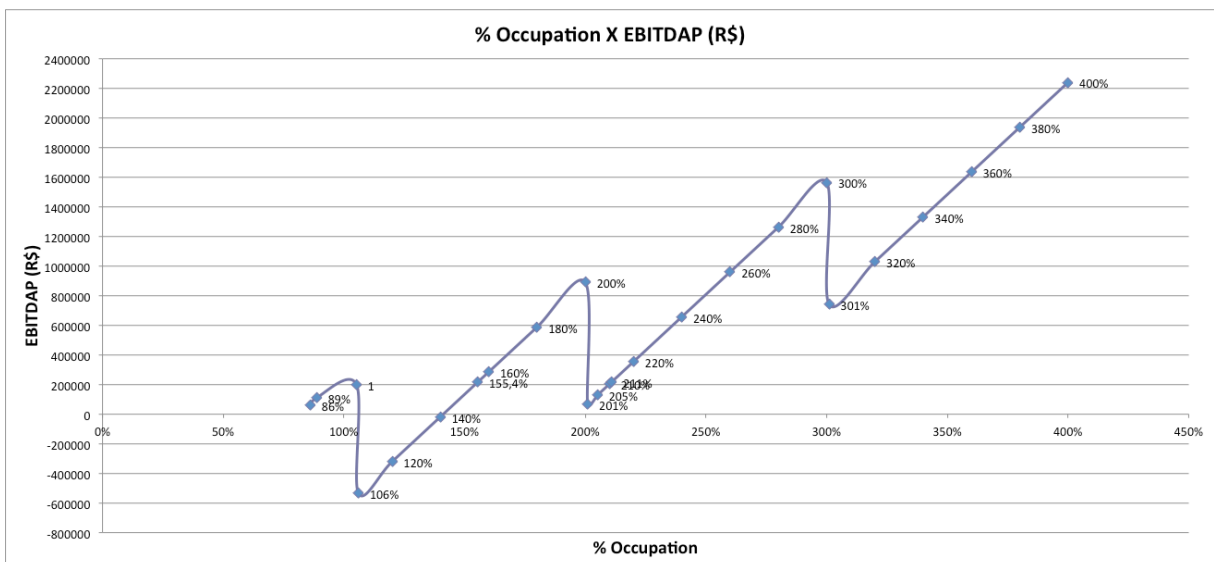


Figure 5: Simulations of used capacity versus profitability

It is important to highlight that the point of equilibrium is a function of the mix products, of the type of vehicle and the distances travelled on each route.

5 FINAL COMMENTS

On the actual express cargo logistics market, the use of outsourced services is vital for survival, just as the use of technology for administration of diverse fronts. However, a lot of companies still have not adapted and continue to suffer damage due to the lack of knowledge/management and because of the bad choices made by clients along with the transported volumes. Currently, the revenue amounts are negotiated by the delivery done, and the transportation cost paid per kilometer travelled or by the weight of the delivered goods.

In this study, it was observed that the problem with the outsourced distribution with fixed routes and a load varying in weight, the focus on profitability is important, making the problem more complex. The profit analysis includes cost parameters (freight) and revenues (delivery price), both from commercial agreements and decisions.

Within the highly influential factors of cost, it is the format of contracts of outsourcing/partnerships which distributes the risks between the goods and services. Little study is done in Brazil about what are the more appropriate tasks and instances to be shared by each logistic partner. The decisions are based a lot on the empirical attempts with a lot of failures and few successes. According to Lee et al (2012), the knowledge and model of distribution of risks to the logistics outsourcing contracts can reduce considerably by the time of final delivery to clients and their respective costs.

It was also noted that to respect the profit percentage of each load's route and to choose well the product blend, a way which the revenue exceeds the content cost is also vital. However, be it known that, in this market, the commercial contracts are not restricted to just a number of important variables to parameterize the process, such as: load variability, loading product mix; fleet mix.

A non- detailed factor, but one which influences profit is the added value of the products and the cost associated to the high attractiveness to theft and misplacements. The mixing of products should take into consideration this fact, preferably by reducing the percentage of loads with these kinds of characteristics, principally in Brazil where robbery of goods is rising and growing. All these elements show the complexity of the problem of the express cargo logistics.

It is important to know profoundly the clients which are more profitable (greater delivery margins, greater load frequency, smaller volumes units, lower rework and disappearances). It is fundamental to remember that majority of the time the best strategy can be to reduce the loads, maintaining it as the greater margins for delivery and small structures, with an aim of obtaining a larger profit.

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