

# **Insourcing Model for Food Storage and Forwarding**

**Tamás Hartványi, Viktor Nagy**

**Department of Logistics and Forwarding, Széchenyi István University  
H-9026 Győr, Egyetem tér 1.  
hartvany@sze.hu**

**Institute of Enterprise Management, Budapest Tech  
H-1084 Budapest, Tavaszmező u. 17.  
nagy.viktor@kgk.bmf.hu**

**Abstract:** The result of a joint study accomplished by the Institute of Enterprise Management at the Budapest Tech and the Department of Logistics and Forwarding at the Széchenyi István University is published in this paper. The aim of the research was to examine the Hungarian logistic market in the point of view of food forwarding and storage. In this approach we were interested in food with special demands as well. Chilled or frozen food transport and storage require special terms and conditions. In order to establish a model for helping the decision making we investigated the characteristics of these fields of logistics. Using our model we can determine the length of time necessary to return. In this paper we publish the theoretical background and the model itself.

*Keywords: modelling, insourcing, outsourcing, transport, warehouse, investment*

## **1. Introduction**

Last year a group of companies saw us about setting up a model in connection with investment decision making. The central issue was insourcing: whether it is worth to insource some services so far hired and if yes, what is the length of time of return. As a special condition, costs of investment can only be financed from savings arising because of giving up hiring the service and doing it by own. During setting up the model we faced several issues. We had to know what to expect from the strategic decisions so first we had to pay attention to the questions of outsourcing and insourcing in order to have theoretical background [1], [4]. Than considering the market characteristics we set up the model. The next step was collection of the input data. Using this dynamic model enables the managers to see the costs in the long term in graphical form as well.

## **2. Outsourcing and Its Advantages**

Outsourcing or contracting out is defined as a subcontracting process to a third-party company so that the firm can concentrate on its core competences. The principle is that the company should take care only of its most important activity.

Hereby they have some advantages. Mainly the background processes are outsourced such as:

- payroll calculation
- bookkeeping
- accounting services
- administration
- software development
- transport
- customer service

The decision about any field of the production or service to be outsourced requires high level management or owner approval. Thanks to the global network systems' effectiveness and that the expert skills and competences can be reached from anywhere outsourcing has become popular. Lots of reasons can be found to confirm the decision on outsourcing. Most of them are in connection with cost saving. On the other hand benefit rising are expected as well. We can find a lot of advantage of outsourcing:

- The company can focus on its core competences so it can allocate its resources more effectively.
- It is usually risky to invest in order to use new technologies. It has a lot of cost as well because in the technology market we can observe a rapid development. Keeping up with the latest innovative solutions ties up a lot of resources and is very costly. In case of outsourcing we have to pay only for operation of new technologies.
- High quality products and services are necessary to provide to retain the consumers. In this point of view the most important to offer these products and services at reasonable prices. Saving money on outsourcing a certain process can help to keep the prices lower than the competitors.
- As according to the subcontract the same amount of money must be paid monthly the cost can be planned.
- The structure of the organization can be fit for purpose and can be aligned with the strategic goals. Clarity and transparency regarding the expectations of different aims can rise.
- Economies of scale.

- Due to the supply market and the contractual commitments the interest of the company can be represented more effectively against the third-party service supplier e.g. in the field of assumption of risk.
- Seasonal peaks can be handled without increasing resources as the third-party company can be more flexible.
- Access to highly skilled manpower.

These days time can be handled as a production factor. Time is money. The rapid reaction in the corporate market can play a key role in order to meet the consumers' changing needs. The development process of products and services often requires creativity, ingenuity, and talent. These factors are not always available inside the company. Some advantage can arise because of the change of cost structure: variable costs can turn into fixed cost.

### **3. Criticisms of Outsourcing**

Outsourcing of course can have some disadvantages too. Outsourcing of a production or service often means that the place of work changes. In case of large enterprises it can heavily damage the local labour market. If we talk about call centres, insufficient language skills and different cultural background can easily mean lower quality in service. Sometimes certain services cannot be outsourced completely. Face to face connection cannot often be replaced by call centres. Lots of people are not convinced e.g. of telebanking or internet banking.

There are some works that need very high-skilled manpower and specialized skills. Outsourcing these works such as programming cannot be fair just because of lower salaries to foreigners. In this case native workers and experts will not find job.

Outsourcing could lead to communication problems. Keeping connection with the staff of the third-party company is more difficult than it is inside the organisation.

Measuring of the quality of the service outsourced is very important so that we can enjoy at least the same level of the service as previously. Contracts must be detailed enough regarding these circumstances. Sometimes lower prices match lower quality.

Outsourcing the IT systems, the control of business secrets and information can easily move to the third-party company. Outsourcing certain activities security risks can arise. People no longer directly employed belong to this group too.

### **4. Insourcing and Its Reasons**

Contracting in or insourcing is often defined as the opposite of outsourcing. Activity previously provided by a third-party company or hired moves to an internal entity. The decision about insourcing requires high level management or owner approval as well. Workflow can become more transparent. Lot of advantage can be gained by acquiring

control of critical services or production. Economies of scale can be reached by insourcing too. If the company has the work does not need any special skills done by its own employees cost efficiency can be achieved. A company for example can carry out some background activities or additional services on its own if it is capitalized enough. In this case, in fact we can point out that the services so far hired must be provided by the company itself. The cost of an activity provided by a third-party company includes the cost of work itself and the benefit of the third-party company. This benefit can be interpreted as a surplus burden what should not be covered by the company if that activity were provided by an internal, but stand-alone entity.

However, the question arises: whether the investment which should be implemented in order to carry out the insourcing returns within a reasonable period of time.

## **5. Risks of Insourcing**

The insourcing is a strategic decision. It is necessary to examine whether the company has competencies to carry out that activity itself.

Insourcing will only be a better solution than taking the services of a third-party company if certain conditions are given inside.

It can be very difficult to meet some basic requirements regarding cost efficiency, as follows.

- It may require high volumes production
- High investment costs
- Problems may occur at any point in the supply chain

If the process of insourcing fails or the internal stand-alone entity is not able to carry out the tasks at a suitable level of quality the company have to restore the original state. This process generates very high sunk costs. The fact of failure itself can affect the value of the shares of the company in the stock exchange. The company may not be able to cooperate with the previous third-party company. Seeking a new suitable partner can take a lot of time.

If an inappropriate insourcing action affects on product line or service regarding volume or quality, consumer behaviour and satisfaction can change. Customers may decide to purchase substitute goods of the competitors.

Although insourcing is not clearly an ill-structured problem it is an important strategic decision. Therefore decision making must be based on a lot of preparatory work. While in case of outsourcing references and obtaining objective information can help to choose a suitable third-party company, in case of insourcing we do not have such experiences.

## 6. Requirements - the model

During the process of setting up the model lots of connections and links between characteristics in the logistic market had to be taken into consideration. Lot of information had to be collected. It is very important that the input information is relevant and reliable. The model is able to handle several combinations of decisions in connection with forwarding and storage as follows in Table 1.

Table 1. Decisions on Insourcing

Warehouse	Dry goods	HIRED
	Chilled goods	INSOURCED
	Frozen goods	HIRED
Rack		INSOURCED
	Container	HIRED
	Pallet	INSOURCED
Vehicle, Size A	Not refrigerated	HIRED
	Refrigerated	INSOURCED
Vehicle, Size B	Not refrigerated	HIRED
	Refrigerated	INSOURCED
Fork lift truck	Type 1	HIRED
	Type 2	INSOURCED
Human resources		HIRED

Theoretically it means that we have lots of possible cases altogether:

$$n^k \quad (1)$$

Where:

- n: number of the decisions.
- k: number of possible ways we can carry out the activity.

We can decide on 13 cases. They can have 2 different solutions because the company either hires the service or does it on its own. So the number of the different solutions for the forwarding and storage problem:

$$n^k = 2^{13} = 8192 \quad (2)$$

We can count on 8192 cases. All these cases are relevant and can be explained. Carrying out all these cases would have been hopeless if we had wanted to count on all of them. That's why a dynamic model was necessary to be set up for this decision-problem. [2], [3]

Many data on warehouse and vehicles has to be handled by the model. Our model distinguishes the fixed cost and the variable cost as well. Examinations were performed on the optimal number of vehicles required to serve the needs.

Considering the storage we have to calculate the cost of building and maintenance vs. rental costs. If we examine the transporting, regarding the own vehicles data is handled according to the Table 2.

Table 2. Cost of Vehicles

Fix cost	Lease	
	Insurance	
	Annual technical inspection	
	Taxes	
Variable costs	Fuel	
	Annual distance to be travelled (km)	
	Consumption (litre/100km)	
	Maintenance	
	Toll	Quantity (up to the number of vehicles)
Cost of unit		

Considering the human resources three groups of employees must be distinguished:

- Lorry drivers
- Fork lift truck drivers/storekeepers
- Administration

According to the current legislation based on gross wages the model meets the requirements as follows. The model calculates the total amount of employer's burden including:

- Pension insurance contribution,
- Health insurance contribution,

- Additional health contribution (fixed),
- Employers' contribution,
- Vocational contribution.
- Possibilities to add some tax free services (e.g. cafeteria services) must be also included.

Further adjustment is possible to make the model more effective. If we decide to build an own warehouse we can count on three stages of the process: 'in course of construction', 'ready', 'in use'. If the warehouse is already built up that does not mean that it can be used. It is necessary to have some legal authorisations in order to use the storage. During this period of time costs arise in connection with booth keeping up the building (included the guarding) and hire. The amount of this money is handled in our model as well. According to the wishes, in the 6th year vehicles will be sold and new ones will be bought. In the model there are cells for these incomes and the costs too. As a possible output the costs compared are shown in Fig. 1. All incomes and costs are displayed as net present value.

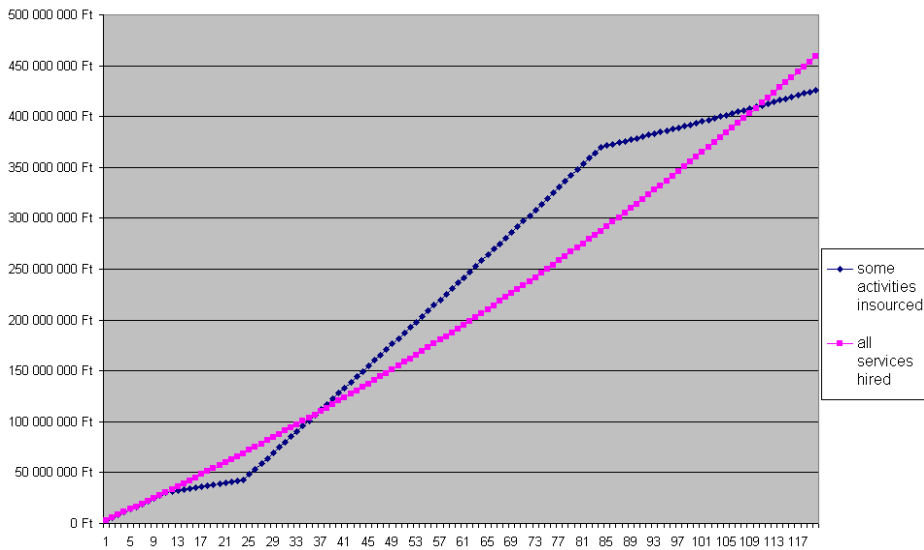


Figure 1. Comparison of costs before and after insourcing

We can talk about some general requirements in model construction. Solutions must be displayed in graphical way and the model must be easy to handle. The model must manage the financial conditions too e.g. cost of lease, inflation. These tasks are considerably complex and need algorithms worked out well. Setting up our model we have taken these requirements into consideration.

## 7. Conclusions

The present study has shown us the model. The knowledge of basic theoretical background is useful to know what to expect from strategic decisions. The deep practical knowledge of the activity is strictly necessary too.

Essentially, all strategic decisions are ill structured but a robust estimation can be reached by setting up a dynamic model. In this way the decision on insourcing or hiring will be valid and established. Basically, the aim is to achieve a more efficient cost structure.

The investment (the insourcing of the activities) is returned if the cumulative costs of the changed situation within a fixed period are lower than the costs of the original situation. In this point of view original situation means that nothing changes i.e. all the activities will be hired like so fare. We talk about changed situation if at least one of the activities will be insourced. The fixed period is 10 years. Due to this long period of time regarded as a long term there will be some uncertainty in the forecasts.

We believe that a model despite this uncertainty must be able to give a robust estimation and reflect the market trends. Of course, there are market trends that cannot be predicted. Handling these situations is a challenge of the top-management.

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