How Price Fluctuations is Influenced by the Response of Intermediaries to Different Sales Methods: A Case Study in Automotive Industry

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Abstract:
IranKhodro Co. (IKCO) is the largest automaker in Middle East. Although this company has a particular interest in international markets, still domestic market is its main market. Because of government regulations, rivalry is not aggressive in domestic market, but real prices for various types of cars have depreciated in recent years. Another problem this company encounters is the instability of its market. Price fluctuations provide a good opportunity for speculators to benefit from buying automobiles in low prices and selling them high. On the other hand, the presence of speculators in the market aggravates the uncertainty because the manufacturer perceives a demand different from the demand of end users and this leads to an unbalanced demand-supply in market. In this paper we will discuss how sales policies of the company leads to above trends in prices and exacerbates its financial problems. Using system dynamics modeling, we are going to answer questions like: What has been the effect of different sales methods on price fluctuations? And what is the effect of different sales methods in long term?

Introduction

Market Instability was one of the main concerns of Mahdi Ghasemi, the newly promoted chief marketing officer of IKCO. In the first meeting of our team with him, we distinguished two types of reasons for price fluctuations; uncontrollable reasons such as changes in seasonal demand, and some controllable reasons. We indicated that using system dynamics we could recognize feedback loops or structures that had caused price fluctuations and he agreed that internal reasons such as the structure of distribution channels had significant effects on price fluctuations. What exactly was this effect and how he could convince other chief officers to alter their policies, in regard to distribution channel, were unclear. This meeting was the starting point of our research project.

IKCO is the biggest automaker in the Middle East. Begun in 1962, today it employs more than 30 000 people and its sales rises up to $2.5 billion per year. Additionally, this company has experienced a decent growth in recent 10 years, while its sales was about 50000 cars a year ten years ago, today its sales is more than 500000 cars. Moreover, its production diversity has boosted in recent years from only one type of car to more than ten types, which almost all of them have various options. Though, competition in the car market has increased gradually during these years and as a result marketing and selling the products became harder and so, previously employed polices would not be as effective as before and should be subject to change. In this research we are intended to examine the results of some of policies that have been employed by IKCO to respond to this gradual increase in competition.

Not long ago, IKCO was the only automaker in Iran. Also because of high import taxes and government regulations firms who desired to import cars were facing a strong barrier. Excess demand had led to formation of a long queue of customers for IKCO products, not surprisingly IKCO was able to "Presell" all of its products effortlessly. Even customers were required to pay the price of their cars up to one year prior to receiving. In this article we entitle this kind of sales method as "Presell".

Due to current more competitive automotive market, IKCO is not able to Presell its products as before. The increase in production level of IKCO and also the rising number of automakers in Iran, and the decrease in import limitations has reduced the gap between supply and demand, even supply may excess demand in the following years. Hence customers are unwilling to pay for a car prior to receiving it. The increase in production level of IKCO and other automobile suppliers in Iran are shown in figure 1.

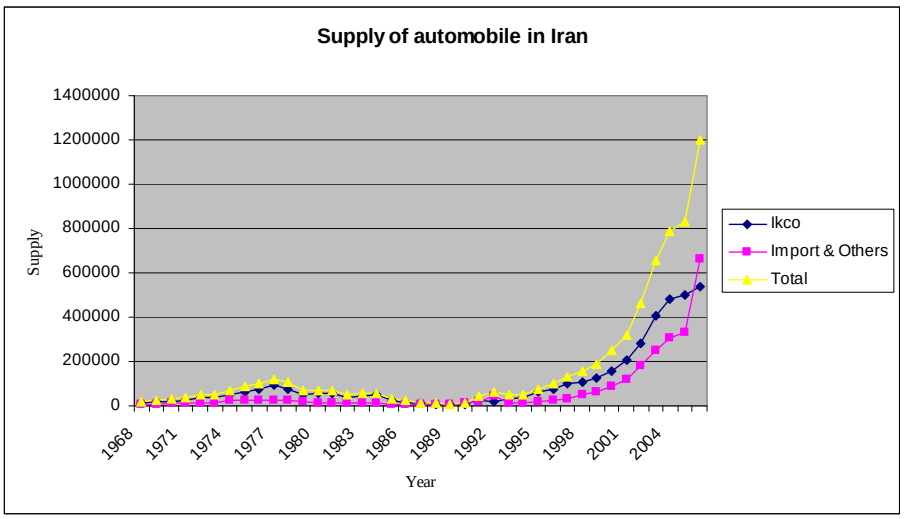

Figure 1- Automobile Supply in Iran Market

The decrease in number of customers who participate in Presell programs has a noticeable effect on the cash flow of IKCO, so the company has employed two solutions to respond to this problem. First, IKCO began to consider the time value of the customers' money with a suitable interest rate. Second, IKCO offered a sizable discount to some of its dealers who participate massively in its Presell programs. We will call the second solution "Wholesale".

In this research project, we are going to answer the questions like: What is the effect of different sale methods such as Wholesaling and Presell on price fluctuations? And what is the effect of different sale methods in long term?

The process of model building

The process of model building is crucial; it determines not only the outcomes but also the acceptance of the results and hence the commitment to them. Confirming that the system dynamics approach is appropriate for the problem our client organization was facing, the modeling team was assembled. In assembling this team we carefully consider special issues with the client organization. Since the issue (market instability and price fluctuations) was implicit and concepts of the model has not physical equivalent in external world, the modeler's mental model might influence the model. To minimize this effect, we decided to include two modelers in our team. Also our team included two data and information collectors and one modeling supervisor. The role of modeling supervisor was to communicate with the client to understand and extract his mental model and also communicate the system dynamics model to him for discovering underlying assumptions of both client and modelers. This process would help the convergence of our client mental model and our simulated model. One of the data collectors was in charge of managing the whole process of the project.

The evolution process of our model was a gradual one. As Vennix suggested in 1996, we developed a Preliminary model to comprehend the issue in the first step. (Figure 2) Based on data gathered through documents and interviews, the modelers started modeling

separately. On a regular basis the modelers discuss each other to unite the model with the help of the modeling supervisor and also they determine the necessary data for next step.

We involved the client, the chief marketing officer, by meeting him on a regular basis, and also we sought to involve other stakeholders in the client organization including chief sales officer and chief sales planning officer.

In our experience of involving the client, we faced an important issue. The main stakeholders of this project were high level management personnel which had a tight working schedule. Though they were interested in the project, they did not have enough time to participate in the modeling process and sometimes this issue hinders our progress. On the one hand we needed their information to progress, it was them who had meaningful insights about the variables we were dealing with, but on the other hand we needed their confirmation of the constructed model to that date. The confirmation of the constructed model was an influential point because of its effect on the acceptance of and commitment to the final results of the project. Also it was in these sessions that we could simulate different scenarios that our client considered and show him the outcome of managerial decisions.

Another issue that we faced was the resistance of some stakeholders like car dealers, who speculated that our project would have negative effects on their income. To alleviate this issue we tried to build trust with them and avoid direct questions.

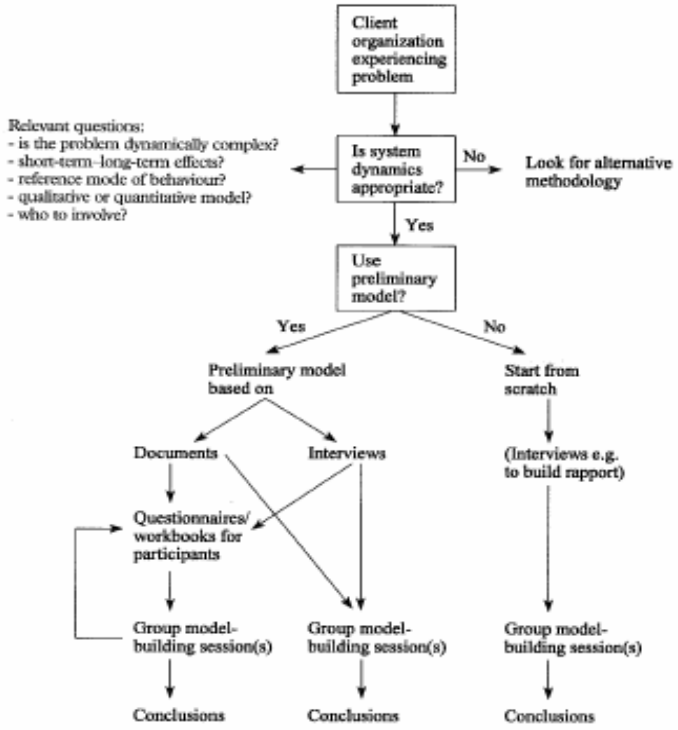

Figure 2: Group Model Building Framework (Vennix 1996)

Model Structure

Our client, Mahdi Ghasemi mentioned that some speculators in the market take special advantage by buying cars in low prices through some sales methods of IKCO and selling them in higher prices. Additionally a number of our interviewees hypothesized that "market prices would fall after Wholesales happen". But there was no consensus about this proposition among managers.

As we discussed in previous part, after first meeting with our client in which he outlined the problem, we used the simple supply-demand model, introduced by Sterman, to build our dynamic hypothesis.

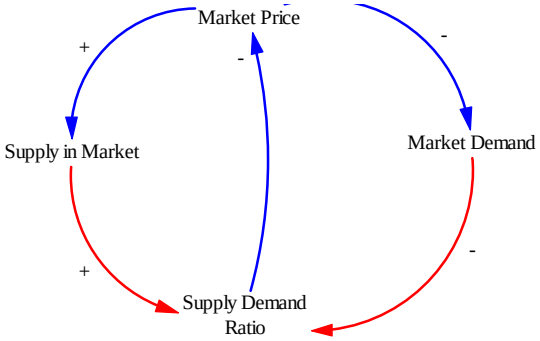

Figure 3: Basic Supply-Demand Model used as preliminary model

We realized that however IKCO dealers were the only formal distributors of products of this company but some other automobile galleries and unofficial intermediaries re-sale the products of IKCO to the end-users. There are some good reasons why consumers may prefer to purchase from these intermediaries. While one who desired to buy a car from IKCO dealers should wait for an average of 20 days to receive his/her car he could receive his car immediately and get rid of formal and time consuming processes required for purchasing form dealers of IKCO. Additionally, one could inspect the car before deciding to buy it. Moreover, surprisingly in some cases the prices which are proposed by unofficial intermediaries were lower than IKCO official prices due to the fact that they wanted to change their cars into cash as soon as possible. Regarding their cash volume, each of these unofficial intermediaries may behave differently in the same market situation and there was not any precise information available about their behavior. As a result of mentioned conditions we were facing a complex problem in our modeling. To face such problem, we chose the market price of a specific type of car (Samand) as our main reference mode to investigate its fluctuations.

Dynamic Hypothesis

As it is shown in the figure 4 , when the company became underfunded, it lapse into discount sales like Wholesale or sizeable discount on Presell, specially Wholesales which increase sale's amount instantly and solve the problem in short run.

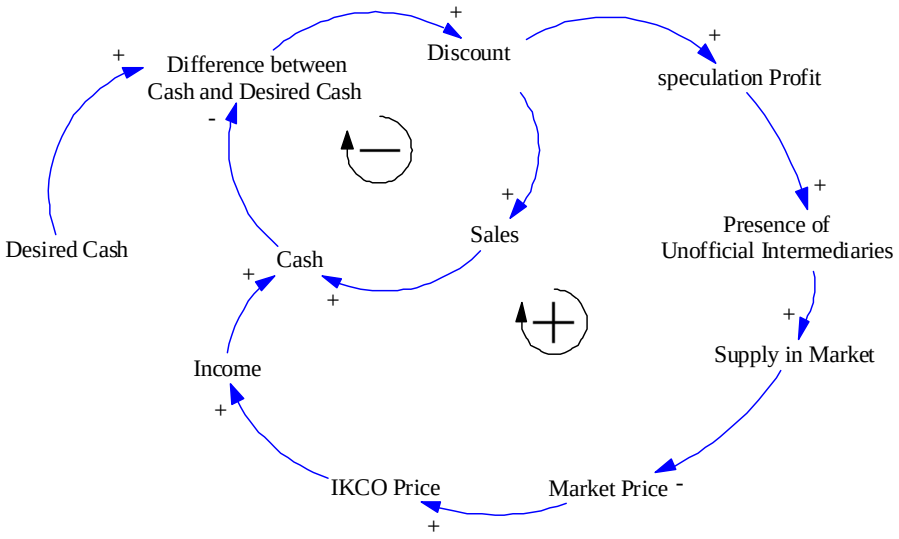

Figure 4: preliminary causal diagram

But in the long run, because of the significant profit margin in speculation, the number of speculators in automotive market would increase. This leads to an increase in supply of the market which affects the automotive market prices. The fall in market price in turn decreases IKCO official prices which are incurred with economical, social and political pressures. This leads to a period of low prices and hence a decrease in income and cash flow of the company. Based on this hypothesis, we began to build our stock and flow model to simulate the market behavior and illuminate the outcomes of this policy.

Stock and Flow diagram

For building the model, we sought to consider all determinants of supply and demand of the market, though we did not consider event based changes such as seasonal changes in demand in our model because we wanted to find out the dynamics behind these fluctuations. Our findings showed supply of the market is provided with two sources:

1. Presell: Our statistical studies showed that 50 percent of customers who have bought car through Presell method were not end-users; they were investors who preferred to keep time value of their money through this way instead of putting their money in bank deposits, because of the higher interest rate proposed by IKCO. Also fluctuation of price and discounts of IKCO encourage individual investors to participate in these programs.

2. Wholesales: As discussed in previous section, some people buy a huge number of cars from IKCO, taking advantage of sizeable discounts. But these dealers want their money back quickly, so they will resell the cars to the car traders with lower fares than the market prices.

In Figure 5 core part of stock-flow diagram is presented. Due to confidential issues and also the complexity of the entire model, here we just demonstrate a narrow part of our stock and flow diagram.

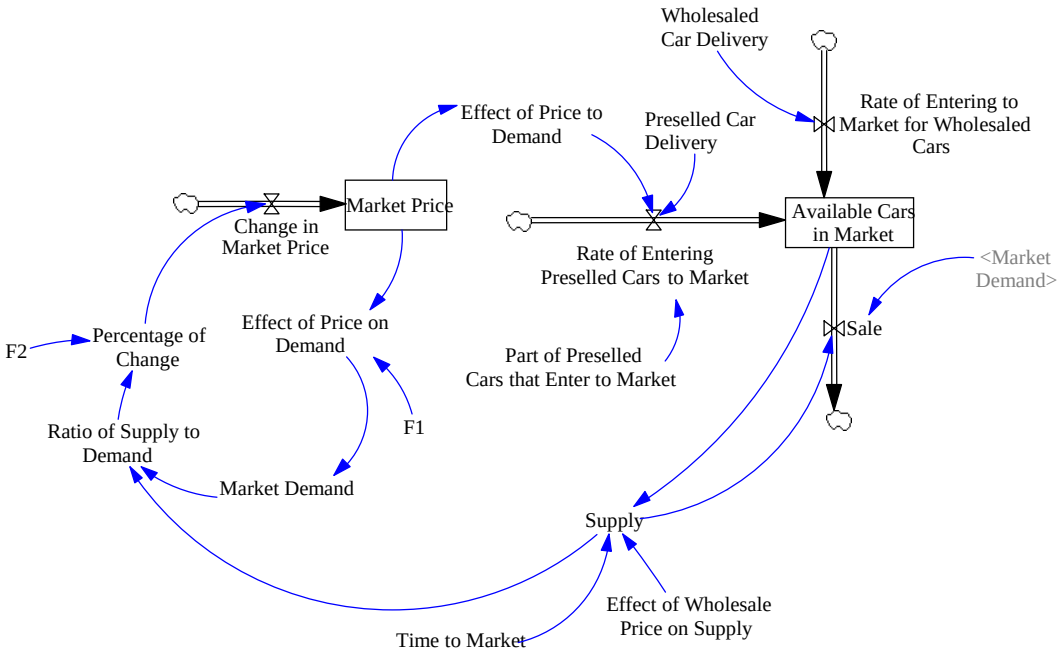

Figure 5: part of stock and flow model

Simulation results

Initially, we assumed that market demand and supply are equal and market is in equilibrium. In the next step we simulate the effect of IKCO managers' decision to Wholesale x-thousand automobiles in a short period of time. Supply-Demand Ratio in the market behaves as shown in figure 6.

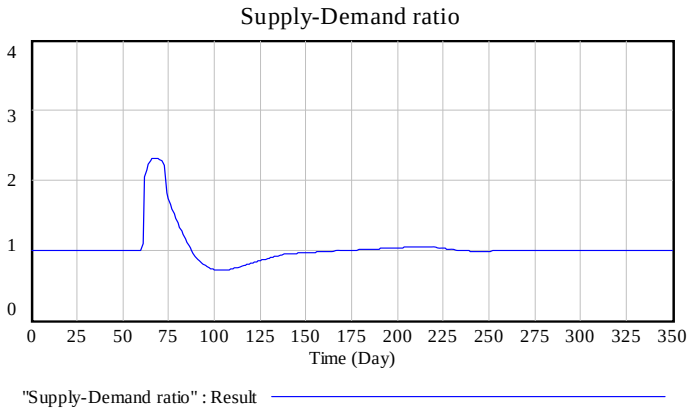

Figure 6

In figure 7, it is clear that the Market price has decreased in the first days next to executing the Wholesaling policy. This effect continues for 30-60 days after this policy.

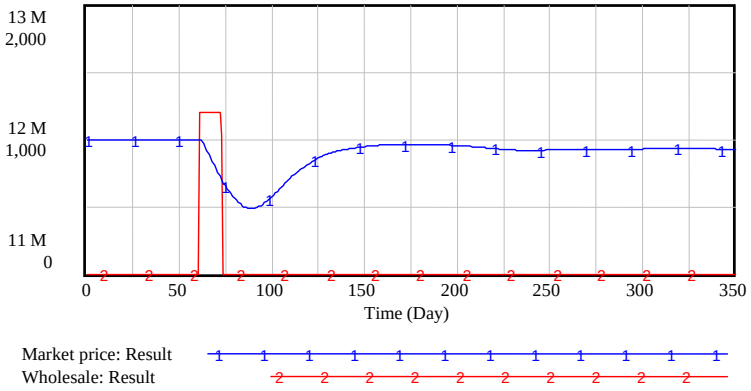

Figure 7

Practically, this policy will not be implemented only once and the company would Wholesale many automobiles in consecutive periods of time, in fact whenever it became underfunded. Figure 8 shows the effect of consecutive Wholesaling on market price.

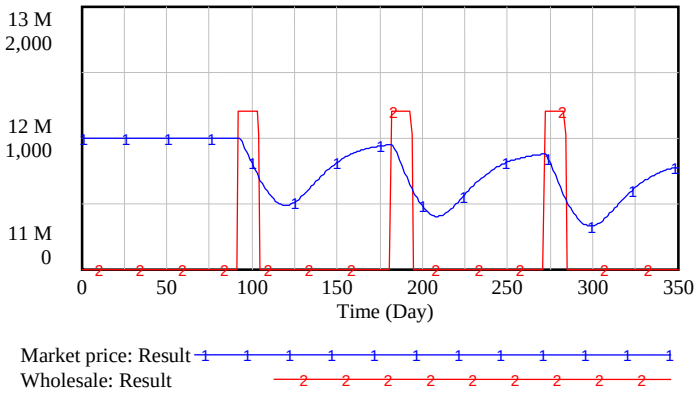

Figure 8

According to figure 8, prices would decrease gradually along time because customers' perception of price which is an average of previous market prices would decline continuously because of periodical decreases in price. This issue is shown in figure 9.

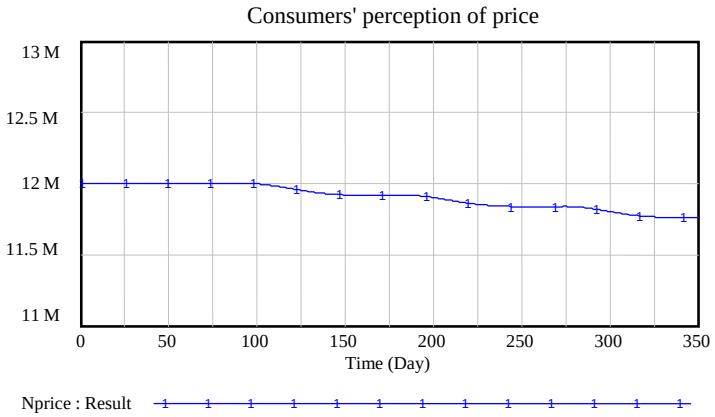

Figure 9

As a result, the gap between accumulated profit of the the company and its desired amount will increase gradually in long term.

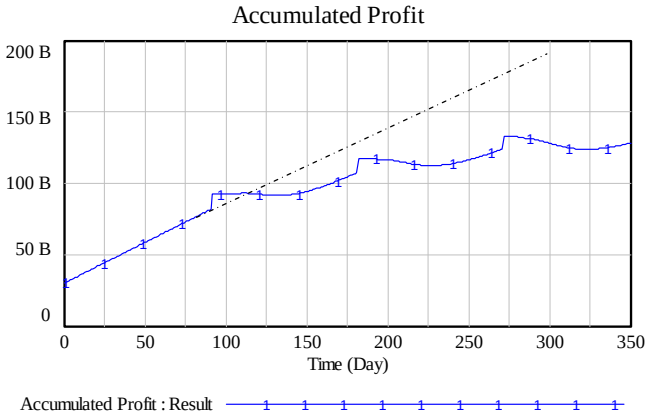

Figure 10

Model Validation

As a part of our model validation we examined relationship between the number of wholesaled cars and automobile prices in a one year period. In figure 11, Samand's price change versus number of Wholesaled cars is presented. Negative relationship between these two variables supported our hypothesis.

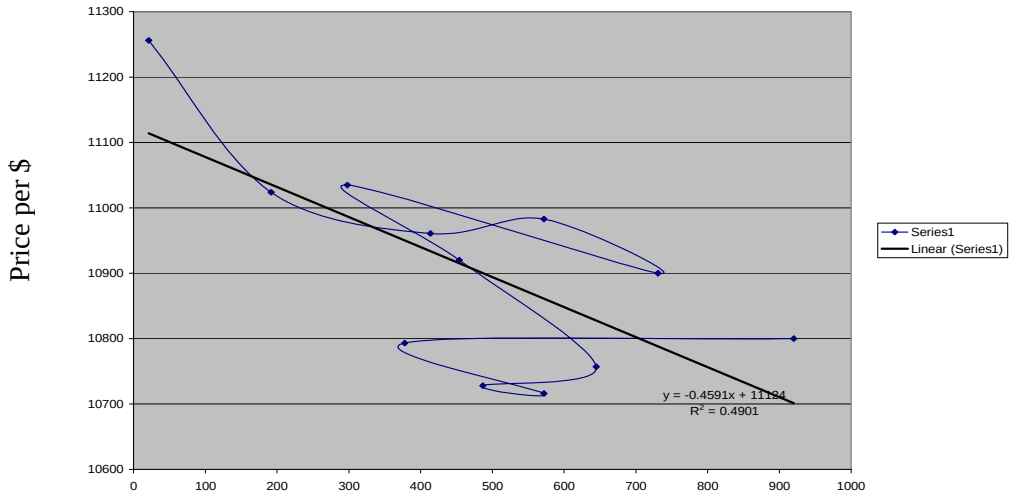

Figure 11

Putting it into system archetypes

Finally for presenting our model to IKCO managers and giving them an insight about what was happening in the market, we mapped our model to “Shifting the Burden” archetype.

IKCO incompetence in selling its products made it underfunded. In response to need for immediate resolution of this trouble, discount sales would be used. But the “Fundamental Problem” was the misfit between production and demand. In fact wrong estimations of demand for each type of product led to such imbalance but the latent point was that this "Symptomatic solution" deteriorated future estimations.

First, selling of low demanded products below official prices led to the wrong impression about demand for these products and it would mislead managers in estimating the demand.

Second, affording sizeable discounts would encourage speculators activity in automotive market. The presence of these unofficial intermediaries (speculators) would result in a more confused market in two ways. One is that the demand of speculators is influenced by many external factors like return on investment which made the demand more chaotic and in fact it is a lot different from end-users' demand. And the other is that, these speculators may buy types of cars that they predict noticeable increase in demand in future months. Suppose all of the speculators behave the same way, it is obvious that totally this behavior leads to misfit between supply and demand of that type of car; consequently some of them will cancel their orders. This cancellation will interrupt IKCO plans.

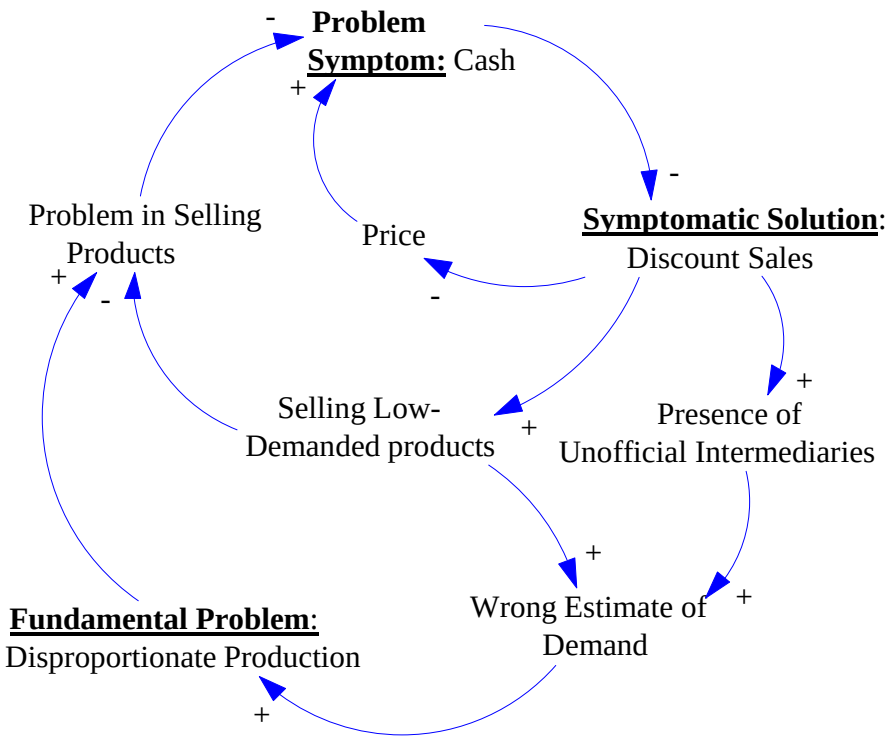

Figure 12- "Shifting the Burden"

Outcome for IKCO

The change of attitude of IKCO managers toward sales methods especially Presale and Wholesale was the most significant outcome of this project. Several changes took place in the company because of this change of attitude. First of all, shares of Wholesale and Presale was reduced in the portfolio of IKCO sales methods. However these sales methods constituted more than 70 percent of the IKCO income, their prominence gradually reduced. Second, simulation results urged our client to define a new project on designing a proper sales channel and revising the kind of relationship between the company and its dealers (albeit it was not a system dynamics problem). We recommended that the company should utilize other sales methods which could communicate with end-users directly and should revise its yearly sales plans. Insisting on previous plans (for each of sales method) would affect negatively on total sales of company and its profit margin. Considering our recommendation, our client, chief marketing officer of IKCO, decided to eliminate Wholesale from IKCO sales method, although his policy was partially accepted by one of the higher rank executives which in fact hindered its immediate implementation.

Conclusion

In this research, using system dynamics modeling, we developed a model to investigate the effects of sales policies of IKCO on price fluctuations of its products. These policies reduced the prices which were perceived by customers and also the market prices in the long run. As we discussed some sales methods such as Wholesale and Presell compared to other sales methods deliver a negligible profit margin, additionally, they affect market prices and consequently total company profit margin negatively. We concluded that IKCO sales policies resulted in presence of speculator in automotive market, misfit between supply and demand for IKCO products and consequently price fluctuations. There is a mutual relationship between presence of speculators in the market and price fluctuation which reinforces each other, so implementing sales policies that moderate presence of speculators in the automotive market would ameliorate the situation.

Some general conclusions could be concluded from this model, too. First, in designing sale policies we have to consider intermediaries to be wise entities that want to maximize their profits. Second, the real demand for each product is different from number of orders for that product. This case showed that how assuming these two concepts together would lead to misfit between supply and demand and its consequences.

There were some limitations in using the results of this research. First, we used questionnaires to find out the quantities of constants and variables we employed in our model, our look up functions such as effect of price on demand or supply of market were based on these questionnaires. We asked people such as IKCO managers, IKCO agents, intermediaries and customers to fill in them. We used questionnaires because we did not have enough data to compute these variables. Next, we extracted event based sources of price fluctuations such as seasonal changes in demand. We realized that adding these event based sources facilitated presenting and communicating the model to our client and reduced the resistance to accept the results, the reason was that adding these event based sources made the results closer to perception of managers from price fluctuations.

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