

A Dynamic Feedback Model for Strategic Management of an Insurance Company

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A system dynamics model is developed for an insurance company to answer some strategic managerial questions. These questions are mostly related to the dynamic growth pattern of the company which tended to stagnate in recent years. After carrying out extensive business and parameter analysis, a simulation model was developed to answer the strategic questions. The model also offers the managers of the company an opportunity to perform various strategic experiments.

1. Introduction

The insurance company (Halk Sigorta T.A.P.) that we carried out the management consultancy project for, deals with the elementary insurance branches (branches other than life and health insurances) and is one of the sixth biggest insurance companies of Turkey in terms of total premium revenues. Like most other elementary insurance companies, about 80 per cent of its revenues are obtained from accident and fire policies.

The company functions countrywide in five regional divisions. The central division which is located in Ýstanbul, underwrites about 45 per cent of policies. Ninety per cent of policy underwritings of the company are performed by agencies which are about 500 in number, whereas the remaining 10 per cent is performed directly by the personnel of the company.

Two major strategic management questions that we were expected to answer were the stagnation / decline in the growth pattern of the company and the continuous demand by various departments for hiring additional employees, in spite of this trend.

2. Model Structure

In the first two months of the 12-month project, the company and the insurance sector are analyzed thoroughly to decide on the basic structure of the simulation model. One key decision arrived at the end of this phase was to model the company in two parts: Ýstanbul (central region) and Regions (other regional divisions). Ýstanbul and Regions perform almost equally in terms of total number of policies and premiums. Another decision was to take the simulation time unit as one month. The model was built as a discrete one, so that the simulation step was also fixed at one month.

The company is modeled into 10 major sectors some of which are similar structurally: *Ýstanbul Accident*, *Ýstanbul Fire*, *Ýstanbul Claims*, *Ýstanbul Agencies*, *Regions Accident*, *Regions Fire*, *Regions Claims*, *Regions Agencies*, *Marketing* and *Finance*. Accident, Fire, Claims and Agencies sectors of Ýstanbul and Regions are very similar in structure with differing parameters.

Accident and Fire sectors are the parts of the model where policy underwriting takes place. Since the 90 per cent of underwritings are performed by the agencies, agency productivity seems to be the most important parameter for new policies. The number of agencies as well as their productivity mostly determine the business volume of the company. In figure 1, the broad causal loop diagram of these structures is shown.

Some parameters or structures such as market expansion rate, market saturation level, agency commission rate, price and marketing expenditures that affect agency productivity are handled in the *Marketing sector*.

The structures determining the dynamics of the number of agencies are tackled with in the *Agencies sectors*. In these sectors, the agency opening and closing decisions are made dependent on sales volume or profitability of the company and the ratio of agencies / employee. Tersly stated, as the agencies per employee ratio decreases or the profitability of the company increases, the model opens new agencies. This means that, for new agencies to open, the company must not only be profitable enough, but it must also have enough employees to provide a minimum service needed by the agencies.

In *Claims sectors*, the structure of claims files generation as a function of the total active policies and the processing rates of these claims and payments are handled.

The monetary aspects of polices and claims are the handled in the *Finance sector*. The premium revenues and claim payments of accident and fire policies are calculated in this sector. Also, the other insurance branches such as *transportation*, *agriculture* and *engineering* are treated here as simple percentages of accident and fire policies. See figure 1 for a very rough structure of the calculation of "technical" profit of the company.

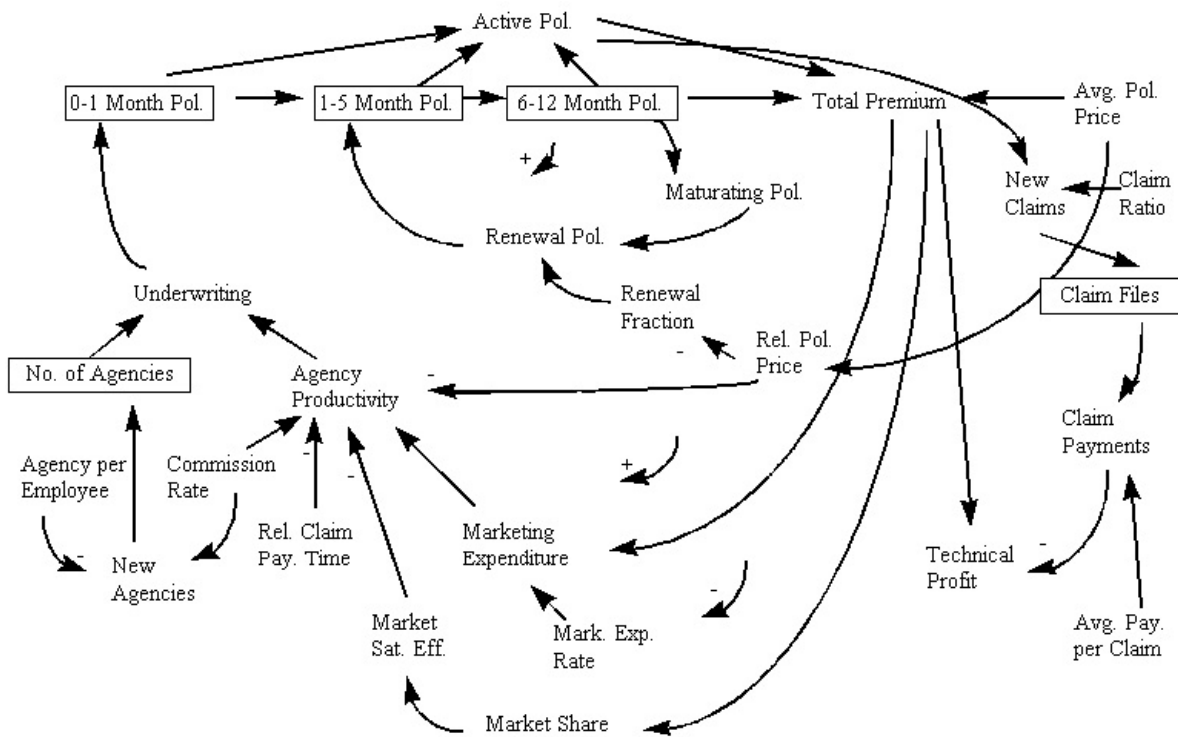


Figure 1. Broad Generic Structures of the Insurance Model

1. Validation, Experimentation and Results

The validation of the model is carried out using the real data of seven years from the beginning of 1989 to the end of 1995, by employing different validation techniques. After redefining and estimating some parameters many times, a model is obtained which reflects the real system dynamics fairly well. Since the validation process is beyond the scope of this short paper, we do not go into any detail.

Some experimentations were carried out using the validated model and the findings were submitted to the company as a final report. To say a few words about the major conclusions: The declining trend in some branches of the company seemed to start recovering in the last year according to the model and indeed, it happened to be the real situation too. Simulation experiments showed hints as to what factors have caused stagnation / decline and how to avoid a similar decline in the future. The demand for additional employees was discovered to be partly because of the steady increase in the number of people in the upper part of the hierarchical pyramid, which has reduced the number of people to do regular daily work. It has been observed that, to keep a substantial growth, either the agency productivity and / or number of agencies should be increased which is not an easy task or other sales methods such as "direct sales" (sales through Internet or ATM machines) should be utilized. Also, ways to increase the renewal rate which is about 60 per cent for the moment, should be sought.

Finally, more important than the experimentations that we carried out for them, the company authorities have received the model, on which they plan to try out their own ideas and see the results. That is, they have acquired a tool with the help of which they can take the first step to being a "learning organization".

References

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