A SYSTEM DYNAMICS MODEL OF DEVELOPMENT AND BUSINESS STRATEGY IN THE TAIWAN LIFE INSURANCE INDUSTRY

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Introduction

In this paper, we apply a system dynamics model to understand the structure of the development system, and the interaction between regulation policy and business strategy, of the life insurance industry in Taiwan. Life insurance industry development is a complex dynamic process. Building a life company requires long-term accumulations of capital, technology, and human resources, among other factors. A life insurance company also needs to face the accelerated change of its environment, such as the technological revolution, the demographic shift, and the competition in the market for financial services (Cummins and Santomero, 1999). Moreover, government policies heavily affect the business strategy decision of a life insurer[1]. The literature, including theoretical models, explores various topics of the Taiwan life industry market. Although those models are useful to describe each topic, they do not comprehensively describe the dynamic interactions between the industry and its socioeconomic environment. Therefore, in this paper, we adopt the concept of system dynamics to explore the history of the Taiwan insurance industry, and to discuss the problem and strategy they faced.

Over the past two decades, the insurance industry has grown rapidly as economic developments took place. Government policy has gradually shifted into an open type of system, which enhanced competition among firms. Moreover, under the influence of economic, social, regulatory, and consumer pattern changes, life insurance companies are now confronted with greater problems and challenges. In this context, the first phenom-

[1]There are many licensing, agent, solvency, and investment regulations.

enon observed is that 50% of the new company operators have chosen to exit the life insurance market, including both foreign firms and local firms. This shows how difficult it is for life insurance companies to stay in business. The second phenomenon is that the life insurance products have undergone major changes in the recent five years. The 2007 new contract statistical data shows that income from investment type of insurance has taken up about 50% of the market ratio ($250 billion). We aim to discuss the effects it has on the future asset and liability management of insurance companies, and the effects it has on consumers as a whole. The third phenomenon observed is the change in channel strategy. Many insurance companies have given up on sales person approaches and have actively turned to bancassurance channels whose premium income now takes up about 40% of the total market share. Numerous data results show that banking insurance channels help cut costs. But do low-cost channels necessary bring about beneficial results to each and every insurance company? Are all insurance companies suited to bancassurance approaches? What effects do they have on the general consumers? The fourth phenomenon is that it is found in balance sheets that the major income source of insurance companies comes from financial income. Apparently, business expenditure have always outweighed business income. What effect does this finding have on insurance companies in the future?

The above phenomena and problems will determine the business strategies, and future developments of insurance companies. The phenomena and problems are caused by various complex and dynamic factors. Since these factors are interrelated, and have cause-effect relationships, they are dependent on one another. Therefore, in this study, literature is collected to construct a business development model for insurance companies. Through the effects of system dynamics, plus external and internal insurance company business features, observations will be made comprehensively to identify problems related to business operations. The implicit structural factors of these phenomena will also be found. Furthermore, predictions will be made on possible future challenges and problems related to business operations, which can serve as reference for the management and decision-making of insurance companies in the future.

System Dynamics

System dynamics is a methodology developed by Forrester et.al. in the 1950s. It is the study of internal information feedback features inside the system. A model is used to improve the organizational structure, and policy setup. This method is frequently used to study organization or company system dynamics and features. It is also extensively applied in studies related to industries. The establishment of the cause-loop model of industrial development structures helps in conducting research, and setup policies. In system dynamics, it is believed that system structure is the main reason that affects

system behaviors. The main components required to operate the system (such as manpower, capital, machinery, material, and information) are regarded as flow. Different 'flows' then stride across the boundaries among systems to integrate system operations. The system dynamics model is established to analyze the information feedback process inside the organization. Based on the interactions, the cause-loop model is established. Finally, the system dynamic behaviors are displayed through simulations. The effects of policies and delay can also be tested to determine how they affect system behaviors.

In terms of validity of the model, system dynamics views the validation model from a teleological theory perspective. The system structure is used to present the features of the entire system behaviors. From the structures, the point of policy intervention is searched in order to assist in decision-making and model user decision-making to achieve their purposes. In other words, the purpose of system dynamics not only predicts a specific event, or the size of a specific numerical value, it also enhances the model constructor's understanding of the real world. The scenario simulation process and results will in turn enhance the 'confidence level' of the decision-maker. Forrester and Senge believe that the validity of the system dynamics model is assessed from three aspects, namely:

1. the credibility of the model structures;
2. the similarity between the model behaviors and that of the real world;
3. the help the model renders and the effects it has on policy analysis.

Industrial development is a complex and dynamic process. Through discussions on the industrial system structures, the interdependent cause-effect relationships among variables during the industrial development process can be better defined. They also help derive more intrinsic system operation discussions, and better policy leverage. The system structures behind the complex dynamic industrial development system can be explored by applying system dynamics from the integral system perspective.

Characteristics of Insurance Industry Development

General Characteristics

Government Regulation

Insurance performs the function of protecting the economy and ensuring safe living. It possesses high public exposure; therefore, governments around the world implement control and monitor the insurance sector. Although such control and monitoring varies in intensity, governments generally place great importance on it. The reason for this is because insurance contracts are a type of aleatory contract. An insurer is a company selling the insurance by providing an indemnity following an accidental event. The pos-

sibility of such accidental event ever occuring is negligible. In other words, there is a great disparity between the premium paid by the insured, and the indemnity paid by the insurer. Therefore, it possesses the feature of inequality of values to be exchanged In addition, insurance contracts possess the feature of contract of adhesion. Both parties by agreement to the contract show obvious contrasts in strengths in terms of information acquisition and professional knowledge. Thus, with regard to insurance business conduct, regulatory authorities tend to implement strict monitoring of insurance proprietors.

The insurance sector, the "people" sector

Business conduct in the insurance sector is unlike other industries that require a physical element such as factories, equipment, machinery, and raw materials for the production of tangible assets and goods; instead, it requires "people" to achieve performance. In addition to general leadership, innovation, and business ideals of firms, it relies on the active involvement of sales persons to recruit clients from outside, and provides intangible services. The intangible services are mostly provided to make sure that consumers' expectations are the same as the actual services received. Therefore, the commodity features, contents, and company processes in the insurance sector are crucial in conveying messages to consumers. A sales person plays an important role as the messenger. An insurance company is a corporate body but it requires planning and business management by people. Moreover, professionals in the area are essential. There are qualification requirements for insurance underwriters, claim adjusters, actuarial specialists, financial analyzers, accountants, and auditors. Particularly, it needs certified actuarial specialists, underwriters, and claim adjusters with licenses. Insurance companies are required to hire these types of professionals before they are allowed to start business. Therefore, the most important intangible asset of the insurance sector is "people". This "people" asset is considered as the most important factor that determines the quality of insurance business operations.

High social and public importance

Insurance is a type of financing for the majority of people. The insurance design, capital use, and bonus distribution take into consideration the benefits and demands of all participants. As a result, insurance possesses high concern and social importance, and the use of capital, underwriting, indemnification, and advertising are based on these two factors.

Difficulties in trading

Under government control, procedures and operations must be observed in the application filing for the start and closure of a business. At the beginning of the application filing to establish an insurance company, the minimum capital, responsible person qualification, and staff review or even economic environment, branded market, and interna-

tionalization level, all influence industry developments. Therefore, license issue/cancellation, and insurance policy wording and premium rating setup should be duly approved and undergo financial and business checks. The insurance sector, even under strict government control in times of financial constraints, is unlike other firms that are autonomous.

Business Characteristics

The cost of life insurance is determined by the future and relies on precise estimations

The total cost of physical products can be computed from manufacture, sales, and management expenses during trading. At the time of trading, the product profitability and loss are already determined. However, life insurance is unlike such products. At the time of trading (i.e. at the time of signing the insurance contract), the premium collected is fixed, but the cost cannot be predicted before the insurance policy expires. Thus, the cost is determined by many uncertain factors of the future. Therefore, during insurance policy design, future scenarios must be precisely estimated to determine the premium rate. Normally, it is computed by hypothesizing that factors which determine the cost are not significantly different from past trends. The three factors that determine the cost of the life insurance policy include the mortality rate, tentative interest rate, and additional expenditures. They are merely estimated values; they cannot be precisely ascertained in advance.

The profit /loss of life insurance is greatly affected by capital profit/loss

Premium is the main source of income for life insurance. It is also the starting point of life insurance business start-ups, and the main source of financing. However, premium collections are "net values" while the future indemnity liabilities of the insurer are "gross values". Premium computations include interest bearing for the financers (insured parties). Therefore, as premiums are collected (capital inflow), the business operators not only shoulder liabilities distributed in the future, the indemnities for the financers (interest bearing is deducted) must be put to good use after they are collected in order to maximize profits before they are distributed. A portion of the profits made is returned to the financers in the form of interest bearing while the rest is used to increase business profits. Capital use, therefore, is one of the main business items. Income from capital use is one of the important ways to create revenue, and has great effects on the profit/loss of the insurance sector. It differs from other firms that regard investment revenue as income outside business operations.

Continual business scale expansion

Sustainable insurance system operations observe the law of large numbers. Due to requirements of the law of large numbers, participants continue to increase in number. Since more and more targets are becoming available every year, the business scale con-

tinues to expand. Conversely, without large-scale insurance business operations, risks will not be distributed, and business stability will be put to the test. Life insurance policies are long-term, and new business undertaken may be valid for years to become the valid contract group. In time, the new contracts and old contracts form a large business and the business scale expands.

Life insurances accumulate capital; operators should focus on business and finance

Life insurance service provisions are often for 20-30 years. Indemnities are often paid toward the later part of the contract period or on the contract expiry day. For this reason, premiums collected in the earlier part of the contract period should be listed as liability reserves for future contract indemnification use. During the long contract period, insurance companies are able to rapidly accumulate large sums of capital for long-term use. The liability reserve falls under the liability category. It plays an extremely important role in the financial structure of the life insurance business. The liability reserve of operators that have been in the business for some time takes up over 95% of the total liabilities and net assets. It therefore is of great importance. Insurance operators should therefore ensure the safety, liquidity, profitability, and public benefits of the capital in addition to efficient business operations.

The higher the number of new business contracts, the higher the loss will be for the particular year. Coordinated operations are therefore necessary

The annual income from life insurance premiums is based on level premium collections. In other words, the same amount of premium is collected yearly. However, in the first year the insurance contract takes effect, expenditures including commissions (a high percentage), medical examination fees, and receipt fees are costly. Generally speaking, for every $100 received, the expenditures may be as high as $140 in the first year of the insurance policy. Therefore, the insurance contract renewal rate should be increased to ensure adequate premium collection in subsequent years. The capital collected should be put to effective use to obtain maximum investment income, and make up for the loss incurred from new contracts.

The selection of risks is essential

Insurers have different motives for signing the insurance contract. In order to attain business stability, and achieve performance, insurance companies must classify the insured. The insured should be categorized according to level of risk. The insurer should decide different rates depending on the risk size so as to observe the fairness of the contract. This selection of risks process is "underwriting". Without underwriting, risks will be gradually eliminated to produce the so-called adverse selection. The outcome of this is that the actual accidental events will exceed anticipated accidental events, and the premium rate will have to increase. The insurance business operations will be trapped in a vicious cycle. Furthermore, the selection of risks also performs the function of pre-

venting moral hazards. It will prevent insurance fraud. It is indispensable in commercial insurance operations unlike other types of firms that prioritize customers and reject none.

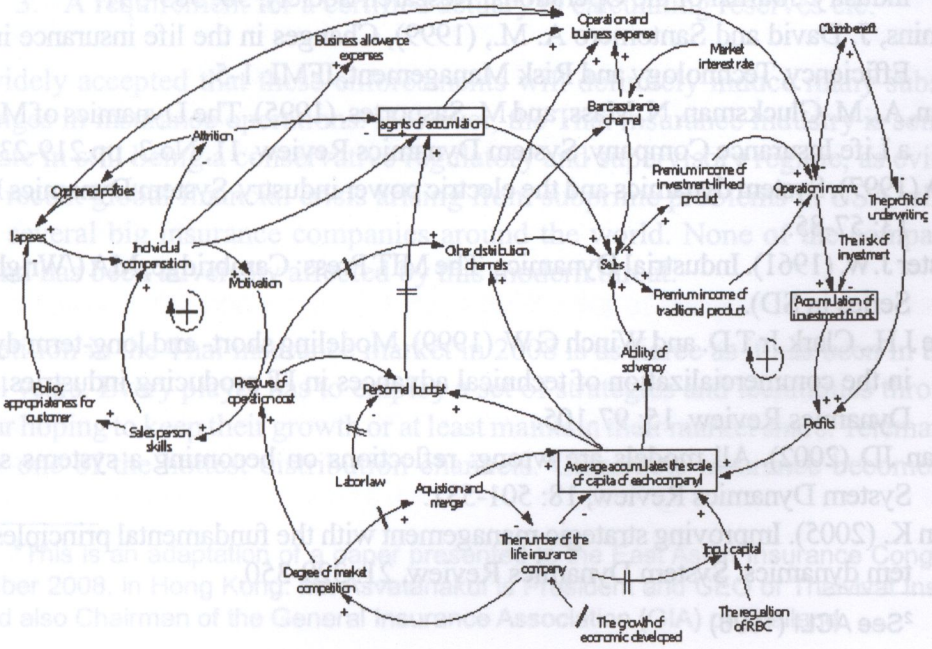
Recent Development of the Insurance Industry in Taiwan

The life insurance market of Taiwan continued its premium growth in the first half-year of 2008 Most of the revenue growth came from new business. In terms of product market share, a tripartite division of investment-linked product, annuity, and traditional life insurance was no longer the case in 2008 due to the ascent of short-term endowment and the descent of interest-sensitive annuity.

The overall profit of the life industry in Taiwan in the first six months only attained NT$ 2.5 bn. Major portion of the profit came from investment instead of underwriting. The profit was much less than recorded in 2007 because the rise of short-term endowment augmented reserve requirements, and the hedge cost for the expanded foreign investment doubled due to unfavorable currency exchange risk.

Modeling

From the issues mentioned, the following model is proposed:



Conclusion

The past several decades have been a tine of fundamental change in terms of the environment that is facing firms in this industry, the expectations of its customers, and an ever-shifting product line, including substantial proliferation and innovations in product offerings. In addition, the recent view is that to be successful, you must be big. This perspective is not alien to the life insurance industry, which has seen its share of consolidation in the past few years. The number of life insurers in the United States decreased by 25% between 1989 and 1995[2]. Financial holding companies will be a force to be reckoned with in the areas of insurance, commercial banking, and investment trusts/companies. These multi-headed financial beasts are new and strange to the Taiwan financial landscape.

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[2]See ACLI (1996)