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# A Model of Structural Oscillation of Conflict Goals

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## Abstract

About the research on structural oscillation, we tried to work from a slightly different angle. Although a large number of studies have been made on, little is known that put conflict goal and second-order system together. This paper is intended as an investigation of the oscillation model. The point about this model is “Success to Successful” archetype, and central to this issue is the problem of “nothing grows forever.” It might cause oscillation due to limited time resource. We have chosen an example about the conflict of work and family to illustrate this model. These results lead to transform the conflict goals model into a generic model. We may go on from this to the conclusion that we must be aware of warning variable and then we present the two solutions. First, we must understand what we really want to do and consider the priority. Second, we must change the measurements of performance in the organizations. So the conflict goals can help us leading into reflections.

**Keywords: Structural Oscillation, Systems Thinking, System Dynamics, Systems Archetype**

## Introduction

The pendulum sway again and again, and this is the most frequent oscillation in our daily life. The economy declines after growing and vice versa. This is so called “the oscillation in economy”. Oscillation occurs not only in Nature, but also in our society. Oscillation in our society, from personal and household to organizational and social domain, happens around us all the time.

People make lots of efforts to learn, accommodate, and exist in the world to confront with the diversity. People may ask why the results return to the beginning while we try hard to change the things. Have you ever thought about what you really want, when you get used to the present situation? (Young, 1994) Time becomes a restricted factor, when we have diverse choices. It forces us to make decisions and

focus on efficiency involuntarily, also makes our life full of oscillation. Even so, people seldom think about the reason of oscillation, and how to get out of it to create what they truly want.

We human beings always face a very confusing problem—the situation is that the same problem will come back again all the time. The go-and-come behavior we call it oscillation behavior. The motivation of the study is trying to understand oscillation behavior. We focus on the discussion of the structure facet. We want to discuss that what kinds of structures will cause the oscillation behavior. The oscillation behavior can occur not only in enterprises but also in individuals and families. Sometimes the oscillation behavior can't be fatal, but it always brings people trouble. In addition, you even can't feel the existence of the oscillation behavior if you don't understand it. Just like a boiled frog, even though you know about the situation, you can do nothing about it. In other word, it is very easy to know but difficult to do.

## Understanding the oscillation behavior from the systemic views

In order to understand the causes of oscillation behavior, we undertake a study from the systemic view. Why we want to know such of things from the systemic view? It is because we must look beyond personalities and events. We must look into the underlying structures, which shape individual actions and create the conditions where types of events become likely (Senge, 19904). As Donella Meadows (1982) expresses it: A truly profound and different insight is the way you begin to see that the system causes its own behavior.

The thought of event make us to see the problems partially. If we observe the problems with this viewpoint, we couldn't see very clear the whole. We couldn't understand the whole story, if we look into such of things from a point of view of event, and we couldn't understand, in the same way, from a point of view of pattern. The purpose of this paper is to explain an oscillation model through the approach of system dynamics.

As for the phenomenon of oscillation, we will propose the hypotheses and simulate it. System dynamics is a strategy to solve such problem. It emphasizes to analyze from underline structure, and takes event into account. At the same time, patterns become a hint to find the structure, and we will pay attention to construct the underline structure. Finally, we could put an end to the problem from structure.

## The Behavior and Structure of Oscillation Model

The patterns of oscillation model are basically oscillatory with time. If there is a principle part at this model, it will oscillate by itself. If there are over two principle parts, it will oscillate with interrelation and appear someone fall and someone raise.

Systems thinking or system dynamics investigate about oscillation behavior. The basic result of cause is balancing feedback with delay. Balancing feedback loop with delay usually result oscillation. Balancing feedback loop with delay could let us to be overstrict in correcting mistakes. This is why it causes such instable result, when we might be in a delay system, and act very positive or impatient. People who had played

the beer game might know that production and marketing system causes the phenomenon of oscillation at inventory. In the each role of the beer game, players try the best of their ability to eliminate the oscillation. But the overwhelming majority of players failed in everything they tried. They didn't know basically the causes of the oscillation (Senge, 1990).

Certainly, the oscillation model is not only just a kind. There are other oscillation models such as escalation, fixes that fail, predator and prey system (second-order system), structural conflict, etc. Different oscillation behaviors cause from diverse model and dominant feedback loop. This paper will explore the oscillation model of goal conflict. The idea which we so-called goal conflict originates in the concepts of Robert Fritz and second-order system. What is structure? According to Fritz's (1999) definition:

> Structure is an entity (such as an organization) made up of individual elements or parts (such as people, resources, aspirations, values, market trends, levels of competence, reward systems, departmental mandates, capital, workload/capacity relationships, and so on) that impact each other by the relationships they form.

In there, Fritz argues the structure, which is structure dynamics. People might appear repeated and oscillatory behavior with goal conflict. If we want to comprehend the oscillation behavior, we have to study from the aspect of structure and investigate why the behavior could oscillate. The reason that causes oscillation is structure, and the real reason that produces the structure is limited time. Now that time resource is limited. We have made a hard choice to accept or reject. There is a very important problem in this process: what do we really want to do. Once we do not know this idea, the problem will take place repeatedly.

## Structural Conflict

The reason of structural conflict is produced due to two parties with a conflict of interests. That is to say, one's situation affects the other, which causes conflict. On the contrary the former situation also affect the latter. We can see these two persons are interdependent. Conflict is usually composed of two balancing feedback loop systems. These two balancing feedback loop systems pull and drag each other. They will dominate the force of the whole system.

Fritz mentions that the reason why the structure conflict occurs is that a result creates a tension between the expected goal and the current reality. When tension-resolution systems are connected to other tension resolution systems, they may compete with each other. In that kind of structure you have a conflict of tendencies. As one tension-resolution system moves toward resolution, the other tension-resolution system moves toward even more tension. Once the tension in the second system is higher than the tension in the first, the structure moves toward resolving the second system. But this will increase the tension in the first system. This structure will lead to oscillation because of the competing tension-resolution systems. (Fritz, 1989)

First-order negative feedback system

About the structural conflict, Fritz (1989) uses a metaphor to describe how

contradictory underlying beliefs work as a system, counter to achieving our goals. Imagine as you move toward your goal, there is a rubber band, symbolizing creative tension, pulling you in the desired direction. But imagine also a second rubber band, anchored to the belief of powerlessness or unworthiness. Just as the first rubber band tries to pull you toward your goal, the second pulls you back toward the underlying belief that you can't have your goal.

Fig. 1 The Structure of structural conflict

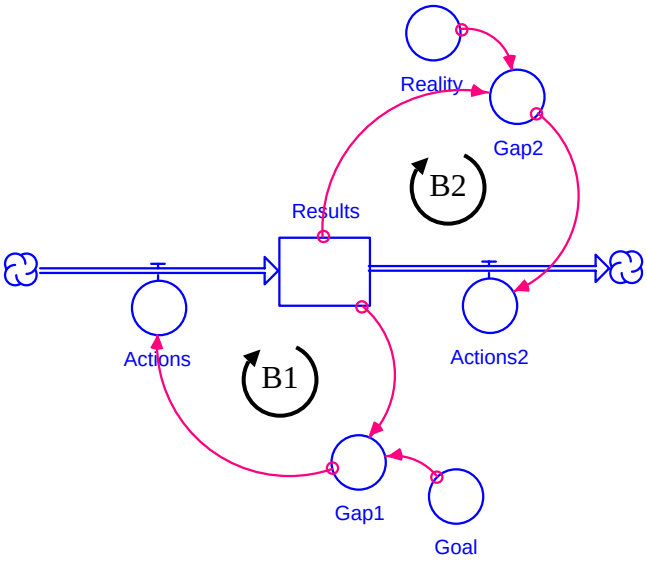
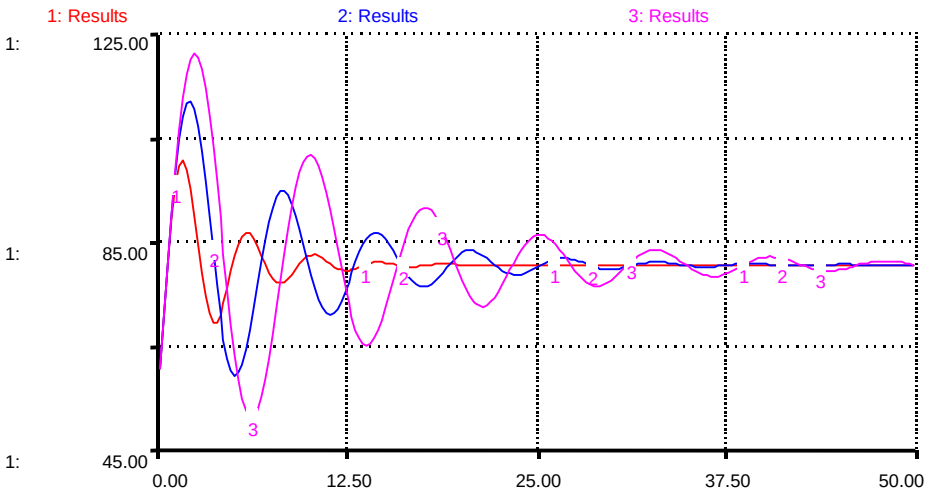



Fig. 1 shows a model of structural conflict. The variable Goal is our desired result. The variable Reality is an originally current reality. When the Goal and Results produce the gap (Gap 1), this will produce the regulatory actions. And the regulatory actions will increase Results. At this time, domination loop is B1. After a period of time, it turns to produce the gap (Gap 2) between Results and Reality. At this time, domination loop is B2. Fig. 1 tells us that there is an only one level in this diagram. The rate, which increase, is the regulatory action. As we know that B1 and B2 are balancing feedback loops. Time delay causes oscillation. Without delay, this model will not cause oscillation.

Fig. 2 The oscillation behavior of structural conflict



There are two negative feedback loops influence in the model of structural conflict. In this process, two negative feedback loops interwork to dominate and result oscillation. In this structure, the expected expecting goal is 100, and the original current reality is 60. When the act begins, Results will move forward toward the target slowly. But on the other hand, it will become another dominant force and pull you back toward original current reality. Once the result pulls you back toward original current reality, the pulling force will become a dominant force. In this repeatedly pulling and dragging process, the balancing goal will be close to 80. We can find that the whole range of oscillation is smaller and smaller with the progress in the time, and it is regulated by the goal continuously.

Fig. 2 shows three consequences. The main of three consequences comparing with influence, which causes from result in the delay's influence. Compared with three Results, the greatest length of delay time is Results 3. Event longer length of delay time is Results 2. The little length of delay time is Results 1. We can find that the range of oscillation of Result 3 is the greatest and the oscillation period is the longest. Then the second is next. Finally, Result 1 is the last. Which we assume that time delay of Actions and Actions 2 are similar.

Fig. 3 Different time delay can cause different oscillation pattern

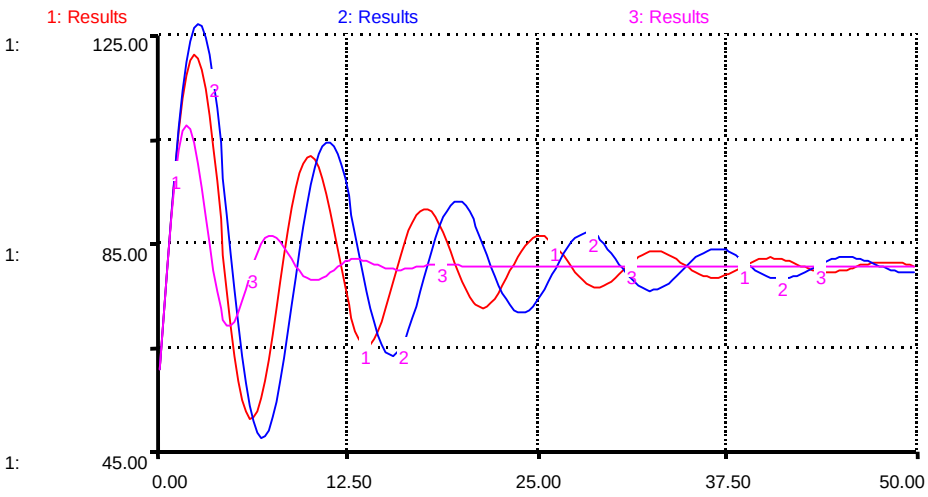



Fig. 3 shows that different time delay can cause different oscillation behavior. Among them, the pattern of Results 1 is under the normal condition of time delay. Normal condition, so-called, means the time delay of Actions equal to Actions 2. The condition of Results 2 is that the time delay of Actions is greater than Actions 2. The condition of Results 3 is that the time delay of Actions is smaller than Actions 2. Therefore, we can find that the range of oscillation of Results 2 is greater than Results 1.

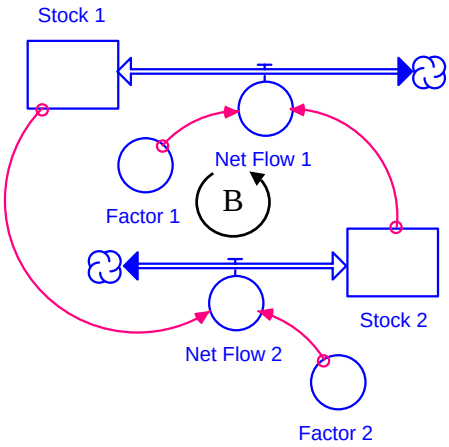
The structure of structural conflict has a goal. This is not the goal of defeating you, as some might guess. This is not the goal of forcing you to suffer hardship by trials of your sincerity, as others might guess. In fact, this goal is equilibrium. (Fritz, 1989) What should we do, if we suffer such structure? Fritz has identified three generic "strategies" for coping with the forces of structural conflict. Letting our vision erode is one such coping strategy. The second is "conflict manipulation," in which we try to manipulate ourselves into greater effort toward what we want by creating

artificial conflict, such as through focusing on avoiding what we don't want. The third generic strategy is the strategy of "willpower," where we simply psych ourselves up to overpower all forms of resistance to achieving our goals.

Second-order negative feedback system

The mode above belongs to a structural oscillation model. Second-order negative feedback system is more complicated than first-order feedback loop system besides first-order negative feedback system. Generally speaking, the representations of first-order feedback system show probable pattern like reinforcing feedback loop, balancing feedback loop, S-curve, and oscillation, etc. Second-order negative feedback systems show mainly oscillation. The common structure of second-order negative feedback system shows in Fig. 4.

Fig. 4 The common structure of second-order negative feedback system




The common structure of second-order negative feedback system composes of two levels. And these two levels (Stock 1 and Stock 2) are in the same negative feedback loop. If the system has two levels and these two levels are not in the same feedback loop system, this is not so-called second-order negative feedback system. We can see very clear that Stock 1 and Stock 2 are in the same loop in Fig. 4. When Stock 1 increases, Stock 2 will increase too. However, when Stock 2 decreases, Stock 1 will decrease and so on.

About the second-order negative feedback system, the most representative example is predator-prey system. The structure of modern predator–prey models in ecology was outlined by Italian mathematician Vito Volterra (1926), who held the Chair of Mathematical Physics in Rome (Kingsland 1985). Umberto D'Ancona, a marine biologist who was engaged to marry Volterra's daughter, Luisa, fascinated with Volterra's interest in predator–prey interactions. D'Ancona suggested to Volterra that there might be a mathematical explanation for the fact that several species of predaceous fish increased markedly during World War I, when fishing by humans almost ceased. Volterra suggested the use of two simultaneous differential equations to model the dynamics of interactive populations of predator and prey.

## The structure of conflict goal

No matter how important the first-order or second-order negative feedback

systems are, especially the second-order one is very familiar in our daily life. If the structure has not only conflict goals but also the second-order negative feedback loop, it makes our life produce oscillation, in which different person has different oscillation variables. For instance, students' oscillation variables like association performance and school performance, etc. Married persons' oscillation variables like work performance and family performance, etc. There are many pressures in the process of handing conflict goals. Different conflict goals has different pressures such as decision pressure, time pressure, family pressure, competition pressure, schoolwork pressure, health pressure, finance pressure, out of stock pressure, same generation pressure, group pressure, etc. The pressures are usually accompanied by attentions. When the pressures disappear, attentions follow to disappear also.

Senge mentions particularly about "Ending the War Between Work and Family" in his book of "Ending the War Between Work and Family." The structure of this mode is an archetype of "Success to the Successful" in the conflict between work and family. The "Success to the Successful" archetype is intrinsically unstable. Because of the dominant reinforcing feedback in "Success to the Successful" archetype, the imbalances are not self-corrected. Indeed, they grow worse and worse over time. Once it starts to drift one way or another, it will tend to continue to drift. In this structure, though each of which tend to fuel increasing level of success, they compete for the same resource. When there is the growth of time and commitment in one's work, more time leads to greater success, which leads to more and more interesting opportunities and more desire for to work. If time to work goes up, less time is available for home, and vice versa (Senge, 1990).

In "Success to the Successful" archetype, family problems are usually the cause of the busy work or frequent overtime. It can cause the depravation of family relation for a long time. You will feel that it is a painful matter to go home. Then, you will be even careless of your family life. Competing for the limited resources causes such of these problems. In fact, we can also get some ideas from "Limits to Growth" archetype: Nothing grows forever? If we extend the time line and try to rethink the behavior of "Success to the Successful", we can find that it will not grow forever. When we perform our work well and acquire the award, we will desire to perform better. And we will invest more and more time to work. However, if we have more than two activities to perform, we have to allocate the time more considerately. We will consider some reference mode to make the decision, like importance, emergency, etc.

According to judgment of importance, emergency, different periods and situations have diverse priority of activities. Different priorities decide diverse resource allocations. The resource includes person, matter, time, place, thing, and money. It is usually due to the two activities balancing at final. Sometime, the main two activities are also due to different conditions to change. For example, students have the conflict problems such as family, schoolwork, part time job, and association activity. Under general conditions, the conflicts among family, school and association conflict are the most familiar. However, these transfer to be between family and part-time job in their vacation. The goals of conflicts will depend upon contexts. We call this kind of the model the oscillation model of conflict goals.

The oscillation model of conflict goals

We explain an oscillation model of conflict goal by an example. About the

conflict of work performance and family performance, the core concept of this model is “Success to the Successful” archetype. The work performance and family performance are about the same in the beginning. Then, you work harder because of the praise from your boss. At last, you will invest time more and more to work than family. Work performance is better than family and your marriage ends in divorce.

The foregoing are some of conditions we have. It still has a kind of situation. This kind of situation is system rebound while work performance or investment time is better than family. At this time, you might react to this situation in some possible. 1. Ignore: if you still adopt this way, it might become “Success to the Successful” archetype. 2. Allocate the investment time to family instead of family: this kind of way is very familiar. Generally speaking, people tend to decrease the investment time in work in order to consider family harmonization. And they want to acquire understanding with family. They even give some compensation to family.

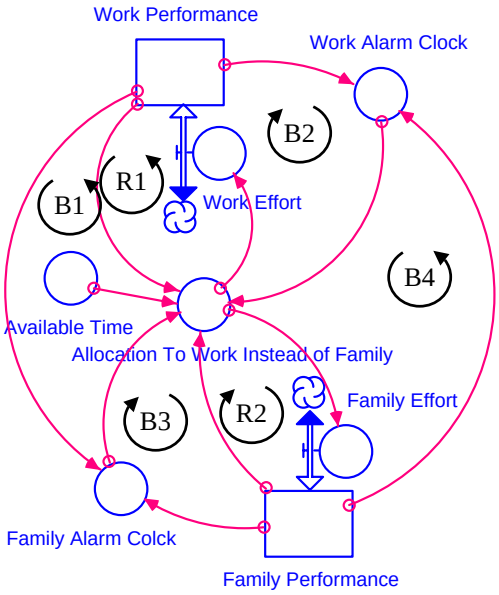
*Re-allocation of resource*

When your husband (or wife) complains to you about working time, you might reallocate your time resource. It is possible that work performance will go down as you modulate the investment time in work, while you will improve family performance. Basically, we assume that investment time and performance are interrelated. We do not consider your ability to do your job; we just observe simply the relations between investment and performance.

*Pressure shown again*

When you compare with family performance with work performance, maybe you will get some pressure. It will affect on your decision of reallocation. Your pressure will be mitigated while reallocating time resource to family. Then your family performance will be better than work performance, and the pressure will decrease. But you will get another pressure from work performance at this moment. You will again reallocate the time resource to work. There is an inverse relationship between performances of work and family.

Fig. 5 The model of the conflict between work and family



There are two important activities in Fig. 5: Work Performance and Family Performance. When you perform well in work, you will continue to invest more time. You tend to allocate more time than family, and work performance will be improved after a period of time.

The warning of family might act to remind while the family performance let us feel disappointing. We will consider reallocating the time to family this moment. And the work performance might ease. Then the warning of work might act to remind. The variables and the meaning are as follows:

Available Time：Individual available time.

Work Performance：Individual performance about one's work.

Work Effort：Individual endeavor and devotion for work.

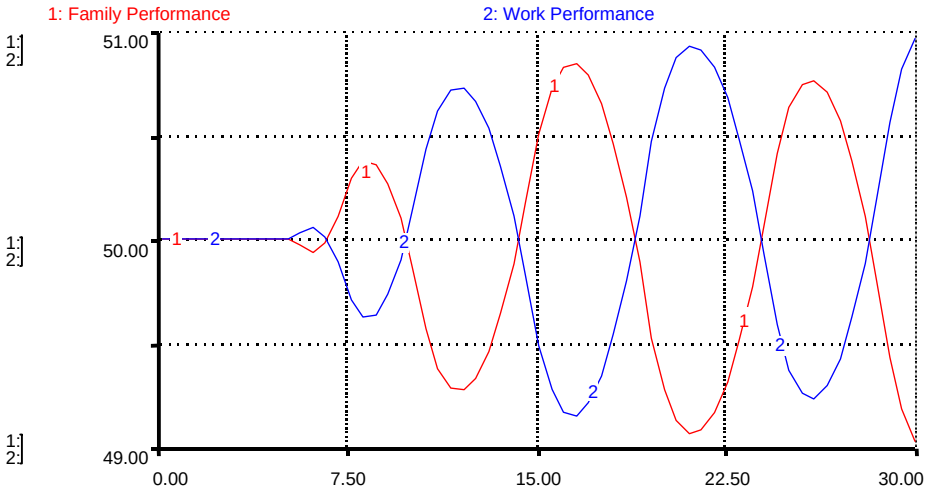
Family Performance：Individual performance about one's family.

Family Effort：Individual endeavor and devotion for family.

Work Alarm Clock：Early warning at bad work performance.

Family Alarm Clock：Early warning at bad family performance.

Fig. 6 The patterns of the conflict about work performance and family performance




We can see the simulation result about oscillation in Fig. 6. This diagram shows that Family performance and Work Performance exhibits sustained oscillations. The two performances continue in this oscillatory pattern.

Both parties' performances become reciprocal goals

As Fig. 5 indicates, B2 is an obvious negative feedback loop and Family Performance is a goal in this negative feedback loop. Work Alarm Clock represents a gap between the goal and current reality. B3 is also a obvious negative feedback loop and Work Performance is a goal in this negative feedback loop. Family Alarm Clock represents a gap between the goal and the current reality. These two conflict systems are dominated by B2 and B3. When B2's performance is better than B3, B3 will warn a warning sign based on the gap of both sides. Then, it will let you reallocate the

investment time.

A comparison conflict goals systems to other conflict models

The situation of conflict goal is obvious yet we often overlook it. We have to compare conflict goals systems with four other similar models. There are four models with which we compared are structural conflict, predator/prey system, success to successful, balancing two boats. As Table 1 shows some compared questions: “Does it have delay?” “The amount of positive feedback loop,” “The amount of negative feedback loop,” “The amount of levels,” “The core model.” In case of “Balancing Two Boats” archetype, its core is “Escalation” in the middle of diagram. The core of “Conflict Goals System” archetype is “Success to Successful” archetype in the middle of diagram. In case of “Success to Successful” archetype, there is a story about two persons in this system. On the contrary “Conflict Goals System” archetype has a story of one person in the system. In the conflict-goal system, one faces his decision and the following results.

Table 1 Compare to other conflict models

| Model / Item | Structural Conflict | Second-Order Feedback System | Success to Successful | Balancing Two Boats. | Conflict-Goal System |
|---|---|---|---|---|---|
| Does it have delay? | ✓ | — | — | ✓ | ✓ |
| The amount of positive feedback loop. | — | 2 | 2 | 2 | 2 |
| The amount of negative feedback loop. | 2 | 4 | — | 2 | 4 |
| The amount of level. | 1 | 2 | 2 | 2 | 2 |
| The core model. | — | — | — | Escalation | Success to Successful |

Warning variable

We try to present the concept of warning variable to fit this model. Ultimate idea is that the systems will catch their attention. When the warning variables act, warning signs will catch our attentions immediately. We might have three a alternative actions in the face of this problem. First, ignore it and pretend that you do not hear. Second, stop the warning sign and deal with it. Third, stop the warning and do the other things.

If we ignore the warning variable, this model will become “Success to Successful” archetype. And the pattern of this model will not oscillate. The warning variable reminds us of our attention. Attention itself is a resource. It let us take notice of this and take notice of this and that. Finally, it will change our decisions. As we often say that the kids who like to cry has the sugar to eat.

Warning variable represents a message of a bad performance, which occurred. The performance is due to compare. For instance, a wife might complain to her husband: “You just took the work into account, you didn’t play your proper role about family.” Or “Our children had some strange behavior recently. Were we neglectful of him?”

Warning variable has an effect of reminiscent. The more warning shows the more reminiscent, and vice versa. We must not ignore another kind of delay. It has also a character of time delay, so it makes oscillation more serious.

Transformation to a generic structure

A generic structure represents a kind of system theories. The generic structure of conflict-goals model represents an oscillation pattern derived from limited time resource and warning variable. Warning variable focuses our attentions to change the investment of time resource. Therefore we can represent conflict goal as follows in a simple diagram:

Fig. 7 The oscillation of conflict goal

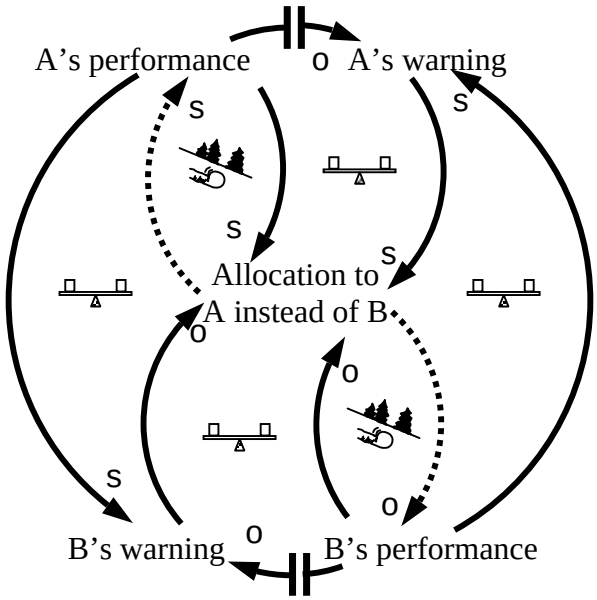



Fig. 7 shows that this model composes of two positive feedback loops, which we call "Success to successful." But these loops are not the greatest effect in the conflict model and do not cause a direct action of oscillation. The other actions, which made this model oscillate, are obvious negative feedback loop. So there are four forces of balancing in this diagram. We can find two "Limits to Growth" in the model..

The three conflict goals

Two conflict goals can cause oscillations. A model with three conflict goals also causes oscillations. It has the same situation of limited time resource. Three conflict goals tend to acquire time less. And the goal equals to the average of the other two performances in this model. When any one side achieves the goal, it will cause even more in balance than before and these warning variables will start effect again. Therefore it performs the same story again and again.

Fig. 8 A model of three conflict goals

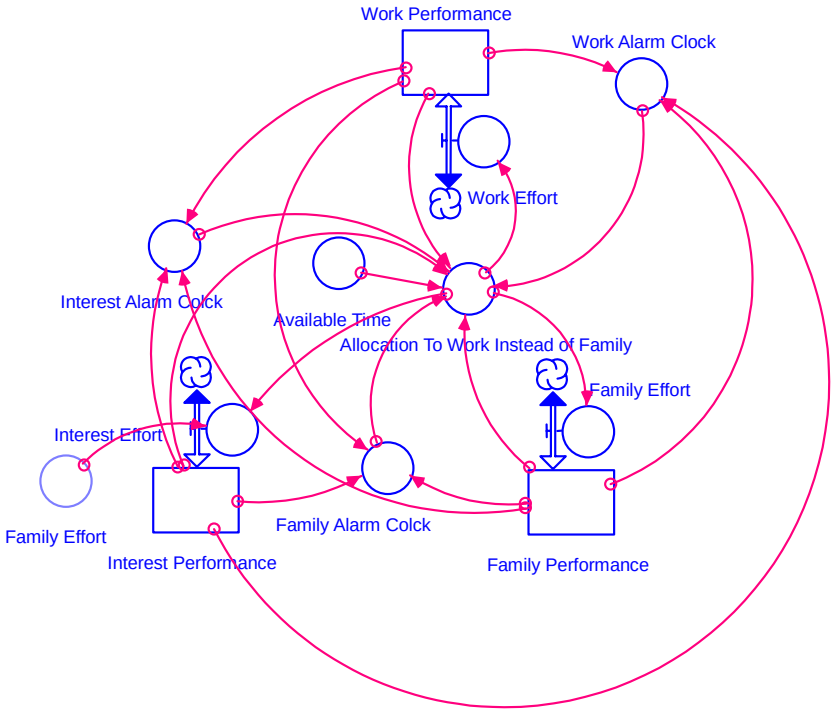
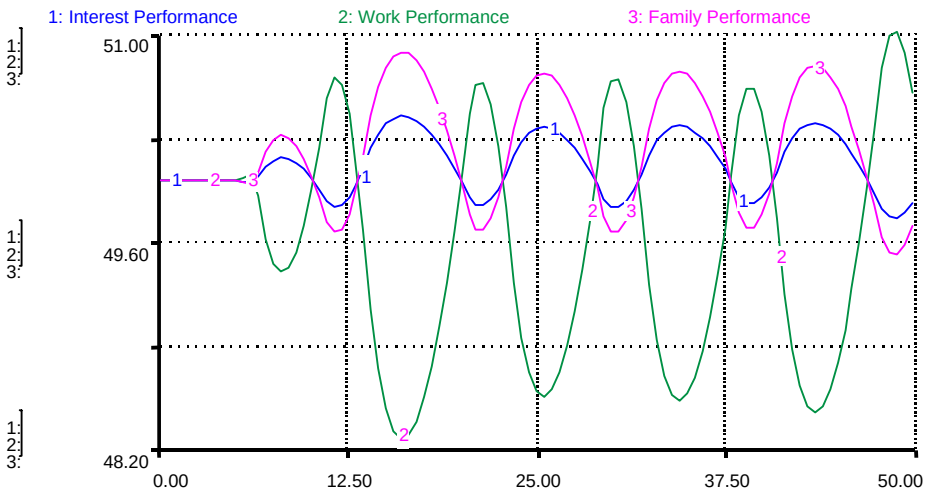



Fig. 8 shows a model a man with of three conflict goals. We add a variable Interest Performance—Interest Performance. It represents that this person has three kinds of conflict problem like work, family, and interest. Each of them uses the limited time resource of it. Finally this person shows an oscillation pattern as follows.

Fig. 9 The result of three conflict goals




## Conclusion and Suggestion

Everyone could meet the problem of conflict goals. This paper emphasized that most of the people like us facing such of problems usually do not know how to do. It is true indeed, no matter what organizations or persons usually leave things to take their own course when we face the dilemma. In an unguarded moment, we might react excessively. It might cause a serious consequence.

Warning Variable is presented in this paper, which has some significance. If this is not a warning variable, the pattern becomes “Success to Successful.” It means that this person does not care about his work or family, so he just makes his own choice ignoring of work or family.

System boundary divides this model into over two diverse systems like work and family. The problem is employees might be in the two systems at the same time and they do their best to work and take care of their family. Once our organizations do not deal with the problem well or do not take aware of it, it might make us suffer.

The work and family is difficult be complete in both respects

It is a difficult choice between work and family. An organization consists of a number of individuals. Naturally, we hope personal effort can contribute to organizational growth. Contradictorily, when organizations pursue growth, it’s very possible to sacrifice employees even more managers firstly. When the time scale is lengthened, we can find that the system consists of not only people’s work but also their families, and that work and family aren’t to be complete in both respects. If we do not care about these things, the problems not only exist but also will be reinforced furthermore.

High leverage

The purpose that we transform conflict goals into a generic model is to help us thinking. If we have this concept, we might increase our awareness to notice. Maybe you will ask some questions such us “What should we do, if we meet such problems? “ “Does anybody have high leverage?” As we know, we have to decrease the range of oscillation if we want to take care of this. For instance, think about what do you really want to do. We have to know the priority, when we face the dilemma. In fact, we have to explore this question in life. Maybe we can ask ourselves “What is the most important things between work and family?” If we think about it very clearly, we have to make a hard choice. Once we understand this principle, the following question is “hold the vision.”

What can we do in the organizations? We can change the measurements of performance in the organizations. If we want to promote someone, we can consider three performance indexes, such as work, family, and health. So we will rethink our time allocation in order to do the right things naturally.

# Reference


Chung V. Celeste. 1994. Generic Structures In Oscillation System I. MIT. (D-4426-1)

Donella H. Meadows, Whole Earth Models and Systems, *Co-Evolution Quarterly* (Summer 1982): 98-108.

Fritz Robert. 1989. *The Path of Least Resistance*. Fawcett Columbine, New York, U.S.A.

Fritz Robert. 1999. *The Path of Least Resistance for Managers*. Berrett-Koehler Publishers, U.S.A.

Hirsch Gary, Immediato Scherry. 1999. Microworlds and generic structures as

resources for integrating care and improving health. *System Dynamics Review*. **15**(3), 315-330.

Kingsland, S. E. 1985. Modeling nature. Chicago: University of Chicago Press.

Kaufman Robert S. 1992. Why Operations Improvement Programs Fail: Four Managerial Contradictions. *MIT Sloan Management Review***.** Cambridge: Fall 1992. Vol. 34, Iss. 1; p. 83.

Senge, Peter M. 1990. ***The Fifth Discipline: The Art & Practice of The Learning Organization***. New York: Currency Doubleday.

Senge, Peter M., Kliener Art, Roberts Charlotte, Ross B. Richard, Smith, J. Byran. 1994. ***The Fifth Discipline Fieldbook-Strategies and Tools for Building a Learning Organization***. The Spieler Agency, New York, U.S.A.

Senge, Peter M.. Kleiner, Art, Roberts, C., Ross, R., Roth, G. and Smith, B. 1999. ***The Dance of Change：The Challenges To Sustaining Momentum In Learning Organization***. New York: Random House.

Sterman, John D.. 2000. ***Business Dynamics：Systems Thinking and Modeling for a Complex World***. U. S.: McGraw-Hill.

Vito Volterra, 1926. Fluctuations in the abundance of a species considered mathematically. *Nature*. 118, 558–560.

Whelan, Joseph G. 1994. ***Modeling Exercises: Section 1***, MIT.

Young, Showing. 1994. *for the Chinese Edition of Peter Senge's* ***The Fifth Discipline: The Art & Practice of The Learning Organization***. Commonwealth Publishing Co., Ltd., Taipei, Taiwan.



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