Exploring the effect of conflict management on the performance of ERP software customization-A Case Study of D Company

Wei-Tsong Wang

National Cheng-Kung University, Dept. of Industrial and Information Management

No.1 University Rd, Tainan, Taiwan, R.O.C

wtwang@mail.ncku.edu.tw

Mei-Chun Luo

National Cheng-Kung University, Dept. of Industrial and Information Management

No.1 University Rd, Tainan, Taiwan, R.O.C

r38011056@mail.ncku.edu.tw

Abstract: In this study, we develop a system dynamics model to explore the effects of conflict management on the performance of customized ERP software. We investigate the relationship between transformational leadership and conflict management in this context. System dynamics is used as a tool to integrate subjective theories of sociology with quantitative analysis, and the simulation results indicate that conflict management is beneficial to the promotion of project consequences. In human resource strategy, an executive will be looking for managers displaying various types of transformational leadership to reduce conflict and improve organizational performance.

1. Introduction

As companies grow, there are more subtle divisions of labor, and enterprise management becomes more complex. In this situation, ERP systems have begun to be widely used. ERP systems are wide-range management systems that facilitate fast, explicit, and convenient information flow among different divisions of enterprises. ERP systems serve as an integrated platform, but they cannot satisfy the different requirements

of every company. Consequently, ERP customization is becoming popular. Many ERP software companies have started focusing on how to create customized ERP systems that can meet the needs of a varied client base.

Accurate feedback from consultants helps to connect both the front- and back-end of businesses because it not only enables back-end engineers to explicitly understand the demands of front-end clients but enables front-end clients to understand the complications of customized ERP software. This understanding may contribute to future price negotiations. However, consultants for ERP software companies tend to pay the most attention to data structure and system report output instead of focusing on system functions that clients emphasize. Thus, from the perspective of consultants, cost and time become the major issues when developing customized ERP software. These considerations are much stronger when the customizations are the core functions of the entire ERP system (Huang, Chen, Chiu & Hsieh, 2012).

Tjosvold (2005) identified three major approaches to conflict management: cooperative, competitive, and avoiding. Additionally, Zhang, Cho, and Tjosvold (2011) illustrated the influence of transformational leadership on conflict management and confirmed that the transformational leadership style positively correlates with cooperative conflict management but negatively correlates with competitive conflict management.

Consequently, with the exception of technical issues, consultants' understanding of the conflict management style of clients and leaders is an important factor affecting decisions about how to improve the ERP customizations.

Current information and communication technology (ICT) has been shown to enhance firm innovation ability, but there are few studies specifically exploring the effects of ICT on the innovation performance of ERP software systems (Hempell and Zwick, 2008). The implementation of ERP systems has a positive influence on the innovation of work procedures but lacks a direct connection with product innovation.

Accordingly, the primary purposes of this study are to combine transformational leadership theory and conflict management, where we develop a system-dynamic model to explore the effects of conflict management on ERP software customization performance. By performing experiments using a simulation model, we provide insights into policy development regarding the operations of ERP project teams.

2.Literature Review

2.1 Conflict management theory

Conflict management theory views conflict as a part of group phenomena, like group

communication. The earliest record of conflict management can be traced back to formal sociology as proposed by Simmel in 1908. Brown (1995) defined conflict as a form of interaction between different parties for which there are three aspects: interest, perception, and preference. Based on this definition, Wang (2015) suggested conflicts in enterprises can be generally divided into two categories. The first category is relational conflicts, which are a result of differences between values and cognition. The second category is task conflicts, which refer to the conflicts caused by different opinions or benefits that occur during the process of pursuing organizational goals.

The issue of conflict management in organizations is becoming more and more important in the contemporary business environment. Conflict management abandons traditional ideas about avoiding and solving conflicts and rather considers conflicts as a normal process that is part of group phenomena. Therefore, there are both constructive conflicts and destructive conflicts, but the ultimate goal of conflicts is to stimulate effective tension among group members, enhance member confidence in the group, provide an opportunity for members to seriously consider different opinions, examine the problems of organizations, and finally for the group to reach consensus and solve problems (Chen, Liu and Tjosvold, 2005).

Chen et al. (2005) identified three major approaches to conflict management: cooperative, competitive, and avoiding. In cooperative conflict management, management leaders emphasize that when one man on the team is moving toward a goal, the others will move toward to the same goal. This type of conflict management method, which places an emphasis on cooperation, will cause any conflict to become productive conflict because of the high cohesiveness of the team. Productive conflict will brings members of top management more strategies to stimulate the innovation ability of their teams, and thus this type of conflict management will definitely bring a certain degree of contributions to team innovation abilities. However, some leaders prefer to adopt competitive methods to handle all conflicts occurring in their teams. Competitive conflict management means that when one side of the team has success, the other side of the team gets farther away from the goal. Therefore, in the case of this kind of team, a conflict is considered to be a win-lose fight. In the long run, the dynamics of the team will be destroyed; good communication among members will no longer exist, and the decision will come to a dead end. This type of conflict management seems to cause more damage than benefits to a team, but when considering other social factors, such as the thinking of rulers or human psychology, we find that competitive conflict management still exists in society. The basic idea of avoiding conflict is trying to solve conflicts before they become serious. Studies regarding group thinking also indicate that to keep the cohesiveness of a

group, most members of the group will resist the ideas from members with opposite opinions, and this resistance is likely leading to disastrous decisions (Aldag and Fuller, 1993). Some studies have emphasized that compared to cooperative conflict management, avoiding conflict management might lead to the outbreak of conflicts where members will adopt similar paths toward completion to resolve negative emotions that have accumulated over time (Barker et al., 1988; Tjosvold, 1982). These studies explain why leaders adopting avoiding conflict management tend to exhibit more conservative thinking and why most of the projects their teams handle fail in the end.

Chen et al. (2005) identified three major approaches to conflict management and created a model for conflict management, which is shown in Figure 1. Their model illustrates the effects of the three conflict management approaches on productive conflict, which, in turn leads to team effectiveness, and concludes with an increase in team innovation. This model is highly related to customization project performance, as discussed in this study, so we decided to use this model as our basic system dynamics framework. Furthermore, this basic framework includes the concept of transformational leadership, so it can be used to discuss customization project performance with a broader scope.
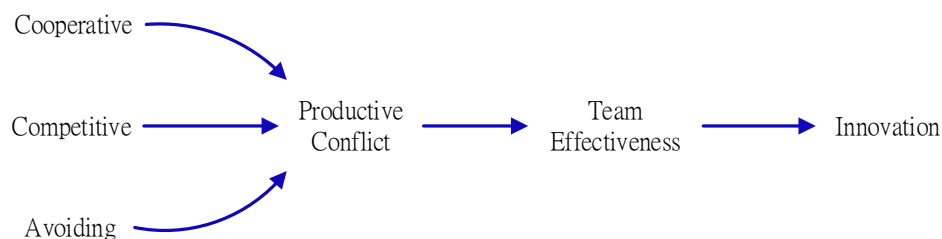

Figure 1: Basic framework for conflict management

2.2 Transformational leadership

Following leadership trait theory, leadership behavior theory, and leadership contingency theory, transformational leadership is a new leadership type proposed by an American Sociologist, Burns, in 1978. Transformational leadership theory is a very inclusive theory, which has broad descriptions about the leadership process, including multilevel and multi-angle perspectives of the leadership process. In summary, transformational leadership theory connects the characteristics of leaders and their subordinates and attempts to create a way to promote power and a moral standard for both.

In this study, transformational leadership is examined further because of Zhang et al.'s model (2011). Zhang et al. hypothesized the effects of transformational leadership

on conflict management and verified their hypotheses. They concluded that transformational leadership behavior positively affects cooperative conflict management and negatively affects competitive conflict management. The preliminary construct model in their article is presented as Figure 2.
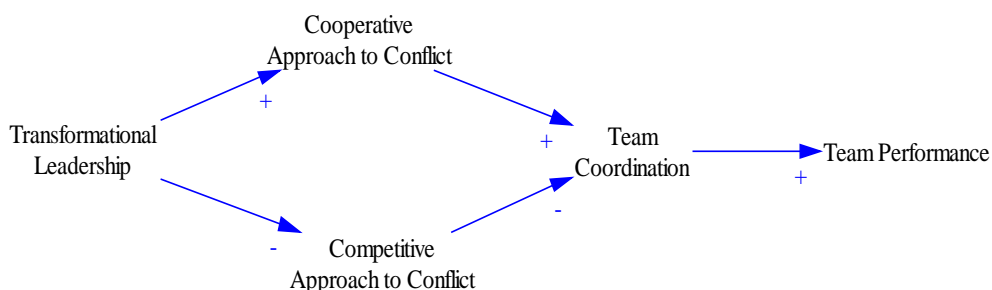

Figure 2: Preliminary model of transformational leadership

2.3 Innovation and customization

2.3.1 ERP software customization

The proliferation of ERP software has to some degree accelerated the efficiency and integration of enterprises. However, some enterprises have had problems where the build-in software process does not match their own work processes. It would be very expensive for an enterprise to change its work process to accommodate ERP software. Nevertheless, if the company keeps its original working process, and it doesn't match the ERP software, this will increase manpower costs. Accordingly, ERP customization has begun to fill this gap.

Soh, Kien and Tay-Yap (2000) observed these problems and found that there are three major types of ERP misfits: data, functional, and output. In summary, as long as any one of the three misfits mentioned above occurs, the enterprise has to make a choice either to adjust the work procedure to meet the ERP software or to request the ERP software supplier to customize the software. Upadhyay et al. (2011) argues that minimum customization is a key success factor for ERP system optimization. In addition, Light (2005) found that a common reason for ERP customization might be a concern with solving functionality misfits between standard ERP system functions and the routine business procedures of a company. The necessity for ERP software customization was mentioned in Haines' (2009) study. First, any mismatch existing between the organization and the adopted ERP software will cause a certain degree of damage to the operations of the organization. Second, the customization of ERP software is a very complicated, costly process. However, ERP software serves as an enterprise's nervous system, which connects each main department within the enterprise. Therefore, when an ERP system

works successfully, it will bring both tangible and intangible benefits to the enterprise. Consequently, enterprises must implement ERP software even though it is costly to do so.

ERP consultants believe that data structure and system report output are the most important part of an ERP system, but to customers, the most important part is system functions. Thus, from the consultants' perspective, cost and time become the major issues when developing customized ERP software. The consideration of cost and time becomes much more significant when the customized part of the software is the core function of the entire ERP system (Huang, Chen, Chiu & Hsieh, 2012).

All of the above referenced literature points out questions about ERP software customization from the perspectives of clients and consultants. Consultants view service as the priority under the permitted scope of cost and time. The relationship between software companies and clients during the ERP customization process is highly related to the questions discussed in this study. In recent years, the role of innovation has become increasingly important to organizations. Literature regarding the relationship between innovation and customization are thus discussed in the next section.

2.3.2 The relationship between innovation and customization

The benefits of innovation to an enterprise cannot be observed immediately. Innovation is a fairly long process that includes procedural innovations, product innovations, and service innovations. Information and communication technology (ICT) can enhance firm innovation, but there are few studies specifically exploring the effects of ICT on the innovative performance of ERP software systems (Hempell and Zwick, 2008). Literature regarding packaged enterprise systems mostly discusses the influence of ICT techniques on systems (Hitt, Wou, and Zhou 2014; Hendricks, Singhal, and Stratman 2007). Very few studies have attempted to discuss the effects of innovation on ERP software and ERP software customization. Since enterprises are increasingly establishing rigorous controls over costs, innovation is becoming more important to the ERP software customization process. Furthermore, an innovative system can offer critical strategic assistance and establish more new ideas about business processes, for example, establishing a new supply chain through a new market mechanism (Shang and Seddon, 2002).

In addition to the direct effects, ERP systems also indirectly enforce the strength of innovation. Since ERP is a core system communicating with many sub-systems, when the ERP system starts functioning, it enables many sub-systems to engage in communication,

and these communications promote the strength of innovation.

From a supply chain perspective, enterprises developing more innovative ideas in the supply chain have more opportunities to engage with both clients and suppliers, which is beneficial to the development and coherence of the entire supply chain (Criscuolo, Haskel, and Slaughter, 2004). If we transfer the supply chains of traditional industries into software industries, the upstream manufacturers in the software industries will be software developers, and the downstream customers will be companies buying ERP software.

Innovation plays an important role in traditional industries in the existing literature on innovation and customization. Furthermore, innovation is also a very influential key factor in ERP software customization.

3. Research Method

The main purpose of this study was to investigate the effects of conflict management on the performance of ERP software customization projects. Through analyzing a case study of a leading ERP software company (D company) in Taiwan, we verified the relationship between conflict management and the performance of customization projects for the reference of business operation. The literature review was used as a foundation to set up the research construct. Conflict management theory was used as the foundation and was integrated with interviews with businesses to modify the customization model and apply system dynamics to test the effects of the three approaches to conflict management on the performance of ERP software customization as well as their effects on innovation.

3.1 Research questions

The variables in this study were used to explore the effects caused by ERP software customization and to improve organizational performance and process innovation. Consequently, the following research questions are proposed.

Research question 1: During the process of ERP software customization, will the solutions that a company adopts to handle the conflicts of team members affect project performance (i.e. the quantity of completed customized modules)?

Research question 2: Among all the different methods available to solve conflicts, which type of conflict management will better stimulate team members to think and enhance their innovation ability?

3.2 Research data collection and dynamic hypotheses

3.2.1 Simple conceptual diagram

Although the research is ongoing, we summarize the relationships among the important concepts to be addressed in this study in Figure 3.
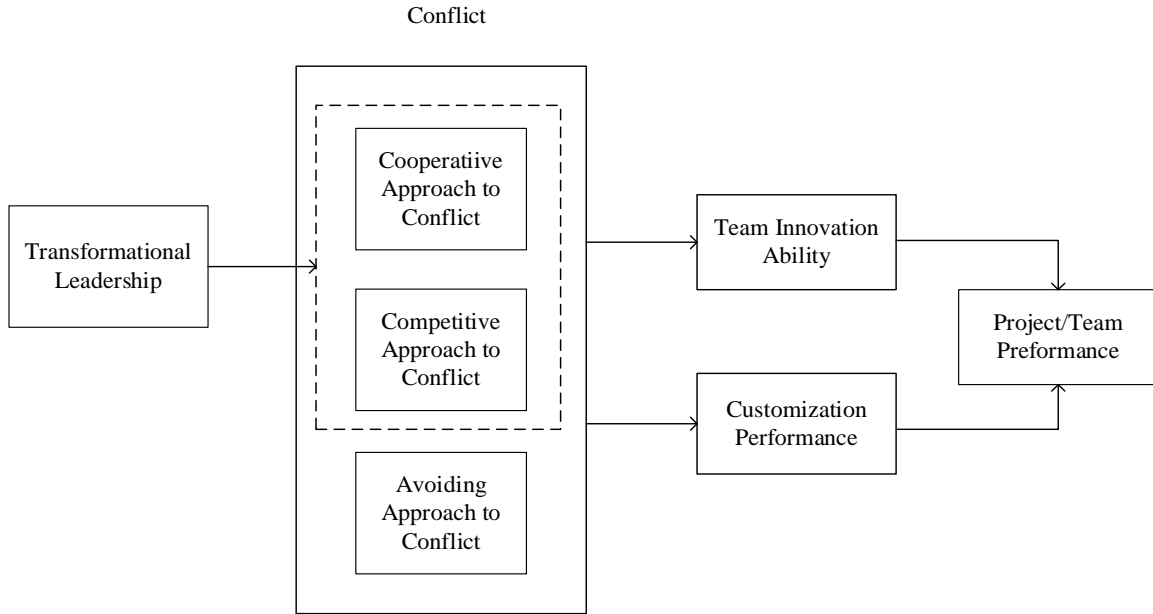
Conflict

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Transformational
Leadership
        ┌─────────────────────┐
        │  ┌───────────────┐   │
        │  │ Cooperatiive  │   │        Team Innovation
        │  │ Approach to   │   │───────▶    Ability      ┐
        │  │ Conflict      │   │                          │
        │  └───────────────┘   │                          ▼
        │  ┌───────────────┐   │                    Project/Team
        │  │ Competitive   │   │                     Preformance
        │  │ Approach to   │   │                          ▲
        │  │ Conflict      │   │                          │
        │  └───────────────┘   │        Customization     │
        │  ┌───────────────┐   │───────▶  Performance   ──┘
        │  │ Avoiding      │   │
        │  │ Approach to   │   │
        │  │ Conflict      │   │
        │  └───────────────┘   │
        └─────────────────────┘
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Figure 3: Simple research conceptual diagram

3.2.2 Interviewee information

The interview subjects are staff members working at D company, a representative company in the field of ERP software. The relevant information about the interviewees from D company is presented in Table. 1.

Table 1: Interviewee Information (Source: This Study)

Interviewee	Gender	Job Title
A	Male	R & D Director
B	Male	General Manager
C	Female	Telemarketing Assistant Manager
D	Male	Deputy General Manager
E	Male	R & D Department Manager
F	Male	Application Architect
G	Male	Product Director

3.2.3 Dynamic hypotheses

According to the literature review, interviews, and decoding, the research is separated into four hypotheses as follows:

Dynamic Hypothesis 1: Fostering the acceptance of group goals helps increase the benefits of cooperative conflict, improves group effectiveness, and enhances innovation ability. Figure 4 presents the causal loop and the effect relationship.
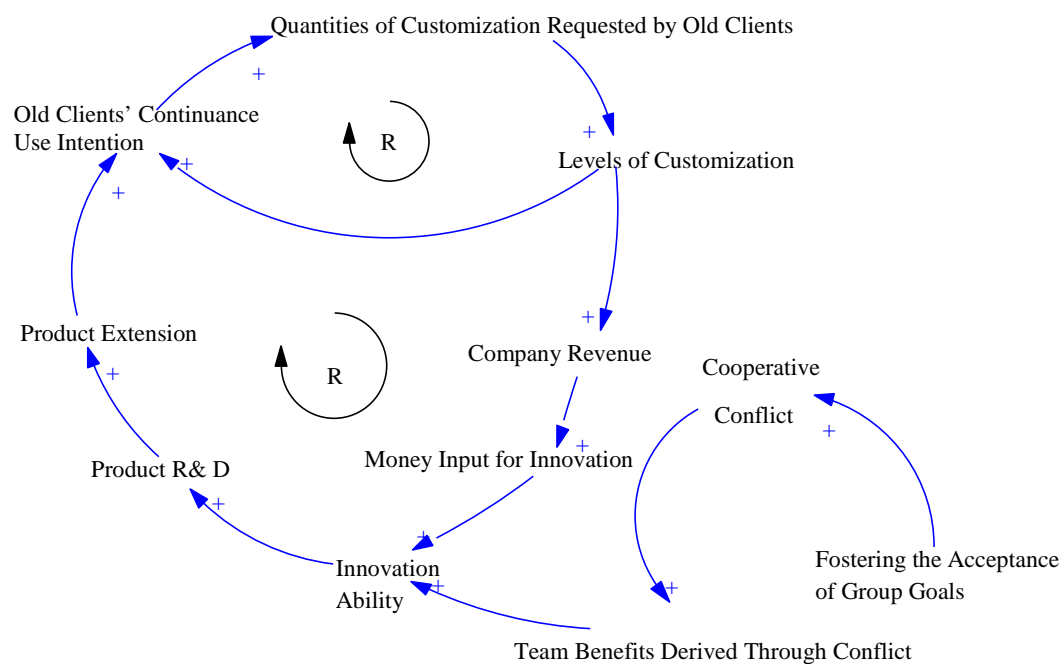

Figure 4: Causal loop of customization with the influences of cooperative conflicts

Dynamic Hypothesis 2: When a leader pursues high-level performance, it will enforce the effects of competitive conflicts, decrease team effectiveness, diminish innovation ability, and slow down research and design ability. Figure 5 presents the causal loop and the effect relationship.
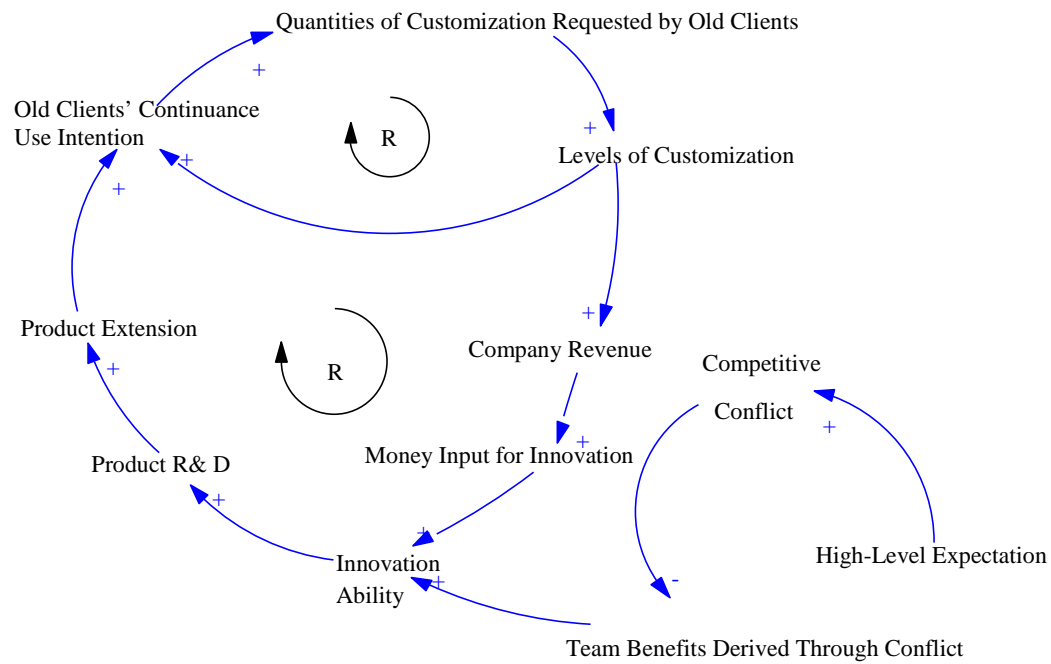
Figure 5: Causal loop of customization with the influences of competitive conflicts

Dynamic Hypothesis 3: When a leader pursues high-level performance, it will enforce the effects of competitive conflicts, decrease team effectiveness, diminish employee productivity, and slow down efficiency. Figure 6 presents the causal loop and the effect relationship.
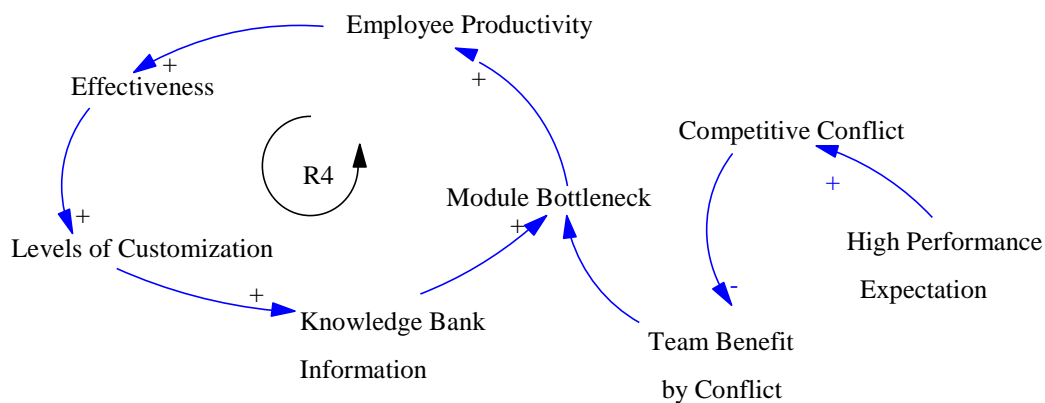

Figure 6: Causal loop for module bottleneck with the influences of competitive conflict management

Dynamic Hypothesis 4: The provision of personal support from a leader enforces the effects of avoiding conflict management, decreases team effectiveness, diminishes productivity, and slows down processing time. Figure 7 presents the causal loop and the effect relationship.
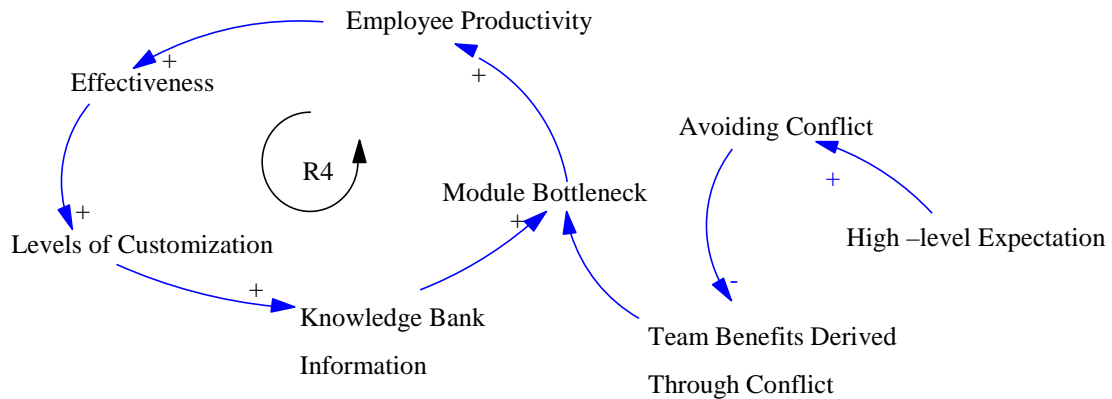

Figure 7: Causal loop of module bottleneck with the influences of avoiding conflict management

Figure 8 presents the overall cause and effect relationship generalized from the interview content of this study, in which the R1 loop refers to indirect influences, and R2, R3, and R4 loops refer to direct influences.
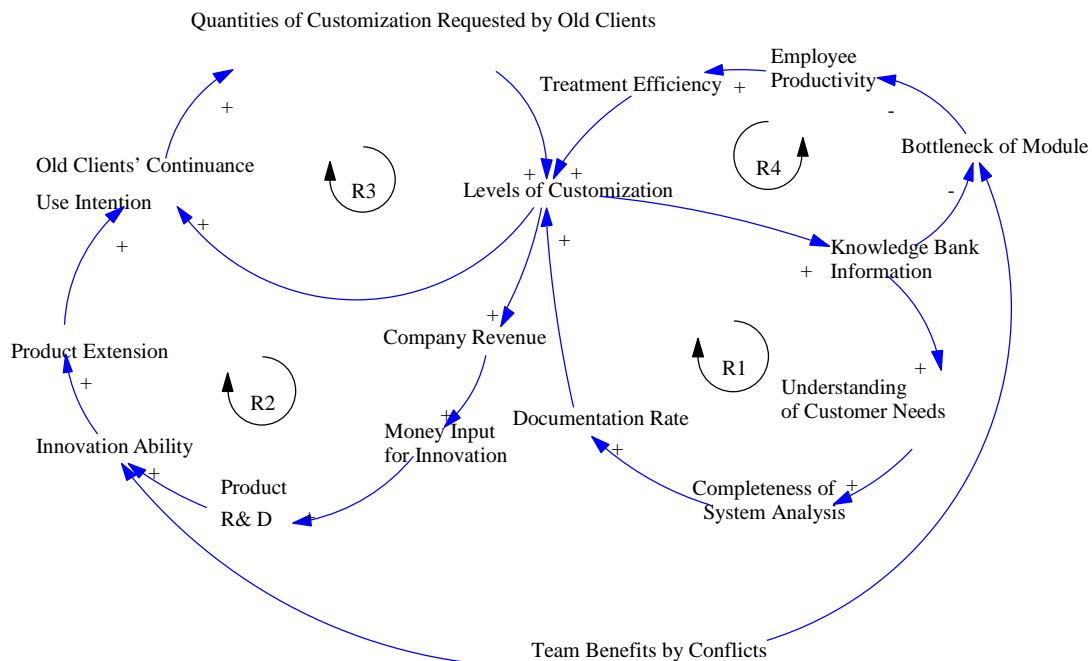

Figure 8: Overall causal loop diagram and the effect relationship

4. Simulation Setting and Preliminary Results

VenSim software (Ventana Systems) was used to set up the dynamic model to simulate the model. Some variable settings in the model should be addressed in advance. The important variable settings and description are presented in Table 2.

Table 2: Important variables in the model

| Name of variables	Input value	Description
Avg. No. of Module per month	2000	Average number of modules per customer per month
Custom Module	1000	Depository of modules ready for customization
Return ratio	0.5	Ratio of accepted rework
Dissatisfied Module	50	Depository of unsatisfactory modules returned by customers
Rework Module	50	Depository of rework modules
Rework ratio	0.85	Ratio of accepted rework
Complete Module	300	Depository of complete modules
Time to confirm the completion of required documentation	4.5	
Avg. data's quantity per module	20	Average output document quantity per custom module
Data in KS	5000	Information quantity stored in knowledge bank
DON	0.7	Ratio of deleted data
The degree to which customer requirements are understood	70~100	The degree to which customer requirements are understood
the Integrity of system analysis	85~100	The Integrity of system analysis
Prob. Recognize from information fraction	0~0.4	The existing data in the knowledge bank could be used to identify the problematic customization steps.
Avg. revenue per module	150000	Average revenue per module
Investment ratio	0.3	Percentage of company revenue invested in innovation
Prob. Recognize fraction by employee	0.6	Percentage of problems solved by employee experience
Return time delay	1	Time required for return
Rework time delay	1	Time required for rework
Data output time delay	1	Time required for data deletion
Analysis time delay	1	Time required for analysis

4.1 Results
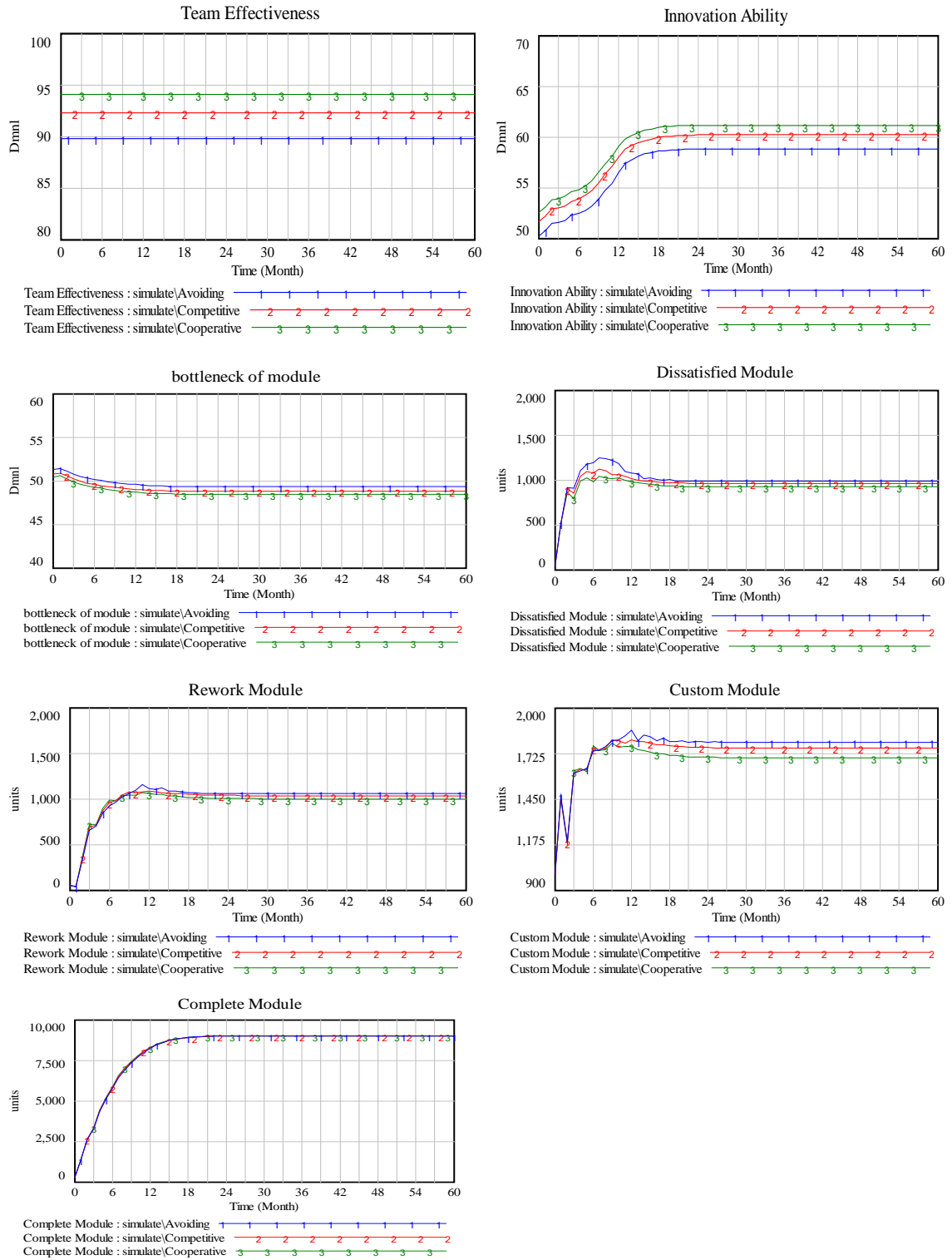
Figure 9: Team effectiveness, innovation ability, module bottlenecks, unsatisfactory modules, rework modules, custom modules, and complete module comparison diagram using three conflict management methods

According to the above results, we verified the four dynamic hypotheses proposed earlier.

First, dynamic Hypothesis 1 (H1) suggests that same group goals→more obvious cooperative conflicts→fostering team effectiveness→promoting research and design ability→increasing degree of customization. The simulation results indicated that cooperative conflict management brings great benefits to team effectiveness, innovation ability, project bottlenecks, and unsatisfactory modules but not on complete custom modules. It is thus concluded that the simulation results generally satisfy dynamic Hypothesis 1 (H1).

In addition, dynamic Hypothesis 2 (H2) states that high expectation→more obvious competitive conflicts→lower team effectiveness→lower innovation ability→lower research and design ability→a lower degree of customization. The simulation results indicated that there were no statistically significant differences in terms of complete custom modules. The results also indicated that competitive conflict management contributes fewer benefits to team effectiveness, innovation ability, project bottlenecks, and unsatisfactory modules. Therefore, the simulation results generally concur with dynamic Hypothesis 2 (H2).
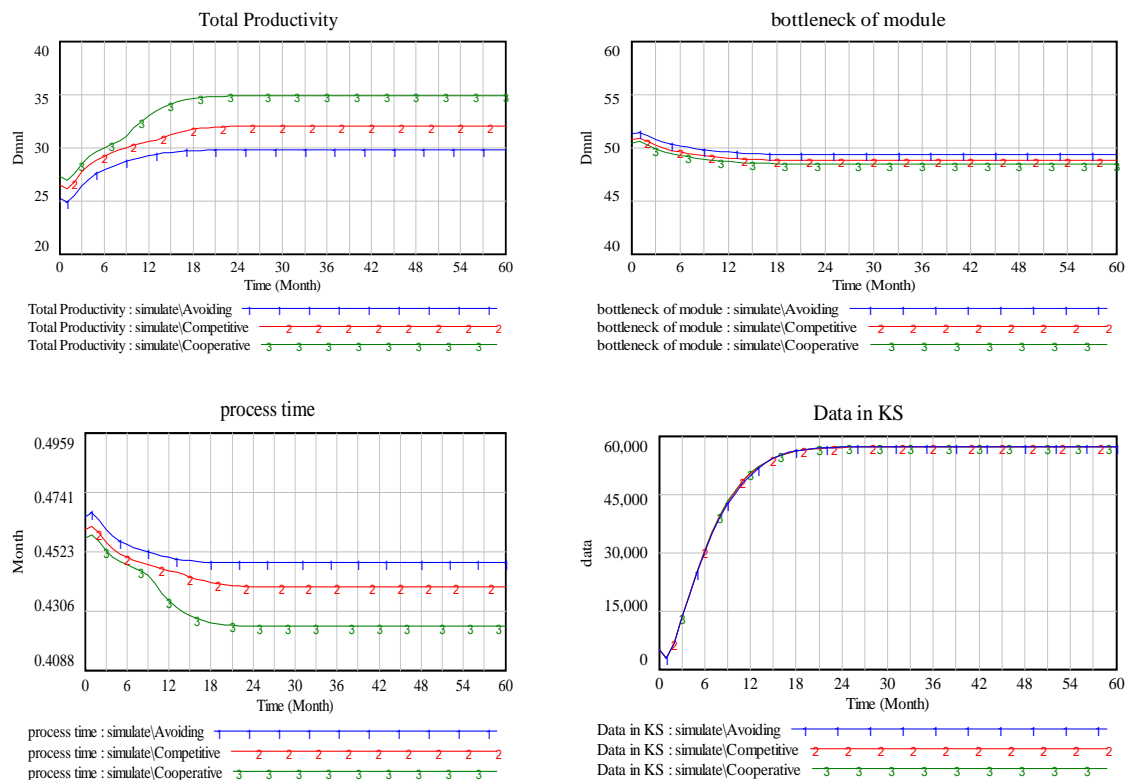

Figure 10: Total productivity, module bottlenecks, processing time and data in KS comparison diagram using three conflict management methods

The following three dynamic hypotheses were verified based on the above simulation results.

First, dynamic Hypothesis 3 (H3) states that high expectation→more obvious competitive conflicts→lower team effectiveness→increases in project bottlenecks→reduced productivity→increased processing time→decreased customization levels→diminished amount of data in the knowledge bank. The simulation results indicate that competitive conflict management brings fewer benefits to productivity, project bottlenecks, and processing time and that there were no statistically significant differences in terms of the complete amount of data in the knowledge bank. It was thus concluded that the simulation results generally concur with dynamic Hypothesis five (H3).

Finally, dynamic hypothesis 4 (H4) states that providing personal assistance→more obvious avoidance of conflicts→lower team effectiveness→increased project bottlenecks →reduced productivity→increased processing time→decreased customization levels→ diminished amount of data in the knowledge bank. The simulation results indicate that avoiding conflict management brings the fewest benefits to productivity, project bottlenecks, and processing time and that there were no statistically significant differences in terms of the complete amount of data in knowledge bank. It was thus concluded that the simulation results generally concur with dynamic Hypothesis four (H4).

5. Conclusion and Discussion

This study makes two contributions based on the theoretical results and practical implications.

The key academic implication of this study is that we combined conflict management with transformational leadership, taking them as the external influencing factors and combining these factors with customization issues for the purpose of discussion. Conflict management and transformational leadership are both theories proposed in the field of sociology. Most studies utilizing these two theories have investigated the interactions among people through questionnaire survey research. Other studies have examined organizational management problems under specific circumstances. Issues about customization are more like discussions of mathematic patterns. This study used system dynamics as a tool to integrate the subjective theories of sociology with the quantitative analysis of customization issues to propose a different method to examine relevant issues in these fields. Except for the difference in the research method, this study focused on styles of transformational leadership because the six styles

of transformational leadership cover various levels. The matching of these different styles with the different personalities of leaders could explain their use of different conflict management methods. From the verification of the dynamic hypotheses in this study, it could be inferred that conflict management is beneficial to shortening project processing time, lessoning module bottlenecks, and increasing customization levels.

In addition, Tjosvold (2005) pointed out that if a management team adopts cooperative conflict management, this makes the conflict productive, which is not obviously shown in the adoption of competitive or avoiding conflict management styles. This statement is consistent with the conclusions of this study, which means that the simulation results for the hypotheses in the study model with other parameters correspond to the results found in the literature. In the future when more precise data can be applied for analysis, the interior parameters of this model could be used as a reference to avoid impractical assumptions.

Additionally, the practical implications of this study include the identification of the research questions and some suggestions for management policy. The two research questions proposed before providing answers were as follows:

Research question 1: During the ERP software customization process, will the solutions (i.e. cooperative, competitive, or avoiding) adopted by a company to handle the conflicts of team members affect project performance? (To answer this question, Figure 9 can be used as a reference) The settings and adjustments based on the collected data could not create a breakthrough effect on the entire system. However, conflict management does have some effects on other indexes, such as innovation, research, and design.

Research question 2: Among all the different methods available to solve conflicts, which type of conflict management will better stimulate team members to think and enhance their innovation ability? (This question can be answered through examining Figure 9) According the simulation, avoiding conflict management provides the least benefits to innovation ability, and cooperative conflict management result in the most.

As to this ongoing research, we confirmed the relationship between transformational leadership and conflict, where conflict management does have some effects on other indexes, such as innovation, research, and design. The quantity of custom modules exhibited some differences because of different conflict management types, but there was little difference in the complete module. Therefore, the settings and adjustments based on the collected data could not create a breakthrough effect on the entire system. However, according the simulation results, avoiding conflict management provides the least benefits to innovation ability, and cooperative conflict management produces the most.

We intend to conduct more in-depth exploration by adding more variables, parameters, and data.

This study provided some managerial suggestions suggesting that in D company, the most suitable project leader is someone who is able to cheer up team members, one who continuously emphasizes the goals in the project process, and one who encourages team members to participate actively when encountering problems. However, Jehn (1995) suggested that conflict is an enduring truth in a team and that it deeply affects the result of team work. In human resource strategy, transformational leadership can reduce conflict effect and enhance performance according to the research results. If an executive expects something to change, he/she should be looking for different transformational leadership types (including a total of six types) as an organization resource policy.

This case study is in its preliminary stages, and further development is necessary to obtain a more accurate model. The model is based on previous studies and interviews, and most of the constructs and relationships in the model have a theoretical foundation, so some of the parameters and assumptions should be further validated by other research methodology or data. The model also should be verified by researchers and executives to further validate the model and ensure its robustness.

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