A System Dynamics Study of Enterprise Value Creation~ the Example of Taiwan's SMEs

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Abstract

With the globalization of economy, industries are facing increasingly greater challenges. Business integration, both internally and externally, is undoubtedly an important topic. However, how does an enterprise create its own value will be the key to an enterprise's success in the future. Therefore, this study bases on the evaluation of company value to assess the key factors and competitive strategies of an enterprise. Yet, only with stable enterprise performance can the company value be correctly evaluated. This will be an important issue for enterprise performance and business strategy. Subject of this study are mainly small and medium-sized enterprises (SMEs). Model construction for SME value assessment is established through the system dynamics approach. Scholars' opinions on literature validation and application of Delphi Method are explored through literature review on local and foreign studies, in order to compile the relevant perspectives and indices for enterprise value creation. Hence model construction of the value creation system is established, and the correlation between the perspectives and related factors is explored to understand the overall dynamics model of SMEs' value creation system. Consequently, a research method based on the system dynamics perspective is provided for the study of enterprise value creation is provided, as policy reference for improvement of decision-making and value creation.

Key Words: Value Creation, System Dynamics, Small and Medium-sized Enterprise, Delphi Method

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1. Introduction

With the rapid industrial development and the rigorous competition of local enterprises, value creation within an enterprise will certainly become the key factor for its success. And enterprise evaluation is beneficiary to the creation of its value, and may provide entrepreneurs and managers with an effective tool to maintain its competitive edge in the industrial development and changing environment. With the globalization of economy, industries are facing increasingly greater challenges. Business integration, both internally and externally, is undoubtedly an important topic. However, how does an enterprise create its own value will be the key to its future success. Therefore, based on the evaluation of company value, the key factors and competitive strategies of an enterprise are assessed. With a stable enterprise performance, its current status can be analyzed and future performance can be evaluated and predicted, and this will constitute value for each level of an enterprise and help enterprise's decision-making. However, factors affecting the assessment of enterprise value are multifaceted, and hence can be highly unstable. So finding a suitable evaluation method and model is the very means to correctly assess the company value of an enterprise. This will be an important topic for enterprise performance and business strategy. In enterprise value management, emphasis on performance evaluation is becoming more and more important. And in the framework of value management development, how to integrate management with each level of operation and make a smooth business operation become very important issues. For the method of assessing enterprise value, not only a suitable evaluation method is proposed to achieve the result of evaluation, but also the relevant perspective models are established for the internal workflow of the enterprise and for value creation. It is only in this way that each department and level of operation in the enterprise can complement each other and run smoothly, and so major aspects of enterprise performance can be profoundly explored for an understanding of the enterprise's real value.

Value management is a very important topic among industries recently, and most industries emphasize only the solution and evaluation of the assessment model, but ignore the correlation of various levels of an enterprise, and hence, fail to achieve the best operational model. This study compiles and analyzes local and foreign literature, and proposes the relevant perspectives and factors that affect enterprise evaluation. Furthermore, model construction for all relevant systems is established, and their difference and relation is discussed, so as to make an overall performance evaluation of Small and Medium-sized Enterprises (SMEs). This study targets mainly at SMEs, and focuses on the following aspects: (1) Discuss the perspectives and relevant factors of the assessment of SMEs' value management; (2) Understand the relevant perspectives of value assessment and the correlation among various levels of operation; (3) Validate the difference and correlation of relevant perspectives with the Delphi expert questionnaire; (4) Establish the model construction for SMEs' value creation with the system dynamics approach.

2. Literature Review

2.1 Definition of SME

The SMEs play an important role in the rapid economic development. They provide free competition in the market and good services, create job opportunities and incubate excellent professionals, promote social advancement. Consequently, SMEs' operational problems and their value creation in the changing environment and under industrial competition become important issues. Different countries have different definition for SMEs, and their general characteristics are "small in scale," "weak competitiveness," "numerous in numbers," etc. Due to the different national situation, environment, economic development of different countries, their definition for SME differs as well. Therefore, we can see that definition of SME varies, and should be flexibly adjusted according to the characteristics of different industries [15]. In Taiwan, SME is defined according to the "Criteria for Small and Medium Enterprises" amended and announced by the Ministry of Economic Affairs in 2000. SMEs are enterprises with legal company registration or business registration that fulfill the following criteria: (1) In manufacturing, construction, mining and quarrying industries with paid-up capital under NT$80 million; (2) In agricultural, forestry, fishery and husbandry industries; public utilities; commercial sector; transportation, warehousing and communication industry; financial, insurance and real estate industry; commercial service sector; social and personal service sector with an annual sale turnover in the previous year less than NT$100 million.

Based on the guidance provided by various authorities, the following number of full-time employees may be used as the identifying criterion for specific industries, which then are not subject to the restriction of the above regulations: (1) In manufacturing, construction, mining and quarrying industries with number of full-time employees less than 200; (2) In agricultural, forestry, fishery and husbandry industries; public utilities; commercial sector; transportation, warehousing and communications industry; financial, insurance and real estate industry; commercial service sector; social and personal service sector, with number of full-time employees less than 50. Moreover, the SMEs meeting the following criteria are called small-scale enterprises (hereafter referred to as small enterprises): (1) In manufacturing, construction, mining and quarrying industries with number of full-time employees less than 20; (2) In agricultural, forestry, fishery and husbandry industries; public utilities; commercial sector; transportation, warehousing and communications industry; financial, insurance and real estate industry; commercial service sector; social and personal service sector, with number of full-time employees less than 5 [15].

2.1.1 Characteristics of SMEs

In the industrial transformation, SMEs' ability to keep their steady growth lies in some of their characteristics, which make them capable of smooth growth and development towards

internationalization under the rapidly developing economy. These operational characteristics of SMEs are described below [15]:

1. Energetic entrepreneurship: Since owners of SMEs possess sufficient autonomy and are responsible for their own success or failure, they are highly motivated for venture and full of risk-taking adventurous spirit. They work overtime, break through difficulties and work hard for themselves, for business opportunities and for profits.

2. Sensitive responsiveness: Due to their small scale and low investment, SMEs could enter and leave market easily. Therefore, they are highly flexible and responsive to changes in the environment and the market.

3. Tendency towards export-orientation: SMEs in Taiwan are export-oriented. Large enterprises provide raw materials and services for their processing, manufacturing, transportation and sales. Altogether they form a mutually beneficial and inter-complementary economy, and lead to a phenomenon that "small enterprises dominate the overseas; large enterprises dominate the domestics."

4. High business risk with little resources: SMEs can be established easily and closed quickly, especially in the first few years of establishment. Since resources are little, they may easily wind up due to poor operation if the entrepreneur is not capable.

2.2 Value Management

Before an enterprise proposes its value management, it has to make considerable evaluation first, so that the enterprise could achieve better operation. How to create its value during the value management process is a very important topic. Based on the compilation and analysis of relevant local and foreign literature, this study proposes the relevant perspectives of value assessment, and suggests the establishment of an overall construction system for value management. In this section, local and foreign literature on value management is reviewed to organize the relevant studies on enterprise value management. The result is shown in Table 1 below.

Table 1. Definition of value management

Scholars	Definition
Armitage and Fog [38]	Value based management (VBM) is the description of a management philosophy built on the principle of creating economic benefits.
Department of Energy [55]	A team of qualified members performed analysis on the performance, reliability, quality, safety, cost of service life, and operating function for the improvement of products, systems or procedures.
Condon and Goldstein [49]	Value based management is a management philosophy, which uses analytical tools and procedures to make the organization focus on the single objective of reinforcing shareholder's value.
Liu and Mei [70]	It is a service that develops from concepts to completion by examining decision-making of the enterprise's value system, and to commission for the maximization of the project's functional value. VM is an organized method to provide necessary functions with the lowest cost, and an organized way to identify and eliminate unnecessary costs.
Simmes [86]	Value based management is a management approach to maximize shareholder's value by earning an excess return over the cost of capital.

2.3 Empirical Studies in Local and Foreign Literature

Most literature on value assessment worldwide focuses on evaluating the effectiveness and relevance of the evaluation models. There are relatively less studies on the application of enterprise value and the assessment indices. Local and foreign studies that explore the evaluation models of value creation in different industries are organized in Table 2 as follows.

Table 2. Summary of local and foreign literature on value creation

Presenting scholars	Subjects of study	Literature summary
Huang [23]	Food industry	Listed companies in Taiwan are subjects of this study. Discounted free cash flow model, discounted abnormal earnings model, price-earnings (P/E) ratio, price book value (P/B) ratio, price cash flow ratio are used to analyze the result, for comparing the difference between the theoretical value and actual value of a company, and exploring the relevance of different evaluation models on food companies.
Hua [7]	Chunhwa Telecom	This study employed Copeland's cash flow evaluation model to explore the enterprise value, and to compare the evaluated results with actual share price for validating the effectiveness of the model, and to conduct discounted cash flow assessment for processing data. Moreover, with sensitivity analysis, all assessment variables' impact on the stability of enterprise value assessment was examined. And the assessment variables were analyzed for their policy implications to entrepreneurs and managers.
Yeh [26]	Electronic industry	The author used seven evaluation models: Free cash flow to the firm (FCFF), free cash flow to assets (FCFA), economic value added (EVA), P/E ratio, book value ratio, sale ratio and option pricing, to assess 61 electronic companies and 61 non-electronic companies listed before 1997 for the individual share prediction differences of the sample companies from 1997 to 1999. T-test was used to determine whether there was significant difference between electronic and non-electronic companies using various evaluation models. Results showed that FCFF had the most accurate prediction on electronic companies, followed by EVA and then P/E ratio.
Chiou [8]	Electronic engineering industry	The author used six evaluation models to assess the electronic engineering industry in Taiwan, namely discounted cash flow model, discounted accounting earnings model, P/E ratio, book value ratio, sales ratio and option pricing. This study took 22 listed electronic engineering companies which were listed before the end of 1999 as the subjects of study, the period from 1992 to 1999 as the model establishment period, and from 2000 to 2003 as the model prediction period. Correlation analysis, Theil's U value and sales percentage were used as the studying methods. It could be seen from the predictive performance index and Theil's U value that book value ratio was the best predictive model.
Chen [18]	Service industry	It is the enterprise evaluation analysis of President Chain Store Corp. The study evaluated President Chain Store Corp., the company in case, based on its financial reports from 1996 to 2001. The chain stores' profitability, risks and potential for future growth was explored from the financial reports in recent years. Breakdown analysis was carried out on President Chain Store Corp's key factors of value for its evaluation. Evaluation analysis was made with discounted cash flow model, with DCF earnings-oriented and DCF sales-oriented approaches of assessment, and then a reasonable value of the enterprise could be evaluated.

Huang [22]	Information electronic industry	The information electronic industry in Taiwan was chosen as the subject of study, with the economic value added (EVA) as the assessment index of the companies' finance. Value creation of upstream, mid-stream and downstream synergic manufacturers in the information electronic industry was explored. Objective of the study was to understand the different value creation model of different manufacturers, and that EVA has considerable influence on the financial policy of an enterprise.
Chen [17]	Electronic industry	Three evaluation methods, namely traditional discounted cash flow (DCF) model, adjusted present value (APV) model and P/E ratio, were used to assess the actual value of enterprises, and to scrutinize the difference between actual value and market price of the enterprises. Investment decision was made based on this difference. Results found that P/E ratio showed the smallest difference between theoretical price and market price, followed by APV, and DCF showed the largest difference. Investment performance was positively related to the price difference. The reason why the DCF generated the largest difference between theoretical price and market price was guessed to originate from the fact that electronic manufacturers tended to have extremely high re-investment rate, and so earnings growth rate is also high, leading to a higher theoretical price than the market price.
Ferguson and Leistikow [60]	Company internal	The study calculated the company's net assets with NOPAT, and compared the relation of economic value added (EVA) and refined economic value added (REVA) with abnormal stock returns. Management decision that increases shareholders' wealth is similar to abnormal stock returns, and the elements of abnormal stock returns are related to the value of these decisions measured by the management decision. But if the returns scheme is based on abnormal stock returns, it may maximize wealth or lead to unnecessary major mistakes. The EVA basic returns scheme may avoid being related to abnormal stock returns, and hence prevails over REVA.
Baker [42]	Company internal	In this study of value creation and destroy of the Beatrice Company, the analysis provided various findings that can systematically explain the enterprise value created by conglomerate merger, but the acquisition targets of this type of merger are limited to small companies. What need to be assessed are the various financial and management resources that the acquired companies may bring to the merging company. Such transactions could eventually generate substantial economic benefits. Moreover, it can be proved from the history of Beatrice that organizational structure and company governance are important to the creation of economic value. For value creation in Beatrice, internal policies and organizational structure did play a significant role.
Berger et al. [44]	Company internal	It proposed that the company value would reflect the put value that its shares contained, that is, the liquidation value at which the company would be given up to the creditors. Analysis was conducted on selected samples which were more relevant to liquidation value. In fact, evidence showed that when the cash flow with the continued operation expectation being controlled, share value would increase with the liquidation value.
Damodaran [53]	Company internal	The enterprise value of Amazon.com was evaluated with the DCF model. It was thought that with the sales growth rate and earnings growth rate at that time, the enterprise value should not be able to support the share price. After this, Amazon's share price fell to the evaluated value.

2.4 Enterprise Evaluation

Most of the past literature emphasizes the proposal of value evaluation model in an industry to study the assessment of value, rather than the process of value creation. In contrast, this study aims at a less touched on part in the past literature, that is, the value creation process. Relevant local and foreign literature was collected, and literature review was conducted to validate and organize the process of value creation. The process concluded here was used as the value creation process framework in this study. In addition, this study explored the system dynamics model, which was constructed from a system dynamics perspective.

2.4.1 Value Creation Process of Enterprises

This section focuses mainly on the compilation and organization of major research results of local and foreign scholars on the topic of enterprise value creation in recent years. Due to the increasingly rigorous industrial competition in recent years, how to create company value through the relevant factors of its value creation becomes more and more important for enhancing the company's competitiveness. Since there are many scholars studying the topic of enterprise value creation, and scholars' views and opinions are highly similar, this section organizes the literature on past studies, and selects representative scholars and their research findings. Major concluding factors in the past literature are organized and numbered in Table 3 as follows.

Table 3. Numbering of value creation process

No.	Major factors	No.	Major factors
1	Aspiration and goal	8	Structural decision-making
2	Investment portfolio management	9	Strategic coordination
3	Internal improvement	10	Resources allocation and planning
4	Organizational design	11	Benchmark setting
5	External improvement	12	Communication of value
6	Value driving factors	13	Awarding system
7	Performance management		

After literature validation of the above table, this study adopts the value creation process proposed by Copeland, which is more representative, for the establishment of system dynamics model construction.

3. Research Method

This study builds the model construction of enterprise value creation with system dynam-

ics, and use the system dynamics software Vensim 5.0 as the tool for constructing the system dynamics diagram. The research method and framework of this study are described and analyzed below, supplemented with exploration and discussion of past studies on system dynamics.

3.1 System Dynamics

3.1.1 Definition and Origin of System Dynamics

System dynamics was first brought up by the American researcher Forrester in 1956, when a computer-simulated model was created, which integrated an experimental method of systematic analysis, decision-making theory and information feedback control theory to form an overall theoretical basis [52]. It was mentioned in Hsieh's book [32] that system dynamics was a method to study the behavioral characteristics of an organization or enterprise's system dynamics. How the structure, policy and delay of an organization or enterprise's systems would interactively affect the growth and stability of its systems was illustrated through the analysis of internal information feedback process and the computer simulation. It is done mainly by establishing an enterprise and company model to determine the organizational structure of the enterprise, the actual situation where business decisions take place within the enterprise's systems, and how it affects the success of the enterprise's operation.

3.1.2 Characteristics of System Dynamics

It is stated in Deng's book that since system dynamics integrates the message feedback, decision-making theory and computer simulation technologies, it may effectively analyze the problems that the enterprise systems face [31]. And in Tao's book, he mentioned that system dynamics mainly probes into the relation of structure and behaviors, and has five major characteristics [20]:

1. High-level complexity: When establishing a model, an extremely important question is which level should be included in the model, and these levels determine the complexity of the model. System dynamics deals with systems of high-level complexity, and may describe the complicated factors between quantity and variables.

2. Feedback: It means that the behavior of an initially triggering element would be affected in return by the transmission of other factors or the effect of a series of elements. It explains how different actions may mutually reinforce each other or offset each other, including reinforcing feedback and regulatory feedback. And reinforcing feedback may have benign cycle or vicious cycle, while regulatory feedback is typically the source of stability and resistance.

3. Non-linear: the relation between elements may be non-linear, or even if it is linear, the interactive relation may show a non-linear pattern because of the feedback process.

4. Interweaving: The real world is interwoven with many causes and effects, but due to limited information or experience, only segments on this interwoven chain are seen. This kills a lot budding systematic thinking. In fact, the feedback cycle cannot sufficiently represent the complexity of relation among elements in an enterprise or social organization, because each question involves some reinforcing and regulatory feedback non-linear relation, being interrelated and interwoven.

5. Delay: Time delay happens when the impact of one variable on the other takes some time to reveal. Longer or shorter time delay exists between any action and its result. In fact, there is certain degree of time delay for all feedback processes, but such delay is usually not obvious enough to be noticed and to cause fluctuation, and hence to add to the dynamic complexity of the systems. Therefore, it may make improving actions over-corrective, which exceed the effective preset goal.

3.1.3 Steps and Tools of Model Construction

In Hsieh's [32] book on system dynamics, he proposed some basic model building and experimenting steps that should be followed when conducting studies on enterprise systems using the system dynamics approach. These basic steps provide good reference for the experiment in this study. They are:

1. Goal setting: Set the goal of the dynamic system development and define the problem that needs to be solved.

2. Description of the system's status: Describe factors that affect the problem, and explain the interrelation of all factors.

3. Construction of mathematical model: Construct a mathematical model according to the goal of the model and the interrelation of various factors.

4. Simulation: Replace the real system with the model developed from Step 3 to simulate the operating situation of the real system.

5. Elaboration: Elaborate the simulation result.

6. System rectification: Revise the system structure or policy according to the elaborated result, so that the model bears greater resemblance to the real system and achieves the best result.

7. Repetition of experiment: Repeat the aforesaid steps of review, amendment and experiment, to improve the performance of the system until its actual run.

3.2 Local and Foreign Empirical Studies on System Dynamics

This study collates and organizes local and foreign literature on system dynamics, to probe into the use of system dynamics in various industries, and discuss the correlation and relation among the industries. It goes deeper into the operation and analysis of system dynam-

ics, and hence establishes the system dynamics perspective of value creation, for increasing the benefits generated from value creation. Table 4 below summarizes the system dynamics literature organized in this study.

Table 4. Summary of literature on system dynamics

Presenting scholar	Subject of study	Summary
Forrester [62]	Supply chain	Use the Dynamo software to build the system dynamics model for supply chain, and discuss the bullwhip effect. Make use of this effect to reduce time delay and adjust a suitable feedback cycle to solve the fluctuating phenomenon.
Wall *et al.* [95]	Manufacturing industry	Propose a dynamic behavioral model for the study of inventory policy, financial policy, suppliers, customers and competition of a manufacturing company, and point out that shortening inventory adjustment time when sale fluctuation is great will result in even bigger fluctuation, and hence loss of market share for the commodity. The proposed model focuses on manufacturing organizations with a single product, and the discussion on policies tends to be theoretical, so this is not suitable for applying to the inventory policy analysis of retail industry.
Alonson and Frasier [36]	Enterprises	Use system dynamics to discuss the just-in-time (JIT) inventory policy's impact on the company's profit under different degrees of sales fluctuation. Conclude that company's profit will be affected because of planning and management delay. And due to uncertainty in demand, the delayed time will be even longer, leading to greater decline in inventory and profit. It is also stated that the JIT inventory policy will improve company's profitability more effectively during great sales fluctuation than during steady sales fluctuation.
Towill [93]	Supply chain	The bullwhip effect was called "supply chain dynamics" phenomenon. It is based on the Forrester's model, making use of system dynamics to discuss the dynamic changes of supply chain, in an expectation to avoid fluctuation arising from overstock.
Tung [28]	Semiconductor industry	Develop Taiwan's semiconductor production and sales model with the system dynamics simulation approach, in order to analyze the changes of demand in the IC market, and the impact of such scenarios as establishment of production center, sudden reduction in raw materials, etc. on the semi-conductor production and sales model. Through this, the interactive relation between different manufacturers is simulated and studied.
Chang [12]	Semiconductor industry	Mention seven different policy scenarios' effect on the production and sales of semiconductors, and integrate with the inventory management approaches, to provide a reference for decision-makers at that time. But no consideration has been put on the environment aspects such as long-term development and global trend. Analysis was made only on the domestic supply structure.
Li [5]	Supply chain manufacturers	Discuss how the relevant components and finished products are affected under the BTO model after our manufacturers have established warehouse center in the local market, and then probe into the interactive relation of inventory management between the supply chain manufacturers. However, the study did not explore the feasibility analysis of relocation of Taiwanese production bases, and the evaluation of strategic alliance among domestic suppliers of related components.

Chen [16]	Automobile industry	Present the supply chain characteristics of Taiwan's automobile industry by means of questionnaire interviews and literature review. Special attention was given to major auto makers and parts manufacturers in Taiwan. The current operation of physical material and information flow was organized and analyzed.
Chan [27]	Military weapons	Construct the major weapon system development model in Taiwan with the system dynamics approach. It is used to interpret the impact created by the domestic weapon systems acquisition policy on the R&D competence development of Chung-Shan Institute of Science and Technology.
Cheng [30]	PC industry	Discuss Taiwan's PC industry in three different production environments, i.e., MTS, MTO, ATO, with different inventory policies, and different styles of demand. Simulated analysis was conducted with the model constructed by the STELLA software. Finally, gray relevancy analysis was used to find out the best mix of inventory policies.
Shih [10]	Taiwan industries	Construct dynamic models for different industries of Taiwan with the system dynamics approach. Explore the different strategic choices and analyses of various industries. The results were provided for entrepreneurs' reference.
Chiou [9]	Automobile industry	Explore the center satellite system network of Taiwan's automobile industry. Build a simulated model of the supply network with the system dynamics approach. And the simulated model was used to conduct experimental analysis, for identifying the efficiency relation of the interactive model between environmental factors and the supply network.
Huang [21]	Enterprises	Attempt to build a financial planning model that may assist financial decision making, in expectation to incorporate the principles of system dynamics, and the spirit and practices of objective management. Construct the "corporate dynamic financial planning model" by applying the simulation tool of system dynamics, to provide a financial planning tool that is capable of repetitive simulated computation, and help enterprises revise their financial activities in a timely and proper manner. Hence, the result of enhancing operational efficiency can be achieved.
Kao [11]	National health insurance	Build the model and policy analysis theory and practice by adopting system dynamics, and construct a model that conform to the current financial status of the national health insurance system, in order to find out major factors that affect its financial status and the scope of the effect. Conduct tests on some feasible suggestions proposed in the relevant literature, trying to understand results of the suggested arrangement under this model. Test whether some improvement measures are feasible under the existing system, in the hope to contribute to the sustainable operation of the national health insurance program.
Deng [31]	Information industry	Make use of the system dynamics simulation method to analyze the industry's global logistic management, in order to understand its impact on the production and sales system. At the same time, the possible changes that the industry may have to face in the future are analyzed with the scenario simulation method, so that reference may be provided for enterprises in developing their global logistic management.

3.3 Framework of Enterprise Value Creation

Based on the compilation and analysis of local and foreign literature in Section 2, and with the value creation theories proposed by many local and foreign researchers, this study summarizes five value creation procedures recognized and agreed by most local and foreign researchers among the 13 major value creation procedures. Therefore, among the scholars proposing these five major value procedures, this study chooses to use Copeland's [50-52] value creation process as the research framework. The framework is used for the model construction of the system dynamic perspectives. Analysis and model construction of individual sub-systems in the framework of enterprise value creation process are conducted. Cause-and-effect cycle analysis of various sub-systems is done according to this research framework. Major research procedures are divided into five main parts, detailed as follows:

1. Confirm business philosophy: At the beginning of the basic principle of corporate value creation, a strong tool is needed to help the company achieve its goal. What the company needs to explore is how it can link values together, how to ensure coordination among the company and employees and how to set the goal and aspiration. These are extremely important issues. Effective business philosophy will push the company up to the best value creation [19].

2. Conduct investment portfolio management: A company must determine the degree of conformity of its current investment portfolio with its aspiration. Establishment of investment portfolio is not only a financial task, and so the company's investment portfolio must be able to incorporate its own strategic advantages, so that the company may continuously seek opportunities to improve its performance. Three aspects (strategy, performance, growth) of investment portfolio management are used to manage the company's future growth path. If the company's investment portfolio is in a good condition, it is helpful in the performance management perspective for an in-depth exploration of the organization and value creation [19].

3. Set down design of organizational structure: For value creation, having suitable organizational design in suitable place is very important, because it ensures the systematic execution of aspiration and strategies involved in value creation. Organizational design is an essential factor influencing value creation management. Organizational structure may obstruct or enhance performance in a number of ways. The core of a company should reflect the source of its advantage, and a company that may successfully enter a market is probably the most suitable for that market. The issue of in-depth discussion of organizational orientation may narrow down the definition of value-based management. But when a company attempts to make major changes for the creation of value, it will find that issues relating to organizational orientation are still very important [19].

4. Improve workflow management: In company workflow management, emphasis should be put on internal improvement and external improvement. Internal improvement lies mainly in the establishment of value driving factors. The process of defining value driving factors may help managers in the following three aspects. Firstly, it helps managers and aides understand how value is created, and how to maximize the company's value. Secondly, it can help manager to prioritize the driving factors, and decide the allocation of resources. Thirdly, it may hold managers and staff of a company together to achieve the high-priority objectives. In external improvement, major focus lies in the information based on which investors make their resources allocation, investment decision and decision workflow. Investors must accurately identify the major objectives and strategies of the company, and must be able to implement and finish them with their management competence. They must also focus on market evaluation and the company's strategic plan. After the workflow management is improved, the company may achieve better performance in its future growth [19].

5. Establish performance management: Establishing performance management is mainly distinguished as managing business performance and managing personal performance. To enhance corporate performance, objectives of different levels in the company have to be integrated. Business performance management is usually the key to value management. Through this activity, managers may introduce value assessment indices, value driving factors and the objectives pursued into their daily activities and decision making. To ensure a good business performance management, three major parts must be properly dealt with. Firstly, business entities must have clear strategies for creation of value. Secondly, objectives must be set down, and explicitly linked up with specific value driving factors. Thirdly, performance has to be regularly audited, to understand the achievement of key performance indices. On the other hand, when a company is conducting personal performance management, a process than links personal behaviors with overall value creation activities is needed. Incentives that stimulate and award personal high performance are also needed. Just as business performance management, the process of personal performance management should include objective setting and performance auditing. Personal objectives should be linked with the key performance indices within one's responsibilities, so that business objectives and personal objectives are consistent [19].

This study focuses mainly on the "business philosophy," "investment portfolio management," "design of organizational structure," "workflow management" and "performance management" in the value creation process for perspective analysis, and it seeks to understand the causal relation between various perspective variables after the analysis. The basis of the system dynamics model is hence established.

4. Empirical Analysis

4.1 System Dynamics Analysis of Value Creation Sub-systems

According to the literature review in Section 2, Copeland's value creation process is chosen as the basis of constructing the system models, and it is distinguished mainly into five sub-systems. Correlation of the perspectives and factors of various sub-systems are explored, to establish the causal relation and sketch out the causal cycle diagram. Table 5 and Figure 1 below show the causal relation chart of value creation and causal cycle diagram.

Table 5. Causal relation chart of value creation

Variables (Causes)	Variables (Effects)	Relation	Description
Current company value	Assessed value	-	Conduct the value creation process according to the current company status, to assess whether the company has been creating value. Improvement and corrective actions are carried out during the value creation process. [Organized in this study.]
Assessed value	GAP	+	In assessing the company value, different opinions and suggestions of the company's management team and managers should be integrated and analyzed, while standardized criteria and procedures should be set down, to rectify the differences in perception. [Organized in this study.]
GAP	Business philosophy	+	Strictly conduct rectification of perceptual difference, to consolidate and unify the opinions of value creation, so that activities of the value creation process can be smoothly proceeded. [Organized in this study.]
Business philosophy	Current company value	+	In the company's business philosophy activities, understanding the basic principle of the company's value creation requires a strong tool that may help the company achieve its goal. In this way, the current company value, and how the company creates value in the future can be assessed. [46]
Business philosophy	Investment portfolio management	+	After confirming and planning the company's business philosophy, investment portfolio management can be proceeded. The company's investment portfolio must be able to incorporate its own strategic advantages, and continuously seek opportunities to improve its performance. Three aspects (strategy, performance, growth) of investment portfolio management are used to manage the company's future growth path. [46]
Investment portfolio management	Organizational design	+	After establishing investment portfolio management, the next essential task is to conduct internal organizational design of the company, because it ensures the systematic execution of the aspiration and strategies involved in value creation. Organizational design is an essential factor influencing value creation management. Organizational structure may obstruct or enhance performance in many ways. Core of a company should reflect the source of its advantages, and organizational design is the most important core and basic structure of a company. [46]
Organizational design	Workflow management	+	A sound organizational design of a company is mainly instrumental to the smooth operation of workflow management, so that the company may create better performance during the workflow management. [46]

| Workflow management	Performance management	+	Emphasis should be put on internal improvement an external improvement in workflow management of a company. Internal improvement lies mainly in establishment of value driving factors. The process of defining value driving factors may help managers and the management in assessing performance management. External improvement emphasizes mainly the information based on which investors make their resources allocation, investment decision and decision workflow. And investors must identify the company's major objectives and strategies. They must implement and finish them with management competence, focus on the market evaluation and the company's strategic plan. In the workflow management activities, corporate performance management may be enhanced through internal and external improvement. [46]
Performance management	Creation of shareholder's value	+	Establishing performance management in a company is mainly distinguished into managing business performance and managing personal performance. For enhancing the company's performance, objectives on different levels of the company have to be integrated for easy coordination and consolidation of performance management in the company. The most important goal is to push performance management up to the best condition, so that shareholder's value can be maximized. [46]
Creation of shareholder's value	Assessment of current company value	+	With the objective of creating shareholder's value, it is explored whether the value creation activities have achieved the company's standard, and this becomes the basis on which the company value is re-assessed. [46]
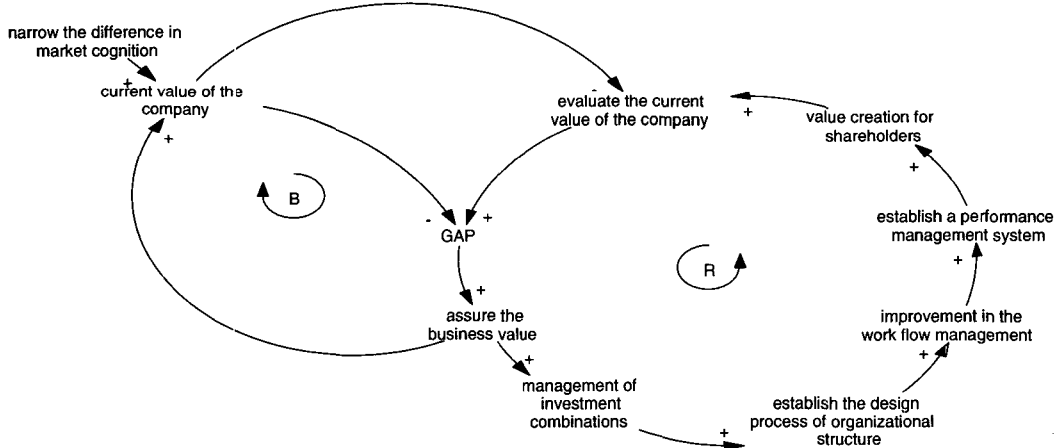
Figure 1. Casual loop of value creation flow

Based on the causal cycle diagram of value creation process in Figure 1, this study tries to establish the system dynamics models for all sub-systems one by one. And the result of literature validation and analysis is used to understand the causal relation of various sub-systems. Hence, the whole chain of value creation can be profoundly explored. After literature validation of various sub-systems, the result is analyzed, and the causal cycle diagram and system flow diagram are established and the correlation of various sub-systems is analyzed. The following sections will give detailed description of various sub-systems.

4.2 System Dynamics Construction of Sub-systems

Based on the value creation workflow of Figure 1, this study establishes the causal cycle diagram and system flow diagram for each sub-system. For the establishment of correlation of the sub-systems, the correlation index of various sub-systems is validated against the literature, so as to conduct the model construction and analysis.

4.2.1 Construction Model of Business Philosophy Sub-systems

Table 6 shows the results of literature validation, which are used as the basis for constructing the system dynamic causal cycle diagram and system flow diagram, as shown in Figure 2 and Figure 3.

Table 6. Correlation factors chart of business philosophy perspective

| Variables (Causes)	Variables (Effects)	Relation	Description (References)
Current company value	Assessed value	-	
Assessed value	GAP	+	Organized in this study
GAP	Value cognition	+	
Value cognition	Value orientation	+	[46, 51, 79]
Value orientation	Goal setting	+	[39, 46, 51]
Goal setting	Assessment index	+	[40, 51, 65, 70, 74]
Assessment index	Value driving factors	+	[51, 79]
Value driving factors	Quantified goal	+	[25, 46, 51, 79]
Quantified goal	Shareholder's value	+	[2, 51]
Core competitiveness	Goal setting	+	[24, 78, 81]
Shareholder's value	Assessment of current company value	+	[37, 46, 51, 72, 74, 79, 88, 94, 98]
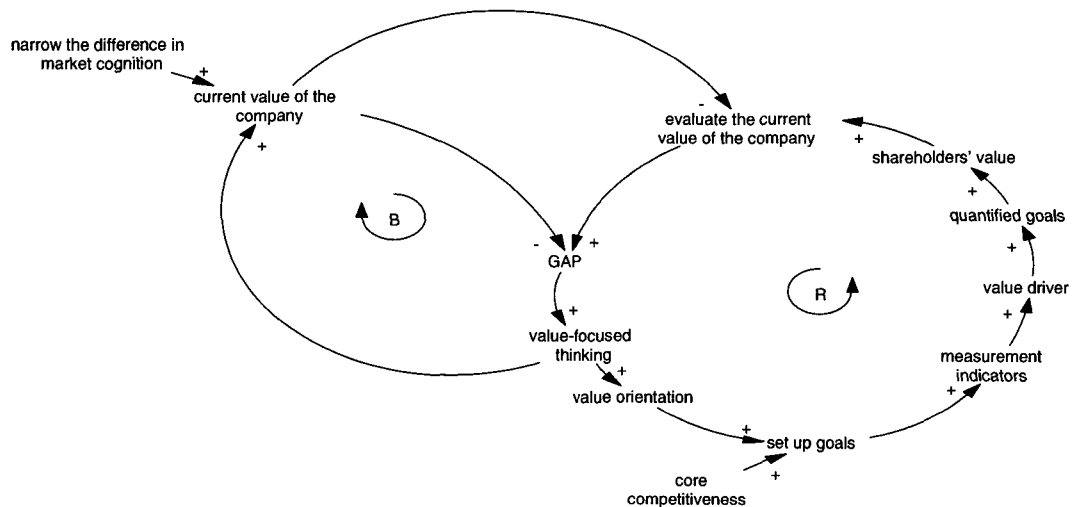
Figure 2. Casual loop of business value management
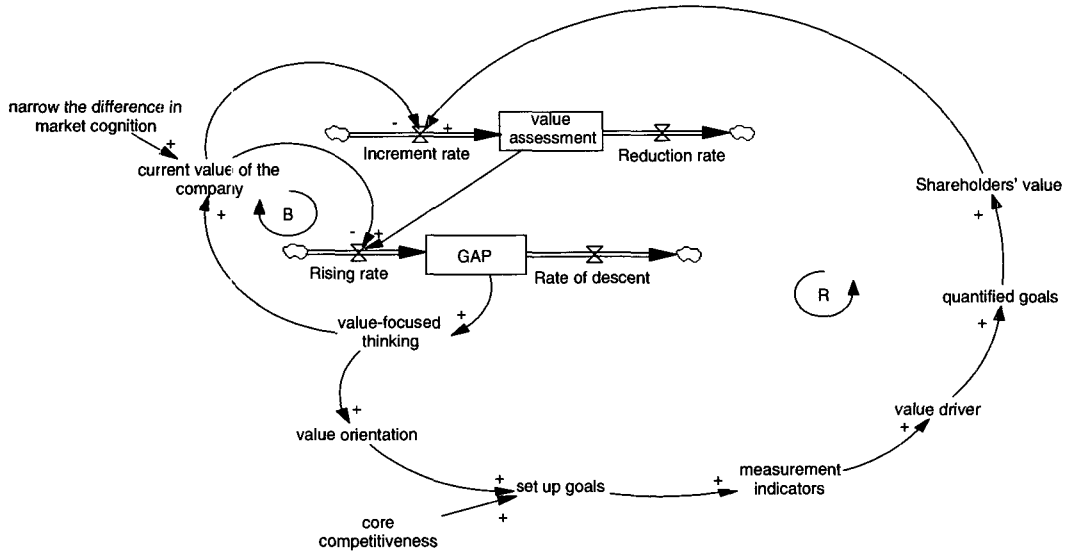
Figure 3. System flow of business value management

4.2.2 Construction Model of Investment Portfolio Sub-system

Table 7 shows the results of literature validation, which are used as the basis for constructing the system dynamic causal cycle diagram and system flow diagram, as shown in Figure 4 and Figure 5.

Table 7. Correlation factors chart of investment portfolio management perspective

| Variables (Causes)	Variables (Effects)	Relation	Description
Current value	Assessed value	-	
Assessed value	GAP	+	Organized in this study
GAP	Investment decision	+	
Investment decision	Strategic decision	+	[51, 57, 72, 74, 81, 88, 90]
Market-analyzed advantage	Strategic decision	+	[80]
Stock market	Strategic decision	+	[51, 72]
Strategic development process	Strategic decision	+	[51, 57, 76, 88, 90]
Strategic decision	Investor communication	+	[25, 40, 87]
Investor communication	External improvement and allocation	+	[40, 51, 72]
External improvement and allocation	Growth opportunity	+	[51, 72]
Growth opportunity	Financial forecast	+	[51]
Financial forecast	Cash flow	+	[47, 51, 74, 80, 92]
Economic profit	Cash flow	+	[37, 46, 51, 73, 74]
Cash flow	Assessment of current company value	+	[51, 54, 69, 81, 84, 96]
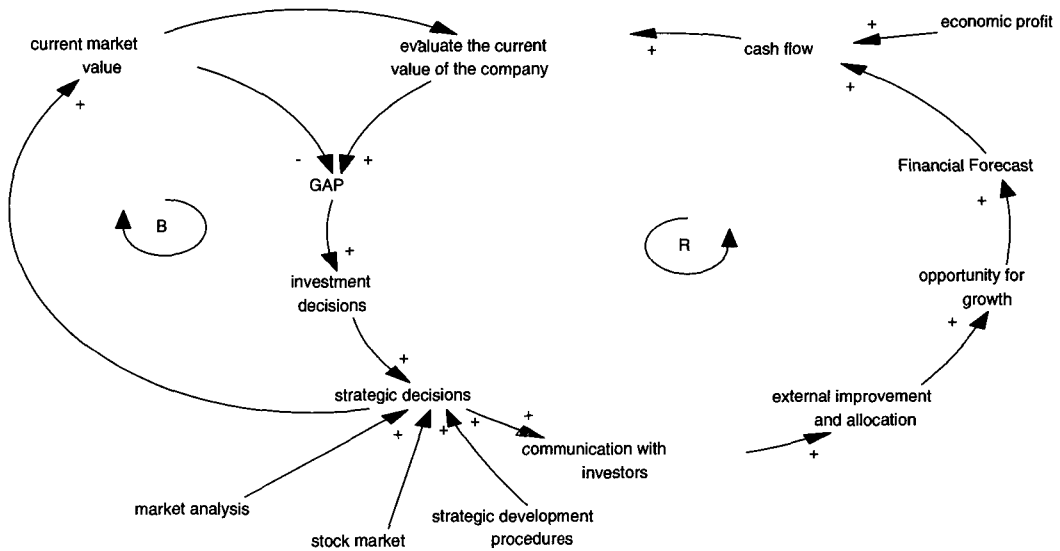
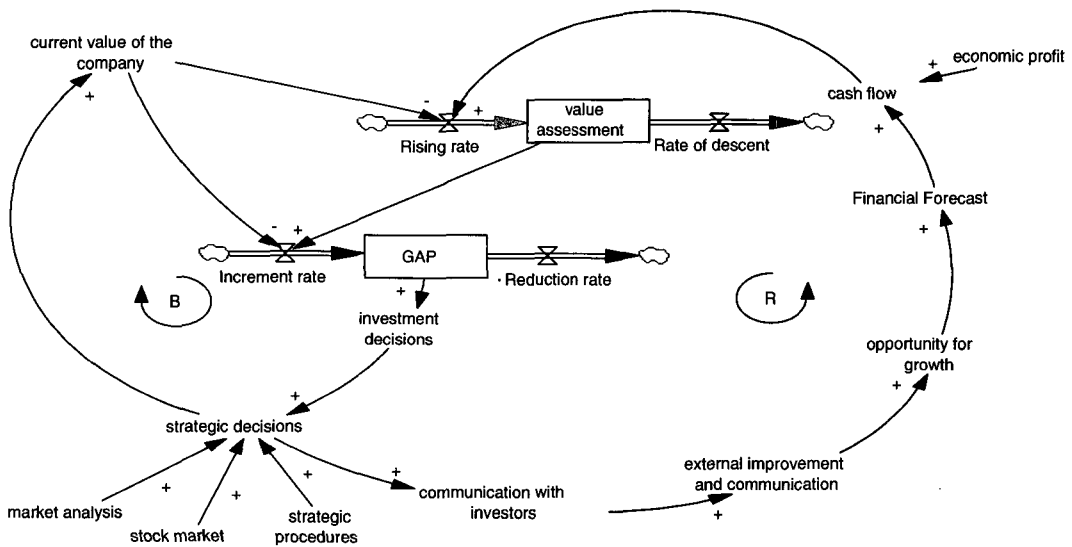**Figure 4.** Casual loop of investment combination management

Figure 5. System flow of investment combination management

4.2.3 Construction Model of Organizational Structure Sub-systems

Table 8 shows the results of literature validation, which are used as the basis for constructing the system dynamic causal cycle diagram and system flow diagram, as shown in Figure 6 and Figure 7.

Table 8. Correlation factors chart of organizational structure perspective

| Variables (Causes)	Variables (Effects)	Relation	Description
Current company value	Assessed value	-	Organized in this study
Assessment of current company value	GAP	+	
GAP	Company strategies	+	
Company strategies	Organizational structure	+	[40, 41, 58, 74]
Organizational structure	Internal design of organization	+	[48, 51, 61, 88, 95]
Internal design of organization	Organizational decision-making	+	[25, 43, 50, 74, 87]
Organizational decision-making	External influencing factors	+	[37, 74, 89, 90]
External influencing factors	Resources allocation and planning	+	[72]
Resources allocation and planning	Organizational coordination mechanism	+	[24, 40, 45, 58, 72, 73, 90]
Organizational coordination mechanism	Forecast of future prospect	+	[51]
Structural decision-making	Organizational coordination mechanism	+	[74, 97]
Forecast of future prospect	Assessment of company value	+	[88]
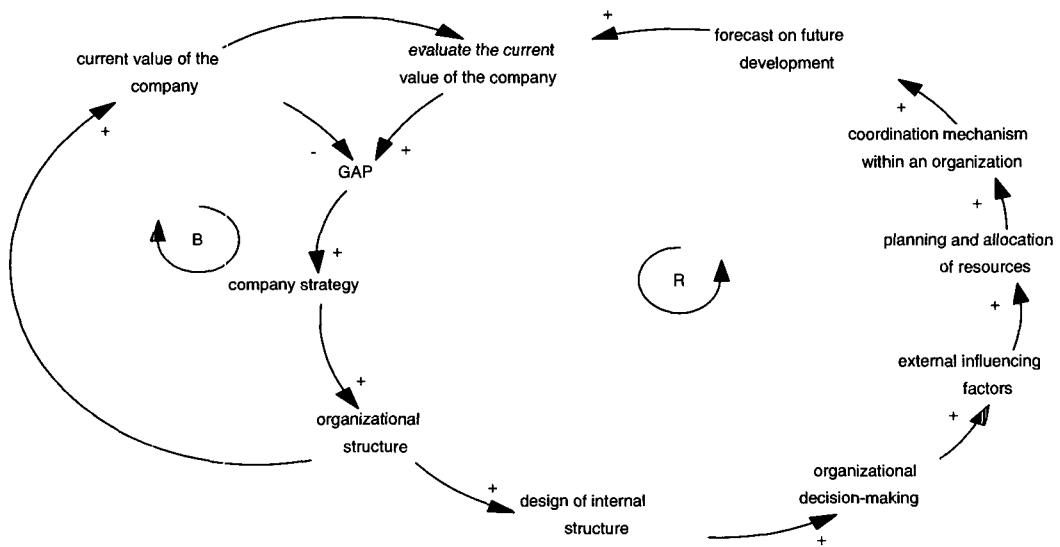
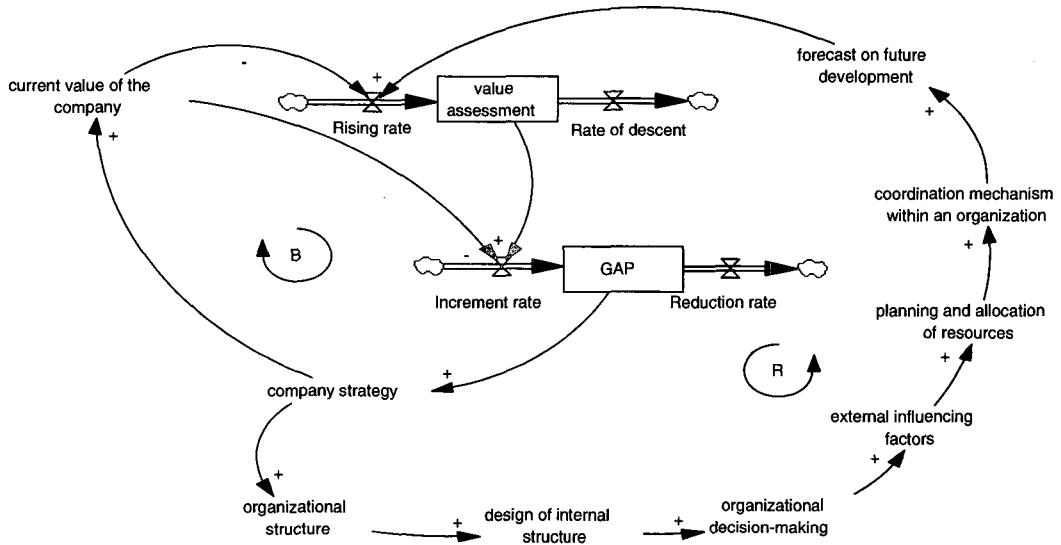**Figure 6.** Casual loop of organizational structure

Figure 7. System flow of organizational structure

4.2.4 Construction Model of Workflow Management Sub-systems

Table 9 shows the results of literature validation, which are used as the basis for constructing the system dynamic causal cycle diagram and system flow diagram, as shown in Figure 8 and Figure 9.

Table 9. Correlation factors chart of workflow management perspective

| Variables (Causes)	Variables (Effects)	Relation	Description
Current company value	Assessed company value	-	
Assessment of current company value	GAP	+	Organized in this study
GAP	Value driving factors	+	
Value driving factors	Brainstorming meeting	+	[24, 25, 37, 45, 46, 51, 69, 79, 82, 85, 96]
Brainstorming meeting	Prioritize driving factors	+	[19, 51]
Prioritize driving factors	Institutionalize	+	[19, 51]
Determine resources allocation	Prioritize driving factors	+	[40, 51, 72, 88]
Institutionalize	Key performance index	+	[51, 72]
Key performance index	Financial and operational index	+	[19, 51]
Return rate to capital injection	Creation of shareholder's value	+	[4, 50]
Financial and operational index	Operational performance	+	[39, 67]
Operational performance	Creation of shareholder's value	+	[51, 63, 72]
Creation of shareholder's value	Assessment of company value	+	[40, 74]
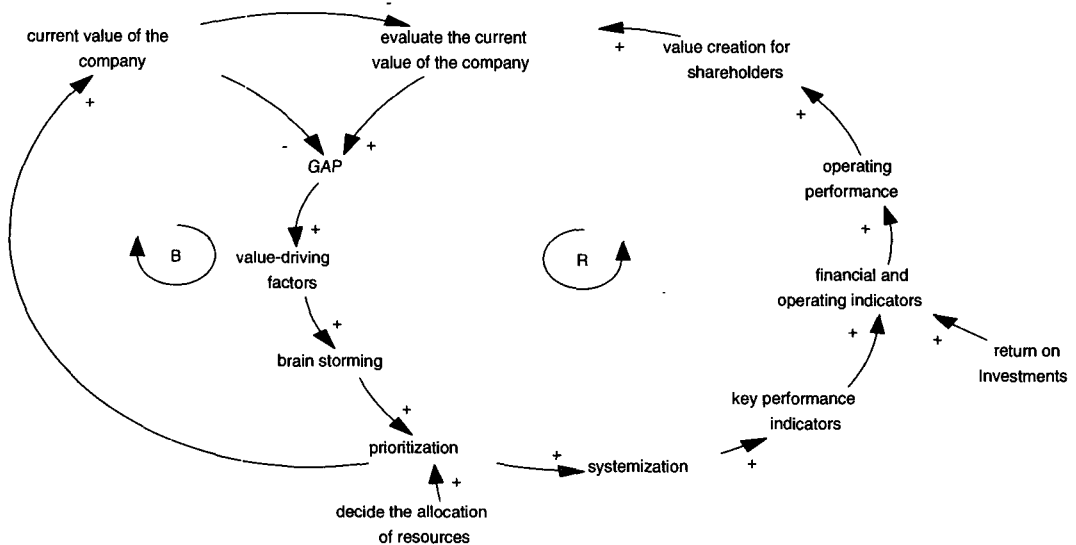
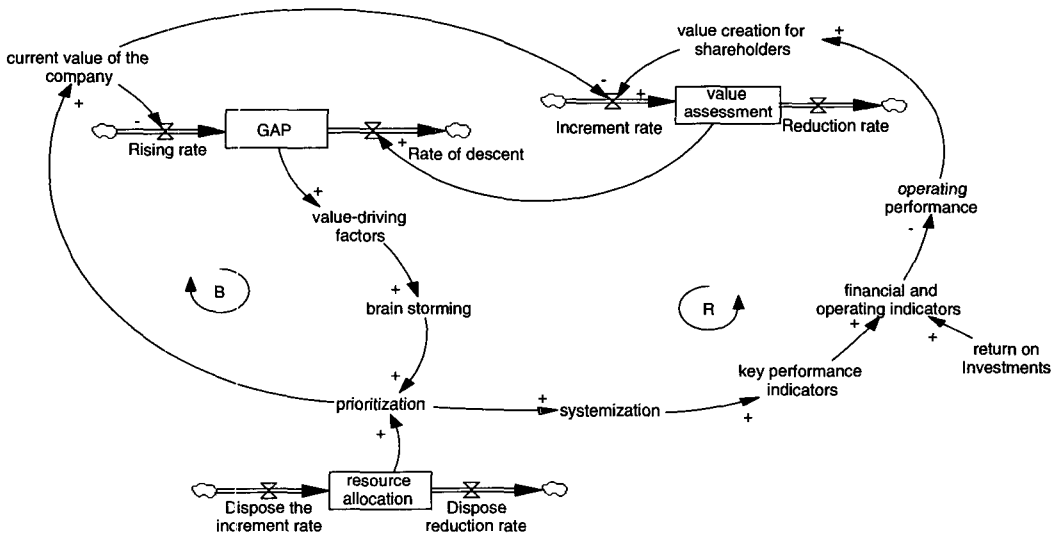**Figure 8.** Casual loop of work flow management

Figure 9. System flow of work flow management

4.2.5 Construction Model of Performance Management Sub-systems

Table 10 shows the results of literature validation, which are used as the basis for constructing the system dynamic causal cycle diagram and system flow diagram, as shown in Figure 10 and Figure 11.

Table 10. Correlation factors chart of performance management perspective

| Variables (Causes)	Variables (Effects)	Relation	Description
Current company value	Assessed value	-	
Assessment of current company value	GAP	+	Organized in this study
GAP	Market potential value	+	
Market potential value	Draft business strategy	+	[19, 51]
Draft business strategy	Goal setting	+	[3, 51, 58, 64, 83]
Competitors' goal	Goal setting	+	[21]
Industrial analysis	Goal setting	+	[3, 46, 90]
Award system	Goal setting	+	[3, 24, 25]
Goal setting	Performance of business units	+	[40, 51, 56, 68, 74]
Performance of business units	Cooperation of management positions	+	[3, 51, 58, 69, 71, 74]
Cooperation of management positions	Regular performance audit	+	[3, 90]
Performance assessment index	Regular performance audit	+	[46, 51, 72, 79]
Regular performance audit	Benchmark setting	+	[51, 58, 74]
Benchmark setting	Assessment of company value	+	[46, 51, 57, 58, 69, 72, 73, 79, 82, 84, 90]
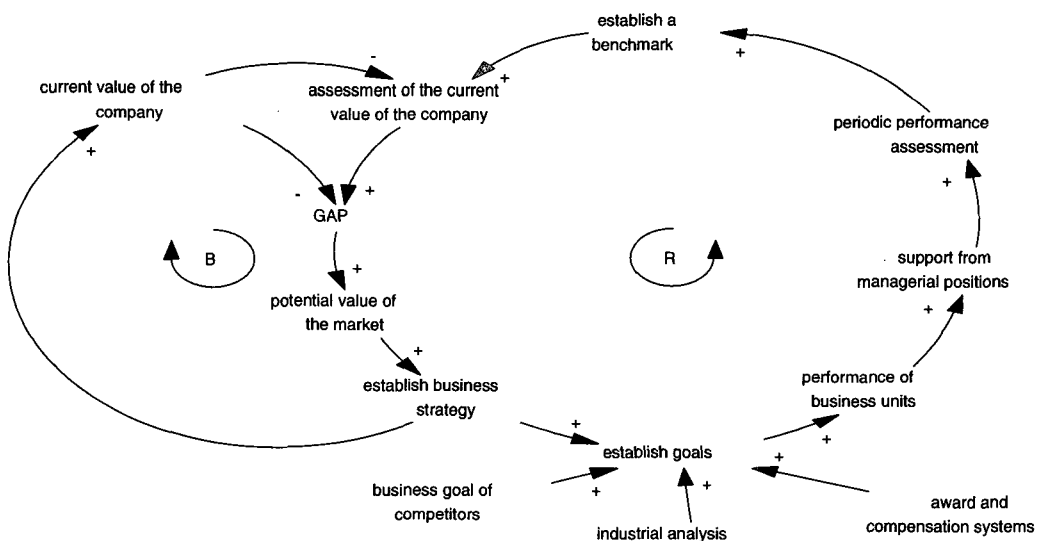
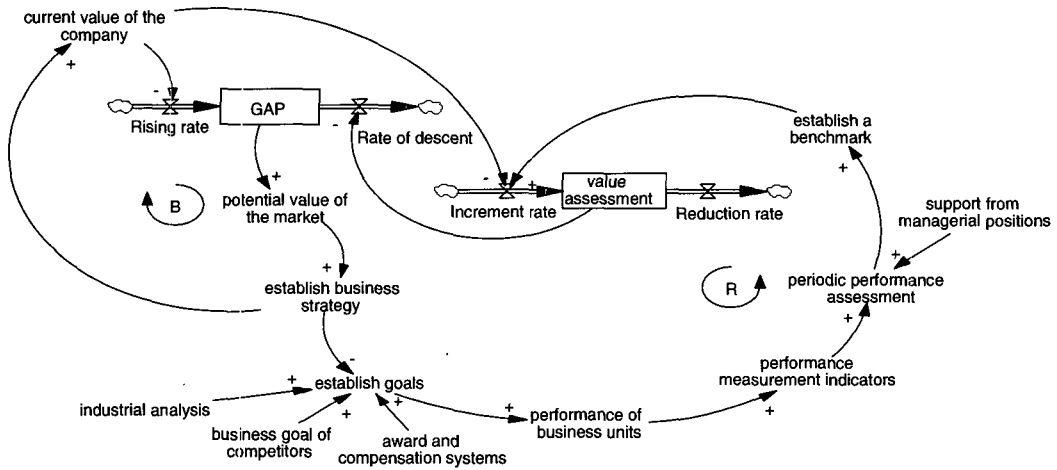**Figure 10.** Casual loop on performance management

Figure 11. System flow of performance management system

The system dynamics model of the discussed value creation process is established in this section. The system dynamics diagram of each value creation sub-system is established in sequence. And the above is the causal cycle diagram of major value creation sub-systems in this study. It aims at describing "business philosophy" as being the most important core objective of the company in the value creation activities. The company will undergo the relevant value creation process and activities according to these fixed objectives and criteria, to achieve the best performance. In devising a comprehensive "business philosophy," influencing factors in the external industry and environment can be understood through "investment portfolio management." Furthermore, it may be seen as the basis and reference for value exploration, which promotes a smoother company operation. In "design of organizational structure," the coordination mechanism of company strategies and managers is used to allocate and arrange the limited resources for internal use. It is expected to achieve the best internal organizational design, so that a better operational performance can be achieved in the "workflow management." Finally, in the activities of value creation, "performance management" is used to explore internal and external integration and coordination of the company, review and improve the company's performance, and further to implement effective workflow and factors through the value creation activities. It is expected to attain the best operational condition of the company, and to create the best shareholder's value for the achievement of the highest efficiency.

4.3 Empirical Analysis

This section is mainly to supplement the deficiencies in the literature validation of value creation with the Delphi expert questionnaire. It aims at exploring the assessment of relevant indices for value creation of SMEs nowadays. This study compiles the major index groups that affect value creation, organizes the assessment indices in local and foreign literature as

the relevant factors in the expert questionnaire. To ensure the expert questionnaire is precise and representative, the Delphi method is used to conduct two cyclical questionnaire surveys, to help finish the relevant research analysis. For the deficiencies of literature validation in the relevant perspective indices of value creation, Delphi method is used for verification. Design and analysis of the expert questionnaire are explored and studied below.

Table 11. Phase 1 expert questionnaire analysis

Perspectives	Items	Relevant assessment indices	Mean	S.D.
A Business philosophy	A1	Assessment indices → Value driving factors	4	0.66
	A2	Quantified goal → Shareholder's value	3.4	1.17
B Investment portfolio management	B1	Market-analyzed advantages → Strategic decision	4.4	0.69
	B2	Stock market → Strategic decision	3.4	0.51
	B3	External improvement and allocation → Growth opportunity	3.5	0.84
	B4	Growth opportunity → Financial forecast	3.8	0.78
C Organizational structure	C1	Company strategies → Organizational structure	3.6	1.34
	C2	External influencing factors → Resources allocation and planning	3.8	0.78
	C3	Organizational coordination mechanism → Forecast of future prospect	4	0.81
	C4	Forecast of future prospect → Assessment of company value	3.7	1.25
D Workflow management	D1	Brainstorming meeting → Prioritize driving factors	3.1	1.19
	D2	Prioritize driving factors → Institutionalization	3.3	0.67
	D3	Key performance index → Financial and operational index	3.6	1.34
	D4	Return rate of capital injection → Financial and operational index	3.4	0.96
	D5	Financial and operational index → Operational performance	3.6	0.69
	D6	Operational performance → Creation of shareholder's value	3.8	0.91
	D7	Creation of shareholder's value → Assessment of company value	3	1.24
E Performance management	E1	Market potential value → Draft business strategy	3.9	0.56
	E2	Competitors' goal → Goal setting	4.3	0.67
	E3	Cooperation of management positions → Regular performance audit	3.9	0.99
	E4	Regular performance audit → Benchmark setting	3.7	0.82

According to the relevant indices explored in Section 4.1 above, this study compiles the relevant indices in the expert questionnaire to explore the experts' recognition of the indicative causal relation in the value creation process, and conducts a two-phase cyclical questionnaire survey. According to the Delphi Method theory, when expert members of the Delphi team have high level of similarity and consensus, the ideal number of members is 15~30. Moreover, Likert's 5-point scale is used to analyze the expert questionnaire, and the importance of relevant assessment indices is analyzed by their respective mean. Expert members in this study are chosen from experienced industry experts of SMEs to conduct the questionnaire survey, from which the causal relation of the relevant indices of value creation is derived, and hence the value creation will be more precise and representative. Analysis of the expert questionnaire in this study is conducted with the statistics software of Excel.

Quantified data are input and filed. Mean and standard deviation are calculated by statistical method, and finally the experts' opinions are compiled and analyzed. This section focuses mainly on the discussion of the questionnaire according to the relevant perspectives and indices as validated against the literature in Section 2. Without the lack of validating indicators, the questionnaire survey is conducted. Table 11 below presents the analysis of the Phase 1 expert questionnaire in this study.

Table 12. Phase 2 expert questionnaire analysis

Perspectives	Items	Relevant assessment indices	Mean	S.D.
A Business philosophy	A1	Assessment indices → Value driving factors	4.2	0.6
	A2	Quantified goal → Shareholder's value	4	0.6
B Investment portfolio management	B1	Market-analyzed advantages → Strategic decision	4.4	0.69
	B2	Stock market → Strategic decision	4	0.66
	B3	External improvement and allocation → Growth opportunity	4	0.66
	B4	Growth opportunity → Financial forecast	4.1	0.87
C Organizational structure	C1	Company strategy → Organizational structure	4.2	0.91
	C2	External influencing factors → Resources allocation and planning	4.1	0.56
	C3	Organizational coordination mechanism → Forecast of future prospect	4	0.66
	C4	Forecast of future prospect → Assessment of company value	4.1	0.56
D Workflow management	D1	Brainstorming meeting → Prioritize driving factors	4	0.66
	D2	Prioritize driving factors → Institutionalization	4.1	0.56
	D3	Key performance index → Financial and operational index	4.1	0.73
	D4	Return rate of capital injection → Financial and operational index	4	0.66
	D5	Financial and operational index → Operational performance	4.1	0.56
	D6	Operational performance → Creation of shareholder's value	4.3	0.48
	D7	Creation of shareholder's value → Assessment of company value	4	0.66
E Performance management	E1	Market potential value → Draft business strategies	4.3	0.48
	E2	Competitors' goal → Goal setting	4.4	0.51
	E3	Cooperation of management positions → Regular performance audit	4.1	0.73
	E4	Regular performance audit → Benchmark setting	4	0.66

This study conducts expert questionnaire analysis based on the importance of the questionnaire, and scholars' recognition of the causal relation of relevant indices in the value process perspectives. This questionnaire takes the results as final only when the mean of the results of expert questionnaire analysis exceed 4. Results of the Phase 1 expert questionnaire show that all the means are above 3 in the overall analysis result, indicating an acceptable recognition of the causal relation of relevant indices of the value process perspectives. And the mean of the A1, B1, C3 and E2 relevant assessment indices is above 4, with standard deviation not exceeding 1. It shows that the experts' recognition of these four indices is rel-

atively consistent, and the recognition of other relevant indices is relatively less consistent. The Phase 2 expert questionnaire survey is then conducted. The Phase 2 expert questionnaire survey is conducted based on the analysis results of its first administration, and the analysis results of the first survey are incorporated into the questionnaire, for the experts' and scholars' reference. Table 12 below presents the Phase 2 analysis results of this study.

In the Phase 2 expert questionnaire survey of this study, results show that all means of the relevant indices are above 4, indicating an agreeable level of experts' recognition, and the standard deviations are all within 1, showing a relatively smaller difference in their recognition. Results of the second expert questionnaire show a more similar and consistent opinions among the experts. So, the part of relevant indices that lacks sufficient literature validation in this study is supplemented with the validating method of the expert questionnaire.

5. Conclusion and Suggestion

5.1 Conclusion

This study takes the example of SMEs to explore the value creation of enterprises. A research method of system dynamics perspective is used to understand the correlation of variables in the five major perspectives of the value creation process, namely "business philosophy," "investment portfolio management," "organizational design," "workflow management" and "performance management." Through this, system dynamic perspective cognition and model construction are conducted to provide another decision-making basis and reference for enterprises in their value creation. The following conclusions can be made from this study:

1. In the value creation process, the ultimate goal is to maximize shareholder's value. Creation of shareholder's value is the most important index to determine whether the goal is achieved, and hence to re-assess and improve the value process. This study makes literature review on relevant local and foreign studies, compiles and analyzes their approaches, and explores the value creation process in five major procedures. Therefore, the five major value procedures in this study are correlated and relevant. In the system dynamics perspective, the causal relation of each value creation procedure is validated against literature. And based on this causal relation, the system dynamics model is constructed, and hence another research and study method for enterprise value creation is provided.

2. Expert questionnaire and literature validation are used as research methods, to provide a comprehensive validation method in the value creation process.

3. In exploring the value creation perspectives; high relevancy is found among the perspectives of "business philosophy," "investment portfolio management," "organizational design," "workflow management" and "performance management."

The ability to create shareholder's value through these five value creation procedures lies in a high relevancy among these perspectives. A company's aspiration and goal are embedded in the business philosophy established at the very beginning, so that these relevant factors will support the operation of the following value creation procedures. The company's business philosophy provides information for the investors, and urges managers to perform well in investment portfolio management through this internal and external information. In this way, the company would encompass good conditions both internally and externally in the organizational design and workflow management stages, and then be capable to perform the final stage of performance management, and explore and understand its current status and improvement potential in the whole value process.

5.2 Contribution of the Study

1. Take system dynamics perspective as the research method for the process of enterprise value creation. Most past literature on enterprise evaluation focused on financial evaluation model to validate its evaluation process, and relatively few studies were conducted with the system dynamics perspective. This study employs the research steps of system dynamics to build the system dynamics model for enterprise evaluation. Enterprise evaluation is illustrated with system dynamics diagram and system flow diagram to show the relation of key variables in the value creation process, to explore the changes of their causal relation, and to find out the correlation of the factors of various perspectives and variables. A system dynamics approach is proposed for the observation of enterprise evaluation, which provides a reference for the industry and subsequent researchers.

2. Validate the causal relation of various perspectives and variables in the value creation process with a literature review approach. In the past studies, researchers only used literature validation to testify the causal relation of the perspectives and variables when constructing the system dynamics model. This study adopts literature review to validate the causal relation of the perspectives of enterprise evaluation, which is more representative. Current industrial scholars' opinions are explored, and verified against the opinions in the past literature. Through compilation and analysis of these opinions, a different decision-making reference is provided for the enterprise value creation process.

5.3 Future Studies and Suggestions

This is a qualitative study on the system dynamics of enterprises' value creation in a system dynamics approach. Because of the relation of various perspectives and variables, a qualitative research may be considered less objective. For the variables of enterprise evaluation, a quantitative research method is quite difficult and is subject to the problem and restriction of data collection. Nonetheless, a questionnaire is designed in this study with the

causal relation of various factors of value creation to obtain quantified data. This may provide a reference for future simulated experiment on system dynamics, so that qualitative and quantitative studies of system dynamics perspective will be more representative and become better references. In addition, it is expected that the industry, government, academics, advisory and consultancy sector will be the subject of future studies with the expert questionnaire. In designing the questionnaire, it is hoped that representative scholars from the theorist and practical fields can be invited to participate in the pilot test for the questionnaire design, so that a higher level of integrity will be achieved for the expert questionnaire. Hence, the expert questionnaire interview will be more precise and representative for research and academic purpose.

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